Leveton Industrial
Land Use
(AR) Application Review

Date:

June 12, 2017
(Rev. 6-22-2017)
(Rev. 7-20-2017)

Submitted to:

City of Tualatin
18880 SW Martinazzi Ave.
Tualatin, OR 97062-7092
Staff Planner: Charles H. Benson III

Applicant:

SG Architecture, LLC
10940 SW Barnes Road, #364
Portland, OR 97225

Property Owner:

Dana Properties, LLC
PO Box 5837
Aloha, OR 97006

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I. Project Description

The Applicant requests architectural review (AR) approval of an approximately 35,728 square foot (SF) one-story Light Manufacturing Use building that is to be developed in a ML (Light Industrial) Planning District.

The proposed project site is 260 feet west of SW 124th Ave. and 70 feet south of SW 126th Place in the LEVETON COMMONS SUBDIVIDSION NO.2, LOT 8, an undeveloped property. The north end of the site has approximately 208 feet of frontage on SW Leveton Drive which is a fully improved street. New public sidewalks, landscape islands strips and two driveways approaches will be constructed in front of this property. As shown on the Site Plan, Sheet DR-1, the legal site square footage recorded is 96,286 SF (2.21 acres). The proposed total site landscaping on the site is 16.27% (15,665 sf) with a total developed area of 37.11 % (35,731 SF)

There are two driveway accesses proposed onto the property. The main EAST full access entrance will primarily be used for servicing semi-trucks exiting and entering the site and is 36 feet wide as shown the site plan DR-1. The WEST full access entrance is a secondary entrance for customers and business owners, 40 feet wide and is approximately 200 feet from the east entrance (center to center). This entrance is located 35 feet east from the northeast corner of SW 126th Place intersection. Both entrances will be designed and built per the City engineering standards.

The Applicant, SGA and Sisul Engineering attended a Scoping meeting with the City on November 7, 2016 (exhibit 1) to start the initial development process. Through-out this meeting many topics were discussed and we were told that the site layout looked to be in conformance with the ML District Development Standards. A detailed summary would need to be shown further for conformance on parking, trash/recycling, landscaping, bike racks, parking & loading see exhibit 20 - DR-1 for this detailed information.

On April 26, 2017 the Applicant conducted a Developers/Neighborhood meeting in conformance with the standards set forth in TDC 31.064-65 (exhibits 3-8). The project was presented with no objections. We were advised that we could move to forward with the AR Review Application pending the local trash hauler and TVFD was in agreement with the site plan layout. We obtained approvals from both of these agencies and their response letters are included in this application (exhibits 14 & 15).

The proposed Light Industrial Use building will be oriented with the front elevation facing north towards the parking lot and SW Leveton Drive. It will be similar in height, building materials and design with the surrounding buildings (exhibit 20 DR-3). The building will be set back from the street (SW Leveton Drive) to help provide added security and a clear and unobstructed view through-out the parking lots to the adjacent properties. A 8 foot wide internal concrete sidewalk from the front of the building to the public sidewalk is proposed to ensure safe travel through the parking lot with site lighting throughout (exhibits 20 DR-1 & E1).

A total of 57 parking stalls including 3 ADA stalls and 2 carpool spaces are proposed on-site which meets the minimum requirements for the Light Industrial use. Due to the specific type of Tenants proposed for this development an additional 4 loading berths have been provided for box trucks servicing located in front of each tenant space at finish floor level (see exhibit 20 DR-3). For the larger endcap Tenants recessed truck loading dock wells have been proposed for wb-52 semi-trucks. An opaque wall of landscaping (see exhibit 20 - L1 & L2) in lieu of a 8'-0" cmu screen wall is being proposed by the applicant for the purpose of screening of the trucks from the adjacent properties. The trash enclosures will be 6'-0" high CMU walls and painted to match the main building and located at the rear of the building, out of site from the public view (exhibit 20-DR1.1).

Proposed utility connections are shown in the Public Utility Facility Plan (exhibit 20 – C1).The plans include 2-inch domestic water at the northwest side of the building, along with a 6-inch fire water and FDC connection in the same location. Sanitary will also connect to the building along the northeast side, where there is a 6-inch line to serve the building. Storm will be connected throughout the site with catch basins and roof leaders and downspouts. The water will be collected at the rear and southeast corner of the building with an underground chamber storm filtering system which will be then connected to the pre-designed storm system for the overall development.

II. General Provisions

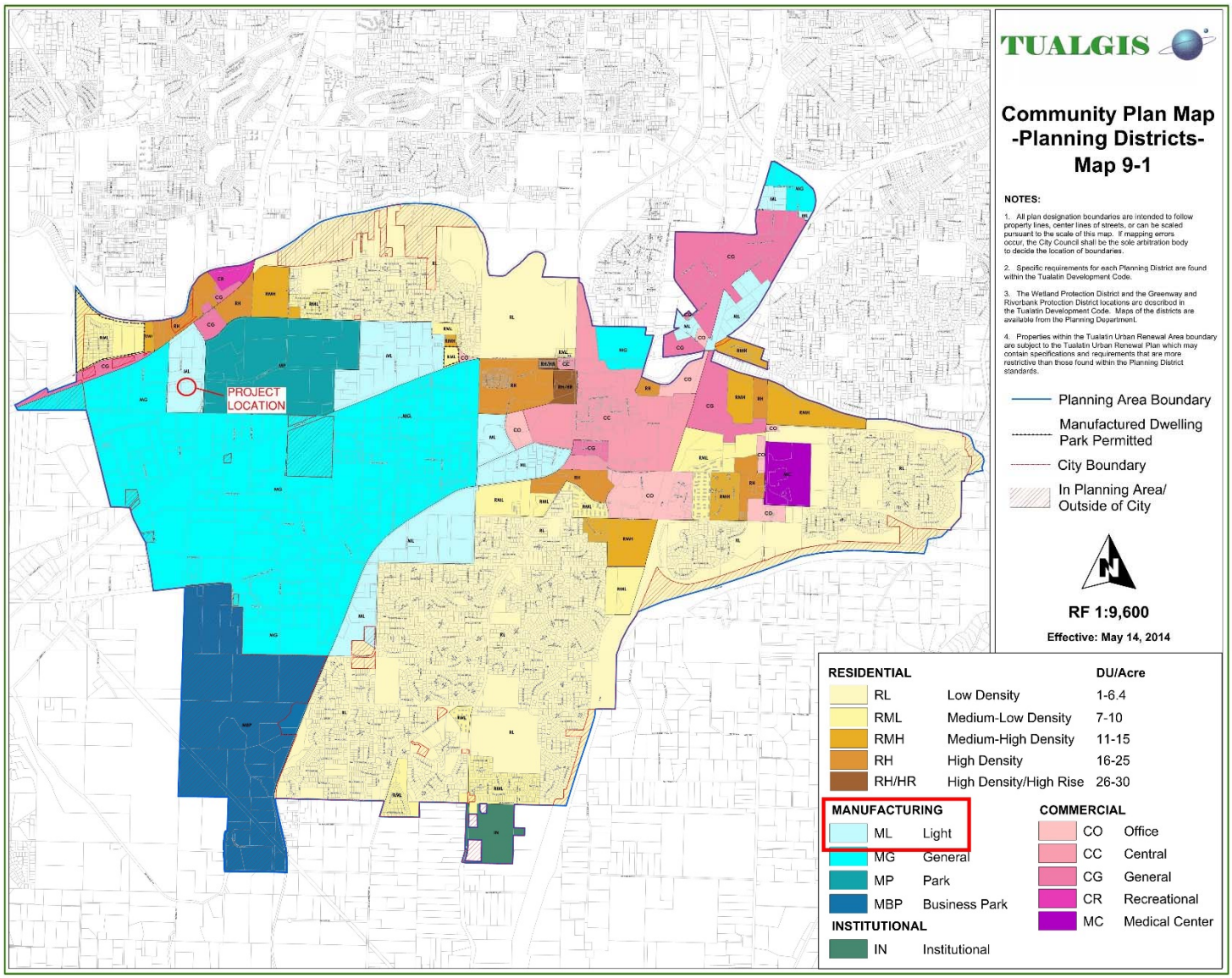
Project Legal Description/Details

Parcel #: R2141835
NE ¼ section 21 T2S R1W W.M.

Address: 12540 SW LEVETON DRIVE
City/Zip: TUALATIN, OR 97062
Legal: LEVETON COMMONS NO.2, LOT 8 2.21ACRES

Zone: ML (Light Industrial)
Property Area: 2.21 Acres (96,267.60 square feet)
Street Type: Site includes approximately 208 feet of frontage on SW Leveton Drive.

Location: The proposed project site is 260 feet west of SW 124th Ave. and 70 feet south of SW 126th Place


TUALGIS
Community Plan Map
-Planning Districts-
Map 9-1
NOTES:
1. All plan designation boundaries are intended to follow property lines, center lines of streets, or can be scaled pursuant to the scale of this map. If mapping errors occur, the City Council shall be the sole arbitration body to decide the location of boundaries.
2. Specific requirements for each Planning District are found within the Tualatin Development Code.
3. The Wetland Protection District and the Greenway and Riverbank Protection District locations are described in the Tualatin Development Code. Maps of the districts are available from the Planning Department.
4. Properties within the Tualatin Urban Renewal Area boundary are subject to the Tualatin Urban Renewal Plan which may contain specifications and requirements that are more restrictive than those found within the Planning District standards.
Planning Area Boundary
Manufactured Dwelling Park Permitted
City Boundary
In Planning Area/ Outside of City
RF 1:9,600
Effective: May 14, 2014
PROJECT LOCATION
RESIDENTIAL
DU/Acre
RL Low Density 1-6.4
RML Medium-Low Density 7-10
RMH Medium-High Density 11-15
RH High Density 16-25
RH/HR High Density/High Rise 26-30
MANUFACTURING
ML Light
MG General
MP Park
MBP Business Park
INSTITUTIONAL
IN Institutional
COMMERCIAL
CO Office
CC Central
CG General
CR Recreational
MC Medical Center

Project Team

Agency

City of Tualatin
18880 SW Martinazzi Ave
Tualatin, OR 97062
(503) 691.3026
www.tualatinoregon.gov

Applicant:

SG Architecture, LLC
10940 SW Barnes Road, #364
Portland, OR 97225
Contact(s): Kevin Godwin/Scot Sutton
Email: kgodwin@sg-arch.net
ssutton@sg-arch.net
Phone: (503) 201.0725 / (503) 347-4685

Property Owner:

Dana Properties LLC
PO Box 5837
Aloha, OR 97003
Contact(s): Jacob Flint / Dave Flint
Email: jacobf@inline-cc.com
davidf@ inline-cc.com
Phone: (503) 519.3976

Consultant Team:

SG Architecture, LLC
10940 SW Barnes Road, #364
Portland, OR 97225
Contact(s): Kevin Godwin/Scot Sutton
Email: kgodwin@sg-arch.net
ssutton@sg-arch.net
Phone: (503) 201.0725 / (503) 347-4685

Lancaster Engineering - Traffic
Portland Metro Office
321 SW 4th Avenue, Suite 400
Portland, Oregon 97204
Contact: Michael Ard, PE
Email: mike@lancasterengineering.com
Phone: (503)248.0313

Chris Freshley - Landscape Architect ASLA
3944 SW 36th Place
Portland, OR 97221
Contact: Christopher Freshley
Email: chris@freshleylandscapearchitect.com
Phone: (503) 222.9881

Sisul Engineering - Civil
375 Portland Avenue
Gladstone, Oregon 97027
Contact: Thomas J. Sisul
Email: tomsisul@sisulengineering.com
Phone: (503) 657.0188

Compass Land Surveyors
4107 SE International Way Suite 705
Milwaukie, Oregon 97222
Phone: (503) 653.9093

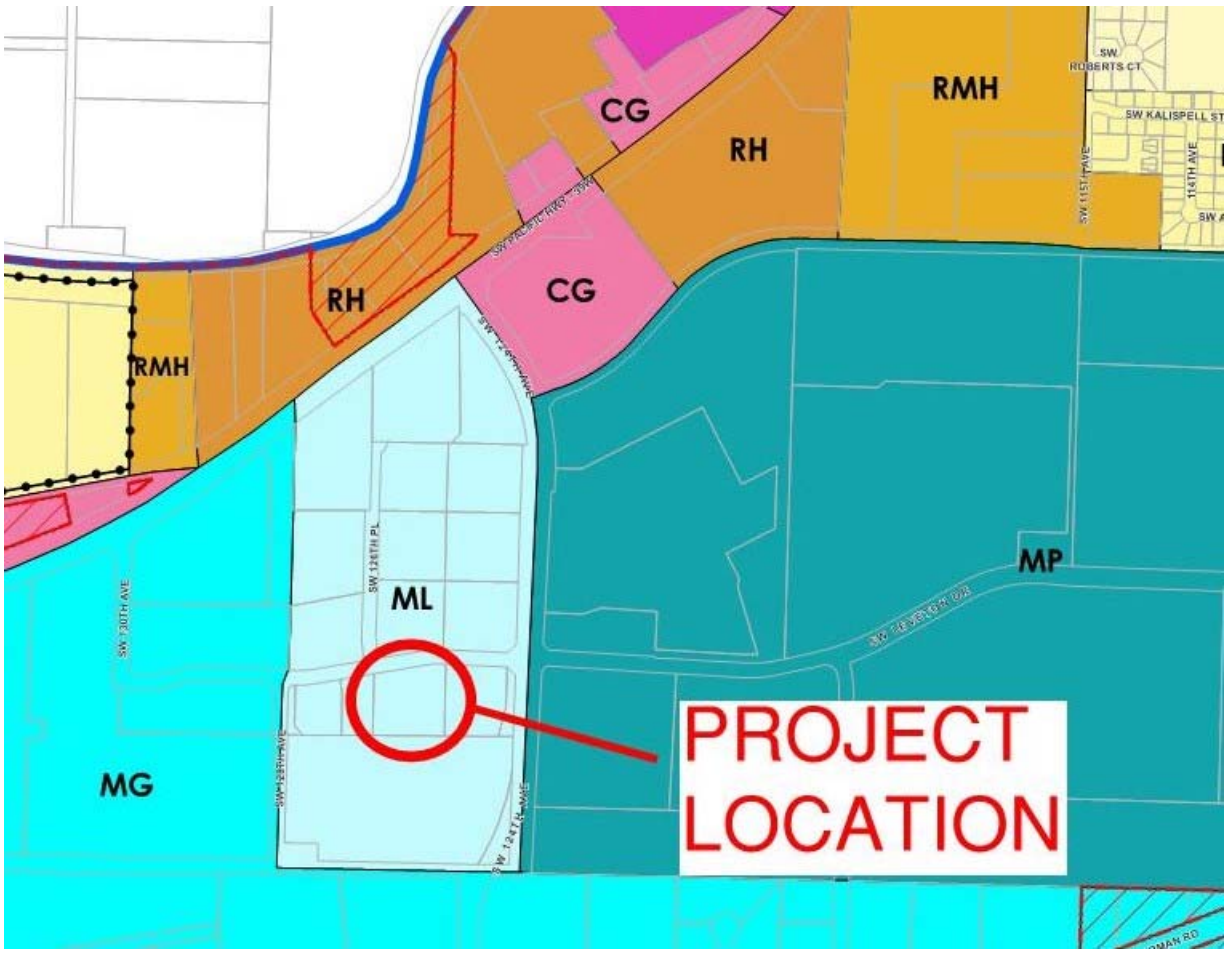
Intertek – PSI (Geo tech)
6032 North Cutter Circle, Suite 480
Portland, Oregon 97217
Contact: Jonathan D. Bunch
Phone: (503) 289.1778

TDC CHAPTER 31: GENERAL PROVISIONS

Section 31.020 Classification of Planning District.

In order to carry out the objectives of the Tualatin Community Plan, land within the City is divided into planning districts. The established planning districts shall be designated on the Plan Map, and the planning district designations shall be as follows:

Planning District	Abbreviated Designation
Light Industrial	ML



Response: *As shown on the partial zoning map provided in the Figure above, the proposed building use will be Light Industrial within the ML Planning District map 9-1. Therefore, this narrative will address all applicable code regulations pertaining to Light Industrial*

warehouse/manufacturing standards in the ML Planning District.

Section 31.063 Neighborhood/ Developer Meetings

(1) This section applies to the following types of Land Use applications: Annexations; Architectural Reviews, except Level I (Clear and Objective) Single-family Architectural Review; Conditional Uses; Historic Landmark actions, including designation, removal of designation, demolition, relocation, or alteration or new construction: Industrial Master Plans; Partitions; Plan Map Amendments for a specific property; Plan Text Amendments for a specific property; Subdivisions; Tree Removal Permit; Transitional Use Permit; and Variances, except for variances to existing single family residences.

Response: *A Neighborhood meeting for this proposal was held on April 26, 2017 from 6:30 to 7:30 p.m. at the Tualatin Public Library, 18878 SW Martinazzi Ave Tualatin. See Exhibits 8 & 9 for meeting information. Notices to adjacent property owners were sent out and a notice sign was posted on the site on March 24, 2017 and the CIOs were emailed out on April 10, 2017 to meet the 14 calendar day notice requirements. All neighborhood meeting materials and affidavits of mailing and postings are provided in Exhibits 4, 5, 6 & 7.*

Section 31.064 Land Use Applications

This section applies to the following types of Land Use applications: Annexations; Architectural Reviews, except Level I(Clear and Objective) Single-family Architectural Review; Conditional Uses; Historic Landmark actions, including designation, removal of designation, demolition, relocation, or alteration or new construction; Industrial Master Plans; Partitions; Plan Map Amendments for a specific property; Plan Text Amendments for a specific property; Subdivisions; Tree Removal Permit; Transitional Use Permit; and Variances, except for variances to existing single family residences.

(1) Mail: An applicant shall mail notice of a Neighborhood/Developer Meeting and the City shall mail notice of application submittal as follows:

Response: *As this project involves an Architectural Review application, the requirements for mailing and sign posting for development applications apply. Notices to adjacent property owners were sent out and a notice sign was posted on the site on March 24, 2017 and the CIOs were emailed out on April 10, 2017. All neighborhood meeting material/minutes, affidavits of mailing and postings are provided in Exhibits 3-8.*

(2) Sign Posting: The applicant shall as follows both provide and post on the subject property a sign that conforms to the standard design established by the City for

signs notifying the public of land use actions:

(a) Minimum Design Requirements: The sign shall be waterproof, and the face size shall be eighteen (18) by twenty-four (24) inches (18 x 24) with text being at least two (2) inches tall.

{b) On-site Placement: Prior to land use application submittal, the applicant shall place a sign along the public street frontage of the subject property or, if there is no public street frontage, along the public right-of-way (ROW) of the street nearest the subject property. A subject property having more than one public street frontage shall have at least one posted sign per frontage with each frontage having one sign.

For a subject property that has a single frontage that is along a dead-end street, the applicant shall post an additional sign along the public ROW of the nearest through street. The applicant shall not place the sign within public ROW pursuant to TDC 38.100(1); however, for a subject property that has no public street frontage or that has a single frontage that is along a dead-end street, the applicant may place the sign within public ROW of the nearest street.

(c) Proof of Posting: The applicant shall submit as part of the land use application submittal an affidavit of posting to the Community Development Director or when applicable the City Engineer.

(d) Removal: If the sign disappears prior to the final decision date of the subject land use application, the applicant shall replace it within forty-eight (48) hours. The applicant shall remove the sign no later than fourteen (14) days after the City makes a final decision on the subject land use application.

Response: *As this project involves an Architectural Review application, the requirements for mailing and sign posting for development applications apply. Notices to adjacent property owners were sent out and a notice sign was posted on the site on March 24, 2017 and the CIOs were emailed out on April 10, 2017. All neighborhood meeting material/minutes, affidavits of mailing, photos and postings are provided in Exhibits 3-8.*

A new sign for a AR Development Review was posted on the site June 13, 2017 see Exhibit 12a for sign posting affidavit.

TDC CHAPTER 60: LIGHT MANUFACTURING PLANNING DISTRICT (ML)

Section 60.010 Purpose

The purpose of this district is to provide areas of the City that are suitable for industrial uses and compatible with adjacent commercial and residential uses. The district serves to buffer heavy manufacturing uses from commercial and residential areas. The district is suitable for warehousing, wholesaling, and light manufacturing processes that are not hazardous and do not create undue amounts of noise, dust, odor, vibration, or smoke. The district is also suitable for

retail sale of products manufactured, assembled, packaged or wholesaled on the site provided the retail sale area, including the showroom area, is no more than 5% of the gross floor area of the building not to exceed 1,500 square feet and, with appropriate restrictions, for retail sale of products not allowed for sale in General Commercial Planning Districts, and office commercial uses where any portion of a legally created lot is within 60 feet of a CO Planning District boundary. Railroad access and screened outdoor storage will be allowed in this district, conforming to defined architectural, landscape, and environmental design standards. In accordance with the Industrial Business Park Overlay District, TDC Chapter 69, and TDC 60.037-60.038 selected small-scale mixed uses that are supportive of and secondary to industrial uses are allowed to provide services to businesses and employees. The purpose is also to allow certain commercial service uses in the Commercial Services Overlay shown in the specific areas illustrated on Map 9-5 and selected commercial uses subject to distance restrictions from residential areas and subject to the Special Commercial Setback from arterial streets as generally illustrated in Map 9-5 and specifically set forth in TDC 60.035. [Ord. 621-84 §5, 2/13/84; Ord. 942-95 §3, 3/27/95; Ord. 1003-98 §2, 4/27/98; Ord. 1046-00 §7, 2/14/00; Ord. 1133-03, 3/24/03; Ord. 1370-14 §2, 03/24/14]

Section 60.020 Permitted Uses

No building, structure or land shall be used in this district, except for the following uses as restricted in TDC 60.021

(1-36) Manufacturing Type Tenants

(2) Light Manufacturing Planning District (ML).

(a) Suitable for warehousing, wholesaling and light manufacturing processes that are not hazardous and that do not create undue amounts of noise, dust, odor, vibration, or smoke. Also suitable, with appropriate restrictions, are the retail sale of products not allowed for sale in General Commercial areas, subject to the Special Commercial Setback from arterial streets and Commercial Services Overlay as generally illustrated in Map 9-5 and specifically set forth in TDC 60.035, and office commercial uses where any portion of a legally created lot is within 60 feet of a CO Planning District boundary. Also suitable is the retail sale of products manufactured, assembled, packaged or wholesaled on the site provided the retail sale area, including the showroom area, is no more than 5% of the gross floor area of the building not to exceed 1,500 square feet. Also suitable for the retail sale of home improvement materials and supplies provided it is not greater than 60,000 square feet of gross floor area per building or business and subject to the Special Commercial Setback from arterial streets as generally illustrated in Map 9-5 and specifically set forth in TDC 60.035. Rail access and screened open storage allowed in these areas will conform to defined architectural, landscape and environmental design standards.

(b) The following uses within the Light Manufacturing District shall comply with the following size limits established by Metro. Retail sale, retail service and professional service uses shall be no greater than 5,000 square feet of sales or service area per outlet, or not greater than 20,000 square feet of sales or service area for multiple outlets in a single building or in multiple buildings that are part of the same development project, with the following exceptions.

(i) Application of the Industrial Business Park Overlay District (TDC Chapter 69).

(ii) The retail sale of products manufactured, assembled, packaged or wholesaled on the site is allowed provided the retail sale area, including the showroom area, is no more than 5% of the gross floor area of the building not to exceed 1,500 square feet.

(iii) Within the Special Commercial Setback from arterial streets (TDC 60.035) the retail sale of home improvement materials and supplies is allowed provided it is not greater than 60,000 square feet of gross floor area per building or business and subject to the Special Commercial Setback from arterial streets as generally illustrated in Map 9-5 and specifically set forth in TDC 60.035. Rail Access and screened open storage allowed in these areas will conform to defined architectural, landscape and environmental design standards.

(c) The purpose of this district is to provide sites for manufacturing uses that are more compatible with adjacent commercial and residential uses and would serve to buffer heavy manufacturing uses. The purpose is also to allow the retail sale of products manufactured, assembled, packaged or wholesaled on the site provided the retail sale area, including the showroom area, is no more than 5% of the gross floor area of the building not to exceed 1,500 square feet. Certain heavier manufacturing uses may be allowed as conditional uses.

(d) In accordance with the Industrial Business Park Overlay District, TDC Chapter 69, selected office and retail uses are allowed to provide services to businesses and employees. The purpose is also to allow certain commercial service uses in the Commercial Services Overlay shown in the specific areas illustrated on Map 9-5 and selected commercial uses subject to distance restrictions from residential areas and subject to the Special Commercial Setback from arterial streets as generally illustrated in Map 9-5 and specifically set forth in TDC 60.035.

Response: *According to TDC 60.020, Permitted Uses within the ML District allows for multiple type of light manufacturing Tenants and limited sized retail type Tenants. Therefore, the proposed Building Uses are a permitted use for the proposed Light Manufacturing Uses.*

Section 60.060 Lot Size

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

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

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

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

(4) 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)

(5) The minimum lot width at the street shall be 50 feet on a cul-de-sac street. [Ord. 866-92, §16, 4/27/92; Ord. 965-96, §54, 12/9/96)

Response: *As shown on the Existing Conditions Plan (Sheet TOPO in Exhibit 20), the proposed building will be located on an existing legal lot identified as Tax Lot R2141835.*

This lot encompasses 96,267.60 SF or approximately 2.21 acres. All of the dimensions for lot size meet the minimum lot size requirements listed above.

Section 60.070 Setback Requirements

(1) Front yard. Except as provided by TDC 60.070, 0 to 30 feet, as determined through the Architectural Review Process.

(2) Side yard. Except as provided by TDC 60.070, 0 to 50 feet, as determined through the Architectural Review process.

(3) Rear yard. 0 to 15 feet, as determined through the Architectural Review process.

(5) Off-street parking and vehicular circulation areas shall be set back a minimum of five (5) feet from any public right-of-way or property line, except as approved through the Architectural Review process.

(8) No fence shall be constructed within 5 feet of a public right-of-way, except that in residential and mixed use residential developments within the Central Design District the minimum fence setback shall be determined through Architectural Review, with no minimum requirement.

Response: *As shown on the Site Plan DR-1in Exhibit 20, the location of the Industrial Use Commecial Building pad meets all setback requirements listed above. All off street parking and vehicular circulation areas are set back greater than 5 feet from the property lines. Section 60.070 Structure Height.*

Section 60.090 Structure Height

(1) Except for flagpoles displaying the flag of the United States of America, either alone or with the State of Oregon flag which shall not exceed 100 feet in height above grade, and except as provided in TDC 60.090, the maximum height of any structure is 85 feet.

Response: *As shown on the building elevation DR-2 included in Exhibit 20, the proposed building height (including parapet) is approximately 32 feet.*

Section 60.100 Access

Except as provided below, no lot shall be created without provision for access to the public right-of-way in accordance with TDC 73.400 and TDC Chapter 75. Such access may be provided by lot frontage on a public street, or via permanent access easement over one or more adjoining properties, creating uninterrupted vehicle and pedestrian access between the subject lot and the public right-of-way. Lots and tracts created to preserve wetlands, greenways, Natural Areas and Stormwater Quality Control Facilities identified by TDC Chapters 71, *lb* Figure 3-4 of the Parks and Recreation Master Plan and the Surface Water Management Ordinance, TMC Chapter 3-5, as amended, respectively, or for the purpose of preserving park lands in accordance with the Parks and Recreation Master Plan, may not be required to abut a public street.

Response: *The site abuts SW Leveton Drive and two driveway accesses are proposed onto the property. The main EAST full access entrance will primarily be used for servicing WB-52 semi-trucks and box-trucks (+/- 30-45 feet)entering & existing the site. This entrance is 36 feet wide as shown on site plan DR-1. The WEST full access entrance is a secondary entrance for customers and business owners, 40 feet wide and is approximately 200 feet from the east entrance (center to center). This entrance is located 35 feet east from the northeast corner of SW 126th Place intersection. Both entrances will be designed and built per the City engineering standards.*

TDC CHAPTER 73: COMMUNITY DESIGN STANDARDS

ARCHITECTURAL REVIEW APPROVAL

(1) Except for an addition or alteration to an existing single-family dwelling when it results in less than a 35% expansion of the structure's existing footprint or less than a 35% alteration of an existing wall plane or only affects the wall plane of the side of the dwelling located in a side yard where the side yard of the dwelling abuts the side yard of an adjacent dwelling, as permitted by these standards, no new building, condominium, townhouse, single family dwelling, addition or alteration to an existing single-family dwelling when it results in a 35% or more expansion of the structure's existing footprint or a new second or higher story or a 35% or more alteration of an existing wall plane (except for the wall plane of a side of the dwelling located in a side yard where the side yard of the dwelling abuts the side yard of an adjacent dwelling), manufactured dwelling park, small-lot subdivision, landscape improvement (excluding greenways, parks and other Parks and Recreation Department road side improvements), parking lot improvement or expansion, above ground public utility facility (sewer or water pump stations, pressure reading stations and water reservoir), electrical substation, above ground natural gas pumping station, installation of decorative lighting (e.g. neon), exterior painting, awnings, murals, wireless communication facility, attached wireless communication facility or exterior major remodeling shall occur until the architectural review plan required under TDC 31.071 has been reviewed and approved by the Community Development Director and City Engineer or their designees, or by the Architectural Review Board or City Council for conformity with applicable standards or criteria.

Response: *This request is for a new Light Industrial Use building within the area 9*

Leveton Industrial District. Therefore, the community design standards and architectural review approval criteria apply to the project. This narrative and the supporting plans and studies are submitted as evidence for Architectural Review approval.

73.050 CRITERIA AND STANDARDS

(1) In exercising or performing his or her powers, duties, or functions, the Community Development 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;

Response: *The proposed site development is in conformance with the standards defined within the Community Design Standards in Chapter 73, as well as all other development code regulations. This narrative is provided as supporting evidence to show that the proposed development meets the location, height, and appearance standards of the development code.*

{b) The proposed design of the development is compatible with the design of other developments in the general vicinity; and

Response: *The proposed exterior design and architectural features of the building are consistent with the context of surrounding areas. The primary use of materials for the building will be painted concrete tilt panels and use of glazing complement materials. Also, it should be noted that all on-site landscaping and electrical was considered and selected to ensure consistency with the adjacent developments.*

(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 primary use of materials for the proposed building will be painted concrete tilt panels and use of glazing complement and metal awnings over the entrances and loading areas. Additional site features are expanded sidewalk areas and plaza spaces for bicycle spaces – See exhibit 20 DR-2 & DR-1 Site Plan & Ext. Elevations..*

(2) In making his or her determination of compliance with the above requirements, the Community Development 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: *The request complies with the City's development standards. Responses and findings are provided under each applicable standard in the following sections of this land use narrative. This project is subject to input received from the Community Development Director and the City Engineer.*

COMMERCIAL 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: *A 8-foot-wide concrete pedestrian connection is proposed to connect from the middle of proposed building to the public sidewalk from SW Leveton Drive. Pedestrian walkways, with a material difference crossings are proposed across any vehicle circulation areas.*

(2) Avoid barriers to disabled individuals.

Response: *Walkways are provided to connect the project's ADA parking stalls to the primary entrance of the proposed building at three (3) locations - See Exhibit 20 DR-1 & DR1.1.*

(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: *No drive-through facility is proposed as part of this request.*

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

Response: *There is no perimeter parking stalls on the west or east sides of the property proposed. All parking back-up areas are in the main parking field in front of the building. Landscape islands do not exceed more than 5 consecutive parking throughout the parking fields. The entire perimeter of the site has a minimum of 5 feet landscape buffers sides exposed to the public. See Exhibits 20 DR1 & L1*

(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 and Landscape Plan provided in Exhibit 20 DR1 & L1, all parking areas are broken up with landscaping and walkways to direct and control vehicular movement patterns & screen headlights from adjacent properties and to the public sidewalk and streets, this is to help lessen the visual dominance of large paved areas.*

(6) Provide vehicular connections to adjoining sites.

Response: *No vehicular connections to the adjoining sites are proposed.*

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

Response: *The proposed landscaping has been designed to complement the surrounding developments with some additional enhancements to help screen the parking stalls adjacent to SW Leveton Drive – See Exhibit 20 L1*

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

Response: *Aside from parking stalls and vehicle maneuvering areas, the parking lot is comprised of pedestrian walkways and landscaping – See Exhibit 20 L1.*

(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: *There are no outdoor seating areas proposed with this development. Therefore, this standard is not applicable.*

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

Response: *The proposed building design and material types will create visual and aesthetic interest to attract Tenants visitors to the building. Landscape plantings will screen portions of the site and also break up the building massing to create visual interest for both the building and overall site. This project will also tie into the existing public pedestrian network on SW Leveton Drive.*

(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: *The proposed Light Industrial Use has no effect on fish and wildlife habitat areas. On- site stormwater treatment will limit surface water runoff which will improve fish habitat areas.*

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

entrances.

Response: *The primary building entrances have a 11-foot-wide plaza to provide safe pedestrian walks in front of the tenants entrances and front-in parking stalls. There is also a 8-foot-wide concrete pedestrian walk protected by landscape islands through the main parking lot connected to the public sidewalk and to the to the ADA compliant parking stalls. See Exhibit 20 DR3 & DR1 Floor plan & Site Plan.*

(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: *This site is part of an existing network of public sidewalks and streets which connects pedestrians to buildings, adjacent public roadways.*

(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 semi-public property.

