



City of Tualatin

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"NECESSARY PARTIES"
MARKED BELOW

NOTICE OF APPLICATION SUBMITTAL

- ANNEXATION CONDITIONAL USE PERMIT PLAN TEXT AMENDMENT
 ARCHITECTURAL REVIEW PLAN MAP AMENDMENT OTHER:

CASE/FILE: AR-16-0012 (Community Development Dept.: Planning Division)

PROPOSAL	The proposal includes the development of a 16,824 square foot industrial building. The concrete tilt-up building will be approximately 28 ft in height with accessory office space located on the second floor. Five loading bays are located on the rear of the building (north side). Tenants for the development are not yet known.
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PROPERTY	Name of Application	ITEL STREET INDUSTRIAL BUILDING		
	<input type="checkbox"/> n/a Street Address	Not yet assigned; approximately 11847 SW Itel Street		
	Tax Map and Lot No(s).	2S1 27B 01800		
	Planning District	General Manufacturing (MG)	Overlays <input type="checkbox"/>	NRPO <input checked="" type="checkbox"/> Flood Plain <input type="checkbox"/>
	Previous Applications	PAR-03-06	Additional Applications:	CIO ALL

DATES	Receipt of application	9/29/16	Deemed Complete	10/28/2016	CONTACT	Name: Erin Engman
	Notice of application submittal			10/31/16		Title: Assistant Planner
	Project Status / Development Review meeting			NA		E-mail: eengman@ci.tualatin.or.us
	Comments due for staff report			11/14/16		Phone: 503-691-3024
	Public meeting: <input type="checkbox"/> ARB <input type="checkbox"/> TPC <input checked="" type="checkbox"/> n/a					Notes: 61.020-080, 73.050, 73.095, 73.100, 73.160, 73.220, 73.227, 73.240-290, 73.340, 73.360-400
	City Council (CC)			<input checked="" type="checkbox"/> n/a		

*Paper Copies

City Staff

- City Manager
- Building Official
- Chief of Police
- City Attorney
- City Engineer
- Community Dev. Director
- Community Services Director
- Economic Dev. liaison
- Engineering Associate*
- Finance Director
- GIS technician(s)
- IS Manager
- Operations Director*
- Parks and Recreation Coordinator
- Planning Manager
- Street/Sewer Supervisor
- Water Supervisor

Neighboring Cities

- Durham
- King City Planning Commission
- Lake Oswego
- Rivergrove PC
- Sherwood Planning Dept.
- Tigard Community Dev. Dept.
- Wilsonville Planning Div.

Counties

- Clackamas County Dept. of Transportation and Dev.
- Washington County Dept. of Land Use and Transportation (AR's)
- Washington County LRP (Annexations)

Regional Government

- Metro

School Districts

- Lake Oswego School Dist. 7J
- Sherwood SD 88J
- Tigard-Tualatin SD 23J (TTSD)
- West Linn-Wilsonville SD 3J

State Agencies

- Oregon Dept. of Aviation
- Oregon Dept. of Land Conservation and Development (DLCD) (via proprietary notice)
- Oregon Dept. of State Lands: Wetlands Program
- Oregon Dept. of Transportation (ODOT) Region 1
- ODOT Maintenance Dist. 2A
- ODOT Rail Div.

Utilities

- Republic Services
- Clean Water Services (CWS)
- Comcast [cable]*
- Frontier Communications [phone]
- Northwest Natural [gas]
- Portland General Electric (PGE)
- TriMet
- Tualatin Valley Fire & Rescue (TVF&R)
- United States Postal Service (USPS) (Washington; 18850 SW Teton Ave)
- USPS (Clackamas)
- Washington County Consolidated Communications Agency (WCCCA)

Additional Parties

- Tualatin Citizen Involvement Organization (CIO)
- 1.032: Burden of Proof
- 31.071 Architectural Review Procedure
- 31.074 Architectural Review Application Review Process

- 31.077 Quasi-Judicial Evidentiary Hearing Procedures
- Metro Code 3.09.045 Annexation Review Criteria
- 32.030 Criteria for Review of Conditional Uses
- 33.020 Conditions for Granting a Variance that is not a Sign or a Wireless Communication Facility
- 33.022 Criteria for Granting a Sign Variance
- 33.024 Criteria for Granting a Minor Variance
- 33.025 Criteria for Granting a Variance
- 34.200 Tree Cutting on Private Property without Architectural Review, Subdivision or Partition Approval, or Tree Removal Permit Prohibited
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- 34.230 Criteria (tree removal)
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- 40.080 Setback Requirements for Conditional Uses (RL)
- 41.030 Conditional Uses Permitted (RML)
- 41.050 Lot Size for Conditional Uses (RML)
- 41.070 Setback Requirements for Conditional Uses (RML)
- 42.030 Conditional Uses Permitted (RMH)
- 42.050 Lot Size for Conditional Uses (RMH)
- 42.070 Setback Requirements for Conditional Uses (RMH)
- 43.030 Conditional Uses Permitted (RH)
- 43.060 Lot Size for Conditional Uses (RH)
- 43.090 Setback Requirements for Conditional Uses (RH)
- 44.030 Conditional Uses Permitted (RH-HR)
- 44.050 Lot Size for Conditional Uses (RH-HR)
- 44.070 Setback Requirements for Conditional Uses (RH-HR)
- 49.030 Conditional Uses (IN)
- 49.040 Lot Size for Permitted and Conditional Uses (IN)
- 49.060 Setback Requirements for Conditional Uses (IN)
- 50.020 Permitted Uses (CO)
- 50.030 Central Urban Renewal Plan – Additional Permitted Uses and Conditional Uses (CO)
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- 52.030 Conditional Uses (CR)
- 53.050 Conditional Uses (CC)
- 53.055 Central Urban Renewal Area – Conditional Uses (CC)
- 54.030 Conditional Uses (CG)
- 56.030 Conditional Uses (MC)
- 56.045 Lot Size for Conditional Uses (MC)
- 57.030 Conditional Uses (MUCOD)
- 60.040 Conditional Uses (ML)
- 60.041 Restrictions on Conditional Uses (ML)
- 61.030 Conditional Uses (MG)
- 61.031 Restrictions on Conditional Uses (MG)
- 62.030 Conditional Uses (MP)
- 62.031 Restrictions on Conditional Uses (MP)
- 64.030 Conditional Uses (MBP)
- 64.050 Lot Size for Permitted and Conditional Uses (MBP)
- 64.065 Setback Requirements for Conditional Uses (MBP)
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- 68.060 Demolition Criteria
- 68.070 Relocation Criteria
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- 73.160 Standards
- 73.190 Standards – Single-Family and Multi-Family Uses
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- 73.227 Standards
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- 73.300 Landscape Standards – Multi-Family Uses
- 73.310 Landscape Standards – Commercial, Industrial, Public and Semi-Public Uses
- 73.320 Off-Street Parking Lot Landscaping Standards
- 73.470 Standards
- 73.500 Standards



City of Tualatin

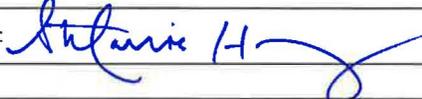
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APPLICATION FOR ARCHITECTURAL REVIEW

Direct Communication to:		
Name: Stefanie Slyman, AICP	Title: Senior Planner	
Company Name: Harper Houf Peterson Righellis Inc.		
Current address: 205 SE Spokane St. Ste 200		
City: Gladstone, PORTLAND	State: OR	ZIP Code: 97202
Phone: 503-221-1131	Fax:	Email: stefanies@hhpr.com
Applicant		
Name: Stefanie Slyman, AICP	Company Name: Harper Houf Peterson Righellis Inc.	
Address: 205 SE Spokane St. Ste 200		
City: Portland	State: OR	ZIP Code: 97202
Phone: 503-221-1131	Fax:	Email: StefanieS@hhpr.com
Applicant's Signature: <i>Stefanie Slyman</i>	Date: 9/27/16	
Property Owner		
Name: FHA & Associates attn: Farouk H. Al-Hadi, P.E., S.E.		
Address: 155 B Avenue, Suite 222		
City: Lake Oswego	State: OR	ZIP Code: 97034
Phone: 503-636-1203	Fax:	Email:
Property Owner's Signature: <i>Farouk H. Al-Hadi</i>	Date: Sep. 21, 2016	
(Note: Letter of authorization is required if not signed by owner)		
Architect		
Name: Steve Entenmann, PE, SE -- Harper Houf Peterson Righellis Inc.		
Address: 205 SE Spokane St. Ste 200		
City: Portland	State: OR	ZIP Code: 97202
Phone: 503-221-1131	Fax:	Email: SteveE@hhpr.com
Landscape Architect		
Name: Jeffrey Creel -- Harper Houf Peterson Righellis Inc.		
Address: 205 SE Spokane St. Ste 200		
City: Portland	State: OR	ZIP Code: 97202
Phone: 503-221-1131	Fax:	Email: JeffC@hhpr.com
Engineer		
Name: Tom Sisul, PE -- Sisul Engineering		
Address: 375 Portland Ave		
City: Gladstone	State: OR	ZIP Code: 97202
Phone: 503-657-0188	Fax:	Email: TomSisul@sisulengineering.com
Project		
Project Title: Tualatin Flex Building / Renamed to: <i>Itel Street Industrial Building</i>		
Address: 11847 SW ITEL Street (TLID 2S127BD01800)		
City: Tualatin	State: OR	ZIP Code: 97062
Brief Project Description: Construct 16,824 sf light-industrial, flex-space building		
Proposed Use: Light Manufacturing and Warehousing		

Value of Improvements: \$1.5M

AS THE PERSON RESPONSIBLE FOR THIS APPLICATION, I HEREBY ACKNOWLEDGE THAT I HAVE READ THIS APPLICATION AND STATE THAT THE INFORMATION ABOVE, ON THE FACT SHEET, AND THE SURROUNDING PERTY OWNER MAILING LIST IS CORRECT. I AGREE TO COMPLY WITH ALL APPLICABLE CITY AND COUNTY ORDINANCES AND STATE LAWS REGARDING BUILDING CONSTRUCTION AND LAND USE.

Applicant's Signature:  Date: 7/27/16

Office Use			
Case No:	Date Received:	Received by:	
Fee: Complete Review :	Receipt No:		
Application Complete as of:	ARB hearing date (if applicable):		
Posting Verification:	6 copies of drawings (folded)		
1 reproducible 8 1/2" X 11" vicinity map	1 reproducible 8 1/2" X 11" site, grading, LS, Public Facilities plan		
Neighborhood/Developer meeting materials			

GENERAL INFORMATION	
Site Address:	11847 SW ITEL ST.
Assessor's Map and Tax Lot #:	2S127BD01800
Planning District:	MG
Parcel Size:	1.66 AC
Property Owner:	FHA & ASSOCIATES
Applicant:	HARPER HOUF PETERSON RIGHELLIS INC.
Proposed Use:	LIGHT INDUSTRIAL FLEX SPACE BUILDING

ARCHITECTURAL REVIEW DETAILS	
Residential	<input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Industrial
Number of parking spaces:	39
Square footage of building(s):	16,824 sf
Square footage of landscaping:	11,684 sf
Square footage of paving:	21,884 sf
Proposed density (for residential):	N/A

For City Personnel to complete:

Staff contact person:

CITY OF TUALATIN FACT SHEET

General

Proposed use: LIGHT INDUSTRIAL FLEX SPACE BUILDING			
Site area:	1.66 acres	Building footprint:	16,824 sq. ft.
Development area:	1.08 acres	Paved area:	21,884 sq. ft.
	47,120 Sq. ft.	Development area coverage:	82 %

Parking

Spaces required (see TDC 73.400) (example: warehouse @ 0.3/1000 GFA) INDUSTRIAL BLEND @ 1.63 /1000 GFA = 27 RATIO @ _____ /1000 GFA = _____ _____ @ _____ /1000 GFA = _____ Total parking required: 27 spaces Handicapped accessible = 2 Van pool = 2 Compact = (max. 35% allowed) = 0 Loading berths = 1	Spaces provided: Total parking provided: 39 spaces Standard = 35 Handicapped accessible = 2 Van pool = 2 Compact = 0 Loading berths = 5
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Bicycles

Covered spaces required: <input checked="" type="checkbox"/>	Covered spaces provided: <input checked="" type="checkbox"/> (2 UNCOVERED PROVIDED)
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Landscaping

Landscaping required: 15 % of dvpt. area 10,873 Square feet	Landscaping provided: 16.1 % of dvpt. area 11,684 Square feet
Landscaped parking island area required: 975 sq. ft.	Landscaped parking island area provided: 1286 sq. ft.

Trash and recycling facility

Minimum standard method: 101 square feet	required; 200 sq. ft. provided
Other method:	square feet

For commercial/industrial projects only

Total building area:	16,824 sq. ft.	2 nd floor:	sq. ft.
Main floor:	13,824 sq. ft.	3 rd floor:	sq. ft.
Mezzanine:	3,000 sq. ft.	4 th floor:	sq. ft.

For residential projects only

Number of buildings:	Total sq. ft. of buildings:	sq. ft.
Building stories:		



Water supply modeling is necessary for larger projects to determine the impact of the project's water demand on the water supply system. Water supply modeling will be performed by a consulting engineer based on the most recent version of the Tualatin Water System Master Plan.

Due to possible impacts to the water supply system, the following projects in Tualatin require hydraulic modeling based on the size and type of the project and projected water use for the finished project. The outcome of modeling could require offsite improvements to the water supply system in order to ensure that adequate water supply is available to serve the project and reduce impacts to the overall system.

Hydraulic modeling of the water supply system is required for the following project type/sizes/demand:

Project Type	Criteria	Permit Fee
Commercial or Industrial Building	Building floor area greater than 48,300 square feet or Anticipated daily water demand greater than 870 gallons per acre per day	\$ 300 per building
Residential development	More than 49 dwelling units	\$ 1,000
Multi-family development	More than 49 dwelling units or a combined building floor area greater than 48,300 square feet	\$ 300 per building

Please complete this form and submit the form and required fee (if applicable) with your land-use application (architectural review, subdivision, etc.).

Commercial or Industrial Development

- Building floor area _____ square feet
- Anticipated water demand (if known) _____ gallons per day
- Described planned building use _____

Residential Development

- Number of dwelling units or single family home lots _____

Multi-Family Residential Development

- Number of dwelling units _____
- Building floor area (sum of all building) _____
- Number of multi-family buildings _____

Permit fee required based on the information provided above \$ N/A per Tony Doran

- If no fee is required, enter \$0.

NOTE: Water Supply Modeling does not replace the requirement for fire hydrant flow testing. Flow testing of fire hydrants will still be required to verify adequate fire flow of finished system

ARCHITECTURAL REVIEW APPLICATION FOR ITEL STREET INDUSTRIAL BUILDING

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- 2. Narrative and Findings**
 - Project Summary and Photos pp. 1-3
 - Architectural/Site Design Findings pp. 4 – 34
 - Public Facilities Findings pp. 35 – 42
- 3. Tax Map**
- 4. Partition Plat No. 2004-017**
- 5. Neighborhood Meeting Information**
- 6. CWS Service Provider Letter**
- 7. Stormwater Report**
- 8. Reduced Size Plan Sheets**
 - 1.1 Cover Sheet
 - C1 Existing Conditions
 - C2 Site Plan
 - C3 Utility Plan
 - C4 Grading Plan
 - L1 Planting Plan
 - L2 Planting Details
 - 1.2 Street Lighting Plan and Cut Sheets
 - 3.1 Elevations
 - 3.2 Elevations
- 9. Republic Services Solid Waste Letter**
- 10. Traffic Study**

ARCHITECTURAL REVIEW APPLICATION FOR ITEL STREET INDUSTRIAL BUILDING

(Previously known as "Tualatin Flex Building")

I. PROJECT SUMMARY AND PROPOSAL

Tax Lot ID: 2S127BD01800

Address. 11847 SW Itel Street

Size: 1.66 ac

Zoning. **General Manufacturing (MG)** The site is located in the MG planning district the purpose of which is to provide areas of the City that are suitable for light industrial uses and also for a wide range of heavier manufacturing and processing activities. The proposed industrial building is a permitted use in this zone.

Existing Conditions. This undeveloped 1.66 ac-site fronts SW Itel Street and is Parcel 2 of Partition Plat 2004-017. (Provided in Tab 4 of binder.) The site takes access from SW Itel Street via two private access easements on the east and west sides of the site and is fully-served with water, sanitary sewer, stormwater, power, and street lighting.

The site is generally flat and does not contain natural resources. There are no mature trees within the development envelope for this proposal which is that undeveloped area located between the existing driveways. To the east of the property, east of the driveway and outside of the development limits of the project, the site is in a natural state with trees and vegetation. The southwest corner of the parcel west of the western driveway is landscaped.

Proposed Development. The proposal is to develop a 16,825 sf flex-space, light-industrial building. The building will be approximately 28' in height, with 13,824 sf on the ground floor and 3,000 sf of accessory office space located on the second floor. Five (5) loading bays are located on the north side of the building and 39 surface parking spaces are located on the west, south, and east sides of the site. Proposed building construction type is concrete tilt up.

Tenants for the development are not yet known, but will fall within allowed light-industrial uses including manufacturing, warehousing, and wholesale establishment. Up to 3,000 sf (18%) of the floor area will be accessory office space associated with light-industrial use tenants.

Surrounding Uses. Surrounding uses include Tualatin Indoor Soccer to the west, La-Z Boy Furniture Warehouse and Overstock Flooring Depot to the north, Western Precision Products to the south of SW Itel Street, and Tract "I" of Partition Plat No. 2002-066 to the east which appears to be a vegetated buffer that will remain undeveloped.

Required Meetings Prior to AR Submittal. A scoping/pre-application conference was held on August 1, 2016 (SC16-0030). A Neighborhood/Developer meeting was held on September 12, 2016 which was noticed and conducted per City requirements (Neighborhood meeting documentation provided in Tab 5 of binder).

II. SITE PHOTOS



Looking north into site from SW Ite Street with adjacent industrial use in rear and undeveloped/natural area to the east.



Looking east/northeast at eastern driveway and adjacent undeveloped/natural area.



Looking north into site at western driveway and adjacent uses.



Looking east along site frontage on SW Istel Street and existing sidewalk, planting strip and street trees.



Looking west from SW corner of site at western driveway and adjacent Tualatin Indoor Soccer.



Adjacent industrial development on south side of SW Istel Street.

III. ARCHITECTURAL/SITE DESIGN FINDINGS

Chapter 61: General Manufacturing Planning District

Section 61.020 Permitted Uses

No building, structure or land shall be used, except for the following uses as restricted in TDC 61.021.

(1) All uses permitted by TDC 60.020 in the Light Manufacturing Planning District.

Response: The future proposed uses associated with this development are manufacturing and warehousing; these uses are allowed in the MG district. While future tenants have not been identified, it is known that the development will serve warehousing and manufacturing uses. This standard is met.

Section 61.050 Lot Size

Except for lots for public utility facilities, natural gas pumping stations and wireless communication facility which shall be established through the Subdivision, Partition or Lot Line Adjustment process, the following requirements shall apply:

(1) The minimum lot area shall be 20,000 square feet.

(2) The minimum lot width shall be 100 feet.

(3) The minimum average lot width at the building line shall be 100 feet.

(4) The minimum lot width at the street shall be 100 feet.

(5) For flag lots, the minimum lot width at the street shall be sufficient to comply with at least the minimum access requirements contained in TDC 73.400(8) to (12).

(6) The minimum lot width at the street shall be 50 feet on a cul-de-sac street

Response: As shown on the attached plans (see sheet C1), the lot meets the current dimensional standards for the MG zone. The site that has been previously subdivided and approved consistent with City standards. This standard is met.

Section 61.060 Setback Requirements

(1) *Front yard. The minimum setback is 30 feet. When the front yard is across the street from a residential or Manufacturing Park (MP) district, a front yard setback of 50 feet is required. When a fish and wildlife habitat area is placed in a Tract and dedicated to the City at the City's option, dedicated in a manner approved by the City to a non-profit conservation organization or is retained in private ownership by the developer, the minimum setback is 10 – 30 feet, as determined in the Architectural Review process, with the exception of front yards across the street from a residential or MP District, provided the buildings are located farther away from fish and wildlife habitat areas.*

Response: This proposal is for an Architectural Review. Front yard setbacks will be determined by this process. This standard is met.

(2) *Side yard. The minimum setback is 0 to 50 feet, as determined through the Architectural Review process. When the side yard is adjacent to a property line or across the street from a residential or Manufacturing Park (MP) District, a side yard setback of 50 feet is required.*

Response: This proposal is for an Architectural Review. Side yard setbacks will be determined by this process. This standard is met.

(3) Rear yard. The minimum setback is 0 to 50 feet, as determined through the Architectural Review process. When the rear yard is adjacent to a property line or across the street from a residential or Manufacturing Park (MP) District, a rear yard setback of 50 feet is required.

Response: This proposal is for an Architectural Review. Rear yard setbacks will be determined by this process. This standard is met.

(4) Corner lot yards. The minimum set-back is the maximum setback prescribed for each yard for a sufficient distance from the street intersections and driveways to provide adequate sight distance for vehicular and pedestrian traffic at intersections and driveways, as determined through the Architectural Review process.

Response: This proposed development is not located on a corner lot. This standard does not apply.

(5) The minimum parking and circulation area setback is 5 feet, except when a yard is adjacent to public streets or Residential or Manufacturing Park District, the minimum setback is 10 feet. No setback is required from lot lines within ingress and egress areas shared by abutting properties in accordance with TDC 73.400(2).

Response: As shown in the attached plan sheets C2, the minimum proposed parking and circulation area setback is at least 5 feet adjacent to other lots, except where a shared access tract exists and 10' adjacent to a public street. The site does not abut a residential or manufacturing park district. This standard is met.

(6) No spur rail trackage shall be permitted within 200 feet of an adjacent residential district.

Response: The proposed development does not include rail spur trackage. This standard does not apply.

(7) No setbacks are required at points where side or rear property lines abut a rail-road right-of-way or spur track.

Response: The property lines do not abut a rail right-of-way or spur track. This standard does not apply.

(8) No fence shall be constructed within 10 feet of a public right-of-way.

Response: No fences are proposed in the proposed development. This standard does not apply.

(9) Setbacks for a wireless communication facility shall be established through the Architectural Review process, shall consider TDC 73.510, shall be a minimum of 5 feet, and shall be set back from an RL District, or an RML District with an approved small lot subdivision, no less than 175 feet for a monopole that is no more than 35 feet in height and the setback shall increase five feet for each one foot increase in height up to 80 feet in height, and the setback shall increase 10 feet for each one foot increase in height above 80 feet.

Response: The proposed development does not include a wireless communication facility. This standard does not apply.

**Chapter 73: Community Design Standards
Architectural Review Approval**

Section 73.050 Criteria and Standards

(1) In exercising or performing his or her powers, duties, or functions, the Planning Director shall determine whether there is compliance with the following:

- (a) The proposed site development, including the site plan, architecture, landscaping, parking and graphic design, is in conformance with the standards of this and other applicable City ordinances insofar as the location, height, and appearance of the proposed development are involved;*
- (b) The proposed design of the development is compatible with the design of other developments in the general vicinity; and*
- (c) The location, design, size, color and materials of the exterior of all structures are compatible with the proposed development and appropriate to the design character of other developments in the vicinity.*

Response: The proposed development is consistent with the surrounding industrial development all zoned MG and similarly developed. The development will be compatible with future surrounding industrial properties. As shown below and on the enclosed plans, the proposed development meets the applicable standards of the City of Tualatin Development Code. This standard is met.

(2) In making his or her determination of compliance with the above requirements, the Planning Director shall be guided by the objectives and standards set forth in this chapter. If the architectural review plan includes utility facilities or public utility facilities, then the City Engineer shall determine whether those aspects of the proposed plan comply with applicable standards.

Response: This application includes architectural features as well as utility facilities and public improvements. This standard is met.

(3) In determining compliance with the requirements set forth, the Planning Director shall consider the effect of his or her action on the availability and cost of needed housing...

Response: The proposed development does not include housing. This standard does not apply.

(4) As part of Architectural Review, the property owner may apply for approval to cut trees in addition to those allowed in TDC 34.200. The granting or denial of a tree cutting permit shall be based on the criteria in TDC 34.230.

Response: No trees are proposed to be removed and no tree cutting permit is proposed at this time. This standard does not apply.

(5) Conflicting Standards. In addition to the MUCOD requirements, the requirements in TDC Chapter 73 (Community Design Standards) and other applicable Chapters apply...

Response: The subject site is not within the MUCOD. This standard does not apply.

Design Standards

Section 73.150 Objectives

All commercial, industrial, public and semi-public projects should strive to meet the following objectives to the maximum extent practicable. Architects and developers should consider these elements in designing new projects. In the Central Design District, the Design Guidelines of TDC 73.610 shall be considered. In the case of conflicts between objectives, the proposal shall provide a desirable balance between the objectives. Site elements shall be placed and designed, to the maximum extent practicable, to:

(1) Provide convenient walkways and crosswalks which separate pedestrians from vehicles and link primary building entries to parking areas, other on-site buildings and the public right-of-way.

Response: As shown on the Site Plan, Sheet C2, the proposed building has a five-foot walkway on the east and west sides of the building and a seven-foot walkway on the south side of the building which serves the main building entrance. The north side of the building is dedicated to vehicular loading therefore, sidewalks are not appropriate in this location. Two walkways link the existing public sidewalk to the building and surrounding sidewalk, one of which is an ADA route. This objective is met.

(2) Avoid barriers to disabled individuals.

Response: As shown on the attached Site Plan, Sheet C1, and Grading Plan, Sheet C4, plans, barriers to disabled individuals will be avoided and ADA and local codes will be met to provide adequate facilities. This objective is met.

(3) Locate and design drive-through facilities in a manner which does not conflict with pedestrian routes or other vehicular circulation and minimizes adverse impacts on adjacent properties.

Response: The proposed development does not include drive-through facilities. This objective does not apply.

(4) Break up parking areas with landscaping (trees, shrubs and walkways) and buildings to lessen the overall impact of large paved areas.

Response: As shown on the attached Site Plan, Sheet C2, and Landscape Plan, Sheet L1, parking areas will be broken up by landscaping and walkways. This objective is met.

(5) Utilize landscaping in parking areas to direct and control vehicular movement patterns, screen headlights from adjacent properties and streets, and lessen the visual dominance of pavement coverage.

Response: As shown on the Site Plan, Sheet C2, and Landscape Plan, Sheet L1, landscaped islands are located on the interior of the parking areas and perimeter landscaping is provided on the SW Itel Street parking lot frontage to lessen the dominance of pavement coverage. Larger landscape islands frame the two accesses to the site and the main parking lot on the south side of the building. Landscape islands located on the ends of parking rows bracket the parking areas to identify the limits of visitor and employee parking areas.

(6) Provide vehicular connections to adjoining sites.

Response: The site includes two access easements located on the east and west sides of the site which provide shared vehicular access to adjacent sites. This objective is met.

(7) Emphasize entry drives into commercial complexes and industrial park developments with special design features, such as landscaped medians, water features and sculptures.

Response: As shown on Landscape Plans, Sheets L1 and L2, landscaping islands are located at the accesses to the site and entry into the main parking lot. This objective is met.

(8) Locate, within parking lots, pedestrian amenities and/or landscaping in areas which are not used for vehicle maneuvering and parking.

Response: As shown on Landscape Plans, Sheets L1 and L2, landscape islands are located throughout the parking areas. This objective is met.

(9) Encourage outdoor seating areas which provide shade during summer and sun during winter, trash receptacles and other features for pedestrian use. Plantings with a variety of textures and color are encouraged.

Response: This proposal is for industrial development, and pedestrian lingering areas are not suitable. However, as shown in the attached Landscape Plans, Sheets L1 and L2, plantings with a variety of textures will be included. This objective is met as much as practical.

(10) Create opportunities for, or areas of, visual and aesthetic interest for occupants and visitors to the site.

Response: This proposal is for industrial development, and no areas for pedestrian are proposed. This objective does not apply.

(11) Conserve, protect and restore fish and wildlife habitat areas, and maintain or create visual and physical corridors to adjacent fish and wildlife habitat areas.

Response: There are no fish or wildlife habitat areas on the site. Views of the adjacent wetland and buffer tract and associated vegetation will be retained to the extent practicable given development of the site. This objective is met.

(12) Provide safe pathways for pedestrians to move from parking areas to building entrances.

Response: As shown on the attached Site Plan, Sheet C1, the vast majority of parking spaces directly access a five-foot and seven-foot walkway that fronts the east, west, and south facades of the building. Parking spaces fronting SW Iteel Street are separated from the building entrances by a single drive aisle, minimizing the distance pedestrians cross to reach the building. Additionally, as there is only one access into the parking lot, there is no through traffic for pedestrians to negotiate.

(13) Design the location of buildings and the orientation of building entrances for commercial, public and semi-public uses such as churches, schools and hospitals to provide adequate pedestrian circulation between buildings and to provide preferential access for pedestrians to existing or planned transit stops and transit stations.

Response: The proposed development does not include commercial, public, or semi-public uses. This objective does not apply.

(14) Provide accessways between commercial, public and semi-public development and publicly-owned land intended for general public use; arterial and collector streets where a transit stop and/or a bike lane is provided or designated; and abutting residential, commercial and semipublic property.

Response: The proposed development does not include commercial, public, or semi-public uses. This objective does not apply.

(15) Provide accessways between industrial development and abutting greenways where a bikeway or pedestrian path is provided or designated.

Response: No bikeway or pedestrian path is provided or designated between the subject site and an abutting greenway. This objective does not apply.

(16) Accessways should be designed and located in a manner which does not restrict or inhibit opportunities for developers of adjacent properties to connect with an accessway, and provide continuity from property to property for pedestrians and bicyclists to use the accessway.

Response: No accessways are proposed. This objective does not apply.

(17) Provide preferential parking for carpool and vanpools to encourage employees to participate in carpools and vanpools.

Response: As shown on the Site Plan, Sheet C2, two vanpool/carpool parking spaces are located adjacent to the building on its southeast corner. This objective is met.

(18) Screen elements such as mechanical and electrical equipment, above ground sewer or water pump stations, pressure reading stations and water reservoirs from view.

Response: As shown on the Elevations, mechanical and electrical equipment is screened from view. This objective is met.

(19) Parking structure exteriors and underground parking should be designed to be harmonious with surrounding buildings and architecturally compatible with the treatment of buildings they serve.

Response: The proposed development does not include any parking structures or underground parking. This objective does not apply.

(20) When a fish and wildlife habitat area abuts or is on the subject property the applicant and decision authority for a development application should consider locating buildings farther away from the fish and wildlife habitat area.

Response: There is no fish or wildlife habitat area on site. A wetland and buffer tract is located east of the site, which is further separated from the proposed development by an existing driveway and natural landscaping. This objective is met.

Section 73.160 Standards

(1) Pedestrian and Bicycle Circulation:

(b) For Industrial Uses:

(i) a walkway shall be provided from the main building entrance to sidewalks in the public right-of-way and other on-site buildings and accessways. The walkway shall be a minimum of 5 feet wide and constructed of concrete, asphalt, or a pervious surface such as pavers or grasscrete, but not gravel or woody material, and be ADA compliant, if applicable.

Response: A concrete walkway of five-feet and seven-feet in width connect the building's main entrances to SW Itel Street. Two routes are provided, one of which is ADA compliant.

(ii) Walkways through parking areas, drive aisles and loading areas shall have a different appearance than the adjacent paved vehicular areas.

Response: No walkways are proposed in vehicular areas as parking spaces have direct access to the walkway surrounding the building or are separated by a single drive aisle which does not necessitate a demarcated appearance.

(iii) Accessways shall be provided as a connection between the development's walkway and bikeway circulation system and an adjacent bike lane;

Response: SW Itel Street does not have a bike lane. This standard does not apply.

(iv) Accessways may be gated for security purposes;

Response: Gated accessways are not proposed.

(v) Outdoor Recreation Access Routes shall be provided between the development's walkway and bikeway circulation system and parks, bikeways and greenways where a bike or pedestrian path is designated.

Response: There is no designated bike or pedestrian path adjacent to the subject site. This standard does not apply.

(c) Curb ramps shall be provided wherever a walkway or accessway crosses a curb.

Response: No walkways cross a curb. This standard does not apply.

(d) Accessways shall be a minimum of 8 feet wide and constructed in accordance with the Public Works Construction Code if they are public accessways, and if they are private accessways they shall be constructed of asphalt, concrete or a pervious surface such as pervious asphalt or concrete, pavers or grasscrete, but not gravel or woody material, and be ADA compliant, if applicable.

Response: No public accessways are proposed. This standard does not apply.

(e) Accessways to undeveloped parcels or undeveloped transit facilities need not be constructed at the time the subject property is developed. In such cases the applicant for development of a parcel adjacent to an undeveloped parcel shall enter into a written agreement with the City guaranteeing future performance by the applicant and any successors in interest of the property being developed to construct an accessway when the adjacent undeveloped parcel is developed. The agreement shall be subject to the City's review and approval.

Response: No accessways to undeveloped parcels or transit facilities are required or proposed.

This standard does not apply.

(f) Where a bridge or culvert would be necessary to span a designated greenway or wetland to provide a connection to a bike or pedestrian path, the City may limit the number and location of accessways to reduce the impact on the greenway or wetland.

Response: There are no wetlands on the site. This standard does not apply.

(g) Accessways shall be constructed, owned and maintained by the property owner.

Response: No accessways are required or proposed. This standard does not apply.

(2) Drive-up Uses

Response: The use proposed does not include a drive-up facility. This section does not apply.

(3) Safety and Security

(a) Locate windows and provide lighting in a manner which enables tenants, employees and police to watch over pedestrian, parking and loading areas.

Response: As shown on the Elevations and the Lighting Plan windows and lighting are provided to enable visibility over pedestrian, parking, and loading areas. This standard is met.

(b) In commercial, public and semi-public development and where possible in industrial development, locate windows and provide lighting in a manner which enables surveillance of interior activity from the public right-of-way.

Response: As shown on the Elevations, windows are provided on the south side of the building facing the public right of way and lighting is provided on this front façade to provide a reasonable amount of visibility as an industrial development. This standard is met.

(c) Locate, orient and select on-site lighting to facilitate surveillance of on-site activities from the public right-of-way without shining into public rights-of-way or fish and wildlife habitat areas.

Response: As shown on the Lighting Plan, site lighting will illuminate the buildings, loading areas, and parking areas, without shining into the public right-of-way or fish and wildlife habitat areas. This standard is met.

(d) Provide an identification system which clearly locates buildings and their entries for patrons and emergency services.

Response: As shown on the Elevations, the building address will be clearly visible for building users and from the adjacent rights-of-way. This standard is met.

(e) Shrubs in parking areas must not exceed 30 inches in height. Tree canopies must not extend below 8 feet measured from grade.

Response: As shown on the Landscape Sheets L1 and L2, shrubs will not exceed 30 inches in height and tree canopies will not extend below 8 feet measured from grade at the time of planting. This standard is met.

(f) Above ground sewer or water pumping stations, pressure reading stations, water reservoirs, electrical substations, and above ground natural gas pumping stations shall provide a minimum 6' tall security fence or wall.

Response: The proposed development does not include any of these elements and none are anticipated for future tenants. This standard does not apply.

(4) Service, Delivery and Screening

(a) On and above grade electrical and mechanical equipment such as transformers, heat pumps and air conditioners shall be screened with sight obscuring fences, walls or landscaping.

Response: Future tenant requirements for on- and above-grade electrical and mechanical equipment, will be screened with sight obscuring fences, walls or landscaping. This standard can be met with a condition of approval.

(b) Outdoor storage, excluding mixed solid waste and source separated recyclables storage areas listed under TDC 73.227, shall be screened with a sight obscuring fence, wall, berm or dense evergreen landscaping.

Response: The proposed development does not include any outdoor storage except trash and recycling enclosures. This standard does not apply.

(c) Above ground pumping stations, pressure reading stations, water reservoirs; electrical substations, and above ground natural gas pumping stations shall be screened with sightobscuring fences or walls and landscaping.

Response: The proposed development does not include any of these elements. This standard does not apply.

(5) The Federal Americans with Disabilities Act (ADA) applies to development in the City of Tualatin. Although TDC, Chapter 73 does not include the Oregon Structural Specialty Code's (OSSC) accessibility standards as requirements to be reviewed during the Architectural Review process, compliance with the OSSC is a requirement at the Building Permit step. It is strongly recommended all materials submitted for Architectural Review show compliance with the OSSC.

Response: The site plan and building are generated with the knowledge that ADA and OSSC standards must be met during the building permit process. This standard is met.

(6) (a) All industrial, institutional, retail and office development on a transit street designated in TDC Chapter 11 (Figure 11-5) shall provide either a transit stop pad on-site, or an on-site or public sidewalk connection to a transit stop along the subject property's frontage on the transit street.

Response: SW Itel is not a designated transit street. This standard does not apply.

(b) In addition to (a) above, new retail, office and institutional uses abutting major transit stops as designated in TDC Chapter 11 (Figure 11-5) shall...

Response: The site is for industrial uses and does not abut a major transit stop shown in the figure. This standard does not apply.

Section 73.210 Objectives

All commercial, industrial, public and semi-public projects should strive to meet the following objectives to the maximum extent practicable. Architects and developers should consider these elements in designing new projects. In the Central Design District, the Design Guidelines of TDC 73.610 shall be considered. In case of conflicts between objectives, the proposal shall provide a desirable balance between the objectives. Buildings shall be designed, to the maximum extent practicable, to:

(1) Minimize disruption of natural site features such as topography, trees and water features.

Response: The site has been previously subdivided and mass graded. There are no natural features such as water features or trees within the development envelope for the proposed industrial building and associate site improvements. This objective is met.

(2) Provide a composition of building elements which is cohesive and responds to use needs, site context, land form, a sense of place and identity, safety, accessibility and climatic factors. Utilize functional building elements such as arcades, awnings, entries, windows, doors, lighting, reveals, accent features and roof forms, whenever possible, to accomplish these objectives.

Response: As shown on the Elevations and the perspective shown on the Cover Sheet, the building makes use of a cohesive color palette, awnings, windows, and building entries that contribute to a sense of place and identity, safety, and accessibility. This objective is met.

(3) Where possible, locate loading and service areas so that impacts upon surrounding areas are minimized. In industrial development loading docks should be oriented inward to face other buildings or other loading docks. In commercial areas loading docks should face outward towards the public right-of-way or perimeter of the site or both.

Response: As shown in the attached plans, the loading areas will be located along the north side of the building, away from SW Iteel Street. This objective is met.

(4) Enhance energy efficiency in commercial and industrial development through the use of landscape and architectural elements such as arcades, sunscreens, lattice, trellises, roof overhangs and window orientation.

Response: Energy efficiency is enhanced through the use of awnings, high efficiency windows, and landscape trees planted throughout the parking lot and adjacent to the building. This objective is met.

(5) Locate and design entries and loading/service areas in consideration of climatic conditions such as prevailing winds, sun and driving rains.

Response: The site layout and building design reflect the most efficient site design practicable given the asymmetrical shape of the site, existing driveway locations, and loading needs associated with an industrial use. This objective is met to the degree practicable.

(6) Give consideration to organization, design and placement of windows as viewed on each elevation having windows. Surveillance over parking areas from the inside, as well as visual surveillance from the outside in, should be considered in window placement.

Response: As shown in the attached Elevations, in order to create a safe environment, windows are located at ground level and the upper level of the public-facing façade. Given the industrial use of the building windows are impractical on all facades. This objective is met to the degree practicable.

(7) Select building materials which contribute to the project's identity, form and function, as well as to the surrounding environment.

Response: The industrial building material is tilt-up concrete which is comparable to and compatible with surrounding uses. This objective is met.

(8) Select colors in consideration of lighting conditions and the context under which the structure is viewed, the ability of the material to absorb, reflect or transmit light and the color's functional role (e.g., to identify and attract business, aesthetic reasons, image-building).

Response: Colors, shown on the building perspective on Sheet 1.1 and called out on the Elevation sheets, are suitable for this industrial use and compatible with surrounding uses. This objective is met.

(9) Where possible, locate windows and provide lighting in a manner which enables tenants, employees and police to watch over pedestrian, parking and loading areas.

Response: As shown on the Elevations (Sheets 3.1 and 3.2), windows are provided on the public side of the building fronting SW Iteel Street and large openable loading doors are located on the north side of the building. As shown on the Site Lighting Plan (Sheet 1.2) lighting is provided around the site perimeter to provide lighting over pedestrian, parking, and loading areas. This objective is met.

(10) Where practicable locate windows and provide lighting in a manner which enables surveillance of interior activity from the public right-of-way or other public areas.

Response: As shown on the Elevations, windows are provided on the public side of the building on SW Iteel Street and lighting located around the site to provide a reasonable amount of visibility for an industrial development from the public right of way and other public areas. This objective is met.

Section 73.220 Standards

(1) Safety and Security

(a) Locate, orient and select on-site lighting to facilitate surveillance of on-site activities from the public right-of-way or other public areas without shining into public rights-of-way or fish and wildlife habitat areas.

Response: As shown on the Lighting Plan, on-site lighting will not shine onto public rights-of-way or fish and habitat areas. This standard is met.

(b) Provide an identification system which clearly identifies and locates buildings and their entries.

Response: As shown on the Elevations, the building addresses and entries are clearly identifiable on the SW Iteel Street frontage. This standard is met.

(c) Shrubs in parking areas shall not exceed 30 inches in height, and tree canopies must not extend below 8 feet measured from grade, ...

Response: As shown on the Landscape plans, shrubs will not exceed 30 inches in height and tree canopies will not extend below 8 feet measured from grade at the time of planting. This standard is met.

Garbage and Recycling

Section 73.226 Objectives

All new or expanded multi-family, including townhouses, commercial, industrial, public and semi-public projects should strive to meet the following objectives to the maximum extent practicable. Architects and developers should consider these elements in designing new projects. In the Central Design District, the Design Guidelines of TDC 73.610 shall be considered. In the case of conflicts between objectives, the proposal shall provide a desirable balance between the objectives. Townhouses may necessitate a different balancing than multi-family developments such as apartments. Mixed solid waste and source separated recyclable storage areas shall be designed to the maximum extent practicable, to:

(1) Screen elements such as garbage and recycling containers from view.

Response: The garbage and recycling enclosure is located to the rear of the site outside of view from the public right of way. It will be screened from view by a six-foot tall cyclone fence with privacy slats. This objective is met.

(2) Ensure storage areas are centrally located and easy to use.

Response: The garbage and recycling area as centrally as practicable given the industrial use, active loading area, and hauler access requirements. This objective is met.

(3) Meet dimensional and access requirements for haulers.

Response: As demonstrated in the attached letter and signed site plan from Republic Services the garbage and recycling area dimensions and access meet hauler requirements. This standard is met.

(4) Designed to mitigate the visual impacts of storage areas.

Response: The garbage and recycling enclosure is located to the rear of the site outside of view from the public right of way. It will be screened from view by a six-foot tall cyclone fence with privacy slats. This objective is met.

(5) Provide adequate storage for mixed solid waste and source separated recyclables.

Response: Adequate storage is provided per the Minimum Standards method. This objective is met.

(6) Improve the efficiency of collection of mixed solid waste and source separated recyclables.

Response: The proposed storage area meets all City requirements which are designed to improve efficiency. This objective is met.

Section 73.227 Standards

(1) The mixed solid waste and source separated recyclables storage standards shall apply to all new or expanded multi-family residential developments containing five or more units and to new or expanded commercial, industrial, public and semi-public development.

Response: The project is a new industrial development. These standards apply and are addressed below. The applicant chose to implement the minimum standards method to demonstrate compliance.

(2) Minimum Standards Method.

(a) The size and location of the storage area(s) shall be indicated on the site plan. Compliance with the requirements set forth below are reviewed through the Architectural Review process.

(i) The storage area requirement is based on the area encompassed by predominant use(s) of the building (e.g., residential, office, retail, wholesale/warehouse/manufacturing, educational/institutional or other) as well as the area encompassed by other distinct uses. If a building has more than one use and that use occupies 20 percent or less of the gross leasable area (GLA) of the building, the GLA occupied by that use shall be counted toward the floor area of the predominant use(s). If a building has more than one use and that use occupies more than 20 percent of the GLA of the building, then the storage area requirement for the whole building shall be the sum of the area of each use.

Response: The proposed development is 16,824 sf of light industrial which falls within the category of Wholesale/Warehouse/Manufacturing. Per the Minimum Standards Method, the minimum required amount of storage area is 101 sf. The proposed area is 200 sf, which exceeds this minimum. This standard is met.

(ii) Storage areas for multiple uses on a single site may be combined and shared.

Response: One combined, shared storage area for the tenants of the industrial building is proposed as allowed. This standard is met.

(iii) The specific requirements are based on an assumed storage area height of 4 feet for mixed solid waste and source separated recyclables. Vertical storage higher than 4 feet, but no higher than 7 feet may be used to accommodate the same volume of storage in a reduced floor space (potential reduction of 43 percent of specific requirements). Where vertical or stacked storage is proposed, submitted plans shall include drawings to illustrate the layout of the storage area and dimensions for containers.

Response: No stacked or vertical storage is proposed. This standard does not apply.

(iv) Multi-family residential developments containing 5-10 units shall provide a minimum storage area of 50 square feet. Multi-family residential developments containing more than 10 units shall provide 50 square feet plus an additional 5 square feet per unit for each unit above 10.

Response: The project does not include any multi-family residential development. This standard does not apply.

(v) Commercial, industrial, public and semi-public developments shall provide a minimum storage area of 10 square feet plus: Office - 4 square feet/1000 square feet gross leasable area (GLA); Retail - 10 square feet/1000 square feet GLA; Wholesale/ Warehouse/ Manufacturing - 6 square feet/1000 square feet GLA; Educational and institutional - 4 square feet/1000 square feet GLA; and other – 4 square feet/1000 square feet GLA.

Response: The proposed development is 16,824 sf of light industrial which falls within the category of Wholesale/Warehouse/Manufacturing. The minimum required amount of storage area is 101 sf. The proposed area is 200 sf, which exceeds this minimum. This standard is met.

(6) Location, Design and Access Standards for Storage Areas.

(a) Location Standards

(i) To encourage its use, the storage area for source separated recyclables may be co-located with the storage area for mixed solid waste.

Response: As shown in the attached plans the trash enclosure area will include space for recyclables as well as trash. This standard is met.

(ii) Indoor and outdoor storage areas shall comply with Building and Fire Code requirements.

Response: As shown in the attached plans trash enclosure areas will comply with Building and Fire Code requirements and will be constructed entirely of non-combustible materials. This standard is met.

(iii) Storage area space requirements can be satisfied with a single location or multiple locations, and can combine both interior and exterior locations.

Response: As shown in the attached plans and described above, one exterior location is proposed. This standard is met.

(iv) Exterior storage areas shall not be located within a required front yard setback or in a yard adjacent to a public or private street.

Response: As shown in the attached plans all trash enclosure area is not located in a front yard setback or adjacent to a public or private street. This standard is met.

(v) Exterior storage areas shall be located in central and visible locations on the site to enhance security for users.

Response: As shown in the attached plans the trash enclosure area is located in the northwest corner of the site and is visible from the building. This standard is met.

(vi) Exterior storage areas can be located in a parking area, if the proposed use provides parking spaces required through the Architectural Review process. Storage areas shall be appropriately screened according to TDC 73.227(6)(b)(iii).

Response: As shown in the attached plans, the trash enclosure is screened by a 6'-tall cyclone fence with privacy slats per the requirements of TDC 73.227(6)(b)(iii). This standard is met.

(vii) Storage areas shall be accessible for collection vehicles and located so that the storage area will not obstruct pedestrian or vehicle traffic movement on site or on public streets adjacent to the site.

Response: As shown in the attached plans, the storage area is located outside the flow of pedestrian and vehicular traffic movement on site and adjacent public streets. This standard is met.

(b) Design Standards

(i) The dimensions of the storage area shall accommodate containers consistent with current methods of local collection at the time of Architectural Review approval.

Response: As shown on the attached plans and discussed in this narrative, all trash enclosures meet the size requirements of the City and hauler, Republic Services. The proposed development will meet the Minimum Standards method for trash storage, as discussed in this narrative's response to Section 73.227.(2)(A). This standard is met.

(ii) Storage containers shall meet Fire Code standards and be made and covered with water proof materials or situated in a covered area.

Response: Storage containers will be provided by Republic Services and will be standard trash and recyclable storage receptacles, made of and covered with waterproof metal and/or plastic. This standard is met.

(iii) Exterior storage areas shall be enclosed by a sight obscuring fence or wall at least 6 feet in height. In multi-family, commercial, public and semi-public developments evergreen plants shall be placed around the enclosure walls, excluding the gate or entrance openings. Gate openings for haulers shall be a minimum of 10 feet wide and shall be capable of being secured in a closed and open position. A separate pedestrian access shall also be provided in multi-family, commercial, public and semi-public developments.

Response: As shown on the attached plans, trash/recycling areas will be screened by sight-obscuring fencing with a 20'-wide gate opening that is capable of being secured in a closed and open position. As an industrial development, a separate pedestrian access is not required. This standard is met.

(iv) Exterior storage areas shall have either a concrete or asphalt floor surface.

Response: The trash enclosure will have an asphalt floor surface. This standard is met.

(v) Storage areas and containers shall be clearly labeled to indicate the type of material accepted.

Response: Storage containers will be provided by Republic Services and will be standard trash and recyclable storage receptacles, clearly labeled. This standard is met.

(c) Access Standards

(i) Access to storage areas can be limited for security reasons. However, the storage areas shall be accessible to users at convenient times of the day, and to hauler personnel on the day and approximate time they are scheduled to provide hauler service.

Response: In accordance with Republic Services standards, trash enclosures will have gates that open by up to 180 degrees. Gates can be latched when closed, but storage areas will be accessible to haulers and pedestrians through gates. This standard is met.

(ii) Storage areas shall be designed to be easily accessible to hauler trucks and equipment, considering paving, grade, gate clearance and vehicle access. A minimum of 10 feet horizontal clearance and 8 feet vertical clearance is required if the storage area is covered.

Response: As shown on the attached plans (see sheet C2), the trash enclosure area will be placed to the rear of the lot within the loading and maneuvering areas and will provide easy access and maneuverability for the solid waste hauler. Trash enclosure will not be covered. This standard is met.

(iii) Storage areas shall be accessible to collection vehicles without requiring backing out of a driveway onto a public street. If only a single access point is available to the storage area, adequate turning radius shall be provided to allow vehicles to safely exit the site in a forward motion.

Response: Collection vehicles will access the storage area via a private driveway and loading area with ample maneuvering room. Vehicles will be able to exit the site in a forward motion. This standard is met.

Section 73.240 Landscaping General Provisions

(3) The minimum area requirement for landscaping for uses in CO, CR, CC, CG, ML and MG Planning Districts shall be fifteen (15) percent of the total land area to be developed, except within the Core Area Parking District, where the minimum area requirement for landscaping shall be 10 percent. When a dedication is granted in accordance with the planning district provisions on the subject property for a fish and wildlife habitat area, the minimum area requirement for landscaping may be reduced by 2.5 percent from the minimum area requirement as determined through the AR process.

Response: As shown on Plan Sheet L1, 11,684 sf of landscaped area is proposed for the 72,489 sf site, achieving 16.1% landscaping. This percentage exceeds the minimum landscaping requirement of 15%. This standard is met.

(11) Any required landscaped area shall be designed, constructed, installed, and maintained so that within three years the ground shall be covered by living grass or other plant materials. (The foliage crown of trees shall not be used to meet this requirement.) A maximum of 10% of the landscaped area may be covered with un-vegetated areas of bark chips, rock or stone. Disturbed soils are encouraged to be amended to an original or higher level of porosity to regain infiltration and stormwater storage capacity.

Response: All landscaped areas will be covered with living plant materials, including trees, shrubs, and groundcover. Bark mulch will cover ground in the landscaped areas between plantings, suppressing weeds and retaining moisture. There are no disturbed soils on the site that need to be amended. This standard is met or does not apply.

(13) Landscape plans for required landscaped areas that include fences should carefully integrate any fencing into the plan to guide wild animals toward animal crossings under, over, or around transportation corridors.

Response: No new fences are proposed for the project. This standard does not apply.

Section 73.250 Tree Preservation

(1) Trees and other plant materials to be retained shall be identified on the landscape plan and grading plan.

Response: Trees and other landscape materials to be retained are identified on the landscape plan and are shown on the grading plan outside the grading limits. This standard is met.

(2) During the construction process:

(a) The owner or the owner's agents shall provide above and below ground protection for existing trees and plant materials identified to remain.

(b) Trees and plant materials identified for preservation shall be protected by chain link or other sturdy fencing placed around the tree at the drip line.

(c) If it is necessary to fence within the drip line, such fencing shall be specified by a qualified arborist as defined in TDC 31.060.

(d) Neither top soil storage nor construction material storage shall be located within the drip line of trees designated to be preserved.

(e) Where site conditions make necessary a grading, building, paving, trenching, boring, digging, or other similar encroachment upon a preserved tree's drip-line area, such grading, paving, trenching, boring, digging, or similar encroachment shall only be permitted under the direction of a qualified arborist. Such direction must assure that the health needs of trees within the preserved area can be met.

(f) Tree root ends shall not remain exposed.

Response: The existing trees on site to be preserved are outside of the development limits and will be separated from construction activities by the existing driveways. Street trees are protected by the existing public sidewalk. As applicable, the above standards will be followed during construction and as noted for Tree Protection on Landscape Sheet L2 . This standard is met.

(3) Landscaping under preserved trees shall be compatible with the retention and health of said tree.

Response: The existing landscaping under trees will remain. This standard does not apply.

(4) When it is necessary for a preserved tree to be removed in accordance with TDC 34.210 the landscaped area surrounding the tree or trees shall be maintained and replanted with trees that relate to the present landscape plan, or if there is no landscape plan, then trees that are complementary with existing, nearby landscape materials. Native trees are encouraged.

Response: No trees are proposed for removal. This standard does not apply.

(5) Pruning for retained deciduous shade trees shall be in accordance with National Arborist Association "Pruning Standards For Shade Trees," revised 1979.

Response: Pruning will be in accordance with the pruning standards for shade trees. This standard has been met.

(6) Except for impervious surface areas, one hundred percent (100%) of the area preserved under any tree or group of trees retained in the landscape plan (as approved through the Architectural Review process) shall apply directly to the percentage of landscaping required for a development.

Response: The landscape plans included with this submittal include the existing landscaping for determining the amount of landscaping provided. This standard is met.

Section 73.260 Tree and Plant Specifications

(1) The following specifications are minimum standards for trees and plants:

(a) Deciduous Trees:

Deciduous shade and ornamental trees shall be a minimum one and one-half inch (1 1/2") caliper measured six inches (6") above ground, balled and burlapped. Bare root trees will be acceptable to plant during their dormant season. Trees shall be characteristically shaped specimens.

(b) Coniferous Trees.

Coniferous trees shall be a minimum five feet (5') in height above ground, balled and burlapped. Bare root trees will be acceptable to plant during their dormant season. Trees shall be well branched and characteristically shaped specimens.

(c) Evergreen and Deciduous Shrubs.

Evergreen and deciduous shrubs shall be at least one (1) to five (5) gallon size. Shrubs shall be characteristically branched. Side of shrub with best foliage shall be oriented to public view.

(d) Groundcovers.

Groundcovers shall be fully rooted and shall be well branched or leafed. English ivy (Hedera helix) is considered a high maintenance material which is detrimental to other landscape materials and buildings and is therefore prohibited.

(e) Lawns.

Lawns shall consist of grasses, including sod, or seeds of acceptable mix within the local landscape industry. Lawns shall be 100 percent coverage and weed free.

Response: As shown in the attached landscape plans (see L Sheets in plan set), the proposed development includes a variety of appropriate landscaping elements including deciduous trees, coniferous trees, evergreen and deciduous shrubs, and groundcovers. No lawns are proposed. As described on the landscape plans, the proposed tree, shrub, and groundcover varieties will meet the dimensional standards and care described above. These standards are met.

(2) Landscaping shall be installed in accordance with the provisions of Sunset New Western Garden Book (latest edition), Lane Publishing Company, Menlo Park, California or the American Nurserymen Association Standards (latest edition).

Response: Landscaping will be installed in accordance with the *Sunset New Western Garden Book* standards and has been designed by a professional landscape architect. This standard is met.

(3) The following guidelines are suggested to ensure the longevity and continued vigor of plant materials:

(a) Select and site permanent landscape materials in such a manner as to produce a hardy and drought-resistant landscaped area.

(b) Consider soil type and depth, spacing, exposure to sun and wind, slope and contours of the site, building walls and overhangs, and compatibility with existing native vegetation preserved on the site or in the vicinity.

Response: Hardy, drought-resistant plants, appropriate to the proposed development and region, have been selected. The project contractor will test and amend the soil as needed. These guidelines are addressed.

(4) All trees and plant materials shall be healthy, disease-free, damage-free, well-branched stock, characteristic of the species.

Response: All plant materials will be new and healthy. This standard is met.

(5) All plant growth in landscaped areas of developments shall be controlled by pruning, trimming or otherwise so that:

- (a) It will not interfere with designated pedestrian or vehicular access; and*
- (b) It will not constitute a traffic hazard because of reduced visibility.*

Response: The selected plant materials are appropriate for the proposed development and climate and will not interfere with visibility or movement. In clear vision areas, no trees will exist within the 30" to 8' clear area. Responsibility for maintenance of landscaping is accepted by the property owner. This standard is met.

Section 73.270 Grading

(1) After completion of site grading, top-soil is to be restored to exposed cut and fill areas to provide a suitable base for seeding and planting.

Response: Topsoil will be stockpiled during excavation to be used for backfill of landscape areas. Additionally, amendments will be added to the topsoil at that time. This standard is met.

(2) All planting areas shall be graded to provide positive drainage.

Response: All planting areas will be graded to provide positive drainage or an area drain basin will be installed to provide such. This standard is met.

(3) Neither soil, water, plant materials nor mulching materials shall be allowed to wash across roadways or walkways.

Response: All soil, plant, and mulching materials will be contained in landscape areas and surrounded by curbing, and will not cross roadways or walkways. Water on the proposed development's impervious areas will drain directly to storm drains.

(4) Impervious surface drainage shall be directed away from pedestrian walkways, dwelling units, buildings, outdoor private and shared areas and landscape areas except where the landscape area is a water quality facility.

Response: As shown on the attached grading plan, drainage on impervious surfaces will be directed to proposed storm drain systems. Impervious areas will not drain across walkways or landscape areas. This standard is met.

Section 73.280 Irrigation System Required

Except for townhouse lots, landscaped areas shall be irrigated with an automatic underground or drip irrigation system.

Response: As shown on Landscape Plan Sheet L1, a note has been added to this sheet indicating the landscaped areas are to be irrigated. This standard is met.

Section 73.290 Re-vegetation in Un-landscaped Areas

The purpose of this section is to ensure erosion protection, and in appropriate areas to encourage soil amendment, for those areas not included within the landscape percentage requirements so native plants will be established, and trees will not be lost.

(1) Where vegetation has been removed or damaged in areas not affected by the landscaping requirements and that are not to be occupied by structures or other improvements, vegetation shall be replanted.

Response: The proposed project will not remove landscaping in areas not affected by the landscaping requirements or where structures or other improvements will be constructed. This standard does not apply.

(2) Plant materials shall be watered at intervals sufficient to ensure survival and growth for a minimum of two growing seasons.

Response: No replanted vegetation is proposed as part of this AR application. This standard does not apply.

(3) The use of native plant materials is encouraged to reduce irrigation and maintenance demands.

Response: No replanted vegetation is proposed as part of this AR application. This standard does not apply.

(4) Disturbed soils should be amended to an original or higher level of porosity to regain infiltration and stormwater storage capacity.

Response: There are no disturbed soils on the site that need to be amended. This standard does not apply.

Section 73.310 Landscape Standards – Commercial, Industrial, Public and Semi-Public Uses

(1) A minimum 5'-wide landscaped area must be located along all building perimeters which are viewable by the general public from parking lots or the public right-of-way, excluding loading areas, bicycle parking areas and pedestrian egress/ingress locations...

Response: As shown on the attached plans (see Plan Sheets C2 and L1) a minimum 5' wide landscaped area will be constructed around all building perimeters facing the right-of-way and parking lots. This standard is met.

(2) Areas exclusively for pedestrian use that are developed with pavers, bricks, etc., and contain pedestrian amenities, such as benches, tables with umbrellas, children's play areas, shade trees, canopies, etc., may be included as part of the site landscape area requirement.

Response: The provided walkways will be exclusively for pedestrian use, and will contain amenities such as shade trees. These are included in the landscape area requirement. This standard is understood.

(3) All areas not occupied by buildings, parking spaces, driveways, drive aisles, pedestrian areas or undisturbed natural areas shall be landscaped.

Response: As shown on Landscape Plan Sheet L1, all areas not identified above are proposed to be landscaped with a variety of materials. This standard is met.

Off-Street Parking Lot Landscaping

Section 73.320 Off-Street Parking Lot Landscaping Standards

(2) Application. Off-street parking lot landscaping standards shall apply to any surface vehicle parking or circulation area.

Response: As shown on Landscape Plan Sheet L1, all vehicle parking and circulation areas will be landscaped to off-street parking lot landscaping standards and meet the above goals. This standard is met.

Section 73.340 Off-Street Parking Lot and Loading Area Landscaping - Commercial, Industrial, Public and Semi-Public Uses, and Residential and Mixed Use Residential Uses within the Central Design District

(1) A clear zone shall be provided for the driver at ends of on-site drive aisles and at driveway entrances, vertically between a maximum of 30 inches and a minimum of 8 feet as measured from the ground level,

Response: As shown in the attached landscape plans (see L Sheets in plan set), landscaping in the parking areas will meet these standards. No trees will be planted in the vision clearance area, and shrub species in vision clearance areas of the parking area will be no higher than 30". This standard is met.

(2) Perimeter site landscaping of at least 5 feet in width shall be provided in all off-street parking and vehicular circulation areas (including loading areas). For conditional uses in multifamily residential planning districts the landscape width shall be at least 10 feet except for uses allowed by TDC 40.030(3), 40.030(5)(j), 40.030(5)(m), 40.030(5)(n) and 41.030(2).

Response: As shown in the attached Landscape Plan Sheet L1, perimeter landscape areas are provided on the SW Istel Street frontage and on the east side of the site adjacent to the wetland/buffer tract. The parking lot will further be buffered from view by a three-foot landscape wall set between the perimeter landscaping and parking lot. This standard is met.

(a) The landscape area shall contain:

(i) Deciduous trees an average of not more than 30 feet on center. The trees shall meet the requirements of TDC 73.360(7).

(ii) Plantings which reach a mature height of 30 inches in three years which provide screening of vehicular headlights year round.

(iii) Shrubs or ground cover, planted so as to achieve 90 percent coverage within three years.

(iv) Native trees and shrubs are encouraged.

Response: As shown on the landscape plans, landscape areas will contain a mix of all of the above plantings. Deciduous trees will be planted in every landscape island. Shrubs (of a variety that will reach a mature height of 30" or more in three years) and ground cover will be spaced appropriately to achieve at least 90% coverage within three years. Plantings will include a

mixture of native and drought-tolerant appropriate plants to achieve biodiversity and longevity. This standard is met.

(b) Where off-street parking areas on separate lots are adjacent to one another and are connected by vehicular access, the landscaped strips required in subsection (2) of this section are not required.

Response: The off-street parking area on the west side of the site is adjacent to a separate lot connected by vehicular access, therefore no landscape strip is required or proposed in this area. This standard is met.

Section 73.360 Off-Street Parking Lot Landscape Islands - Commercial, Industrial, Public, and Semi-Public Uses

(1) A minimum of 25 square feet per parking stall shall be improved with landscape island areas which are protected from vehicles by curbs. These landscape areas shall be dispersed throughout the parking area [see 73.380(3)]. Landscape square footage requirements shall not apply to parking structures and underground parking.

Response: As shown on the attached plans (see Plan Sheets C2 and L1), 39 parking spaces are proposed; therefore, 975 sf of landscape island areas are required. This standard is met through landscape islands located every eight or fewer parking spaces, as well as through the landscaped areas at the ends of parking bays. The proposed plan provides for 1,286sf of landscape island areas parking lot as shown on Landscape Sheet L1 which exceeds this minimum. This standard is met.

(2) All landscaped island areas with trees shall be a minimum of 5 feet in width (60 inches from inside of curb to curb) and protected with curbing from surface runoff and damage by vehicles. Landscaped areas shall contain groundcover or shrubs and deciduous shade trees.

Response: As shown in the attached plans, all areas considered toward the landscape island area requirement are a minimum of 5' in width; all provide ample room for the proposed trees and plantings. As shown in the attached landscape plans (see L Sheets), all landscape island areas will be covered with trees, shrubs, and groundcover. This standard is met.

(3) Provide a minimum of one deciduous shade tree for every four (4) parking spaces to lessen the adverse impacts of glare from paved surfaces and to emphasize circulation patterns...

Response: For the 39 parking spaces proposed, 10 deciduous shade trees are required. As shown on the landscape plan, 10 trees will be planted within the parking area landscaping. This standard is met.

(4) Landscaped islands shall be utilized at aisle ends to protect parked vehicles from moving vehicles and emphasize vehicular circulation patterns. ...

Response: As shown on the attached plans, typical landscape islands are proposed spaced every eight or fewer parking spaces, as well as through landscaped areas at the ends of parking bays. This standard is met.

(5) Required landscaped areas shall be planted so as to achieve 90 percent coverage within three years.

Response: As shown on the Landscape Plans, Shrubs and ground cover will be spaced appropriately to achieve at least 90% coverage within three years. This standard is met.

Section 73.370 Off-Street Parking and Loading

(2) Off-Street Parking Provisions.

(a) The following are the minimum and maximum requirements for off-street motor vehicle parking in the City...

USE	MINIMUM MOTOR VEHICLE PARKING REQUIREMENT	MAXIMUM MOTOR VEHICLE PARKING REQUIREMENT	BICYCLE PARKING REQUIREMENT	PERCENTAGE OF BICYCLE PARKING TO BE COVERED
<u>Industrial</u>				
(i) Manufacturing	1.60 spaces per 1,000 sq. ft. of gross floor area	None	2, or 0.10 spaces per 1,000 gross sq. ft., whichever is greater	First 5 spaces or 30%, whichever is greater
(ii) Warehousing	0.30 spaces per 1,000 sq. ft. of gross floor area	Zone A: 0.4 spaces per 1,000 sq. ft. gross floor area Zone B: 0.5 spaces per 1,000 sq. ft. gross floor area	2, or 0.10 spaces per 1,000 gross sq. ft., whichever is greater	First 5 spaces or 30%, whichever is greater
(iii) Wholesale establishment	3.00 spaces per 1,000 sq. ft. of gross floor area	None	2, or 0.50 spaces per 1,000 gross sq. ft., whichever is greater	First 5 spaces or 30%, whichever is greater

Response: Tenants for the proposed light industrial use are not yet known and may be one of the three industrial categories noted in the industrial parking calculation table. Therefore, a blended rate of these three industrial parking ratios has been calculated of 1.63 spaces/1,000 sf and applied to the building, resulting in a minimum requirement of 27 spaces. Note that up to 3,000 sf in the building is accessory to the light industrial uses therefore it is calculated as light industrial, not as office use. Proposed parking is 39 spaces which exceeds minimum parking for an industrial use. This standard is met.

(3) Off-Street Vanpool and Carpool Parking Provisions.

The minimum number of off-street Vanpool and Carpool parking for commercial, institutional and industrial uses is as follows:

Number of Required Parking Spaces	Number of Vanpool or Carpool Spaces
0 to 10	1
10 to 25	2
26 and greater	1 for each 25 spaces

Response: Two carpool/vanpool stalls are required for the 39 parking space provided and two are proposed.

73.380 Off-Street Parking Lots

(1) Off-street parking lot design shall comply with the dimensional standards set forth in Figure 73-1 of this section....

Response: The proposed parking spaces comply with dimensions noted in Figure 73-1.

(2) Parking stalls for sub-compact vehicles shall not exceed 35 percent of the total parking stalls required by TDC 73.370(2).

Response: No compact stalls are proposed. This standard is met.

(3) Off-street parking stalls shall not exceed eight continuous spaces in a row without a landscape separation...

Response: No more than 8 continuous parking space are proposed in a row. This standard is met.

(4) Areas used for standing or maneuvering of vehicles shall have paved asphalt or concrete surfaces maintained adequately for all-weather use and so drained as to avoid the flow of water across sidewalks.

Response: As shown in the attached grading and utility plans drainage will be hard surfaced and drain away from sidewalk areas. This standard is met.

(5) Except for parking to serve residential uses, parking areas adjacent to or within residential planning districts or adjacent to residential uses shall be designed to minimize disturbance of residents.

Response: The site does not abut any residential uses. This standard does not apply.

(6) Artificial lighting, which may be provided, shall be deflected to not shine or create glare in a residential planning district, an adjacent dwelling, street right-of-way in such a manner as to impair the use of such way or a Natural Resource Protection Overlay District, Other Natural Areas identified in Figure 3-4 of the Parks and Recreation Master Plan, or a Clean Water Services Vegetated Corridor.

Response: The project site does not abut residential uses. Site lighting is designed to not impair drivers along the abutting streets. As shown on the attached lighting plan foot-candle

levels will be low at the edges of parking and drive areas abutting the property line and right-of-way. This standard is met.

(8) Service drives to off-street parking areas shall be designed and constructed to facilitate the flow of traffic, provide maximum safety of traffic access and egress, and maximum safety for pedestrians and vehicular traffic on the site.

Response: Off-street parking takes access from two existing private driveways which meet the dimensional standards for access and egress. This standard is met.

(9) Parking bumpers or wheel stops or curbing shall be provided to prevent cars from encroaching on the street right-of-way, adjacent landscaped areas, or adjacent pedestrian walkways.

Response: Curbing will be used to prevent cars from encroaching on landscape areas, pedestrian walkways, and the west side of the loading area. This standard is met.

(10) Disability parking spaces and accessibility shall be provided in accordance with applicable federal and state requirements.

Response: Two ADA stalls will be provided in accordance with ADA requirements, one of which will be a van accessible stall.

(11) On-site drive aisles without parking spaces, which provide access to parking areas with regular spaces or with a mix of regular and sub-compact spaces, shall have a minimum width of 22 feet for two-way traffic and 12 feet for one-way traffic. On-site drive aisles without parking spaces, which provide access to parking areas with only sub-compact spaces, shall have a minimum width of 20 feet for two-way traffic and 12 feet for one-way traffic.

Response: All drive aisles will be at least 24 feet wide. This standard is met.

Section 73.390 Off-Street Loading Facilities

(1) The minimum number of off-street loading berths for commercial, industrial, public and semipublic uses is as follows:

Square Feet of Floor Area	Number of Berths
Less than 5,000	0
5,000 - 25,000	1
25,000 - 60,000	2
60,000 and over	3

Response: Six loading berths are provided, which exceeds the minimum of one berth provided for the 16,284 sf building. This standard is met.

(2) Loading berths shall conform to the following minimum size specifications.

(a) Commercial, public and semi-public uses of 5,000 to 25,000 square feet shall be 12' x 25' and uses greater than 25,000 shall be 12' x 35'

(b) Industrial uses - 12' x 60'

(c) Berths shall have an unobstructed height of 14'

(d) Loading berths shall not use the public right-of-way as part of the required off-street loading area.

Response: Five (5) loading berths will be provided on the north side of the building. All will be at least 12' wide by 60' long and have an unobstructed height of at least 14'. Public rights-of-way will not be a part of the off-street loading area. This standard is met.

(3) Required loading areas shall be screened from public view from public streets and adjacent properties by means of sight-obscuring landscaping, walls or other means, as approved through the Architectural Review process.

Response: The loading area is located to the rear of the site out of view of public streets, but adjacent to shared access driveways that serve properties to the west and north where no screening is required or proposed. This standard is met.

(4) Required loading facilities shall be installed prior to final building inspection and shall be permanently maintained as a condition of use.

Response: This standard is accepted as a condition of use. This standard is met.

(5) A driveway designed for continuous forward flow of passenger vehicles for the purpose of loading and unloading children shall be located on the site of a school or child day care center having a capacity greater than 25 students.

Response: The proposed development does not include a school or day care. This standard does not apply.

(6) The off-street loading facilities shall in all cases be on the same lot or parcel as the structure they are intended to serve. In no case shall the required off-street loading spaces be part of the area used to satisfy the off-street parking requirements.

Response: The off-street loading spaces are not part of the off-street parking areas. This standard is met.

(7) Subject to Architectural Review approval, the Community Development Director may allow the standards in this Section to be relaxed within the Central Design District...

Response: The property is not located within the Central Design District. No adjustments to the loading standards are requested. This standard does not apply.

Section 73.400 Access

(1) The provision and maintenance of vehicular and pedestrian ingress and egress from private property to the public streets as stipulated in this Code are continuing requirements for the use of any structure or parcel of real property in the City of Tualatin. Access management and spacing standards are provided in this section of the TDC and TDC Chapter 75. No building or other permit shall be issued until scale plans are presented that show how the ingress and egress requirement is to be fulfilled. If the owner or occupant of a lot or building changes the use to which the lot or building is put, thereby increasing ingress and egress requirements, it shall be unlawful and a violation of this code to begin or maintain such altered use until the required increase in ingress and egress is provided.

Response: The provision and maintenance of vehicular and pedestrian accesses on the site will be maintained throughout construction. This standard is understood and is met.

(2) Owners of two or more uses, structures, or parcels of land may agree to utilize jointly the same ingress and egress when the combined ingress and egress of both uses, structures, or parcels of land satisfies their combined requirements as designated in this code; provided that satisfactory legal evidence is presented to the City Attorney in the form of deeds, easements, leases or contracts to establish joint use. Copies of said deeds, easements, leases or contracts shall be placed on permanent file with the City Recorder.

Response: Previous partition platting, see Partition Plat No. 2004-017 submitted with this application, has created shared access and ingress and egress easements across this parcel and adjoining parcels. Existing easements and deed restrictions already exist from previous platting requirements. This standard is met.

(3) Joint and Cross Access.

(a) Adjacent commercial uses may be required to provide cross access drive and pedestrian access to allow circulation between sites.

Response: Private access easements between this parcel and adjacent parcels were platted with Partition Plat 2004-017 to provide cross access and circulation. No change to access is proposed. This standard does not apply.

(b) A system of joint use driveways and cross access easements may be required and may incorporate the following:

(i) a continuous service drive or cross access corridor extending the entire length of each block served to provide for driveway separation consistent with the access management classification system and standards.

(ii) a design speed of 10 mph and a maximum width of 24 feet to accommodate two-way travel aisles designated to accommodate automobiles, service vehicles, and loading vehicles; (iii) stub-outs and other design features to make it visually obvious that the abutting properties may be tied in to provide cross access via a service drive;

(iv) a unified access and circulation system plan for coordinated or shared parking areas.

Response: Existing joint use driveways and cross access easements already exist on the site and adjoining parcel via earlier partitioning requirements as shown in Partition Plat No. 2004-017. This standard is met.

(c) Pursuant to this section, property owners may be required to:

(i) Record an easement with the deed allowing cross access to and from other properties served by the joint use driveways and cross access or service drive;

(ii) Record an agreement with the deed that remaining access rights along the roadway will be dedicated to the city and pre-existing driveways will be closed and eliminated after construction of the joint-use driveway;

(iii) Record a joint maintenance agreement with the deed defining maintenance responsibilities of property owners;

(iv) If (i-iii) above involve access to the state highway system or county road system, ODOT or the county shall be contacted and shall approve changes to (i-iii) above prior to any changes.

Response: Such easements and maintenance agreements already exist. This standard is met.

(4) Requirements for Development on Less than the Entire Site.

(a) To promote unified access and circulation systems, lots and parcels under the same ownership or consolidated for the purposes of development and [comprising] more than one

building site shall be reviewed as one unit in relation to the access standards. The number of access points permitted shall be the minimum number necessary to provide reasonable access to these properties, not the maximum available for that frontage. All necessary easements, agreements, and stipulations shall be met. This shall also apply to phased development plans. The owner and all lessees within the affected area shall comply with the access requirements.

Response: The proposal is for one parcel to be developed in a single phase. This standard does not apply.

(b) All access must be internalized using the shared circulation system of the principal commercial development or retail center. Driveways should be designed to avoid queuing across surrounding parking and driving aisles.

Response: This project does not include a commercial development or retail center. This standard does not apply.

(5) Lots that front on more than one street may be required to locate motor vehicle accesses on the street with the lower functional classification as determined by the City Engineer.

Response: The site fronts only SW Itel Street. This standard does not apply.

(6) Except as provided in TDC 53.100, all ingress and egress shall connect directly with public streets.

Response: As shown on the attached plans, the subject site has direct access to SW Itel, a public street. This standard is met.

(7) Vehicular access for residential uses shall be brought to within 50 feet of the ground floor entrances or the ground floor landing of a stairway, ramp or elevator leading to dwelling units.

Response: The project does not include any residential uses. This standard does not apply.

(8) To afford safe pedestrian access and egress for properties within the City, a sidewalk shall be constructed along all street frontage, prior to use or occupancy of the building or structure proposed for said property . . .

Response: The subject lot fronts an improved street with a sidewalk. This standard is met.

(9) The standards set forth in this Code are minimum standards for access and egress, and may be increased through the Architectural Review process in any particular instance where the standards provided herein are deemed insufficient to protect the public health, safety, and general welfare.

Response: This standard is understood.

(10) Minimum access requirements for residential uses:

Response: The proposed project is for an industrial use. This standard does not apply.

(11) Minimum Access Requirements for Commercial, Public and Semi-Public Uses.

Response: The proposed project is for an industrial use. This standard does not apply.

(12) Minimum Access Requirements for Industrial Uses.

Ingress and egress for industrial uses shall not be less than the following:

Required Parking Spaces	Minimum Number Required	Minimum Pavement Width	Minimum Pavement Walkways, Etc.
1-250	1	36 feet for first 50' from ROW, 24' thereafter	No curbs or walkway required
Over 250	As required by City Engineer	As required by City Engineer	As required by City Engineer

Response: As shown on the Civil Site Plan Sheet C2, 40-foot wide access for the first 50 feet of access from the Itel Street right-of-way will be created along the easterly access drive on the site. The driveway accesses will be no less than 28 feet at any other point on the property. This standard is met.

(13) One-way Ingress or Egress.

When approved through the Architectural Review process, one-way ingress or egress may be used to satisfy the requirements of Subsections (7), (8), and (9). However, the hard surfaced pavement of one-way drives shall not be less than 16 feet for multi-family residential, commercial, or industrial uses.

Response: Neither one-way ingress nor egress is proposed. This standard does not apply.

(14) Maximum Driveway Widths and Other Requirements.

(a) Unless otherwise provided in this chapter, maximum driveway widths shall not exceed 40 feet.

Response: As shown on the Civil Site Plan Sheet C2, driveway widths will not exceed 40 feet.

(b) Except for townhouse lots, no driveways shall be constructed within 5 feet of an adjacent property line, except when two adjacent property owners elect to provide joint access to their respective properties, as provided by Subsection (2).

Response: The development will take access from existing access easements and will not construct new driveways. This standard does not apply.

(c) There shall be a minimum distance of 40 feet between any two adjacent driveways on a single property unless a lesser distance is approved by the City Engineer.

Response: The development will take access from existing driveways and will not construct new driveways. This standard does not apply.

(15) Distance between Driveways and Intersections.

Except for single-family dwellings, the minimum distance between driveways and intersections shall be as provided below. Distances listed shall be measured from the stop bar at the intersection.

(a) At the intersection of collector or arterial streets, driveways shall be located a minimum of 150 feet from the intersection.

Response: SW Itel is designated as a Local Commercial Industrial street which intersects with SW 115th Avenue, classified as a collector. The proposed development will access SW Itel Street, which is over 650' from this intersection and exceeds the minimum of 150 feet. This standard is met.

(b) At the intersection of two local streets, driveways shall be located a minimum of 30 feet from the intersection.

Response: The closest intersection is over 650' from the site's eastern-most driveway, in excess of the 30' minimum. This standard is met.

(c) If the subject property is not of sufficient width to allow for the separation between driveway and intersection as provided, the driveway shall be constructed as far from the intersection as possible, while still maintaining the 5-foot setback between the driveway and property line as required by TDC 73.400(14)(b).

Response: The existing driveways on the site meet the driveway and intersection separation standards. This standard does not apply.

(d) When considering a public facilities plan that has been submitted as part of an Architectural Review plan in accordance with TDC 31.071(6), the City Engineer may approve the location of a driveway closer than 150 feet from the intersection of collector or arterial streets, based on written findings of fact in support of the decision. The written approval shall be incorporated into the decision of the City Engineer for the utility facilities portion of the Architectural Review plan under the process set forth in TDC 31.071 through 31.077.

Response: No driveways on the site will be less than 200' from an intersection. This standard does not apply.

(16) Vision Clearance Area.

(a) Local Streets - A vision clearance area for all local street intersections, local street and driveway intersections, and local street or driveway and railroad intersections shall be that triangular area formed by the right-of-way lines along such lots and a straight line joining the right-of-way lines at points which are 10 feet from the intersection point of the right of- way lines, as measured along such lines (see Figure 73-2 for illustration).

Response: SW Itel Street is a designated Local Street. As shown in the attached landscape plans, vision clearance for all driveways onto SW Itel Street will be maintained. This standard is met.

(b) Collector Streets - A vision clearance area for all collector/arterial street intersections, collector/arterial street and local street intersections, and collector/arterial street and railroad intersections shall be that triangular area formed by the right-of-way lines along such lots and a straight line joining the right-of-way lines at points which are 25 feet from the intersection point of the right-of-way lines, as measured along such lines. Where a driveway intersects with a collector/arterial street, the distance measured along the driveway line for the triangular area shall be 10 feet (see Figure 73-2 for illustration).

Response: SW Itel Street is a Local Street. This standard does not apply.

(c) Vertical Height Restriction - Except for items associated with utilities or publicly owned structures such as poles and signs and existing street trees, no vehicular parking, hedge, planting, fence, wall structure, or temporary or permanent physical obstruction shall be permitted between 30 inches and 8 feet above the established height of the curb in the clear vision area (see Figure 73-2 for illustration).

Response: As shown in the attached landscape plans, no vertical obstruction will be located in the clear vision area. This standard is met.

(17) Major driveways, as defined in 31.060, in new residential and mixed-use areas are required to connect with existing or planned streets except where prevented by topography, rail lines, freeways, pre-existing development or leases, easements or covenants, or other barriers.

Response: The project is not in a new residential or mixed-use area. This standard does not apply.

IV. PUBLIC FACILITIES FINDINGS

TDC 74.120 ...No work shall be undertaken on any public improvement until after the construction plans have been approved by the City Engineer and a Public Works Permit issued and the required fees paid.

Response: Applicant acknowledges this requirement.

TDC 74.140 (1) All the public improvements required under this chapter shall be completed and accepted by the City prior to issuance of a Certificate of Occupancy.

Response: Applicant acknowledges this requirement.

TDC 74.330 Utility Easements

(1) Utility easements for water, sanitary sewer and storm drainage facilities, telephone, television cable, gas, electric lines and other public utilities shall be granted to the City.

(4) ...For both on-site and off-site easement areas, a utility easement shall be granted to the City; Building Permits shall not be issued for the development prior to acceptance of the easement by the City.

(5) The width of the public utility easement shall meet the requirements of the Public Works Construction Code.

Response: Applicant acknowledges these conditions for Utility Easements.

TMC 4-1.010 This development is subject to all applicable building code requirements and all applicable building and development fees.

Response: Applicant demonstrates compliance with the following code requirements.

1. FIRE AND LIFE SAFETY

TMC 4-2.010 (1) Every application for a building permit and accompanying plans shall be submitted to the Building Division for review of water used for fire protection, the approximate location and size of hydrants to be connected, and the provisions for access and egress for firefighting equipment. If upon such review it is determined that the fire protection facilities are not required or that they are adequately provided for in the plans, the Fire and Life Safety Reviewer shall recommend approval to the City Building Official.

Response: As shown on the Utility Plan, Sheet C3, there are 2 existing fire hydrants near the site, 1 public and 1 private. The applicant will submit plans that comply with fire protection requirements as determined through the Building Division and Tualatin Valley Fire & Rescue (TVF&R).

2. TRANSPORTATION

TDC 11.610 Transportation Goals and Objectives (2) (e) For development applications, including, but not limited to subdivisions and architectural reviews, a LOS of at least D and E are encouraged for signalized and unsignalized intersections, respectively.

Response: A transportation impact analysis (TIA) has been completed for the site. Table 2 within the TIA shows the Capacity and LOS Analysis for existing conditions, 2018 Background Conditions, and 2018 Background + Site Conditions. Based on the analysis, all study intersections, which include SW Tualatin Sherwood Road at SW 120th Ave, SW Tualatin Sherwood Road at SW 115th Ave, and SW Itel Street at SW 115th Ave, operate within City of Tualatin and Washington County performance standards through year 2017 with full build-out of the development.

TDC 73.400 (5)...a sidewalk shall be constructed along all street frontage, prior to use or occupancy of the building or structure proposed for said property. The sidewalks required by this section shall be constructed to City standards,...

Response: The development fronts SW Itel Street, which has been previously improved to City standards to include a 6' sidewalk.

TDC 74.210 Minimum Street Right-of-Way Widths

TDC 74.420 (6) All required street improvements shall include curbs, sidewalks, storm drainage, streetlights, street signs, street trees, and, where designated, bikeways and transit facilities.

TDC 74.425 Street Design Standards

Response: The development fronts SW Itel Street, which has been previously improved to City standards. No street improvements are proposed as part of this application.

TDC 74.430 Streets, Modifications of Requirements in Cases of Unusual Conditions.

Response: No modifications to standards in cases of unusual conditions are proposed as part of this development.

TDC 74.440 Streets, Traffic Study Required

Response: A traffic study has been prepared by a professional engineer and is included with this Architectural Review application.

TDC 74.450 Bikeways and Pedestrian Paths

Response: The development fronts SW Itel Street, which has been previously improved to City standards.

TDC 74.470 Street Lights

(1) Street light poles and luminaries shall be installed in accordance with the Public Works Construction Code.

(2) The applicant shall submit a street lighting plan for all interior streets on the proposed development prior to issuance of a Public Works Permit.

Response: All street lights and luminaries on SW Itel Street have been previously installed in accordance with the Public Works Construction Code. No interior streets are proposed.

TDC 74.475 Street Names.

(1) No street name shall be used which will duplicate or be confused with the names of existing streets in the Counties of Washington or Clackamas, except for extensions of existing streets. Street names and numbers shall conform to the established pattern in the surrounding area.

(2) The City Engineer shall maintain the approved list of street names from which the applicant may choose. Prior to the creation of any street, the street name shall be approved by the City Engineer.

Response: No new street names are proposed as part of this application.

TDC 74.480 Street Signs.

(1) Street name signs shall be installed at all street intersections in accordance with standards adopted by the City.

(2) Stop signs and other traffic control signs (speed limit, dead-end, etc.) may be required by the City.

(3) Prior to approval of the final subdivision or partition plat, the applicant shall pay the City a non-refundable fee equal to the cost of the purchase and installation of street signs, traffic control signs and street name signs. The location, placement, and cost of the signs shall be determined by the City. [Ord.. 1192-05, 7/24/05]

Response: No new street signs are proposed as part of this application.

TDC 74.485 Street Trees

(1) Prior to approval of a residential subdivision or partition final plat, the applicant shall pay the City a nonrefundable fee equal to the cost of the purchase and installation of street trees. The location, placement, and cost of the trees shall be determined by the City. This sum shall be calculated on the interior and exterior streets as indicated on the final subdivision or partition plat.

(2) In nonresidential subdivisions and partitions street trees shall be planted by the owners of the individual lots as development occurs.

(3) The Street Tree Ordinance specifies the species of tree which is to be planted and the spacing between trees. [Ord. 1192-05, 7/25/05]

Response: Five existing street trees along the frontage of the site will be retained and separated from new site improvements by the existing sidewalk.

TDC 74.660 Underground.

(1) All utility lines including, but not limited to, those required for gas, electric, communication, lighting and cable television services and related facilities shall be placed underground. Surface-mounted transformers, surface-mounted connection boxes and meter cabinets may be placed above ground. Temporary utility service facilities, high capacity electric and communication feeder lines, and utility transmission lines operating at 50,000 volts or above may be placed above ground. The applicant shall make all necessary arrangements with all utility companies to provide the underground services. The City reserves the right to approve the location of all surface-mounted transformers.

Response: All utilities will be placed underground, except for surface mounted facilities such as electrical transformers which will be screened from adjacent right of way.

TDC 75.060 Existing Driveways and Street Intersections (2) The City Engineer may restrict existing driveways and street intersections to right-in and right-out by construction of raised median barriers or other means.

Response: The development will access SW Itel Street from two private driveways. No restriction of existing driveways is anticipated as a part of this application.

TDC 74.120 ...No work shall be undertaken on any public improvement until after the construction plans have been approved by the City Engineer and a Public Works Permit issued and the required fees paid.

TDC 74.140 (1) All the public improvements required under this chapter shall be completed and accepted by the City prior to issuance of a Certificate of Occupancy.

Response: The applicant concurs with this requirement. No work shall be undertaken on any public improvement until after approval has been granted and fees are paid. Prior to occupancy, all public improvements required under this chapter will be completed and accepted.

3. ACCESS

TDC 73.400 Access

(2) Owners of two or more uses, structures or parcels of land may agree to utilize jointly the same ingress and egress when the combined ingress and egress of both uses, structures, or parcels of land satisfies their combined requirements as designated in this code; provided that satisfactory legal evidence is presented to the City Attorney in the form of deeds, easements, leases or contracts to establish joint use.

Response: Two access easements exist across the parcel. One on the easterly portion of the site that is 30 to 40 feet in width and lies totally on the subject parcel, and one on

the westerly side that straddles the westerly property for most of its length and lies 17.5 feet into the subject property and is 29.50 feet in total width. At the southwestern corner of the subject property this westerly access easement crosses entirely onto the subject site is up to 40 feet wide in this portion.

(10) Minimum access requirements for residential uses: (b) Ingress and egress for multi-family residential uses shall not be less than the following:...for 50-499 parking spaces a minimum of one 32-foot wide access or two 24-foot wide accesses are required.

(11) Minimum Access Requirements for Commercial, Public and Semi-Public Uses. If 1-99 parking spaces are required, only one access is required. If 100-249 parking spaces are required, two accesses are required. Ingress and egress shall not be less than 32 feet wide for the first 50 feet from the right-of-way and 24 feet thereafter.

(12) Minimum Access Requirements for Industrial Uses. If 1-250 parking spaces are required, only one access is required. Ingress and egress shall not be less than 36 feet wide for the first 50 feet from the right-of-way and 24 feet thereafter.

(14) (a) Unless otherwise herein provided, maximum driveway widths shall not exceed 40 feet.

Response: The development is an Industrial with less than 250 parking spaces and will have two accesses onto SW Itel Street from two private driveways. These driveways are 32 and 40 feet wide for the first 50 feet from the right-of-way and vary in width thereafter but at least 28 feet thereafter. These driveway widths do not exceed 40 feet.

(15) Distance between Driveways and Intersections. Distances listed shall be measured from the stop bar at the intersection. (a) At the intersection of collector or arterial streets, driveways shall be located a minimum of 150 feet from the intersection.

Response: The easterly driveway is more than 650 feet from the intersection of Itel Street and SW 115th Avenue

TDC 75.120 Existing Streets

Response: Vicinity streets include Tualatin Sherwood Road which is designated as an Arterial by Washington County and Major Arterial by the City of Tualatin; and SW 120th Ave, SW 115th Ave, and SW Itel Street which are designated as Local Streets by Washington County and Local Commercial Industrial Streets by the City of Tualatin.

4. WATER

TDC 74.610 (1) Water lines shall be installed to serve each property in accordance with the Public Works Construction Code. Water line construction plans shall be submitted to the City Engineer for review and approval prior to construction.

TMC 3-3.040 (2) For nonresidential uses, separate meters shall be provided for each structure.

TMC 3-3.120 (2) The owner of property to which City water is furnished for human consumption shall install in accordance with City standards an appropriate backflow

prevention device on the premises where any of the following circumstances exist: (b) Where there is a fire protection service, and irrigation service or a nonresidential service connection which is two inches or larger in size;

TMC 3-3.120 (4) requires all irrigation systems to be installed with a double check valve assembly.

TDC 74.610 (3) As set forth in TDC Chapter 12, Water Service, the City has three water service levels. All development applicants shall be required to connect the proposed development site to the service level in which the development site is located.

Response: As shown on the Utility Plan, Sheet C3, domestic water and fire line connections will be made to public water main in SW Itel Street. The domestic and fire line sizes will be determined at a later date depending upon building and fire code requirements.

5. SANITARY SEWER

TDC 74.620 (1) Sanitary sewer lines shall be installed to serve each property in accordance with the Public Works Construction Code. Sanitary sewer construction plans and calculations shall be submitted to the City Engineer for review and approval prior to construction.

Response: As shown on the Utility Plan, Sheet C3, a sanitary sewer connection will be made to an existing sewer stub along in the northeast corner of the site that connects to a public sewer main that lies in a public easement between Itel Street and Tualatin-Sherwood Road.

TDC 74.330 Utility Easements (1) Utility easements for water, sanitary sewer and storm drainage facilities, telephone, television cable, gas, electric lines and other public utilities shall be granted to the City.

Response: An 8 foot-wide public utility easement has been granted along SW Itel as part of Partition Plat 2003-042. Any additional easements required by the City will be granted as needed.

6. STORM DRAINAGE & WATER QUALITY

TDC 74.630 Storm Drainage System

(1) Storm drainage lines shall be installed to serve each property in accordance with City standards. Storm drainage construction plans and calculations shall be submitted to the City Engineer for review and approval prior to construction.

(2) The storm drainage calculations shall confirm that adequate capacity exists to serve the site. The discharge from the development shall be analyzed in accordance with the City's Storm and Surface Water

Regulations (TMC 3-5).

Response: As a part of the City of Tualatin approval in Case File # PAR-03-01, a stormwater facility for water quality and water quantity was constructed on Tract A per Partition Plat 2003-042. Storm drain easement and conveyance piping already exists for this parcel to drain to the noted Tract "A". A Stormwater letter has been submitted with this application confirming that existing facilities have adequate capacity to serve the proposed development.

TDC 74.650 Water Quality, Stormwater Detention and Erosion Control

(2) On all other development applications, prior to issuance of any building permit, the applicant shall arrange to construct a permanent on-site water quality facility and stormwater detention facility and submit a design and calculations indicating that the requirements of the Surface Water Management Ordinance will be met and obtain a Stormwater Connection Permit from Clean Water Services.

(3) For on-site private and regional non-residential public facilities, the applicant shall submit a stormwater facility agreement, which will include an operation and maintenance plan provided by the City, for the water quality facility for the City's review and approval. The applicant shall submit an erosion control plan prior to issuance of a Public Works Permit. No construction or disturbing of the site shall occur until the erosion control plan is approved by the City and the required measures are in place and approved by the City.

TMC 3-5-220 Criteria for Requiring On-Site Detention to be Constructed.

(1) There is an identified downstream deficiency, as defined in TMC 3-5.210, and detention rather than conveyance system enlargement is determined to be the more effective solution.

(2) There is an identified regional detention site within the boundary of the development.

TMC 3-5-330 Permit Required. Except as provided in TMC 3-5.310, no person shall cause any change to improved or unimproved real property that will, or is likely to, increase the rate or quantity of run-off or pollution from the site without first obtaining a permit from the City and following the conditions of the permit.

TMC 3-5-380 Criteria for Granting Exemptions to Construction of On-Site Water Quality Facilities. A regional public facility may be constructed to serve private non-residential development provided:

(1) The facility serves more than one lot; and

(2) All owners sign a stormwater facility agreement; and

(3) Treatment accommodates reasonable worst case impervious area for full build-out, stormwater equivalent to existing or proposed roof area is privately treated in LIDA facilities, and any detention occurs on each lot.