Response: *The proposed building provides pedestrian connectivity to the overall pedestrian network which connects pedestrians to buildings, adjacent roadways.*

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

Response: *The proposed building is Light Industrial; this criterion is not applicable.*

(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: *The proposed building accessways proposed provides pedestrian connectivity to the overall public pedestrian network. The on-site pedestrian path connects pedestrians to the public sidewalk at SW Leveton Drive which are connected in an east/west direction to the adjacent buildings, roadways and developments.*

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

Response: *The site has allocated for two (2) carpool parking stalls located next to the pedestrian walk that connects directly to the front of the new building See Exhibit 20 DR-1.*

(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: *All proposed mechanical equipment will be located on the building rooftop and will be screened by the parapets on all elevations and as indicated in Exhibit 20 DR-3 exterior elevations & DR-3 Floor Plan. All transformers, water meters, gas meters and electrical switchgear have been located at the southwest side of the building out of visibility from the public or adjacent properties.*

(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: *There is no parking structure or underground parking proposed with this request, therefore, this provision is not applicable to this request.*

(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: *No portion of the redevelopment site abuts or is located on a fish or wildlife habitat area. Therefore, this provision does not apply.*

Section 73.160 Standards

The following standards are minimum requirements for commercial, industrial, public and semi-public development, and it is expected that development proposals shall meet or exceed these minimum requirements.

(1) Pedestrian and Bicycle Circulation.

(a) For commercial, public and semi-public uses:

(i) a walkway shall be provided between the main entrance to the building and any abutting public right-of-way of an arterial or collector street where a transit stop is designated or provided. The walkway shall be a minimum of 6 feet wide and shall be 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;

(ii) walkways shall be provided between the main building entrances and other on-site buildings and accessways. The walkways shall be a minimum of 6 feet wide and shall be 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;

(iii) walkways through parking areas, drive aisles, and loading areas shall be visibly raised and of a different appearance than the adjacent paved vehicular areas;

(iv) accessways shall be provided as a connection from the development's internal bikeways and walkways to all of the following locations that

apply: abutting arterial or collector streets upon which transit stops or bike lanes are provided or designated; abutting undeveloped residential or commercial areas; adjacent undeveloped sites where an agreement to provide an accessway connection exists; and to abutting publicly-owned land intended for general public use, including schools;

(v) fences or gates which prevent pedestrian and bike access shall not be allowed at the entrance to or exit from any accessway.

Response: *As this site is part of the larger Leveton Commons Subdivision, the proposed building ties into the existing pedestrian and bicycle circulation network abutting SW Leveton Drive ROW. All proposed internal walkways through the parking areas are a minimum of 8-feet wide and constructed of concrete to differentiate from the adjacent paved vehicular areas See Exhibit 20 DR-1 & DR-1.2 Site Plan & Site Details.*

(vi) bikeways shall be provided which link building entrances and bike facilities on the site with the adjoining public right-of-way and accessways.

Response: T*he proposed building ties into the existing pedestrian and bicycle circulation network abutting SW Leveton Drive ROW. Bike racks have been designated on the plazas. See Exhibit 20 DR1 & DR3 Site Plan & Floor plan.*

(vii) 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: *Not applicable for this application.*

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

Response: *As shown on in Exhibit 20 DR1.1, Site Details curb ramps are provided wherever a walkway or accessway crosses a curb.*

(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 access-ways 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: *All on-site proposed walkways and pedestrian paths to be 8-feet in width and have a concrete surface.*

(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 re-view and approval.

Response: *No transit Accessways are not purposed or required for this proposed development.*

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

Response: *All proposed private Accessways will be maintained by the developer.*

(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 building elevations DR-3 provided in Exhibit 20, all windows are located to provide natural lighting which enables employees and patrons to watch over pedestrian and parking areas.*

(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 building elevations DR-2 provided in Exhibit 20, all windows and lighting are located to enable surveillance of interior activity from the adjacent drive aisles and parking areas.*

(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 Site Photometric Plan E1 provided in Exhibit 20, all on-site lighting allows for surveillance of on-site activities from adjacent drive aisles and parking areas without shining lights into the adjacent SW Leveton Drive ROW.*

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

Response: *Signage will be provided to clearly mark the primary building access for both patrons and emergency services. Further coordination will be addressed by the Fire Marshall and Building Official,*

(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 Plan L1 provided in Exhibit 20, existing shrubs in parking areas do not exceed 30-inches in height and tree canopies do not extend below 8-feet measured from grade.*

(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: *As shown on the Landscape Plan provided under Exhibit 20, Sheets L1.0 and L2, the location for the at-grade mechanical equipment, specifically the transformer pad, is screened using a combination of shrubs and trees and located behind a 6-foot-tall trash enclosure out of view of the public. An Alternate transformer pad has been proposed located in the first double row at the northwest landscape island. Appropriate screening will be provided and an updated landscape plan will be provided if this become the permanent pad location.*

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: *This proposed development will not cause additional impacts to natural site features such as the topography, trees and water features.*

(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 site plan and building elevations provided in Exhibit 20, DR-1 & DR2 the proposed building materials and glazing, when combined with the proposed landscape materials, create an attractive and vibrant site that ties into the overall varied aesthetic appearance with in the surrounding developments. The building entrances and pedestrian*

connections from the parking areas provide safe and accessible pathways throughout the parking lot, while also connecting to the adjacent public sidewalk to SW Leveton Drive. As shown on the building elevations in Exhibit 20 DR-2, the primary entrances feature covered canopy entries, plaza landscaping, and expanded sidewalk areas to give the building depth and to draw attention to the Tenant entrances.

(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.

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

Response: *Due to the specific type of tenants and delivery demands for this Light Industrial Use building multiple delivery areas have been proposed. Two (2) depressed delivery areas to accommodate WB-52 semi's for longer on/off loading durations located on the east/west building sides. Heavy opaque landscaping screening for the entire length of the loading dock from the adjacent properties is being proposed in lieu of an 8-foot-high cmu screen wall. Four (4) Box truck delivery areas for shorter on/off loading durations have been provided directly in front of each proposed tenant space that will be flush with the building finish floor elevation (see Exhibit 20, sheets DR1, DR1.1, L1 & L2). The site plan also identifies the truck maneuvering ingress/egress paths through-out the parking lot from the EAST entrance form SW Leveton Drive to ensure safe clearances between the drivelanes, pedestrian walkways and parking stalls. Deliveries will be made multiple times during the week and coordinated with each Tenant during off-peak, non-business hours whenever possible-mainly for the semi's.*

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

(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: *Site landscaping around the building perimeter will screen areas around the future building from the sun. In addition, window and door canopies are also proposed. Other energy efficient methods will be proposed with the building under a separate permit application. These measures will work to enhance energy efficiency.*

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

Response: *The primary building entrances and loading service areas are located primarily on the north side of the building, with entrances under canopies to protect from wind, sun and driving rain.*

(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 on the building elevations in Exhibit 20 DR-2, the north elevation has the majority of the storefront and business entrances that face the parking lot. The east and west elevations are loading areas for trucks and trash service hauler with no vehicle access to the rear of the building. In addition, a 20-foot-wide fire lane has been required by the Tualatin Valley Fire Department (TVFD) see Exhibit 16 for a letter of authorization for approval. These areas are well lite and have wall security lighting around the entire building See Exhibit 20 E1 Site Photometric. The south elevation has the majority of rear exit doors combined with multiple windows up high to bring in natural light into the warehouses. When combined with site lighting, the site provides a safe, secure, and efficient layout.*

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

Response: *The proposed building materials, except for the significant amount of glazing, are primarily gray tone colors and of texture that would blend in well with the landscape and the surrounding buildings. Primary materials are tilt-up concrete panels with metal coping awnings. Secondary materials include aluminum frames for the glazing (windows) that create a clean and orderly style with flat metal entrance canopies. These elements work to create a clean harmonizing style that separate it from the other industrial/commercial buildings. See Exhibit 20 DR2 Exterior Elevations.*

(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: *The building materials were selected for an "natural" color palette, as well as features that would blend in well with the landscape and the natural vernacular surrounding buildings found in the surrounding development. The color schemes are not too bright or dark and will limit sun reflection to the window glazing and aluminum framing. See Exhibit 20 DR2 Exterior Elevations.*

(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 building elevations in Exhibit 20, DR3 there are multiple windows provided on the front of the building, These windows are located to provide visual lines of sight from both the outside into the building, as well as visual lines for patrons looking out over the parking areas, pedestrian paths and plaza area. When combined with site lighting, the site provides a safe, secure, and efficient layout. See Exhibit 20 DR2 Exterior Elevations.*

(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. [Ord. 904-93, §51, 9/13/93; Ord. 1097-02, 2/11/02]

Response: *As shown on the building elevations in Exhibit 20 DR2, there are multiple windows provided on the front of the building, where the building abuts parking areas and pedestrian paths. These windows are located to provide visual surveillance from both the outside in and from patrons looking out over the parking areas and pedestrian paths. When combined with site lighting, the site provides a safe, secure, and efficient layout.*

Section 73.220 Standards.

The following standards are minimum requirements for commercial, industrial, public and semi-public development and it is expected that development proposals shall meet or exceed these minimum requirements.

(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.

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

(c) Shrubs in parking areas shall not exceed 30 inches in height, and tree canopies must not extend below 8 feet measured from grade, except for parking structures and underground parking where this provision shall not apply. [Ord. 904-93, §52, 9/13/93; Ord. 20-94, §18, 4/11/94; Ord.1224-06 §24, 11/13/06)

Response: *The on-site lighting-See Exhibit 20 E1 & E2 Site Photometric Plan proposed for this Industrial Use Commecial Building will combine to provide adequate candling for safe and visible access by both vehicles and pedestrians. The lighting will be focused internally to the site, limiting off-site impacts to the frontages along SW Leveton Drive and adjacent properties. The proposed signage and lighting will provide an identification system for the primary entrances, while shrubs will be installed to not exceed 30-inches in height and trees will not extend below 8-feet measured from grade. See DR2 exterior elevation for exterior lighting shown on the elevations.*

Section 73.225 Mixed Solid Waste and Source Separated Recyclables Storage Areas for New or Expanded Multi-Unit Residential, Including Townhouses, Commercial, Industrial, Public and Semi-Public Development

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.

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

(3) Meet dimensional and access requirements for haulers.

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

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

(6) Improve the efficiency of collection of mixed solid waste and source separated recyclables. [Ord. 898-93, §7, 6/14/93. Ord. 1025-99, §40, 7/26/99; Ord. 1097-02, 2/11/02)

Response: *As shown on the Site Plan Exhibit 20 DR1& DR1.1 Site Plan & Trash*

Enclosure details, the proposed enclosure area will be designed to accommodate mixed solid waste and source separated recyclable storage areas. The trash enclosure design was submitted to Republic Services and a letter of authorization is provided in Exhibit 14 to verify that the enclosure meets the dimensional and access requirements for the service hauler. The Solid Waste calculations are shown on DR1 (Data Summary.

Section 73.227 Standards

The following standards are minimum requirements for mixed solid waste and source separated recyclables storage areas. To provide for flexibility in designing functional storage areas, this section provides four different methods to meet the objectives of providing adequate storage for mixed solid waste and source separated recyclables and improving the efficiency of collection.

An applicant shall choose and implement one of the following four methods to demonstrate compliance: 1) minimum standards; 2) waste assessment; 3) comprehensive recycling plan; or 4) franchised hauler review, as more fully described in subsections (2), (3), (4) and (5) of this section.

(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.

(2) Minimum Standards Method. This method specifies a minimum storage area requirement based on the size and general use category of the new or expanded development. This method is most appropriate when specific use of a new or expanded development is not known. It provides specific dimensional standards for the minimum size of storage areas by general use category.

(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.

(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.

(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 - 1O 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: *Based on the Light Manufacturing (Wholesale/ Warehouse) requirements for storage areas, the minimum requirement is 214 square feet of storage area. As shown on the Site Plan (Exhibit 20 DR1) and Trash Enclosure Details (Exhibit 20 DR1.1). The proposed trash enclosure area will be designed to accommodate mixed solid waste and source separated recyclable storage areas. The proposed area is approximately 683 square feet. The trash enclosure plans were submitted to Republic Services and a letter of authorization is provided in Exhibit G to verify that the enclosure meets the dimensional and access requirements for the service hauler.*

(6) Location, Design and Access Standards for Storage Areas. The following location, design and access standards are applicable 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.

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

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

(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.

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

(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(6lCbHiiil.

(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: *The trash enclosures are located on east/west sides of the building, in a designated area from the main parking stalls, and outside any required*

setback or yard. The storage area is appropriately screened according to TDC 73.227(6)(b)(iii) and two sets of front access doors are provided on the side of the enclosure with locking mechanisms – See Exhibit 20 DR1.1 Trash Enclosure Details. The base of the enclosure is designed with 8 x 16 smooth face CMU to improve overall longevity of the enclosure and painted to compliment the proposed building.

(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.

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

(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.

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

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

Response: *As shown on the Site Plan and Trash Enclosure Details Exhibit 20 DR1.1 the proposed trash enclosure size is dimensioned 21-4 -feet wide by 16-feet deep, with walls 6-feet tall with double metal front access doors with locking mechanisms in the form of drop rods. Tenant access into the enclosure is provided in the rear by a concrete sidewalk that is connected to the proposed building on the east, west & south side exit doors. The trash enclosure plan was submitted to Republic Services and a letter of authorization is provided in Exhibit 14 to verify that the enclosure meets the dimensional and access requirements for the service hauler, including signature on the proposed plan for the trash enclosure*.

(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.

(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.

(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. [Ord. 898-93, §8, 6/4/93]

Response: *Vehicle access to the enclosure is provided from the new parking lot and will not require backing onto the public street for servicing. A trash enclosure plan was submitted to Republic Services and a letter of authorization is provided in Exhibit 14 to verify that the enclosure meets the dimensional and access requirements for the hauler, including signature on the proposed plan for the trash enclosure.*

LANDSCAPING

Section 73.240 Landscaping General Provisions

(1) The following standards are minimum requirements.

(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 the Landscape Planting Plan Exhibit 20 L1& DR1, the overall landscape percentage provided for the proposed developed area is 16.65% (16,028 SF) of the total development area of 37.11 % (35,731 SF).*

(9) Yards adjacent to public streets, except as described in the Hedges Creek Wetlands Mitigation Agreement, TDC 73.240(7), shall be planted to lawn or live groundcover and trees and shrubs and be perpetually maintained in a manner providing a park-like character to the property as approved through the Architectural Review process.

Response: *The yard adjacent to SW Leveton Drive is planted to be lawn, live groundcover, trees, shrubs and street trees to create an attractive park like character. See Exhibit 20 L1 Landscape Plan*

(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 proposed landscape areas are designed and will be constructed and installed so that all ground will be covered by living grass and/or plant material within three years of installation. No rock or stone are being proposed as groundcover however bark chips are only proposed under the existing trees near the development. See Exhibit 20 L1 Landscape Plan.*

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: *There no existing trees on the site – this standard is not applicable.*

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 Tree: 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 Shrub: 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: *The Landscape Plan provided in Exhibit 20, Sheet L1& L2 includes a legend that specifies the species size and caliper of each species of the proposed new plant material. A photo sheet of the plantings has been provided.*

(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: *The proposed Landscape Plan has been prepared, reviewed and signed by a registered landscape architect. The design and plant species have been chosen to reflect the site characteristics.*

Section 73.280 Irrigation System Required

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

Response: *All landscape areas shown on the Landscape Plan in Exhibit 20, Sheet L1 will be irrigated with an automatic drip irrigation system.*

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.

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

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

(4) Disturbed soils should be amended to an original or higher level of porosity to regain infiltration and stormwater storage capacity. [Ord. 1224-06 §27, 11/13/06]

Response: *The new development have NO Un-landscaped (Non Planted) areas with the exception of the areas under the existing trees but we are treating those areas with a bark mulch application which is what an Arborist would typically recommend.*

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

(1) A minimum 5-foot-wide landscaped area must be located along all building perimeters which are viewable by the public from parking lots or the public right-of-way, excluding loading areas, bicycle parking areas and pedestrian egress/ingress locations. Pedestrian amenities such as landscaped plazas and arcades may be substituted for

this requirement. This requirement shall not apply where the distance along a wall between two vehicle or pedestrian access openings (such as entry doors, garage doors, carports and pedestrian corridors) is less than 8 feet.

Response: *As shown on Exhibit 20 DR-1 & L1 Site Plan and Landscape Plan, there are proposed landscaped areas located along the north, west, and east portions of the building which are viewable from SW Leveton Drive.*

(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: *Although some pedestrian amenities are provided on-site, none of these areas are included in the site landscape area requirement.*

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

Response: *All areas within the limit of work that are not occupied by buildings, parking spaces, drive aisles, pedestrian area or undisturbed natural areas are planned to be landscaped with new plantings. The landscape plan includes both deciduous and coniferous trees, shrubs and groundcover to occupy all remaining areas not summarized above.*

OFF-STREET PARKING LOT LANDSCAPING

Section 73.320 Off-Street Parking Lot Landscaping Standards

(1) General Provisions. In addition to the goals stated in TDC 73.110 and 73.140, the goals of the off-street parking lot standards are to create shaded areas in parking lots, to reduce glare and heat buildup, provide visual relief within paved parking areas, emphasize circulation patterns, reduce the total number of spaces, reduce the impervious surface area and stormwater runoff and enhance the visual environment. The design of the off-street parking area shall be the responsibility of the developer and should consider visibility of signage, traffic circulation, comfortable pedestrian access, and aesthetics. Trees shall not be cited as a reason for applying for or granting a variance on placement of signs.

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

Response: *As shown on the Site Plan Existing Exhibit 20 DR1 parking stalls, drivelanes and landscape islands have been provided.*

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. They may be lower than the surrounding parking surface to allow them to receive stormwater run-off and function as water quality facilities as well as parking lot landscaping. They shall be protected from vehicles by curbs, but the curbs may have spaces to allow drainage into the islands. They shall be dispersed throughout the parking

area [see TDC 73.380(3)]. They shall be planted with groundcover or shrubs that will completely cover the island area within 3 years. They shall be planted with deciduous shade trees when needed to meet the parking lot shade tree requirements. Native plant materials are encouraged. Landscape square footage requirements shall not apply to parking structures and underground parking.

(2) Landscaped island areas with deciduous parking lot shade trees shall be a minimum of 5 feet in width (from inside of curb to curb).

(3) A minimum of one deciduous shade tree shall be provided for every four (4) parking spaces to lessen the adverse impacts of glare, reduce heat from paved surfaces, and to emphasize circulation patterns. Required shade trees shall be uniformly distributed throughout the parking lot (see TDC 73.380(3)), except that within the Central Design District landscape islands and shade trees may be placed to frame views of the Tualatin Commons water feature or identified architectural focal elements. The trees shall meet the requirements of TDC 73.360(7). Parking lot shade tree requirements shall not apply to parking structures and underground parking.

(4) Landscape islands shall be utilized at aisle ends to protect parked vehicles from moving vehicles and emphasize vehicular circulation patterns. Landscape island location requirements shall not apply to parking structures and under-ground parking.

(5) Required plant material in landscape islands shall achieve 90 percent coverage within three years. Native shrubs and trees are encouraged.

(6) (a) Except as in (b) below, site access from the public street shall be defined with a landscape area not less than 5 feet in width on each side and extend 25 feet back from the property line for commercial, public, and semi-public development with 12 or more parking spaces and extend 30 feet back from the property line for industrial development, except for parking structures and under-ground parking which shall be determined through the Architectural Review process.

(b) In the Central Design District where driveway access is on local streets, not collectors or arterials, and the building(s) on the property is(are) less than 5,000 square feet in gross floor area, or parking is the only use on the property, site access from the public street shall be defined with a landscape area not less than 5 feet in width on each side and extend 5 feet back from the property line, except for parking structures and underground parking which shall be determined through the Architectural Review process.

(7) Deciduous shade trees shall meet the following criteria:

(a) Reach a mature height of 30 feet or more;

(b) Cast moderate to dense shade in summer;

(c) Long lived, i.e., over 60 years;

(d) Do well in an urban environment:

(i) Pollution tolerant.

(ii) Tolerant of direct and reflected heat.

(e) Require little maintenance:

(i) Mechanically strong.

(ii) Insect- and disease-resistant.

(iii) Require little pruning.

(f) Be resistant to drought conditions;

(g) Be barren of fruit production. [Ord. 882-92, §20, 12/14/92; Ord. 904-93, §64, 9/13/93; Ord. 920-94, §20, 4/11/94; Ord. 945-95, §1, 5/8/95; Ord. 1224-06 §32, 11/13/06**]**

Response: *The project has 57 parking spaces which requires a minimum of 1,425 SF (57 x 25 sf). of interior landscaped islands of 5 feet min. width and no more than 4 parking spaces between each island. The proposed site has provided 2,120 SF of interior landscaping, See Exhibit DR-1Site plan (Legend) & L-1 Lanscape plan for these locations as part of this calculation with min. 6 foot wide landscape planters throughout the parking areas.*

Section 73.370 Off-Street Parking and Loading

(1) General Provisions.

(a) At the time of establishment of a new structure or use, or change in use, or change in use of an existing structure, within any planning district of the City, off-street parking spaces, off-street vanpool and carpool parking spaces for commercial, institutional and industrial uses, off-street bicycle parking, and off-street loading berths shall be as provided in this and following sections, unless greater requirements are otherwise established by the conditional use permit or the Architectural Review process, based upon clear findings that a greater number of spaces are necessary at that location for protection of public health, safety and welfare or that a lesser number of vehicle parking spaces will be sufficient to carry out the objectives of this section. In the Central Design District, the Design Guidelines of TDC 73.610 shall be considered. In case of conflicts between guidelines or objectives in TDC Chapter 73, the proposal shall provide a balance.

(b) At the time of enlargement of an existing multi-family residential, commercial, institutional or industrial structure or use, TDC 73.370 shall apply to the existing and enlarged structure or use.

(c) Except where otherwise specified, the floor area measured shall be the gross floor area of the building primary to the function of the use of the property other than space devoted to off-street parking or loading.

(d) Where employees are specified, the term shall apply to all persons, including proprietors, working on the premises during the peak shift.

(e) Calculations to determine the number of required parking spaces and loading berths shall be rounded to the nearest whole number.

(f) If the use of a property changes, thereby increasing off-street parking or loading requirements, the increased parking/loading area shall be provided prior to commencement of the new use.

(g) Parking and loading requirements for structures not specifically listed herein shall be determined by the Community Development Director, based upon requirements of comparable uses listed.

(h) When several uses occupy a single structure, the total requirements for off- street parking may be the sum of the requirements of the several uses computed separately or be computed in accordance with TDC 73.370(1)(m), Joint Use Parking.

(i) Off-street parking spaces for dwellings shall be located on the same lot with the dwelling. Other required parking spaces may be located on a separate parcel, provided the parcel is not greater than five hundred (500) feet from the entrance to the building to be served, measured along the shortest pedestrian route to the building. The applicant must prove that the parking located on another parcel is functionally located and that there is safe vehicular and pedestrian access to and from the site. The parcel upon which parking facilities are located shall be in the same ownership as the structure.

(j) Required parking spaces shall be available for the parking of operable passenger automobiles of residents, customers, patrons and employees and shall not be used for storage of vehicles or materials or for the parking of trucks used in conducting the business.

(k) Institution of on-street parking, where none is previously provided, shall not be done solely for the purpose of relieving crowded parking lots in commercial or industrial planning districts.

(n) Bicycle parking facilities shall include long-term parking that consists of covered, secure stationary racks, lockable enclosures, or rooms (indoor or outdoor) in which the bicycle is stored and short-term parking provided by secure stationary racks (covered or not covered), which accommodate a bicyclist's lock securing the frame and both wheels. The Community Development Director, their designee, or the Architectural Review Board may approve a form of bicycle parking not specified in these provisions but that meets the needs of long-term and/or short-term parking pursuant to Section 73.370.

Response: *The proposed Light Industrial Use meets the threshold requirements defined under 73.370{1)(a), triggering the off-street parking, loading, and bicycle parking requirements. The minimum parking requirements are based on fig.73-3 (i) (manufacturing 1.6 spaces / 1,000 sf) and rounded to the nearest whole number. Additional bicycle parking & carpool is provided within this development and within the parking lot and building front plazas. See Exhibit 20 DR1 for site data summary.*

(2) <u>Off-Street Parking Provisions</u>

(a) The following are the minimum and maximum requirements for off-street

motor vehicle parking in the City, except for minimum parking requirements for the uses in TDC 73.370(2)(a) (Residential Uses: iii, iv, v, vi, vii; Places of Public Assembly: I, ii, iv; Commercial Amusements: I, ii; and Commercial: I, ii, xi, xii, xiv) within the Core Area Parking District (CAPO). Minimum standards for off-street motor vehicle parking for the uses in 73.370(2) (a) Residential Uses: iii, iv, v, vi, vii; Places of Public Assembly: I, ii, iv; Commercial Amusements: I, ii; and Commercial: I, ii, xi, xii, xiv in the CAPO are in TDC 73.370(2)(b).

(b) The maximum requirements are divided into Zone A and Zone B, as shown on the Tualatin Parking Zone Map, Figure 73-3. The following are exempt from calculation of maximum parking requirements: parking structures; fleet parking; parking for vehicles for sale, lease or rent; car/vanpool parking; dedicated valet parking; and user-paid parking.

Response: *Parking, Loading & Bicycle parking stall meet the requirements for this code section. See Exhibit 230 DR1 Site Plan data for calculation.*

Section 73.380 Off-Street Parking Lots

A parking lot, whether an accessory or principal use, intended for the parking of automobiles or trucks, shall comply with the following:

(1) Off-street parking lot design shall comply with the dimensional standards set forth in Figure 73-1 of this section, except for parking structures and underground parking where stall length and width requirements for a standard size stall shall be reduced by .5 feet and vehicular access at the entrance if gated shall be a minimum of 18 feet in width.

Response: *All proposed standard parking stalls associated with this new development are dimensioned at 9 feet wide by 19 feet long to meet the dimensional standards set forth 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). Stalls more than the number required by TDC 73.370(2) can be sub-compact stalls.

Response: *Compact parking stalls associated with this new development are dimensioned at 7.7 feet wide by 16 feet long to meet the compact parking dimensional standards. No compacts are being proposed for this development review.*

(3) Off-street parking stalls shall not exceed eight continuous spaces in a row without a landscape separation, except for parking structures and underground parking. For parking lots within the Central Design District that are designed to frame views of the central water feature or identified architectural focal elements as provided in TDC 73.350(3), this requirement shall not apply and the location of parking lot landscape islands shall be determined through the Architectural Review process.

Response: *As shown on the Site Plan in Exhibit 20 DR1, no section of parking stalls exceeds eight continuous stalls in a row without a landscape separation.*

(4) Parking lot drive aisles shall be constructed of asphalt or concrete, including pervious concrete. Parking stalls shall be constructed of asphalt or concrete, or a pervious surface such as pavers or grasscrete, but not gravel or woody material. Drive aisles and parking stalls shall be maintained adequately for all-weather use and drained to avoid water flow across sidewalks. Pervious surfaces such as pervious concrete, pavers and grasscrete, but not gravel or woody material, are encouraged for parking stalls in or abutting the Natural Resource Protection Overlay District, Other Natural Areas identified in Figure 3-4 of the Parks and Recreation Master Plan, or in a Clean Water Services Vegetated Corridor. Parking lot landscaping shall be provided pursuant to the requirements of TDC 73.350 and TDC 73.360. Walkways in parking lots shall be provided pursuant to TDC 73.160.

Response: *All parking lot drive aisles are constructed of asphalt.*

(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: *Proposed lighting will deflect to the interior of the site to limit shine or glare into adjacent properties and street ROWs see Exhibit 20 E1 Site Photometric Plan*.

(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 of pedestrians and vehicular traffic on the site.

Response: *All parking areas associated with this development will be served by two (2) driveways. A service drive on the northwest end of the site which is intended for truck ingress/egress only along with signage posted to identify this drive to only serving loading vehicles for the development. A main entrance drive is proposed on the northeast end of the site which is intended for the Tenants and customers. This drive alignment with the existing drive to the north was limited due to the east properties size and the need for a 5-foot landscape buffer between adjacent properties. The site plan also identifies a truck maneuvering ingress/egress path through-out the parking lot from SW Leveton Drive to show there is clear and safe traveling clearances for the loading trucks. See Exhibit 20 DR1.*

(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: *All parking adjacent to landscaped areas and pedestrian walkways*

feature minimum 6" high concrete curbs to prevent cars from encroaching into the landscaping, plazas and pedestrian pathways.

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

Response: *ADA compliant parking spaces are provided at the north side of the building. There are Three (3) which one (1) is van accessible. See Exhibit 20 DR1 & DR1.1.*

(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 proposed on-site drive aisles located on the new development meet or exceed the dimensional standards set forth in these standards. Applicant is seeking a reduced drive lane to 12 feet (20 feet currently shown) on the northwest end of the project for truck one-way access for ingrees/egress.*

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: *Ingress and egress from adjacent properties are not designed nor required as a part of this development. This proposed development connects to the existing SW Leveton Drive, a public street*.

(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

Response: *As shown on the Site Plan DR-1 the proposed EAST entrance is 36 feet wide and the WEST entrance is 40 feet wide. Both entrances will be designed and built per the City engineering standards.*

Section 74.410 & 74.765 Street Tree Species and Planting Locations.
All trees, plants or shrubs planted in the right-of-way of the City shall conform in species and location and in accordance with the street tree plan in Schedule A. If the Operations Director determines that none of the species in Schedule A is appropriate or finds appropriate a species not listed, the Director may substitute an unlisted species. [Ord. 963-96, § 9, 6/24/96; Ord. 1279-09 §7, 3/23/09]

Response: *The The applicant has proposed street trees along SW Leveton See Exhibit 20 L-1 Lanscape plan.* ***Golden Desert Ash*** *trees at 30 feet on center has been specified per the City's Schedule A approved Tree Species.*

Schedule A: Street Tree Species					
The following street trees are authorized for planting in the City of Tualatin. Please refer to Map 74-1 to reference locations of the following species of trees. [Ord. 963-96 §9, 6/24/96; Ord. 1079-01 §8, 7/23/01; Ord. 1279-09 §8, 3/23/09]					
Species Common Names	Planting Strip Width (feet)			Powerline Compatible	Spacing on center (feet)
Zone 1	4	5	6+		
Leprechaun Ash	•	•	•		30
Purple Beech	•	•	•		30
European Hornbeam	•	•	•	•	30
Armstrong Maple	•	•	•		30
Scanlon/Bowhall Maple	•	•	•		30
Skyrocket English Oak	•	•	•		30

Capital Flowering Pear	•	•	•		30
Persian Parrotia	•	•	•		30
Eastern Redbud	•	•	•		30
Zelkova Musashino	•	•	•		30
Autumn Applause Ash		•	•		30
Shademaster Honey Locust		•	•		30
Zone 2					30
Golden Desert Ash	•	•	•	•	**30**
Leprechaun Ash	•	•	•		30
Purple Beech	•	•	•		30
Goldenrain	•	•	•		30
European Hornbeam	•	•	•	•	30
Ivory Japanese Lilac	•	•	•	•	30
Amur Maackia	•	•	•	•	30
Amur Maple	•	•	•	•	30
Crimson Sentry Maple	•	•	•	•	30
Trident Maple	•	•	•	•	30
Skyrocket English Oak	•	•	•	•	30
Persain Parrotia	•	•	•		30

Eastern Redbud	•	•	•		30
Yellowwood	•	•	•		30
Raywood Ash		•	•	•	30
Urbanite Ash		•	•		30
Ginko		•	•		30
Greenspire Linden		•	•		30
Crimson King Maple		•	•		30
Tri-Color Beech			•		60
Frontier Elm			•		60
Globe Sugar Maple			•		60
Red Sunset Maple			•		60
Red Oak			•		60
Scarlet Oak			•		60

CONCLUSION

The request for an Architectural Review approval for the proposed new development meets all applicable code provisions as addressed in this project narrative and in the attached application submittal materials. Therefore, the applicant respectfully requests approval of the proposed Light Industrial Building and associated site development.

EXHIBIT-1

City of Tualatin

COMMUNITY DEVELOPMENT PLANNING DIVISION

Scoping Meeting Request

The purpose of the Scoping and Pre-Application meetings is to offer early assistance in the land use and permitting process. This includes thoughtful feedback on preliminary design direction and visioning, outlining expectations, and to assist the applicant in attaining a complete application at first submittal.

PROJECT DESCRIPTION

Project name/title: Leveton Development

What is the primary purpose of this scoping meeting (What would you like to accomplish)? (Attach additional sheets if needed.)

To review proposed site plan and confirm the jurisdictional requirements and continue the A/R Site Plan Review process with the City.

PROPERTY INFORMATION

Property address/location(s): 12540 SW Leveton Dr. Tualatin, OR 97062

Tax map and tax lot no.(s): 2S121A0-04000 Zoning:

PROPERTY OWNER/HOLDER INFORMATION

Name(s): Dana Properties, LLC.

Address: P.O. Box 5837 Phone: 503-579-3973

City/state: Aloha, OR Zip: 97003

APPLICANT INFORMATION

Name: Jacob Flint

Address: 18880 SW Shaw St. Phone: 503-519-3967

City/state: Aloha, OR Zip: 97007

Contact person: Jacob Flint

Phone: 503-519-3967 Email: Jacobf@inline-cc.com

Scoping Meeting Information

All of the information identified on this form is required and must be submitted to the Planning Division with this application. Conferences are scheduled subject to availability and a minimim of two weeks after receiving this application and all materials. Scoping meetings are one (1) hour long and are typically held on Mondays between the hours of 3-4 p.m. or Wednesdays between 2-4 p.m.

REQUIRED SUBMITTAL ELEMENTS

(Note: Requests will not be accepted without the required submittal elements)

☐ A complete application form.

1 hard copy and an electronic set of the following:

☐ Preliminary site and building plans, drawn to scale, showing existing and proposed features. (Plans do not need to be professionaly prepared; just accurate and reliable.)

☐ A detailed narrative description of the proposal that clearly identifies the location, existing and proposed uses, and any proposed construction.

☐ A list of all questions or issues the applicant would like the City to address.

FOR STAFF USE ONLY

Case No.: _____

Related Case No.(s): _____

Application accepted:

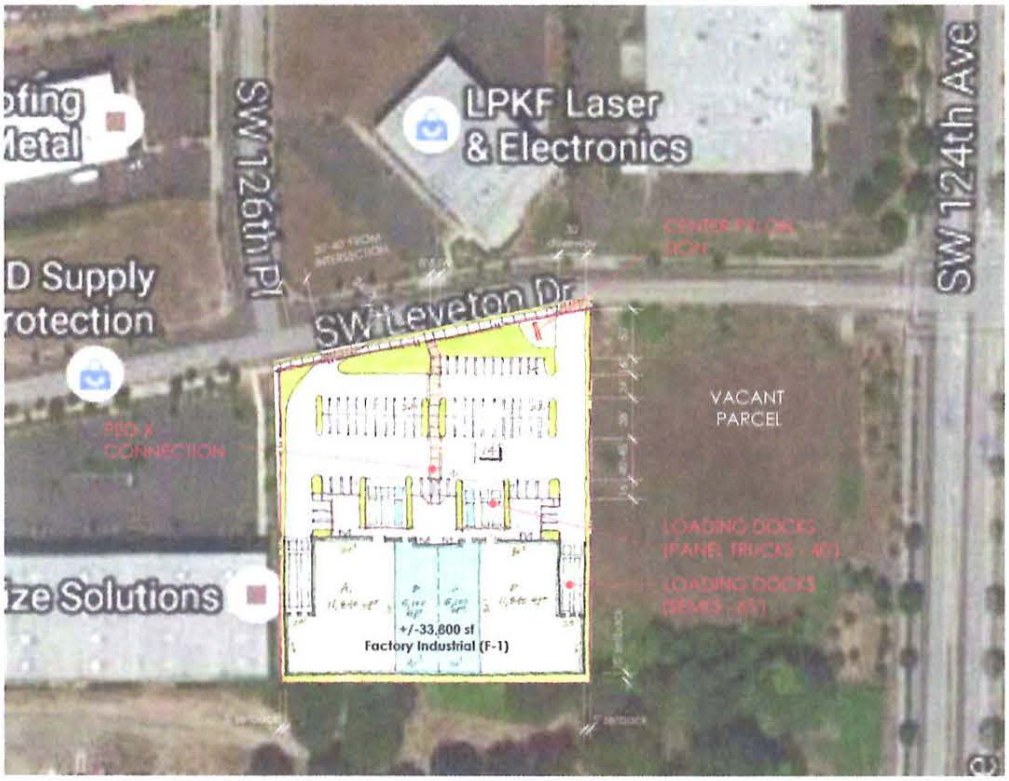
By: _____ Date: _____

Date of Scoping: _____

Time of Scoping: _____

Planner assigned to Scoping: _____

If more than four (4) people are expected to attend the scoping meeting in your group, please inform the City in advance so that alternate room arrangements can be made to accommodate the group.



SITE DATA		96,268 SF	2.21 Ac
Building '1':	(Industrial)		33,880 S.F.
Parking Provided:			74 spaces
Parking Provided / Ratio:			2.18 Spaces / 1,000 SF
Site Ratio:			35.19%
Impervious Area +/- (Pavement /walks):		46,120 S.F.	48%
Landscape Area (+/-):		16,248 S.F.	17%
Building Coverage:		33,880 S.F.	35%
	Total Site Coverage	96,268 S.F.	100%

SITE PLAN

SGA

SW Leveton Drive & SW 124th Ave.
Tualatin, Oregon

NORTH

Inline Commercial Construction, Inc.
PO Box 5837
Aloha, Or 97075

Pre-lim Scoping Meeting

sp-1

SGA

SG ARCHITECTURE, LLC

d: 11.7.16

p: LEVETON INDUST. SCOPING MTG. p|n: 16-113

3:00 PM.

ATTENDEES: JACOB FLINT, DAVE FLINT, THOMAS SUISSA, KEVIN GODWIN, CHARLES BENSON & MTG. ORGANIZER (DON'T REMBER HER NAME)

TOPICS DISCUSSED:

- ☐ SCREENING OF LOADING DOCKS WALL VS LANDSCAPING
- ☐ CONFIRMED SETBACKS FOR BLDG/LS.
- ☐ PARKING REQUIREMENTS FOR LT. INDUST.
- ☐ WATER QUALITY (ABOVE/BELOW NEED SOIL REPORT.
- ☐ OWNER OF TREES ON THE PROPERTY TO THE SOUTH. DISCUSS TRIMMING @ PROP. LINE.
- ☐ NEED TO SPEAK WITH ENGINEERING (TONY) FOR THE ~~@~~ "TRUCKS ONLY" DRIVEWAY # MIN. DISTANCE FROM INTERSECTION CITY STANDARDS.
- ☐ COORDINATION W/ TUALATIN HALCLFER & TVFD.
- ☐ VISION CLEARANCES
- ☐ NEED A TRAFFIC STUDY (SEE WEBSITE FOR REQUIREMENTS)
- ☐ NO NEED FOR PRE-APP IF FEES ARE PAID. PRIOR TO A/R SUBMITTAL.
- ☐ NEIGHBORHOOD MEETING REQ'D. SEE WEBSITE FOR DEV'G. PACKAGE.
- ☐ NO MAJOR ISSUES ON PROPOSED SITE PLAN.

MEETING ADJOURNED @ 3:45

10940 SW BARNES ROAD #364
PORTLAND, OREGON 97225
503-201-0725 | 503-347-4685
WWW.SG-ARCH.NET

s|n: 1 of 1

The Applicant has been allowed to have the Pre-Application **waived** by the City Planner. The Applicant will provide the City with appropriate documentation and receipt of payment.

EXHIBIT-3

Tualatin Public Library
Facility Use Permit

Tualatin Public Library
18878 SW Martinazzi Ave.
Tualatin, OR 97062-7092
Phone 503.691.3074 *library information*
503.691.3079 *reservations*

APRIL 26TH 2017
Event Date

Today's Date: 3.23.17

Organization/Individual requesting use: SG ARCHITECTURE, LLC

Contact Name: KEVIN GODWIN

Street Address: 10940 SW BARNES RD # 364

City: PORTLAND State: OR Zip Code: 97225

Day Phone(s): 503 201 0725 Evening Phone: SAME

Email Address: KGODWIN@SG-ARCH.NET

Purpose of Event: NEIGHBORHOOD MEETING FOR NEW COMMERCIAL PROJECT

Classification (see policies): CLASS 4

Hours of Event: from: 6:00 am/pm to: 7:30 am/pm Size of Group: +/- 15

Number of cars anticipated: 10-15

Fees: The rates shown below are hourly rates. Reservations must be made for a **minimum of one hour.**

Facility	Max Capacity	Classes 1 & 2	Class 3 Res/ Non-Res	Class 4 Res/ Non-Res	# of Hours	Fee
Library Community Room	147	No fee	$10 /$20	$15/ $30	x 1.5 hrs	

Total Building Rental Fee: $_____

I have read the Policies and Procedures brochure on rental of the Tualatin Public Library Community Room. I agree to abide by the Policies and Procedures as well as the ordinances of the City of Tualatin and I accept responsibility for any violations as they may pertain to the above permits.

Signature of group representative or individual

For Office Use Only

Fees Paid: $_____ Receipt #_____

Date Fees Paid: _____ Initials: _____

Refund Amount: $_____ Date: _____

Copy to Library _____ Calendar _____

CO TUALATIN LIBRARY KIOSK
18878 SW MARTINAZZI AVE
TUALATIN, OR 97062
503-691-3074

CO TUALATIN LIBRARY KIOSK
00173400008028041427OO

Date: 03/23/2017 12:26:15 PM

CREDIT CARD SALE

VISA
CARD NUMBER: **********8320 K
TRAN AMOUNT: $45.00
APPROVAL CD: 022615
RECORD #: 000
CLERK ID: nbeall

X_____
Kevin Godwin

I AGREE TO PAY THE ABOVE TOTAL AMOUNT
ACCORDING TO THE CARD ISSUER AGREEMENT
(MERCHANT AGREEMENT IF CREDIT VOUCHER)

Thank you!

Merchant Copy

CO TUALATIN LIBRARY KIOSK
18878 SW MARTINAZZI AVE
TUALATIN, OR 97062
503-691-3074

CO TUALATIN LIBRARY KIOSK

Date: 03/23/2017 12:26:15 PM

CREDIT CARD SALE

VISA
CARD NUMBER: **********8320 K
TRAN AMOUNT: $45.00
APPROVAL CD: 022615
RECORD #: 000
CLERK ID: nbeall

Thank you!

Customer Copy

EXHIBIT-4

NEIGHBORHOOD / DEVELOPER MEETING
CERTIFICATION OF SIGN POSTING

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's representative for the Neighborhood Developers Meeting for the **Leveton Industrial project,** I hereby certify that on this day, **April 4th 2017,** a sign was 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: Kevin M. Godwin – SG Architecture, LLC
(PLEASE PRINT)

Applicant's Signature: _____

Date: 4-5-17


12620
NOTICE
NEIGHBORHOOD /
DEVELOPER MEETING
4/26/2017 6:30 p.m.
19875 SW Martinazzi Ave
503-261-0725


NOTICE
NEIGHBORHOOD /
DEVELOPER MEETING
4/26/2017 6:30 p.m.
18878 SW Martinazzi Ave
(Library Community Room)
503-201-0725

NOTICE

NEIGHBORHOOD / DEVELOPER MEETING

4/26/2017 6:30 p.m.

18878 SW Martinazzi Ave

(Library Community Room)

503-201-0725

EXHIBIT-5

SGA
SUTTON | GODWIN | ARCHITECTURE

March 24, 2017

Re: New Industrial Building

Dear Property Owner-

You are cordially invited to attend a NEIGBORHOOD / DEVELOPER meeting on April 26, 2017 at 6:30 pm in the Community Room at the Tualatin Public Library. This meeting is for a new proposed Industrial Commercial Building on the property located at

12540 SW Leveton Drive, Tualatin, Oregon 97229.

The purpose of this meeting is to present the project and to meet the surrounding property owners and discuss this proposal and identity any issues regarding the future development of the property.

Sincerely,
SG Architecture, LLC

Kevin M. Godwin – Partner
503-201-0725
kgodwin@sg-arch.net

10940 SW Barnes Rd #364
Portland, OR 97225
503.201.0725

EXHIBIT-6

NEIGHBORHOOD/DEVELOPER MEETING
AFFIDAVIT OF MAILING

STATE OF OREGON)
) SS
COUNTY OF WASHINGTON)

I, **Kevin M. Godwin** being first duly sworn, depose and say:

That on the **24th day of March, 2017** I served upon the persons shown on Exhibit "A," attached hereto and by this reference incorporated herein, a copy of the Notice of Neighborhood/Developer meeting marked Exhibit "B," attached hereto and by this reference incorporated herein, by mailing to them a true and correct copy of the original hereof. I further certify that the addresses shown on said Exhibit "A" are their regular addresses as determined from the books and records of the Washington County and/or Clackamas County Departments of Assessment and Taxation Tax Rolls, and that said envelopes were placed in the United States Mail with postage fully prepared thereon.

Signature

SUBSCRIBED AND SWORN to before me this 24th day of March, 20 17.

OFFICIAL STAMP
RYAN CHRISTOPHER CHAVEZ
NOTARY PUBLIC-OREGON
COMMISSION NO 940536
MY COMMISSION EXPIRES JULY 09, 2019

Notary Public for Oregon
My commission expires:

RE: New Proposed Industrial Building - SW Leveton Drive

AR17-0003

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.

EXHIBIT 'B'

SGA
SUTTON | GODWIN | ARCHITECTURE

March 24, 2017

Re: New Industrial Building

Dear Property Owner-

You are cordially invited to attend a NEIGBORHOOD / DEVELOPER meeting on April 26, 2017 at 6:30 pm in the Community Room at the Tualatin Public Library. This meeting is for a new proposed Industrial Commercial Building on the property located at

12540 SW Leveton Drive, Tualatin, Oregon 97229.

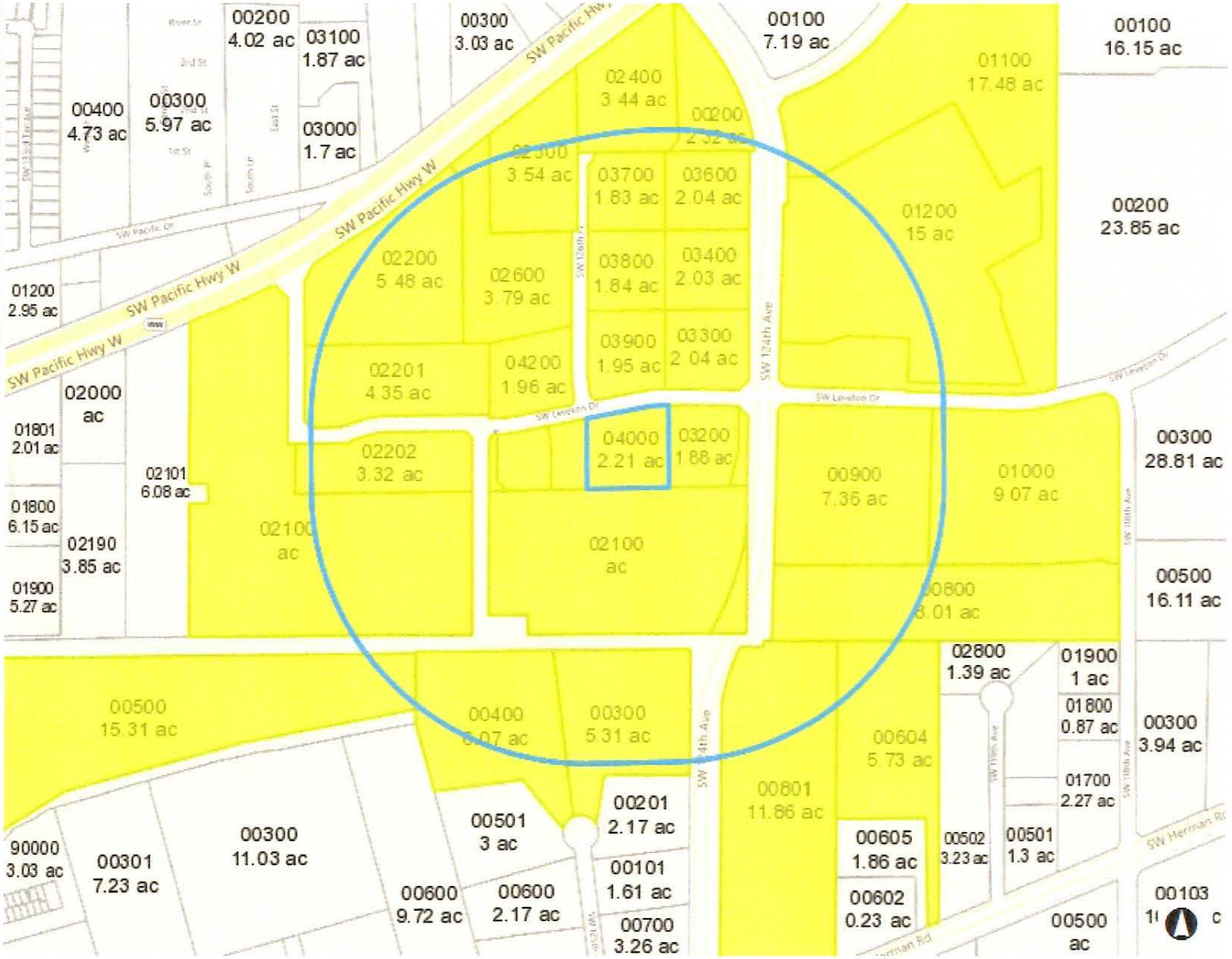
The purpose of this meeting is to present the project and to meet the surrounding property owners and discuss this proposal and identity any issues regarding the future development of the property.

Sincerely,
SG Architecture, LLC

Kevin M. Godwin – Partner
503-201-0725
kgodwin@sg-arch.net

10940 SW Barnes Rd #364
Portland, OR 97225
503.201.0725

1000' Radius around 12540 SW Leveton Dr



First American Title™

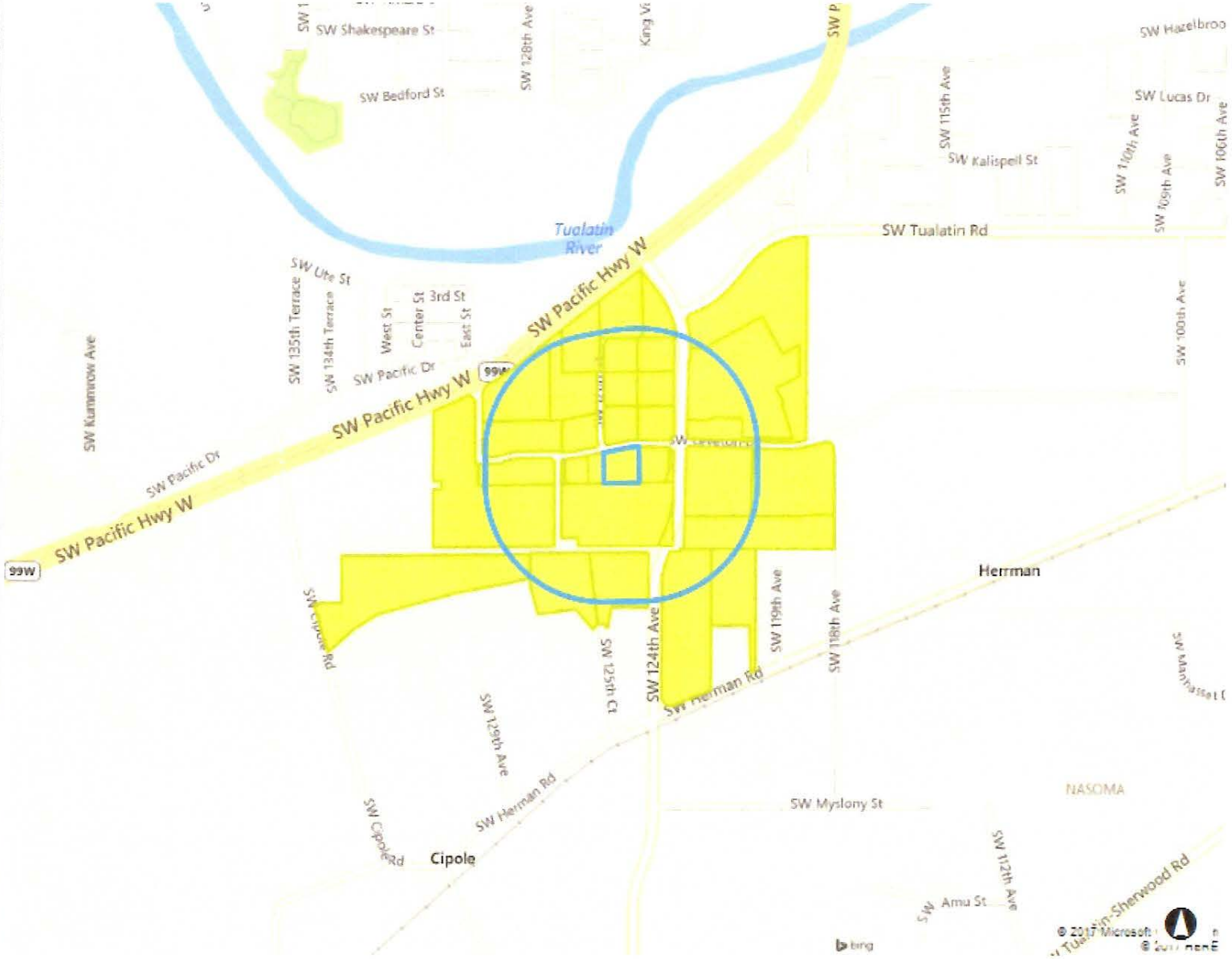
☐ Taxlot

3/6/2017

Notes

0.3 0 0.14 0.3 Miles

1000' Radius around 12540 SW Leveton Dr



First American Title™

☐ Taxlot

3/6/2017

Notes

0.7 0 0.33 0.7 Miles

EXHIBIT-7

Reply all | Delete Junk | •••

Leveton Neighborhood Developer Meeting

KG

Kevin Godwin

Mon 4/10/2017 4:56 PM

Reply all

To: atasaedi@hotmail.com; dan@danhardyproperties.com; jasuwi7@gmail.com; rmheide@comcast.net; charlie5915@hotmail.com; hgeorge@gmail.com; doug_ulmer@comcast.net; jrpride@frontier.com; chaserd2003@gmail.com; kencottam@yahoo.com; tmpgarden@comcast.net; theanadine@yahoo.com; carmentmadrid@gmail.com; roy@rueckco.com; kaydix@comcast.net; lloop@klcorp.com; jamie.gowins@gmail.com; shamusluv@yahoo.com; patrickcrowell79@gmail.com; justin_speer@hotmail.com; jmakarowsky@comcast.net; edkcnw@comcast.net; willie.fisher@gmail.com; s.caporale85@gmail.com; mwestenhaver@hotmail.com; kzlateff@comcast.net; tualatincommercialcio@gmail.com; Gannett@oregonrn.org; scottm@capacitycommercial.com; famtunstall1@frontier.com; Scot Sutton; Jacob Flint <jacobf@inline-cc.com>; davef@inline-cc.com

Sent Items

NHM CIO Contacts f.pdf
1 MB

16-113 Tualtin NHM Me...
379 KB

2 attachments (1 MB) Download all Save all to OneDrive - sg-arch.net

Dear CIO Officers-
Please find attached our site plan and meeting notice letter for our upcoming Neighborhood Developers Meeting. We invite you all to attend and please contact me if you have any questions.

Thanks

Kevin Godwin | SG Architecture, LLC
10940 SW Barnes Rd #364 | Portland OR 97225 | **503-201-0725**
kgodwin@sg-arch.net

EXHIBIT-8

SGA
SUTTON | GODWIN | ARCHITECTURE

March 26th, 2017

Sign – In Sheet

Neighborhood / Developer Meeting

Date: April 26th, 2017
Location: Library Community Room – 18878 SW Martinazzi Ave
Time: 6:30 PM
Project: New building - Leveton Industrial

Name	Address	Phone or email
Kevin Godwin - SGA	10940 SW Barnes RD # 364 Portland, OR 97225	503-201-0725 (Cell)
Jacob Flint – Inline Const.	18880 SW Shaw St	503-519-3967 (Cell)
TOM SISUL	375 ROTHMAN AVE, GLADSTONE	503-657-0109
CHARLES BENSON	TUALATIN CITY OFFICES	503.691.3029

10940 SW Barnes Rd #364
Portland, OR 97225
503.201.0725

EXHIBIT-9

SGA
SUTTON | GODWIN | ARCHITECTURE

May 12, 2017

Mr. Charles H. Benson III
Associate Planner
City of Tualatin
18880 SW Martinazzi Ave
Tualatin, OR 97062-7092
cbenson@ci.tualatin.or.us

REF: Leveton Industrial
Neighborhood Meeting Minutes
Tualatin, Or 97062

Charles-
This letter is to inform you that SG Architecture, LLC **conducted** a Neighborhood Association Meeting pursuant to TDC 31.063 on **April 26th, 2017 at 6:30 pm in the Tualatin Community Library (Community Room) located at 18878 SW Martinazzi Ave, Tualatin, Oregon 97062**. As mandated by the City of Tualatin code attached are the minutes of the meeting (exhibit A) and the sign-in sheet (exhibit B).

Should you have questions please feel free to call me at 503-201-0725.

Sincerely,
SG Architecture, LLC

Kevin M. Godwin – Partner

Encls: Exhibits 'A' & 'B'
CC: Jacob Flint – In-Line Construction Company (email)

10940 SW Barnes Rd #364
Portland, OR 97225
503.201.0725

EXHIBIT 'A'

Leventon Industrial

Meeting Minutes

Time:	April 26th, 2017 at 6:30 pm
Location:	**Tualatin Community Library (Community Room) 18878 SW Martinazzi Ave, Tualatin, Oregon 97062**
Neighbors Present:	(0) NONE
Others Present:	Charles Benson – City of Tualatin, Jacob Flint – Inline-Const., Kevin Godwin-SGA & Tom Sisul – Sisul Engineering

Meeting Adjourned: 7:25 PM

Topics Discussed between the Applicant and Charles Benson (City Planner)

1. ***The minimum Distance of the "truck-only" service drive from SW 126th intersection.***
   SGA was directed by Charles to coordinate the minimum required spacing requirement from the intersection with Tony Doran – City Engineering Department.

2. ***Screening of roof top units is required?***
   SGA response was that the proposed units would be pushed back on the building such that the units would not be seen from the street (SW Leveton).

3. ***Tree removal/pruning of trees on the adjacent rear property.***
   Charles recommended the Applicant to speak with the adjacent property owner to discuss the pruning of the over lapping trees on the properties. City has no jurisdiction in this matter.

4. ***Material change for pedestrian walks in parking lot.***
   Charles directed the Applicant that all pedestrian walkways to be hard surfaces (concrete or brick) material change from the surrounding asphalt parking lot

5. ***Approval of trash enclosures with local trash hauler prior to submittal of AR***
   There were discussions regarding that the trash hauler wanted the trash enclosures up front near SW Leveton Drive for ease of servicing. The City planner agreed with our proposed keeping their proposed location near the rear of the building and loading docks so that it would not be seen from the street.

6. ***Landscaping in lieu of CMU loading dock screen wall***
   There were discussions regarding the use of landscaping in lieu of an 8'-0" high screen wall at the loading docks. Charles recommended that we review the TDC criteria for loading dock screening requirements and provide an alternate if we choose to do so. They would take it under advisement.

meeting adjourned.

EXHIBIT - 10

City of Tualatin

www.tualatinoregon.gov

APPLICATION FOR ARCHITECTURAL REVIEW

Direct Communication to:			
Name: KEVIN GODWIN	Title: PARTNER		
Company Name: SG ARCHITECTURE, LLC.			
Current address: 10940 SW BARNES RD #364			
City: PORTLAND	State: OR	ZIP Code: 97225	
Phone: 503.201.0725	Fax:	Email: KGODWIN@SG-ARCH.NET	

Applicant			
Name: KEVIN GODWIN	Company Name: SG ARCHITECTURE LLC		
Address: 10940 SW BARNES RD #364			
City: PORTLAND OI	State: OR	ZIP Code: 97225	
Phone:	Fax:	Email: KGODWIN@SG-ARCH.NET	
Applicant's Signature:		Date: 6.5.17	

Property Owner			
Name: DANA PROPERTIES, LLC			
Address: P.O. BOX 5837			
City: ALOHA	State: OR	ZIP Code: 97003	
Phone: 503 519.3976	Fax:	Email: JACOBFC INLINE-CC.COM	
Property Owner's Signature:		Date 6-7-17	
(Note: Letter of authorization is required if not signed by owner)			

Architect			
Name: SG ARCHITECTURE, LLC			
Address: 10940 SW BARNES RD #364			
City: PORTLAND	State: OR	ZIP Code: 97225	
Phone: 503 201 0725	Fax:	Email: KGODWIN@SG-ARCH.NET	

Landscape Architect			
Name: CHRISTOPHER FRESHLEY LANDSCAPE ARCHITECT			
Address: 3944 SW 36TH PLACE			
City: PORTLAND	State: OR	ZIP Code: 97221	
Phone: 503 222-9861	Fax:	Email: CHRISFRESHLEYLANDSCAPEARCHITECT.COM	

Engineer			
Name: SISUL ENGINEERING			
Address: 375 PORTLAND AVE			
City: GLADSTONE	State: OR	ZIP Code: 97027	
Phone: 503 657-0188	Fax:	Email: TOM@SISULENGINEERING.COM	

Project			
Project Title: LEVETON INDUSTRIAL			
Address: 12540 SW LEVETON DRIVE			
City: TUALATIN	State: OR	ZIP Code: 97062	
Brief Project Description: NEW ONE-STORY TILT-UP BUILDING - APPROX 35,750 SF.			
Proposed Use: LT. INDUSTRIAL			

Value of Improvements:
2.0 - 2.5 million

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: 6-5-17

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 ½" X 11" vicinity map	1 reproducible 8 ½" X 11" site, grading, LS, Public Facilities plan	
Neighborhood/Developer meeting materials		

Revised: 6/12/14

EXHIBIT-11

Architectural Review (AR) Intake Check List

Project Name:_____

AR-___-____ Date Received:_____ Submittal # _____

- ❑ Project name or title that matches CRW scoping/pre-application meeting name. (Names should be somewhat descriptive of the project i.e. ABC Company New Building).
- ❑ Include page numbers, a Table of Contents, and staple documents or put documents in a binder. Do not use binder clips or paper clips.
- ❑ Plans should have page numbers and an Index to Sheets that matches page numbers. All symbols, line types, and textures must have a legend. Please direct to page of legend on each sheet. Plans should be stapled down the length of the left side.
- ❑ Application shall contain the names, addresses, e-mails, and telephone numbers of:

  ___ Property Owner(s) ___ Applicant ___Project Planner

  ___ Architect ___ Engineer ___ Landscape Architect
- ❑ Signatures from Property Owner(s) and the Applicant– along with printed name and date.
- ❑ Street Address(s), Tax Lot Number(s), and current tax map(s).
- ❑ Clean Water Services (CWS) Service Provider Letter (SPL) indicating a "Stormwater Connection Permit Authorization Letter" will likely be issued or Pre-Screen signed by CWS with appropriate box checked to indicate that it serves as an SPL.
- ❑ Wetland delineations and floodplain, if applicable
- ❑ Fill/Removal Permit Issued by the Oregon Division of State Lands (DSL) and the U.S. Army Corps of Engineers, if applicable
- ❑ Application Fee (must be paid at time of first submittal).
- ❑ Hydraulic Modeling worksheet and fee (must be paid at time of first submittal).
- ❑ 3 plan sets of the following plans:
  - o Existing Conditions Plan
  - o Site Plan
  - o Grading Plan
  - o Landscape Plan
  - o Elevations including specifications as to type, color, and texture of exterior surfaces of proposed structures (scale of 1/16":1', 1/8":1', ¼":1', ½":1', ¾":1')
  - o Tree Preservation Plan

Architectural Review (AR) Intake Check List

Project Name:_____

AR-___-____ Date Received:_____ Submittal # _____

- All plan sets shall be collated, stapled and folded and shall include a north arrow, scale and legend corresponding to symbols on the plans.
- Scale for Existing Conditions, Site Plan, Grading, Landscape and Tree Preservation shall be 1":10', 1":20', 1":30', for larger developments 1":40' or 1":50'. Adjust the scale accordingly on ledger (11x17) and letter (8.5x11) size copies.
- 3 sets of 8 ½" x11", 11"x17", 24"x36"
- Attachment 1 to this check list contains detailed plan requirements for each of the above

❑ Public Utility Facility Plan (Per Tualatin Development Code Ch. 74) including the following information:

- show the location type, size, and grade of all existing and proposed utility facilities such as: sanitary and storm sewers, water lines, fire hydrants, streets and sidewalks, and water quality facilities.
- Water quality, detention, and conveyance calculations and plans. (Soils report will also be required if soils type used for drainage calculations).
- Traffic study information as required by the City Engineer- 4 copies
- Other utility facilities as required by the City Engineers such as a fire flow test
- All plan sets shall be collated, stapled and folded and shall include a north arrow, scale and legend corresponding to symbols on the plans.
- Scale shall be 1":10', 1":20', 1":30', for larger developments 1':40' or 1":50'.Adjust the scale accordingly on ledger (11x17) and letter (8.5x11) size copies.
- 3 sets of 8 ½" x11", 11"x17", 24"x36"
- Attachment 1 to this check list contains detailed plan requirements.

❑ Developments in the Central Design District shall provide the Neighborhood Meeting notes and evidence of the notice posting required in TDC 31.071(5) and shall provide narratives statements considering each of the Design Guidelines in TDC 73.610 Narrative, (TDC Fig. 73-4 maps this district)

❑ Completed City fact sheet on the project

❑ A letter from the franchise solid waste and recycling hauler reviewing the proposed solid waste and recyclables method and facility signed and dated by a designee of the hauler. Attach a site plan and elevations of trash enclosures signed and dated by the hauler, if applicable.

❑ Acoustical engineer report as required by the Community Development Director

❑ Neighborhood Meeting information including the following:

Architectural Review (AR) Intake Check List

Project Name:_____

AR-___-____ Date Received:_____ Submittal # _____

- o Mailing affidavit and
- o Sign Posting certification on current City forms;
- o attendance log and notes;
- o copy of Neighborhood Meeting invitation;
- o GIS buffer map and mailing list including CIO contacts and mailing list.
- o Neighborhood Meeting must have occurred no more than 180 days from date of first submittal.
- o Pursuant to TDC 31.063

❑ Indication of a railroad (RR) at-grade crossing that provides sole access to the subject property, if applicable.