Response: As a part of the City of Tualatin approval in Case File # PAR-03-01, a stormwater facility for water quality and water quantity was constructed on Tract A per Partition Plat 2003-042. Storm drain easement and conveyance piping already exists for this parcel to drain to the noted Tract "A". A Stormwater letter has been submitted

with this application confirming that existing facilities have adequate capacity to serve the proposed development.

7. GRADING

TDC 74.640 (1) Development sites shall be graded to minimize the impact of stormwater runoff onto adjacent properties and to allow adjacent properties to drain as they did before the new development. (2) A development applicant shall submit a grading plan showing that all lots in all portions of the development will be served by gravity drainage from the building crawl spaces; and that this development will not affect the drainage on adjacent properties. The City Engineer may require the applicant to remove all excess materials from the development site.

Response: The proposed grading plan on Sheet C4 minimizes the impact of stormwater runoff to adjacent properties and allows adjacent properties to drain as they did before the development.

8. EROSION CONTROL

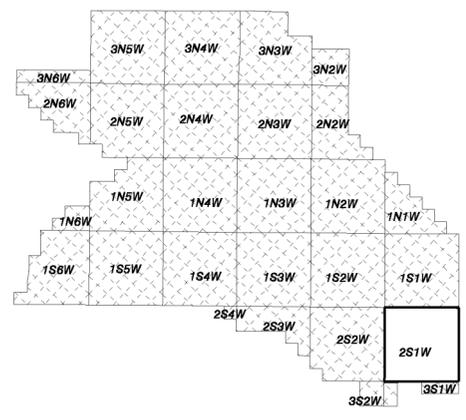
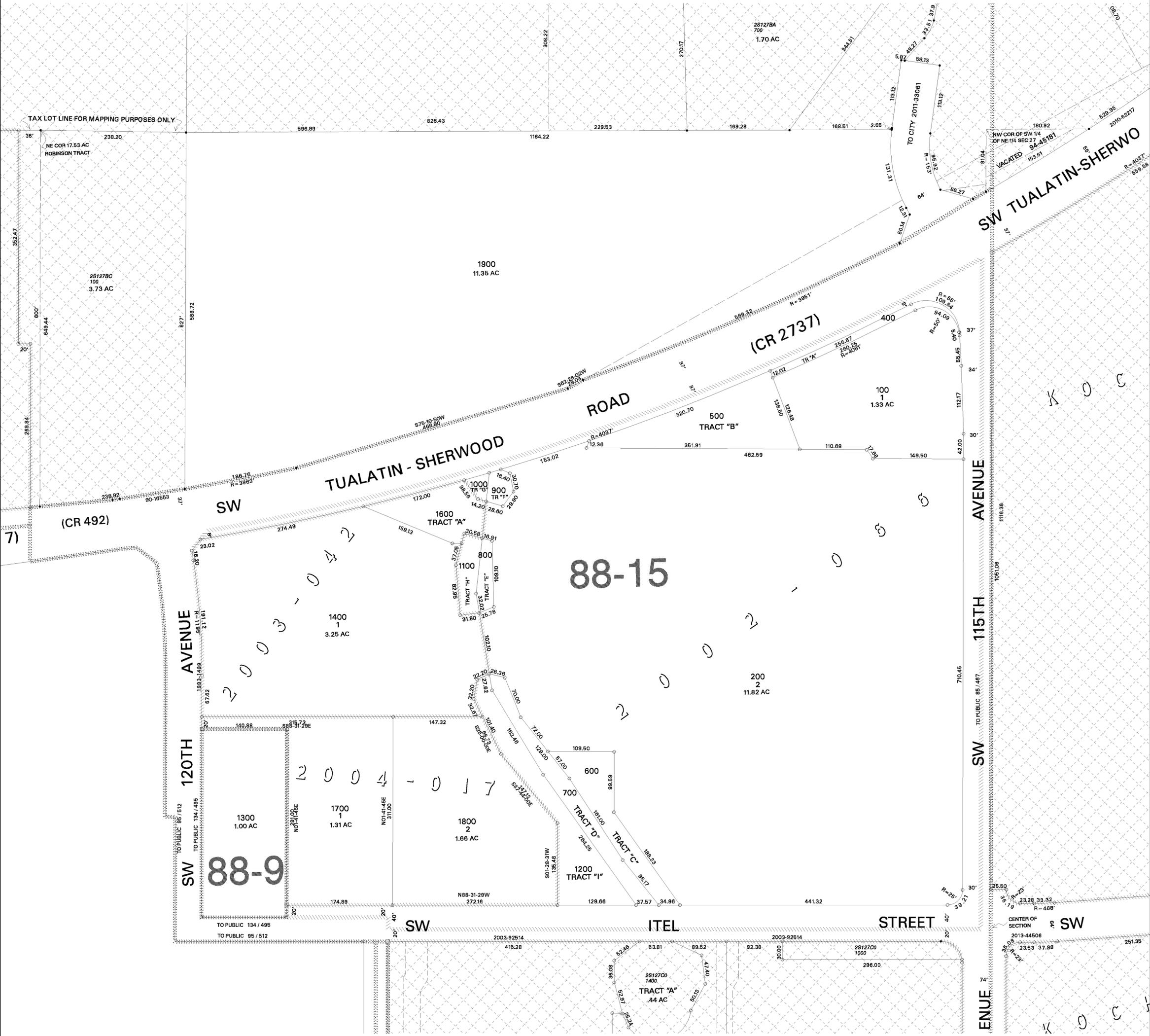
TDC 74.650 (3) ..the applicant shall submit an erosion control plan prior to issuance of a Public Works Permit. No construction or disturbing of the site shall occur until the erosion control plan is approved by the City and the required measures are in place and approved by the City. In order to reduce the amount of sediment discharged into the public storm system, erosion control measures are required during construction. If the site is over 1 acre in size a NPDES Erosion Control Permit is required.

Response: A 1200-C permit application will be applied for as part of the construction permitting approvals. The expected disturbance area is 1.08 acres.

9. STORMWATER CONNECTION PERMIT

TDC 74.650 Water Quality, Stormwater Detention and Erosion Control (2) On all other development applications, prior to issuance of any building permit, the applicant shall arrange to construct a permanent on-site water quality facility and stormwater detention facility and submit a design and calculations indicating that the requirements of the Surface Water Management Ordinance will be met and obtain a Stormwater Connection Permit from the Unified Sewerage Agency.

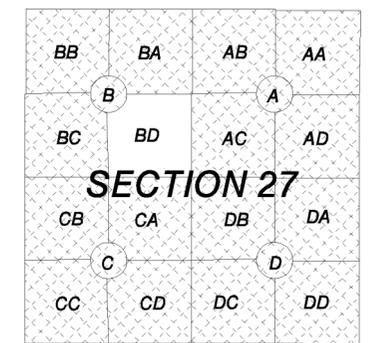
Response: A CWS Service Provider Letter (SPL) indicating that no site assessment or service provider letter is required is included with the Architectural Review application.



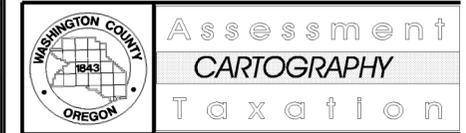
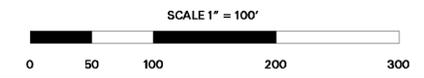
WASHINGTON COUNTY OREGON
SE 1/4 NW 1/4 SECTION 27 T2S R1W W.M.
SCALE 1" = 100'

36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6
12	7	8	9	10	11	12	7
13	18	17	16	15	14	13	18
24	19	20	21	22	23	24	19
25	30	29	28	27	26	25	30
36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6

FOR ADDITIONAL MAPS VISIT OUR WEBSITE AT
www.co.washington.or.us



Cancelled Taxlots For: 2S127BD
 300,1500,



PLOT DATE: September 10, 2013
FOR ASSESSMENT PURPOSES ONLY - DO NOT RELY ON FOR OTHER USE

Map areas delineated by either gray shading or a cross-hatched pattern are for reference only and may not indicate the most current property boundaries. Please consult the appropriate map for the most current information.

Partition Plat No. 2004-017
 RECORDED AS DOCUMENT NO. 2004036269
 A REPLAT OF
 PARCEL 2, PARTITION PLAT NO. 2003-042
 NW 1/4 SEC. 27, T.2S., R.1W., W.M.
 City of Tualatin, Washington County
 Oregon
 Date: MARCH 4, 2004

Curve Data Table

CURVE	RADIUS	LENGTH	DELTA	CHORD	CH.BEARING
C-1	1195.00'	191.12'	9°09'49"	190.92'	N 02°48'16"W
C-2	4049.00'	448.49'	6°19'05"	446.26'	N 78°47'36"E
C-3	4049.00'	43.05'	0°36'33"	43.05'	N 75°19'47"E
C-4	1165.00'	186.32'	9°09'49"	186.13'	N 02°48'16"W
C-5	200.00'	17.36'	4°58'21"	17.35'	S 28°42'15"E
C-6	200.00'	70.72'	20°15'33"	70.35'	S 41°19'12"E
C-7	290.00'	287.88'	52°55'30"	258.46'	S 24°59'14"E
C-8	260.00'	167.82'	36°58'58"	164.92'	N 32°57'30"W
C-9	230.00'	82.74'	20°36'41"	82.29'	N 41°08'39"W
C-10	4057.00'	25.00'	0°21'11"	25.00'	N 81°43'54"W
C-11	1203.00'	10.00'	0°28'35"	10.00'	N 07°08'54"W
C-12	4049.00'	274.49'	3°53'03"	274.44'	N 80°00'37"E
C-13	4049.00'	172.00'	2°28'02"	171.99'	N 78°51'05"E

Legend:

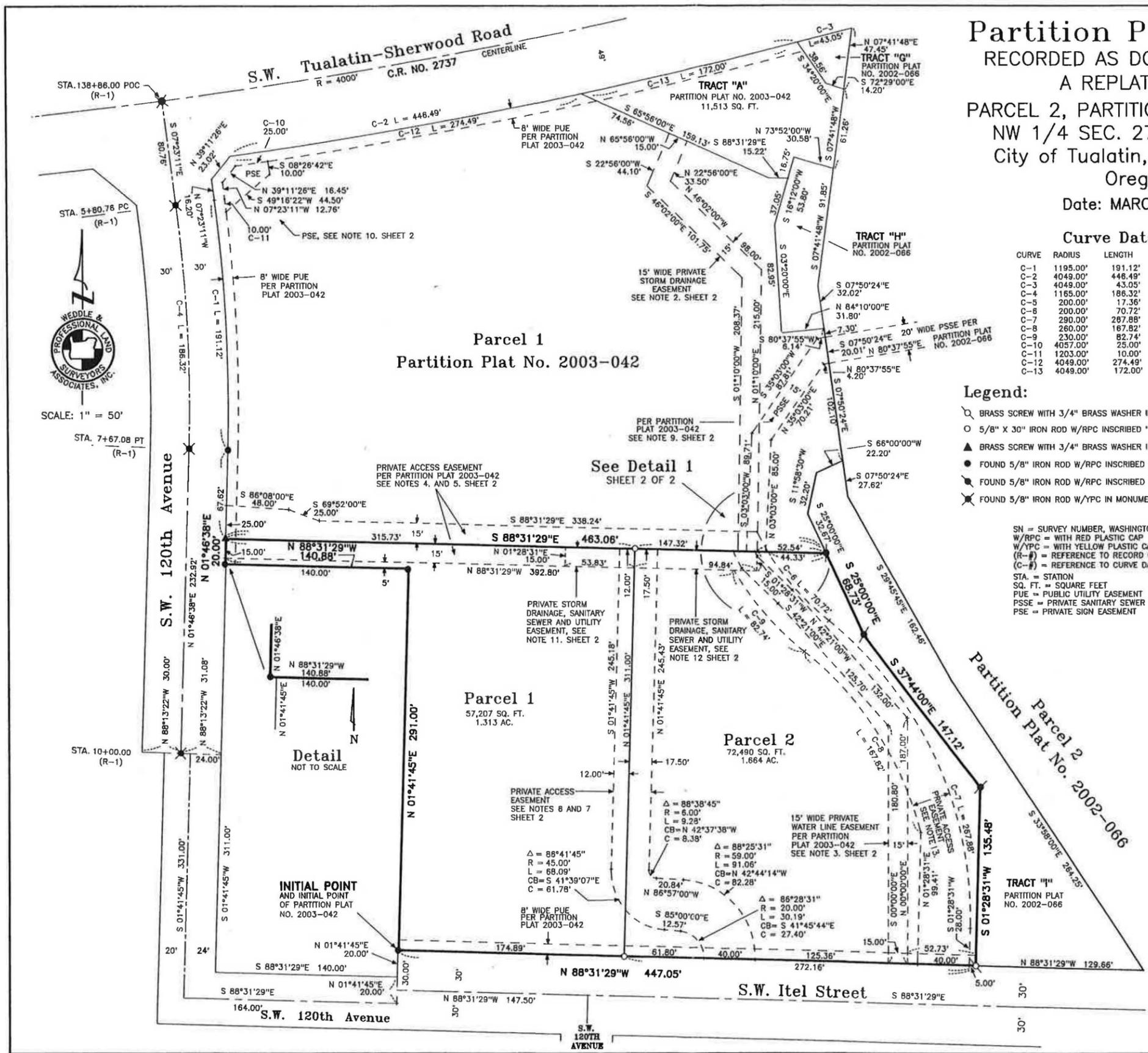
- BRASS SCREW WITH 3/4" BRASS WASHER INSCRIBED "CHEEL PLS 42649" SET MARCH 4, 2004.
- 5/8" X 30" IRON ROD W/RPC INSCRIBED "GARY W. CHEEL PLS 42649" SET MARCH 4, 2004.
- ▲ BRASS SCREW WITH 3/4" BRASS WASHER INSCRIBED "CHEEL PLS 42649" PER PARTITION PLAT NO. 2003-042.
- FOUND 5/8" IRON ROD W/RPC INSCRIBED "GARY W. CHEEL PLS 42649" PER PARTITION PLAT NO. 2002-066.
- FOUND 5/8" IRON ROD W/RPC INSCRIBED "GARY W. CHEEL PLS 42649" PER PARTITION PLAT NO. 2003-042.
- ⊗ FOUND 5/8" IRON ROD W/YPC IN MONUMENT BOX INSCRIBED "W&H PACIFIC" PER SN 25092.

SN = SURVEY NUMBER, WASHINGTON COUNTY SURVEY RECORDS
 W/RPC = WITH RED PLASTIC CAP
 W/YPC = WITH YELLOW PLASTIC CAP
 (R-#) = REFERENCE TO RECORD OF SURVEY NUMBER OR SN
 (C-#) = REFERENCE TO CURVE DATA TABLE
 STA. = STATION
 SQ. FT. = SQUARE FEET
 PUE = PUBLIC UTILITY EASEMENT
 PSSE = PRIVATE SANITARY SEWER EASEMENT
 PSE = PRIVATE SIGN EASEMENT

I HEREBY CERTIFY THAT THIS IS AN EXACT COPY OF THE ORIGINAL PLAT



Surveyor:
 Weddle & Assoc., Inc.
 1750 SW Skyline Blvd.
 Suite 105
 Portland, OR 97221-2544
 (503) 292-8083
 1-888-222-8083
 Fax: (503) 292-0938



SCALE: 1" = 50'

STA. 7+67.08 PT (R-1)

STA. 10+00.00 (R-1)

Approvals:

APPROVED THIS 1st DAY OF APRIL, 2004
MAYOR OF THE CITY OF TUALATIN
BY [Signature]

ATTESTED THIS 1st DAY OF APRIL, 2004
CITY OF TUALATIN RECORDER
BY Steve Whala

APPROVED THIS 8th DAY OF April, 2004
WASHINGTON COUNTY SURVEYOR
BY Kenneth A. Jauer

ALL TAXES, FEES, ASSESSMENTS OR OTHER CHARGES
AS PROVIDED BY ORS 92.095 HAVE BEEN PAID AS
OF APRIL 8th, 2004

DIRECTOR OF ASSESSMENT AND TAXATION
WASHINGTON COUNTY, OREGON

BY Paul A. Kuffner
DEPUTY

STATE OF OREGON } SS
COUNTY OF WASHINGTON }

I DO HEREBY CERTIFY THAT THIS PARTITION PLAT WAS
RECEIVED ON THIS 8th DAY OF April, 2004
AT 4:25 O'CLOCK P.M., AND RECORDED IN THE COUNTY
CLERK RECORDS.

BY Laura M. Eakin
DEPUTY COUNTY CLERK

STATE OF OREGON } SS
COUNTY OF WASHINGTON }

I DO HEREBY CERTIFY THAT THIS TRACING IS A
COPY CERTIFIED TO ME, BY THE SURVEYOR OF THIS
PARTITION PLAT, TO BE A TRUE AND EXACT COPY
OF THE ORIGINAL, AND THAT IT WAS RECORDED ON
THE 8th DAY OF April, 2004, AT 4:25 O'CLOCK P.M.,
IN THE COUNTY CLERK RECORDS.

BY Laura M. Eakin
DEPUTY COUNTY CLERK

References:

- (R-1) SN 25092
- SN 22177
- SN 22598
- SN 21904
- SN 19375
- PARTITION PLAT NO. 2002-066
- PARTITION PLAT NO. 2003-042
- PLAT OF "TONQUIN ANNEX"
- DOC. NO. 91011886
- DOC. NO. 94045181
- DOC. NO. 93001500
- DOC. NO. 93001499
- DOC. NO. 90-48906
- BOOK 134, PAGE 495
- BOOK 95, PAGE 512
- BOOK 85, PAGE 467
- DOC. NO. 96100387
- DOC. NO. 99060423
- DOC. NO. 94045181
- DOC. NO. 78008171
- BOOK 363 PAGE 141
- DOC. NO. 2003-124025

Declaration:

KNOW ALL PEOPLE BY THESE PRESENTS THAT, INDOOR ARENA INVESTORS, LLC, AN OREGON LIMITED LIABILITY COMPANY, OWNER OF THE LAND REPRESENTED ON THE ANNEXED MAP, BEING MORE PARTICULARLY DESCRIBED IN THE ACCOMPANYING SURVEYOR'S CERTIFICATE, DOES HEREBY MAKE, ESTABLISH AND DECLARE THE ANNEXED MAP TO BE A TRUE MAP AND CORRECT MAP, AND HAVE CAUSED THE SAME TO BE SURVEYED AND PARTITIONED INTO PARCELS AS SHOWN HEREON IN ACCORDANCE WITH THE PROVISIONS OF O.R.S 92, AND DOES HEREBY GRANT ALL EASEMENTS AS SHOWN OR NOTED HEREON.

[Signature]
MICHAEL S. MARSDEN
MANAGER OF INDOOR ARENA INVESTORS, LLC
AN OREGON LIMITED LIABILITY COMPANY

[Signature]
MONTGOMERY J. HAWKINS
MANAGER OF INDOOR ARENA INVESTORS, LLC
AN OREGON LIMITED LIABILITY COMPANY

Acknowledgement:

STATE OF OREGON
COUNTY OF Multnomah } SS

THIS INSTRUMENT WAS ACKNOWLEDGED BEFORE ME ON March 23, 2004

BY MICHAEL S. MARSDEN, MANAGER OF INDOOR ARENA INVESTORS, LLC
BY MONTGOMERY J. HAWKINS, MANAGER OF INDOOR ARENA INVESTORS, LLC

[Signature]
NOTARY PUBLIC FOR THE STATE OF OREGON

D.M. MURO
PRINTED

COMMISSION NO. 367051
MY COMMISSION EXPIRES March 27, 2007.

Narrative:

THE PURPOSE OF THIS SURVEY IS TO LOCATE THE CORNERS OF PARCEL 2, PARTITION PLAT NO. 2003-042, WASHINGTON COUNTY PLAT RECORDS, AND PARTITION THE SAME INTO PARCELS.

PROCEDURE:
FOUND MONUMENTS, AS SHOWN ON THE MAP, PER PARCEL 2, PARTITION PLAT NO. 2003-042, WERE LOCATED IN THE FIELD AND HELD.

BASIS OF BEARING:
PARCEL 2, PARTITION PLAT NO. 2003-042, WASHINGTON COUNTY PLAT RECORDS.

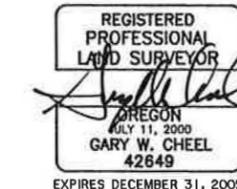
Partition Plat No. 2004-017
RECORDED AS DOCUMENT NO. 2004036269
A REPLAT OF
PARCEL 2, PARTITION PLAT NO. 2003-042
NW 1/4 SEC. 27, T.2S., R.1W., W.M.
City of Tualatin, Washington County
Oregon
Date: MARCH 4, 2004

Surveyor's Certificate:

I, GARY W. CHEEL, HEREBY CERTIFY THAT I HAVE CORRECTLY SURVEYED AND MARKED WITH PROPER MONUMENTS THE LANDS REPRESENTED ON THE ANNEXED PARTITION PLAT, BEING PARCEL 2, PARTITION PLAT NO. 2003-042, WASHINGTON COUNTY PLAT RECORDS RECORDED AS DOCUMENT NO. 200310568, IN THE NORTHWEST 1/4 OF SECTION 27, TOWNSHIP 2 SOUTH, RANGE 1 WEST OF THE WILLAMETTE MERIDIAN, CITY OF TUALATIN, COUNTY OF WASHINGTON, STATE OF OREGON. THE INITIAL POINT BEING A 5/8" IRON ROD WITH A RED PLASTIC CAP INSCRIBED "GARY W. CHEEL PLS 42649" AT THE SOUTHWEST CORNER OF PARCEL 2, PARTITION PLAT NO. 2003-042.

CONTAINING THEREIN 129,697 SQUARE FEET OR 2.977 ACRES, MORE OR LESS.

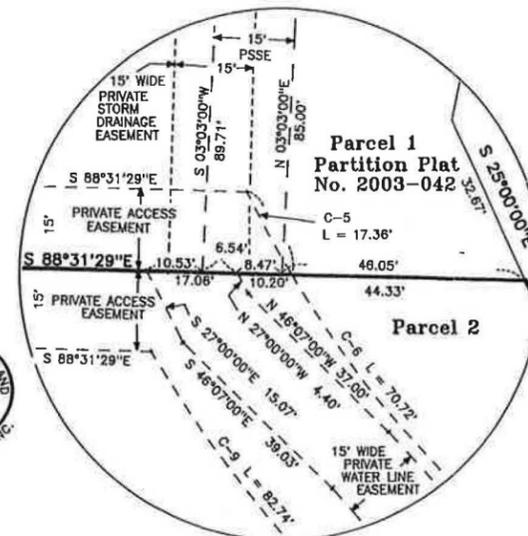
I HEREBY CERTIFY THAT THIS IS AN
EXACT COPY OF THE ORIGINAL PLAT



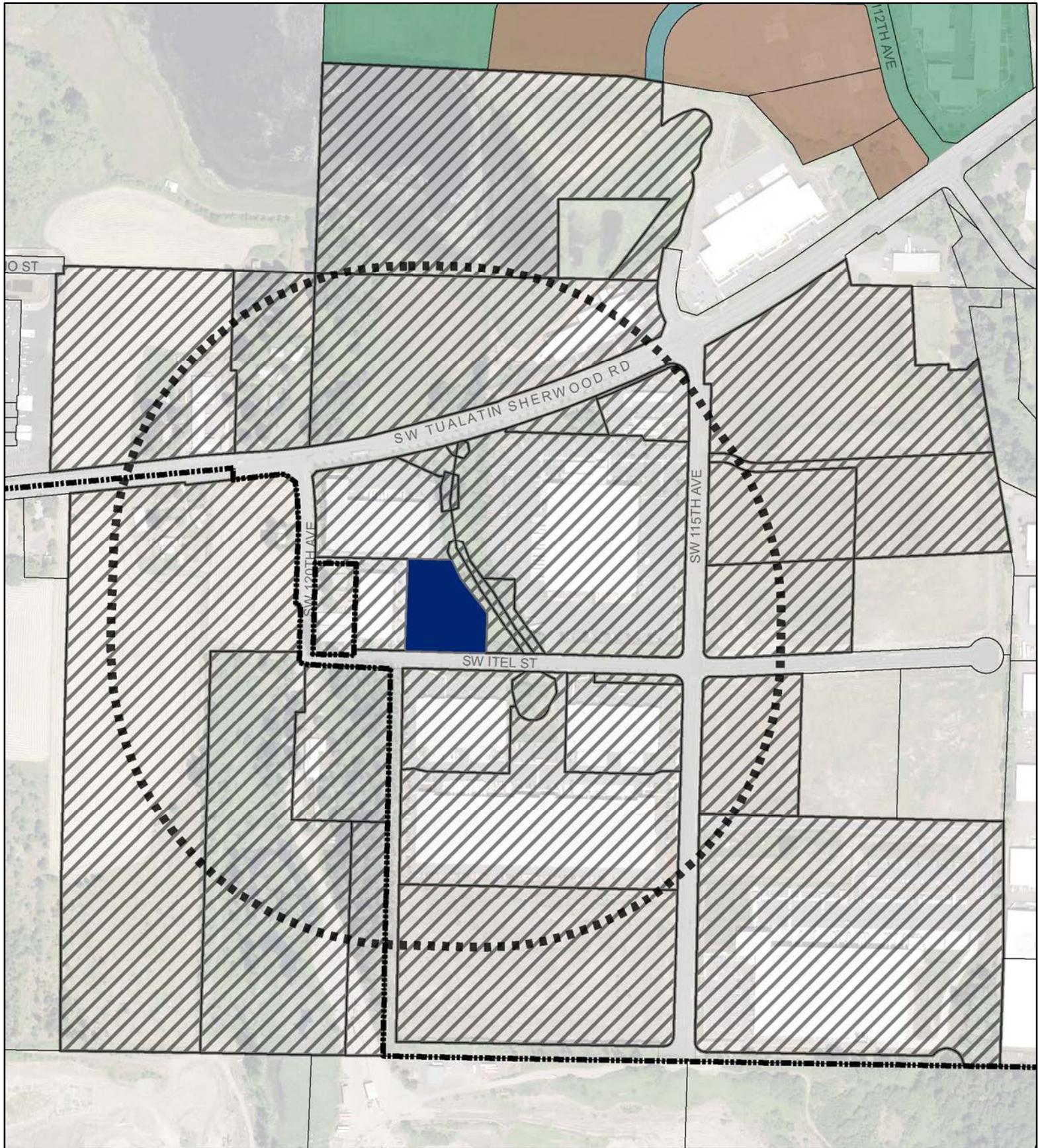
Surveyor:
Weddle & Assoc., Inc.
1750 SW Skyline Blvd.
Suite 105
Portland, OR 97221-2544
(503) 292-8083
1-888-222-8083
Fax: (503) 292-0938

Notes:

1. THIS PARTITION PLAT IS SUBJECT TO THE CONDITIONS IMPOSED BY THE CITY OF TUALATIN, CASE FILE NO. PAR-03-06.
2. PER PARTITION PLAT NO. 2003-042 THE PRIVATE STORM DRAINAGE EASEMENT LOCATED ON PARCEL 1, PARTITION PLAT NO. 2003-042 IS FOR THE BENEFIT OF PARCEL 1 AND PARCEL 2.
3. PER PARTITION PLAT NO. 2003-042 THE PRIVATE WATER LINE EASEMENT LOCATED ON PARCEL 2 IS FOR THE BENEFIT OF PARCEL 1 AND PARCEL 1, PARTITION PLAT NO. 2003-042.
4. PER PARTITION PLAT NO. 2003-042 THE 15-FOOT WIDE PRIVATE ACCESS EASEMENT LOCATED ON PARCEL 1, PARTITION PLAT NO. 2003-042 IS FOR THE BENEFIT OF PARCEL 1 AND PARCEL 2.
5. PER PARTITION PLAT NO. 2003-042 THE 15 FOOT WIDE PRIVATE ACCESS EASEMENT LOCATED IN PARCEL 1 AND PARCEL 2 IS FOR THE BENEFIT OF PARCEL 1, PARTITION PLAT NO. 2003-042 AND PARCELS 1 AND 2.
6. THE PRIVATE ACCESS EASEMENT OVER THE EASTERLY PORTION OF PARCEL 1 IS FOR THE BENEFIT OF PARCEL 2 AND PARCEL 1, PARTITION PLAT NO. 2003-042.
7. THE PRIVATE ACCESS EASEMENT OVER THE WESTERLY PORTION OF PARCEL 2 IS FOR THE BENEFIT OF PARCEL 1, AND PARCEL 1, PARTITION PLAT NO. 2003-042.
8. THE CITY OF TUALATIN AND CLEAN WATER SERVICES ARE GRANTED A PERMANENT RIGHT OF ACCESS ACROSS THE EASTERLY 15.00 FEET OF PARCEL 2 FOR THE INSPECTION OF TRACTS 'G' AND 'H' PER PARTITION PLAT NO. 2002-066.
9. PER PARTITION PLAT NO. 2003-042 THE PRIVATE SANITARY SEWER EASEMENT LOCATED ON PARCEL 1, PARTITION PLAT NO. 2003-042 IS FOR THE BENEFIT OF PARCEL 1 AND PARCEL 2.
10. PER PARTITION PLAT NO. 2003-042 THE PRIVATE SIGN EASEMENT LOCATED ON PARCEL 1, PARTITION PLAT NO. 2003-042 IS FOR THE BENEFIT OF PARCEL 1 AND PARCEL 2.
11. THE 15-FOOT WIDE PRIVATE STORM DRAINAGE, SANITARY SEWER AND UTILITY EASEMENT LOCATED ON PARCEL 1 IS FOR THE BENEFIT OF PARCEL 2.
12. THE 15-FOOT WIDE STORM DRAINAGE, SANITARY SEWER AND UTILITY EASEMENT LOCATED ON PARCEL 2 IS FOR THE BENEFIT OF PARCEL 1.
13. PER PARTITION PLAT NO. 2003-042 THE PRIVATE ACCESS EASEMENT LOCATED IN THE EASTERN PORTION OF PARCEL 2 IS FOR THE BENEFIT OF PARCEL 1 AND PARCEL 1, PARTITION PLAT NO. 2003-042.



Detail 1
SCALE: 1" = 20'



 1000' Buffer

 Selected Taxlots



Itel Street Industrial Building (Tualatin Flex Building)

Neighborhood/Developer Meeting Summary

A Neighborhood/Developer meeting was held at 5:30pm on Monday, September 12th at the Tualatin Public Library. The meeting was noticed and conducted in accordance with City requirements.

Two people attended the meeting, Erin Engman and Melinda Anderson, both with the City of Tualatin. Steve Entenmann, PE, SE, with Harper Houf Peterson Righellis Inc. presented the project. Questions were asked related to understanding the design. No concerns were raised.

TUALATIN FLEX BUILDING NEIGHBORHOOD/DEVELOPER MEETING

SEPTEMBER 12, 2016

NAME	ADDRESS
Erin Engman	City of Tualatin
Melinda Anderson	City of Tualatin

NEIGHBORHOOD / DEVELOPER MEETING CERTIFICATION OF SIGN POSTING

NOTICE
NEIGHBORHOOD / DEVELOPER MEETING
__/__/2010 __:__.m.
SW _____
503-____-____

24" 18"

In addition to the requirements of TDC 31.064(2) quoted earlier in the packet, the 18" x 24" sign that the applicant provides must display the meeting date, time, and address and a contact phone number. The block around the word "NOTICE" must remain **orange** composed of the **RGB color values Red 254, Green 127, and Blue 0**. Additionally, the potential applicant must provide a flier (or flyer) box on or near the sign and fill the box with brochures reiterating the meeting info and summarizing info about the potential project, including mention of anticipated land use application(s). Staff has a Microsoft PowerPoint 2007 template of this sign design available through the Planning Division homepage at < www.tualatinoregon.gov/planning/land-use-application-sign-templates >.



As the applicant for the

TUALATIN FLEX BUILDING project, I

hereby certify that on this day, August 26, 2016 sign(s) was/were posted on the subject property in accordance with the requirements of the Tualatin Development Code and the Community Development Department - Planning Division.

Applicant's Name: STEFANIE H. SLYMAN
(PLEASE PRINT)

Applicant's Signature: *Stefanie H. Slyman*

Date: 9/6/2016

State of Oregon)
)
County of Multnomah)

Signed before me on September 16th by Stephanie Slyman

Ann C Schumacher

Notary Public for Oregon

My commission expires: February 19, 2017



OFFICIAL STAMP

AR16-0012

To lessen the bulk of the notice of application and to address privacy concerns, this sheet substitutes for the photocopy of the mailing labels. A copy is available upon request.

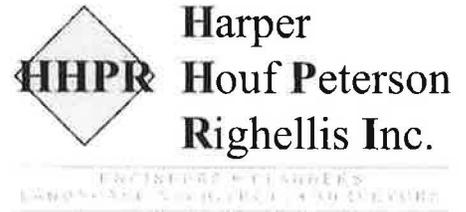
Missing Addresses (Copy of CIO Contacts_Aug2016a):

Carmen Madrid, President
Tualatin, OR 97062

Kay Dix, Land Use Chair
Tualatin, OR 97062

Kathy Gannett, Vice President
Tualatin, OR 97062

EXHIBIT B



August 26, 2016

**RE: PROPOSED LIGHT-INDUSTRIAL BUILDING AT 11847 SW ITTEL ST, TUALATIN
(TAX LOT 2S127BD01800)**

Dear Property Owner or CIO Contact,

You are cordially invited to attend a Neighborhood/Developer Meeting on **Monday, September 12th at 5:30 pm** at the Tualatin Library Conference Room located at 18878 SW Martinazzi Avenue, Tualatin to learn more about this proposed development.

The proposal is to develop a 18,424 sf flex-space, light-industrial building with 13,284 sf on the ground floor and 4,600 sf of accessory office space on the second floor. The site is zoned General Manufacturing Planning District (MG) in which this is a permitted use.

The building will be approximately 28' in height. Six (6) loading bays are located on the north side of the building with 35-40 surface parking spaces located on the west, south, and east sides of the site. See attached proposed site plan, conceptual rendering, and aerial.

The purpose of this meeting is to provide a means for the applicant and surrounding property owners to meet and discuss this proposal and identify any issues regarding this proposal.

If you have any questions about the meeting or the proposal, please feel free to contact me.

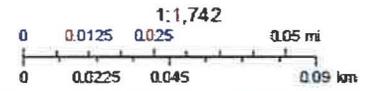
Regards,

Stefanie Slyman, AICP
Harper Houf Peterson Righellis Inc.
503-221-1131 stefanies@hhpr.com



July 18, 2016

- World Transportation Taxlots
- City Boundary Planning Districts
- Planning Area Boundary



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerotric, IGN, IGP, swisstopo, and

CityofTulsa

Sensitive Area Pre-Screening Site Assessment

1. Jurisdiction: Tualatin

2. Property Information (example 1S234AB01400)

Tax lot ID(s): 2S127BD01800

3. Owner Information

Name: FHA & Associates

Company: _____

Address: 155 B Avenue, Suite 222

City, State, Zip: Lake Oswego, OR 97034

Phone/Fax: 503-636-1203

E-Mail: _____

OR Site Address: _____

City, State, Zip: _____

Nearest Cross Street: _____

4. 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 Industrial Building

5. Applicant Information

Name: Tom Sisul

Company: Sisul Engineering

Address: 375 Portland Avenue

City, State, Zip: Gladstone, OR 97027

Phone/Fax: 503-657-0188

E-Mail: tomsisul@sisulengineering.com

6. Will the project involve any off-site work? Yes No Unknown

Location and description of off-site work _____

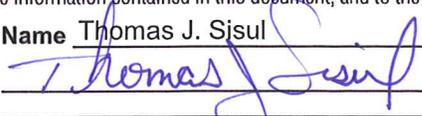
7. Additional comments or information that may be needed to understand your project Industrial Building to be erected with existing facilities.

This application does NOT replace 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 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 Thomas J. Sisul

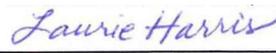
Print/Type Title President

Signature 

Date 8-2-2016

FOR DISTRICT 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 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 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 

Date 08/03/16

Once complete, email to: SPLReview@cleanwaterservices.org • Fax: (503) 681-4439
 OR mail to: SPL Review, Clean Water Services, 2550 SW Hillsboro Highway, Hillsboro, Oregon 97123

SISUL ENGINEERING

A Division of Sisul Enterprises, Inc.

375 PORTLAND AVENUE, GLADSTONE, OREGON 97027

(503) 657-0188

September 22, 2016

FAX (503) 657-5779

City of Tualatin
Engineering Division
18880 SW Martinazzi Ave
Tualatin, OR 97062

ATTN: Tony Doran

RE: FHA Industrial Building on Itel Stormwater Management

Dear Tony:

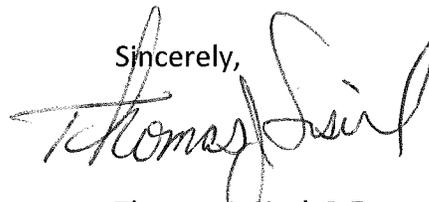
We appreciate the City's and Clean Water Services cooperation in accepting the proposed industrial development off of Itel Street to use the existing stormwater facility constructed in the early 2000s with the La-Z-Boy development for stormwater management.

After reviewing the stormwater calculations provided to our office, by the City, we have no reservations to the methods that were used in designing the current stormwater facility. Upon further investigation on our end, it was determined that the pervious area previously accounted for in the La-Z-Boy post-developed calculations will actually be approximately 16% larger than previously accounted for. This would then make the post-developed impervious area less than previously accounted for and thus making the post-developed runoff slightly less than originally designed. This would then confirm that the current stormwater facility will sufficiently provide treatment and detention capacity from the Itel property.

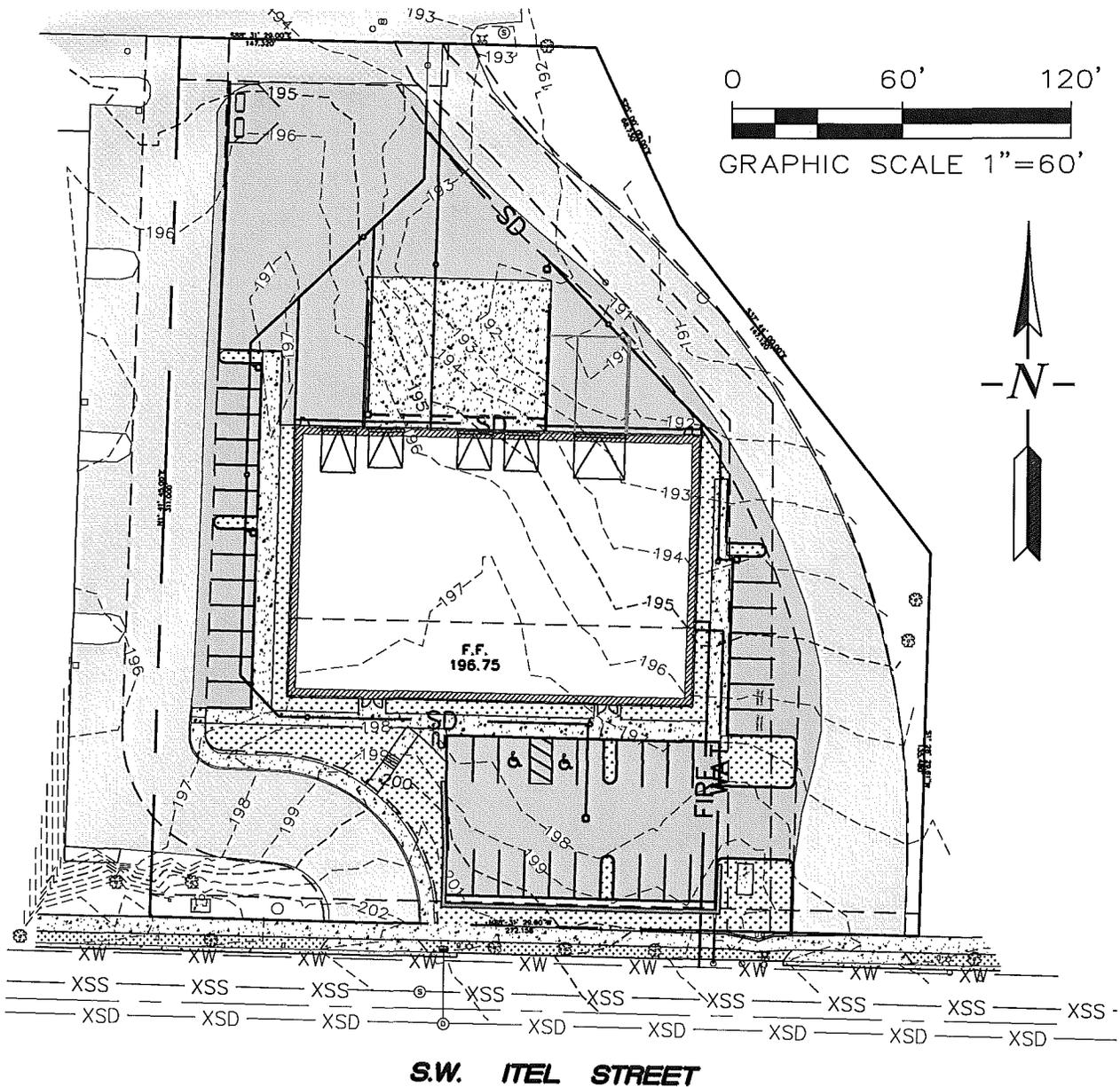
A 12" storm stub was constructed on the Itel property as part of the La-Z-Boy development to pick up stormwater runoff once the Itel property is developed. This 12" storm stub installed will adequately convey runoff from the Itel development to the current stormwater facility and not overwhelm the storm line.

If you have any questions regarding the project that I may be able to help you with, please feel free to give me a call.

Sincerely,



Thomas J. Sisul, P.E.



TOTAL SITE AREA: 1.66 ACRES

PRE-DEVELOPED AREA
 PERVIOUS AREA - 1.25 ACRES
 IMPERVIOUS AREA - 0.41 ACRES

POST DEVELOPED AREA
 PERVIOUS AREA - 0.28 ACRES
 IMPERVIOUS AREA - 1.38 ACRES

REGISTERED PROFESSIONAL
 ENGINEER
 12,820
Thomas J. Sisul
 OREGON
 FEB 14, 1985
 THOMAS J. SISUL
 DATE 9-22-16
 EXPIRES: 6/30/18

FHA INDUSTRIAL BUILDING
 ON ITEL STREET
 SITE AREA

DATE	SEPT. 2016
SCALE	1"=60'
DRAWN	JVM
JOB	SGL 16-053

SISUL ENGINEERING
 375 PORTLAND AVENUE
 GLADSTONE, OREGON 97027
 (503) 657-0188

VLMK

CONSULTING ENGINEERS

3933 SW Kelly Avenue • Portland • Oregon 97201-4393

P 503.222.4453
F 503.248.9263
E vlmk@vlmk.com
W www.vlmk.com

STORMWATER CALCULATIONS

for

LA-Z-BOY WAREHOUSE / ITEL PROPERTY

S.W. TUALATIN-SHERWOOD ROAD
TUALATIN, OREGON

June 4, 2002



CITY OF TUALATIN
ARCHITECTURAL REVIEW
1st SUBMITTAL

DATE: AR-02-09

CITY OF TUALATIN
RECEIVED

JUN 12 2002

PLANNING

Prepared by: Brian Dubal

VLMK Job Number 201539.2

LA-Z-BOY WAREHOUSE/ITEL PROPERTY (Lot 3)

Tualatin, Oregon

STORMWATER REPORT

June 4, 2002

TABLE OF CONTENTS

I. Site and Project Information	
1. Site Vicinity Map	1
2. Project Information	2
3. Stormwater Narrative	3 - 4
II. On-site Stormwater Facilities for La-z-boy/Itel Property (Lot 3) Site	
A. Water Quality/Detention Facility Design	
1. Pre & Post Development Areas	6
2. Water Quality Calculations	7
3. SBUH Information Summary	8
4. Routing Calculations	9 - 10
5. Pond Volumes & Peak Elevations	11
6. WQ Control Calculations	12
7. Pond Plan	13
8. Pond Sections & Outflow Control Structure	14

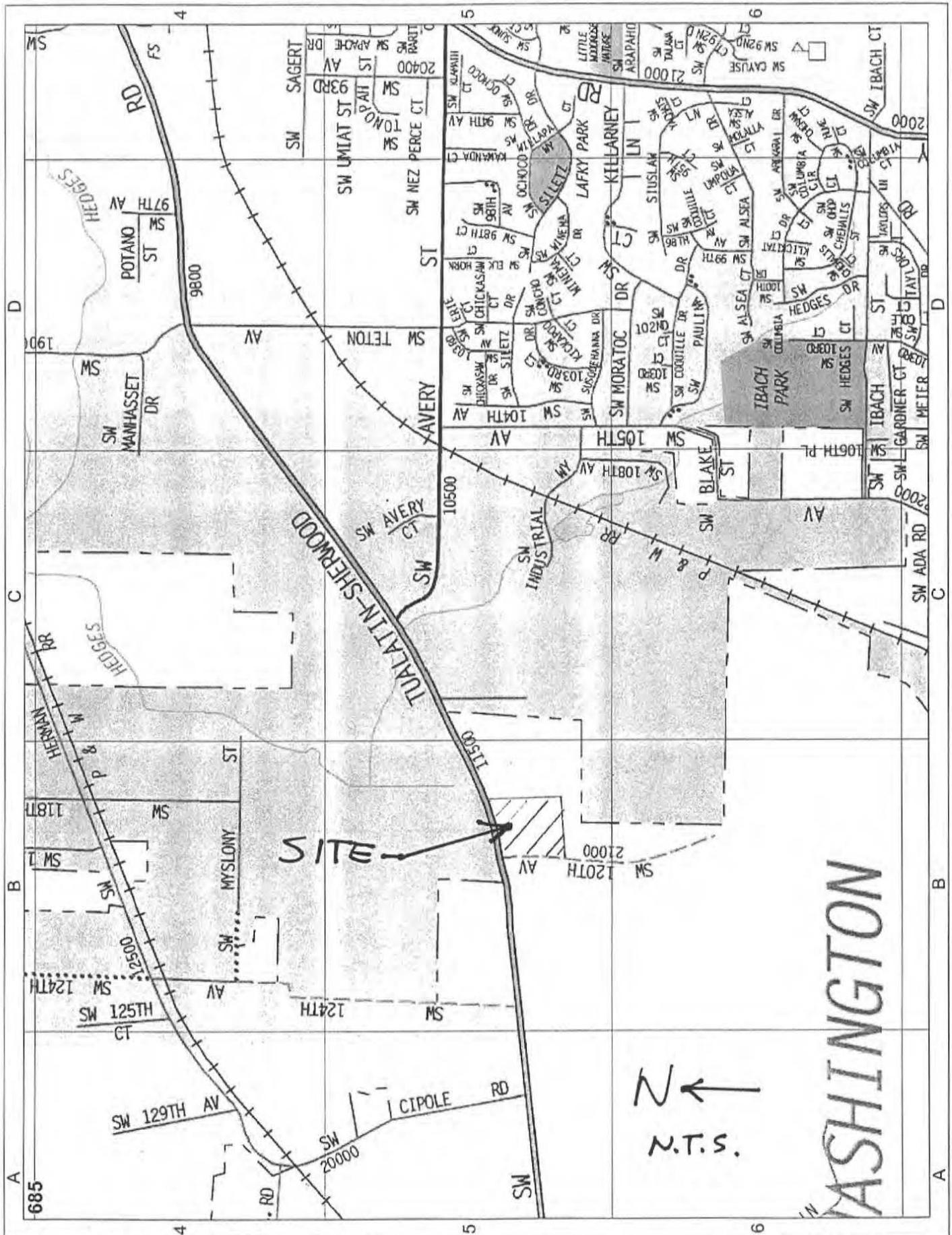
LA-Z-BU / WAREHOUSE/ITEL PROPERTY (Lot 3)
Tualatin, Oregon

STORMWATER REPORT

APPENDIX

A. USDA SCS Soil Survey and hydrologic classification	A1 thru A3
B. SCS Runoff Curve number Tables	B1 thru B2
C. Time of Concentration Flow Paths, Calcs. & Backup Info	C1 thru C7
D. Design Storms per CWS	D1
E. On-site SBUH Calculations	E1 thru E5

VINITY MAP



PROJECT INFORMATION

The proposed project is located along SW Tualatin-Sherwood Road adjacent to the east side of 120th Avenue on lot 3 of the Itel Property located on a portion of NW & NE ¼ Sec. 27, T.2S, R.1W., W.M., in the City of Tualatin, Washington County, Oregon. Lot 3 of the Itel Property is approximately 7.120 Acres in size. About 3.49 Acres, the northern half of Lot 3 that is directly adjacent to Tualatin-Sherwood Road, is to be developed for the La-z-boy Warehouse. The full build-out of the remainder of the Itel Property Lot 3 will be accommodated in the water quality/detention facility constructed with the La-z-boy warehouse.