❑ Land Use application notification information including:

- o Provide a list of mailing list of recipients pursuant to TDC 31.064(1)
- o Post a sign pursuant to TDC 31.064(2)
- o Sign and dated posting certification with given case file number on current City Form.

❑ Narrative containing responses to the applicable criteria in the Tualatin Development and Municipal Code.

❑ Evidence of completed pre-application and scoping meeting with dates (no older than 180 days from date of 1st submittal).

❑ Pre-Printed labels of mailing list (size 5160).

❑ Adobe PDF(s) of application materials (direct conversions, not scans) on a CD or USB flash drive.

❑ Lighting Plan with "scattered" photometrics, light specs, and a legend. All photometric measurements must be shown covering all subject site property lines and the entire subject site. All light specs must show lights that are full cut off. Photometric measurement labels must be large enough to read.

Application Re-Submittals:

❑ Revisions to application must include date of resubmission on all new and revised materials. Provide a response letter addressing each incomplete item and on what page the missing information can be found. Please submit 3 copies of an entire new packet, not just the revised and new materials, in paper and electronic format. Please organize the new and revised materials and put them in the appropriate places it the application.

Please provide 3 full paper copies of every piece of the application for completeness review. During every completeness review staff will retain at least one paper copy of the submission for the record. Additional copies may be slip sheeted for resubmission at the staff member's discretion.

Architectural Review (AR) Intake Check List

Project Name:_____

AR-___-____ Date Received:_____ Submittal # _____

After the application is deemed complete, the project planner will request the appropriate number of complete application paper copies.

Revised date April 21, 2016

S:\Shared\Community Development\AR INTAKE CHECK LIST 2016 5 Rev. 4.21.16

Architectural Review (AR) Intake Check List
PLAN REQUIREMENTS

Project Name: _____

AR-____-_____ Date Received_____ Submittal # _____

PROPOSED SITE PLAN AND EXISTING CONDITIONS PLAN:

- North arrow and scale of drawing (Scale 1":10', 1":20': 1":30', for larger developments 1":40' or 1":50'). Adjust the scale accordingly on ledger (11 x 17) and letter (8.5 x 11) size copies.
- Site Data to include Planning District designation, square footage of site, square footage of development area, square footage of landscaping, square footage of parking lot landscaping, square footage of pavement, number of parking spaces (standard, subcompact and disability), square footage of building (gross and perimeter). Information must contain existing and proposed square footage of parking spaces. Identify landscape credits available and building setback reduction.
- Correct lot area and lot line dimensions of the site. Correct location of Natural Resource Protection Overlay District, including greenways, wetland natural areas and open space natural areas, and 25' vegetated corridors adjacent to a sensitive area. Also show delineated wetland boundary, top of bank and centerline for rivers and creeks. Indicate if wetlands or greenways are proposed to be dedicated.
- Location of buildings and main building entrance, dimensions and square footage of existing and proposed development, including setback distances to property lines and setback distances between buildings. Include location of bicycle parking and covered bicycle parking.
- Location of accessways, walkways and on-site bikeways.
- Fronting street(s), right-of-way lines, driveways, sidewalks, curbs, paths, railroad right-of-way, bicycle paths, pedestrian paths, transit stop locations and easements (include dimensions).
- Parking circulation and loading areas (dimensions of spaces) and type of surface. Show entrances, exits, direction of traffic flow, maneuvering areas and setbacks. Indicate location of subcompact spaces, vanpool and car pool parking and type of curbing. Identify disability stall locations and stall dimensions.
- Location of fences, walls, trash enclosures, recycling areas, electric transformer pads, rooftop mechanical equipment and exterior light fixtures.
- Outdoor storage areas and future development areas, if applicable.
- Include all property lines and easements based on survey or other recorded county documents.
- Include all proposed building envelopes.

GRADING PLAN:

- North arrow and scale of drawing (scale 1":10', 1":20', 1":30').
- Correct lot area and lot line dimensions of the site. Correct location of Natural Resource Protection Overlay District, including greenways, delineated wetland boundary, wetland natural areas and open space natural areas, and CWS vegetated corridors adjacent to a sensitive area. Also show top of bank and centerline for rivers and creeks. Indicate if wetlands or greenways are proposed to be dedicated.

- Show site contour lines and elevations (existing and proposed, referenced from mean sea level. Minimum five-foot contours).
- Location, size and species of all existing trees having a trunk diameter of 8" or greater measured at a point 4' above the ground. Indicate trees to be removed or retained.
- Place a note on the plan stating that existing trees to be retained shall be fenced around the drip line with chain link or other sturdy fencing during construction. Indicate topsoil replacement in all landscape areas.
- Location, size and grading plan of water quality facility, if applicable.

TREE PRESERVATION PLAN:

- Tree Preservation Site Plan (drawn to scale 1:10, 1:20, or 1:30), including a north arrow, existing and proposed property lines, existing and proposed topographical contour lines (existing to remain and proposed structure envelopes), structures, impervious surfaces, wells, septic systems, stormwater retention/detention facilities, utility and access locations/easements, vision clearance areas, and all trees having a trunk diameter of 8" or greater as measured at a point 4' above the ground. All trees proposed for removal and all trees proposed for preservation shall be indicated on the site plan as such by identifying symbols. For each tree illustrated, include information on size, species, and tag i.d. number.
- A Tree Assessment Report, prepared by a qualified arborist, including the following information: an analysis as to whether trees proposed for preservation can in fact be preserved in light of the development proposed, are healthy specimens, and do not pose an imminent hazard to persons or property if preserved; an analysis as to whether any trees proposed for removal could be reasonably preserved in light of the development proposed and health of the tree; a statement addressing the tree removal approval criteria set forth in TDC 34.230; and arborist's signature and contact information. The Tree Assessment Report shall have been prepared no more than one calendar year preceding the date the Architectural Review application is deemed complete by the City.
- Tagging. All trees on-site shall be physically identified and numbered in the field with an arborist-approved tagging system. The tag i.d. numbers shall correspond with the tag i.d. numbers illustrated on the Tree Preservation Site Plan.
- Where Clean Water Services (CWS) has approved delineation of a "sensitive area" or "vegetated corridor" on the subject property, and CWS has required dedication of an easement that prohibits encroachment into the delineated area, and the CWS-required easement boundary is clearly illustrated and identified on the site plan, then all trees located within the CWS-required easement need not be individually identified on the Tree Preservation Site Plan, need not be addressed in the Tree Assessment Report, and need not be tagged.

ELEVATIONS:

- Color elevations. View of proposed structures drawn at scale of 1/16":1', 1/8":1', 1/4":1' (buildings, covered bicycle parking and mixed solid waste and source separated recyclable storage areas).
- Scaled elevations. View of exterior light fixtures, electrical transformer pads, and rooftop mechanical equipment.
- Colored elevation views shall include specifications as to materials and colors to be used in the development, including walls, roof, windows, doors, garages and trim.
- Cut sheet of exterior lighting units showing down deflecting lighting pattern. Include parking lot pole- mounted lighting and wall-mounted lights.
- Plans drawn at scale of 1/16":1', 1/8":1' or 1/4":1'.

LANDSCAPE PLAN:

- North arrow and scale of drawing (scale of 1":10', 1":20', 1":30').

- Correct lot area and lot line dimensions of the site. Correct location of Natural Resource Protection Overlay District, including greenways, wetland natural areas and open space natural areas, and 25' vegetated corridors adjacent to a sensitive area. Also show top of bank and centerline for rivers and creeks. Indicate if wetlands or greenways are proposed to be dedicated.
- Specific locations of all proposed and existing landscaping, including greenway landscaping (if applicable). Identify location of sensitive area buffer landscaping.
- Location, size and species of all existing trees having a trunk diameter of 8" or greater as measured at a point 4' above the ground. Designate trees to be removed or retained. When trees are to be retained, please put tree protection measures on both the Grading and Landscape plans.
- Take-off sheet table indicating square footage of landscaping. Indicate square footage of landscape islands in parking lot.
- Plant legend which includes:
  - Total percentage and square footage of landscaped areas.
  - Square footage of parking lot landscaping.
  - Common and botanical names of plants.
  - Quantity and spacing of plants.
  - Size of plants (caliper, height or container size).
  - Landscaping materials to be used (bark dust, river rock, etc.).
  - Notation on type of irrigation system (automatic underground or drip).
  - Replacement of topsoil.
  - Location of street trees.

PUBLIC FACILITIES PLAN:

- North arrow and scale of drawing (scale of 1":10', 1":20', 1":30').
- Correct lot area and lot line dimensions of the site. Correct location of Natural Resource Protection Overlay District, including greenways, wetland natural areas and open space natural areas, and 25' vegetated corridors adjacent to a sensitive area. Also show top of bank and centerline for rivers and creeks. Indicate if wetlands or greenways are proposed to be dedicated.
- Street - existing and proposed. Show centerline, right-of way lines, dimensions, sidewalks, and curbs, bike lanes, accessways, walkways, landscape strips, signalized intersections and nearby transit stops.
- Water - show existing and proposed water lines, fire hydrants, meters, line sizes, easements, public or private lines.
- Sanitary Sewer - existing and proposed. Sewer lines laterals, manholes and cleanouts, line sizes, easements, public or private line.
- Flood Plain - If applicable, show 100-year flood plain and/or floodway boundaries.
- Storm Sewer - existing and proposed. Storm lines, catch basins, manholes, line sizes, easement, public or private line.
- Calculations supporting the water quality facility design.
- Traffic Study Information - as required by City Engineer (5 copies).
- Identify greenway areas, bicycle paths and pedestrian paths.
- Location of all signs within the public right-of-way adjacent to the parcel.

EXHIBIT -12

GENERAL INFORMATION	
Site Address:	12540 SW LEVETON DRIVE
Assessor's Map and Tax Lot #:	NE 1/4 21 T2S R1W W.M.
Planning District:	(ML) LIGHT INDUSTRIAL
Parcel Size:	2.21 AC.
Property Owner:	DANA PROPERTIES, LLC
Applicant:	QG. ARCHITECTURE LLC
Proposed Use:	ONE STORY INDUSTRIAL BLDG.

ARCHITECTURAL REVIEW DETAILS		
Residential	☐ Commercial	☒ Industrial
Number of parking spaces:	57 SPACES	
Square footage of building(s):	35,728 SF (ONE-STORY)	
Square footage of landscaping:	16,028 SF (16.65%)	
Square footage of paving:	44,509 SF.	
Proposed density (for residential):	N/A	

For City Personnel to complete:
Staff contact person:

CITY OF TUALATIN FACT SHEET

General

Proposed use: ONE-STORY CONCRETE TILT-UP INDUSTRIAL BLDG W/ MULT-USE TENANTS (PROPOSED 4)			
Site area:	2.21 acres	Building footprint:	35,728 sq. ft.
Development area:	acres	Paved area:	44509 sq. ft.
	35,731 Sq. ft.	Development area coverage:	37.11 %

Parking

Spaces required (see TDC 73.400) *(example: warehouse @ 0.3/1000 GFA)* _____@1.6/1000 GFA = 57 _____@_____/1000 GFA = _____ _____@_____/1000 GFA = _____Total parking required: 57 spaces Handicapped accessible = 3 Van pool = 2 Compact = *(max. 35% allowed)* = Loading berths = 2	Spaces provided: Total parking provided: 57 spaces Standard = 52 Handicapped accessible = 3 Van pool = 2 Compact = 0 Loading berths = 6 BERTHS

Bicycles

Covered spaces required: 1 (ONE) 30% OF TOTAL REQ'D	Covered spaces provided: 4 TOTAL PROV'D (1) COVERED.

Landscaping

Landscaping required: 15 % of dvpt. area 14,440 Square feet	Landscaping provided: 10.65 % of dvpt. area 16,028 Square feet
Landscaped parking island area required: N/A %	Landscaped parking island area provided: N/A %

Trash and recycling facility (INDUSTRIAL/MANUF STANDARDS.

Minimum standard method: 143 square feet	35,726/1000 x 4 = 143 SF
Other method: PROVIDED: 684 SF. 21'-3 x 16' = 342' square feet	x 2 ENCLOSURES = 684 SF

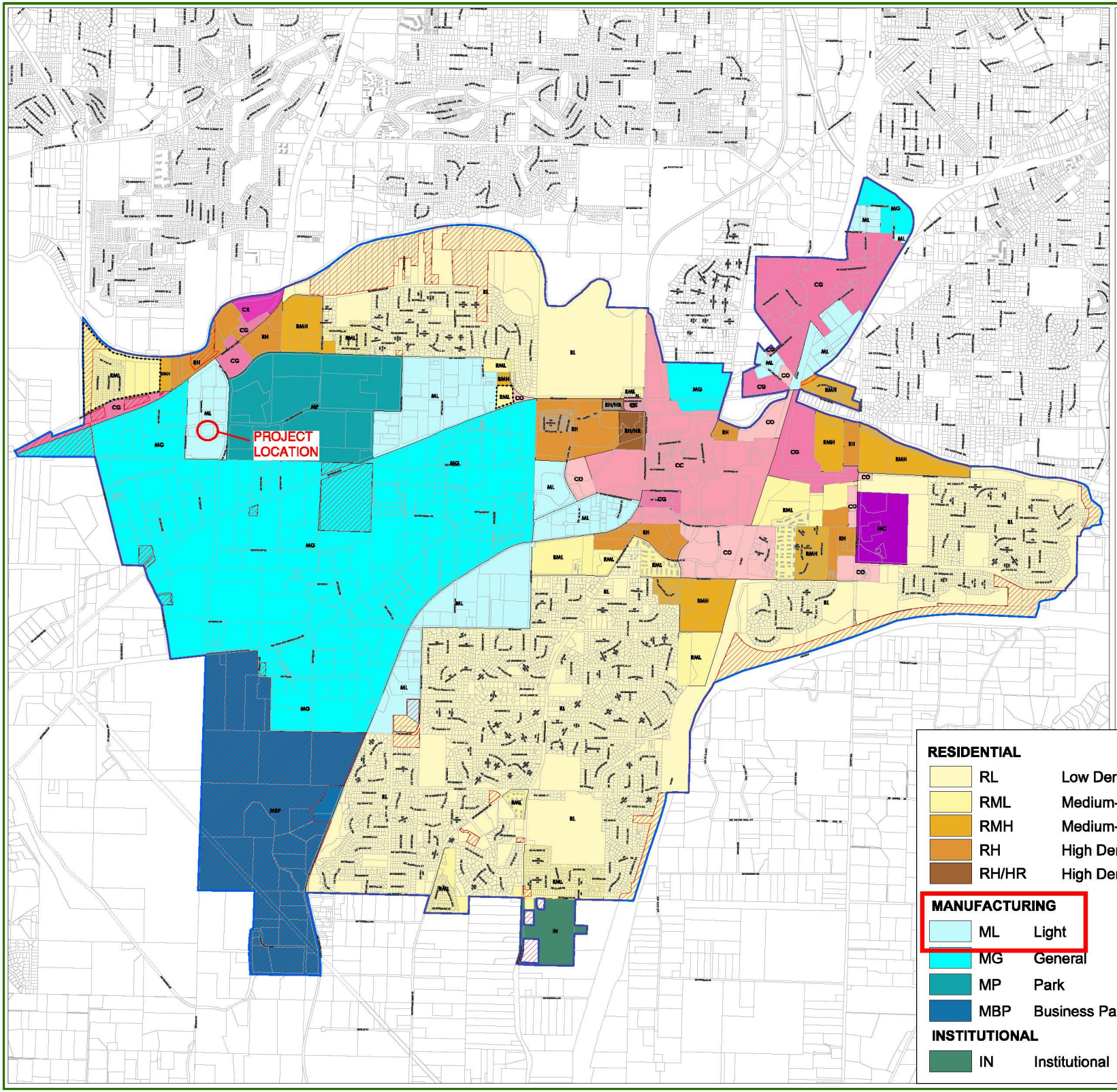
For commercial/industrial projects only

Total building area:	35,728 sq. ft.	2nd floor:	sq. ft.
Main floor:	35,728 sq. ft.	3rd floor:	sq. ft.
Mezzanine:	sq. ft.	4th floor:	sq. ft.

For residential projects only

Number of buildings:	N/A	Total sq. ft. of buildings:	N/A sq. ft.
Building stories:			

EXHIBIT 12A



TUALGIS

Community Plan Map -Planning Districts- Map 9-1

NOTES:

1. All plan designation boundaries are intended to follow property lines, center lines of streets, or can be scaled pursuant to the scale of this map. If mapping errors occur, the City Council shall be the sole arbitration body to decide the location of boundaries.

2. Specific requirements for each Planning District are found within the Tualatin Development Code.

3. The Wetland Protection District and the Greenway and Riverbank Protection District locations are described in the Tualatin Development Code. Maps of the districts are available from the Planning Department.

4. Properties within the Tualatin Urban Renewal Area boundary are subject to the Tualatin Urban Renewal Plan which may contain specifications and requirements that are more restrictive than those found within the Planning District standards.

- Planning Area Boundary
- Manufactured Dwelling Park Permitted
- City Boundary
- In Planning Area/ Outside of City

RF 1:9,600

Effective: May 14, 2014

RESIDENTIAL		DU/Acre
RL	Low Density	1-6.4
RML	Medium-Low Density	7-10
RMH	Medium-High Density	11-15
RH	High Density	16-25
RH/HR	High Density/High Rise	26-30

MANUFACTURING	
ML	Light
MG	General
MP	Park
MBP	Business Park

INSTITUTIONAL	
IN	Institutional

COMMERCIAL	
CO	Office
CC	Central
CG	General
CR	Recreational
MC	Medical Center

EXHIBIT-13

Clean Water Services

Clean Water Services File Number: 16-003679

Sensitive Area Pre-Screening Site Assessment

1. **Jurisdiction:** Tualatin

2. **Property Information** *(example 1S234AB01400)*
   Tax lot ID(s): 2S121A004000
   Site Address: 12540 SW LEVETON DR
   City, State, Zip: Tualatin Oregon, Oregon, 97229
   Nearest Cross Street: SW 124th Ave

3. **Owner Information**
   Name: Dave Flint - President
   Company: Inline Construction Company
   Address: PO Box 5837
   City, State, Zip: Aloha, OR, 97006
   Phone/Fax: 503642-5117
   E-Mail: Jacobf@inline-cc.com

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: New 30k-35k + light Industrial building w/curb cut

5. **Applicant Information**
   Name: Kevin Godwin
   Company: SG Architecture , LLC
   Address: 10940 SW Barnes Rd #364, Portland, Or 97225
   City, State, Zip: Portland, OR, 97225
   Phone/Fax: 503-201-0725
   E-Mail: kgodwin@sg-arch.net

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**

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 Kevin Godwin **Print/Type Title** Partner

ONLINE SUBMITTAL **Date** 10/3/2016

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. SEE LEVETON COMMONS NO.2 PLAT

Reviewed by Chuck Bichsel Date 10/3/16

EXHIBIT-14

REPUBLIC SERVICES

10295 SW Ridder Road, Wilsonville, OR 97070
O: 503.570.0626 F: 503.582.9307 rsginc.com

May 16, 2017

Kevin Godwin
SG Architecture, LLC
10940 SW Barnes Rd. #364
Portland OR 97225

Re: Leveton Industrial
Waste & Recycling Services

Dear Kevin;

Thank you, for sending me the drawings of the Industrial Building 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.

Thank you for increasing the sizes of the enclosures. They should be fine for my containers to fit in. While I do not like the prospect of my trucks having to back over 100' after service; hopefully with the loading docks at each end they will have some areas of sight and be free of encumbrances.

Thanks Kevin for your help and concerns for our services prior to this project being developed.

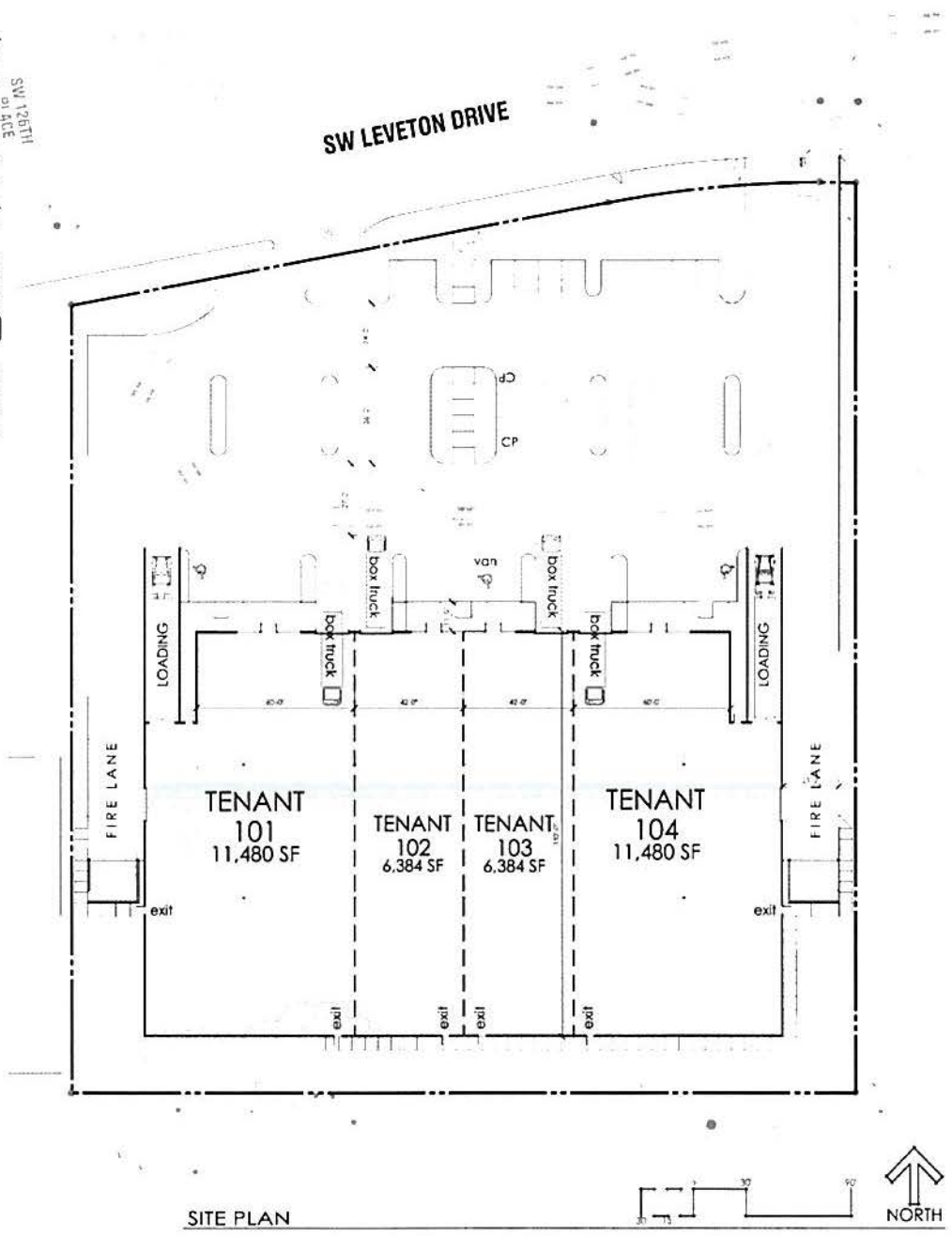
Sincerely,

Frank J. Lonergan

Frank J. Lonergan
Operations Manager
Republic Services Inc.

SITE DATA

Zoning		**ML - Light Industrial**	
Site Area :		**2.21 ACRES**	**96,286 S.F.**
	Min. Parking req'd		
Tenant 101:	18.37		11,480 S.F.
Tenant 102 :	10.21		6,384 S.F.
Tenant 103 :	10.21		6,384 S.F.
Tenant 104 :	18.37		11,480 S.F.
Total Building GLA (Gross) :	57.20		**35,728 S.F.**
Standard Parking Provided :			52 SPACES
Handicap Parking Provided :			3 SPACES
Vanpool Parking Required :	(1/25 spaces)		2 SPACES
Total Parking Area :			**57 SPACES**
Parking Ratio :	1.60 / 1,000 SF		**1.60 SPACES/1,000 S.F.**
Site Coverage:			**37.11%**
Landscape Coverage :	15% min.		**TBD**
Loading Required :	(2) required -25k-60k		**2 spaces**



SITE PLAN

SGA

LEVETON INDUSTRIAL
SW Leveton Drive & SW 124th Ave.
Tualatin, Oregon

Inline Commercial Construction, Inc.
PO Box 5837
Aloha, Or 97075

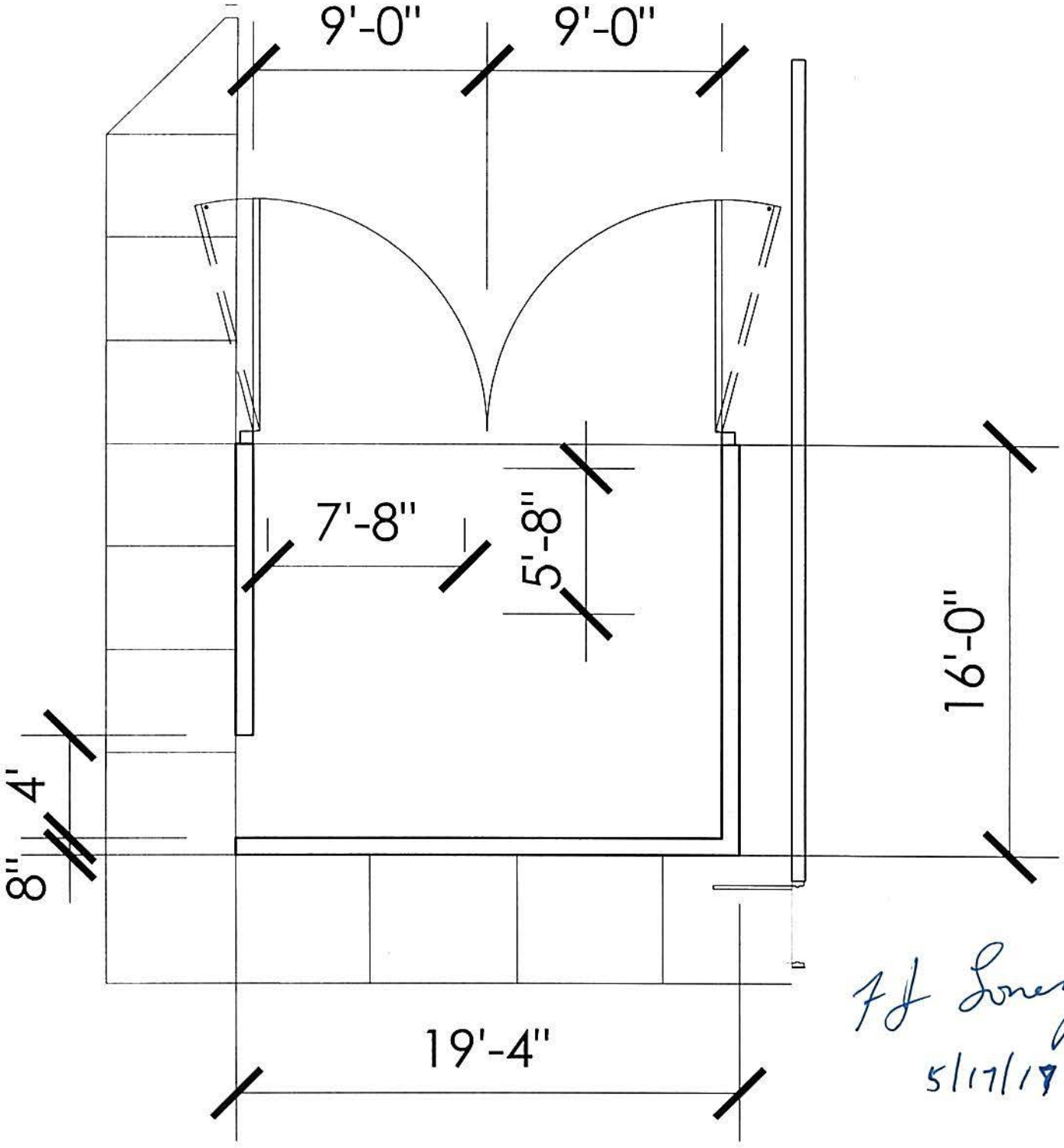
PROJECT NUMBER
16-111

DATE

DRAWN BY
KG

SITE PLAN

SP-AR



F J Lonergan
5/17/19

EXHIBIT-15

Reply all | Delete Junk | •••

RE: Leveton Industrial

DM

Darby, Ty M. <Ty.Darby@tvfr.com>
Today, 9:19 PM
Kevin Godwin

Reply all |

Inbox

You replied on 5/24/2017 10:56 PM.

Hi Kevin,

Sorry for the delay… I'm on military leave for a few weeks. Based on what I've seen so far and our phone conversations things look good so far. If your submitting for AR with the City, the plans will get routed to me again for review. Generally, I submit a boiler-plate type letter back to the City after my review which states TVF&R's requirements and conditions for access and water supply. If you need something now, this email is public record and should suffice.

Let me know if you need something more formal.

Thank you,

Ty

Ty Darby | Deputy Fire Marshal
Tualatin Valley Fire & Rescue
Direct: 503-259-1409
www.tvfr.com

From: Kevin Godwin [mailto:kgodwin@sg-arch.net]
Sent: Monday, May 15, 2017 11:21 AM
To: Darby, Ty M. <Ty.Darby@tvfr.com>
Cc: Scot Sutton <ssutton@sg-arch.net>
Subject: Leventon Industrial

Hello Ty-
We have finalized our site plan and had our neighborhood meeting. Could you now please provide us with a letter stated that TVFD is in approval with our site design layout. We are looking to submit late next week for the City's AR review and you letter is a requirement for our submittal. Please call me if you have any questions and the site plan hasn't changed since we last spoke.

Thanks!

Kevin Godwin | SG Architecture, LLC
10940 SW Barnes Rd #364 | Portland OR 97225 | **503-201-0725**

Reply all | Delete Junk | •••

EXHIBIT-16

First American Title Insurance Company
NATIONAL COMMERCIAL SERVICES

National Commercial Services
200 SW Market St - Portland, OR 97201
Phone: 866-747-3372 Fax: 866-879-4491
Email: cs.cimmercial@firstam.com
Today's Date : 3/6/2017

OWNERSHIP INFORMATION

Owner	: **Dana Properties LLC**
CoOwner	:
Site Address	: 12540 SW Leveton Dr Tualatin 97062
Mail Address	: PO Box 5837 Aloha Or 97006
County	: Washington (OR)

Bldg #	Of
Ref Parcel Number	: 2S121A0 04000
Parcel Number	: R2141835
T: 02S R: 01W S: 21 Q: NE QQ:	

PROPERTY DESCRIPTION

Map Page Grid	:
Census Tract	: 320.01 Block: 1
Neighborhood	: YTSH
School District	: SHERWOOD
Subdivision/Plat	:
Improv Type	:
Property Use	:
Land Use	: 2300 Com,Highest & Best Use,Ind Zone
Legal	: LEVETON COMMONS NO.2, LOT 8, ACRES : 2.21 :

ASSESSMENT AND TAX INFORMATION

Mkt Land	: $553,540
Mkt Structure	:
Mkt Total	: $553,540
%Improved	:
M50AssdTotal	:
Levy Code	: 08815
16-17 Taxes	: $9,571.48
Millage Rate	: 17.5403
Zoning	: MI

PROPERTY CHARACTERISTICS

Bedrooms	:	BldgSqFt	:	Year Built	:
Bathrooms	:	1stFlrSqFt	:	Total Units	:
Family Room	:	2ndFlrSqFt	:	LotAcres	: 2.21
Kitchen	:	AtticSqFt	:	LotSqFt	: 96,268
Dining Room	:	BsmtFinSqFt	:	Lot Dimen	:
Utility Room	:	BsmtUnFinSqFt	:	Curb/Gutter	:
Living Room	:	BsmtTotalSqFt	:	StAccess	:
Other Rooms	:	TotalLvgSqFt	:	Paving Matl	:
Floor Cov	:	GarageSqFt	:	ElecService	:
Fireplace	:	GarageSpaces	:	Nuisance	:
Cooling	:	GarageType	:	Sewer	:
Heat Method	:	Patio SqFt	:	View Qlty	:
Heat Source	:	Patio	:	Foundation	:
WallMaterial	:	Deck SqFt	:	Roof Mat	:
Water Source	:	Deck	:	Roof Shape	:
Bldg Style	:	Stories	:	Const Type	:

TRANSFER INFORMATION

Owner Name(s)	Sale Date	Doc#	Sale Price	Deed Type	Loan Amount	Loan Type
:Dana Properties LLC	:07/30/2007	83170	:$757,000	:Warranty	:$492,050	:Conventi
:	:		:	:	:	:
:	:		:	:	:	:
:	:		:	:	:	:
:	:		:	:	:	:
:	:		:	:	:	:

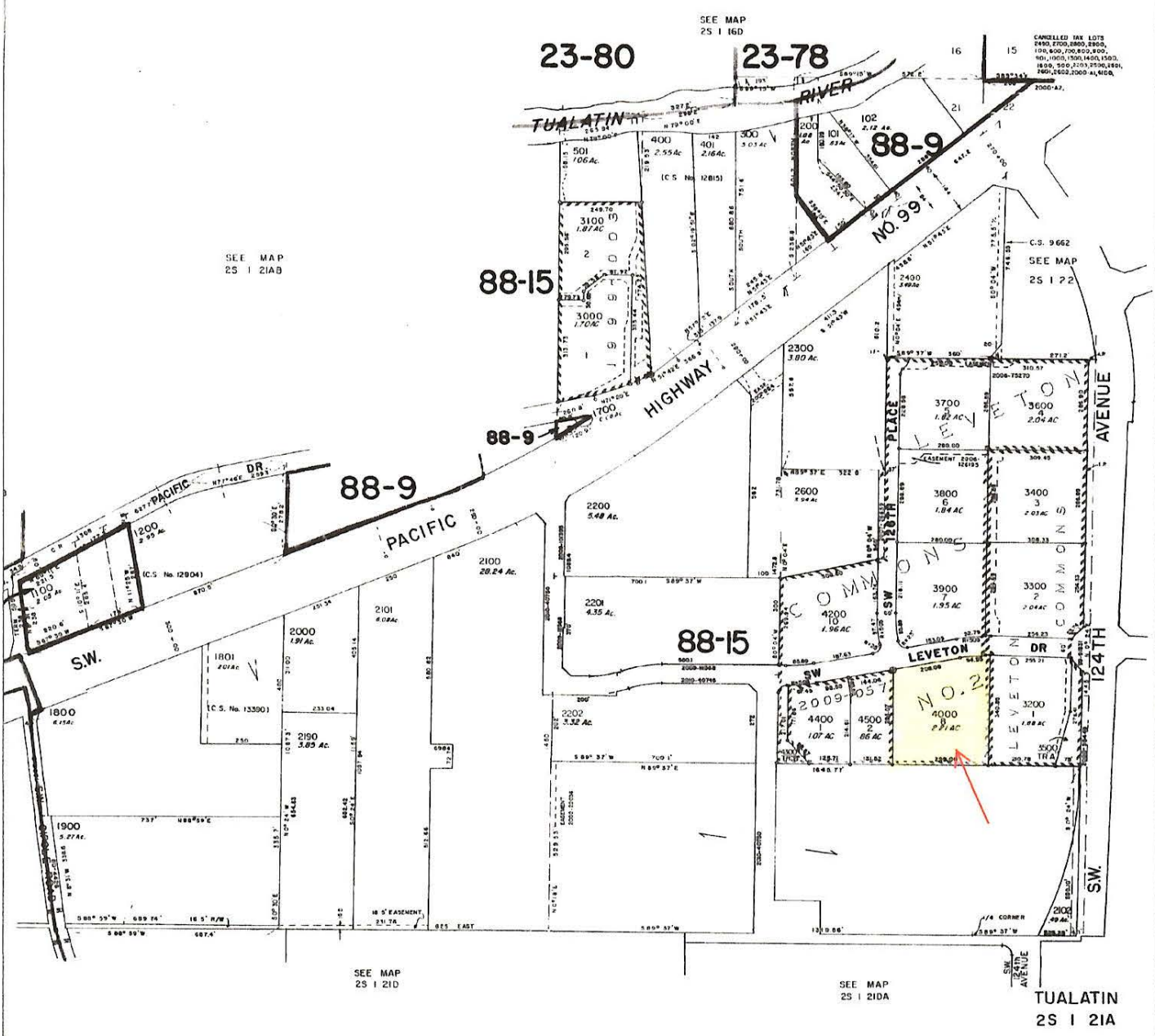
NE 1/4 SECTION 21 T2S R1W W.M.

WASHINGTON COUNTY OREGON

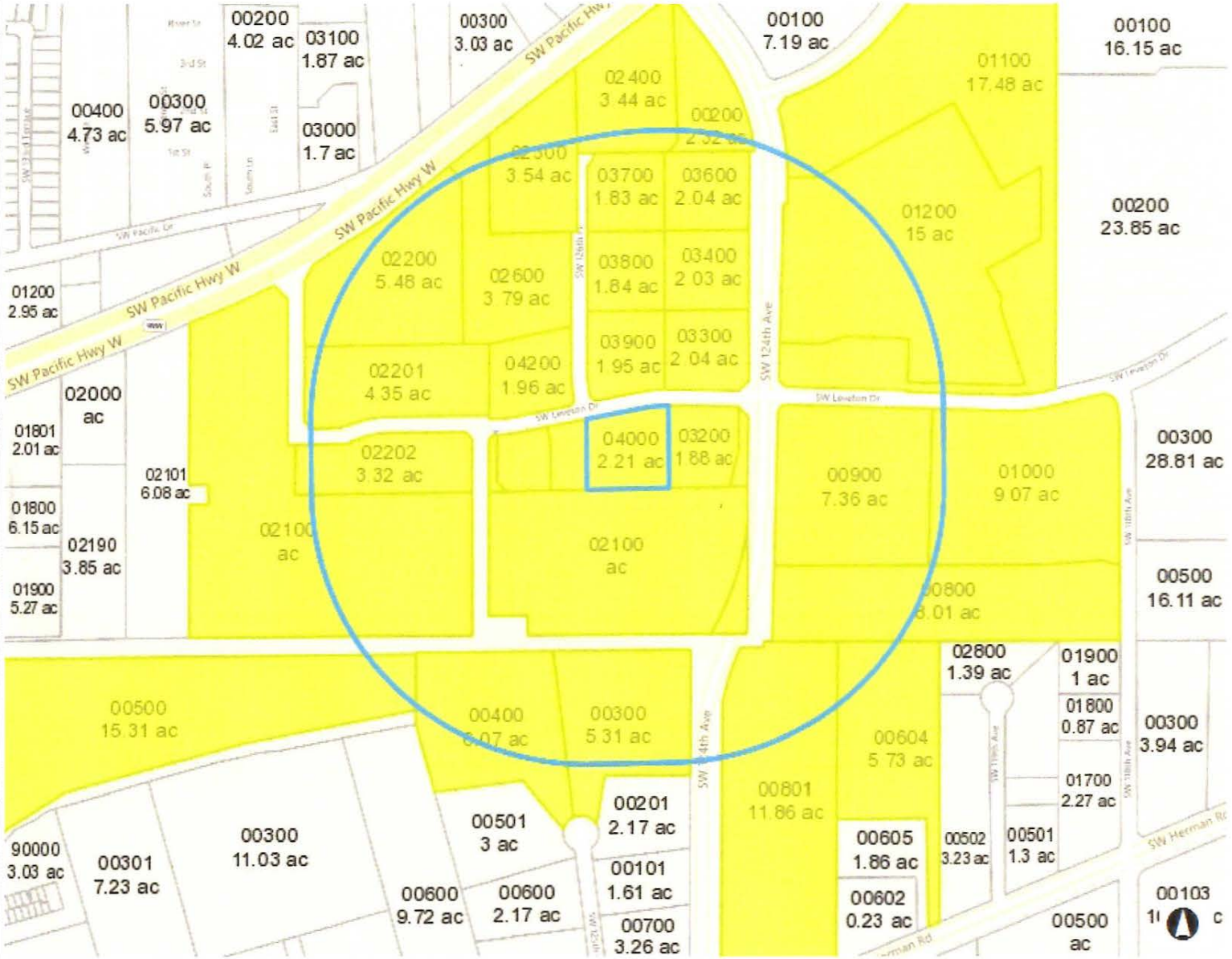
SCALE 1" = 200'

FOR ASSESSMENT PURPOSES ONLY
DO NOT RELY ON FOR ANY OTHER USE

2S 1 21A



1000' Radius around 12540 SW Leveton Dr



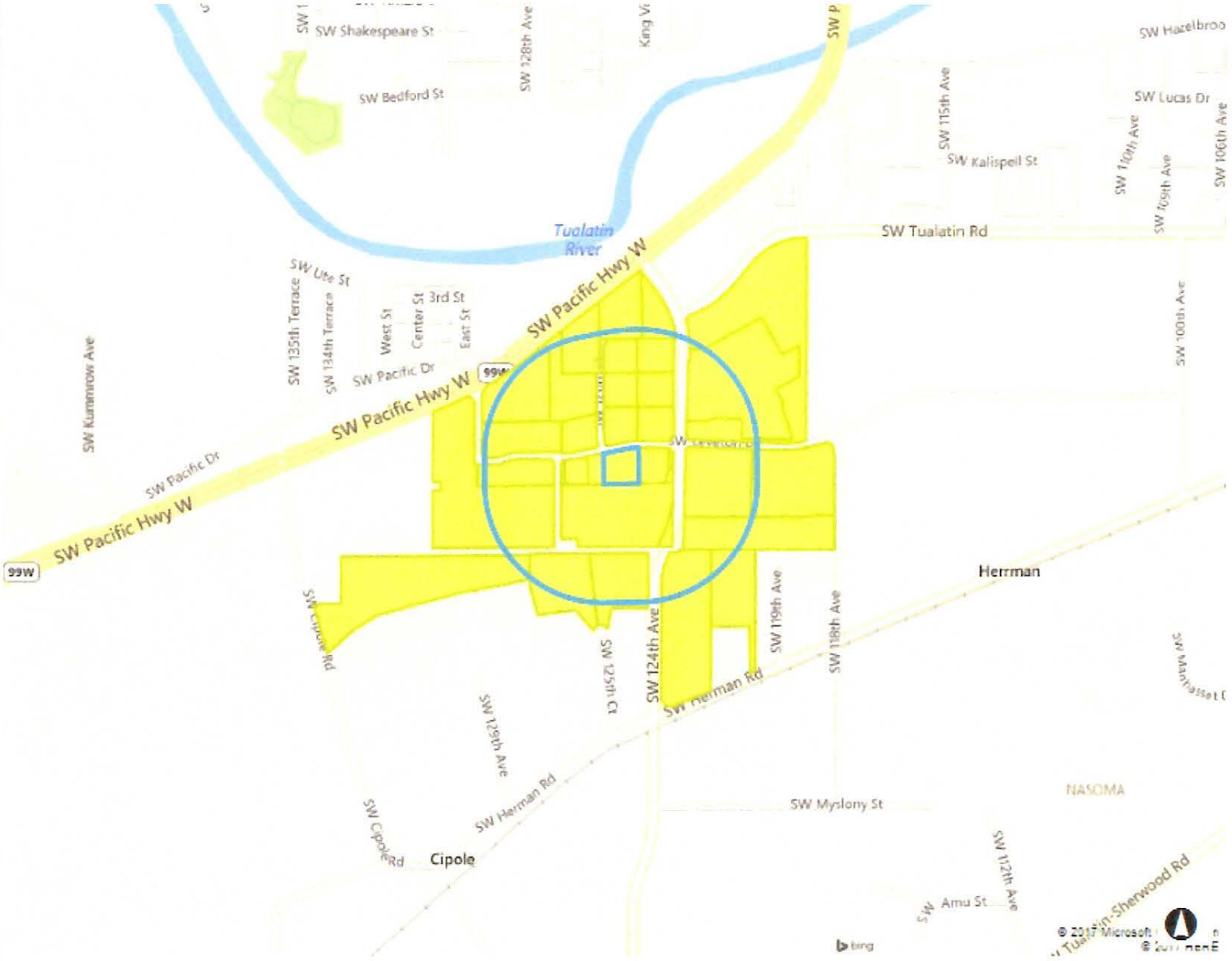
First American Title™

Taxlot

3/6/2017

Notes

1000' Radius around 12540 SW Leveton Dr



First American Title™

Taxlot

3/6/2017

Notes

0.7 0 0.33 0.7 Miles

EXHIBIT-17

GEOTECHNICAL ENGINEERING REPORT

Proposed Light Industrial Building
12540 SW Leveton Drive
Tualatin, Oregon

Prepared for:

Inline Commercial Construction
18880 SW Shaw Street
Aloha, Oregon 97007

Prepared by:

Professional Service Industries, Inc.
6032 North Cutter Circle, Suite 480
Portland, Oregon 97217

May 17, 2017

PSI PROJECT NO. 07041016

May 17, 2017

Inline Commercial Construction
18880 SW Shaw Street
Aloha, Oregon 97007

Attention: Mr. Jacob Flint
Senior Project Manager
(503) 642-5117
jacobf@inline-cc.com

Subject: Geotechnical Engineering Report
Proposed Light Industrial Building
12540 SW Leveton Drive
Tualatin, Oregon
PSI Project No. 07041016

Dear Mr. Flint:

Professional Service Industries, Inc. (PSI) is pleased to submit this geotechnical engineering report for the proposed light industrial building to be located near the intersection of SW Leveton Drive and SW 124th Avenue in Tualatin, Oregon. This report summarizes the work accomplished and provides PSI's recommendations for design and construction of the proposed project. PSI performed the requested geotechnical engineering services in general accordance with PSI proposal No.: 0704-192104R2.

We thank you for choosing us as your consultant for this project. Please contact the undersigned at (503) 289-1778, if you have any questions or we if may be of further service.

Respectfully Submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.

EXPIRES: 6-30-2017

Jonathan D. Bunch, EI
Staff Engineer

Mike Kath
Project Engineer

Reviewed by Michael Place, PE, Principal Consultant

TABLE OF CONTENTS

FIGURES

LIST OF APPENDICES

1 PROJECT INFORMATION

1.1 PROJECT AUTHORIZATION

This report presents the results of our geotechnical investigation performed for the proposed light industrial building to be located at 12540 SW Leveton Drive in Tualatin, Oregon (see Figure 1, *Site Vicinity Map*). This exploration was performed for Inline Commercial Construction (Inline), in general accordance with PSI Proposal No. 0704-192104R2, revised October 21, 2016. PSI's services were authorized by Mr. Jacob Flint with Inline on October 24, 2016.

1.2 PROJECT DESCRIPTION

Project information was provided to PSI by Mr. Jacob Flint via email on August 23, 2016, October 5, 2016, and October 17, 2016. PSI was provided with the following documents:

- An undated drawing titled "*D. Leveton Corp.*", which generally depicts the proposed site plan, areas of heavy traffic, and proposed test drilling locations.

PSI understands that Inline is planning on developing an approximately 2.37-acre tract of land situated at 12540 SW Leveton Drive in Tualatin, Oregon. PSI understands that building is to be a single-story, light industrial and manufacturing facility, with no basement level, and is anticipated to measure approximately 33,000 square feet in plan area. PSI understands that the building design is not complete, and a second story may be part of the final design. PSI understands that the building is to be constructed with concrete tilt-up panels, steel roof joists and columns, and a slab-on-grade floor system. PSI understands that the project will include appurtenant asphaltic concrete and Portland cement concrete pavement to support truck traffic. Truck docks will be constructed near the east and west sides of the building.

PSI understands the building will be set back approximate 20 to 30 feet from the south property line and slope. PSI understands a detention basin may be constructed in this area for site run-off.

Structural loads were not provided to us; however, based on our understanding of these types of projects, we anticipate the maximum column and wall loads to be on the order of 250 kips and 5 kips per linear foot, respectively. Traffic volumes were not provided to PSI; however, it is anticipated that traffic will generally consist of heavy trucks and passenger cars.

Should any of the above information or assumptions made by PSI be inconsistent with the planned construction, it is requested that you contact us immediately to allow us to make any necessary modifications to this report.

1.3 PURPOSE AND SCOPE-OF-SERVICES

The purpose of this exploration was to evaluate the subsurface conditions at the site and to develop geotechnical design criteria for support of foundations for the planned project. The scope of the exploration and analysis included a reconnaissance of the project site, completion of Cone Penetration Test (CPT) soundings, completion of geophysical testing, laboratory testing of selected subsurface samples, an engineering analysis and evaluation of the subsurface materials encountered, and the preparation of this report.

As directed by the client, PSI did not provide any service to investigate or detect the presence of moisture, mold or other biological contaminates in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence of the amplification of the same. Client acknowledges that mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. Client further acknowledges that site conditions are outside of PSI's control, and that mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, PSI cannot and shall not be held responsible for the occurrence or recurrence of mold amplification.

1.3.1 FIELD EXPLORATION PROGRAM

PSI investigated the subsurface materials and conditions on November 7, 2016. The field activities consisted of 4 Cone Penetration Tests (CPTs), geophysical testing using refraction microtremor (ReMi) methods, and infiltration testing (see Figure 2, *Site Exploration Map* for approximate locations of explorations). The CPTs were performed by Oregon Geotechnical Explorations, Inc. (OGE) and are designated as CPT-01 through CPT-04.

The planned depth of CPT-01 was to 60 feet below existing ground surface (bgs), , and the planned depths of CPT-02 through CPT-04 were to 30 feet bgs. The final depths of CPT-02 through CPT-04 ranged between about 30½ and 31 feet bgs. CPT-01 was extended to a depth of approximately 60 feet bgs. Two porewater dissipation tests were performed at the locations of CPT-01 and CPT-03 at depths of approximately 20 feet bgs. The results of the dissipation tests indicate static groundwater at depths of about 11 and 13 feet bgs at the locations of CPT-01 and CPT-03, respectively.

PSI collected bulk samples of the near-surface soils at the locations, designated GP-01 through GP-04, using a direct-push geoprobe. The geoprobe sampling was extended to depths of approximately 10 feet bgs at the locations indicated on Figure 2. The samples were sealed in airtight containers and transported to our laboratory for further examination and testing.

The soil profiles shown on the CPT and geoprobe logs represent the conditions only at actual exploration locations. Variations between exploration locations may occur and should be expected. The stratifications represent the approximate boundary between subsurface materials; the actual transitions may be gradual.

Cone Penetration Test with Pore-Pressure Readings (CPTu)

CPTu is an in-situ testing method used to determine the geotechnical engineering properties of soils and to delineate soil lithology. CPTu data is commonly used in the analysis and design of foundations. CPTu probing is a fast and cost-effective method for identifying subsurface soil types and evaluating the engineering properties of soils.

During a CPTu, the electric cone (tip angle 60°, section area 10 cm²) and the sounding rods are pushed continuously into the ground. Intermittent measurements of the cone resistance (q_c), sleeve friction (f_s), and pore pressure (u) are measured and recorded by the electric cone while it is being pushed into the ground. The measurements from a CPTu can be used to correlate a multitude of geotechnical parameters, including:

- Effective friction angle (φ', degree)
- Coefficient of consolidation (C_v, cm^2/sec)
- Overconsolidation Ratio (OCR)
- Undrained shear strength (s_u)

The results of the measured and correlated data are used in various geotechnical analyses, including: soil behavior type, soil bearing capacity, estimated settlement, liquefaction settlement, lateral spread, foundation-design criteria, slope stability, and seismic site class.

Refraction Microtremor (ReMi)

One Refraction Microtremor (ReMi) array was performed at the project site. The ReMi method uses standard P-wave recording equipment and ambient noise to determine shear-wave velocities. The equipment used for our ReMi evaluation included a Seismic Source DAQLink III 24-Bit ADC acquisition system and STC-85 - SM-4 10-hertz geophones developed by Seismic Source Technology. Field acquisition of the data incorporated 24 geophone locations with equal spacing of 12 feet. Data was recorded at various sample intervals and various sampling rates per channel at gains of 1 and 16. SeisOpt ReMi Version 4.0 (Vspect and Disper modules) software developed by Optim LLC was used to process the collected data, and to create shear wave velocity profiles. To provide a robust data profile, both individual recordings and multiple summed (stacked) recordings were evaluated.

Each individual record of the traces is pre-processed to reduce or eliminate anomalies in the raw data. The data is then processed to produce a velocity spectrum. This process involves computing a surface wave, phase velocity dispersion spectral ratio image by p-tau and Fourier transforms across the array. This process is described in the document titled, "*Faster, Better: Shear-wave Velocity to 100 Meters Depth from Refraction Microtremor Arrays*", Bulletin of the Seismological Society of America by Louie, J, N. (2001). The resulting spectrum is in the slowness-frequency (p-f) domain. The p-f transformation helps segregate the Rayleigh Wave arrivals from other surface waves,

body waves, sound waves, etc. The p-f image is generated for each record, and a final p-f image for each test is generated by combining some, or all, of the individual images.

The fundamental mode dispersion curve on the final p-f image can be seen as a distinct trend from the aliasing and wave-field transformation truncation artifact trends in the spectra. Once the fundamental mode dispersion curve is visually interpreted, data points along this curve are picked. Using the picked data points, an interactive forward-modeling process is used to model a shear wave velocity profile, with a resulting dispersion curve that approximately matches the picked data points. The process and resulting velocity profiles are able to identify the various velocity layers in the subsurface, including velocity inversions within the profile.

The results of the ReMi testing indicates that the weighted-average shear wave velocity in the upper 100 feet of the project site (VS_{100}) is approximately 924 feet per second (i.e., the weighted-average shear wave velocity in the upper 30 meters of the project site [VS_{30}] is approximately 282 meters per second). These results indicate that the project site is classified as a Site Class “D”, in accordance with ASCE 7-10.

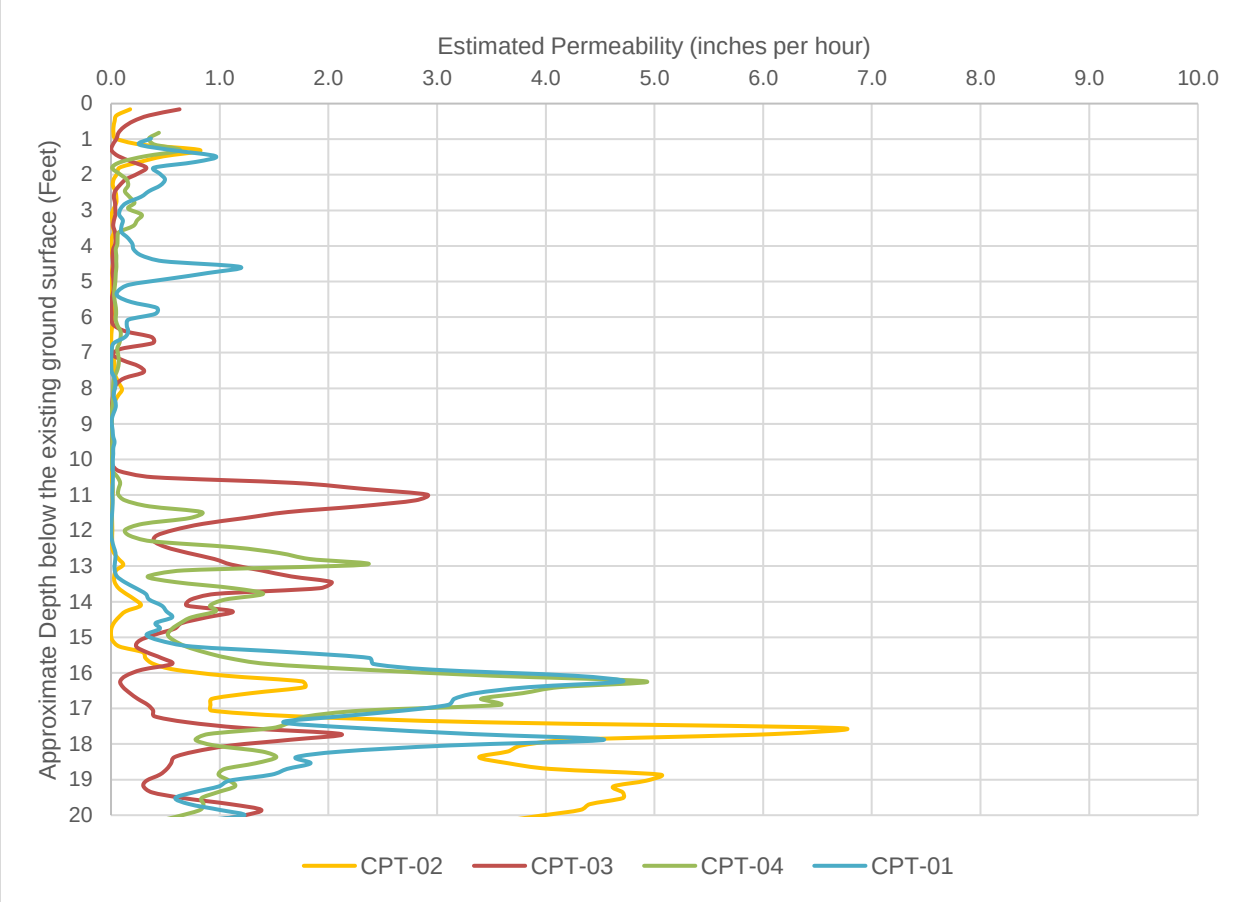
Infiltration Testing

PSI performed the infiltration test by embedding a 2-inch diameter PVC pipe approximately 6 inches into the bottom of the geoprobe hole at a depth of approximately 5 feet bgs. Open-graded gravel was placed in the bottom of the test pipes to reduce the potential for siltation. A water-level data logger was installed near the bottom of the PVC pipe, and water was added to the pipe. The water-level data logger detected changes in water level based on the amount of head, expressed in pounds per square inch (psi), as the water level in the test locations decreased due to infiltration into the soils below the test locations.

PSI retrieved the water-level data logger from the infiltration test location and analyzed the data. Based on the infiltration analysis and the CPT data, PSI anticipates that the soil beneath the infiltration test location is impermeable, with an estimated average infiltration rate of less than 0.1 inches per hour. PSI’s infiltration test was observed over several days, and during this time a precipitation event occurred, which may have contributed to the poor infiltration rate. It is recommended that additional infiltration studies be performed at the site during the dry season of the year.

PSI estimated the infiltration rate within the upper 20 feet was estimated utilizing the guidelines in the document titled, “*Guide to Cone Penetration Testing for Geotechnical Engineering*” by P.K. Robertson and K.L. Cabal, 6th Edition, 2015. The following graph depicts the estimated permeability in inches per hour within the upper 20 feet at each boring location. PSI’s measured infiltration rate is within the estimated range of the interpretation of the CPT data.

Graph 1: Estimated Permeability from CPT Data (Upper 20 feet)



Sampling Procedures

PSI collected bulk samples of the near-surface soils using a direct-push geoprobe. The geoprobe sampling was extended to depths of approximately 10 feet bgs at the 4 approximate locations indicated on Figure 2. The samples were sealed in airtight containers and transported to our laboratory for further examination and testing.

1.3.2 LABORATORY TESTING PROGRAM AND PROCEDURES

Soil samples obtained during the field explorations were examined in our laboratory. The physical characteristics of the samples were noted and the field classifications were modified, where necessary, in accordance with terminology presented on the General Notes included in Appendix B.

Representative samples were selected during the course of the examination for further testing. The laboratory test procedures are summarized below. The results of our laboratory testing are summarized on the geoprobe logs in Appendix B, and detailed in Appendix C, *Laboratory Test Results.*

Visual-Manual Classification

The soil samples were classified in general accordance with guidelines presented in ASTM D2488. Certain terminology incorporating current local engineering practice, as provided in the Soil Classification Chart, included with, or in lieu of, ASTM terminology. The term which best described the major portion of the sample was used in determining the soil type (i.e., gravel, sand, silt or clay).

Moisture Content

Natural moisture content determinations were made on fine-grained soil samples. The natural moisture content is defined as the ratio of the weight of water to the dry weight of soil, expressed as a percentage. The results of the moisture content determinations are presented on the geoprobe logs in Appendix B.

Sieve Analysis by Washing

The determination of the amount of material finer than the U.S. Standard No. 200 (75-µm) sieve was made on selected soil samples in general accordance with guidelines presented in ASTM C117. In general, the sample is dried in an oven and then washed with water over the No. 200 sieve. The mass retained on the No. 200 sieve is dried in an oven, and the dry weight recorded. Results from this test procedure assist in determining the fraction, by weight, of coarse-grained and fine-grained soils in the sample.

Atterberg Limits

The Atterberg Limit is defined by the liquid limit (LL) and plastic limit (PL) states of a given soil. These limits are used to determine the moisture content limits where the soil characteristics changes from behaving more like a fluid on the liquid limit end to where the soil behaves more like individual soil particles on the plastic limit end. The liquid limit is often used to indicate if a soil is a low or high plasticity soil. The plasticity index (PI) is difference between the liquid limit and the plastic limit. The plasticity index is used in conjunction with the liquid limit to assess if the material will behave like a silt or clay. The material can also be classified as an organic material by comparing the liquid limit of the natural material to the liquid limit of the sample after being oven-dried.

2 SITE AND SUBSURFACE CONDITIONS

2.1 SITE DESCRIPTION

The project site is located in Tualatin, Oregon, approximately 550 feet to the southwest of the intersection of SW Leveton Drive and SW 124th Avenue. The site is currently vacant and the surface of the site is covered with long grass and vegetation. A wetland area is located to the south of the project site, and standing water was observed at the surface of the site near this area.

The site is bordered by SW Leveton Drive and a commercial building to the north, SW 124th Avenue and a commercial building to the east, trees and a wetland area to the south, and a commercial building to the west.

2.1.1 TOPOGRAPHY

Based on available topographic information and our site investigation, PSI anticipates that the project site slopes gently up to the north, with grade changes across the project site on the order of 5 feet. PSI was not provided with a topographical map of the project site; however, based on data obtained from Google Earth Pro, the southern portion of the project site slopes down toward a wetland area at an approximate slope ranging between about 3H:1V to 2H:1V. The height of the slope is on the order of 5 to 8 feet from crest to toe.

2.1.2 GEOLOGY

Based on available geologic information, PSI anticipates that the site is underlain by “Alluvium and glacial-outburst flood sediments (Qs)”, which are generally described as silt, sand, and gravel deposited mainly by late Pleistocene glacial-outburst floods. Additionally, this area may also be underlain by glaciofluvial sediments from the Cascade Range and Willamette Silt.

2.1.3 LOCAL FAULTING AND SEISMIC DESIGN PARAMETERS

PSI has reviewed the USGS Quaternary Fault and Fold Database of the United States. Table 1 summarizes distance and names of the closest mapped faults within about 25 miles (40 kilometers) of the project site.

Table 1: Summary of Published, Nearby Faults

Fault Name	Approximate Distance and Direction from the Site
Canby-Molalla Fault	2.3 miles northeast
Beaverton Fault Zone	6.8 miles north
Oatfield Fault	7.6 miles northeast
Portland Hills Fault	9.6 miles northeast
Newberg Fault	10.0 miles southwest
Damascus-Tickle Creek Fault	12.2 miles northeast
Helvetia Fault	12.3 miles northwest
East Bank Fault	12.5 miles northeast
Gales Creek Fault Zone	13.6 miles west
Mount Angel Fault	15.8 miles south
Lacamas Lake Fault	24.5 miles northeast

The contribution of potential earthquake-induced ground motion from all known sources, including the faults listed above, are included in the probabilistic ground motion maps developed by the USGS. The risk-targeted design parameters are presented in accordance with the 2014 Oregon Structural Specialty Code (OSSC), the 2012 International Building Code (IBC), and ASCE 7-10. The mapped spectral accelerations given below are based on a seismic event having a 2% probability of exceedance in 50 years.

Based upon our evaluation, the site is potentially liquefiable and is consistent with the characteristics of a Site Class “F” as defined in Table 20.3-1 of ASCE 07-10. However, the exception in Section 20.3.1 of ASCE 07-10 permits the Site Class to be determined in accordance with Section 20.3, provided the proposed structures will have fundamental periods of vibration equal to or less than ½ second, and the corresponding values of Fa and Fv may be determined from Tables 11.4-1 and 11.4-2. Based on this exception, if the fundamental period of vibration is less than or equal to ½ second, the seismic site class can be determined based on shear wave velocities determined from our ReMi testing. Based on our ReMi data the shear wave velocities for the site appear to conform to the characteristics of a Site Class “D”. Seismic design values for the project site are provided in Table 2:

Table 2: Seismic Design Parameters
(45.38439°, -122.80609°) – SITE CLASS "D"

Period (seconds)	Mapped Spectral Acceleration Parameters (g)	Site Coefficients	Adjusted Spectral Acceleration Parameters (g)	Design Spectral Acceleration Parameters (g)	Period, T (sec)
0.0 (PGA)	PGA = 0.415	F_{PGA} = 1.085	PGA_M = 0.450	—	—
0.2 (S_s)	S_s = 0.946	F_a = 1.122	S_{ms} = 1.061	S_{Ds} = 0.707	T_0 = 0.125
1.0 (S_1)	S_1 = 0.418	F_v = 1.582	S_{m1} = 0.661	S_{D1} = 0.441	T_s = 0.624

Notes: PGA_M = Maximum considered earthquake geometric mean peak ground acceleration adjusted for Site Class effects
S_S = Short period (0.2 second) Mapped Spectral Acceleration
S_1 = 1.0 second period Mapped Spectral Acceleration
S_{MS} = Spectral Response adjusted for site class effects for short period = F_a • S_S
S_{M1} = Spectral Response adjusted for site class effects for 1-second period = F_v • S_1
S_{DS} = Design Spectral Response Acceleration for short period = 2/3 • S_{MS}
S_{D1} = Design Spectral Response Acceleration for 1-second period =2/3 • S_{M1}
F_a = Short Period Site Coefficients
F_v = Long Period Site Coefficients
T_0 = 0.2 • S_{D1} / S_{Ds}
T_s = S_{D1} / S_{Ds}

2.2 SUBSURFACE CONDITIONS

The surface of the site is predominantly covered with long grass and vegetation. At the time of our site exploration on November 7, 2016, the southern portion of the project site was observed to have standing water at the surface. A site visit that occurred on November 28, 2016, indicated standing water over the majority of the project site. A wetland area is located approximately 200 feet to the south of the proposed building structure. Based on the pore water dissipation tests performed on November 7, 2016, we anticipate groundwater to be located in the upper 10 to 15 feet of existing ground surface.