The proposed development will involve:

- ◆ The construction of a 65,938 sq. ft. building and site development of 3.49 Acres of the Itel Property (Lot 3) for the La-z-boy Warehouse.
- ◆ The construction of sanitary and storm sewers for the future build-out of the remainder of the Itel property (Lot 3) – approximately 3.63 Acres.

Survey information used is from a boundary and topographic survey of Lot 3 of the Itel Property located on a portion of NW & NE ¼ Sec. 27, T.2S., R.1W., W.M., in the City of Tualatin, Washington County, Oregon. The survey dated April 2, 2002 was provided by Weddle & Associates, Inc. (1750 SW Skyline Blvd., Suite 105., Portland, Oregon 97221, phone: 503-292-8083).

Additional as-built information used was obtained from CIDA (4445 SW Barbur Blvd., Suite 200, Portland, Oregon 97201, phone: 503-226-1285).

All stormwater facilities and conveyance systems for this development have been designed per the Unified Sewerage Agency (USA) "Design & Construction Standards for Sanitary Sewer and Surface Water Management" manual dated February 2000.

Additional design information used was obtained from:

- The USDA SCS "Soil Survey of Washington County"
- USDA SCS TR-55 "Urban Hydrology for Small Watersheds" (2nd Ed., June 1986)

Software used in design:

- King County 'HYD' program, version 4.21B
- Haestad Methods 'FlowMaster' program, version 5
- Microsoft EXCEL95
- AutoCad 14.0

On-site Stormwater Facilities for La-z-boy Warehouse/Itel Property (Lot 3)

On-site storm runoff from paved areas, roof areas and some landscaping areas will be routed to "trapped" catch basin that discharge the stormwater to the on-site water quality/detention facility. This facility has been designed as an "Extended Dry Detention Pond" as defined in the USA design manual. As required in the design manual the "trapped" catch basins will provide a 15% removal credit and the pond will provide a 50% removal credit, meeting the 65% USA requirement. A minimum 1-ft of freeboard has been provided above the peak water surface elevation of the post-development 25-year event in the pond.

Sedimentation is the most significant unit process used in stormwater management for reducing the concentrations of priority pollutants in stormwater. This facility has been designed to maximize sedimentation of the suspended solids in the pond influent. As most pollutants (Phosphorous, Nitrogen, metals, etc.) sorb to suspended solids, the greater the amount of suspended solids that settle out, the lower the pollutant concentrations in the effluent.

Discharge into the pond is via a forebay located at the west end of the facility. This forebay will maximize sedimentation of suspended solids from the stormwater, especially for the smaller storm events, as these normally tend to be of lower intensity and duration than the design Water Quality Event (0.36" in 4 hours). The total surface area of the water quality event in the forebay is approximately 26.30% of the total water quality surface area, exceeding the USA requirement of 20%. The water quality volume in the forebay (1580.95 c.f.) is 20.93% of the total treatment volume provided (7555.17 c.f.), slightly exceeding the USA requirement of 20% of the total volume in the forebay.

The elevation of the bottom of the pond as used in design is 161.00. There is a 0.4-ft "permanent" pool in the bottom the pond (at elevation 160.60), as required in the USA design manual, will encourage various process in the underlying soil (at the bottom of the pond) such as aerobic reduction of organics, bacteria nitrification (breakdown of organic nitrogen), sorption of metals to organics in soils, precipitation of carbonates and phosphates, reduction of iron and sulfates, etc. when this depth of water or greater is maintained for more than a day or two.

The minimum required Water Quality Volume (WQV) has been calculated to be 7,486.31 c.f. (0.36" dev. in 4 hrs over impervious area) and the required Water Quality Flow (WQF) has been calculated to be 0.043 cubic feet per second (draw-down time, T = 48 hrs). The peak water quality surface elevation will be 163.47. This elevation will provide about 68.86 cubic feet more than required in the water quality portion of the facility. See the following pages for these calculations.

Stormwater Quantity control has been designed to release post-development design events (2, 5, 10 and 25-year) at peak pre-development rates. The peak water surface elevation will be 165.59 for the post-development 25-year event. See the following pages for these calculations. The detention volume is "stacked" on top of the water quality volume in the pond during storm events larger than the water quality event. The detention storage on top of the water quality volume will increase the dynamic settling of suspended solids during the larger storm events and encourage overturn of the water in the system. Between storm events the extra volume of water will promote quiescent settling in the pond.

The following table shows the water quality and detention design information:

Water Quality/Detention Facility Design Information Summary (See report and appendix for calculations)					
Event	Precipitation (inches)	Duration (hours)	Pre- development Q (cfs)	Post- development Q (cfs)	Peak Water Surface Elevation in pond (ft)
Water Quality	0.36	4	n/a	0.043	163.47
2-year	2.50	24	1.24	3.78	164.52
5-year	3.10	24	1.84	4.85	164.94
10-year	3.45	24	2.21	5.49	165.16
25-year	3.90	24	2.70	6.31	165.45
					Elevation (ft)
Bottom of Pond					161.00
Bottom of Permanent Pool (per USA requirements)					160.60
Top of Bank for 1-ft freeboard					166.45

Water Quality outflow will be controlled by a 0.94" diameter orifice at an elevation of 160.25' in the outlet control structure. Detention control will be accomplished by two orifices located in the outlet control structure. The first being a 4.43" diameter orifice at an elevation of 160.00' and the second an 8.08" diameter orifice at an elevation of 164.77'. Events in excess of the 25-year event water surface level of 165.45 will overflow directly into the outlet control structure and out into the public system. Should the orifice become plugged the peak water surface level for the 25-year event will rise 0.57-ft above the peak 25-year water surface level to an elevation of 166.08. The outflow pipe from the control structure will have the capacity to convey the post-development 100-year event flowrate of 7.41 cfs (see "On-site SBUH calculations" in the Appendix).

All on-site conveyance pipes have been designed to convey the 25-year event flowrate as calculated using the Santa Barbara Unit Hydrograph method via King County's 'HYD' software. Haestad Methods "Flowmaster" software was used for pipe conveyance calculations. PVC pipe with a Manning's coefficient of 0.010 was used to size all onsite conveyance pipes.

On-site Stormwater Facilities for La-z-boy Warehouse/Itel Property

N
↑
SCALE: 1" = 80'



PRE & POST DEVELOPMENT AREAS

3.49 AC
+ 3.63 AC

TOTAL SITE AREA : 7.12 AC (310,145.05 FT²)

PRE-DEVELOPMENT

PERVIOUS AREA : 7.12 AC
IMPERVIOUS AREA : 0 AC.

POST-DEVELOPMENT

PERVIOUS AREA : 1.405 AC
IMPERVIOUS AREA : 5.715 AC

WATER QUALITY CALCULATIONS

REQ'D WATER QUALITY VOLUME = IMPERVIOUS AREA
x 0.36"
(PER USG/CWS STDS.)

∴ WATER QUALITY VOLUME (WQV):

$$WQV = 5.715 A_c \times 0.36'' \\ = 248,943.68 \text{ ft}^2 \times 0.36'' \times \frac{1 \text{ ft}}{12''}$$

$$WQV = 7,468.31 \text{ ft}^3$$

$$Q_{wq} = \frac{V}{t}$$

$$t = 48 \text{ HRS}$$

$$Q_{wq} = \frac{7468.31 \text{ ft}^3}{48 \text{ HRS} \times 3600 \text{ SEC/HR}}$$

$$Q_{wq} = 0.043 \text{ CFS}$$

SBUH INFORMATION Summary (SEE APPENDIX FOR SBUH COLLS.)

PRE-DEV

(7.12, 86, 0, 98, 42.39)

POST-DEV

(1.405, 74, 5.715, 98, 5)

DETENTION (QUANTITY CONTROL) PARAMETERS:

RELEASE POST-DEV EVENTS AT PEAK PRE-DEV RATES.

24-HR STORM EVENT

PRECIPITATION

DETENTION {	2-YR	2.50"
	5-YR	3.10"
	10-YR	3.45"
	25-YR	3.90"
OVERFLOW —	100-YR	4.50"

KING COUNTY DEPARTMENT OF PUBLIC WORKS
Surface Water Management Division

HYDROGRAPH PROGRAMS
Version 4.21B

ROUTING CALCULATIONS

- 1 - INFO ON THIS PROGRAM
- 2 - SBUHYD
- 3 - MODIFIED SBUHYD
- 4 - ROUTE
- 5 - ROUTE2
- 6 - ADDHYD
- 7 - BASEFLOW
- 8 - PLOTHYD
- 9 - DATA
- 10 - RDFAC
- 11 - RETURN TO DOS

ENTER OPTION:

10

R/D FACILITY DESIGN ROUTINE

SPECIFY TYPE OF R/D FACILITY:

- 1 - POND
- 2 - TANK
- 3 - VAULT
- 4 - INFILTRATION POND
- 5 - INFILTRATION TANK
- 6 - GRAVEL TRENCH/BED

1

ENTER: POND SIDE SLOPE (HORIZ. COMPONENT)

3

ENTER: EFFECTIVE STORAGE DEPTH(ft) BEFORE OVERFLOW

1.98

ENTER [d:][path]filename[.ext] OF PRIMARY DESIGN INFLOW HYDROGRAPH: (25-YR POST)
c:\0drawing\201539.2\25post.hyd

PRIMARY DESIGN INFLOW PEAK = 6.31 CFS

ENTER PRIMARY DESIGN RELEASE RATE(cfs):

2.70

ENTER NUMBER OF INFLOW HYDROGRAPHS TO BE TESTED FOR PERFORMANCE (5 MAXIMUM):

3

ENTER [d:][path]filename[.ext] OF HYDROGRAPH 1: (10-YR POST)
c:\0drawing\201539.2\10post.hyd

ENTER TARGET RELEASE RATE(cfs):

2.21

ENTER [d:][path]filename[.ext] OF HYDROGRAPH 2: (5-YR POST)
c:\0drawing\201539.2\5post.hyd

ENTER TARGET RELEASE RATE(cfs):

1.84

ENTER [d:][path]filename[.ext] OF HYDROGRAPH 3: (2-YR POST)
c:\0drawing\201539.2\2post.hyd

ENTER TARGET RELEASE RATE(cfs):

1.24

ENTER: NUMBER OF ORIFICES, RISER-HEAD(ft), RISER-DIAMETER(in)

2,5.45,18

RISER OVERFLOW DEPTH FOR PRIMARY PEAK INFLOW = .57 FT

SPECIFY ITERATION DISPLAY: Y - YES, N - NO

y

SPECIFY: R - REVIEW/REVISE INPUT, C - CONTINUE

c

INITIAL STORAGE VALUE FOR ITERATION PURPOSES: 31941 CU-FT

BOTTOM ORIFICE: ENTER Q-MAX(cfs)

1.24

DIA.= 4.43 INCHES

TOP ORIFICE: ENTER HEIGHT(ft)

4.77

DIA.= 8.08 INCHES

ITERATION COMPUTATION BEGINS...

TRIAL	BOTTOM-AREA	STOR-AVAIL	STOR-USED	PK-STAGE	PK-OUTFLOW
1	14564.1	31941	16525	4.54	1.13
2	10877.8	24233	15644	4.80	1.30
3	8838.5	19939	13769	4.89	1.74
4	7382.5	16854	12632	5.00	1.98
5	6391.7	14743	11991	5.12	2.16
6	5748.7	13367	11614	5.22	2.33
7	5340.5	12490	11386	5.29	2.45
8	5084.2	11938	11230	5.34	2.53
9	4919.9	11584	11124	5.38	2.59
10	4813.3	11354	11052	5.40	2.62
11	4743.4	11203	10982	5.42	2.64
12	4692.2	11092	10928	5.42	2.66
13	4654.3	11010	10888	5.43	2.67
14	4626.0	10949	10858	5.44	2.68
15	4604.9	10903	10835	5.44	2.68
16	4589.1	10869	10818	5.44	2.69
17	4577.3	10844	10805	5.44	2.69
18	4568.4	10824	10796	5.45	2.69
19	4561.7	10810	10788	5.45	2.69
20	4556.7	10799	10783	5.45	2.70
21	4553.0	10791	10779	5.45	2.70
22	4550.1	10785	10776	5.45	2.70

PERFORMANCE:	INFLOW	TARGET-OUTFLOW	ACTUAL-OUTFLOW	PK-STAGE	STORAGE	
DESIGN HYD:	6.31	2.70	2.70	5.45	10776	CF FOR 25-YR EVENT
TEST HYD 1:	5.49	2.21	2.18	5.12	8780	CF FOR 10-YR EVENT
TEST HYD 2:	4.85	1.84	1.83	4.91	7470	CF FOR 5-YR EVENT
TEST HYD 3:	3.78	1.24	1.13	4.51	5230	CF FOR 2-YR EVENT

SPECIFY: D - DOCUMENT, R - REVISE, A - ADJUST ORIF, E - ENLARGE, S - STOP

POND VOLUMES & PEAK ELEVATIONS

Forebay				
Stage (ft)	Area (sf)	Volume (cf) (Ac-ft)		Storage (cf)
161	218.02	0.00	0.00	0.00
162	522.15	370.09	0.0085	370.09
163	926.91	724.53	0.0166	1094.62
163.47	1142.61	486.34	0.0112	1580.95
wq in main pond				
Stage (ft)	Area (sf)	Volume (cf) (Ac-ft)		Storage (cf)
161	1758.11	0.00	0.00	0.00
162	2268.50	2013.31	0.0462	2013.31
163	2843.26	2555.88	0.0587	4569.19
163.47	3135.63	1405.04	0.0323	5974.22
pond above spillway elev				
Stage (ft)	Area (sf)	Volume (cf) (Ac-ft)		Storage (cf)
163.47	4345.22	0.00	0.00	0.00
164	4851.00	2437.00	0.0559	2437.00
165	5839.50	5345.25	0.1227	7782.25
166	6900.12	6369.81	0.1462	14152.06

Total cumulative pond storage capacity				
Stage (ft)	Area (sf)	Volume (cf) (Ac-ft)		Storage (cf)
161	1976.13	0.00	0.00	0.00
162	2790.65	2383.39	0.0547	2383.39
163	3770.17	3280.41	0.0753	5663.80
163.47	4345.22	1907.12	0.0438	7570.92
164	4851.00	2437.00	0.0559	10007.91
165	5839.50	5345.25	0.1227	15353.16
166	6900.12	6369.81	0.1462	21722.97

EVENT

PEAK VOLUME REQ'D

PEAK W.S.E.

WQ
2-YR
5-YR
10-YR
25-YR

7570.92 + 0 = 7570.92 CF
7570.92 + 5230 = 12800.92 CF
7570.92 + 7470 = 15040.92 CF
7570.92 + 8780 = 16350.92 CF
7570.92 + 10776 = 18346.92 CF

163.47 FT
164.52 FT
164.94 FT
165.16 FT
165.45 FT

1-FT FREE-BOARD ELEV. = 166.45 FT

WQ CONTROL CALCULATION

PEAK WQ WSE: 163.47

BOTTOM OF POND: 161.00

2.47

WQ ORIFICE C.L. 9" (.75 ft) BELOW BOTTOM OF POND.

$\therefore H_{wq} = 2.47 + .75 = 3.22 \text{ FT}$

ORIFICE EQN: $Q = CA(ZgH_{wq})^{1/2}$

$C = 0.62 \quad g = 32.2 \text{ ft/s}^2$

$Q = 0.043 \text{ CFS}$

SOLVE FOR A

$\therefore A = \frac{Q}{C(ZgH_{wq})^{1/2}} = \frac{0.043 \text{ ft}^3/\text{SEC}}{0.62(2 \times 32.2 \text{ ft/s}^2 \times 3.22 \text{ ft})^{1/2}}$

$A = 0.0048 \text{ FT}^2$

$A = \pi r^2 \Rightarrow r = \left(\frac{A}{\pi}\right)^{1/2} = \left(\frac{0.0048 \text{ FT}^2}{\pi}\right)^{1/2} = 0.039 \text{ ft}$

$r = 0.039 \text{ ft}$

$d = 2 \times r = 0.078 \text{ ft} = 0.94 \text{''}$

\therefore USE (1) 0.94" DIA. ORIFICE AT C.L. ELEV 160.25 FOR WQ CONTROL

59.7

Plan, Plan

* SEE FOLLOWING PG. FOR SECTIONS.

TULALIP - SHELWOOD RD



SCALE: 1" = 30'

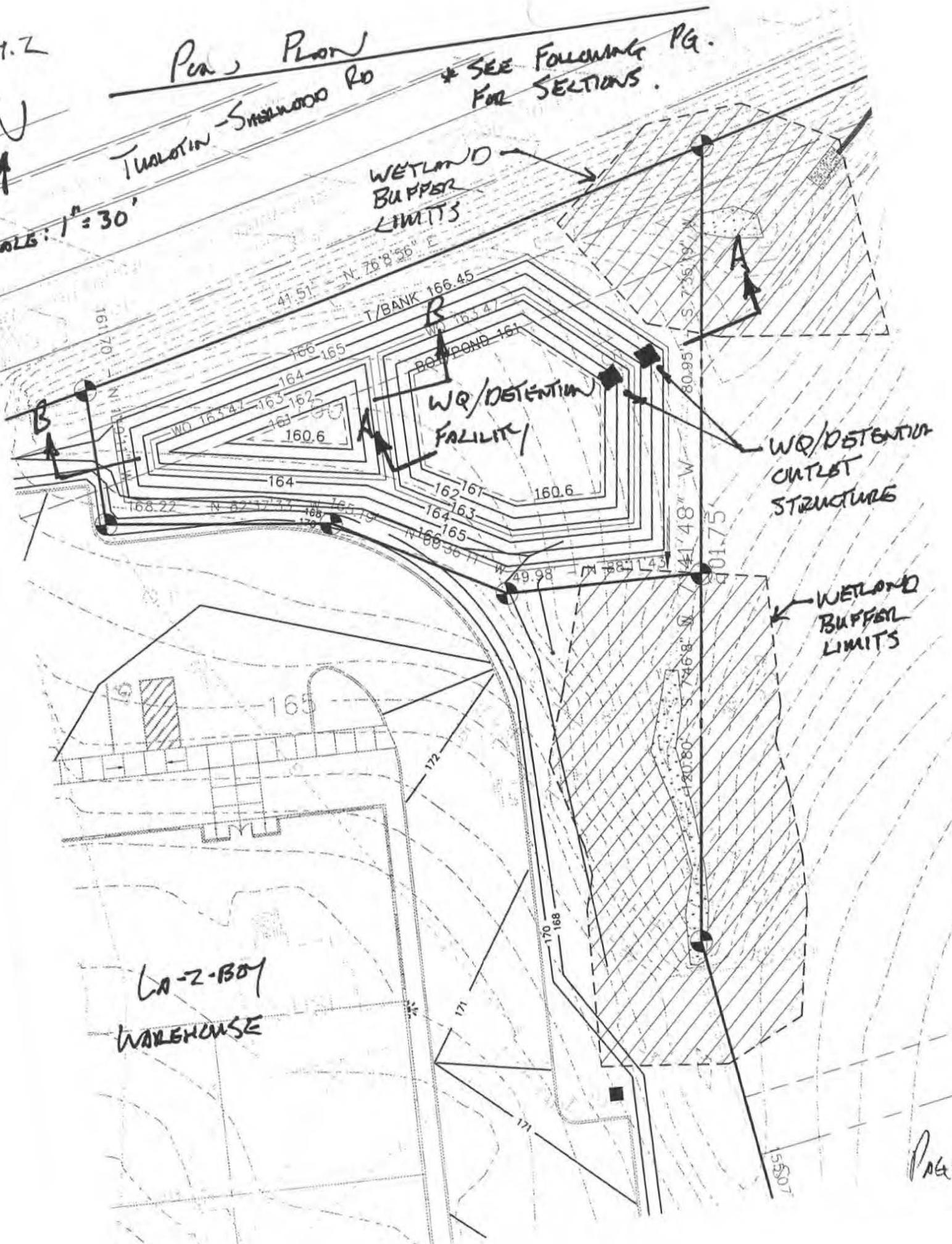
WETLAND BUFFER LIMITS

WQ/DETENTION OUTLET STRUCTURE

WETLAND BUFFER LIMITS

WQ/DETENTION FACILITY

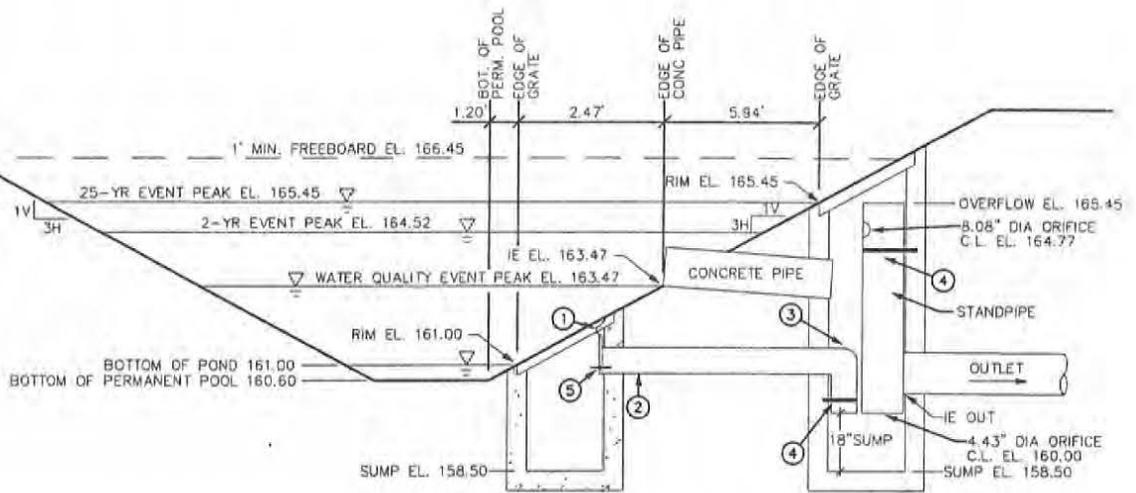
LA-2-B01 WAREHOUSE



POND SECTIONS & OUTFLOW CONTROL STRUCTURE

NOTES

1. ALL GRATES ON BASINS SHALL BE PER USA DWG. # 260.
2. CONCRETE BASIN WALL SECTIONS AND INTERIOR DIMENSIONS SHALL BE PER USA DWG. # 250.
3. SEE LANDSCAPING PLAN FOR POND PLANTINGS.
4. NEATLY GRADE POND WALLS AROUND GRATE RIMS.



Water Quality/Detention Facility Design Information Summary
(See report and appendix for calculations)

Event	Precipitation (inches)	Duration (hours)	Pre-development Q (cfs)	Post-development Q (cfs)	Peak Water Surface Elevation in pond (ft)
Water Quality	0.36	4	n/a	0.043	163.47
2-year	2.50	24	1.24	3.78	164.52
5-year	3.10	24	1.84	4.85	164.94
10-year	3.45	24	2.21	5.49	165.16
25-year	3.90	24	2.70	6.31	165.45

Elevation (ft)	Description
161.00	Bottom of Pond
160.60	Bottom of Permanent Pool (per USA requirements)
166.45	Top of Bank for 1-ft freeboard

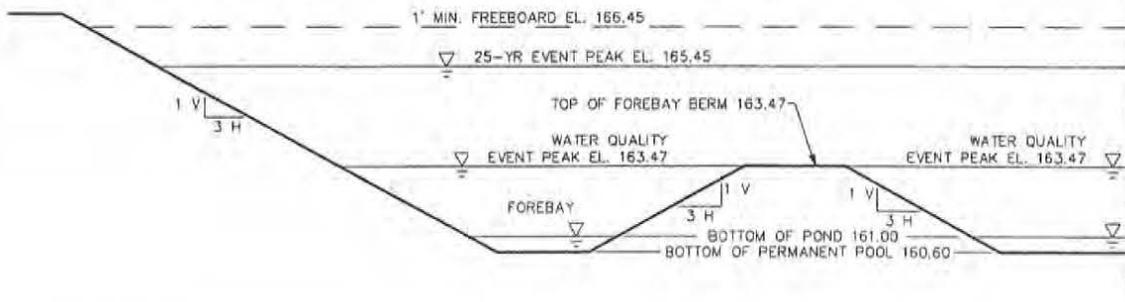
KEYNOTES

- ① 3/16" S.S. CABLE OR CHAIN
- ② 8" DIA. C-900 OR D.I.P.
- ③ 8" DIA. C-900 OR D.I.P. ELBOW (90°)
- ④ 2" STAINLESS STEEL STRAP
- ⑤ FRP PLATE & GUIDE (WATER QUALITY CONTROL)
0.94" DIA. ORIFICE AT C.I. EL 160.25
- SIM TO FRP PLATE & GUIDE DETAIL PER USA DWG. # 545

A-A
G-6

SECTION A-A

N.T.S.



B-B
G-6

SECTION B-B

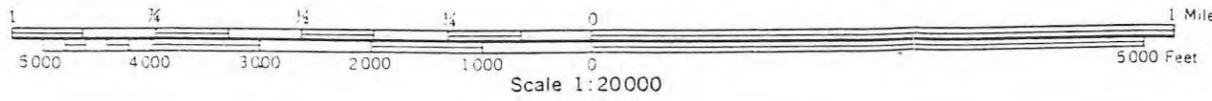
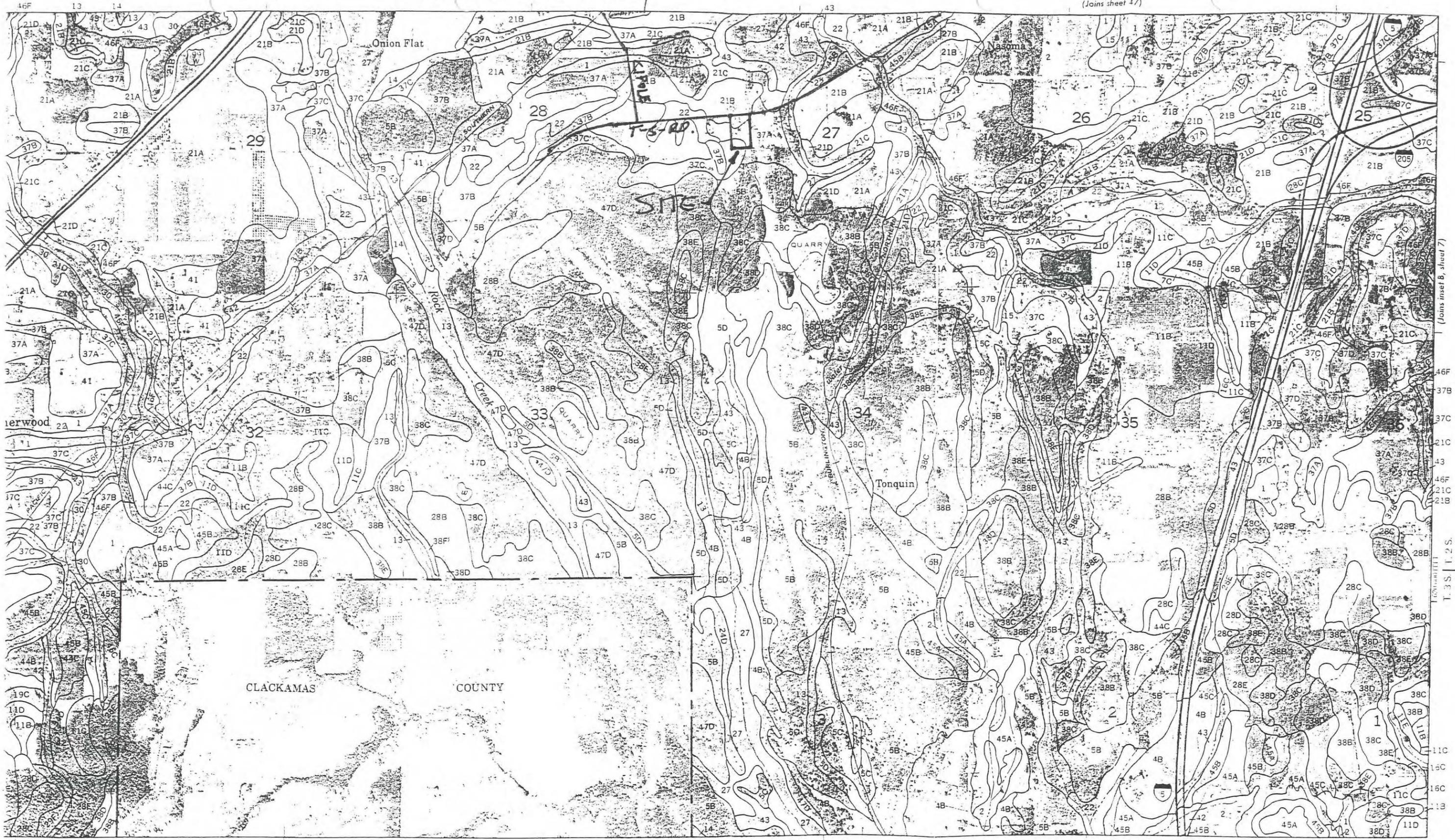
N.T.S.

APPENDIX

USDA SCS SOIL SURVEY

SECTION 49 SHEET NUMBER 49

(Joins sheet 47)



(Joins inset, sheet 48)

1:420,000 FEET

AI

201539.2

1100 SCS

TABLE 13.—Soil and

[Absence of an entry indicates the feature is not a concern. See Glossary for descriptions of such

Soil name and map symbol	Hydro-logic group	Flooding		
		Frequency	Duration	Months
Aloha: 1	C	None		
Amity: 2	C	None		
Astoria: 3E, 3F	B	None		
Briedwell: 4B, 5B, 5C, 5D	B	None		
Carlton: 6B, 6C	B	None		
Cascade: 7B, 7C, 7D, 7E, 7F	C	None		
Cehalem: 8C	C	None		
Cehalis: 9, 10	B	Common	Brief	Nov-Mar
Cornelius: ¹ 11B, ² 11C, ³ 11D, ⁴ 11E, ⁵ 11F; Cornelius part	C	None		
Kinton part	C	None		
Cornelius Variant: 12A, 12B, 12C	C	None		
Cove: 13, 14	D	Common	Brief	Dec-Apr
Dayton: 15	D	None		
Delena: 16C	D	None		
Goble: 17B, 17C, 17D, 17E, 18E, 18F	C	None		
Helvetia: 19B, 19C, 19D, 19E	C	None		
Hembre: 20E, 20F, 20G	B	None		
Hillsboro: 21A, 21B, 21C, 21D	B	None		
Huberly: 22	D	None		
Jory: 23B, 23C, 23D, 23E, 23F	C	None		
Kilchis: ¹ 24G: Kilchis part	C	None		
Klickitat part	B	None		

AZ

TABLE 13.—Soil and

Soil name and map symbol	Hydrologic group	Flooding		
		Frequency	Duration	Months
Klickitat: 25E, 25F, 25G -----	B	None -----		
Knappa: 26 -----	B	None -----		
Labish: 27 -----	D	Frequent -----	Very long -----	Dec-Apr -----
Laurelwood: 28B, 28C, 28D, 28E, 29E, 29F -----	B	None -----		
McBee: 30 -----	B	Frequent -----	Brief -----	Nov-May -----
Melbourne: 31B, 31C, 31D, 31E, 31F -----	B	None -----		
Melby: 32C, 32D, 32E, 33E, 33F, 33G -----	C	None -----		
Olyic: 34C, 34D, 34E, 35E, 35F, 35G -----	B	None -----		
Pervina: 36C, 36D, 36E, 36F -----	C	None -----		
→ Quatama: 37A, 37B, 37C, 37D -----	C	None -----		
Saum: 38B, 38C, 38D, 38E, 38F -----	C	None -----		
Tolke: 39E, 39F -----	B	None -----		
Udifuvents: 40 -----	B	Frequent -----	Very brief -----	Nov-Apr -----
Verboort: 42 -----	D	Frequent -----	Brief -----	Dec-Apr -----
Wapato: 43 -----	D	Frequent -----	Brief -----	Dec-Apr -----
Willamette: 44A, 44B, 44C, 44D -----	B	None -----		
Woodburn: 45A, 45B, 45C, 45D -----	C	None -----		
Xerochrepts: ¹ 46F: Xerochrepts part -----	B	None -----		
Haploxerolls part -----	C	None -----		
¹ 47D: Xerochrepts part -----	D	None -----		
Rock outcrop part.				

¹ This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TR-55 "URBAN HYDROLOGY FOR SMALL WATERSHEDS"

Table 2-2a.—Runoff curve numbers for urban areas¹

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area ²	A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
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
<i>Developing urban areas</i>					
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).					

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

²The 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.

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

⁴Composite 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.

⁵Composite 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.

-01559.2

TR-55 "WILSON HYDROLOGY FOR SMALL WATERSHEDS"

Table 2-2c.—Runoff curve numbers for other agricultural lands¹

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. ²	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. ³	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30	48	65	73
Woods—grass combination (orchard or tree farm). ⁵	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. ⁶	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

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

²Poor: <50% ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: >75% ground cover and lightly or only occasionally grazed.

³Poor: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

⁴Actual curve number is less than 30; use CN = 30 for runoff computations.

⁵CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

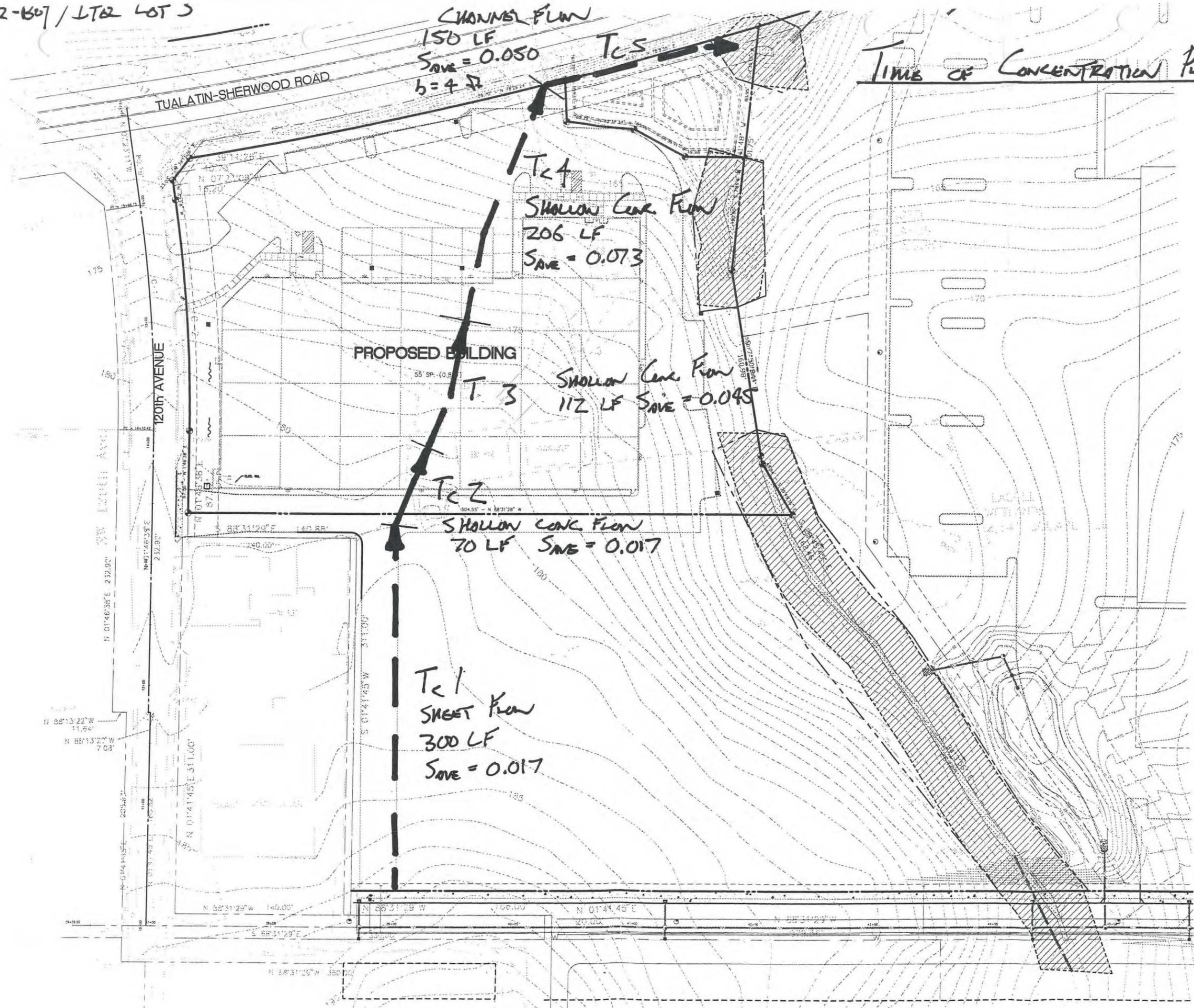
⁶Poor: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

BZ

Z01539.2 LA-2-607/LTA2 LOT 3



SCALE: 1"=80'



TIME OF CONCENTRATION FLOW PATH

TIME OF CONCENTRATION CALC.PRE-DEVELOPMENT T_{C1} : SHEET FLOW300 LF $S_{AVE} = 0.017$ FT/FT $n = 0.13$ $I = 2.50$

$$\text{SHEET FLOW EQN: } T_C = \frac{0.93 \times L^{0.6} \times n^{0.3}}{I^{0.4} \times S^{0.3}}$$

(PER USG/CMS)

$$T_C = \frac{0.93 \times (300)^{0.6} \times (0.13)^{0.3}}{(2.50)^{0.4} \times (0.017)^{0.3}} = 36.36$$

$$\underline{\underline{T_{C1} = 36.36 \text{ MINUTES}}}$$

 T_{C2} : SHALLOW CONC. FLOW70 LF $S_{AVE} = 0.017$ FT/FT $V_{AVE} = 0.95$ FT/SEC (USA DWG #720)

$$t = \frac{L}{V} = \frac{70 \text{ LF}}{0.95 \text{ FT/SEC}} = 73.68 \text{ SEC} = 1.23 \text{ MIN}$$

$$\underline{\underline{T_{C2} = 1.23 \text{ MINUTES}}}$$

 T_{C3} : SHALLOW CONC. FLOW112 LF $S_{AVE} = 0.045$ FT/FT $V_{AVE} = 1.53$ FT/SEC (USA DWG #720)

$$t = \frac{L}{V} = \frac{112 \text{ LF}}{1.53 \text{ FT/SEC}} = 73.20 \text{ SEC} = 1.22 \text{ MIN.}$$

$$\underline{\underline{T_{C3} = 1.22 \text{ MINUTES}}}$$

T_{c4} : SHALLOW CONC. FLOW
206 LF. $S = 0.073$ ft/ft

$V_{AVE} = 1.95$ ft/sec (USE DWG #720)

$$t = \frac{L}{V} = \frac{206 \text{ LF}}{1.95 \text{ ft/sec}} = 105.64 \text{ SEC} = 1.76 \text{ min}$$

$T_{c4} = 1.76$ MINUTES

T_{c5} : CHANNEL FLOW

150 LF $S_{AVE} = 0.050$ ft/ft

$B = 4$ ft AVE $SS_{AVE} = 2\frac{1}{2} H \cdot IV$

$V_{AVE} = 1.37$ ft/sec (SEE FLOWMASTER CALC.)

$$t = \frac{L}{V} = \frac{150 \text{ LF}}{1.37 \text{ ft/sec}} = 109.49 \text{ SEC} = 1.82 \text{ min.}$$

$T_{c5} = 1.82$ MINUTES

$T_c \text{ PRE} =$
36.36
1.23
1.22
1.76
+ 1.82

42.39 MINUTES = $T_c \text{ PRE}$ ←

$T_c \text{ POST}$: 5.0 MINUTES ASSUMED FOR $T_c \text{ POST}$

5.0 MINUTES = $T_c \text{ POST}$ ←

Tc 5 : Channel Flow
Worksheet for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	201539.2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Discharge

Input Data	
Mannings Coefficient	0.130
Channel Slope	0.050000 ft/ft
Depth	0.50 ft
Left Side Slope	2.500000 H : V
Right Side Slope	2.500000 H : V
Bottom Width	4.00 ft

Results		
Discharge	3.59	cfs
Flow Area	2.63	ft ²
Wetted Perimeter	6.69	ft
Top Width	6.50	ft
Critical Depth	0.28	ft
Critical Slope	0.406563	ft/ft
Velocity	1.37	ft/s
Velocity Head	0.03	ft
Specific Energy	0.53	ft
Froude Number	0.38	
Flow is subcritical.		

CA

When developing the runoff hydrograph, the above equation for Q_d is used to compute the incremental runoff depth for each time interval from the incremental precipitation depth given by the design storm hyetograph. This time distribution runoff depth is often referred to as the precipitation excess and provides the basis for synthesizing the runoff hydrograph.

d) Time of Concentration:

Time of concentration (T_c) is the time for runoff to travel from the hydraulically most distant point of the watershed to the point where the hydrograph is to be calculated. Travel time (T_t) is the time it takes water to travel from one location to another in a watershed. T_t is a component of time of concentration (T_c). T_c is computed by summing all the travel times for consecutive components of the drainage conveyance system. T_c influences the shape and peak of the runoff hydrograph.

(1) Sheet Flow

Sheet flow is flow over plane surfaces. It usually occurs in the headwater of streams. For sheet flow up to 300 feet, use the kinematics solution below to directly compute T_t :

$$\text{Sheet Flow: } T_t = (0.93L^{0.6} \times n^{0.3}) / (I^{0.4} \times S^{0.3})$$

Where T_t = travel time (min)
 n = Manning's effective roughness coefficient for sheet flow
 L = flow length (ft)
 I = rainfall intensity in inches per hour
 S = slope of hydraulic grade line (ft/ft)

Sheet flow shall not be used for distances exceeding 300-feet.

(2) Shallow Concentrated Flow

For slopes less than 0.005 ft/ft the following equations can be used:

- a) For Unpaved Surfaces: $V = 16.1345 (S)^{0.5}$
 b) For Paved Surfaces: $V = 20.3282 (S)^{0.5}$

201557.4

From TR-55 "URBAN HYDROLOGY FOR SMALL WATERSHEDS" 2nd ed. 1986

Sheet flow

Sheet flow is flow over plane surfaces. It usually occurs in the headwater of streams. With sheet flow, the friction value (Manning's n) is an effective roughness coefficient that includes the effect of raindrop impact; drag over the plane surface; obstacles such as litter, crop ridges, and rocks; and erosion and transportation of sediment. These n values are for very shallow flow depths of about 0.1 foot or so. Table 3-1 gives Manning's n values for sheet flow for various surface conditions.

For sheet flow of less than 300 feet, use Manning's kinematic solution (Overton and Meadows 1976) to compute Tt:

Tt = (0.007 (nL)^0.8) / ((P2)^0.5 s^0.4) [Eq. 3-3]

Table 3-1.-Roughness coefficients (Manning's n) for sheet flow

Table with 2 columns: Surface description and n1. Rows include Smooth surfaces (concrete, asphalt, gravel, or bare soil) with n1 0.011; Fallow (no residue) with n1 0.05; Cultivated soils with residue cover <= 20% (n1 0.06) and > 20% (n1 0.17); Grass: Short grass prairie (n1 0.15), Dense grasses (n1 0.24), Bermudagrass (n1 0.41); Range (natural) with n1 0.13; Woods: Light underbrush (n1 0.40), Dense underbrush (n1 0.80).

1The n values are a composite of information compiled by Engman (1986). 2Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures. 3When selecting n, consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

where

- Tt = travel time (hr), n = Manning's roughness coefficient (table 3-1), L = flow length (ft), P2 = 2-year, 24-hour rainfall (in), and s = slope of hydraulic grade line (land slope, ft/ft).

This simplified form of the Manning's kinematic solution is based on the following: (1) shallow steady uniform flow, (2) constant intensity of rainfall excess (that part of a rain available for runoff), (3) rainfall duration of 24 hours, and (4) minor effect of infiltration on travel time. Rainfall depth can be obtained from appendix B.

Shallow concentrated flow

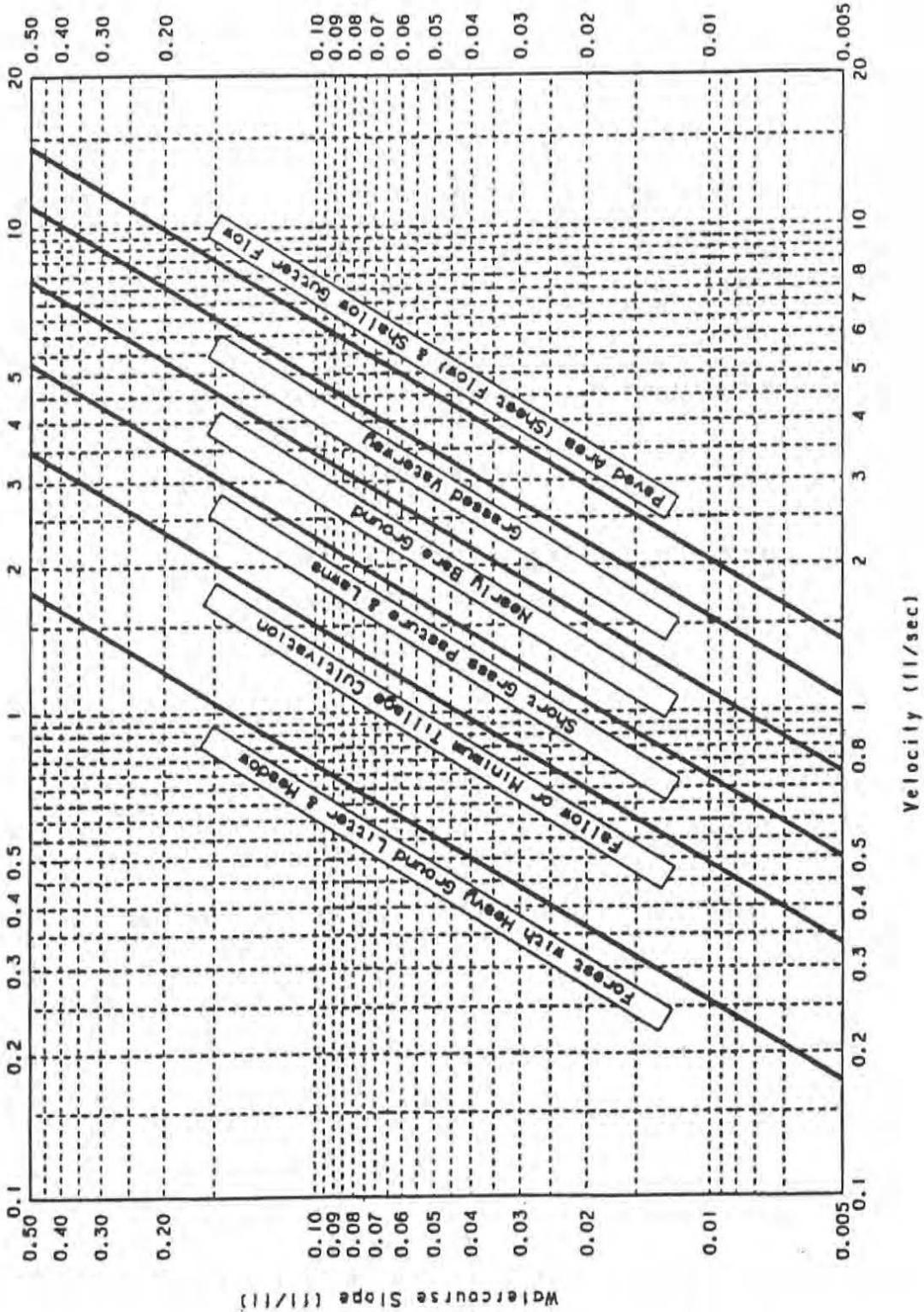
After a maximum of 300 feet, sheet flow usually becomes shallow concentrated flow. The average velocity for this flow can be determined from figure 3-1, in which average velocity is a function of watercourse slope and type of channel. For slopes less than 0.005 ft/ft, use equations given in appendix F for figure 3-1. Tillage can affect the direction of shallow concentrated flow. Flow may not always be directly down the watershed slope if tillage runs across the slope.