Underlying the surficial material and based on visual classification of the bulk geoprobe samples, PSI generally encountered silt with varying amounts of sand at the locations of GP-01, GP-02, and GP-04, to depths of approximately 10 feet bgs. Based on the CPT data, the consistency of these upper materials is generally soft to very stiff, with an average side friction ranging between about ¼ to 5½ tons per square foot (tsf). The upper materials at the location of GP-03 generally consisted of lean clay with sand to a depth of approximately 10 feet bgs. Based on the CPT data, the consistency of the clayey material was generally medium stiff to stiff, with side friction ranging between about ½ to 5½ tsf.

Based on the Soil Behavior Type (SBT), the upper materials were generally underlain by interbedded layers of medium dense sand, silty sand, and sandy silt to the completion depths of the soundings, between approximately 30 and 60 feet bgs.

2.2.1 GROUNDWATER INFORMATION

Based on the results of the pore-pressure dissipation tests during our investigation, PSI estimates groundwater at depths between approximately 10 to 13 feet bgs. Table 3 below summarizes the depth of groundwater and the elevation of groundwater encountered at both CPT locations.

Table 3: Depth and Elevation of Groundwater Encountered at CPT Locations

CPT Location	Approximate Elevation* (Feet above MSL)	Approximate Depth to Groundwater (Feet BGS)	Approximate Groundwater Elevation* (Feet above MSL)
CPT-01	145	11	134
CPT-03	147	13	134

*Elevations were estimated using Google Earth Pro
MSL – mean sea level
BGS – Below Existing Ground Surface

Groundwater levels on this site are likely to vary based on seasonal conditions and precipitation. Fluctuations in groundwater levels should be anticipated.

2.2.2 SOIL LIQUEFACTION POTENTIAL AND SETTLEMENT

Soil liquefaction is a mechanism by which loose, saturated, granular materials, such as sands and low-plasticity silts, temporarily lose strength during and immediately after a seismic event. Liquefaction occurs when saturated granular soils are subjected to cyclic loading, which distorts the soil structure and causes loosely packed groups of particles to collapse, increasing pore water pressure in the soil mass. As pore water pressure increases, the soil begins to lose strength and may even behave as a viscous liquid in the most extreme cases. As strength is lost, there is an increased risk of settlement, and an increased risk of lateral spreading and/or slope instability on sloping sites.

According to the Oregon Department of Geology and Mineral Industries (DOGAMI) IMS-1, the project site is mapped as Liquefaction Hazard Category 3 for relative liquefaction hazards, which indicates that there may be greater than 30 feet of “liquefiable material”, and that the groundwater table is less than 15 feet below the ground surface.

A liquefaction settlement screening for the site has been completed. Based on PSI’s analyses of the field exploration results, it is estimated that settlement due to liquefaction will be on the order of 2½ to 4 inches in a major earthquake (i.e., an earthquake with a moment magnitude M_w of 7.7 and an acceleration of 0.57g, based on the peak ground acceleration (PGA_M) from the deaggregation of the USGS probabilistic seismic hazard analysis for 2% exceedance in 50 years.

3 CONCLUSIONS AND RECOMMENDATIONS

The subsurface explorations indicate that the site is predominantly covered at the surface by long grass and vegetation, and underlain by approximately 10 feet of silt with varying amounts of sand and lean clay with sand, which is predominantly underlain by sand, silty sand, and sandy silt to depths of approximately 30 to 60 feet bgs.

It is PSI's opinion that the proposed light industrial building can be supported by conventional shallow foundations, provided PSI's recommendations are followed. PSI estimates that a total static settlement of less than 1-inch, and liquefaction-induced settlements on the order of 2½ to 4 inches should be considered for footing design for the proposed structure.

3.1 SITE PREPARATION

3.1.1 SITE STRIPPING

PSI recommends that, prior to construction, unsuitable materials be stripped and removed from the site, or stockpiled in non-settlement sensitive areas of the project site (e.g. landscaping areas or berms). Unsuitable materials include vegetation/organics, organic soils, undocumented fills, construction debris, soft soils, etc. Unsuitable materials have the potentially to undergo high and variable volume changes when subjected to loads, resulting in detrimental performance of structures placed on or in these materials. Based on the results of PSI's field exploration, it is expected that approximately 6 inches of topsoil may be present across the site that must be removed.

The thickness of the topsoil and other unsuitable materials are likely to vary throughout the site and other, possibly more extensive, deposits could be encountered during the site work activities. The exact depth of removal of these soils should be observed by PSI during the stripping activities.

3.1.2 WET WEATHER CONSTRUCTION

Where silty or clayey (fine grained) soils are exposed, the subcontractor must use care to protect the subgrade from disturbance by construction traffic, particularly during wet weather. Permanent cut and fill slopes should be limited to 2H:1V or flatter to minimize erosion and the risk of slope instability.

It may be prudent to use working blankets and haul roads constructed of imported granular material to provide equipment support and to protect the underlying subgrade during wet-weather conditions, especially in areas of ponding water. Clean, coarse-graded fragmental rock with less than 5% passing the U.S. Standard No. 200 sieve (washed analysis), such as 4-inch-minus crushed rock (4"-0), capped with a leveling course of clean finer-graded rock, such as ¾-inch-minus (¾"-0), works well for this purpose. A typical haul-road section consists of 18 inches of 4"-0 crushed rock, overlaid by a 6-inch leveling course of ¾"-0 crushed rock. The sections may be reduced by 25 to

50 percent for areas of light construction activities that are anticipated to be subjected to limited truck traffic. The 4”-0 crushed rock thickness may be able to be reduced by utilizing a geotextile fabric. PSI recommends the use of a geotextile fabric (overlapped by at least 12 inches at joints) between the granular material and the underlying subgrade as a separation to limit the movement of fine material into the crushed rock. The use of a fabric tends to reduce maintenance of working blankets or haul roads during construction. PSI recommends the use of Mirafi 140N (or equivalent) geotextile fabric for separation. Where practicable, PSI recommends that the fill be placed so that the construction equipment remains on newly-placed fill soils and not on the exposed subgrade during fill placement.

Where silty and clayey soils are concerned, it has also been PSI’s experience that despite during warm, dry weather, the moisture content of the upper few feet of the fine-grained soils that mantle the site will decrease, below this depth the moisture content of the soil tends to remain relatively unchanged and above the optimum moisture content required for proper compaction. As a result, the subcontractor must employ construction equipment and procedures that prevent disturbance and softening of the subgrade soils. The use of excavation equipment equipped with smooth-edged buckets for excavation, along with the concurrent placement of granular work pads tends to minimize the potential for subgrade disturbance. Subgrade disturbed during construction activities should be over-excavated to firm soil and backfilled with structural fill.

3.1.3 SUBGRADE PREPARATION

After the surficial and unsuitable materials have been stripped, PSI should observe the subgrade to identify any soft, unstable areas. Where organic, soft or otherwise unsuitable soils are identified, these unsuitable soils should be completely removed and replaced with structural fill. In areas where unsuitable soils are encountered and overexcavation occurs below footings, the overexcavation and structural fill should extend laterally a minimum distance that is equal to the depth of the excavation below the footing. The Contractor should provide a contingency for the repair of soft areas identified by the Geotechnical Engineer. Geotextile fabric and/or geotextile grid may be utilized to provide stabilization of the subgrade; however, more extensive subgrade stabilization measures may be needed upon observation of the subgrade.

3.1.4 FILL MATERIALS

Proper control of placement and compaction of new fills should be monitored by PSI. Fill materials should be placed in individual lifts not exceeding 12 inches in un-compacted thickness. Each lift is to be compacted to a minimum of 95 percent of the maximum dry density within 2 percent of the optimum moisture content, as determined in accordance with ASTM D1557 (modified Proctor). A sufficient number of in-place density tests should be performed on each lift of fill, as determined by the Geotechnical Engineer.

Tested structural fill materials that do not achieve either the required dry density or moisture content range shall be recorded, the location noted, and reported to the

Contractor and Owner. A re-test of the area should be performed after the Contractor performs remedial measures.

Structural Fill

Fill placed at the project site should be installed as properly compacted structural fill. PSI recommends using granular material, especially if placement and compaction take place during wet weather. Imported granular material for structural fill should consist of pit-run or quarry-run rock, crushed rock, crushed gravel, or sand. The imported material should be well-graded between coarse and fine material, angular, have a plasticity index of 8 or less, and have less than 5 percent by weight passing the U.S. Standard No. 200 Sieve (75-µm).

Structural fill should be placed in lifts with a maximum un-compacted thickness of 12 inches, and compacted to not less than 95 percent of the maximum dry density within 2 percent of optimum moisture content, as determined by ASTM D1557 (modified Proctor). A sufficient number of in-place density tests, as determined by the geotechnical engineer should be performed on each lift of the fill.

Utility Trench Backfill

Utility trenches should be backfilled with granular structural fill such as sand, sand and gravel, fragmented rock, or recycled concrete with constituents less than 2 inches in maximum diameter, and less than 5 percent passing the U.S. Standard No. 200 sieve (washed analysis).

Utility trench backfill should be placed in lifts with a maximum un-compacted thickness of 12 inches. Utility trenches should be compacted to not less than 95 percent of the maximum dry density within 2 percent of optimum moisture content, as determined by ASTM D1557 (modified Proctor), in the upper 3 feet of the final surface grade or to the full depth of the trench under footings, and to about 90 percent below 3 feet outside of areas impacted by footings. A sufficient number of in-place density tests should be performed on each lift of the fill. Compaction by jetting or flooding should not be permitted.

Drain Rock

Drain rock, or “free-draining” material, should have less than 2% passing the U.S. Standard No. 200 (75-µm) sieve (washed analysis). Examples of materials that would satisfy this requirement include ¾-inch to ¼-inch or 1½-inch to ¾-inch crushed rock.

3.2 EXCAVATIONS AND SLOPES

3.2.1 TRENCH EXCAVATIONS

Excavations should be made in accordance with applicable Federal and State Occupational Safety and Health Administration regulations. Trenches in the near-surface silty and clayey soils at the site will likely require to be sloped due to the potential for caving. Actual inclinations will ultimately depend on the soil conditions encountered during earthwork. While PSI may provide certain approaches for trench excavations, the Contractor should be responsible for selecting the excavation technique, monitoring the trench excavations for safety, and providing shoring, as required, to protect personnel and adjacent improvements. The information provided below is for use by the Owner and Engineer and should not be interpreted to mean that PSI is assuming responsibility for the Contractor's actions or site safety.

The Contractor should be aware that excavation and shoring should conform to the requirements specified in the applicable local, state, and federal safety regulations, such as OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations. PSI understands that such regulations are being strictly enforced, and if not followed, the Contractor may be liable for substantial penalties.

Excavation and construction operations may expose the on-site soils to inclement weather conditions. The stability of exposed soils may deteriorate due to a change in moisture content or the action of heavy or repeated construction traffic. Accordingly, foundation and pavement area excavations must be protected from the elements and from the action of repetitive or heavy construction loadings. In addition, it is recommended that surcharge loads due to construction traffic, material laydown, excavation spoils, etc., not be allowed within a horizontal distance of H/2 from the top of the cut, where H is the height of the cut.

Permanent cut and fill slopes should be limited to 2H:1V or flatter to minimize erosion and the risk of slope instability.

3.2.2 TEMPORARY SLOPES

It is PSI's opinion that temporary excavation slopes should be limited to 2H:1V. Slopes should be covered with waterproof sheeting, and all surface drainage should be directed away from the excavation to protect temporary excavation slopes from erosion caused by rainfall and subsequent runoff. In addition, PSI recommends that surcharge loads due to construction traffic, material laydown, excavation spoils, etc., not be allowed within a horizontal distance of one-half of the height from the top of the cut (i.e., H/2, where H is the height of the cut). In this regard, PSI recommends the use of fencing or barricades along the top of the cut to prevent this area from being subjected to surcharge loads.

The Contractor should recognize that the above recommendations will not guarantee that failure of temporary cut slopes will not occur.

3.2.3 EXISTING SOUTHERN SLOPE

PSI was not provided with a topographical map of the project site, but based on data obtained from Google Earth Pro, the southern portion of the proposed building location slopes down toward the wetland area at an approximate slope ranging between about 3H:1V to 2H:1V. The southern slope is estimated to measure approximate 5 to 8 feet in height.

PSI understands that southern portion of the building is planned to be constructed approximately 20 to 30 feet from the crest of the southern slope. However, a detention basin may be constructed within this area. Analysis of the stability of the southern slope was not included in PSI's scope-of-work for this report. In addition to the potential for slope instability (primarily by the mechanism of additional weight at the top of the slope and the potential soil strength reduction by increased moisture), foundation drainage at the building perimeter, at or below the planned foundation bearing elevation, must be incorporated into the final building design.

3.3 FOUNDATIONS

It is PSI's opinion that the planned structure at the project site can be supported by shallow foundations, provided PSI's recommendations are followed and the building is not constructed adjacent to the existing slope near the southern portion of the project site.

Foundation support for the new structures can be provided by conventional spread footings. Spread footings can be designed for a net, allowable bearing pressure of up to 2,500 psf, where these foundations are placed on at least 12 inches of structural fill, overlying firm, or medium dense, existing subgrade soils. Where unsuitable or soft native soils have been encountered at the subgrade elevation, these soils should overexcavated, and replaced with properly placed and compacted structural fill. In areas where overexcavation occurs below footings, the overexcavation and structural fill should extend laterally a minimum distance that is equal to the depth of the excavation below the footing. These recommendation are contingent on the estimated settlements in discussed in section 3.3.1 can are considered acceptable, if these settlements are determined to be too much for the building foundations intermediate or deep foundation systems, discussed in section 3.3.2, should be considered.

PSI recommends that column footings have a minimum width of 24 inches, even if those dimensions result in stresses below the allowable bearing capacity. The purpose of limiting the footing size is to prevent excessive shear deformation and to provide for vertical stability. Footings should be provided with at least 18 inches of embedment below the lowest adjacent exterior final grade.

Horizontal forces can be resisted partially or completely by frictional forces developed between the base of the spread footings and the underlying native soils. The total shearing resistance between the foundation footprint and the soil should be taken as the normal force (i.e., the sum of all vertical forces, dead load plus real live load, times the

coefficient of friction between the soil and the base of the footing). PSI recommends utilizing an ultimate coefficient of friction value of 0.35 for design. If additional lateral resistance is required, passive earth pressures against embedded footings can be computed using a pressure based on an equivalent fluid with a unit weight of 150 pcf. This value is based on backfill around footings being cast against the native silty, clayey soils. Where the backfill around the footings is cast against properly compacted structural fill, a passive pressure of 300 pcf may be utilized. These values are considered ultimate values, and an appropriate factor of safety should be utilized in the design.

3.3.1 SETTLEMENT

The foundation and live loads will cause settlement due to consolidation, or compression, of the underlying soils. PSI anticipates that the maximum column loads will be up to 250 kips, and maximum wall loads will be up to 5 kips per foot. Based on the anticipated loading conditions and PSI's recommended net allowable bearing capacity, PSI anticipates column and wall footing widths on the order of 10 and 1½ feet, respectively.

PSI estimates that the static (non-seismic) settlement of a typically loaded, isolated column footing that is designed and constructed in accordance with the recommendations in this report, will be less than 1 inch, assuming the foundations will consist of square spread footings. This estimated static settlement is based on the load on the footing is sustained (actual) dead load or long-term live load. Lesser actual bearing pressures should produce less settlement.

Some differential settlement between footings should be expected due to differences in their size and loading conditions and the variability in subsurface conditions across the loaded footprint. Differential settlements are difficult to quantify; however, PSI anticipates the differential static settlements will likely be limited to less than about one half the total settlement, or approximately ½-inch over a span of approximately 40 feet. Settlement of the footings is also expected to occur rapidly, essentially as the new structural loads are placed and shortly thereafter.

The settlement noted above is due to structural loads and the previously recommendations in this report. The additional settlement due to earthquake-induced liquefaction must also be considered in the building design. The total estimated settlement (i.e., foundation settlement plus the earthquake-induced liquefaction settlement) is anticipated to be on the order of 3½ to 5 inches, with estimated differential settlements on the order of up to 2½ inches over a 40 foot span.

3.3.2 ALTERNATIVE FOUNDATION SYSTEMS

Aggregate Piers

In order to mitigate the potentially excessive total building settlement, the proposed building may be supported on an intermediate foundation such as spread footing foundations supported by ground improvement through the placement of aggregate piers

(also known as “vibrated stone columns” and as a proprietary name “Geopiers®”). This ground improvement method improves the foundation soils such that conventional shallow spread footing foundation elements and mat foundations may be used with significantly less potential for settlement and an increased net allowable soil bearing capacity.

With an aggregate pier system, holes are typically drilled on a grid pattern across the site or below individual foundation locations, which are then backfilled with aggregate and compacted in-place. The compaction process laterally displaces the aggregate into the excavation sidewalls increasing the lateral stresses thereby stiffening the entire soil mass and reducing the potential settlement. Additionally, the aggregate pier system aids in the mitigation of a build-up of pore-water pressure during a seismic event, thereby significantly reducing the potential for liquefaction within the depth these elements are installed.

Based on past experience, foundations supported over soils improved through aggregate pier elements may generally be designed for net allowable soil bearing capacity on the order of 4,000 to 6,000 psf. However, this ground improvement system is engineered, designed and installed exclusively by representatives of the foundation company (i.e., design-build). If an aggregate pier ground improvement alternative is of interest, PSI would be pleased to work with the aggregate pier design-build contractor to better define the feasibility of ground improvement and scope of work for this site and to provide a specific recommended allowable soil bearing pressure and estimated settlement for use in the spread footing design as well as the associated costs. However, based on previous experience these system are usually able to reduce differential settlements to less than ½ inch over a 40 foot span.

Alternative Foundation Designs

Alternative foundation designs, such as deep foundations (e.g., drilled piers, driven piles, helical anchors, etc.) or spread foundations connected by grade beams may be suitable for support of the structure. The deep foundations or grade beams (which are top and bottom-reinforced) should provide suitable support of the building to prevent collapse of the structure in a seismic event. The structural engineer should be consulted to determine the most effective foundation system for this purpose. PSI is available to provide additional consultation and design parameters after the foundation concept is developed.

3.4 FLOOR SUPPORT

The subgrade soils utilized for the support of floor slabs should be prepared as indicated previously within Section 3.1 of this report. The Geotechnical Engineer should identify the condition of the subgrade for slab-on-grade floors prior to the placement of structural fill, reinforcing steel, or concrete. Areas of soft or unsuitable subgrade should be excavated to firm soil and backfilled with properly-compacted structural fill.

Where slab-on-grade floors are constructed, the slab-on-grade should be underlain by at least 8 inches of structural fill material to provide uniform support and to limit the risk of the capillary rise of moisture. The structural fill should be compacted to at least 95 percent of maximum dry density as determined by ASTM D1557 (modified Proctor). In addition, it will be appropriate to install a durable vapor-retarding membrane beneath the slab-on-grade to limit the risk of damp floors in areas that will have moisture-sensitive materials placed directly on the floor. The vapor-retarding membrane should be installed in accordance with the manufacturer's recommendations.

For subgrade prepared as recommended or for properly-compacted fill, a modulus of subgrade reaction, *k*, of 150 pounds per cubic inch (pci) may be used in the grade slab design based on values typically obtained from 1-foot by 1-foot plate load tests. However, depending on how the slab load is applied, the value must be geometrically modified. The value should be adjusted for larger areas using the following expression for cohesive and cohesionless soil:

Modulus of Subgrade Reaction, $k_s = \frac{k}{B}$ for cohesive soil; and,

$$k_s = k * \left(\frac{B+1}{2B} \right)^2 \text{ for cohesionless soil}$$

where: k_s = coefficient of vertical subgrade reaction for loaded area;
k = coefficient of vertical subgrade reaction for a 1 by 1 square foot area; and,
B = width of area loaded, in feet.

PSI recommends that the footing excavations be observed and documented by PSI's Geotechnical Engineer or designated technical representative prior to placement of structural fill, concrete, or reinforcing steel to verify their suitability for foundation support.

3.5 PAVEMENT

Prior to pavement construction, the pavement subgrade should be prepared as indicated in Section 3.1 of this report. In lieu of extensive testing for determination of pavement subgrade support characteristics, PSI has provided the following estimated pavement subgrade parameters based visual classification of the near-surface soils and experience in the general area of the project site with similar subgrade soils:

- Estimated Native Silty Subgrade California Bearing Ratio (CBR) – 2 to 4
- Estimated Native Silty Subgrade Resilient Modulus(M_R)– 3,000 to 5,000 psi
- Reliability = 95%
- Standard Deviation = 0.49
- Initial Serviceability Index = 4.2
- Terminal Serviceability Index = 3.0
- Estimated Traffic Volumes in Equivalent Single Axle Loads (ESALs)
    - Light-Duty – 20,000 ESALs

- Heavy-Duty – 1,500,000 ESALs

The CBR value should be verified by formal laboratory testing and specific traffic frequencies and axle loading determined prior to pavement design acceptance. In accepting the following pavement designs based on the correlated CBR value, Inline must then accept a greater risk of over-design or pavement failure and/or higher maintenance costs, compared to an engineered design.

Table 4: Recommended Pavement Section

	FLEXIBLE Light-Duty	**FLEIXBLE Heavy-Duty**	**RIGID Heavy-Duty**
Asphalt or Concrete Course	3” Asphalt	8” Asphalt	7" Concrete
Gravel Base Course	8”	18”	6”

The recommended pavement sections in Table 4 are based on the AASHTO design methods for flexible and rigid pavement design, and a design life of 20 years.

In heavy truck lanes or turn areas or where refuse containers or other similar objects are to be placed on the pavement such that a considerable load is transferred from relatively small steel supports, it is recommended that rigid concrete pavement be provided. This will provide for the proper distribution of loads to the subgrade without causing deformation of the surface, especially during hot weather. It will also resist the wear resulting from dumpster pick-ups and vehicle traffic. Concrete design parameters include a 28-day mean modulus of rupture of 600 pounds per square inch (psi) and a 28-day mean modulus of elasticity of approximately 3,600,000 psi.

The concrete mix design should consist of a normal weight concrete with a minimum 28-day compressive strength of 4,000 psi when tested in accordance to ASTM C39. The design of joints, joint spacing, doweling and steel/wire mesh reinforcement was not included in PSI’s Scope-of-Services, but should conform to the applicable local or Oregon Department of Transportation (ODOT) requirements.

Actual pavement section thicknesses should be provided by the design Civil Engineers based on actual traffic volumes and axle loads, laboratory-determined California Bearing Ratio tests, and the Owner's design life requirements. Periodic maintenance should be expected and performed on all pavements during the service life. All pavement materials and construction procedures should conform to ODOT, or appropriate local requirements.

Pavements may be placed after the subgrade has been properly prepared as outlined in this report. The recommended pavement sections are based on the subgrade consisting of firm, undisturbed soil or structural fill, and that the pavement will be constructed during

the dry summer months. Proof-rolling using a fully-loaded tandem-axle dump truck should be used to evaluate pavement subgrade. Soft areas disclosed by proof-rolling will likely require over-excavation and replacement with properly compacted structural fill. Some contingency should be provided by the Contractor for the repair of any soft areas.

Permanent, properly installed drainage is an essential aspect of pavement design and construction. All paved areas should have positive drainage to prevent ponding of surface water and saturation of the base course. This is particularly important in areas of standing water, cut sections, or at low points within the paved areas, such as around stormwater catch basins. Effective means to prevent saturation of the base course include installing weep holes in the sidewalls to catch basins. Allowances for proper drainage and proper selection of base materials are most important for the performance of pavements.

Vehicle traffic or the loading of partially constructed pavement sections will likely cause premature pavement failure. All vehicle traffic or pavement loading should be restricted until the pavement section has been completely constructed or the partial pavement section must be designed for this purpose, particularly if construction traffic will use the partial pavement.

3.6 DRAINAGE

Pavement surfaces and open space areas should be sloped such that surface water runoff is collected and routed to suitable discharge points. PSI also recommends that ground surfaces adjacent to the proposed improvements be sloped to facilitate positive drainage away from these structures and the related foundations.

PSI recommends footing drains be placed around the exterior of the building foundation to reduce the potential for lateral migration of moisture into the building envelope. The roof drains should be connected to a tight-line pipe leading to storm drain facilities. The foundation drains must be placed at or below the proposed foundation bearing elevation.

3.7 DESIGN REVIEW AND CONSTRUCTION MONITORING

After plans and specifications are complete, PSI should review the final design and specifications so that the earthwork and foundation recommendations are properly interpreted and implemented. It is considered imperative that the Geotechnical Engineer and/or their representative be present during earthwork operations and foundation installations to observe the field conditions with respect to the design assumptions and specifications. PSI will not be responsible for changes in the project design or project information it was not provided, or interpretations and field quality control observations made by others. PSI would be pleased to provide these services for this project.

4 GEOTECHNICAL RISK AND REPORT LIMITATIONS

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which geotechnical engineers use are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned. The engineering recommendations presented in the preceding sections constitute PSI's professional estimate of those measures that are necessary for the proposed structure to perform according to the proposed design based on the information generated and referenced during this evaluation, and PSI's experience in working with these conditions.

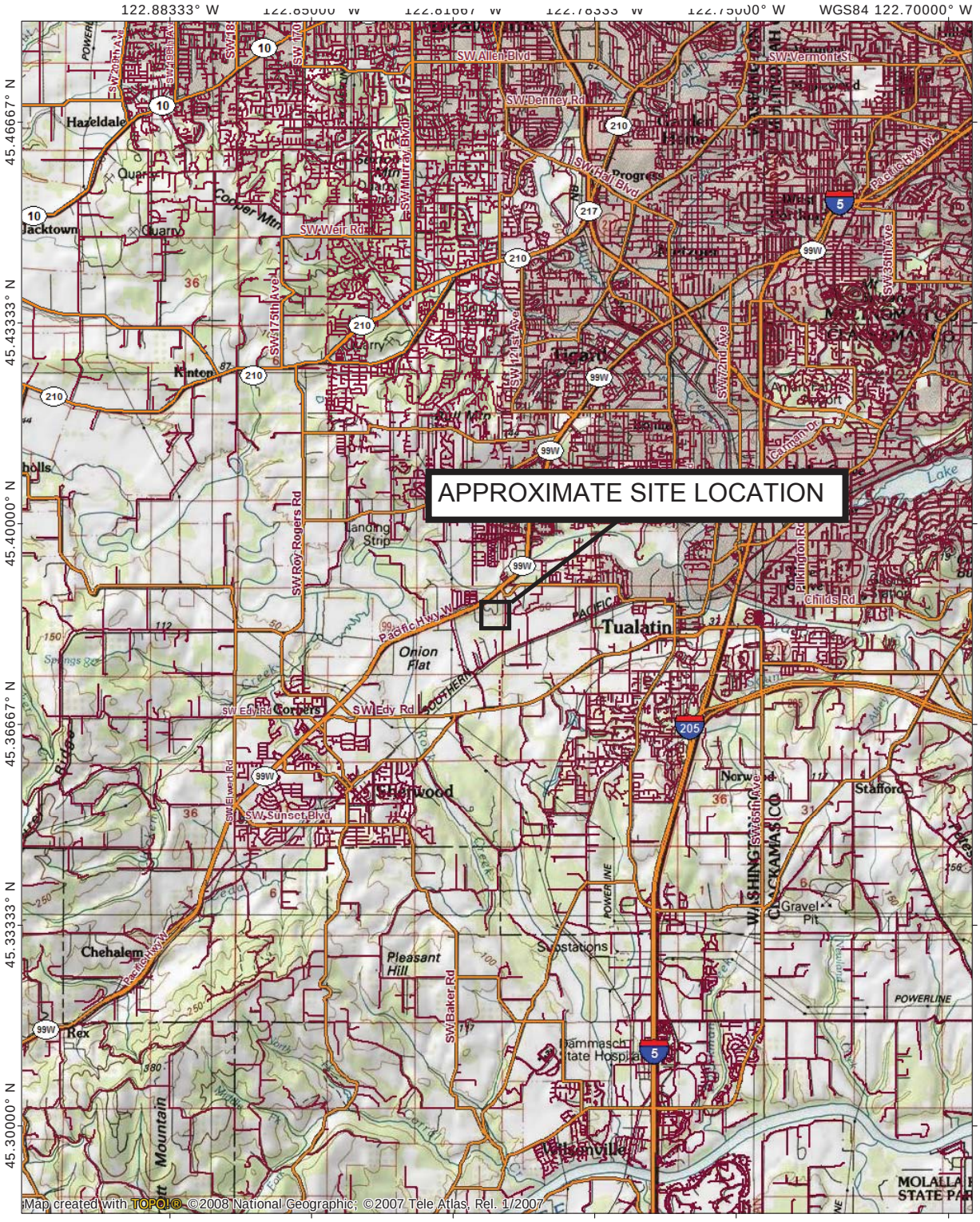
The recommendations submitted for the proposed light industrial building are based on the information provided to PSI. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI must be notified immediately to determine if changes to PSI's recommendations are required. If PSI is not retained to perform these functions, PSI cannot be responsible for the impact of those conditions on the performance of the project.

The stratification shown on the CPT and geoprobe logs represent the conditions only at the actual sounding locations. Variations may occur and should be expected between exploration locations. The stratification represents the approximate boundary between subsurface materials; however, the actual transition may be gradual, abrupt, or not clearly defined.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are complete, PSI should be retained to review the final design plans and specifications. This review is required to verify that the engineering recommendations are appropriate for the final configuration, and that they have been properly incorporated into the design documents. This report has been prepared for the exclusive use of Inline Commercial Construction for specific application to the proposed light industrial building to be situated at 12540 SW Leveton Drive in Tualatin, Oregon.

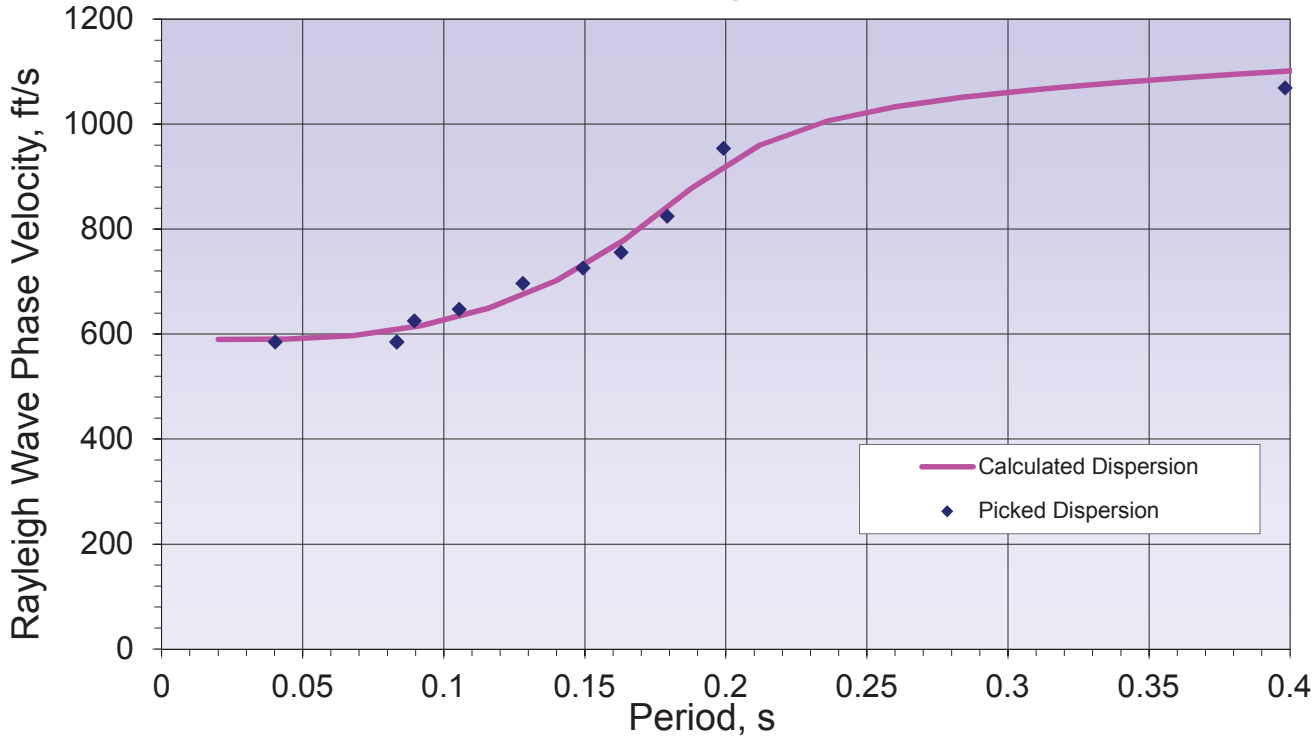
FIGURES



psi Information To Build On Engineering • Consulting • Testing	DATE: DECEMBER 2016	PROPOSED LIGHT INDUSTRIAL BUILDING 12540 SW LEVETON DRIVE TUALATIN, OREGON	PSI PROJECT NUMBER 07041016
PSI, INC. **6032 N. CUTTER CIRCLE, SUITE 480** **PORTLAND, OREGON 97217** **(503) 289-1778**	DRAWN BY: JDB	**SITE VICINITY MAP**	**FIGURE 1**

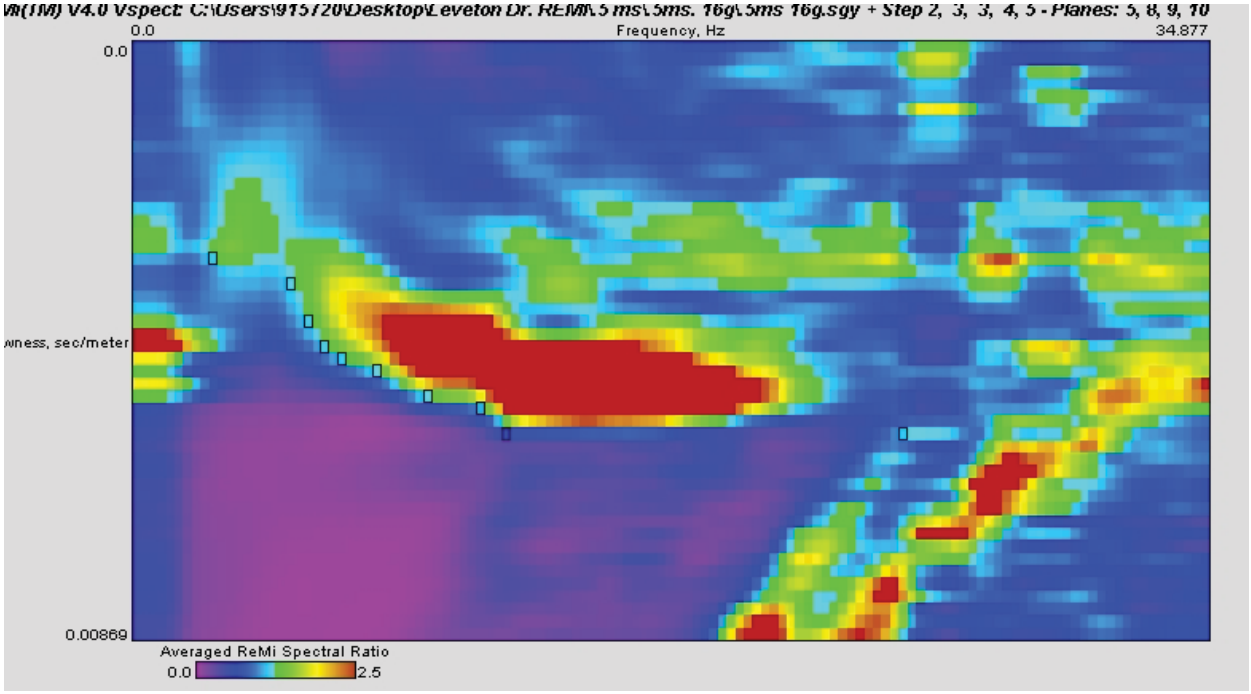
psi Information To Build On Engineering • Consulting • Testing	DATE: DECEMBER 2016	PROPOSED LIGHT INDUSTRIAL BUILDING 12540 SW LEVETON DRIVE TUALATIN, OREGON	PSI PROJECT NUMBER 07041016
PSI, INC. **6032 N. CUTTER CIRCLE, SUITE 480** **PORTLAND, OREGON 97217** **(503) 289-1778**	DRAWN BY: JDB	**SITE EXPLORATION MAP**	**FIGURE 2**

Dispersion Curve Showing Picks and Fit



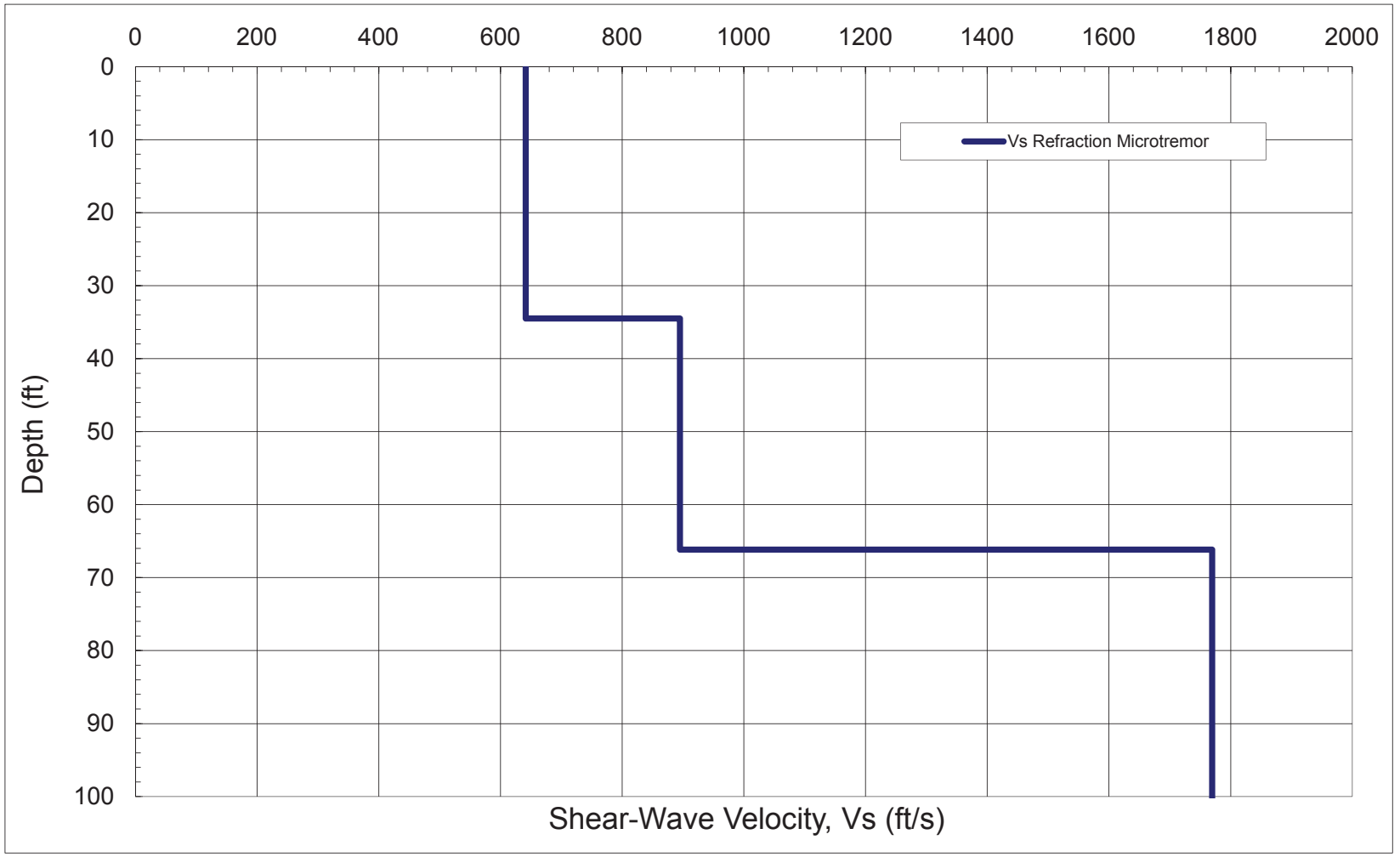
Geophone Spacing (ft) 12 Sampling Interval (ms) 1

p-f Image with Dispersion Modeling Picks



psi Information To Build On Engineering • Consulting • Testing	DATE: DECEMBER 2016	PROPOSED LIGHT INDUSTRIAL BUILDING 12540 SW LEVETON DRIVE TUALATIN, OREGON	PSI PROJECT NUMBER 07041016
PSI, INC. **6032 N. CUTTER CIRCLE, SUITE 480** **PORTLAND, OREGON 97217** **(503) 289-1778**	DRAWN BY: JDB	**DISPERSION MODELING (REMI RESULTS)**	**FIGURE 3**

Shear Wave Velocity Profile Vs. Depth



IBC Site Class	**D**
Average Shearwave Velocity within 100 feet, V_s (ft/s)	**924**

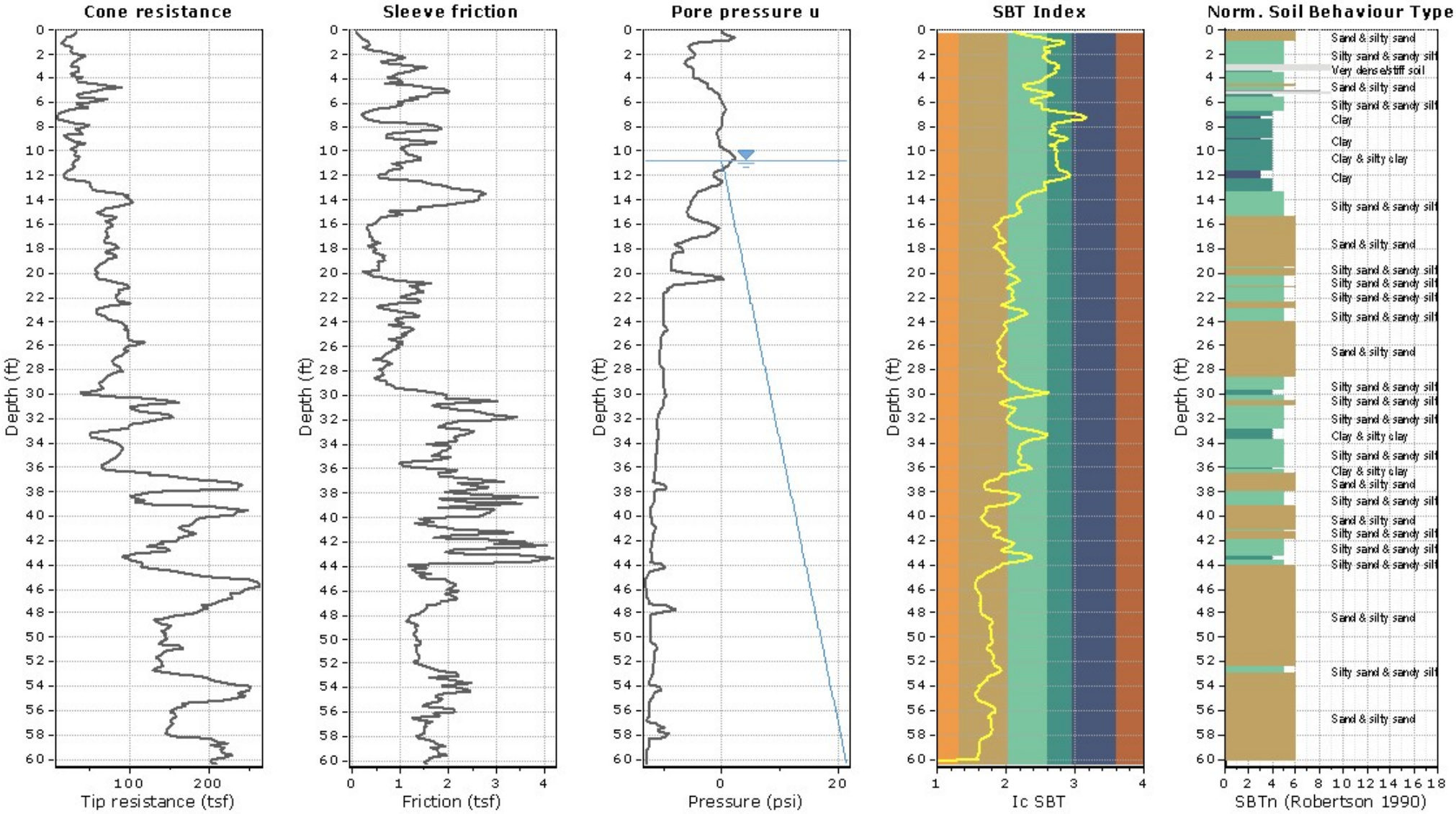
psi Information To Build On Engineering • Consulting • Testing	DATE: DECEMBER 2016	PROPOSED LIGHT INDUSTRIAL BUILDING 12540 SW LEVETON DRIVE TUALATIN, OREGON	PSI PROJECT NUMBER 07041016
PSI, INC. **6032 N. CUTTER CIRCLE, SUITE 480** **PORTLAND, OREGON 97217** **(503) 289-1778**	DRAWN BY: JDB	**SHEAR WAVE VELOCITY PROFILE (REMI RESULTS)**	**FIGURE 4**

APPENDIX A – CPT LOGS

Professional Service Industries, Inc.
6032 North Cutter Circle, Suite 480
Portland, Oregon 97217
www.psiusa.com

CPT: CPT-01
Total depth: 60.37 ft, Date: 11/7/2016
Surface Elevation: 145.00 ft
Coords: X:0.00, Y:0.00
Cone Type: Hogentogler
Cone Operator: T.Jacques

Project: **Proposed Light Industrial Building**
Location: **12540 SW Leveton Dr. Tualatin, OR**



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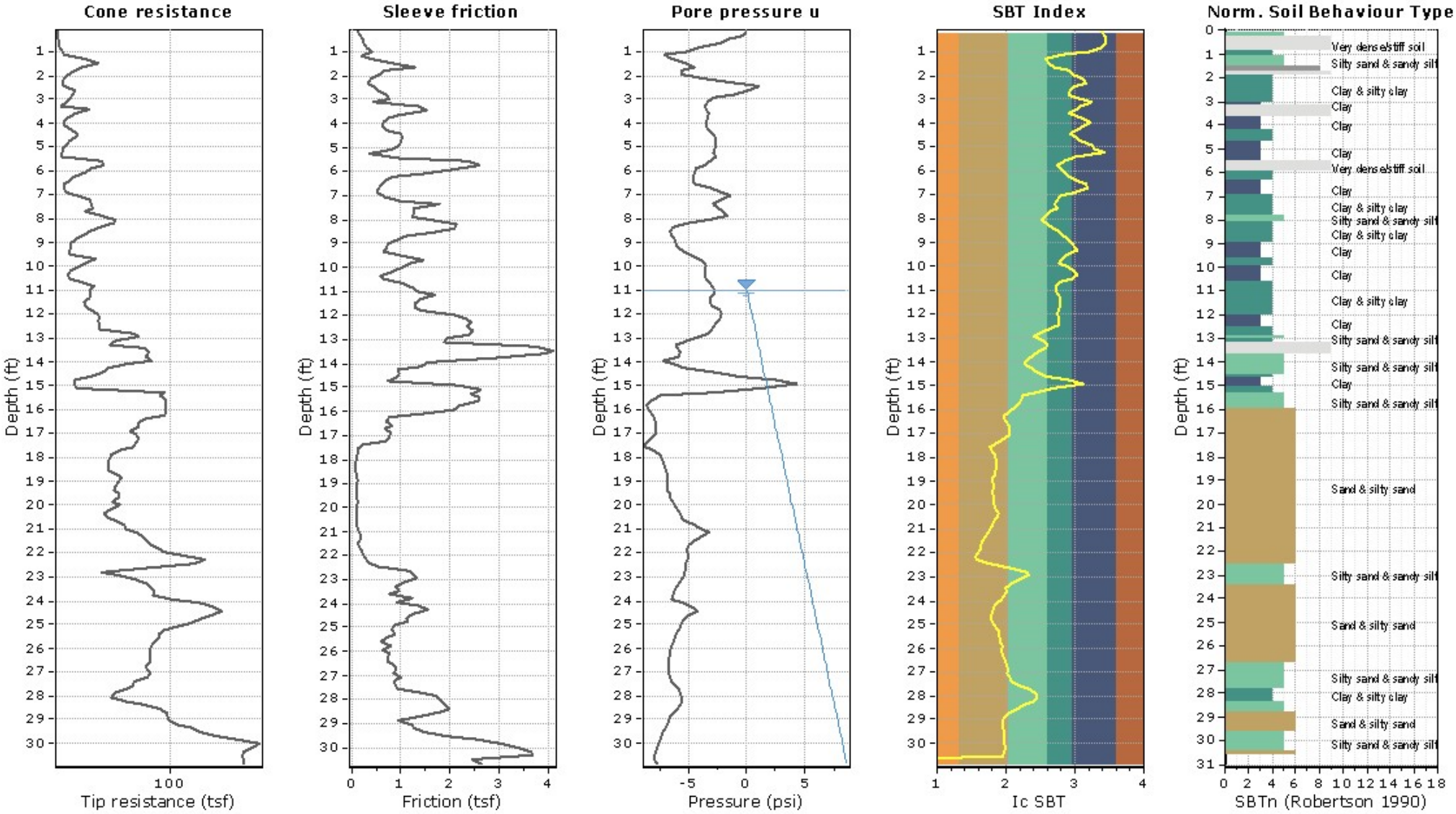
CPT: CPT-02
Total depth: 30.84 ft, Date: 11/7/2016
Surface Elevation: 146.00 ft
Coords: X:0.00, Y:0.00
Cone Type: Hogentogler
Cone Operator: T.Jacques

Project: **Proposed Light Industrial Building**
Location: **12540 SW Leveton Dr. Tualatin, OR**



Professional Service Industries, Inc.
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Portland, Oregon 97217
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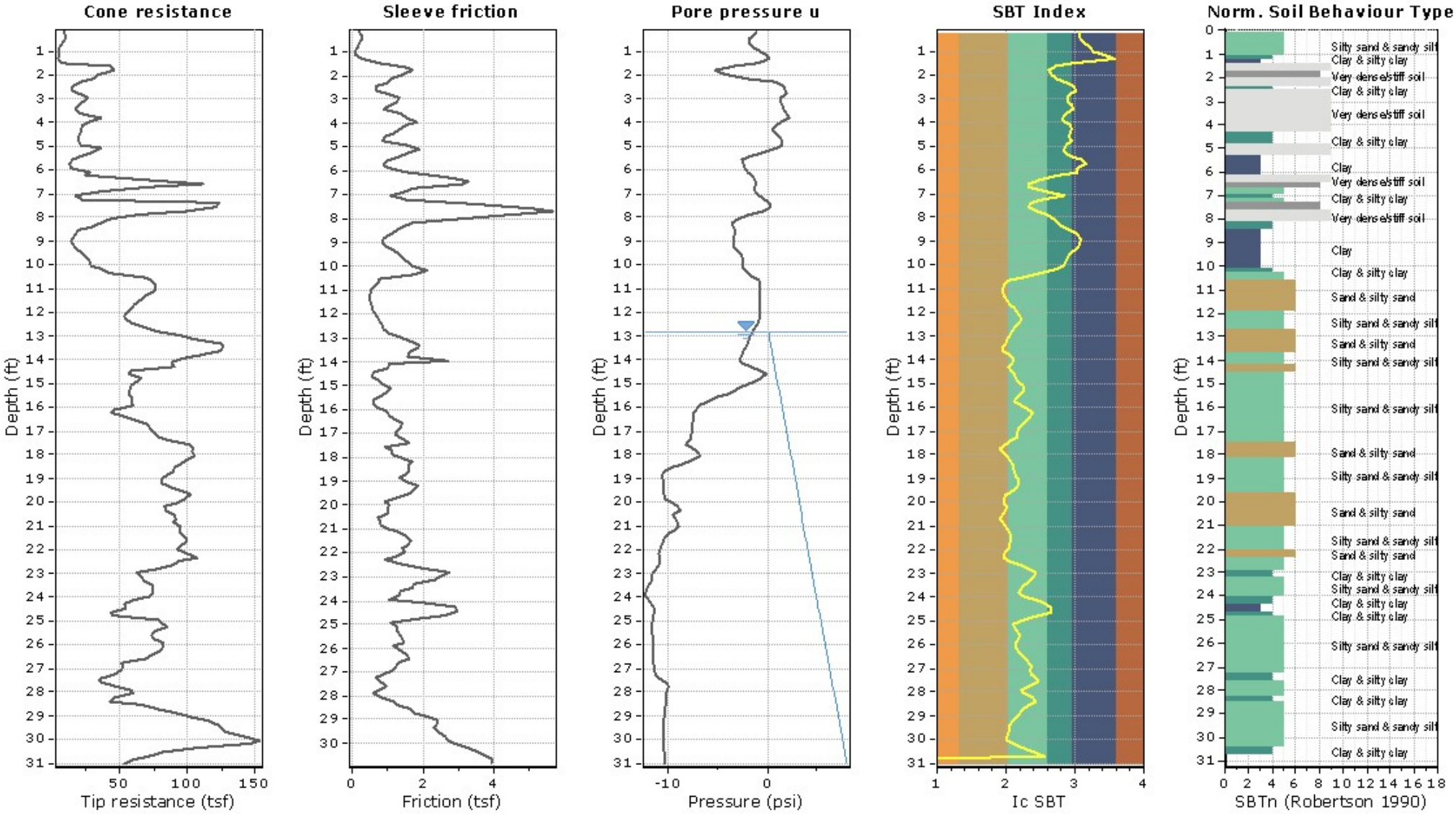
CPT: CPT-03
Total depth: 31.00 ft, Date: 11/7/2016
Surface Elevation: 147.00 ft
Coords: X:0.00, Y:0.00
Cone Type: Hogentogler
Cone Operator: T.Jacques

Project: **Proposed Light Industrial Building**
Location: **12540 SW Leveton Dr. Tualatin, OR**



Professional Service Industries, Inc.
6032 North Cutter Circle, Suite 480
Portland, Oregon 97217
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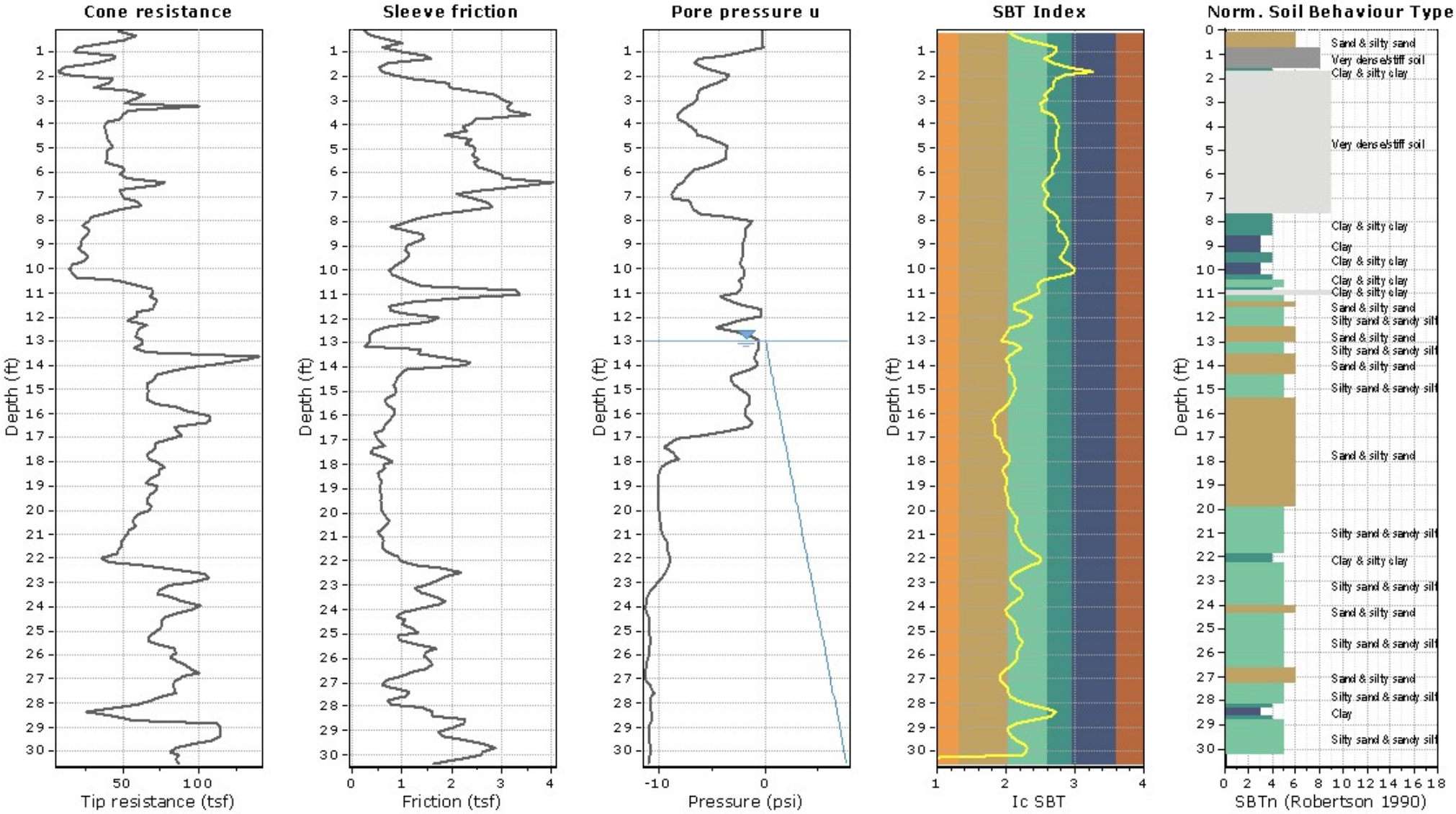
CPT: CPT-04
Total depth: 30.51 ft, Date: 11/7/2016
Surface Elevation: 147.00 ft
Coords: X:0.00, Y:0.00
Cone Type: Hogentogler
Cone Operator: T.Jacques

Project: **Proposed Light Industrial Building**
Location: **12540 SW Leveton Dr. Tualatin, OR**



APPENDIX B – GEOPROBE LOGS, GENERAL NOTES, AND SOIL CLASSIFICATION CHART

BORING GP-01

DATE STARTED:	11/7/16	**DRILL COMPANY:**	Oregon Geotechnical Explorations
DATE COMPLETED:	11/7/16	**DRILLER:** T.Jacques	**LOGGED BY:** M.Friedman
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	Geoprobe
BENCHMARK:	N/A	**DRILLING METHOD:**	Direct Push
ELEVATION:	149 ft	**SAMPLING METHOD:**	Bulk Sample
LATITUDE:	45.384604°	**HAMMER TYPE:**	N/A
LONGITUDE:	-122.806574°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	S.Rahe

REMARKS: NFWE- No Free Water Encountered

Water

While Drilling	NFWE
Upon Completion	NFWE
	N/A

BORING LOCATION:
See Site Exploration Map (Figure 2)

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Approximately 6 inches grass and topsoil.				
						SANDY SILT - Brown, moist, fine to medium sand, nonplastic fines, trace scattered fine gravel.		23	×	Non-Plastic Fines=66.1%
145										
	5						ML	21	×	
140										
	10					Geoprobe terminated approximately 10 feet below existing ground surface. No groundwater encountered.				

Professional Service Industries, Inc.
6032 N. Cutter Circle, Suite 480
Portland, OR 97219
Telephone: (503) 289-1778

PROJECT NO.: 07041016
PROJECT: Proposed Light Industrial Building
LOCATION: 12540 SW Leveton Drive
Tualatin, Oregon

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING GP-02

DATE STARTED:	11/7/16	**DRILL COMPANY:**	Oregon Geotechnical Explorations
DATE COMPLETED:	11/7/16	**DRILLER:** T.Jacques	**LOGGED BY:** M.Friedman
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	Geoprobe
BENCHMARK:	N/A	**DRILLING METHOD:**	Direct Push
ELEVATION:	146 ft	**SAMPLING METHOD:**	Bulk Sample
LATITUDE:	45.384152°	**HAMMER TYPE:**	N/A
LONGITUDE:	-122.806087°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	S.Rahe

REMARKS: NFWE- No Free Water Encountered

Water

While Drilling	NFWE
Upon Completion	NFWE
	N/A

BORING LOCATION:
See Site Exploration Map (Figure 2)

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Approximately 6 inches grass and topsoil.				
145						**SILT with SAND** - Brown with orange mottling, moist, nonplastic, fine to medium sand, trace gravel. Occasional lenses of silty sand.	ML	25	×	
	5					**SILTY SAND** - Brown with black mottling, moist, fine to medium sand, nonplastic fines. Occasional lenses of clayey sand with gravel.	SM	17	×	
140						**CLAYEY SAND with GRAVEL** - Gray, moist, fine to medium sand, low plasticity fines.	SC	19	×	
	10					Geoprobe terminated approximately 10 feet below existing ground surface. No groundwater encountered.				

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Telephone: (503) 289-1778

PROJECT NO.: 07041016
PROJECT: Proposed Light Industrial Building
LOCATION: 12540 SW Leveton Drive
Tualatin, Oregon

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING GP-03

DATE STARTED:	11/7/16	**DRILL COMPANY:**	Oregon Geotechnical Explorations
DATE COMPLETED:	11/7/16	**DRILLER:** T.Jacques	**LOGGED BY:** M.Friedman
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	Geoprobe
BENCHMARK:	N/A	**DRILLING METHOD:**	Direct Push
ELEVATION:	147 ft	**SAMPLING METHOD:**	Bulk Sample
LATITUDE:	45.384391°	**HAMMER TYPE:**	N/A
LONGITUDE:	-122.806095°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	S.Rahe

REMARKS: NFWE- No Free Water Encountered

Water

While Drilling	NFWE
Upon Completion	NFWE
	N/A

BORING LOCATION:
See Site Exploration Map (Figure 2)

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Approximately 6 inches grass and topsoil.				
						LEAN CLAY with SAND - Brown with black speckling, moist, low plasticity, fine to medium sand.		23	×	Fines=71.7%
145						Root zone observed.				
	5					Color changes to brown and gray with occasional lenses of sandy silt.	CL	21	×	
140						Gravel observed from 7 to 7-1/2 feet below ground surface.				
	10					Geoprobe terminated approximately 10 feet below existing ground surface. No groundwater encountered.				

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Telephone: (503) 289-1778

PROJECT NO.: 07041016
PROJECT: Proposed Light Industrial Building
LOCATION: 12540 SW Leveton Drive
Tualatin, Oregon

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING GP-04

DATE STARTED:	11/7/16	**DRILL COMPANY:**	Oregon Geotechnical Explorations
DATE COMPLETED:	11/7/16	**DRILLER:** T.Jacques	**LOGGED BY:** M.Friedman
COMPLETION DEPTH	10.0 ft	**DRILL RIG:**	Geoprobe
BENCHMARK:	N/A	**DRILLING METHOD:**	Direct Push
ELEVATION:	149 ft	**SAMPLING METHOD:**	Bulk Sample
LATITUDE:	45.384736°	**HAMMER TYPE:**	N/A
LONGITUDE:	-122.805609°	**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	S.Rahe

REMARKS: NFWE- No Free Water Encountered

Water

While Drilling	NFWE
Upon Completion	NFWE
	N/A

BORING LOCATION:
See Site Exploration Map (Figure 2)

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0					Approximately 6 inches grass and topsoil.				
						SILTY SAND - Brown with orange mottling, moist, nonplastic, fine to medium sand.		16	×	
145										
	5						ML	23 ■	×	Non-Plastic Fines=45.2%
140										
	10					Geoprobe terminated approximately 10 feet below existing ground surface. No groundwater encountered.				

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PROJECT NO.: 07041016
PROJECT: Proposed Light Industrial Building
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Tualatin, Oregon

The stratification lines represent approximate boundaries. The transition may be gradual.

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

SFA: Solid Flight Auger - typically 4" diameter flights, except where noted.
HSA: Hollow Stem Auger - typically 3¼" or 4¼ I.D. openings, except where noted.
M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry
R.C.: Diamond Bit Core Sampler
H.A.: Hand Auger
P.A.: Power Auger - Handheld motorized auger

SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
RC: Rock Core
TC: Texas Cone
BS: Bulk Sample
PM: Pressuremeter
CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
N_{60}: A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
Q_u: Unconfined compressive strength, TSF
Q_p: Pocket penetrometer value, unconfined compressive strength, TSF
w%: Moisture/water content, %
LL: Liquid Limit, %
PL: Plastic Limit, %
PI: Plasticity Index = (LL-PL),%
DD: Dry unit weight, pcf
▼,▽,⧩ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Relative Density	N - Blows/foot
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	50 - 80
Extremely Dense	80+

ANGULARITY OF COARSE-GRAINED PARTICLES

Description	Criteria
Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular:	Particles are similar to angular description, but have rounded edges
Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded:	Particles have smoothly curved sides and no edges

GRAIN-SIZE TERMINOLOGY

Component	Size Range
Boulders:	Over 300 mm (>12 in.)
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)
Coarse-Grained Gravel:	19 mm to 75 mm (¾ in. to 3 in.)
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to ¾ in.)
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)
Medium-Grained Sand:	0.42 mm to 2 mm (No.40 to No.10)
Fine-Grained Sand:	0.075 mm to 0.42 mm (No. 200 to No.40)
Silt:	0.005 mm to 0.075 mm
Clay:	<0.005 mm

PARTICLE SHAPE

Description	Criteria
Flat:	Particles with width/thickness ratio > 3
Elongated:	Particles with length/width ratio > 3
Flat & Elongated:	Particles meet criteria for both flat and elongated

RELATIVE PROPORTIONS OF FINES

Descriptive Term	% Dry Weight
Trace:	< 5%
With:	5% to 12%
Modifier:	>12%

GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

Q_U - TSF	N - Blows/foot	Consistency
0 - 0.25	0 - 2	Very Soft
0.25 - 0.50	2 - 4	Soft
0.50 - 1.00	4 - 8	Firm (Medium Stiff)
1.00 - 2.00	8 - 15	Stiff
2.00 - 4.00	15 - 30	Very Stiff
4.00 - 8.00	30 - 50	Hard
8.00+	50+	Very Hard

MOISTURE CONDITION DESCRIPTION

Description	Criteria
Dry:	Absence of moisture, dusty, dry to the touch
Moist:	Damp but no visible water
Wet:	Visible free water, usually soil is below water table

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term	% Dry Weight
Trace:	< 15%
With:	15% to 30%
Modifier:	>30%

STRUCTURE DESCRIPTION

Description	Criteria
Stratified:	Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick
Laminated:	Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick
Fissured:	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided:	Fracture planes appear polished or glossy, sometimes striated
Blocky:	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed:	Inclusion of small pockets of different soils
Layer:	Inclusion greater than 3 inches thick (75 mm)
Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample
Parting:	Inclusion less than 1/8-inch (3 mm) thick

SCALE OF RELATIVE ROCK HARDNESS

Q_U - TSF	Consistency
2.5 - 10	Extremely Soft
10 - 50	Very Soft
50 - 250	Soft
250 - 525	Medium Hard
525 - 1,050	Moderately Hard
1,050 - 2,600	Hard
>2,600	Very Hard

ROCK BEDDING THICKNESSES

Description	Criteria
Very Thick Bedded	Greater than 3-foot (>1.0 m)
Thick Bedded	1-foot to 3-foot (0.3 m to 1.0 m)
Medium Bedded	4-inch to 1-foot (0.1 m to 0.3 m)
Thin Bedded	1¼-inch to 4-inch (30 mm to 100 mm)
Very Thin Bedded	½-inch to 1¼-inch (10 mm to 30 mm)
Thickly Laminated	1/8-inch to ½-inch (3 mm to 10 mm)
Thinly Laminated	1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

Voids	Void Diameter
Pit	<6 mm (<0.25 in)
Vug	6 mm to 50 mm (0.25 in to 2 in)
Cavity	50 mm to 600 mm (2 in to 24 in)
Cave	>600 mm (>24 in)

GRAIN-SIZED TERMINOLOGY

(Typically Sedimentary Rock)

Component	Size Range
Very Coarse Grained	>4.76 mm
Coarse Grained	2.0 mm - 4.76 mm
Medium Grained	0.42 mm - 2.0 mm
Fine Grained	0.075 mm - 0.42 mm
Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

Rock Mass Description	RQD Value
Excellent	90 -100
Good	75 - 90
Fair	50 - 75
Poor	25 -50
Very Poor	Less than 25

DEGREE OF WEATHERING

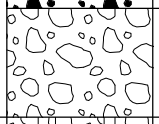
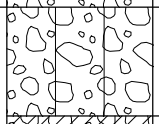
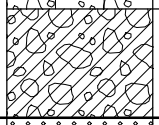
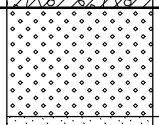
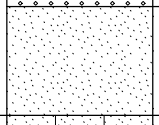
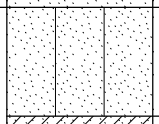
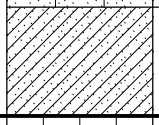
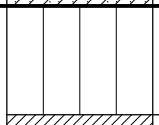
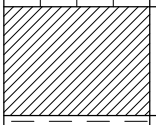
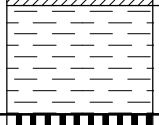
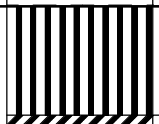
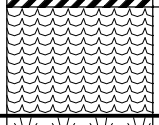
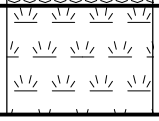
Slightly Weathered: Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.