After determining average velocity in figure 3-1, use equation 3-1 to estimate travel time for the shallow concentrated flow segment.

Open channels

Open channels are assumed to begin where surveyed cross section information has been obtained, where channels are visible on aerial photographs, or where blue lines (indicating streams) appear on United States Geological Survey (USGS) quadrangle sheets. Manning's equation or water surface profile information can be used to estimate average flow velocity. Average flow velocity is usually determined for bank-full elevation.

46



AVERAGE VELOCITIES FOR ESTIMATING TRAVEL TIME FOR OVERLAND FLOWS*

*For use with the Rational Method only. From Soil Conservation Service, Tech. Release No. 55, January 1975



DESIGN STORMS PER CWS (USA)

b. The Design Storm

- 1) Return frequency and duration specify the design storm event. The design storms shall be based on two parameters:
 - a) Total rainfall (depth in inches).
 - b) Rainfall distribution (dimensionless).

c. Design Storm Distribution

- 1) The rainfall distribution to be used within the Agency is the design storm of 24-hour duration based on the standard NRCS Type 1A rainfall distribution using the chart on the following page. The total depth of rainfall for storms of 24-hour duration and 2, 5, 10, 25, 50 and 100 year recurrence are 2.50, 3.10, 3.45, 3.90, 4.20, 4.50 inches respectively.

Recurrence Interval (years)	Total Precipitation Depth (in)
2	2.50
5	3.10
10	3.45
25	3.90
50	4.20
100	4.50

SBUH/SCS METHOD FOR COM TING RUNOFF HYDROGRAPH

STORM OPTIONS:

- 1 - S.C.S. TYPE-1A
- 2 - 7-DAY DESIGN STORM
- 3 - STORM DATA FILE

ON-SITE SBUH CALCULATIONS

SPECIFY STORM OPTION:

1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION

ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)

2,24,2.50

***** S.C.S. TYPE-1A DISTRIBUTION *****

***** 2-YEAR 24-HOUR STORM **** 2.50" TOTAL PRECIP. *****

Pre-Dev

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1

7.12,86,0,98,42.39

DATA PRINT-OUT:

AREA(ACRES) PERVIOUS IMPERVIOUS TC(MINUTES)

A	CN	A	CN	TC
7.1	7.1	86.0	0	98.0

PEAK-Q(CFS) T-PEAK(HRS) VOL(CU-FT)

<u>1.24</u>	8.00	31866
-------------	------	-------

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:

C:/0DRAWING/201539.2/2PRE.HYD

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP

Post-Dev

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 2

1.405,74,5.715,98,5

DATA PRINT-OUT:

AREA(ACRES) PERVIOUS IMPERVIOUS TC(MINUTES)

A	CN	A	CN	TC
7.1	1.4	74.0	5.7	98.0

PEAK-Q(CFS) T-PEAK(HRS) VOL(CU-FT)

3.78	7.67	50209
------	------	-------

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:

C:/0DRAWING/201539.2/2POST.HYD

SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

- 1 - S.C.S. TYPE-1A
- 2 - 7-DAY DESIGN STORM
- 3 - STORM DATA FILE

SPECIFY STORM OPTION:

1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION

ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
5,24,3.10

***** S.C.S. TYPE-1A DISTRIBUTION *****

***** 5-YEAR 24-HOUR STORM **** 3.10" TOTAL PRECIP. *****

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1
7.12,86,0,98,42.39

DATA PRINT-OUT:

AREA(ACRES)		PERVIOUS		IMPERVIOUS		TC(MINUTES)
A	CN	A	CN	A	CN	
7.1	7.1	86.0	.0	98.0		42.4

PEAK-Q(CFS)	T-PEAK(HRS)	VOL(CU-FT)
<u>1.84</u>	8.00	44833

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
C:/DRAWING/201539.2/5PRE.HYD

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 2
1.405,74,5.715,98,5

DATA PRINT-OUT:

AREA(ACRES)		PERVIOUS		IMPERVIOUS		TC(MINUTES)
A	CN	A	CN	A	CN	
7.1	1.4	74.0	5.7	98.0		5.0

PEAK-Q(CFS)	T-PEAK(HRS)	VOL(CU-FT)
4.85	7.67	64453

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
C:/DRAWING/201539.2/5POST.HYD

SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

- 1 - S.C.S. TYPE-1A
- 2 - 7-DAY DESIGN STORM
- 3 - STORM DATA FILE

SPECIFY STORM OPTION:

1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION

ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)

10,24,3.45

***** S.C.S. TYPE-1A DISTRIBUTION *****

***** 10-YEAR 24-HOUR STORM **** 3.45" TOTAL PRECIP. *****

Pre-Dev

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1

7.12,86,0,98,42.39

DATA PRINT-OUT:

AREA(ACRES)	PERVIOUS	IMPERVIOUS	TC(MINUTES)
A CN	A CN		
7.1 7.1	86.0 .0	98.0	42.4

PEAK-Q(CFS)	T-PEAK(HRS)	VOL(CU-FT)
<u>2.21</u>	8.00	52684

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
C:/DRAWING/201539.2/10PRE.HYD

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP

Post-Dev

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 2

1.405,74,5.715,98,5

DATA PRINT-OUT:

AREA(ACRES)	PERVIOUS	IMPERVIOUS	TC(MINUTES)
A CN	A CN		
7.1 1.4	74.0 5.7	98.0	5.0

PEAK-Q(CFS)	T-PEAK(HRS)	VOL(CU-FT)
5.49	7.67	72878

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
C:/DRAWING/201539.2/10POST.HYD

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP

SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

- 1 - S.C.S. TYPE-1A
- 2 - 7-DAY DESIGN STORM
- 3 - STORM DATA FILE

SPECIFY STORM OPTION:

1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION

ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
25,24,3.90

***** S.C.S. TYPE-1A DISTRIBUTION *****
 ***** 25-YEAR 24-HOUR STORM **** 3.90" TOTAL PRECIP. *****

Pre-Dev

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1
7.12,86,0,98,42.39

DATA PRINT-OUT:

AREA(ACRES)	PERVIOUS	IMPERVIOUS	TC(MINUTES)
A CN	A CN		
7.1 7.1	86.0 .0	98.0	42.4

PEAK-Q(CFS)	T-PEAK(HRS)	VOL(CU-FT)
<u>2.70</u>	7.83	62878

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
C:/DRAWING/201539.2/25PRE.HYD

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP

Post-Dev

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 2
1.405,74,5.715,98,5

DATA PRINT-OUT:

AREA(ACRES)	PERVIOUS	IMPERVIOUS	TC(MINUTES)
A CN	A CN		
7.1 1.4	74.0 5.7	98.0	5.0

PEAK-Q(CFS)	T-PEAK(HRS)	VOL(CU-FT)
6.31	7.67	83808

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
C:/DRAWING/201539.2/25POST.HYD

E4

SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

- 1 - S.C.S. TYPE-1A
- 2 - 7-DAY DESIGN STORM
- 3 - STORM DATA FILE

SPECIFY STORM OPTION:

1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION

ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
100,24,4.50

***** S.C.S. TYPE-1A DISTRIBUTION *****
***** 100-YEAR 24-HOUR STORM **** 4.50" TOTAL PRECIP. *****

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1
1.405,74,5.715,98,5

DATA PRINT-OUT:

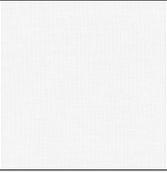
AREA(ACRES)	PERVIOUS	IMPERVIOUS	TC(MINUTES)
A	CN	A	CN
7.1	1.4	74.0	5.7 98.0 5.0

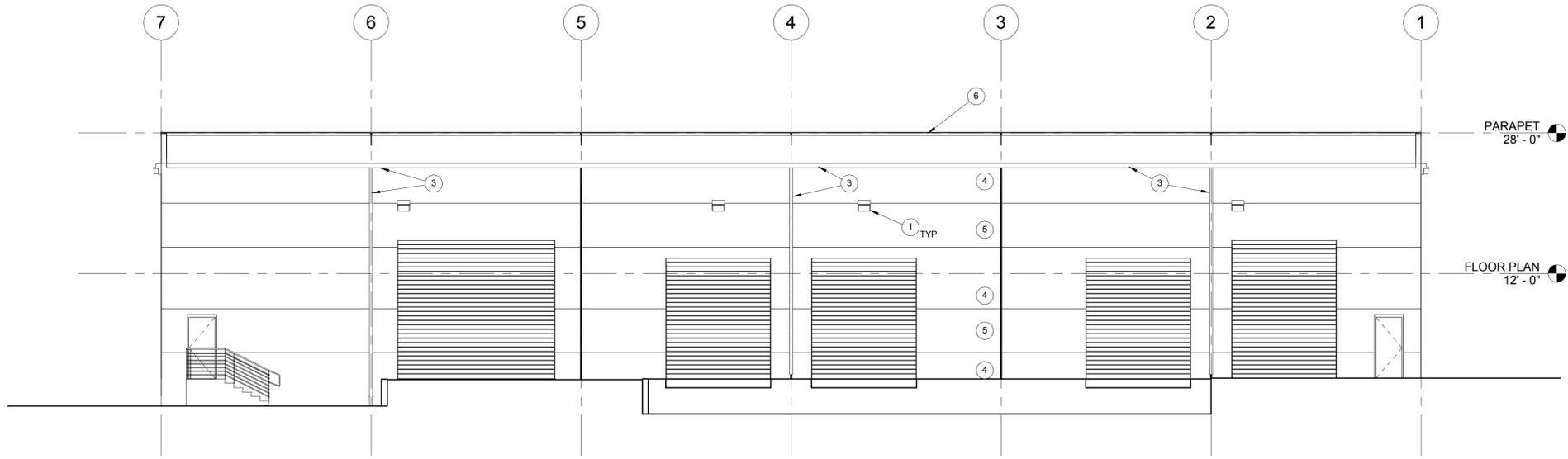
PEAK-Q(CFS)	T-PEAK(HRS)	VOL(CU-FT)
7.41	7.67	98518

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
C:\0DRAWING\201539.2\100POST.HYD

Post-Dev

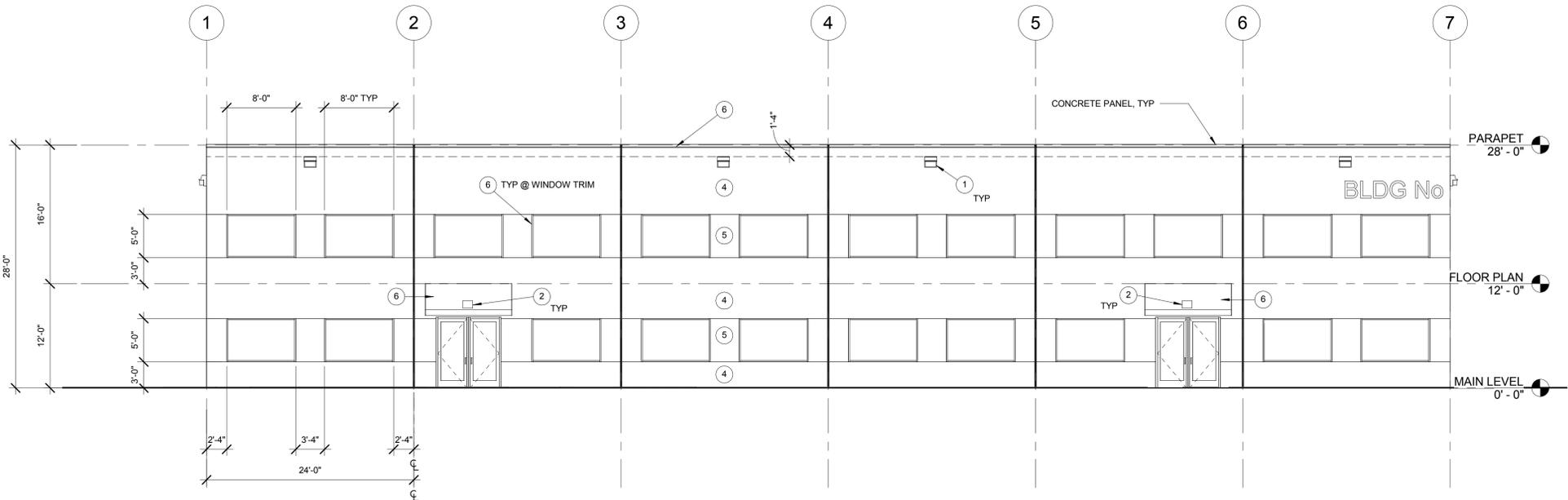
KEYNOTES	
1.	EXTERIOR SITE LIGHT, DOWNLIGHT CONFIGURATION, TYPICAL
2.	EXTERIOR SITE LIGHT UNDER AWNING
3.	GUTTER AND DOWNSPOUT
4.	ACCENT PAINT, COLOR P-1
5.	ACCENT PAINT, COLOR P-2
6.	ACCENT PAINT, COLOR P-3

PAINT SAMPLES	
	ACCENT PAINT, COLOR P-1
	ACCENT PAINT, COLOR P-2
	ACCENT PAINT, COLOR P-3



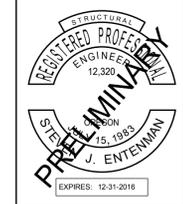
2 BACK ELEVATION
3.1 1/8" = 1'-0"

NOTE:
ALL EXTERIOR BUILDING SURFACES TO BE PAINTED.
SMOOTH CONCRETE WALLS, TYPICAL



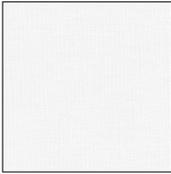
1 FRONT ELEVATION
3.1 1/8" = 1'-0"

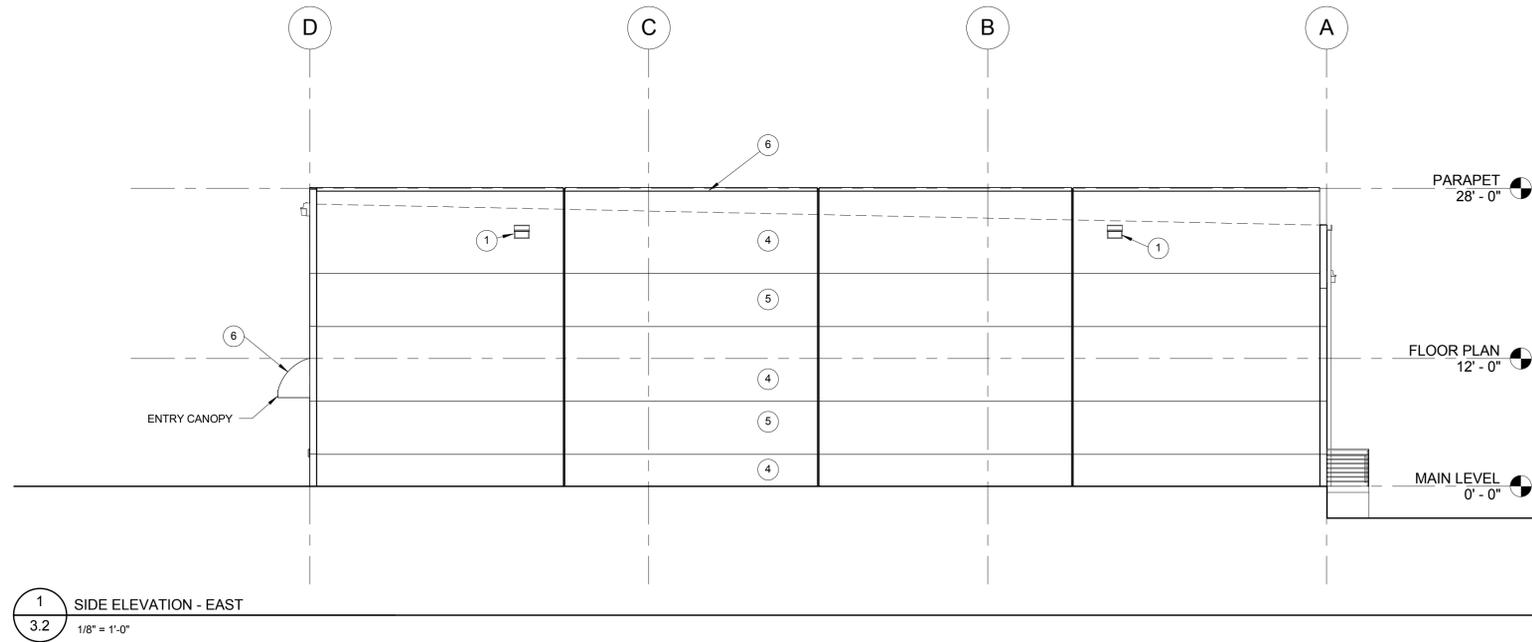
Harper Houf Peterson
Righellis Inc.
ENGINEERS • PLANNERS
LANDSCAPE ARCHITECTS • SURVEYORS
205 SE Spokane Street, Suite 200, Portland, OR 97202
phone: 503.221.1131 www.hhpr.com fax: 503.221.1171



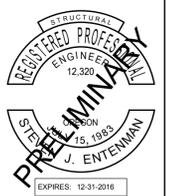
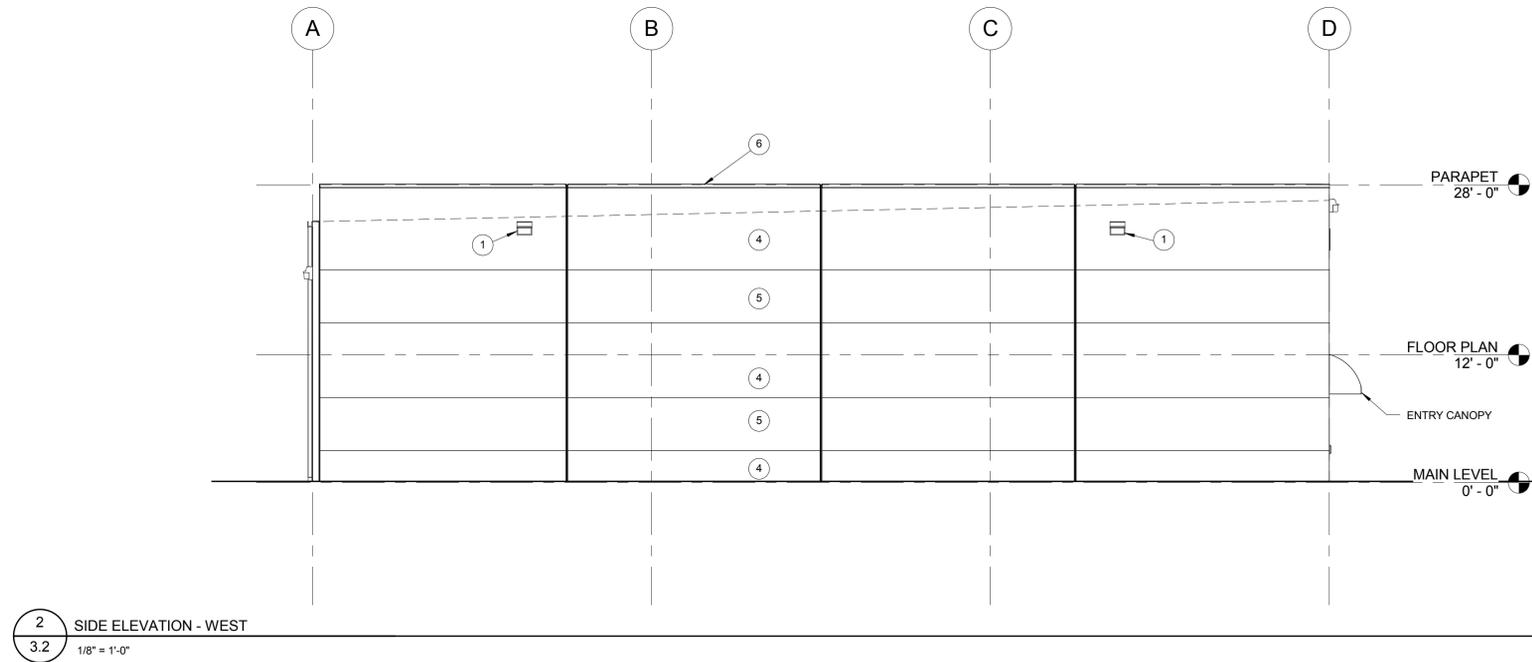
DESIGNED: ***	DRAWN: HHPR	CHECKED: ***	DATE: 09/15/2016
R E V I S I O N S			
NO.	DESCRIPTION	DATE	

KEYNOTES	
1.	EXTERIOR SITE LIGHT, DOWNLIGHT CONFIGURATION, TYPICAL.
2.	EXTERIOR SITE LIGHT UNDER AWNING.
3.	GUTTER AND DOWNSPOUT
4.	ACCENT PAINT, COLOR P-1
5.	ACCENT PAINT, COLOR P-2
6.	ACCENT PAINT, COLOR P-3

PAINT SAMPLES	
	ACCENT PAINT, COLOR P-1
	ACCENT PAINT, COLOR P-2
	ACCENT PAINT, COLOR P-3



NOTE:
ALL EXTERIOR BUILDING SURFACES TO BE PAINTED.
SMOOTH CONCRETE WALLS, TYPICAL



DESIGNED:	Designer	Author	Checker	DATE:	09/28/16
DRAWN:					
CHECKED:					

NO.	DESCRIPTION	DATE	R	E	V	I	S	I	O	N	S

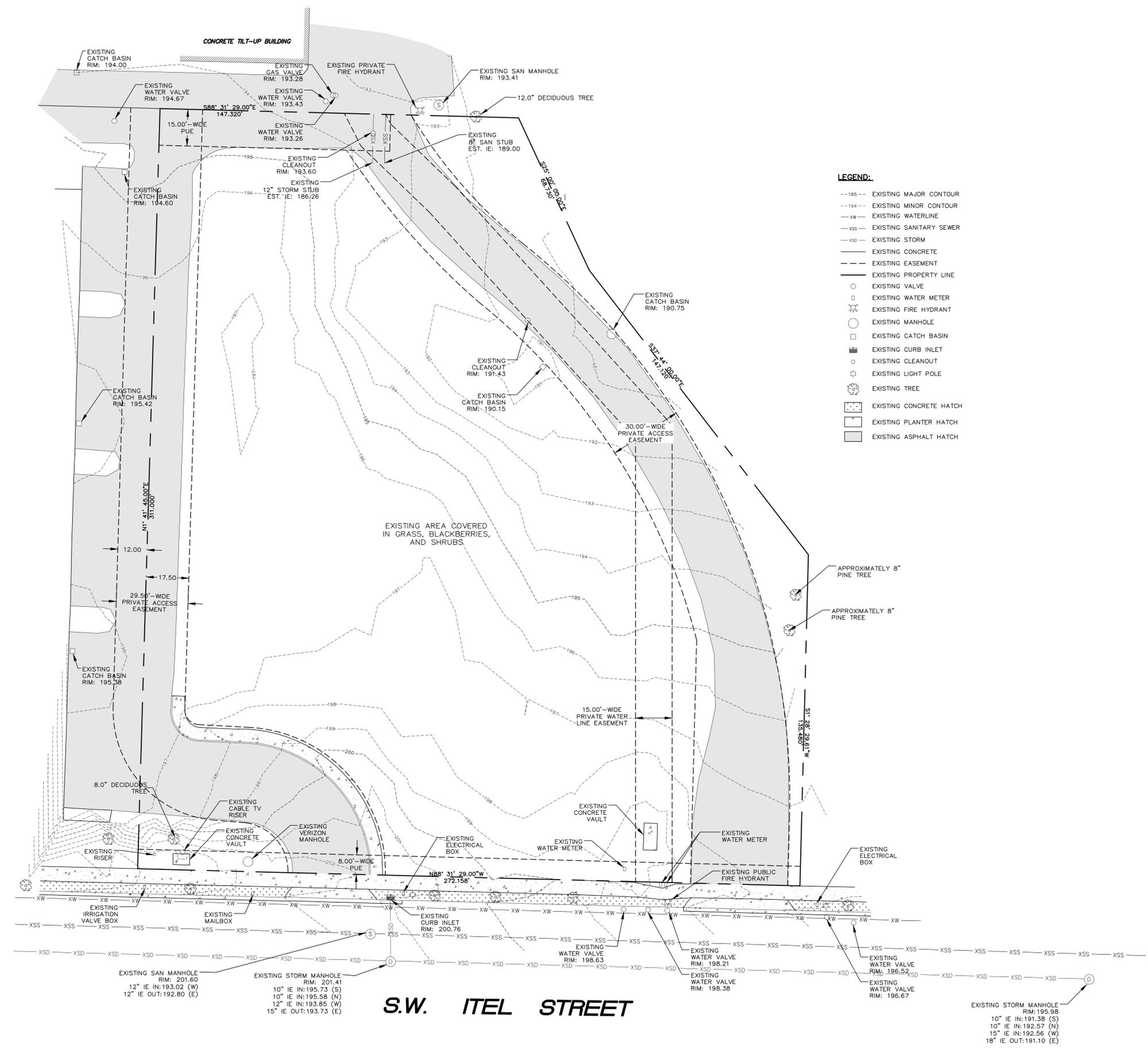
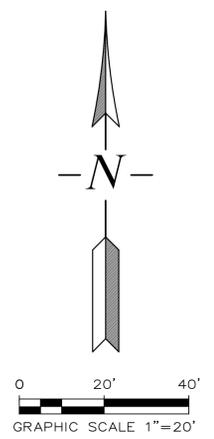
REVISIONS	BY

ITEL STREET
INDUSTRIAL BUILDING
 FHA & ASSOCIATES

Existing Conditions

SISUL ENGINEERING
 376 PORTLAND AVENUE
 GLADSTONE, OREGON 97027
 (503) 667-0188
DRAWING: 16-C03-PP-XCOND.dwg

DATE	SEPT. 2016
SCALE	1"=20'
DRAWN	JDM
JOB	SGL16-053
SHEET	C1
OF C4 SHEETS	



- LEGEND:**
- 195-- EXISTING MAJOR CONTOUR
 - 194-- EXISTING MINOR CONTOUR
 - XW- EXISTING WATERLINE
 - XSS- EXISTING SANITARY SEWER
 - XSD- EXISTING STORM
 - - - EXISTING CONCRETE
 - - - EXISTING EASEMENT
 - - - EXISTING PROPERTY LINE
 - EXISTING VALVE
 - EXISTING WATER METER
 - ⊕ EXISTING FIRE HYDRANT
 - EXISTING MANHOLE
 - EXISTING CATCH BASIN
 - ⊕ EXISTING CURB INLET
 - EXISTING CLEANOUT
 - ⊕ EXISTING LIGHT POLE
 - ⊕ EXISTING TREE
 - ▨ EXISTING CONCRETE HATCH
 - ▨ EXISTING PLANTER HATCH
 - ▨ EXISTING ASPHALT HATCH

S.W. ITEL STREET



PRELIMINARY
 EXPIRES: 6/30/18

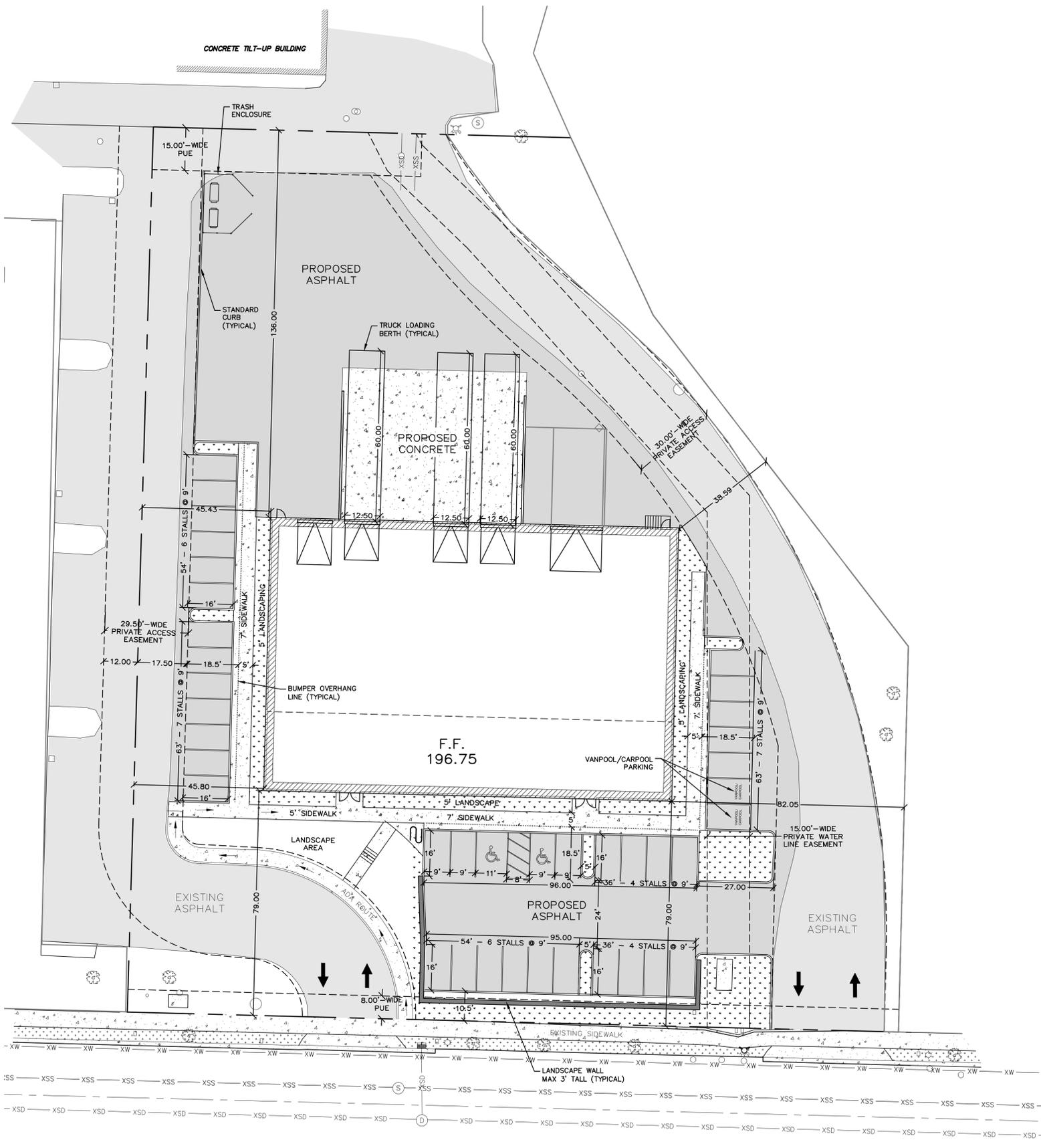
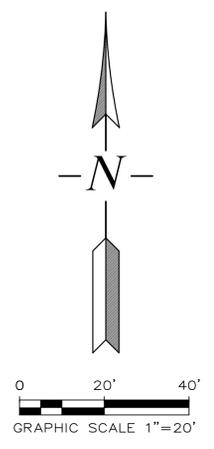
REVISIONS	BY

**ITEL STREET
INDUSTRIAL BUILDING**
FHA & ASSOCIATES

Site Plan

SISUL ENGINEERING
376 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188
DRAWING: 16-053.PP-SITE.dwg

DATE SEPT. 2016
SCALE 1"=20'
DRAWN JVM
JOB SGL16-053
SHEET **C2**
OF C4 SHEETS



- ZONING DESIGNATION – GENERAL MANUFACTURING (MG)
- SQUARE FOOTAGE OF SITE – 72,489 SF
- SQUARE FOOTAGE OF DEVELOPMENT AREA – 47,210 SF
- SQUARE FOOTAGE OF LANDSCAPING – 11,684 SF
- SQUARE FOOTAGE OF PARKING LOT LANDSCAPING – 3,932 SF
- SQUARE FOOTAGE OF PAVEMENT – 21,884 SF
- NUMBER OF PARKING SPACES – 39 TOTAL
 - STANDARD – 35 TOTAL
 - CARPOOL/VANPOOL – 2 TOTAL
 - DISABILITY – 2 TOTAL
- SQUARE FOOTAGE OF BUILDING
 - GROSS – 16,824 SF
 - PERIMETER – 13,824 SF

S.W. ITEL STREET



EXPIRES: 6/30/18

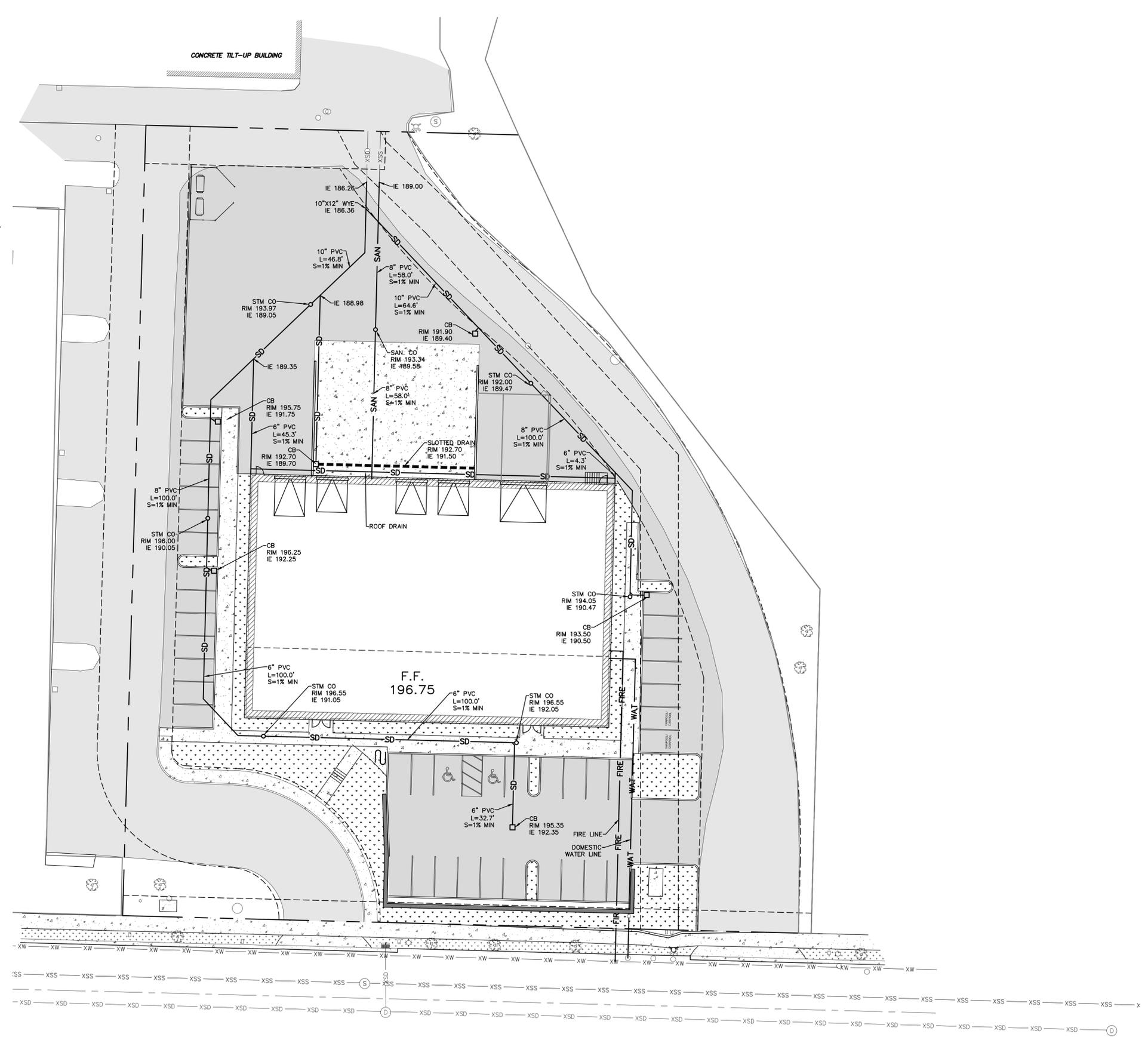
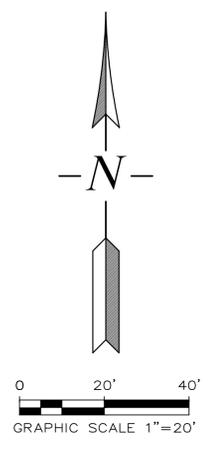
REVISIONS	BY

**ITEL STREET
INDUSTRIAL BUILDING**
FHA & ASSOCIATES

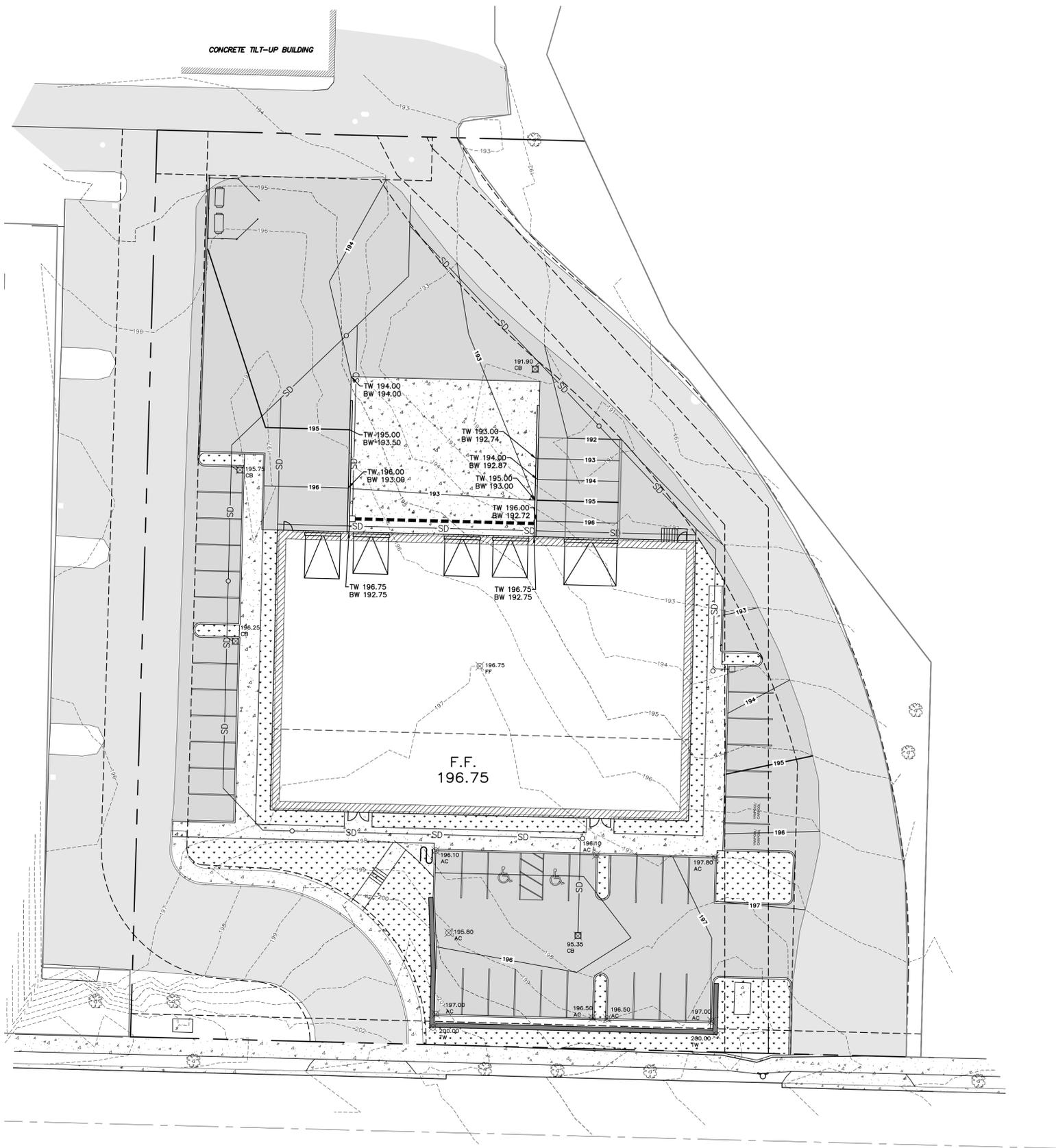
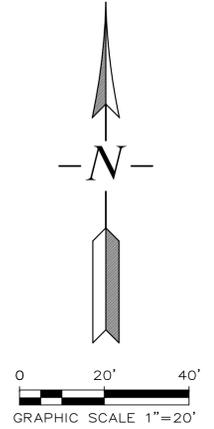
Utility Plan

SISUL ENGINEERING
376 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188
DRAWING: 16-053-PP-UTILITY.dwg

DATE SEPT. 2016
SCALE 1"=20'
DRAWN JVM
JOB SGL16-053
SHEET **C3**
OF C4 SHEETS



S.W. ITEL STREET



S.W. ITEL STREET



PRELIMINARY
EXPIRES: 6/30/18

REVISIONS	BY

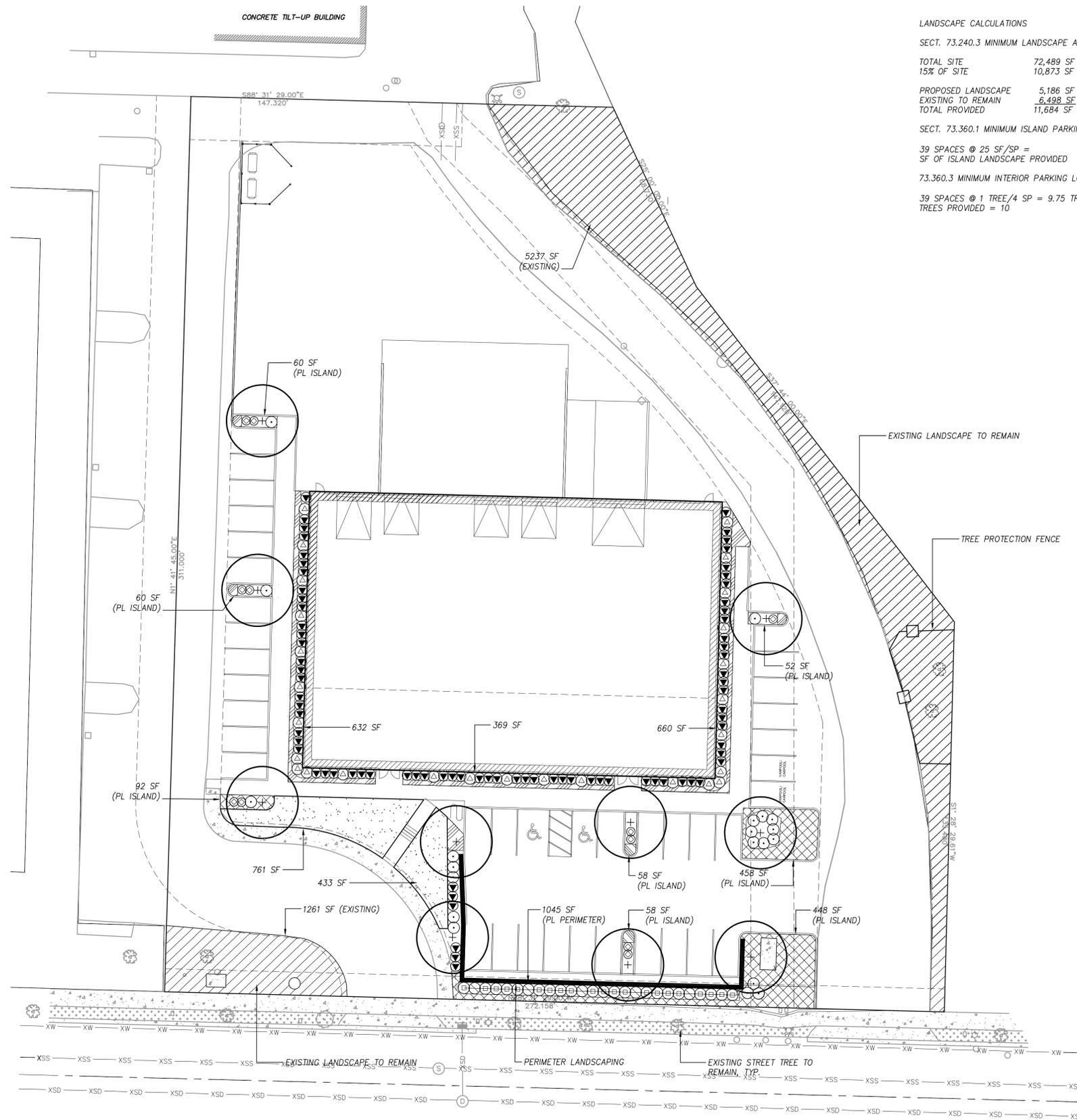
**ITEL STREET
INDUSTRIAL BUILDING**
FHA & ASSOCIATES

Grading Plan

SISUL ENGINEERING
376 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188
DRAWING: 16-053.PP-GRADING.dwg

DATE	SEPT. 2016
SCALE	1"=20'
DRAWN	JVM
JOB	SGL16-053
SHEET	C4
OF C4 SHEETS	

N:\FHA (FHA Associates)\FHA-07 (Tualatin Flex Bldg)\DWG\XREF\FHA07-PLANT.dwg



LANDSCAPE CALCULATIONS

SECT. 73.240.3 MINIMUM LANDSCAPE AREA

TOTAL SITE 72,489 SF
15% OF SITE 10,873 SF

PROPOSED LANDSCAPE 5,186 SF
EXISTING TO REMAIN 6,498 SF
TOTAL PROVIDED 11,684 SF

SECT. 73.360.1 MINIMUM ISLAND PARKING LOT LANDSCAPING

39 SPACES @ 25 SF/SP = 975 SF
SF OF ISLAND LANDSCAPE PROVIDED 1286 SF

73.360.3 MINIMUM INTERIOR PARKING LOT TREE REQUIREMENT

39 SPACES @ 1 TREE/4 SP = 9.75 TREES
TREES PROVIDED = 10

PLANT SCHEDULE

EXISTING LANDSCAPE TO REMAIN

TREES 1 1/2 7/12

10 Carpinus betulus 'Fastigiata' - European Hornbeam
1.5" CAL B&B, WELL BRANCHED, LIMBED TO 8'

SHRUBS 2 1/2

HEIGHT X WIDTH AT MATURITY

30" X 48" 20 Pinus mugo var. pumilio - Dwarf Mugo Pine
5 GAL CONT., FULL PLANTS, SPACING AS SHOWN

36" X 48" 21 Prunus laurocerasus 'Otto Luyken' - Otto Luyken Laurel
3 GAL CONT., FULL PLANTS, SPACING AS SHOWN

48" X 48" 27 Thuja occidentalis 'Golden Globe' - Golden Globe Arborvitae
1 GAL CONT., FULL PLANTS, SPACING AS SHOWN

36" X 48" 80 Berberis thunbergii 'Rose Glow' - Rose Glow Barberry
1 GAL CONT., FULL PLANTS, SPACING AS SHOWN

30" X 36" 11 Spiraea japonica 'Goldmound' - Goldmound Spirea
1 GAL CONT., FULL PLANTS, SPACING AS SHOWN

48" X 48" 8 Miscanthus sinensis 'Gracillimus' - Maiden Grass
1 GAL CONT., FULL PLANTS, SPACING AS SHOWN

GROUNDCOVER 3 1/2

24" X 72" 227 Cotoneaster horizontalis 'Perpusillus' - Prostrate Rock Cotoneaster
4" POT CONT., FULL PLANTS, 30" O.C.

30" X 24" 173 Pennisetum alopecuroides 'Maudry' - Black Flowering Fountain Grass
4" POT CONT., FULL PLANTS, 24" O.C.

SEED MIXES

SEED MIX (LAWN AREAS)	% PLS	LBS OF PLA/100SF
Festuca rubra 'Gibraltar'	10	0.364
Festuca rubra 'Silhouette'	10	0.364
Lolium perenne 'Delaware Dwarf'	40	5.563

GENERAL PLANTING NOTES

- ALL CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH CURRENT CITY OF TUALATIN AND THE OREGON UNIFORM BUILDING CODES.
- INSTALL EROSION CONTROL SYSTEMS IN ACCORDANCE WITH CITY OF TUALATIN STANDARDS PRIOR TO SITE WORK AND LANDSCAPE INSTALLATION.
- MARK AND PROTECT ALL UTILITIES, SITE FEATURES, AND VEGETATION TO REMAIN IN PLACE. INSURE NO DISTURBANCE OCCURS ON THE RIVER SIDE OF THE WILLAMETTE RIVER GREENWAY PATHWAY.
- REMOVE EXISTING PLANTING BED SOILS AND REPLACE AND/OR AMEND SOILS IN BEDS IN ACCORDANCE WITH LANDSCAPE PLANS AND SPECIFICATIONS.
- LANDSCAPE INSTALLATION SHALL INCLUDE PROVISION OF AN AUTOMATIC IRRIGATION SYSTEM DESIGNED AND BUILT BY CONTRACTOR TO COMPLIMENT LANDSCAPE PLANTINGS. MEETING LOCAL AND STATE BUILDING CODES.
- PLANT MATERIAL INSTALLED SHALL CONFORM IN SIZE AND GRADE TO THE "AMERICAN STANDARD FOR NURSERY STOCK" CURRENT EDITION.
- THE QUANTITIES OF PLANT MATERIALS SHALL BE AS DETERMINED BY THE CONTRACTOR IN ACCORDANCE WITH THE SPECIFIED SPACING OR LOCATION ON THE PLAN. MATERIAL QUANTITIES SHOWN ON PLAN ARE FOR CONTRACTOR CONVENIENCE ONLY AND SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO INSTALLATION. SURPLUS OR SHORTAGES OF PLANT QUANTITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL PLANTINGS TO BE ALIVE AND IN SATISFACTORY HEALTH FOR THE 1 YEAR WARRANTY PERIOD AFTER FINAL ACCEPTANCE.
- LANDSCAPE CONTRACTOR SHALL WATER PLANTINGS DURING THE WARRANTY PERIOD.

S.W. ITEL STREET

N
1
L1
PRELIMINARY PLANTING PLAN
1" = 20'-0"

PRELIMINARY

PLANTING PLAN
ITEL STREET INDUSTRIAL BUILDING
TUALATIN, OREGON

Harper Houff Peterson
Righellis Inc.
ENGINEERS+PLANNERS
LANDSCAPE ARCHITECTS+SURVEYORS
205 SW Spokane Street, Suite 200, Portland, OR 97202
Phone: 503.221.1131 www.hhpri.com fax: 503.221.1171

REGISTERED
747
PRELIMINARY
JEFFERY P. CREEL
OREGON
06/13/11
LANDSCAPE ARCHITECT

DESIGNED:	IPC	IPC	SS	DATE:	9/9/2016
DRAWN:					
CHECKED:					

NO.	DESCRIPTION	R	E	V	I	S	I	O	N
DATE									

SHEET NO.
L1
JOB NO. FHA-07



Ultra high output, high efficiency 360 Watt LED wallpacks with multi-level motion sensor. Patent Pending airflow technology ensures long LED and driver lifespan. 5 Year Warranty.

Color: White

Weight: 79.4 lbs

Project:

Type:

Prepared By:

Date:

Driver Info

Type:	Constant Current
120V:	3.0A
208V:	1.8A
240V:	1.5A
277V:	1.3A
Input Watts:	359W
Efficiency:	N/A

LED Info

Watts:	360W
Color Temp:	5000K
Color Accuracy:	71 CRI
L70 Lifespan:	100000
Lumens:	37,366
Efficacy:	104 LPW

Technical Specifications

Listings

UL Listing:

Suitable for wet locations.

DLC Listed:

This product is on the Design Lights Consortium (DLC) Qualified Products List and is eligible for rebates from DLC Member Utilities.

IESNA LM-79 & IESNA LM-80 Testing:

RAB LED luminaires have been tested by an independent laboratory in accordance with IESNA LM-79 and 80, and have received the Department of Energy "Lighting Facts" label.

Dark Sky Approved:

The International Dark Sky Association has approved this product as a full cutoff, fully shielded luminaire.

Construction

IP Rating:

Ingress Protection rating of IP66 for dust and water.

IES Classification:

The Type IV distribution (also known as a Forward Throw) is especially suited for mounting on the sides of buildings and walls, and for illuminating the perimeter of parking areas. It produces a semiCircular distribution with essentially the same candlepower at lateral angles from 90° to 270°.

Ambient Temperature:

Suitable for use in 40°C (104°F) ambient temperatures

Cold Weather Starting:

The minimum starting temperature is -40°C/-40°F

Thermal Management:

Superior heat sinking with external Air-Flow fins.

Housing:

Die cast aluminum with airflow fins for cooling.

Lens:

Tempered glass

Reflector:

Vacuum-metallized polycarbonate

Gaskets:

High temperature silicone gaskets.

Finish:

Our environmentally friendly polyester powder coatings are formulated for high-durability and long-lasting color, and contains no VOC or toxic heavy metals.

Green Technology:

Mercury and UV free.

For use on LEED Buildings:

IDA Dark Sky Approval means that this fixture can be used to achieve LEED Credits for Light Pollution Reduction.

LED Characteristics

LEDs:

Multi-chip, high-output, long-life LEDs

Color Consistency:

3-step MacAdam Ellipse binning to achieve consistent fixture-to-fixture color.

Color Stability:

LED color temperature is warranted to shift no more than 200K in CCT over a 5 year period.

Color Uniformity:

RAB's range of CCT (Correlated color temperature) follows the guidelines of the American National Standard for Specifications for the Chromaticity of Solid State Lighting (SSL) Products, ANSI C78.377-2015.

Electrical

Dimming Driver:

Driver includes dimming control wiring for 0-10V dimming systems. Requires separate 0-10V DC dimming circuit. Dims as low as 10%.

Drivers:

Constant Current, Class 1, 1560mA, 100-277V, 50-60Hz, 120V: 3.0A, 208V: 1.8A, 240V: 1.5A, 277V: 1.3A

Surge Protection:

6kV

Other

Country of Origin:

Designed by RAB in New Jersey and assembled in the USA by RAB's IBEW Local 3 workers.

Buy American Act Compliant:

This product is a COTS item manufactured in the United States, and is compliant with the Buy American Act.

Recovery Act (ARRA) Compliant:

This product complies with the 52.225-21 "Required Use of American Iron, Steel, and Manufactured Goods-- Buy American Act-- Construction Materials (October 2010).

Technical Specifications (continued)

Other

Trade Agreements Act Compliant:

This product is a COTS item manufactured in the United States, and is compliant with the Trade Agreements Act.

GSA Schedule:

Suitable in accordance with FAR Subpart 25.4.

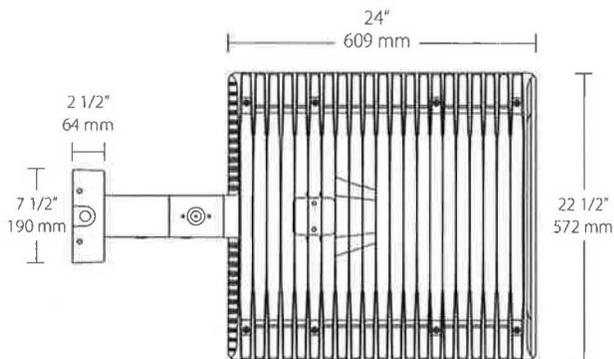
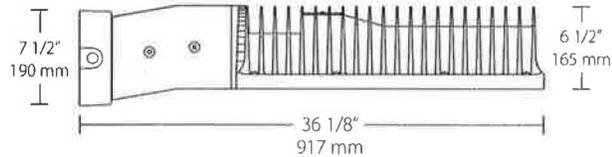
Warranty:

RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish.

Patents:

The WPLED design is protected by patents pending in the U.S., Canada, China, Taiwan and Mexico.

Dimensions



Features

- Includes integrated motion sensor/photocell for multi-level control
- High output, high efficiency LED
- Maintains 70% of initial lumens at 100,000 hours
- Weatherproof high temperature silicone gaskets
- Superior heat sinking with die cast aluminum housing and external fins
- 5-year warranty

Date : 27 Sep 2016

Title : Enter the title here...

Desc : Enter the description here...

Luminaire

IES Filename rab01822.ies

Description : ALED4T360/D10 - ALED4T360SF/D10 -
WPLED4T360/D10 - WPLED4T360FX/D10 (TYPE
IV)
CAST FINNED METAL HOUSING, 4 CIRCUIT

For : Client's name or company...

By : Your name or company...

Light Loss Factor : 1.00

Number of Lamps : 4

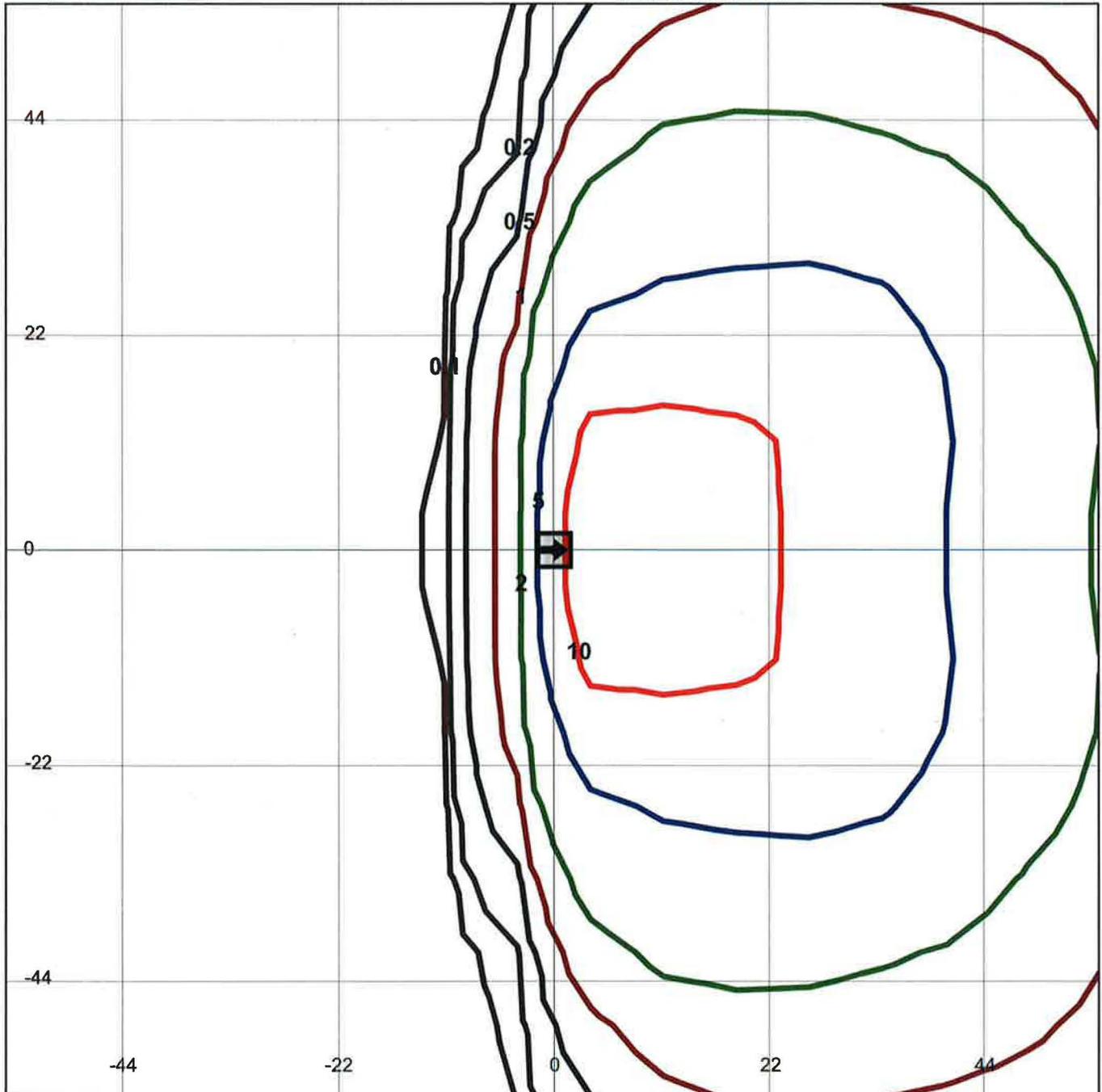
Lamp Lumens : -1 lms

Luminaire Watts : 360 W



Scale:  0 16 32 feet

Arrangement Magnification: 100 %





10295 SW Ridder Road, Wilsonville, OR 97070
O: 503.570.0626 F: 503.982.9307 republicservices.com

September 21, 2016

Steven J. Entenman, PE SE
Structural Manager
Harper Houf Peterson Righellis Inc
205 SE Spokane Street
Suite 200
Portland, OR 97202

Re: Itel Street Industrial Building

Dear Steven;

Thank you, for sending me your site plans for this industrial building located off SE Itel street in Tualatin.

My Company: Republic Services of Clackamas & Washington Counties has the franchise agreement to service this area with the City of Tualatin. We will provide complete commercial waste removal and recycling services as needed on a weekly basis for this location.

The changes you made for the location & size of the enclosure, the opening of the gates, are very much appreciated. With the changes I do not foresee any problems for my company to be able to provide solid waste and recycling services to this site.

Thank you Steven; for your help, and concerns for our services prior to this project being developed.

Sincerely,

A handwritten signature in black ink that reads "Frank J. Lonergan". The signature is fluid and cursive, with a long horizontal flourish at the end.

Frank J. Lonergan
Operations Manager
Republic Services Inc.

SW Itel Street

Transportation Impact Study
Tualatin, Oregon

DATE:

September 21, 2016

PREPARED FOR:

Stefanie Slyman AICP
Harper Houf Peterson Righellis Inc.

PREPARED BY:

Jessica Hajar
Gwen Shaw, EI
Todd Mobley, PE



RENEWS: 12/31/2016



LANCASTER
ENGINEERING



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Executive Summary

1. The proposed development will construct an 18,424 square foot light industrial building on an undeveloped site. The project site is located directly north of SW Itel Street, east of SW 120th Avenue, and west of SW 115th Avenue in Tualatin, Oregon.
2. The trip generation calculations show that the proposed development is projected to generate a total of 17 trips during the morning peak hour and 18 trips during the evening peak hour.
3. The study intersections operate within Washington County and City of Tualatin performance standards through year 2018 with full build-out of the proposed development. Accordingly, no mitigation is necessary or recommended as a part of this project.
4. Based on the measured intersection sight distance to the east and west of the proposed accesses, adequate sight distance is available to safely accommodate the proposed use of the site.
5. A review of the detailed crash data as well as our observations of the study area intersections showed no crash patterns and no significant design concerns were identified. No specific safety mitigations are recommended in conjunction with the proposed development.



Project Description

Introduction

The proposed development will construct an 18,424 square foot light industrial building. The building will be approximately 28' in height, with 13,284 square feet on the ground floor and 4,600 square feet of accessory office space on the second floor. The project site is located directly north of SW Itel Street, east of SW 120th Avenue, and west of SW 115th Avenue in Tualatin, Oregon.

This report addresses the impacts of the proposed development on the nearby street system. The report includes safety and capacity / level-of-service analyses at the following intersections:

1. SW Tualatin Sherwood Road at SW 120th Avenue
2. SW Tualatin Sherwood Road at SW 115th Avenue
3. SW 115th Avenue at SW Itel Street

The purpose of the study is to determine whether the transportation system in the vicinity of the site is capable of safely and efficiently supporting the existing and proposed land uses, and to determine any mitigation that might be necessary to do so.

Location Description

The project site is located directly north of SW Itel Street, east of SW 120th Avenue, and west of SW 115th Avenue in Tualatin, Oregon. The project site has two driveways along SW Itel Street and is able to access SW 120th Avenue through roadways of adjacent properties.

The subject site is located in the General Manufacturing planning district the purpose of which is to provide areas of the City that are suitable for light industrial uses and also for a wide range of heavier manufacturing and processing activities. The proposed use is a permitted use in this zone.

Vicinity Streets

SW Tualatin Sherwood Road is classified as an Arterial by Washington County and as a Major Arterial by the City of Tualatin. In the vicinity of the subject site the roadway has a three-lane cross-section, with one standard travel lane in each direction and a center two-way left-turn lane. The roadway has a posted speed of 45 mph. Curbs, sidewalks, and bicycle lanes are provided along both sides of the roadway.



SW 120th Avenue is classified as a Local Street by Washington County and as a Local Commercial Industrial Street by the City of Tualatin. The roadway has a two-lane cross-section with no centerline striping. Curbs and sidewalks are provided along both sides of the roadway for about 250 feet from the intersection with SW Tualatin Sherwood Road and are otherwise not provided. Bicycle lanes are not provided on either side of the roadway.

SW 115th Avenue is classified as a Local Street by Washington County and as a Local Commercial Industrial Street by the City of Tualatin. The roadway has a three-lane cross section, with one travel lane in each direction and a center two-way left-turn lane. Curbs, sidewalks, and bicycle lanes are provided along both sides of the roadway.

SW Itel Street is classified as a Local Street by Washington County and as a Local Commercial Industrial Street by the City of Tualatin. The roadway has a three-lane cross section, with one travel lane in each direction and a center two-way left-turn lane. Curbs and sidewalks are provided on both sides of the roadway. Bicycle lanes are not provided on either side of the roadway.

Study Area Intersections

The intersection of SW Tualatin Sherwood Road at SW 120th Avenue is a three-legged intersection that is stop-controlled for the northbound approach of SW 120th Avenue. The northbound approach has one shared left-turn/right-turn lane. The eastbound approach has one through lane, one bicycle lane, and one right-turn lane. The westbound approach has one left-turn lane, one through lane, and one bicycle lane. Crosswalks are not marked across any intersection legs.

The intersection of SW Tualatin Sherwood Road at SW 115th Avenue is a four-legged intersection controlled by a traffic signal. The northbound approach has one shared through/left-turn lane and one right-turn lane. The southbound approach has one left-turn lane and one shared through/right-turn lane. The eastbound approach has one left-turn lane, one through lane, one bicycle lane, and one right-turn lane. The westbound approach has one left-turn lane, one shared through/right-turn lane, and one bicycle lane. Crosswalks are marked across all intersection legs. Mitigation for a previous development required construction of a second westbound left-turn lane and reconfiguring the northbound approach to a shared through/left-turn lane and right-turn lane to allow for an overlap phase.

The intersection of SW 115th Avenue at SW Itel Street is a four-legged intersection that is stop-controlled for all approaches. The northbound and southbound approaches each have one left-turn



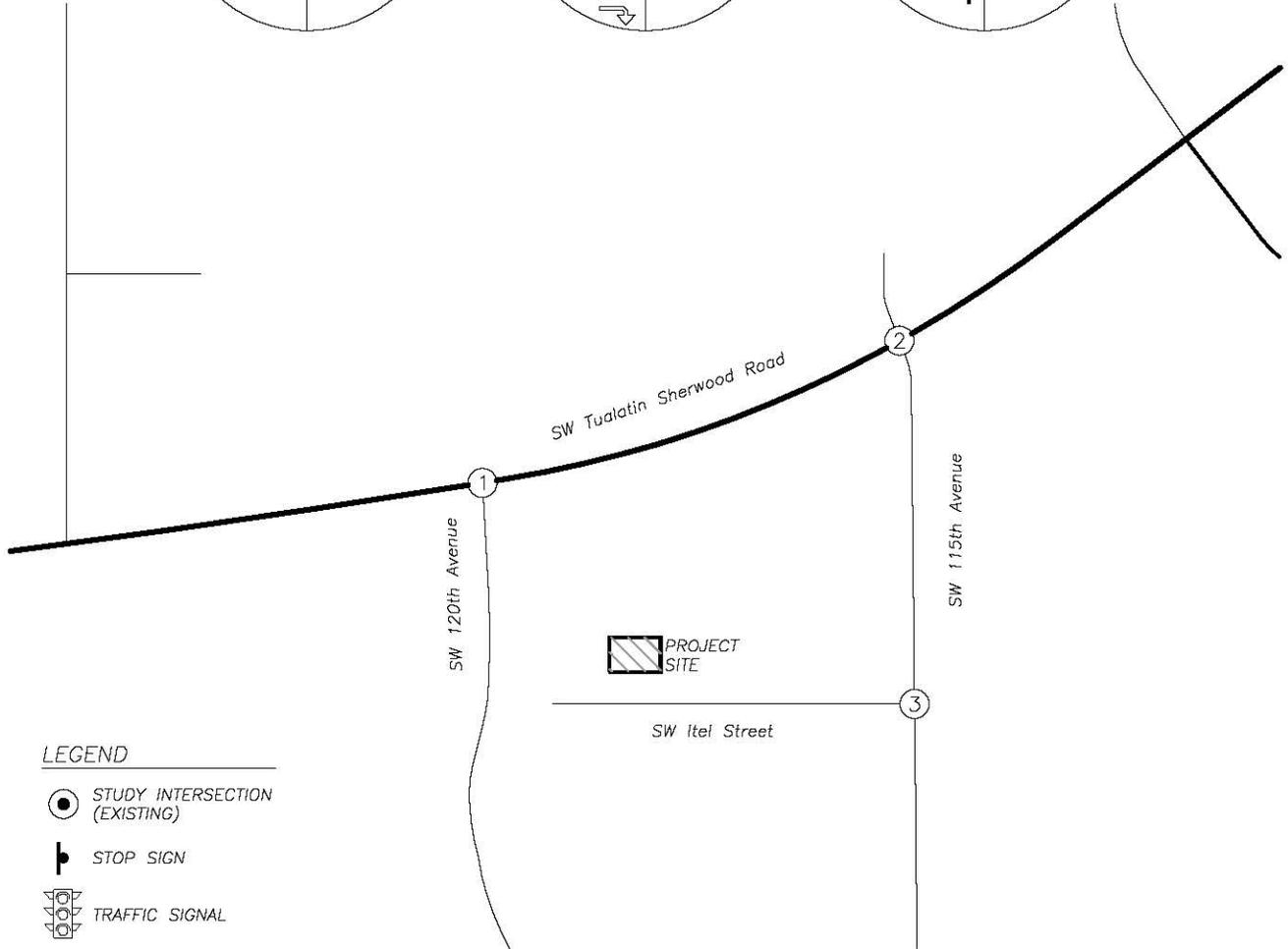
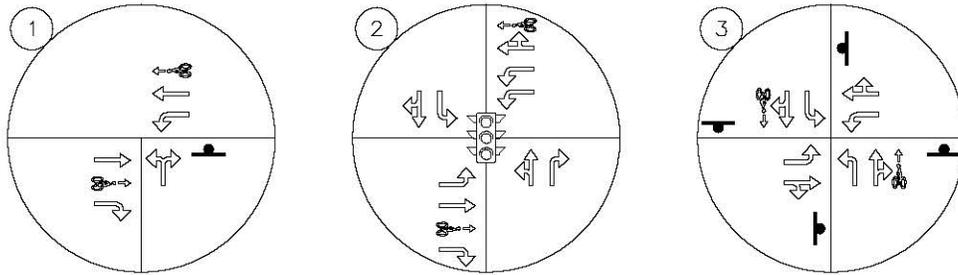
lane, one shared through/right-turn lane, and one bicycle lane. The eastbound and westbound approaches each have one left-turn lane and one shared through/right-turn lane. Crosswalks are not marked across any intersection legs.

A vicinity map displaying the project site, vicinity streets, and the study area intersections with their associated lane configurations is shown in Figure 1 on page 7.

Traffic Volumes

Traffic counts were conducted at the intersections of SW 120th Avenue at SW Tualatin Sherwood Road and SW 115th Avenue at SW Tualatin Sherwood Road on Wednesday, August 31st, 2016 and Thursday, September 1st, 2016 from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. Data used from the morning and evening peak hours reflect each intersection peak hour. Traffic counts for the intersection of SW 115th Avenue at SW Iteel Street were conducted on Thursday, September 8th, 2016 from 4:55 PM to 4:25 PM, corresponding to the PM peak hour for SW 115th Avenue. These counts were multiplied to obtain PM peak hour counts for the entire hour. Typically, evening peak hour volumes are higher than morning peak hour volumes. Because the observed PM peak hour volumes were very low and showed no operational problems, AM peak hour counts were not needed.

Figure 2 on page 8 shows the existing morning and evening peak hour traffic volumes for the study intersections.

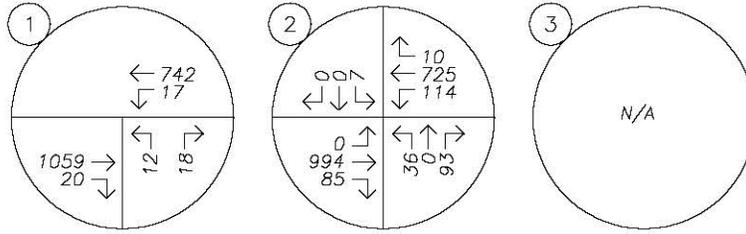


LEGEND

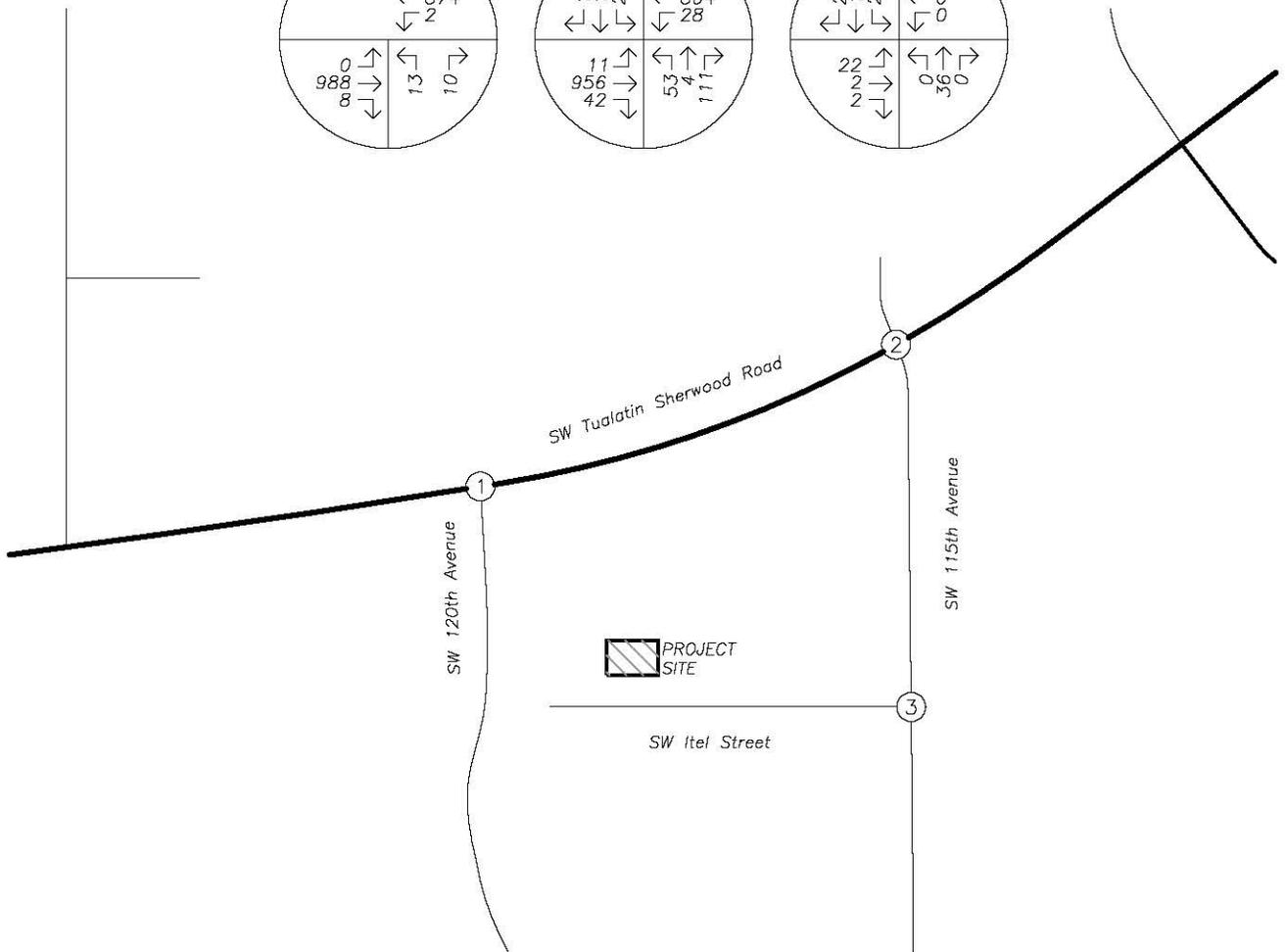
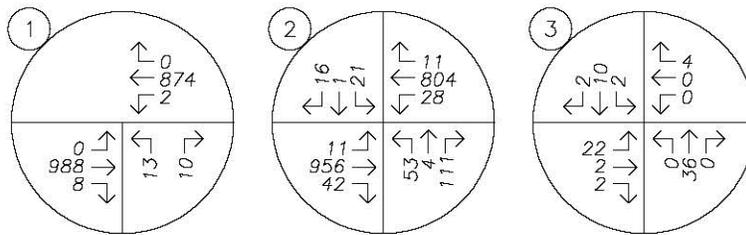
- STUDY INTERSECTION (EXISTING)
- STOP SIGN
- TRAFFIC SIGNAL
- BIKE LANE
- PROJECT SITE
- ARTERIAL ROADWAY
- COLLECTOR ROADWAY
- LOCAL ROADWAY



AM PEAK HOUR



PM PEAK HOUR



TRAFFIC VOLUMES
Existing Conditions
AM & PM Peak Hours



FIGURE
2

PAGE
8



Site Trips

Trip Generation

The proposed development will construct an 18,424 square foot light industrial building. To estimate the number of trips that will be generated by the proposed development, trip rates from the *TRIP GENERATION MANUAL*¹ were used. Data from land-use code 110, *General Light Industrial*, were used to estimate the proposed development's trip generation based on square footage.

The trip generation calculations show that the proposed building could generate a total of 17 trips during the morning peak hour and 18 trips during the evening peak hour. The trip generation estimates are summarized in Table 1 and detailed trip generation calculations are included in the technical appendix to this report.

Table 1 - Trip Generation Summary								
	ITE Code	Size (sq. ft.)	Morning Peak Hour			Evening Peak Hour		
			In	Out	Total	In	Out	Total
General Light Industrial	110	18	15	2	17	2	16	18

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 travel patterns of the existing volumes at the study area intersections.

It is expected that trips to/from the site will utilize the following trip distribution:

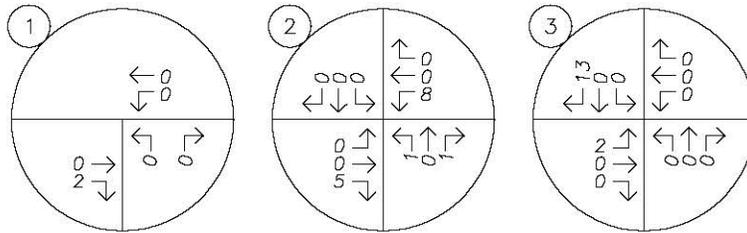
- Approximately 55 percent of the site trips will travel to/from the east along SW Tualatin Sherwood Road with 50 percent coming from SW 115th Avenue and 5 percent from SW 120th Avenue.
- Approximately 45 percent of the site trips will travel to/from the west along SW Tualatin Sherwood Road with 35 percent coming from SW 115th Avenue and 10 percent from SW 120th Avenue.

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

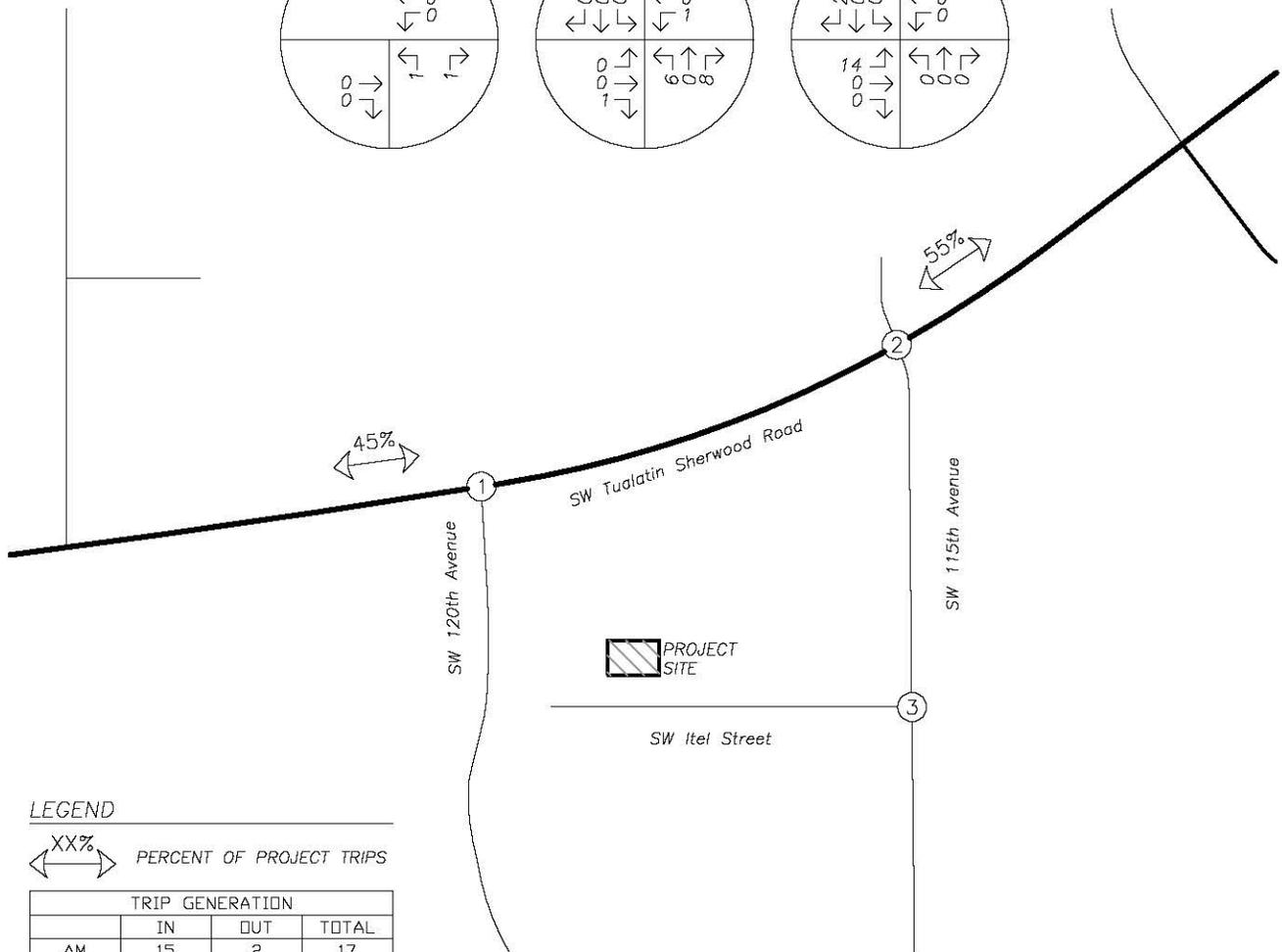
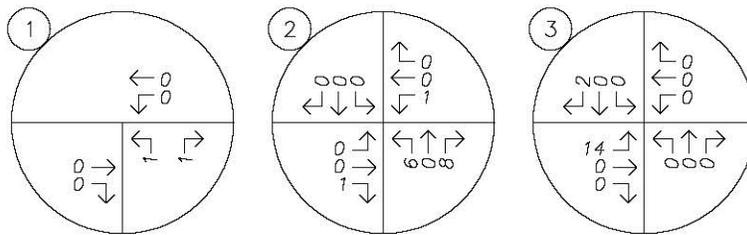


The trip assignment for the site trips generated by the proposed development during the morning and evening peak hours are shown in Figure 3 on page 11.

AM PEAK HOUR



PM PEAK HOUR



LEGEND

XX% PERCENT OF PROJECT TRIPS

TRIP GENERATION			
	IN	OUT	TOTAL
AM	15	2	17
PM	2	16	18



TRIP DISTRIBUTION & ASSIGNMENT
Proposed Development Plan – Site Trips
AM & PM Peak Hours



FIGURE 3

PAGE 11



Operational Analysis

Background Volume

To provide analysis of the impact of the proposed development on the nearby transportation facilities, an estimate of future traffic volumes is required. In order to calculate the future traffic volumes, a compounded growth rate of two percent per year for an assumed build-out condition of two years was applied to the measured existing traffic volumes to approximate year 2018 background conditions.

In addition to the traffic growth described above, the Koch Corporate Center development is currently not contributing to the nearby transportation system but is anticipated to by year 2018. The City of Tualatin has provided in-process development trips that are expected to impact study intersections. These site trips were added to the year 2018 background volumes at each of the study intersections.

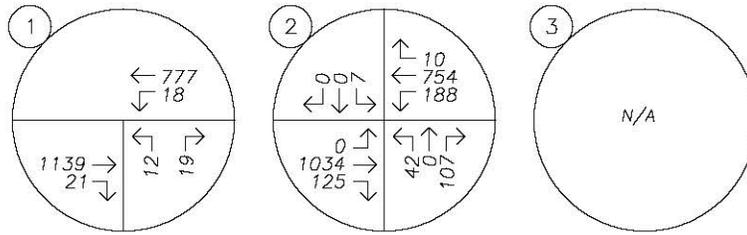
Figure 4 on page 13 shows the projected year 2018 background traffic volumes for the morning and evening peak hours at the study area intersections.

Background Volume plus Site Trips

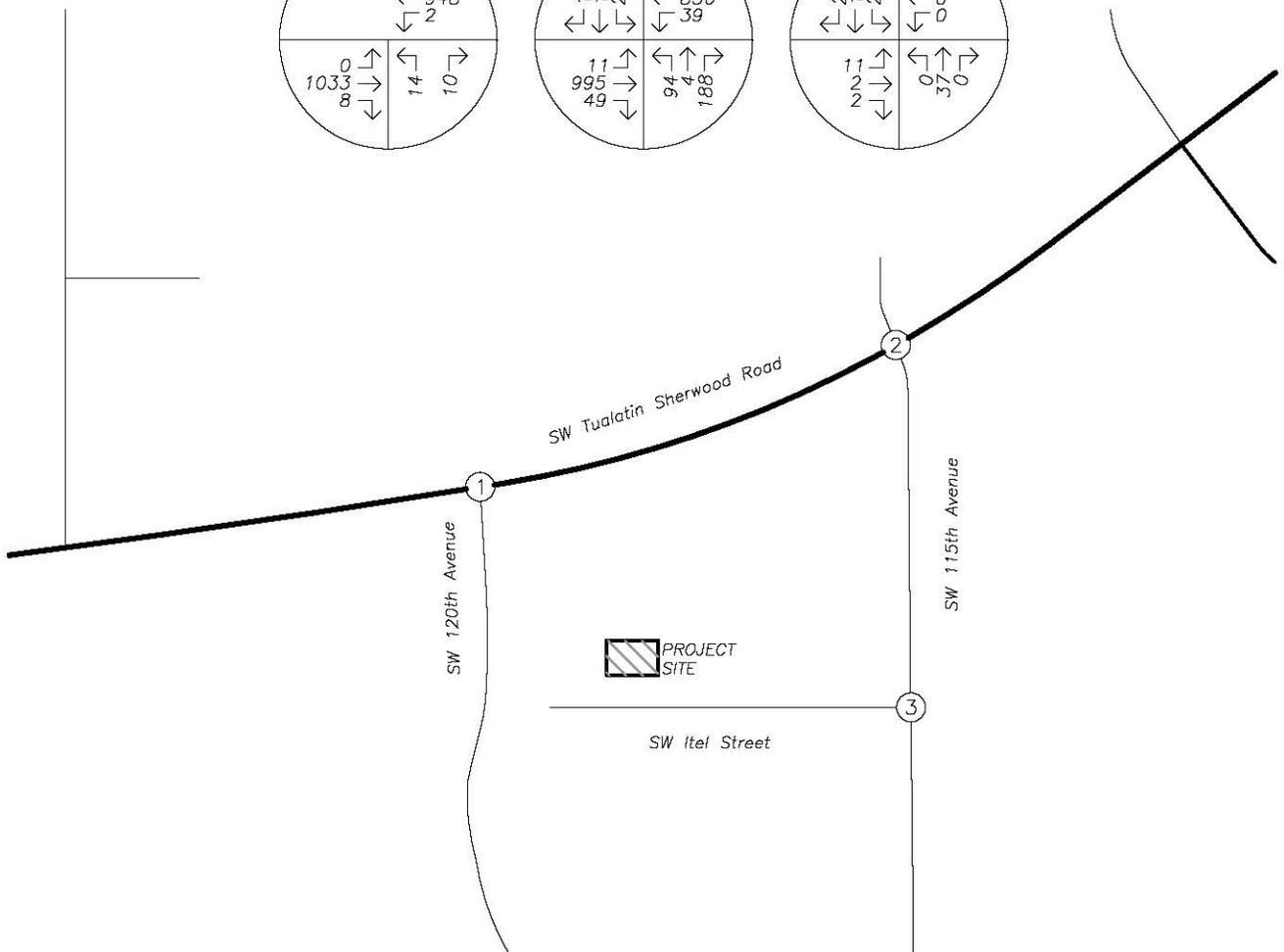
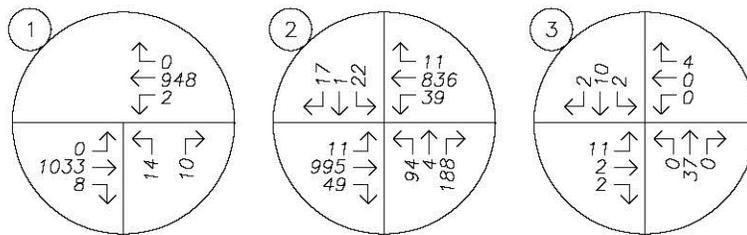
Peak hour trips calculated to be generated from the proposed development, as described earlier within the Trip Generation section, were added to the projected year 2018 background traffic volumes to obtain the expected 2018 background plus site trip volumes.

Figure 5 on page 14 shows the projected year 2018 peak hour background traffic volumes plus proposed development site trips at the study area intersections.

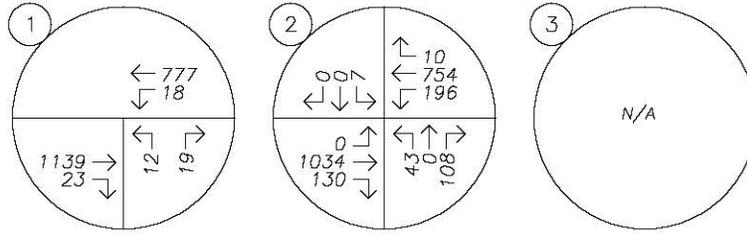
AM PEAK HOUR



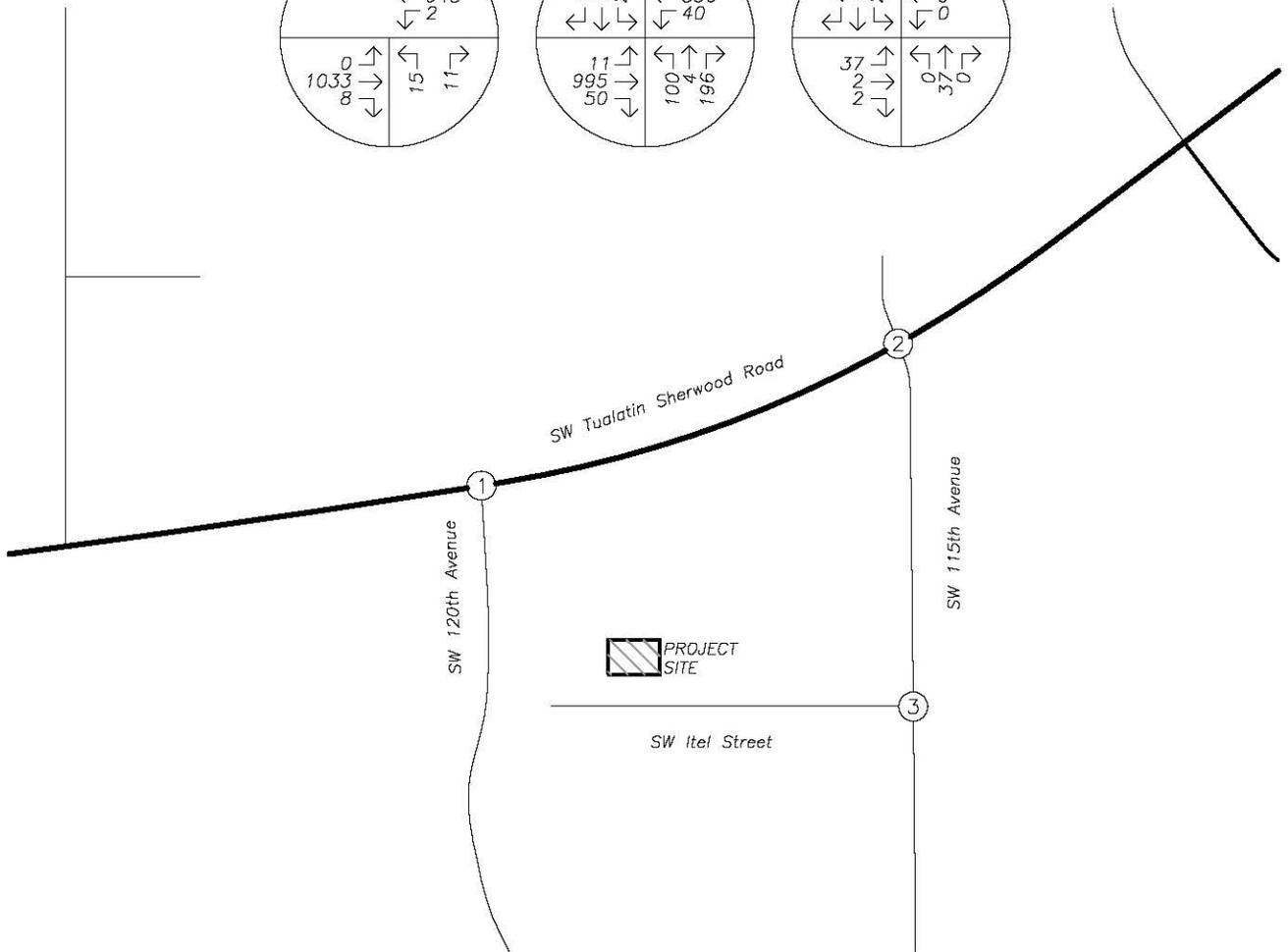
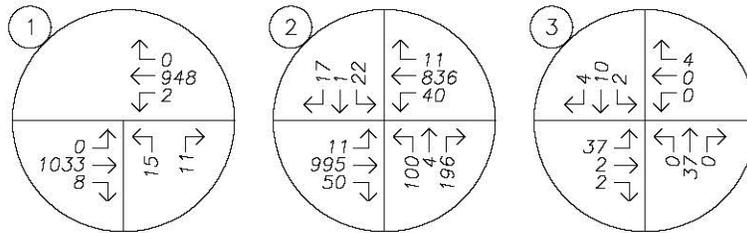
PM PEAK HOUR



AM PEAK HOUR



PM PEAK HOUR



TRAFFIC VOLUMES
 Year 2018 Background plus Site Conditions
 AM & PM Peak Hours



FIGURE
5

PAGE
14



Intersection Capacity and Level-of-Service Analysis

To determine the capacity and level-of-service (LOS) at the study intersections, a capacity analysis was conducted. The analysis was conducted using the signalized and unsignalized intersection analysis methodologies in the *HIGHWAY CAPACITY MANUAL (HCM)* published by the Transportation Research Board. The v/c ratio is a measure that compares the traffic volume (demand) against the available capacity of an intersection. Washington County requires v/c ratios less than 0.9. The City of Tualatin requires LOS D or better for signalized intersections and LOS E or better for unsignalized intersections. For both LOS and delay related to the analysis of unsignalized intersections, the reported result applies to the worst movement.

The intersection of SW Tualatin Sherwood Road at SW 120th Avenue currently operates at LOS E with v/c ratios of 0.67 during the morning peak hour and 0.62 during the evening peak hour. Under year 2018 conditions with or without addition of site trips from the proposed development, the intersection is projected to continue operating at LOS E.

The intersection of SW Tualatin Sherwood Road at SW 115th Avenue currently operates at LOS C with v/c ratios of 0.82 and 0.80 during the morning and evening peak hours, respectively. Under year 2018 conditions with or without addition of site trips from the proposed development, the intersection is projected to continue operating at LOS C.

The intersection of SW 115th Avenue at SW Itel Street currently operates at LOS A. Upon completion of the proposed development in 2018, the intersection is projected to continue operating at LOS A.

The v/c, delay, and LOS results of the capacity analysis are shown in Table 2. Detailed calculations as well as tables showing the relationships between delay and level of service are included in the appendix to this report.



Table 2 - Capacity and LOS Analysis Summary						
	Morning Peak Hour			Evening Peak Hour		
	LOS	Delay (s)	v / c	LOS	Delay (s)	v / c
SW Tualatin Sherwood Road at SW 120th Avenue						
Existing Conditions	E	44	0.67	E	43	0.62
2018 Background Conditions	E	50	0.72	E	49	0.65
2018 Background + Site Conditions	E	50	0.72	E	50	0.65
SW Tualatin Sherwood Road at SW 115th Avenue						
Existing Conditions	C	23	0.82	C	21	0.80
2018 Background Conditions	C	24	0.84	C	27	0.84
2018 Background + Site Conditions	C	25	0.85	C	28	0.85
SW Itel Street at SW 115th Avenue						
Existing Conditions	--	--	--	A	7	--
2018 Background Conditions	--	--	--	A	7	--
2018 Background + Site Conditions	--	--	--	A	7	--

Based on the analysis, the study intersections operate within Washington County and City of Tualatin performance standards through year 2017 with full build-out of the proposed development. Accordingly, no mitigation is necessary or recommended as a part of this project.



Safety Analysis

Sight Distance

Intersection sight distance was measured and evaluated in accordance with the standards established in *A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS*². According to AASHTO, the driver's eye is assumed to be 15 feet from the near edge of the nearest travel lane of the intersecting street and at a height of 3.5 feet above the approach street pavement. Vehicle/object height is assumed to be 3.5 feet above the cross-street pavement. Using a vehicle/object height equal to the driver's eye height makes intersection sight distances reciprocal (if one driver can see another vehicle, then the driver of that vehicle can also see the first vehicle).

For the western access along SW Itel Street, intersection sight distance was measured to be 245 feet to the right and 440 feet to the left. Sight distance to the right is limited by a barrier that is restricting travel to and from the west. Sight distance for this access can accommodate speeds up to 50 miles per hour. For the eastern access along SW Itel Street, intersection sight distance was measured to be 414 feet to the right and 347 feet to the left. Again, sight distance to the right is limited by the barrier on the roadway. Sight distance to the left is limited by overgrown vegetation that should be cleared upon development of the site. Sight distance for this access can accommodate speeds up to 40 miles per hour. Although there are no posted speed limits, travel speeds were observed to be less than 35 mph. Sight distance is adequate at both driveways to safely accommodate the proposed development. No sight distance mitigation is necessary or recommended.

Crash Data Analysis

Using data obtained from ODOT's Crash Analysis and Reporting Unit, a review of the most recent available five years of crash history (2010-2014) at the study area intersections was performed. The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions and the resulting crash rate for the intersection. Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that travel through the intersection. Crash rates were calculated using the common assumption that traffic counted during the evening peak period represents 10% of annual average daily traffic (AADT) at the intersection.

² American Association of State Highway and Transportation Officials (AASHTO), *A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS*, 6th Edition, 2011.



Crash rates in excess of one to two crashes per million entering vehicles (CMEV) may be indicative of safety hazards that should be further investigated for possible mitigation.

The intersection of SW Tualatin Sherwood Road at SW 120th Avenue had two reported crashes during the analysis period. The crashes consisted of two rear-end collision and both were classified as “Property Damage Only” (*PDO*). The crash rate at the intersection was calculated to be 0.06 CMEV.

The intersection of SW Tualatin Sherwood Road at SW 115th Avenue had eight reported crashes during the analysis period. The crashes consisted of four rear-end collisions and four turning-movement collisions. These reported collisions resulted in one “Non-Incapacitating Injury” (*Injury B*), eight “Possible Injury” (*Injury C*), and two “Property Damage Only” (*PDO*). The crash rate at the intersection was calculated to be 0.21 CMEV.

Based on the most recent five years of crash data at the study area intersections crash rates are relatively low, crash severity was relatively low for crashes likely to occur again, and no significant crash patterns are evident. The crash data does not appear to be indicative of any significant safety hazards. Accordingly, no safety mitigations are recommended.

Detailed information about crashes and crash reports for the study intersections are included in the appendix to this report.



Conclusions

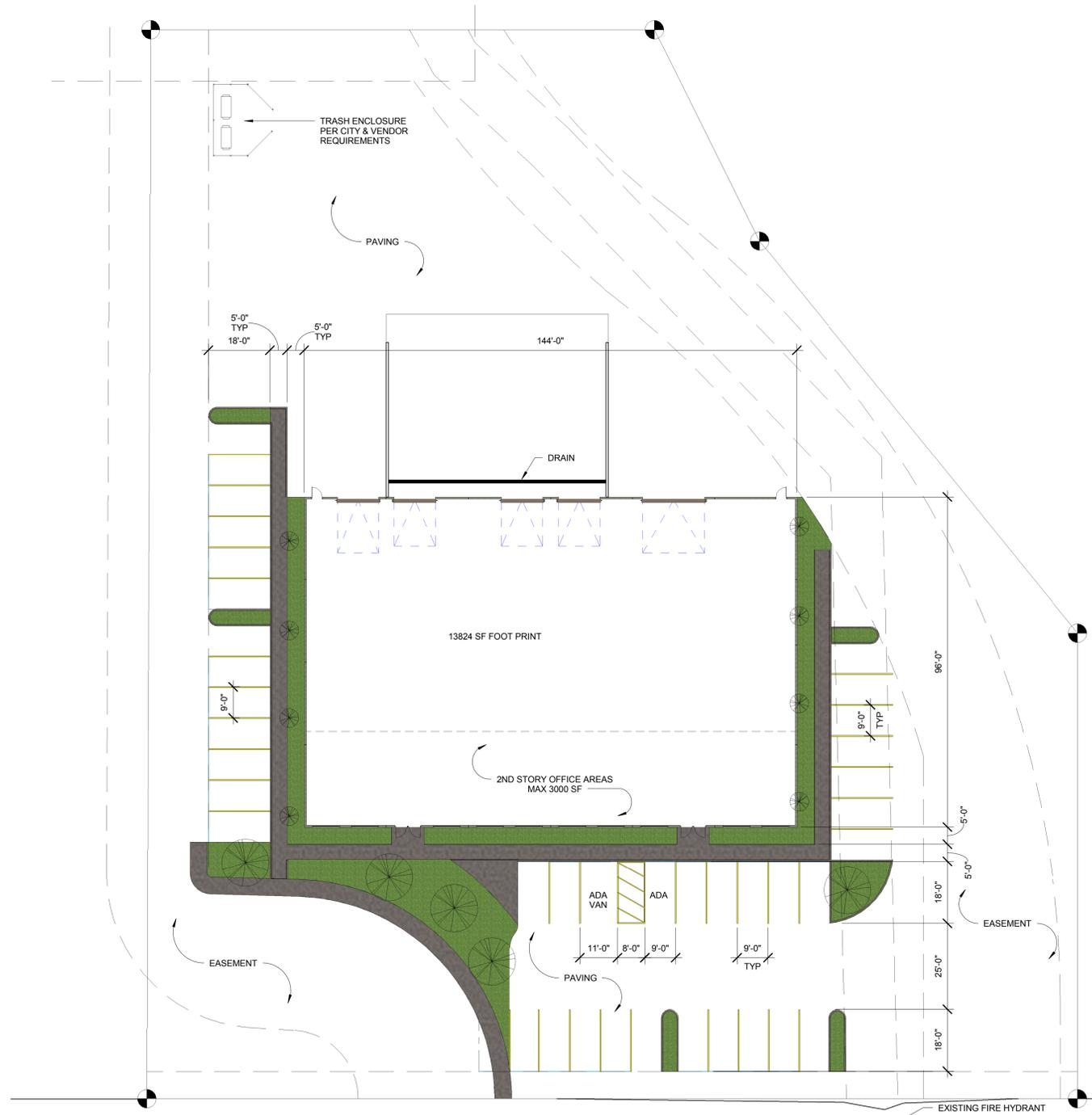
Based on the analysis, the study intersections operate within Washington County and City of Tualatin performance standards through year 2018 with full build-out of the proposed development. Accordingly, no operational mitigation is necessary or recommended as a part of this project.

Based on the measured intersection sight distance to the east and west of the proposed accesses, adequate sight distance is available to safely accommodate the proposed use of the site.

Based on the review of the detailed crash data as well as our observations of the study area intersections, no crash patterns and no significant design concerns were identified. No specific safety mitigations are recommended in conjunction with the proposed development.

1e

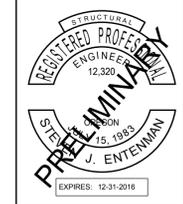
Appendix




 PRELIMINARY SITE PLAN
 1" = 20'-0"

SITE PLAN
TUALATIN FLEX BUILDING
 TUALATIN, OREGON

Harper Houf Peterson Righellis Inc.
 ENGINEERS • PLANNERS
 LANDSCAPE ARCHITECTS • SURVEYORS
 205 SE Spokane Street, Suite 200, Portland, OR 97202
 phone: 503.221.1131 www.hhpr.com fax: 503.221.1171



DESIGNED:	SJE	DATE:	09/02/2016
DRAWN:	HHPR		
CHECKED:	SJE		

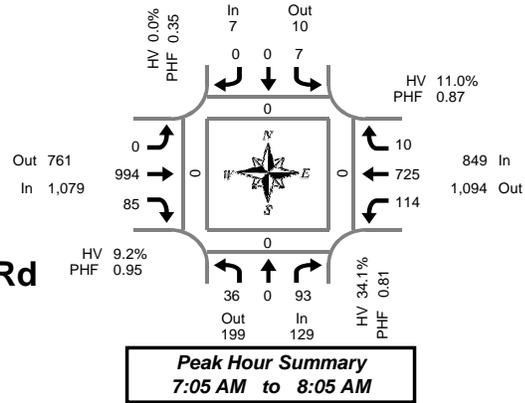
NO.	DATE	DESCRIPTION

SHEET NO. **1**
 JOB NO. FHA-07

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW 115th Ave & SW Tualatin Sherwood Rd

Thursday, September 01, 2016

7:00 AM to 9:00 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	2	0	3	0	0	0	0	0	0	91	5	0	10	44	0	0	155	0	1	0	0
7:05 AM	1	0	6	0	0	0	0	0	0	82	8	0	5	55	0	0	157	0	0	0	0
7:10 AM	2	0	6	0	3	0	0	0	0	84	5	0	7	59	1	0	167	0	0	0	0
7:15 AM	4	0	9	0	1	0	0	0	0	87	6	0	8	47	0	0	162	0	0	0	0
7:20 AM	7	0	12	0	1	0	0	0	0	75	5	0	14	51	1	0	166	0	0	0	0
7:25 AM	2	0	5	0	0	0	0	0	0	81	9	0	5	66	1	0	169	0	0	0	0
7:30 AM	2	0	8	0	2	0	0	0	0	79	11	1	16	74	0	0	192	0	0	0	0
7:35 AM	6	0	9	0	0	0	0	0	0	76	5	0	4	77	0	0	177	0	0	0	0
7:40 AM	2	0	5	0	0	0	0	0	0	83	10	0	9	55	0	0	164	0	0	0	0
7:45 AM	3	0	10	0	0	0	0	0	0	86	8	0	9	60	1	0	177	0	0	0	0
7:50 AM	0	0	14	0	0	0	0	0	0	91	7	0	8	72	2	0	194	0	0	0	0
7:55 AM	4	0	6	0	0	0	0	0	0	82	6	0	9	58	4	0	169	0	0	0	0
8:00 AM	3	0	3	0	0	0	0	0	0	88	5	0	20	51	0	0	170	0	0	0	0
8:05 AM	2	0	2	0	0	0	0	0	0	73	6	0	6	66	0	0	155	0	0	0	0
8:10 AM	3	0	2	0	1	0	0	0	0	88	2	0	2	63	1	0	162	0	0	0	0
8:15 AM	5	0	3	0	1	0	0	0	1	49	6	0	8	49	3	0	125	0	0	0	0
8:20 AM	4	0	2	0	0	0	0	0	1	74	3	0	7	50	1	0	142	0	0	0	0
8:25 AM	1	0	5	0	0	0	0	0	0	90	5	0	3	62	0	0	166	0	0	0	0
8:30 AM	5	0	6	0	0	0	0	0	2	69	4	0	3	47	2	0	138	0	0	0	0
8:35 AM	2	0	5	0	0	0	0	0	2	75	9	0	5	58	0	0	156	0	0	0	0
8:40 AM	3	0	5	0	0	0	0	0	0	65	1	2	8	66	2	0	150	0	0	0	0
8:45 AM	1	0	4	0	0	0	0	0	2	95	3	0	8	69	0	0	182	0	0	0	0
8:50 AM	2	0	6	0	3	0	0	0	0	60	5	0	5	46	3	0	130	0	0	0	0
8:55 AM	1	0	6	0	0	0	0	0	2	81	12	0	6	59	3	0	170	0	0	0	0
Total Survey	67	0	142	0	12	0	0	0	10	1,904	146	3	185	1,404	25	0	3,895	0	1	0	0

15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	5	0	15	0	3	0	0	0	0	257	18	0	22	158	1	0	479	0	1	0	0
7:15 AM	13	0	26	0	2	0	0	0	0	243	20	0	27	164	2	0	497	0	0	0	0
7:30 AM	10	0	22	0	2	0	0	0	0	238	26	1	29	206	0	0	533	0	0	0	0
7:45 AM	7	0	30	0	0	0	0	0	0	259	21	0	26	190	7	0	540	0	0	0	0
8:00 AM	8	0	7	0	1	0	0	0	0	249	13	0	28	180	1	0	487	0	0	0	0
8:15 AM	10	0	10	0	1	0	0	0	2	213	14	0	18	161	4	0	433	0	0	0	0
8:30 AM	10	0	16	0	0	0	0	0	4	209	14	2	16	171	4	0	444	0	0	0	0
8:45 AM	4	0	16	0	3	0	0	0	4	236	20	0	19	174	6	0	482	0	0	0	0
Total Survey	67	0	142	0	12	0	0	0	10	1,904	146	3	185	1,404	25	0	3,895	0	1	0	0

Peak Hour Summary

7:05 AM to 8:05 AM

By Approach	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	129	199	328	0	7	10	17	0	1,079	761	1,840	1	849	1,094	1,943	0	2,064	0	0	0	0
%HV	34.1%				0.0%				9.2%				11.0%				11.4%				
PHF	0.81				0.35				0.95				0.87				0.96				

By Movement	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	36	0	93	129	7	0	0	7	0	997	85	1,079	114	725	10	849	2,064
%HV	13.9%	0.0%	41.9%	34.1%	0.0%	0.0%	0.0%	0.0%	0.0%	8.0%	22.4%	9.2%	12.3%	10.8%	10.0%	11.0%	11.4%
PHF	0.69	0.00	0.78	0.81	0.35	0.00	0.00	0.35	0.00	0.95	0.82	0.95	0.77	0.84	0.36	0.87	0.96

Rolling Hour Summary

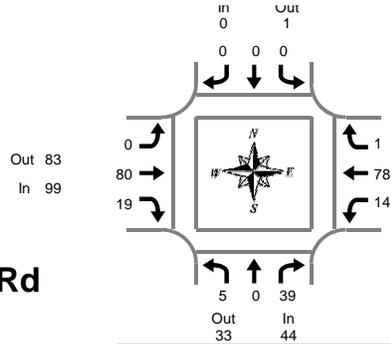
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	35	0	93	0	7	0	0	0	0	997	85	1	104	718	10	0	2,049	0	1	0	0
7:15 AM	38	0	85	0	5	0	0	0	0	989	80	1	110	740	10	0	2,057	0	0	0	0
7:30 AM	35	0	69	0	4	0	0	0	2	959	74	1	101	737	12	0	1,993	0	0	0	0
7:45 AM	35	0	63	0	2	0	0	0	6	930	62	2	88	702	16	0	1,904	0	0	0	0
8:00 AM	32	0	49	0	5	0	0	0	10	907	61	2	81	686	15	0	1,846	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Peak Hour Summary
7:05 AM to 8:05 AM

SW 115th Ave & SW Tualatin Sherwood Rd

Thursday, September 01, 2016

7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				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	1	1	3	4	0	7	8
7:05 AM	0	0	3	3	0	0	0	0	0	9	3	12	1	6	0	7	22
7:10 AM	0	0	2	2	0	0	0	0	0	6	2	8	1	4	1	6	16
7:15 AM	1	0	4	5	0	0	0	0	0	7	2	9	0	2	0	2	16
7:20 AM	1	0	9	10	0	0	0	0	0	5	0	5	3	5	0	8	23
7:25 AM	1	0	3	4	0	0	0	0	0	6	3	9	2	9	0	11	24
7:30 AM	0	0	2	2	0	0	0	0	0	3	4	7	0	6	0	6	15
7:35 AM	1	0	5	6	0	0	0	0	0	8	2	10	0	9	0	9	25
7:40 AM	0	0	1	1	0	0	0	0	0	8	1	9	1	6	0	7	17
7:45 AM	0	0	5	5	0	0	0	0	0	9	1	10	2	6	0	8	23
7:50 AM	0	0	2	2	0	0	0	0	0	5	0	5	0	10	0	10	17
7:55 AM	1	0	3	4	0	0	0	0	0	8	0	8	1	9	0	10	22
8:00 AM	0	0	0	0	0	0	0	0	0	6	1	7	3	6	0	9	16
8:05 AM	1	0	0	1	0	0	0	0	0	10	1	11	2	7	0	9	21
8:10 AM	0	0	0	0	0	0	0	0	0	7	0	7	0	6	0	6	13
8:15 AM	0	0	1	1	0	0	0	0	0	4	2	6	2	7	0	9	16
8:20 AM	2	0	0	2	0	0	0	0	0	6	2	8	2	7	0	9	19
8:25 AM	0	0	2	2	0	0	0	0	0	10	0	10	0	10	0	10	22
8:30 AM	0	0	2	2	0	0	0	0	0	9	2	11	1	12	1	14	27
8:35 AM	1	0	3	4	0	0	0	0	0	8	0	8	1	9	0	10	22
8:40 AM	0	0	1	1	0	0	0	0	0	8	0	8	2	11	0	13	22
8:45 AM	0	0	0	0	0	0	0	0	0	7	1	8	1	10	0	11	19
8:50 AM	1	0	1	2	1	0	0	1	0	8	2	10	3	7	1	11	24
8:55 AM	0	0	4	4	0	0	0	0	0	12	2	14	2	8	0	10	28
Total Survey	10	0	53	63	1	0	0	1	0	169	32	201	33	176	3	212	477

Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	5	5	0	0	0	0	0	15	6	21	5	14	1	20	46
7:15 AM	3	0	16	19	0	0	0	0	0	18	5	23	5	16	0	21	63
7:30 AM	1	0	8	9	0	0	0	0	0	19	7	26	1	21	0	22	57
7:45 AM	1	0	10	11	0	0	0	0	0	22	1	23	3	25	0	28	62
8:00 AM	1	0	0	1	0	0	0	0	0	23	2	25	5	19	0	24	50
8:15 AM	2	0	3	5	0	0	0	0	0	20	4	24	4	24	0	28	57
8:30 AM	1	0	6	7	0	0	0	0	0	25	2	27	4	32	1	37	71
8:45 AM	1	0	5	6	1	0	0	1	0	27	5	32	6	25	1	32	71
Total Survey	10	0	53	63	1	0	0	1	0	169	32	201	33	176	3	212	477

Heavy Vehicle Peak Hour Summary

7:05 AM to 8:05 AM

By Approach	Northbound SW 115th Ave			Southbound SW 115th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	44	33	77	0	1	1	99	83	182	93	119	212	236
PHF	0.58			0.00			0.85			0.80			0.91

By Movement	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	5	0	39	44	0	0	0	0	0	80	19	99	14	78	1	93	236
PHF	0.42	0.00	0.61	0.58	0.00	0.00	0.00	0.00	0.00	0.80	0.53	0.85	0.70	0.78	0.25	0.80	0.91

Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	5	0	39	44	0	0	0	0	0	74	19	93	14	76	1	91	228
7:15 AM	6	0	34	40	0	0	0	0	0	82	15	97	14	81	0	95	232
7:30 AM	5	0	21	26	0	0	0	0	0	84	14	98	13	89	0	102	226
7:45 AM	5	0	19	24	0	0	0	0	0	90	9	99	16	100	1	117	240
8:00 AM	5	0	14	19	1	0	0	1	0	95	13	108	19	100	2	121	249

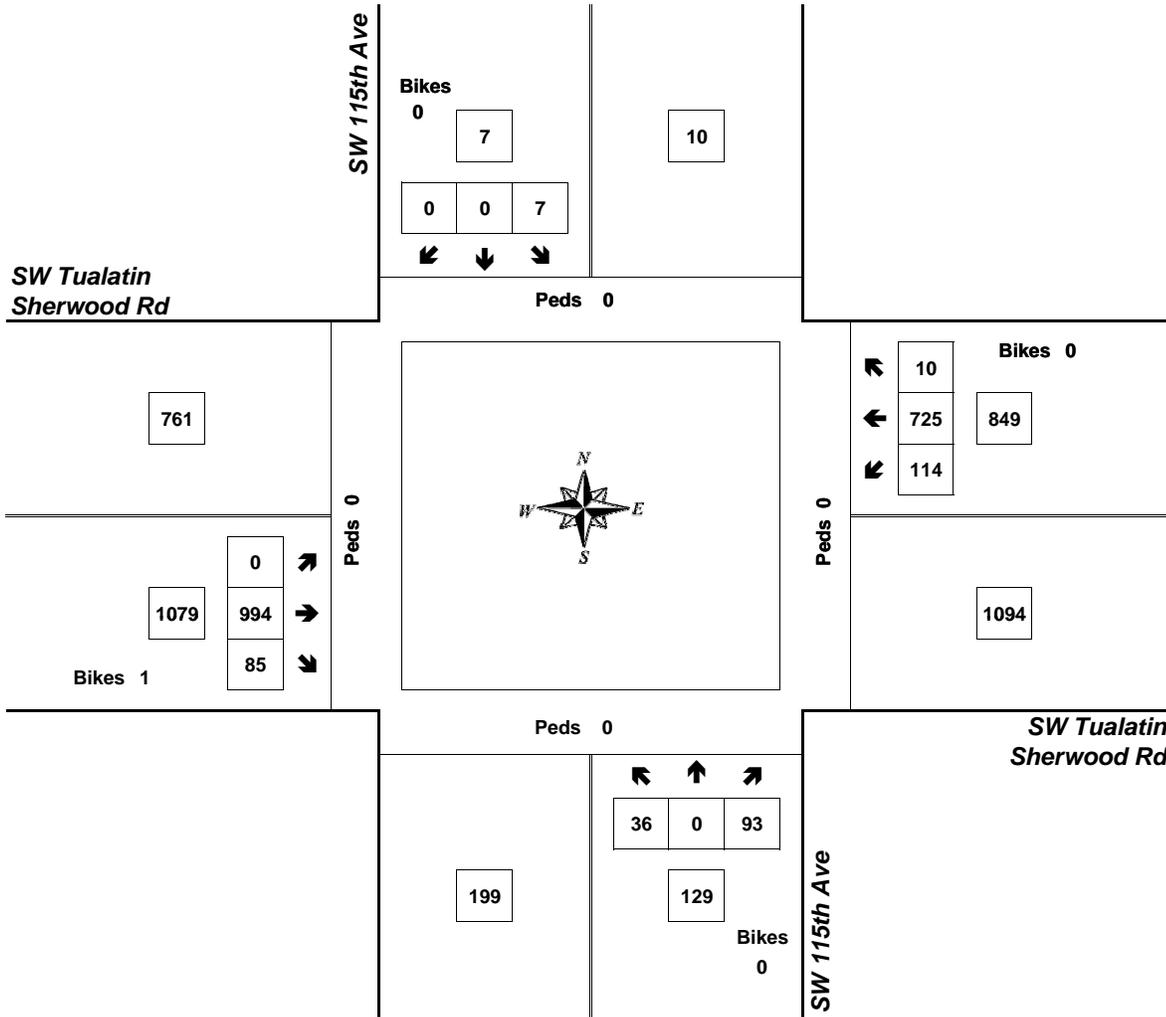
Peak Hour Summary



Clay Carney
(503) 833-2740

SW 115th Ave & SW Tualatin Sherwood Rd

7:05 AM to 8:05 AM
Thursday, September 01, 2016



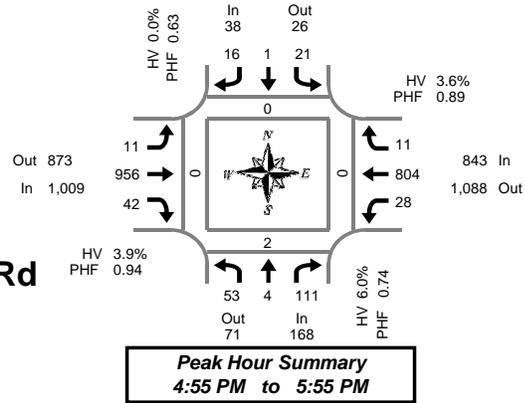
Approach	PHF	HV%	Volume
EB	0.95	9.2%	1,079
WB	0.87	11.0%	849
NB	0.81	34.1%	129
SB	0.35	0.0%	7
Intersection	0.96	11.4%	2,064

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW 115th Ave & SW Tualatin Sherwood Rd

Wednesday, August 31, 2016

4:00 PM to 6:00 PM

5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	5	0	11	0	2	0	0	0	2	87	1	0	1	68	0	0	177	0	0	0	0
4:05 PM	2	0	15	0	0	0	0	0	2	81	4	0	4	68	5	0	181	0	0	0	0
4:10 PM	2	0	5	0	0	0	0	0	0	90	3	0	4	76	2	0	182	0	0	0	0
4:15 PM	9	0	7	0	0	0	1	0	1	68	4	0	4	56	1	0	151	0	0	0	0
4:20 PM	6	0	4	0	1	0	0	0	2	75	7	0	1	74	0	0	170	1	0	0	0
4:25 PM	4	1	8	0	0	1	1	0	0	63	3	0	8	53	0	0	142	1	0	0	0
4:30 PM	4	0	8	0	0	0	1	0	1	82	4	0	0	76	0	0	176	0	0	0	0
4:35 PM	5	0	18	0	0	0	2	0	0	69	2	0	4	59	1	0	160	0	0	0	0
4:40 PM	0	0	6	0	2	0	0	0	0	84	3	0	3	64	0	0	162	0	1	0	0
4:45 PM	5	0	10	0	1	0	1	0	0	64	2	0	0	69	0	0	152	0	0	0	0
4:50 PM	1	0	1	0	0	0	0	0	0	84	2	0	3	76	0	0	167	0	0	0	0
4:55 PM	6	0	7	0	2	0	3	0	1	66	4	0	2	61	1	0	153	0	0	0	0
5:00 PM	6	0	11	0	0	0	2	0	1	84	3	0	2	66	0	0	175	0	0	0	0
5:05 PM	5	1	21	0	1	0	2	0	0	76	3	0	2	59	2	0	172	0	0	0	0
5:10 PM	2	0	7	0	2	1	0	0	1	81	5	0	4	69	0	1	172	0	0	0	0
5:15 PM	3	0	14	0	2	0	0	0	0	74	2	0	1	63	0	1	159	0	0	0	0
5:20 PM	3	0	3	0	1	0	1	0	2	90	2	0	2	75	3	0	182	0	0	0	0
5:25 PM	6	0	4	0	7	0	2	0	1	81	1	0	3	59	1	0	165	0	0	0	0
5:30 PM	1	0	8	0	1	0	3	0	0	84	6	0	1	77	0	0	181	0	1	0	0
5:35 PM	9	0	14	0	1	0	1	0	1	65	6	0	1	52	0	1	150	0	0	0	0
5:40 PM	1	0	10	0	2	0	1	0	1	96	1	0	3	82	1	0	198	0	1	0	0
5:45 PM	8	3	5	0	2	0	0	0	2	68	5	0	4	64	1	0	162	0	0	0	0
5:50 PM	3	0	7	0	0	0	1	0	1	91	4	0	3	77	2	0	189	0	0	0	0
5:55 PM	1	0	5	0	1	0	0	0	2	62	2	0	3	75	0	0	151	0	0	0	0
Total Survey	97	5	209	0	28	2	22	0	21	1,865	79	0	63	1,618	20	3	4,029	2	3	0	0

15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	9	0	31	0	2	0	0	0	4	258	8	0	9	212	7	0	540	0	0	0	0
4:15 PM	19	1	19	0	1	1	2	0	3	206	14	0	13	183	1	0	463	2	0	0	0
4:30 PM	9	0	32	0	2	0	3	0	1	235	9	0	7	199	1	0	498	0	1	0	0
4:45 PM	12	0	18	0	3	0	4	0	1	214	8	0	5	206	1	0	472	0	0	0	0
5:00 PM	13	1	39	0	3	1	4	0	2	241	11	0	8	194	2	1	519	0	0	0	0
5:15 PM	12	0	21	0	10	0	3	0	3	245	5	0	6	197	4	1	506	0	0	0	0
5:30 PM	11	0	32	0	4	0	5	0	2	245	13	0	5	211	1	1	529	0	2	0	0
5:45 PM	12	3	17	0	3	0	1	0	5	221	11	0	10	216	3	0	502	0	0	0	0
Total Survey	97	5	209	0	28	2	22	0	21	1,865	79	0	63	1,618	20	3	4,029	2	3	0	0

Peak Hour Summary 4:55 PM to 5:55 PM

By Approach	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	168	71	239	0	38	26	64	0	1,009	873	1,882	0	843	1,088	1,931	3	2,058	0	2	0	0
%HV	6.0%				0.0%				3.9%				3.6%				3.8%				
PHF	0.74				0.63				0.94				0.89				0.94				

By Movement	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Total				
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total					
Volume	53	4	111	168	21	1	16	38	11	956	42	1,009	28	804	11	843	2,058				
%HV	5.7%	0.0%	6.3%	6.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%	4.8%	3.9%	21.4%	3.0%	0.0%	3.6%	3.8%				
PHF	0.74	0.33	0.66	0.74	0.53	0.25	0.57	0.63	0.69	0.94	0.81	0.94	0.70	0.90	0.69	0.89	0.94				

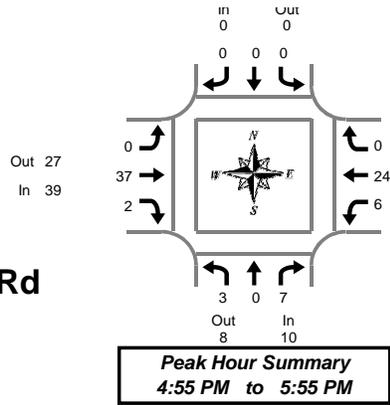
Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	49	1	100	0	8	1	9	0	9	913	39	0	34	800	10	0	1,973	2	1	0	0
4:15 PM	53	2	108	0	9	2	13	0	7	896	42	0	33	782	5	1	1,952	2	1	0	0
4:30 PM	46	1	110	0	18	1	14	0	7	935	33	0	26	796	8	2	1,995	0	1	0	0
4:45 PM	48	1	110	0	20	1	16	0	8	945	37	0	24	808	8	3	2,026	0	2	0	0
5:00 PM	48	4	109	0	20	1	13	0	12	952	40	0	29	818	10	3	2,056	0	2	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



SW 115th Ave & SW Tualatin Sherwood Rd

Wednesday, August 31, 2016

4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	1	1	0	0	0	0	0	5	0	5	0	4	0	4	10
4:05 PM	0	0	1	1	0	0	0	0	0	3	0	3	0	5	0	5	9
4:10 PM	0	0	1	1	0	0	0	0	0	5	0	5	0	2	0	2	8
4:15 PM	0	0	0	0	0	0	0	0	0	4	0	4	0	6	0	6	10
4:20 PM	0	0	0	0	0	0	0	0	0	5	1	6	0	3	0	3	9
4:25 PM	0	0	0	0	0	0	0	0	0	1	0	1	1	3	0	4	5
4:30 PM	0	0	2	2	0	0	0	0	0	3	1	4	0	7	0	7	13
4:35 PM	0	0	0	0	0	0	0	0	0	3	0	3	0	1	0	1	4
4:40 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	4	0	4	6
4:45 PM	0	0	0	0	0	0	0	0	0	5	0	5	0	4	0	4	9
4:50 PM	0	0	0	0	0	0	0	0	0	4	0	4	1	2	0	3	7
4:55 PM	0	0	2	2	0	0	0	0	0	4	1	5	0	2	0	2	9
5:00 PM	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5
5:05 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
5:10 PM	0	0	2	2	0	0	0	0	0	4	0	4	1	2	0	3	9
5:15 PM	1	0	2	3	0	0	0	0	0	5	0	5	0	2	0	2	10
5:20 PM	0	0	0	0	0	0	0	0	0	4	0	4	0	2	0	2	6
5:25 PM	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5
5:30 PM	0	0	0	0	0	0	0	0	0	1	1	2	1	3	0	4	6
5:35 PM	1	0	1	2	0	0	0	0	0	6	0	6	1	1	0	2	10
5:40 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	4	0	4	5
5:45 PM	0	0	0	0	0	0	0	0	0	2	0	2	1	3	0	4	6
5:50 PM	1	0	0	1	0	0	0	0	0	2	0	2	2	1	0	3	6
5:55 PM	0	0	0	0	0	0	0	0	0	3	0	3	1	4	0	5	8
Total Survey	3	0	12	15	0	0	0	0	0	80	4	84	9	69	0	78	177

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	3	3	0	0	0	0	0	13	0	13	0	11	0	11	27
4:15 PM	0	0	0	0	0	0	0	0	0	10	1	11	1	12	0	13	24
4:30 PM	0	0	2	2	0	0	0	0	0	8	1	9	0	12	0	12	23
4:45 PM	0	0	2	2	0	0	0	0	0	13	1	14	1	8	0	9	25
5:00 PM	0	0	2	2	0	0	0	0	0	9	0	9	1	4	0	5	16
5:15 PM	1	0	2	3	0	0	0	0	0	12	0	12	0	6	0	6	21
5:30 PM	1	0	1	2	0	0	0	0	0	8	1	9	2	8	0	10	21
5:45 PM	1	0	0	1	0	0	0	0	0	7	0	7	4	8	0	12	20
Total Survey	3	0	12	15	0	0	0	0	0	80	4	84	9	69	0	78	177

Heavy Vehicle Peak Hour Summary 4:55 PM to 5:55 PM

By Approach	Northbound SW 115th Ave			Southbound SW 115th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	10	8	18	0	0	0	39	27	66	30	44	74	79
PHF	0.50			0.00			0.75			0.68			0.79

By Movement	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	3	0	7	10	0	0	0	0	0	37	2	39	6	24	0	30	79
PHF	0.75	0.00	0.44	0.50	0.00	0.00	0.00	0.00	0.00	0.71	0.50	0.75	0.50	0.75	0.00	0.68	0.79

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 115th Ave				Southbound SW 115th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	7	7	0	0	0	0	0	44	3	47	2	43	0	45	99
4:15 PM	0	0	6	6	0	0	0	0	0	40	3	43	3	36	0	39	88
4:30 PM	1	0	8	9	0	0	0	0	0	42	2	44	2	30	0	32	85
4:45 PM	2	0	7	9	0	0	0	0	0	42	2	44	4	26	0	30	83
5:00 PM	3	0	5	8	0	0	0	0	0	36	1	37	7	26	0	33	78

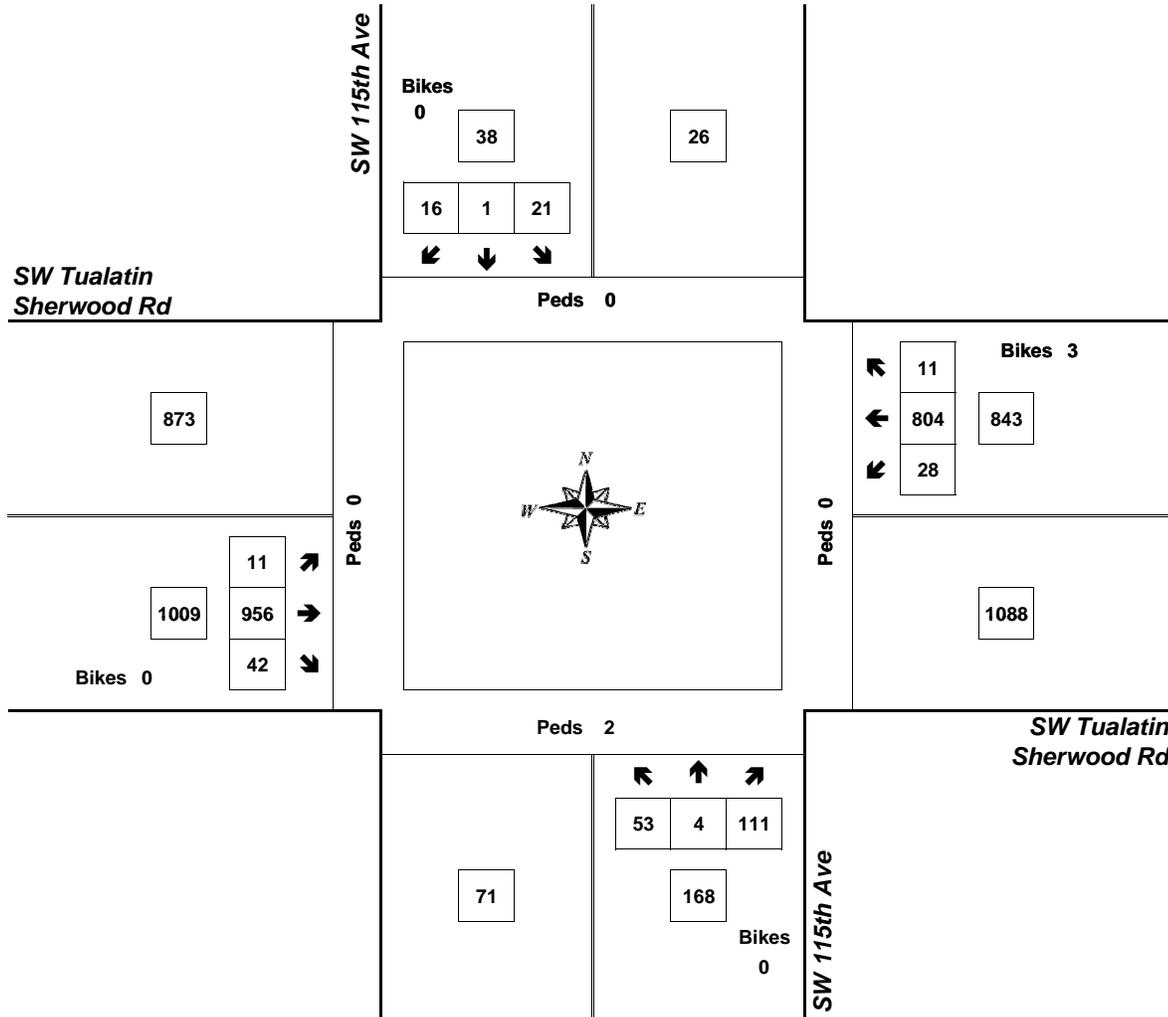
Peak Hour Summary



Clay Carney
(503) 833-2740

SW 115th Ave & SW Tualatin Sherwood Rd

4:55 PM to 5:55 PM
Wednesday, August 31, 2016



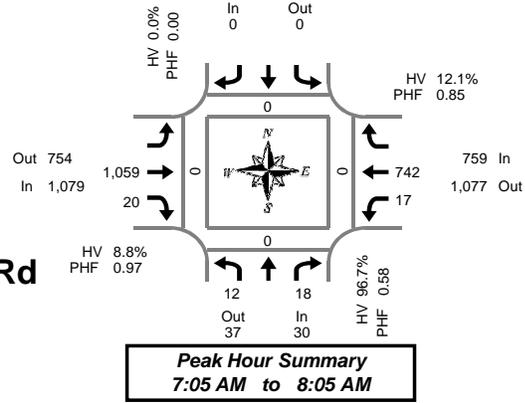
Approach	PHF	HV%	Volume
EB	0.94	3.9%	1,009
WB	0.89	3.6%	843
NB	0.74	6.0%	168
SB	0.63	0.0%	38
Intersection	0.94	3.8%	2,058

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW 120th Ave & SW Tualatin Sherwood Rd

Thursday, September 01, 2016

7:00 AM to 9:00 AM

Peak Hour Summary
7:05 AM to 8:05 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
7:00 AM	0	0	0			0	89	5	0	1	47	0	142	0	0	0	0
7:05 AM	0	0	0			0	98	0	0	1	51	0	150	0	0	0	0
7:10 AM	1	0	0			0	82	0	0	1	64	0	148	0	0	0	0
7:15 AM	0	1	0			0	94	3	0	0	40	0	138	0	0	0	0
7:20 AM	1	1	0			0	82	2	3	1	68	0	155	0	0	0	0
7:25 AM	2	0	0			0	87	2	1	0	62	0	153	0	0	0	0
7:30 AM	3	1	0			0	89	3	0	3	78	0	177	0	0	0	0
7:35 AM	1	3	0			0	82	2	0	1	80	0	169	0	0	0	0
7:40 AM	0	5	0			0	90	0	0	0	59	0	154	0	0	0	0
7:45 AM	2	1	0			0	91	6	0	1	49	0	150	0	0	0	0
7:50 AM	1	3	0			0	91	1	0	4	71	0	171	0	0	0	0
7:55 AM	1	2	0			0	88	0	0	3	64	1	158	0	0	0	0
8:00 AM	0	1	0			0	85	1	0	2	56	0	145	0	0	0	0
8:05 AM	1	1	0			0	76	1	0	3	62	0	144	0	0	0	0
8:10 AM	0	0	0			0	76	2	0	5	54	0	137	0	0	0	0
8:15 AM	3	1	0			0	62	2	0	1	50	0	119	0	0	0	0
8:20 AM	1	3	0			0	89	3	0	0	66	0	162	0	0	0	0
8:25 AM	1	5	0			0	78	2	0	5	50	0	141	0	0	0	0
8:30 AM	0	1	0			0	92	3	0	1	58	0	155	0	0	0	0
8:35 AM	1	4	0			0	68	3	1	2	66	0	144	0	0	0	0
8:40 AM	1	1	0			0	76	5	3	3	64	0	150	0	0	0	0
8:45 AM	0	4	0			0	75	4	0	2	57	0	142	0	0	0	0
8:50 AM	2	4	0			0	79	1	0	3	52	0	141	0	0	0	0
8:55 AM	0	1	0			0	77	1	0	1	59	0	139	0	0	0	0
Total Survey	22	43	0			0	1,996	52	8	44	1,427	1	3,584	0	0	0	0

15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
7:00 AM	1	0	0			0	269	5	0	3	162	0	440	0	0	0	0
7:15 AM	3	2	0			0	263	7	4	1	170	0	446	0	0	0	0
7:30 AM	4	9	0			0	261	5	0	4	217	0	500	0	0	0	0
7:45 AM	4	6	0			0	270	7	0	8	184	1	479	0	0	0	0
8:00 AM	1	2	0			0	237	4	0	10	172	0	426	0	0	0	0
8:15 AM	5	9	0			0	229	7	0	6	166	0	422	0	0	0	0
8:30 AM	2	6	0			0	236	11	4	6	188	0	449	0	0	0	0
8:45 AM	2	9	0			0	231	6	0	6	168	0	422	0	0	0	0
Total Survey	22	43	0			0	1,996	52	8	44	1,427	1	3,584	0	0	0	0

Peak Hour Summary

7:05 AM to 8:05 AM

By Approach	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	30	37	67	0	0	0	0	0	1,079	754	1,833	4	759	1,077	1,836	1	1,868
%HV	96.7%			0.0%			8.8%			12.1%			11.6%				
PHF	0.58			0.00			0.97			0.85			0.93				

By Movement	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Total				
	L	R	Total			Total	T	R	Total	L	T	Total					
Volume	12	18	30			0	1,059	20	1,079	17	742	759	1,868				
%HV	###	NA	94.4%	96.7%	NA	NA	NA	0.0%	NA	8.4%	30.0%	8.8%	52.9%	11.2%	NA	12.1%	11.6%
PHF	0.50		0.50	0.58		0.00	0.97	0.63	0.97	0.47	0.84	0.85	0.93				

Rolling Hour Summary

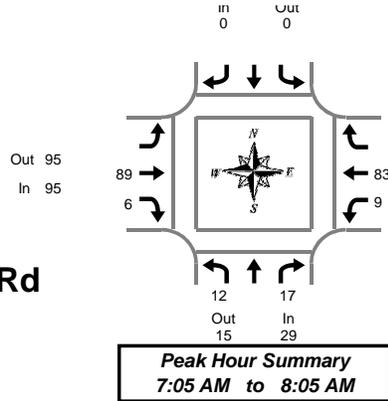
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
7:00 AM	12	17	0			0	1,063	24	4	16	733	1	1,865	0	0	0	0
7:15 AM	12	19	0			0	1,031	23	4	23	743	1	1,851	0	0	0	0
7:30 AM	14	26	0			0	997	23	0	28	739	1	1,827	0	0	0	0
7:45 AM	12	23	0			0	972	29	4	30	710	1	1,776	0	0	0	0
8:00 AM	10	26	0			0	933	28	4	28	694	0	1,719	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



SW 120th Ave & SW Tualatin Sherwood Rd

Thursday, September 01, 2016

7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
7:00 AM	0	0	0			0	2	3	5	1	0	1	6
7:05 AM	0	0	0			0	15	0	15	1	8	9	24
7:10 AM	1	0	1			0	8	0	8	0	0	0	9
7:15 AM	0	1	1			0	6	1	7	0	4	4	12
7:20 AM	1	1	2			0	10	0	10	0	5	5	17
7:25 AM	2	0	2			0	8	0	8	0	11	11	21
7:30 AM	3	1	4			0	10	1	11	0	9	9	24
7:35 AM	1	3	4			0	7	0	7	1	11	12	23
7:40 AM	0	5	5			0	6	0	6	0	4	4	15
7:45 AM	2	1	3			0	3	2	5	1	6	7	15
7:50 AM	1	2	3			0	6	1	7	3	7	10	20
7:55 AM	1	2	3			0	4	0	4	1	11	12	19
8:00 AM	0	1	1			0	6	1	7	2	7	9	17
8:05 AM	1	1	2			0	8	1	9	3	2	5	16
8:10 AM	0	0	0			0	5	1	6	3	5	8	14
8:15 AM	3	1	4			0	8	2	10	1	6	7	21
8:20 AM	1	3	4			0	6	1	7	0	6	6	17
8:25 AM	1	5	6			0	8	2	10	5	7	12	28
8:30 AM	0	1	1			0	11	2	13	1	14	15	29
8:35 AM	1	4	5			0	3	0	3	0	9	9	17
8:40 AM	1	1	2			0	5	3	8	3	10	13	23
8:45 AM	0	3	3			0	5	2	7	1	7	8	18
8:50 AM	2	3	5			0	11	1	12	2	7	9	26
8:55 AM	0	1	1			0	10	0	10	1	8	9	20
Total Survey	22	40	62			0	171	24	195	30	164	194	451

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
7:00 AM	1	0	1			0	25	3	28	2	8	10	39
7:15 AM	3	2	5			0	24	1	25	0	20	20	50
7:30 AM	4	9	13			0	23	1	24	1	24	25	62
7:45 AM	4	5	9			0	13	3	16	5	24	29	54
8:00 AM	1	2	3			0	19	3	22	8	14	22	47
8:15 AM	5	9	14			0	22	5	27	6	19	25	66
8:30 AM	2	6	8			0	19	5	24	4	33	37	69
8:45 AM	2	7	9			0	26	3	29	4	22	26	64
Total Survey	22	40	62			0	171	24	195	30	164	194	451

Heavy Vehicle Peak Hour Summary 7:05 AM to 8:05 AM

By Approach	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	29	15	44	0	0	0	95	95	190	92	106	198	216
PHF	0.56			0.00			0.79			0.72			0.79

By Movement	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Total
	L	R	Total			Total	T	R	Total	L	T	Total	
Volume	12	17	29			0	89	6	95	9	83	92	216
PHF	0.50	0.47	0.56			0.00	0.77	0.50	0.79	0.38	0.67	0.72	0.79

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
7:00 AM	12	16	28			0	85	8	93	8	76	84	205
7:15 AM	12	18	30			0	79	8	87	14	82	96	213
7:30 AM	14	25	39			0	77	12	89	20	81	101	229
7:45 AM	12	22	34			0	73	16	89	23	90	113	236
8:00 AM	10	24	34			0	86	16	102	22	88	110	246

Peak Hour Summary



Clay Carney
(503) 833-2740

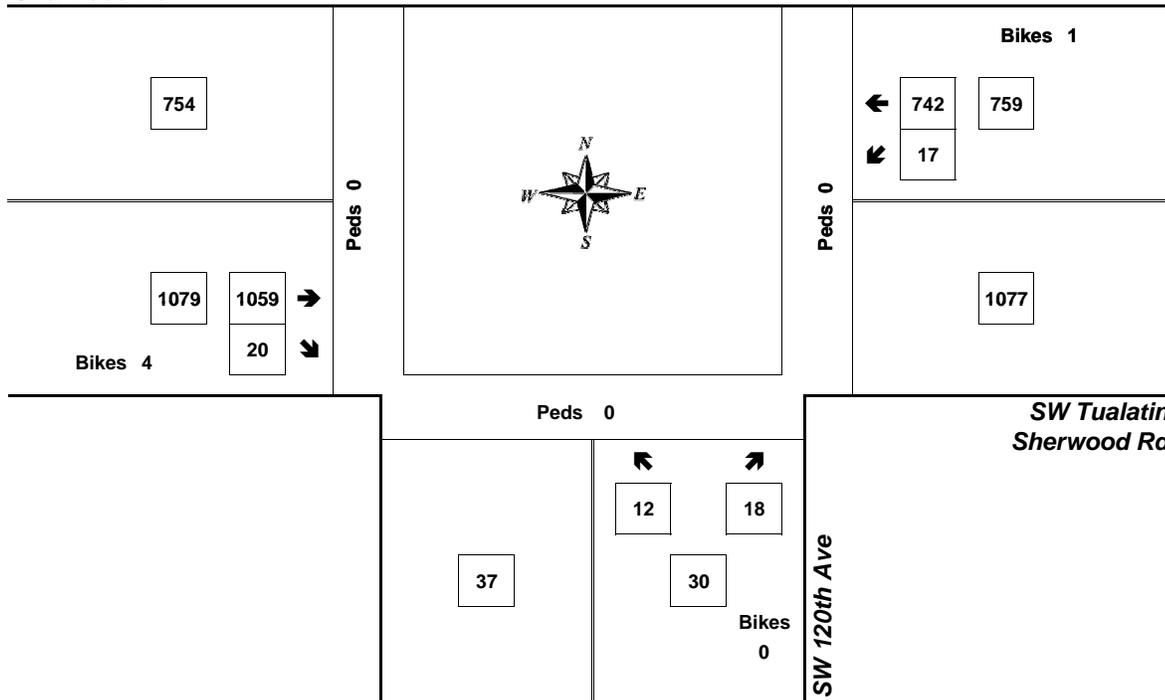
SW 120th Ave & SW Tualatin Sherwood Rd

7:05 AM to 8:05 AM
Thursday, September 01, 2016

Bikes
0

SW Tualatin
Sherwood Rd

Peds 0



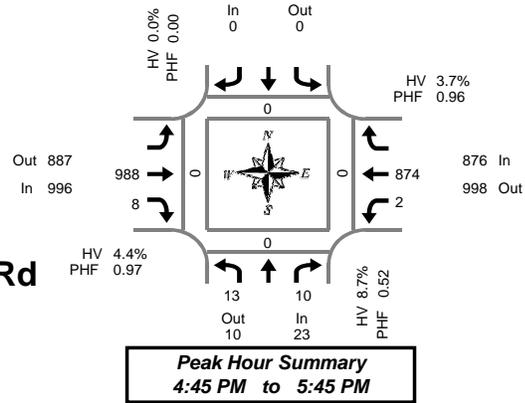
Approach	PHF	HV%	Volume
EB	0.97	8.8%	1,079
WB	0.85	12.1%	759
NB	0.58	96.7%	30
SB	0.00	0.0%	0
Intersection	0.93	11.6%	1,868

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW 120th Ave & SW Tualatin Sherwood Rd

Wednesday, August 31, 2016

4:00 PM to 6:00 PM

5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
4:00 PM	1	0	0			0	92	0	0	0	74	0	0	0	0	0	0
4:05 PM	1	1	0			0	83	2	0	1	71	0	0	0	0	0	0
4:10 PM	2	1	0			0	78	0	0	1	77	0	0	0	0	0	0
4:15 PM	1	4	0			0	79	2	0	1	70	0	0	0	0	0	0
4:20 PM	1	0	0			0	60	1	0	0	77	0	0	0	0	0	0
4:25 PM	1	0	0			0	83	0	0	0	64	0	0	0	0	0	0
4:30 PM	1	0	0			0	88	1	0	1	70	0	0	0	0	0	0
4:35 PM	2	0	0			0	76	1	0	0	71	0	0	0	0	0	0
4:40 PM	1	1	0			0	70	1	1	0	67	0	0	0	0	0	0
4:45 PM	0	1	0			0	79	2	0	1	75	0	0	0	0	0	0
4:50 PM	1	1	0			0	83	3	0	0	78	0	0	0	0	0	0
4:55 PM	2	2	0			0	74	2	0	1	72	0	0	0	0	0	0
5:00 PM	1	3	0			0	87	0	0	0	66	0	0	0	0	0	0
5:05 PM	3	0	0			0	79	0	0	0	69	0	0	0	0	0	0
5:10 PM	4	0	0			0	82	1	0	0	71	1	0	0	0	0	0
5:15 PM	0	0	0			0	82	0	1	0	73	1	0	0	0	0	0
5:20 PM	0	0	0			0	90	0	1	0	69	0	0	0	0	0	0
5:25 PM	2	0	0			0	78	0	1	0	75	0	0	0	0	0	0
5:30 PM	0	1	0			0	90	0	0	0	76	0	0	0	0	0	0
5:35 PM	0	0	0			0	79	0	0	0	71	1	0	0	0	0	0
5:40 PM	0	2	0			0	85	0	0	0	79	0	0	0	0	0	0
5:45 PM	1	0	0			0	80	0	0	0	74	0	0	0	0	0	0
5:50 PM	0	1	0			0	81	0	0	0	82	1	0	0	0	0	0
5:55 PM	0	1	0			0	67	0	0	0	82	0	0	0	0	0	0
Total Survey	25	19	0			0	1,925	16	4	6	1,753	4	3,744	0	0	0	0

15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
4:00 PM	4	2	0			0	253	2	0	2	222	0	485	0	0	0	0
4:15 PM	3	4	0			0	222	3	0	1	211	0	444	0	0	0	0
4:30 PM	4	1	0			0	234	3	1	1	208	0	451	0	0	0	0
4:45 PM	3	4	0			0	236	7	0	2	225	0	477	0	0	0	0
5:00 PM	8	3	0			0	248	1	0	0	206	1	466	0	0	0	0
5:15 PM	2	0	0			0	250	0	3	0	217	1	469	0	0	0	0
5:30 PM	0	3	0			0	254	0	0	0	226	1	483	0	0	0	0
5:45 PM	1	2	0			0	228	0	0	0	238	1	469	0	0	0	0
Total Survey	25	19	0			0	1,925	16	4	6	1,753	4	3,744	0	0	0	0

Peak Hour Summary 4:45 PM to 5:45 PM

By Approach	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Total	Pedestrians Crosswalk					
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total		North	South	East	West		
Volume	23	10	33	0	0	0	996	887	1,883	3	876	998	1,874	3	1,895	0	0	0	0
%HV	8.7%			0.0%			4.4%			3.7%			4.1%						
PHF	0.52			0.00			0.97			0.96			0.98						

By Movement	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Total			
	L	R	Total			Total	T	R	Total	L	T	Total				
Volume	13	10	23			0	988	8	996	2	874	876	1,895			
%HV	15.4%	NA	0.0%	8.7%	NA	NA	0.0%	NA	4.3%	25.0%	4.4%	0.0%	3.7%	NA	3.7%	4.1%
PHF	0.41	0.42	0.52			0.00	0.96	0.29	0.97	0.25	0.97	0.96	0.98			

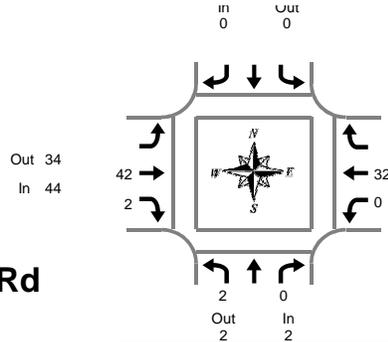
Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
4:00 PM	14	11	0			0	945	15	1	6	866	0	1,857	0	0	0	0
4:15 PM	18	12	0			0	940	14	1	4	850	1	1,838	0	0	0	0
4:30 PM	17	8	0			0	968	11	4	3	856	2	1,863	0	0	0	0
4:45 PM	13	10	0			0	988	8	3	2	874	3	1,895	0	0	0	0
5:00 PM	11	8	0			0	980	1	3	0	887	4	1,887	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

SW 120th Ave & SW Tualatin Sherwood Rd

Wednesday, August 31, 2016

4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
4:00 PM	0	0	0			0	5	0	5	0	3	3	8
4:05 PM	1	0	1			0	4	0	4	1	5	6	11
4:10 PM	2	1	3			0	2	0	2	0	2	2	7
4:15 PM	1	1	2			0	6	1	7	1	5	6	15
4:20 PM	1	0	1			0	4	1	5	0	1	1	7
4:25 PM	0	0	0			0	1	0	1	0	2	2	3
4:30 PM	0	0	0			0	5	0	5	1	4	5	10
4:35 PM	1	0	1			0	3	1	4	0	1	1	6
4:40 PM	0	0	0			0	5	0	5	0	4	4	9
4:45 PM	0	0	0			0	5	1	6	0	4	4	10
4:50 PM	0	0	0			0	5	1	6	0	2	2	8
4:55 PM	0	0	0			0	5	0	5	0	2	2	7
5:00 PM	0	0	0			0	1	0	1	0	2	2	3
5:05 PM	1	0	1			0	4	0	4	0	0	0	5
5:10 PM	0	0	0			0	5	0	5	0	2	2	7
5:15 PM	0	0	0			0	3	0	3	0	3	3	6
5:20 PM	0	0	0			0	2	0	2	0	3	3	5
5:25 PM	1	0	1			0	5	0	5	0	2	2	8
5:30 PM	0	0	0			0	4	0	4	0	3	3	7
5:35 PM	0	0	0			0	2	0	2	0	5	5	7
5:40 PM	0	0	0			0	1	0	1	0	4	4	5
5:45 PM	0	0	0			0	2	0	2	0	6	6	8
5:50 PM	0	0	0			0	5	0	5	0	3	3	8
5:55 PM	0	0	0			0	3	0	3	0	5	5	8
Total Survey	8	2	10			0	87	5	92	3	73	76	178

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
4:00 PM	3	1	4			0	11	0	11	1	10	11	26
4:15 PM	2	1	3			0	11	2	13	1	8	9	25
4:30 PM	1	0	1			0	13	1	14	1	9	10	25
4:45 PM	0	0	0			0	15	2	17	0	8	8	25
5:00 PM	1	0	1			0	10	0	10	0	4	4	15
5:15 PM	1	0	1			0	10	0	10	0	8	8	19
5:30 PM	0	0	0			0	7	0	7	0	12	12	19
5:45 PM	0	0	0			0	10	0	10	0	14	14	24
Total Survey	8	2	10			0	87	5	92	3	73	76	178

Heavy Vehicle Peak Hour Summary

4:45 PM to 5:45 PM

By Approach	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	2	2	4	0	0	0	44	34	78	32	42	74	78
PHF	0.50			0.00			0.65			0.67			0.78

By Movement	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Total
	L	R	Total			Total	T	R	Total	L	T	Total	
Volume	2	0	2			0	42	2	44	0	32	32	78
PHF	0.50	0.00	0.50			0.00	0.70	0.25	0.65	0.00	0.67	0.67	0.78

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 120th Ave			Southbound SW 120th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
4:00 PM	6	2	8			0	50	5	55	3	35	38	101
4:15 PM	4	1	5			0	49	5	54	2	29	31	90
4:30 PM	3	0	3			0	48	3	51	1	29	30	84
4:45 PM	2	0	2			0	42	2	44	0	32	32	78
5:00 PM	2	0	2			0	37	0	37	0	38	38	77

Peak Hour Summary



Clay Carney
(503) 833-2740

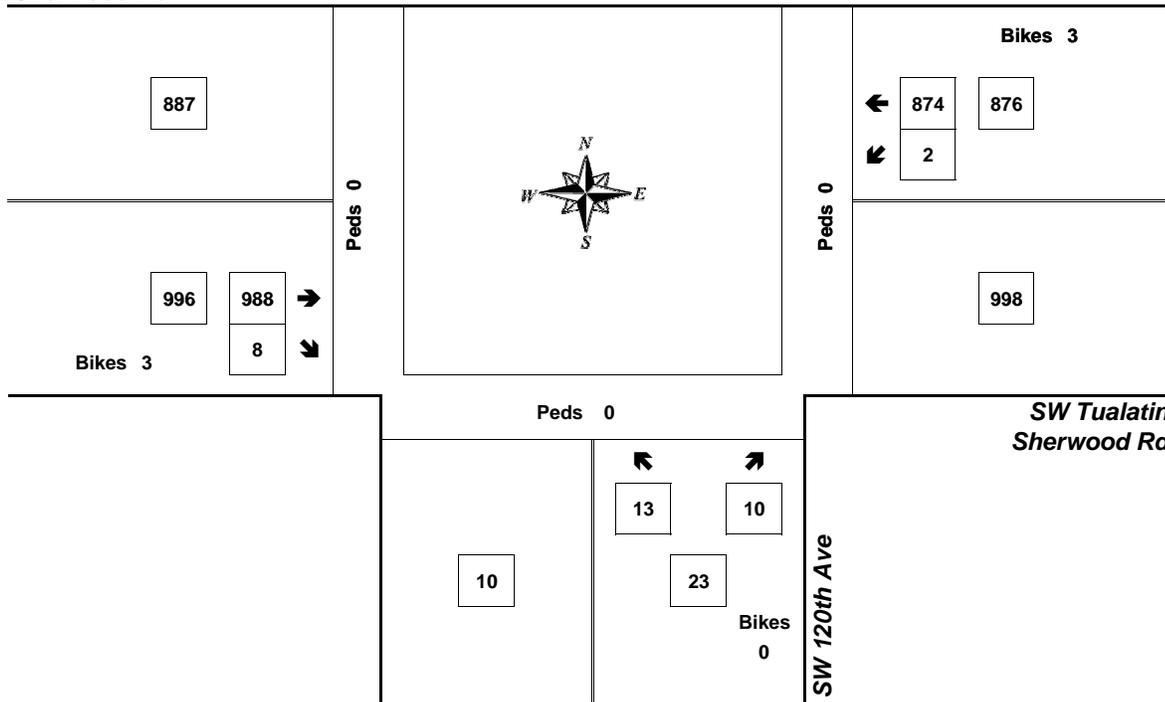
SW 120th Ave & SW Tualatin Sherwood Rd

4:45 PM to 5:45 PM
Wednesday, August 31, 2016

Bikes
0

SW Tualatin
Sherwood Rd

Peds 0



Approach	PHF	HV%	Volume
EB	0.97	4.4%	996
WB	0.96	3.7%	876
NB	0.52	8.7%	23
SB	0.00	0.0%	0
Intersection	0.98	4.1%	1,895

Count Period: 4:00 PM to 6:00 PM



LEVEL OF SERVICE

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

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

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

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

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

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

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



*LEVEL OF SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS*

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

*LEVEL OF SERVICE CRITERIA
FOR UNSIGNALIZED INTERSECTIONS*

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

HCM Unsignalized Intersection Capacity Analysis
 1: SW Tualatin Sherwood Rd & SW 120th Ave

Tualatin Flex Building
 Existing AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1059	20	17	742	12	18
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1139	22	18	798	13	19
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL		
Median storage veh				0		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1160		1973	1139
vC1, stage 1 conf vol					1139	
vC2, stage 2 conf vol					834	
vCu, unblocked vol			1160		1973	1139
tC, single (s)			4.2		7.4	7.2
tC, 2 stage (s)					6.4	
tF (s)			2.3		4.4	4.2
p0 queue free %			97		86	88
cM capacity (veh/h)			568		93	161

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1139	22	18	798	32
Volume Left	0	0	18	0	13
Volume Right	0	22	0	0	19
cSH	1700	1700	568	1700	125
Volume to Capacity	0.67	0.01	0.03	0.47	0.26
Queue Length 95th (ft)	0	0	2	0	24
Control Delay (s)	0.0	0.0	11.6	0.0	43.7
Lane LOS			B		E
Approach Delay (s)	0.0		0.3		43.7
Approach LOS					E

Intersection Summary					
Average Delay			0.8		
Intersection Capacity Utilization			65.7%	ICU Level of Service	C
Analysis Period (min)			15		

HCM Signalized Intersection Capacity Analysis
 2: SW Tualatin Sherwood Rd & SW 115th Avenue

Tualatin Flex Building
 Existing AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↗			↑	↗	↖	↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0	4.0		
Lane Util. Factor		1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Frbp, ped/bikes		1.00	0.98	1.00	1.00			1.00	1.00	1.00		
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Frt		1.00	0.85	1.00	1.00			1.00	0.85	1.00		
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00	0.95		
Satd. Flow (prot)		1743	1451	1626	1708			1347	1205	1805		
Flt Permitted		1.00	1.00	0.95	1.00			0.76	1.00	0.95		
Satd. Flow (perm)		1743	1451	1626	1708			1074	1205	1805		
Volume (vph)	0	994	85	114	725	10	36	0	93	7	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1035	89	119	755	10	38	0	97	7	0	0
RTOR Reduction (vph)	0	0	26	0	0	0	0	0	77	0	0	0
Lane Group Flow (vph)	0	1035	63	119	765	0	0	38	20	7	0	0
Conf. Bikes (#/hr)			1									
Heavy Vehicles (%)	9%	9%	9%	11%	11%	11%	34%	34%	34%	0%	0%	0%
Turn Type	Prot		Perm	Prot		Perm		pm+ov		Prot		
Protected Phases	5	2		1	6			8	1	7	4	
Permitted Phases			2			8			8			
Actuated Green, G (s)		78.5	78.5	15.1	97.6			9.6	24.7	0.8		
Effective Green, g (s)		78.5	78.5	15.1	97.6			9.6	24.7	0.8		
Actuated g/C Ratio		0.65	0.65	0.13	0.81			0.08	0.21	0.01		
Clearance Time (s)		4.0	4.0	4.0	4.0			4.0	4.0	4.0		
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0	3.0		
Lane Grp Cap (vph)		1140	949	205	1389			86	288	12		
v/s Ratio Prot		c0.59		0.07	c0.45				0.01	c0.00		
v/s Ratio Perm			0.04					c0.04	0.01			
v/c Ratio		0.91	0.07	0.58	0.55			0.44	0.07	0.58		
Uniform Delay, d1		17.7	7.5	49.5	3.8			52.6	38.4	59.4		
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Incremental Delay, d2		12.1	0.1	4.1	1.6			3.6	0.1	56.2		
Delay (s)		29.7	7.6	53.6	5.4			56.2	38.5	115.7		
Level of Service		C	A	D	A			E	D	F		
Approach Delay (s)		28.0			11.9			43.5			115.7	
Approach LOS		C			B			D			F	
Intersection Summary												
HCM Average Control Delay			22.6			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			77.3%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 1: SW Tualatin Sherwood Rd & SW 120th Ave

Tualatin Flex Building
 Existing PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	988	8	2	874	13	10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1062	9	2	940	14	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL		
Median storage veh						0
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1071		2006	1062
vC1, stage 1 conf vol					1062	
vC2, stage 2 conf vol					944	
vCu, unblocked vol			1071		2006	1062
tC, single (s)			4.2		7.4	7.2
tC, 2 stage (s)					6.4	
tF (s)			2.3		4.4	4.2
p0 queue free %			100		85	94
cM capacity (veh/h)			614		94	181
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	1062	9	2	940	25	
Volume Left	0	0	2	0	14	
Volume Right	0	9	0	0	11	
cSH	1700	1700	614	1700	119	
Volume to Capacity	0.62	0.01	0.00	0.55	0.21	
Queue Length 95th (ft)	0	0	0	0	19	
Control Delay (s)	0.0	0.0	10.9	0.0	43.2	
Lane LOS			B		E	
Approach Delay (s)	0.0		0.0		43.2	
Approach LOS					E	
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			62.0%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 2: SW Tualatin Sherwood Rd & SW 115th Avenue

Tualatin Flex Building
 Existing PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↑	↗	↙	↗			↑	↗	↙	↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00			1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1656	1743	1463	1626	1708			1355	1205	1805	1631	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.73	1.00	0.95	1.00	
Satd. Flow (perm)	1656	1743	1463	1626	1708			1031	1205	1805	1631	
Volume (vph)	11	956	42	28	804	11	53	4	111	21	1	16
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	996	44	29	838	11	55	4	116	22	1	17
RTOR Reduction (vph)	0	0	13	0	0	0	0	0	99	0	14	0
Lane Group Flow (vph)	11	996	31	29	849	0	0	59	17	22	4	0
Conf. Bikes (#/hr)			1									
Heavy Vehicles (%)	9%	9%	9%	11%	11%	11%	34%	34%	34%	0%	0%	0%
Turn Type	Prot		Perm	Prot		Perm		pm+ov		Prot		
Protected Phases	5	2		1	6			8	1	7	4	
Permitted Phases			2			8			8			
Actuated Green, G (s)	0.8	83.4	83.4	6.0	88.6			11.6	17.6	3.0	18.6	
Effective Green, g (s)	0.8	83.4	83.4	6.0	88.6			11.6	17.6	3.0	18.6	
Actuated g/C Ratio	0.01	0.70	0.70	0.05	0.74			0.10	0.15	0.02	0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	11	1211	1017	81	1261			100	217	45	253	
v/s Ratio Prot	0.01	c0.57		c0.02	c0.50				0.00	c0.01	0.00	
v/s Ratio Perm			0.02					c0.06	0.01			
v/c Ratio	1.00	0.82	0.03	0.36	0.67			0.59	0.08	0.49	0.01	
Uniform Delay, d1	59.6	13.0	5.7	55.1	8.2			51.9	44.2	57.7	42.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	271.4	6.4	0.1	2.7	2.9			8.6	0.2	8.1	0.0	
Delay (s)	331.0	19.4	5.8	57.8	11.0			60.5	44.4	65.9	43.0	
Level of Service	F	B	A	E	B			E	D	E	D	
Approach Delay (s)		22.1			12.6			49.8			55.6	
Approach LOS		C			B			D			E	

Intersection Summary

HCM Average Control Delay	21.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 3: SW IteI Street & SW 115th Avenue

Tualatin Flex Building
 Existing PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	22	2	2	0	0	4	0	36	0	2	10	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	2	2	0	0	4	0	39	0	2	11	2
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total (vph)	24	4	0	4	0	39	2	13				
Volume Left (vph)	24	0	0	0	0	0	2	0				
Volume Right (vph)	0	2	0	4	0	0	0	2				
Hadj (s)	0.53	-0.32	0.00	-0.67	0.00	0.03	0.53	-0.08				
Departure Headway (s)	5.2	4.3	4.7	4.0	4.6	4.6	5.1	4.5				
Degree Utilization, x	0.03	0.01	0.00	0.00	0.00	0.05	0.00	0.02				
Capacity (veh/h)	686	812	773	878	786	761	692	777				
Control Delay (s)	7.1	6.1	6.5	5.8	6.4	6.7	7.0	6.4				
Approach Delay (s)	7.0		5.8		6.7		6.5					
Approach LOS	A		A		A		A					
Intersection Summary												
Delay			6.7									
HCM Level of Service			A									
Intersection Capacity Utilization			17.9%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 1: SW Tualatin Sherwood Rd & SW 120th Ave

Tualatin Flex Building
 Year 2018 Background AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1139	21	18	777	12	19
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1225	23	19	835	13	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL		
Median storage veh				0		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1247		2099	1225
vC1, stage 1 conf vol					1225	
vC2, stage 2 conf vol					874	
vCu, unblocked vol			1247		2099	1225
tC, single (s)			4.2		*7.3	7.2
tC, 2 stage (s)					6.3	
tF (s)			2.3		4.4	4.2
p0 queue free %			96		85	85
cM capacity (veh/h)			525		86	141

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1225	23	19	835	33
Volume Left	0	0	19	0	13
Volume Right	0	23	0	0	20
cSH	1700	1700	525	1700	113
Volume to Capacity	0.72	0.01	0.04	0.49	0.30
Queue Length 95th (ft)	0	0	3	0	28
Control Delay (s)	0.0	0.0	12.1	0.0	49.7
Lane LOS			B		E
Approach Delay (s)	0.0		0.3		49.7
Approach LOS					E

Intersection Summary					
Average Delay			0.9		
Intersection Capacity Utilization			69.9%	ICU Level of Service	C
Analysis Period (min)			15		

* User Entered Value

HCM Signalized Intersection Capacity Analysis
2: SW Tualatin Sherwood Rd & SW 115th Avenue

Tualatin Flex Building
Year 2018 Background AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖↗	↖			↑	↗	↖	↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0	4.0		
Lane Util. Factor		1.00	1.00	0.97	1.00			1.00	1.00	1.00		
Frbp, ped/bikes		1.00	0.99	1.00	1.00			1.00	1.00	1.00		
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Frt		1.00	0.85	1.00	1.00			1.00	0.85	1.00		
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00	0.95		
Satd. Flow (prot)		1743	1463	3155	1708			1347	1205	1805		
Flt Permitted		1.00	1.00	0.95	1.00			0.76	1.00	0.95		
Satd. Flow (perm)		1743	1463	3155	1708			1074	1205	1805		
Volume (vph)	0	1034	125	188	754	10	42	0	107	7	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1077	130	196	785	10	44	0	111	7	0	0
RTOR Reduction (vph)	0	0	36	0	0	0	0	0	90	0	0	0
Lane Group Flow (vph)	0	1077	94	196	795	0	0	44	21	7	0	0
Conf. Bikes (#/hr)			1									
Heavy Vehicles (%)	9%	9%	9%	11%	11%	11%	34%	34%	34%	0%	0%	0%
Turn Type	Prot		Perm	Prot		Perm		pm+ov		Prot		
Protected Phases	5	2		1	6			8	1	7	4	
Permitted Phases			2			8			8			
Actuated Green, G (s)		80.4	80.4	12.6	97.0			10.2	22.8	0.8		
Effective Green, g (s)		80.4	80.4	12.6	97.0			10.2	22.8	0.8		
Actuated g/C Ratio		0.67	0.67	0.10	0.81			0.08	0.19	0.01		
Clearance Time (s)		4.0	4.0	4.0	4.0			4.0	4.0	4.0		
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0	3.0		
Lane Grp Cap (vph)		1168	980	331	1381			91	269	12		
v/s Ratio Prot		c0.62		0.06	c0.47				0.01	c0.00		
v/s Ratio Perm			0.06					c0.04	0.01			
v/c Ratio		0.92	0.10	0.59	0.58			0.48	0.08	0.58		
Uniform Delay, d1		17.1	7.0	51.2	4.1			52.4	40.0	59.4		
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Incremental Delay, d2		13.2	0.2	2.8	1.8			4.0	0.1	56.2		
Delay (s)		30.3	7.2	54.1	5.9			56.4	40.1	115.7		
Level of Service		C	A	D	A			E	D	F		
Approach Delay (s)		27.8			15.4			44.7			115.7	
Approach LOS		C			B			D			F	
Intersection Summary												
HCM Average Control Delay			24.0			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			78.8%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 1: SW Tualatin Sherwood Rd & SW 120th Ave

Tualatin Flex Building
 Year 2018 Background PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1033	8	2	948	14	10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1111	9	2	1019	15	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL		
Median storage (veh)						0
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1119		2134	1111
vC1, stage 1 conf vol					1111	
vC2, stage 2 conf vol					1024	
vCu, unblocked vol			1119		2134	1111
tC, single (s)			4.2		7.4	7.2
tC, 2 stage (s)					6.4	
tF (s)			2.3		4.4	4.2
p0 queue free %			100		82	94
cM capacity (veh/h)			589		85	168
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	1111	9	2	1019	26	
Volume Left	0	0	2	0	15	
Volume Right	0	9	0	0	11	
cSH	1700	1700	589	1700	107	
Volume to Capacity	0.65	0.01	0.00	0.60	0.24	
Queue Length 95th (ft)	0	0	0	0	22	
Control Delay (s)	0.0	0.0	11.1	0.0	48.9	
Lane LOS			B		E	
Approach Delay (s)	0.0		0.0		48.9	
Approach LOS					E	
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			64.4%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 2: SW Tualatin Sherwood Rd & SW 115th Avenue

Tualatin Flex Building
 Year 2018 Background PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00			1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1656	1743	1463	3155	1709			1353	1205	1805	1630	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.72	1.00	0.95	1.00	
Satd. Flow (perm)	1656	1743	1463	3155	1709			1022	1205	1805	1630	
Volume (vph)	11	995	49	39	836	11	94	4	188	22	1	17
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	1036	51	41	871	11	98	4	196	23	1	18
RTOR Reduction (vph)	0	0	16	0	0	0	0	0	130	0	15	0
Lane Group Flow (vph)	11	1036	35	41	882	0	0	102	66	23	4	0
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	9%	9%	9%	11%	11%	11%	34%	34%	34%	0%	0%	0%
Turn Type	Prot		Perm	Prot			Perm		pm+ov	Prot		
Protected Phases	5	2		1	6			8	1	7	4	
Permitted Phases			2				8		8			
Actuated Green, G (s)	0.8	81.9	81.9	4.8	85.9			14.6	19.4	2.7	21.3	
Effective Green, g (s)	0.8	81.9	81.9	4.8	85.9			14.6	19.4	2.7	21.3	
Actuated g/C Ratio	0.01	0.68	0.68	0.04	0.72			0.12	0.16	0.02	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	11	1190	998	126	1223			124	235	41	289	
v/s Ratio Prot	0.01	c0.59		0.01	c0.52				c0.01	c0.01	0.00	
v/s Ratio Perm			0.02					c0.10	0.04			
v/c Ratio	1.00	0.87	0.04	0.33	0.72			0.82	0.28	0.56	0.01	
Uniform Delay, d1	59.6	14.9	6.2	56.0	10.0			51.4	44.2	58.1	40.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	271.4	8.8	0.1	1.5	3.7			33.7	0.7	16.4	0.0	
Delay (s)	331.0	23.7	6.3	57.5	13.7			85.1	44.8	74.4	40.7	
Level of Service	F	C	A	E	B			F	D	E	D	
Approach Delay (s)		26.0			15.7			58.6			59.2	
Approach LOS		C			B			E			E	
Intersection Summary												
HCM Average Control Delay			26.7			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			77.3%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

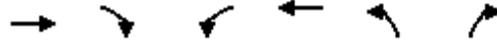
HCM Unsignalized Intersection Capacity Analysis
 3: SW Itel Street & SW 115th Avenue

Tualatin Flex Building
 Year 2018 Background PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	23	2	2	0	0	4	0	37	0	2	10	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	2	2	0	0	4	0	40	0	2	11	2
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total (vph)	25	4	0	4	0	40	2	13				
Volume Left (vph)	25	0	0	0	0	0	2	0				
Volume Right (vph)	0	2	0	4	0	0	0	2				
Hadj (s)	0.53	-0.32	0.00	-0.67	0.00	0.03	0.53	-0.08				
Departure Headway (s)	5.2	4.3	4.7	4.0	4.6	4.6	5.1	4.5				
Degree Utilization, x	0.04	0.01	0.00	0.00	0.00	0.05	0.00	0.02				
Capacity (veh/h)	685	811	772	876	785	761	691	777				
Control Delay (s)	7.2	6.1	6.5	5.8	6.4	6.7	7.0	6.4				
Approach Delay (s)	7.0		5.8		6.7		6.5					
Approach LOS	A		A		A		A					
Intersection Summary												
Delay			6.7									
HCM Level of Service			A									
Intersection Capacity Utilization			17.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 1: SW Tualatin Sherwood Rd & SW 120th Ave

Tualatin Flex Building
 Year 2018 Background + Site AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1139	23	18	777	12	19
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1225	25	19	835	13	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL		
Median storage veh				0		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1249		2099	1225
vC1, stage 1 conf vol					1225	
vC2, stage 2 conf vol					874	
vCu, unblocked vol			1249		2099	1225
tC, single (s)			4.2		*7.3	7.2
tC, 2 stage (s)					6.3	
tF (s)			2.3		4.4	4.2
p0 queue free %			96		85	85
cM capacity (veh/h)			524		86	141

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1225	25	19	835	33
Volume Left	0	0	19	0	13
Volume Right	0	25	0	0	20
cSH	1700	1700	524	1700	113
Volume to Capacity	0.72	0.01	0.04	0.49	0.30
Queue Length 95th (ft)	0	0	3	0	28
Control Delay (s)	0.0	0.0	12.1	0.0	49.7
Lane LOS			B		E
Approach Delay (s)	0.0		0.3		49.7
Approach LOS					E

Intersection Summary					
Average Delay			0.9		
Intersection Capacity Utilization			69.9%	ICU Level of Service	C
Analysis Period (min)			15		

* User Entered Value

HCM Signalized Intersection Capacity Analysis
 2: SW Tualatin Sherwood Rd & SW 115th Avenue

Tualatin Flex Building
 Year 2018 Background + Site AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖↗	↖			↑	↗	↖	↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0	4.0		
Lane Util. Factor		1.00	1.00	0.97	1.00			1.00	1.00	1.00		
Frbp, ped/bikes		1.00	0.99	1.00	1.00			1.00	1.00	1.00		
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Frt		1.00	0.85	1.00	1.00			1.00	0.85	1.00		
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00	0.95		
Satd. Flow (prot)		1743	1463	3155	1708			1347	1205	1805		
Flt Permitted		1.00	1.00	0.95	1.00			0.76	1.00	0.95		
Satd. Flow (perm)		1743	1463	3155	1708			1074	1205	1805		
Volume (vph)	0	1034	130	196	754	10	43	0	108	7	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1077	135	204	785	10	45	0	112	7	0	0
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	90	0	0	0
Lane Group Flow (vph)	0	1077	97	204	795	0	0	45	22	7	0	0
Conf. Bikes (#/hr)			1									
Heavy Vehicles (%)	9%	9%	9%	11%	11%	11%	34%	34%	34%	0%	0%	0%
Turn Type	Prot		Perm	Prot		Perm		pm+ov		Prot		
Protected Phases	5	2		1	6			8	1	7	4	
Permitted Phases			2			8			8			
Actuated Green, G (s)		79.6	79.6	13.3	96.9			10.3	23.6	0.8		
Effective Green, g (s)		79.6	79.6	13.3	96.9			10.3	23.6	0.8		
Actuated g/C Ratio		0.66	0.66	0.11	0.81			0.09	0.20	0.01		
Clearance Time (s)		4.0	4.0	4.0	4.0			4.0	4.0	4.0		
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0	3.0		
Lane Grp Cap (vph)		1156	970	350	1379			92	277	12		
v/s Ratio Prot		c0.62		0.06	c0.47				0.01	c0.00		
v/s Ratio Perm			0.07					c0.04	0.01			
v/c Ratio		0.93	0.10	0.58	0.58			0.49	0.08	0.58		
Uniform Delay, d1		17.8	7.3	50.7	4.2			52.3	39.3	59.4		
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00	1.00		
Incremental Delay, d2		14.4	0.2	2.5	1.8			4.0	0.1	56.2		
Delay (s)		32.2	7.5	53.2	5.9			56.4	39.5	115.7		
Level of Service		C	A	D	A			E	D	F		
Approach Delay (s)		29.5			15.6			44.3			115.7	
Approach LOS		C			B			D			F	
Intersection Summary												
HCM Average Control Delay			24.9			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			79.1%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 1: SW Tualatin Sherwood Rd & SW 120th Ave

Tualatin Flex Building
 Year 2018 Background + Site PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1033	8	2	948	15	11
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1111	9	2	1019	16	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL		
Median storage veh				0		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1119		2134	1111
vC1, stage 1 conf vol					1111	
vC2, stage 2 conf vol					1024	
vCu, unblocked vol			1119		2134	1111
tC, single (s)			4.2		7.4	7.2
tC, 2 stage (s)					6.4	
tF (s)			2.3		4.4	4.2
p0 queue free %			100		81	93
cM capacity (veh/h)			589		85	168

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1111	9	2	1019	28
Volume Left	0	0	2	0	16
Volume Right	0	9	0	0	12
cSH	1700	1700	589	1700	108
Volume to Capacity	0.65	0.01	0.00	0.60	0.26
Queue Length 95th (ft)	0	0	0	0	24
Control Delay (s)	0.0	0.0	11.1	0.0	49.8
Lane LOS			B		E
Approach Delay (s)	0.0		0.0		49.8
Approach LOS					E

Intersection Summary					
Average Delay			0.7		
Intersection Capacity Utilization		64.4%		ICU Level of Service	C
Analysis Period (min)		15			

HCM Signalized Intersection Capacity Analysis
 2: SW Tualatin Sherwood Rd & SW 115th Avenue

Tualatin Flex Building
 Year 2018 Background + Site PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00			1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1656	1743	1463	3155	1709			1353	1205	1805	1630	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.72	1.00	0.95	1.00	
Satd. Flow (perm)	1656	1743	1463	3155	1709			1021	1205	1805	1630	
Volume (vph)	11	995	50	40	836	11	100	4	196	22	1	17
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	1036	52	42	871	11	104	4	204	23	1	18
RTOR Reduction (vph)	0	0	16	0	0	0	0	0	129	0	15	0
Lane Group Flow (vph)	11	1036	36	42	882	0	0	108	75	23	4	0
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	9%	9%	9%	11%	11%	11%	34%	34%	34%	0%	0%	0%
Turn Type	Prot		Perm	Prot			Perm		pm+ov	Prot		
Protected Phases	5	2		1	6			8	1	7	4	
Permitted Phases			2				8		8			
Actuated Green, G (s)	0.8	81.4	81.4	4.8	85.4			15.1	19.9	2.7	21.8	
Effective Green, g (s)	0.8	81.4	81.4	4.8	85.4			15.1	19.9	2.7	21.8	
Actuated g/C Ratio	0.01	0.68	0.68	0.04	0.71			0.13	0.17	0.02	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	11	1182	992	126	1216			128	240	41	296	
v/s Ratio Prot	0.01	c0.59		0.01	c0.52				c0.01	c0.01	0.00	
v/s Ratio Perm			0.02					c0.11	0.05			
v/c Ratio	1.00	0.88	0.04	0.33	0.73			0.84	0.31	0.56	0.01	
Uniform Delay, d1	59.6	15.3	6.4	56.0	10.3			51.3	44.0	58.1	40.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	271.4	9.3	0.1	1.6	3.8			37.0	0.7	16.4	0.0	
Delay (s)	331.0	24.6	6.4	57.6	14.1			88.3	44.8	74.4	40.3	
Level of Service	F	C	A	E	B			F	D	E	D	
Approach Delay (s)		26.8			16.1			59.8			59.0	
Approach LOS		C			B			E			E	
Intersection Summary												
HCM Average Control Delay			27.5			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			77.8%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 3: SW IteI Street & SW 115th Avenue

Tualatin Flex Building
 Year 2018 Background + Site PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	37	2	2	0	0	4	0	37	0	2	10	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	40	2	2	0	0	4	0	40	0	2	11	4
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total (vph)	40	4	0	4	0	40	2	15				
Volume Left (vph)	40	0	0	0	0	0	2	0				
Volume Right (vph)	0	2	0	4	0	0	0	4				
Hadj (s)	0.53	-0.32	0.00	-0.67	0.00	0.03	0.53	-0.17				
Departure Headway (s)	5.2	4.3	4.7	4.0	4.6	4.7	5.2	4.5				
Degree Utilization, x	0.06	0.01	0.00	0.00	0.00	0.05	0.00	0.02				
Capacity (veh/h)	684	810	769	872	776	752	674	781				
Control Delay (s)	7.3	6.1	6.5	5.8	6.4	6.7	7.0	6.4				
Approach Delay (s)	7.2		5.8		6.7		6.5					
Approach LOS	A		A		A		A					
Intersection Summary												
Delay			6.8									
HCM Level of Service			A									
Intersection Capacity Utilization			18.7%		ICU Level of Service				A			
Analysis Period (min)			15									

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

CITY OF TUALATIN, WASHINGTON COUNTY

TUALATIN-SHERWOOD at 115TH AVE, City of Tualatin, Washington County, 01/01/2010 to 12/31/2014

Total crash records: 8

SER#	INVEST	S D P R S W E A U C O DATE E L G H R DAY D C S L K TIME	CLASS	CITY STREET	RD CHAR	INT-TYPE (MEDIAN) INT-REL LEGS TRAF- (#LANES) CONTL	OFFRD	WTHR	CRASH	SPCL USE TRLR QTY OWNER	MOVE	A S G E LICNS E X RES	PRTC	INJ	PED	ERROR	ACT	EVENT	CAUSE	
			DIST	FIRST STREET	DIRECT		RNDBT	SURF	COLL		FROM									
			FROM	SECOND STREET	LOCTN		DRVWY	LIGHT	SVRTY	V# TYPE	TO		P# TYPE	SVRTY						
06976	NONE	N N N 12/09/2011 FR 11A	16	SW TUALATIN-SHERWOOD SW 115TH AVE	INTER SE	CROSS 0	N	CLR DRY DAY	S-1STOP REAR PDO	01 UNKN UNKN UNKNOWN	0 0 0	STRGHT SW-NE	01 DRVR	NONE	00 M	026	000	000	07	
										02 NONE PRVTE PSNGR CAR	0 0 0	STOP NE-SW	01 DRVR	NONE	43 M	000	011	000	00	
																				OR<25
02414	NONE	N N N 05/10/2013 FR 9A	16	SW TUALATIN-SHERWOOD SW 115TH AVE	INTER SW	CROSS 0	N	CLR DRY DAY	S-1STOP REAR INJ	01 NONE PRVTE PSNGR CAR	0 0 0	STRGHT SW-NE	01 DRVR	NONE	31 F	026	000	000	07	
										02 NONE PRVTE PSNGR CAR	0 0 0	STOP SW-NE	01 DRVR	INJC	27 M	000	011	000	00	
																				OR<25
06202	NO RPT	N N N 11/09/2012 FR 12P	16	SW TUALATIN-SHERWOOD SW 115TH AVE	INTER CN	CROSS 0	N	CLR DRY DAY	S-1TURN TURN INJ	01 NONE PRVTE PSNGR CAR	0 0 0	TURN-R SW-S	01 DRVR	NONE	31 M	006	000	000	08	
										02 NONE PRVTE PSNGR CAR	0 0 0	STRGHT SW-NE	01 DRVR	INJC	21 M	000	000	000	00	
																				OR<25
06982	CITY	N N N N N 12/07/2012 FR 11A	16	SW TUALATIN-SHERWOOD SW 115TH AVE	INTER CN	CROSS 0	N	CLD DRY DAY	S-1STOP REAR PDO	01 NONE PRVTE PSNGR CAR	0 0 0	STRGHT W -E	01 DRVR	NONE	43 F	043,026	000	000	07	
										02 NONE PRVTE PSNGR CAR	0 0 0	STOP W -E	01 DRVR	NONE	41 F	000	011	013	00	
										03 NONE PRVTE MOTRHOME	0 0 0	STOP W -E	01 DRVR	NONE	80 M	000	022	000	00	
																				OR<25
00809	CITY	N N N N N 02/15/2013 FR 1P	16	SW TUALATIN-SHERWOOD SW 115TH AVE	INTER CN	CROSS 0	N	CLR DRY DAY	S-1STOP REAR INJ	01 NONE PRVTE PSNGR CAR	0 0 0	STRGHT NE-SW	01 DRVR	INJB	32 F	043,026	022	022	07	
										02 NONE PRVTE PSNGR CAR	0 0 0	STRGHT NE-SW	01 DRVR	INJC	37 F	043,026	000	000	07	
										03 NONE PRVTE PSNGR CAR	0 0 0	STOP NE-SW	01 DRVR	NONE	37 M	000	022	022	00	
																				OR<25
04799	CITY	N N N N N 08/29/2013 TH 6A	16	SW TUALATIN-SHERWOOD SW 115TH AVE	INTER CN	3-LEG 0	N	RAIN WET DAY	O-1 L-TURN TURN INJ	01 NONE PRVTE PSNGR CAR	0 0 0	TURN-L NE-S	01 DRVR	INJC	44 M	020,004	000	000	04	
																				OR<25

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

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

CITY OF TUALATIN, WASHINGTON COUNTY

TUALATIN-SHERWOOD at 120TH AVE, City of Tualatin, Washington County, 01/01/2010 to 12/31/2014

Total crash records: 2

SER#	INVEST	S D	P R S W	E A U C O DATE	CLASS	CITY STREET	RD CHAR	INT-TYPE	(MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	TRLR QTY	MOVE	A S	G E LICNS	PED	ERROR	ACT	EVENT	CAUSE
E L G H R DAY	DIST	FIRST STREET	DIRECT	LEGS	TRAF-	RNDBT	SURF	COLL	OWNER	FROM	PRTC	INJ	E X RES	LOC	ERROR	ACT	EVENT	CAUSE					
D C S L K TIME	FROM	SECOND STREET	LOCTN	(#LANES)	CONTL	DRVWY	LIGHT	SVRTY	V# TYPE	TO	P# TYPE	SVRTY	E X RES	LOC	ERROR	ACT	EVENT	CAUSE					
06366	N N N	10/27/2014	16	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLD	S-1STOP	01 NONE	0	STRGHT									29	
NONE	MO	0	SW 120TH AVE	E	STOP SIGN	N	WET	REAR	PRVTE	E -W												00	
	2P			06	0		DAY	PDO	PSNGR CAR		01 DRVR	NONE	40 M	OR-Y	026	000						29	
									02 NONE	0	STOP												
									PRVTE	E -W												011	
									PSNGR CAR		01 DRVR	NONE	26 M	OR-Y	000	000						00	
04977	N N N	09/14/2011	16	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	0	STRGHT									07	
NONE	WE	0	SW 120TH AVE	CN	STOP SIGN	N	DRY	REAR	PRVTE	E -W												00	
	5P			01	0		DAY	PDO	PSNGR CAR		01 DRVR	NONE	65 F	OR-Y	026	000						07	
									02 NONE	0	STOP												
									PRVTE	E -W												011	
									PSNGR CAR		01 DRVR	NONE	00 M	OR-Y	000	000						00	

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