Weathered: Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.

Highly Weathered: Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

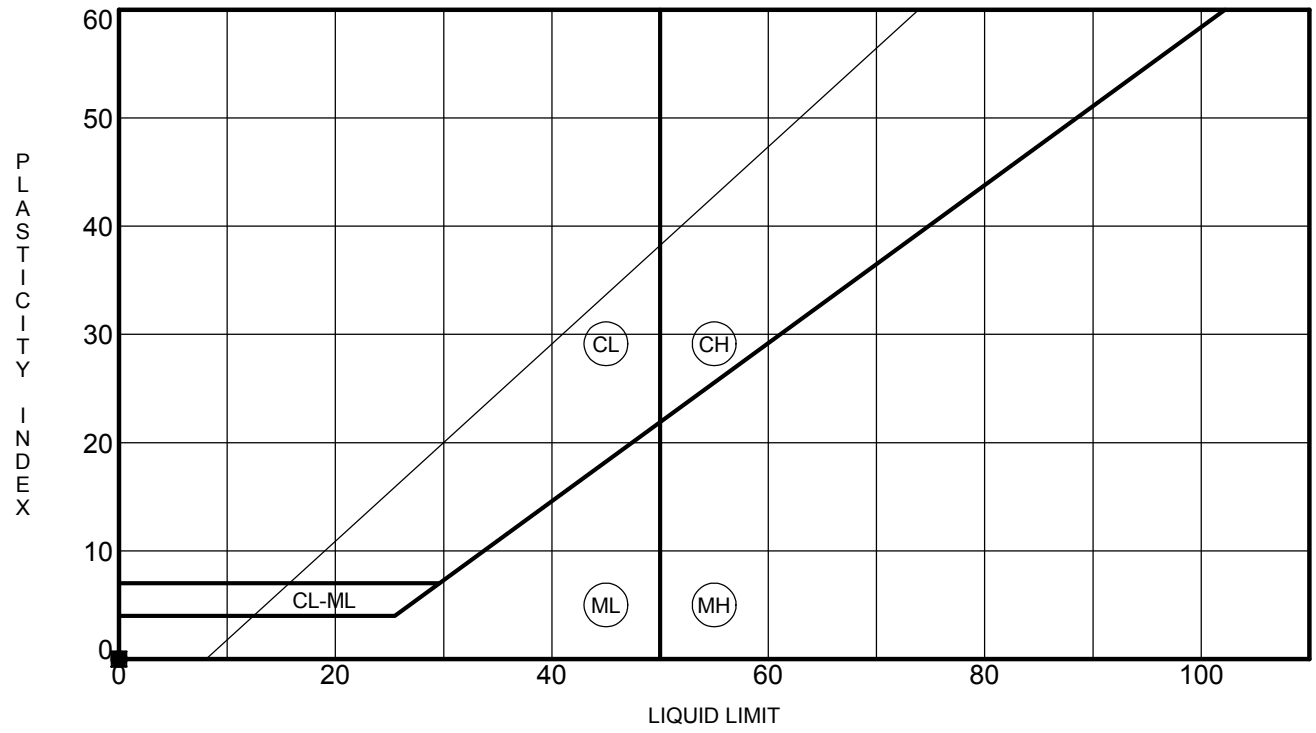
SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

psi

APPENDIX C – LABORATORY TEST RESULTS

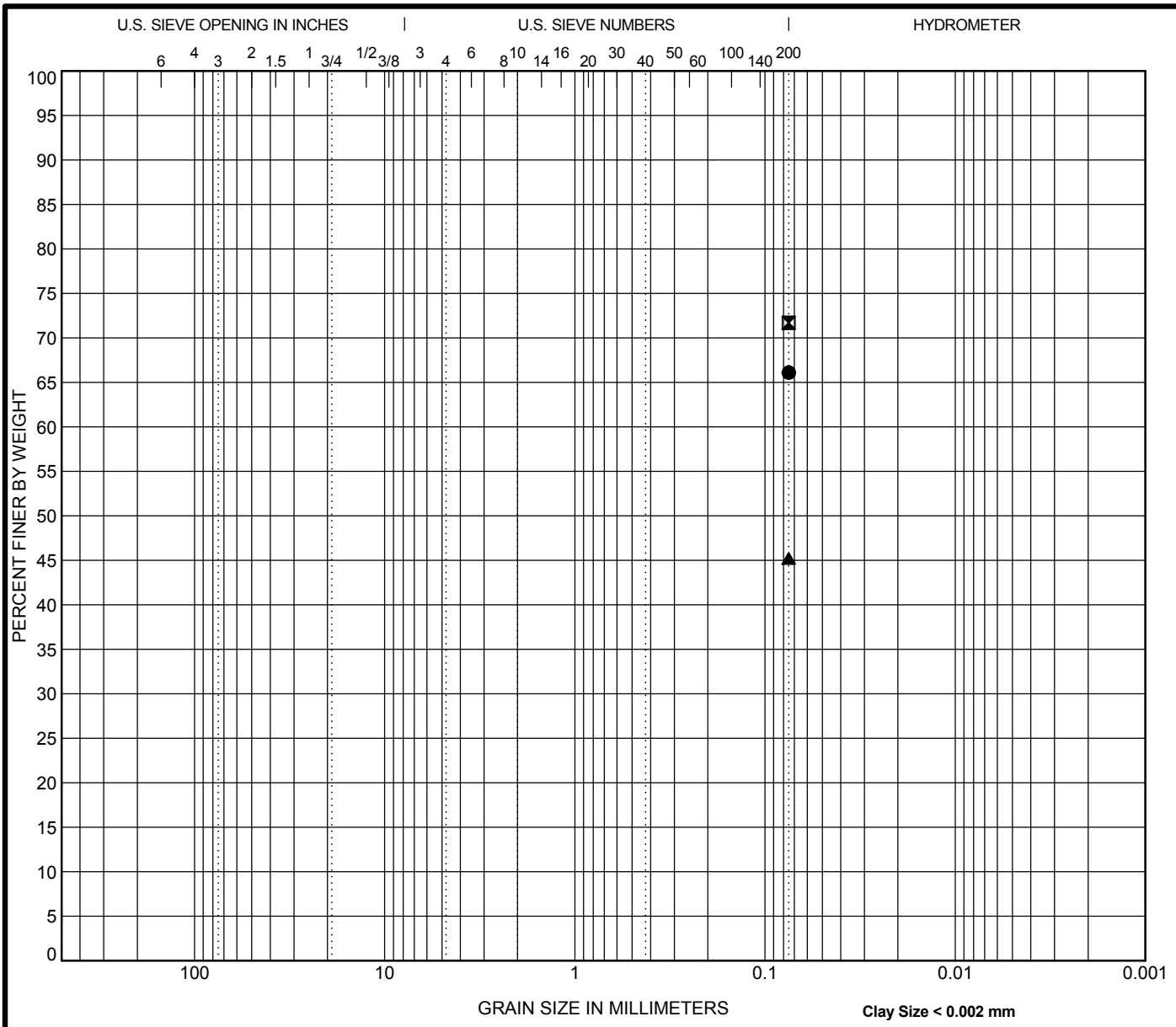


	Boring	Depth (ft)	LL	PL	PI	Fines	Classification (*Visual)
●	**GP-01**	**1.0**	**NP**	**NP**	**NP**	**66.1**	
⊠	**GP-04**	**5.0**	**NP**	**NP**	**NP**	**45.2**	

Professional Service Industries, Inc.
6032 N. Cutter Circle, Suite 480
Portland, OR 97219
Telephone: (503) 289-1778
Fax: (503) 289-1918

ATTERBERG LIMIT RESULTS

PSI Job No.: 07041016
Project: Proposed Light Industrial Building
Location: 12540 SW Leveton Drive
Tualatin, Oregon



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**GP-01**	**1.0**		**NP**	**NP**	**NP**		
⊠	**GP-03**	**1.0**						
▲	**GP-04**	**5.0**		**NP**	**NP**	**NP**		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**GP-01**	**1.0**	**0.075**				**0.0**	**0.0**	**66.1**	
⊠	**GP-03**	**1.0**	**0.075**				**0.0**	**0.0**	**71.7**	
▲	**GP-04**	**5.0**	**0.075**				**0.0**	**0.0**	**45.2**	

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6032 N. Cutter Circle, Suite 480
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GRAIN SIZE DISTRIBUTION

Project: Proposed Light Industrial Building
PSI Job No.: 07041016
Location: 12540 SW Leveton Drive
Tualatin, Oregon

APPENDIX D – LIQUEFACTION ANALYSIS RESULTS

Professional Service Industries, Inc.
6032 N. Cutter Circle
Suite 480
Portland, Oregon 97217

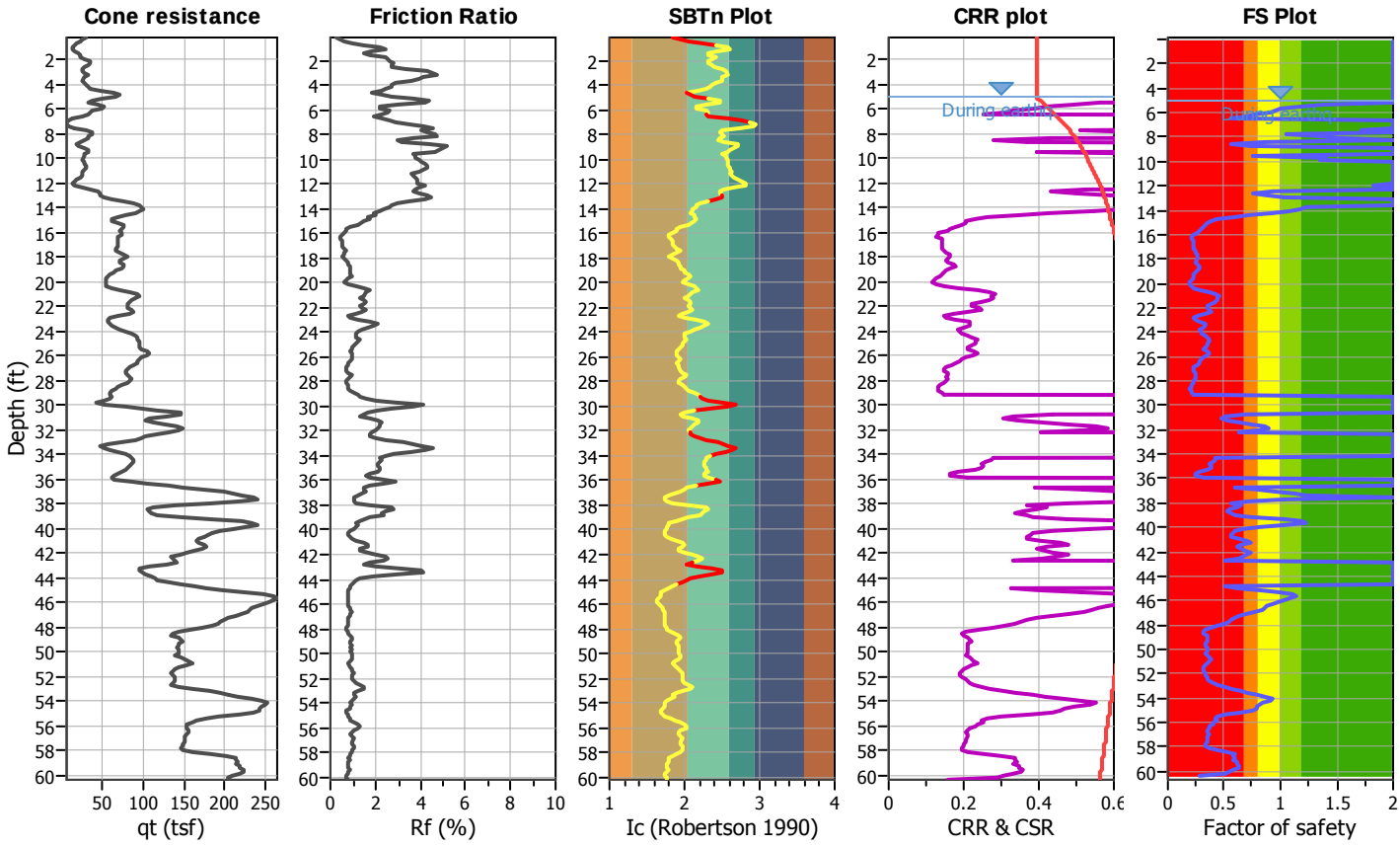
LIQUEFACTION ANALYSIS REPORT

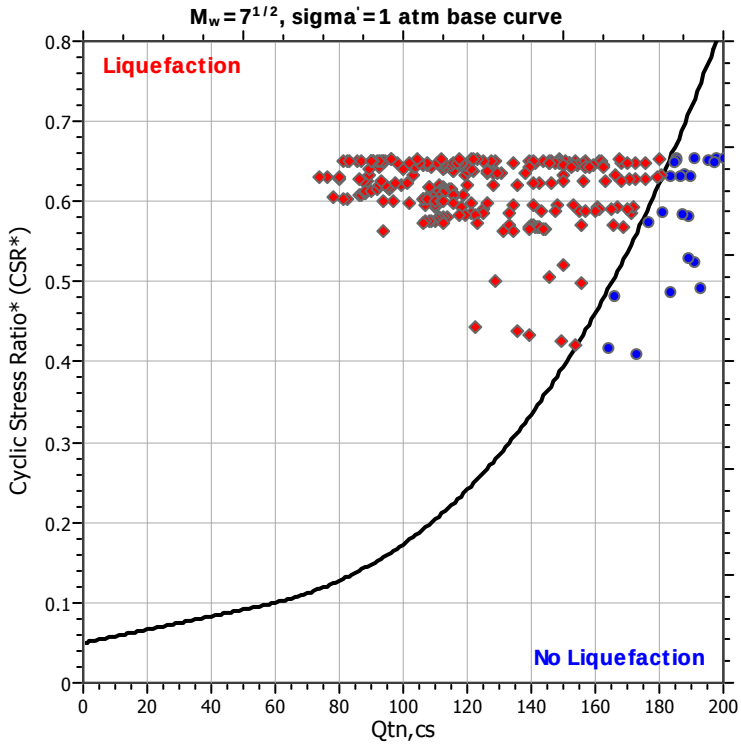
Project title : **Location :**

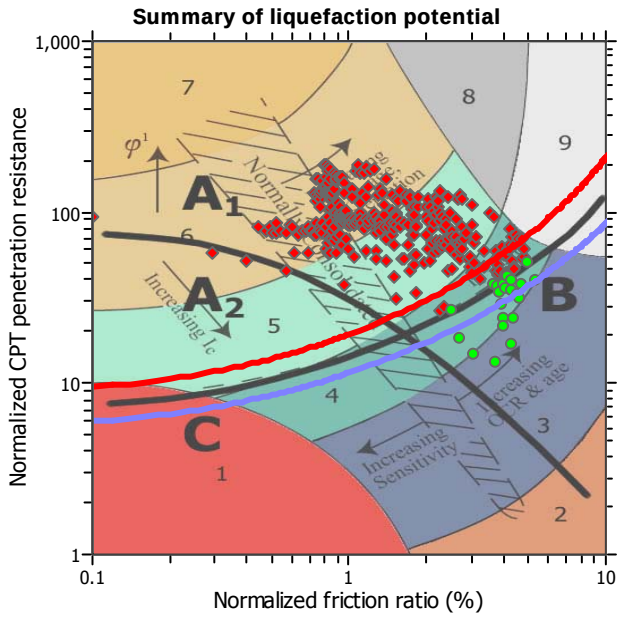
CPT file : CPT-01

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	10.77 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	5.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.57	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

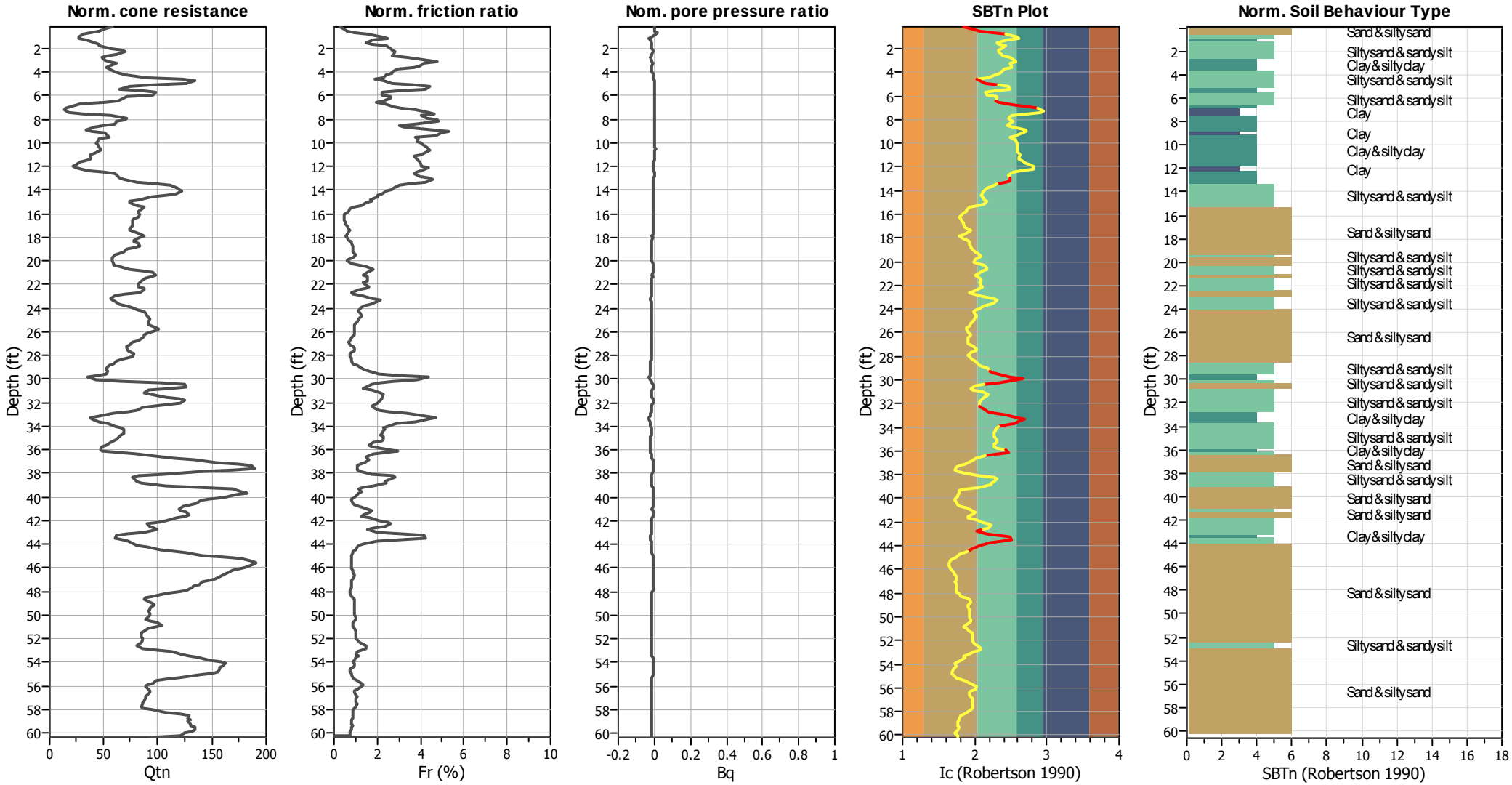






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



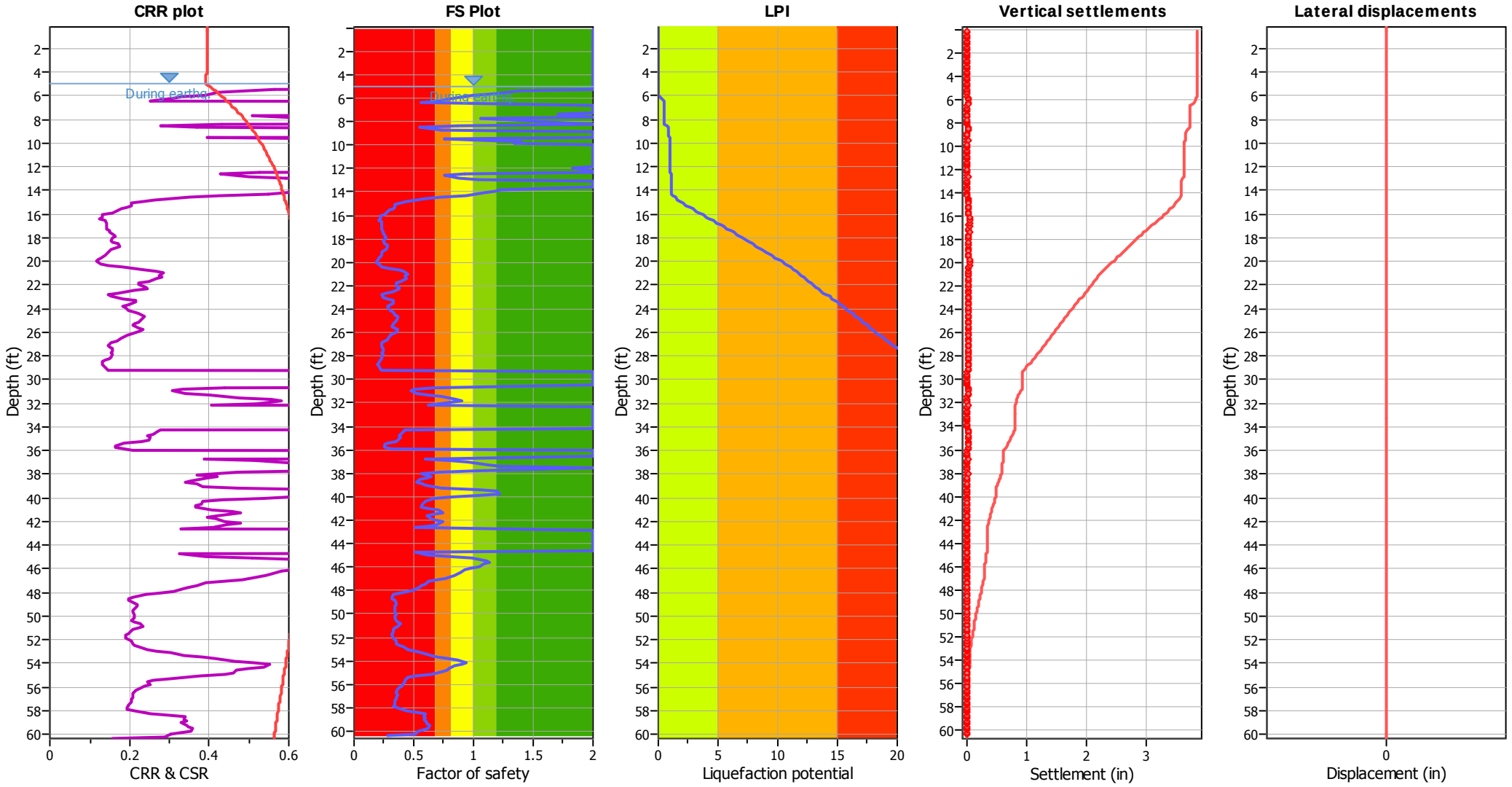
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.77 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.77 ft	Fill height:	N/A	Limit depth:	N/A

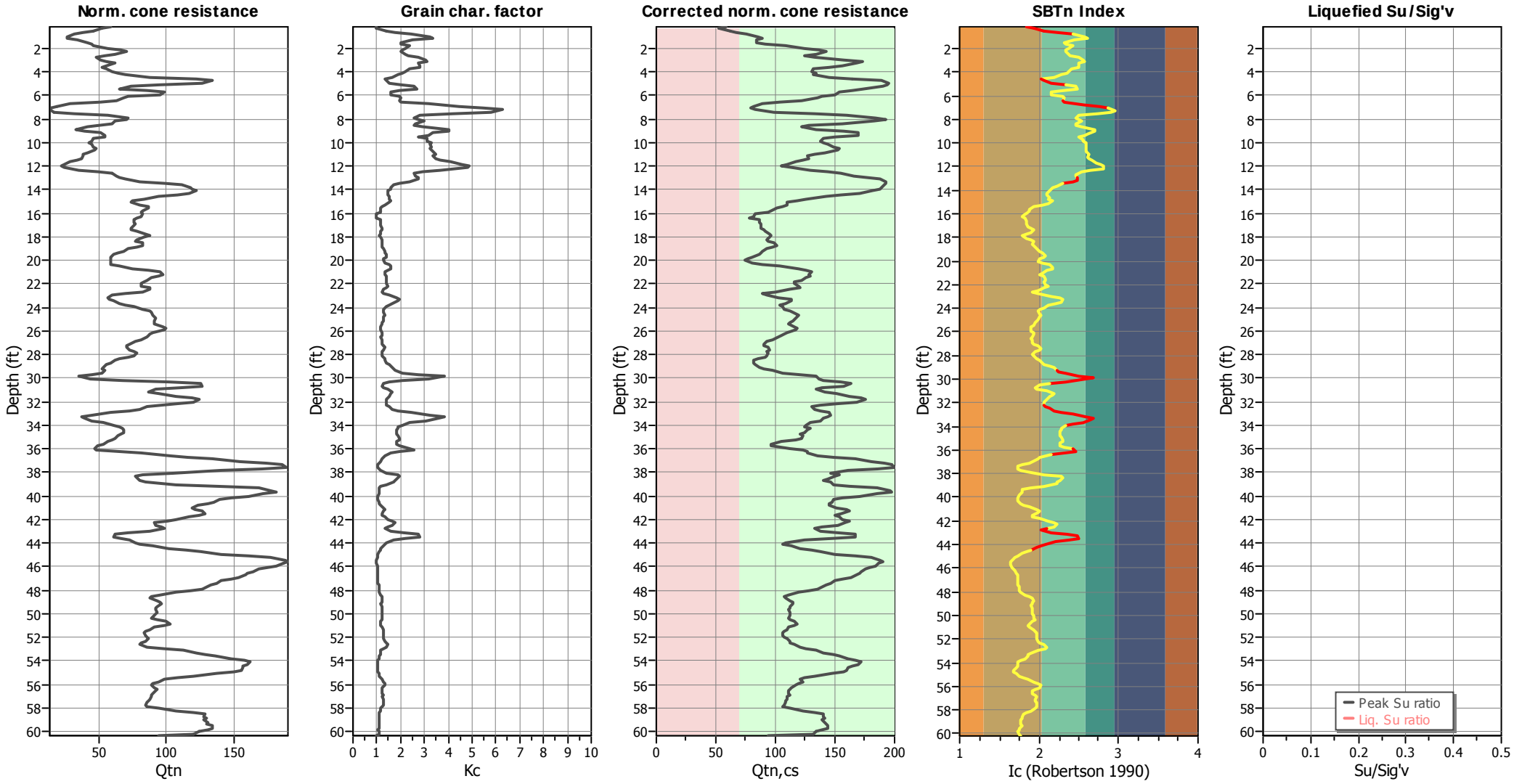
F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

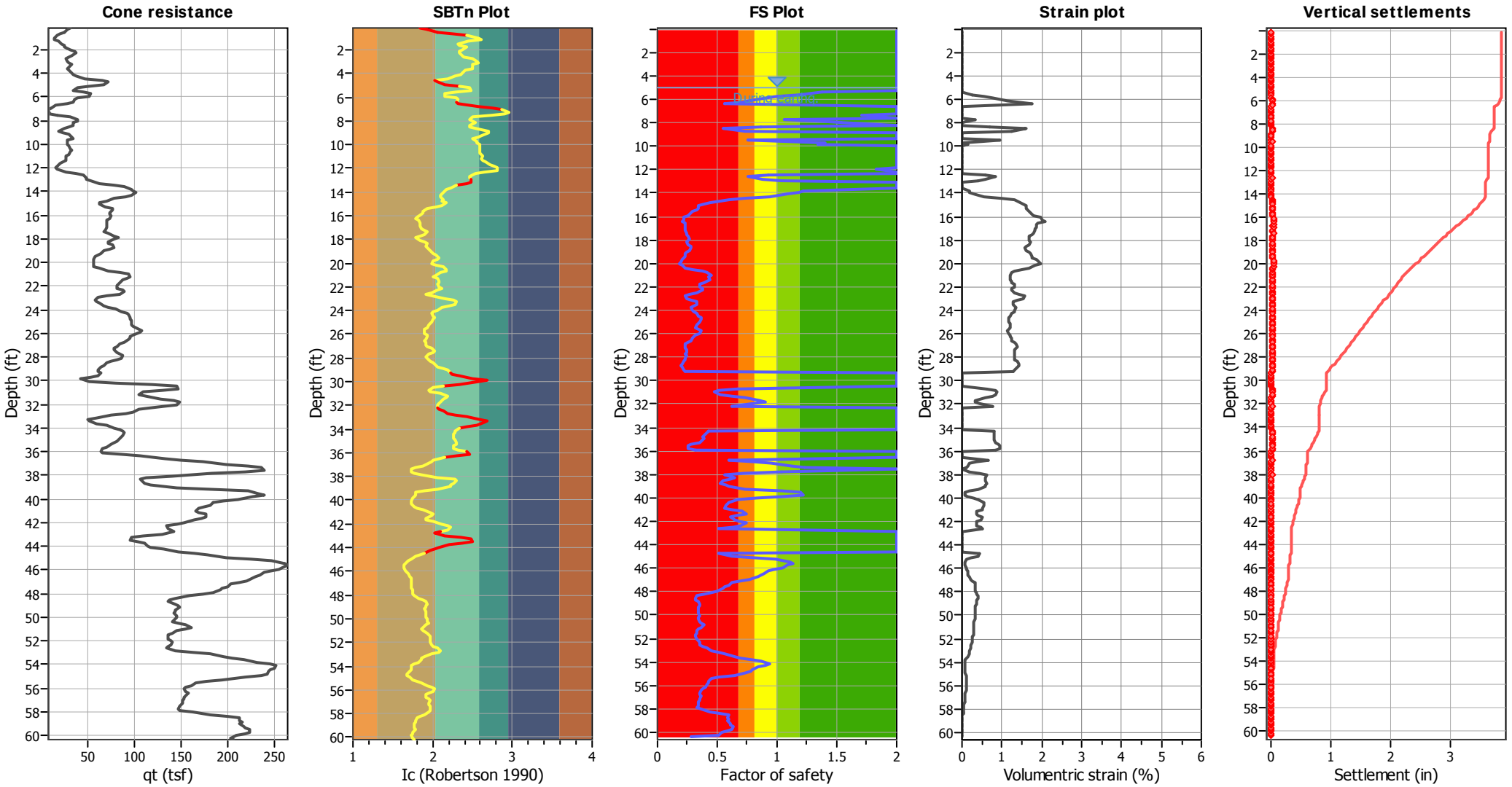
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.77 ft	Fill height:	N/A	Limit depth:	N/A

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Professional Service Industries, Inc.
6032 N. Cutter Circle
Suite 480
Portland, Oregon 97217

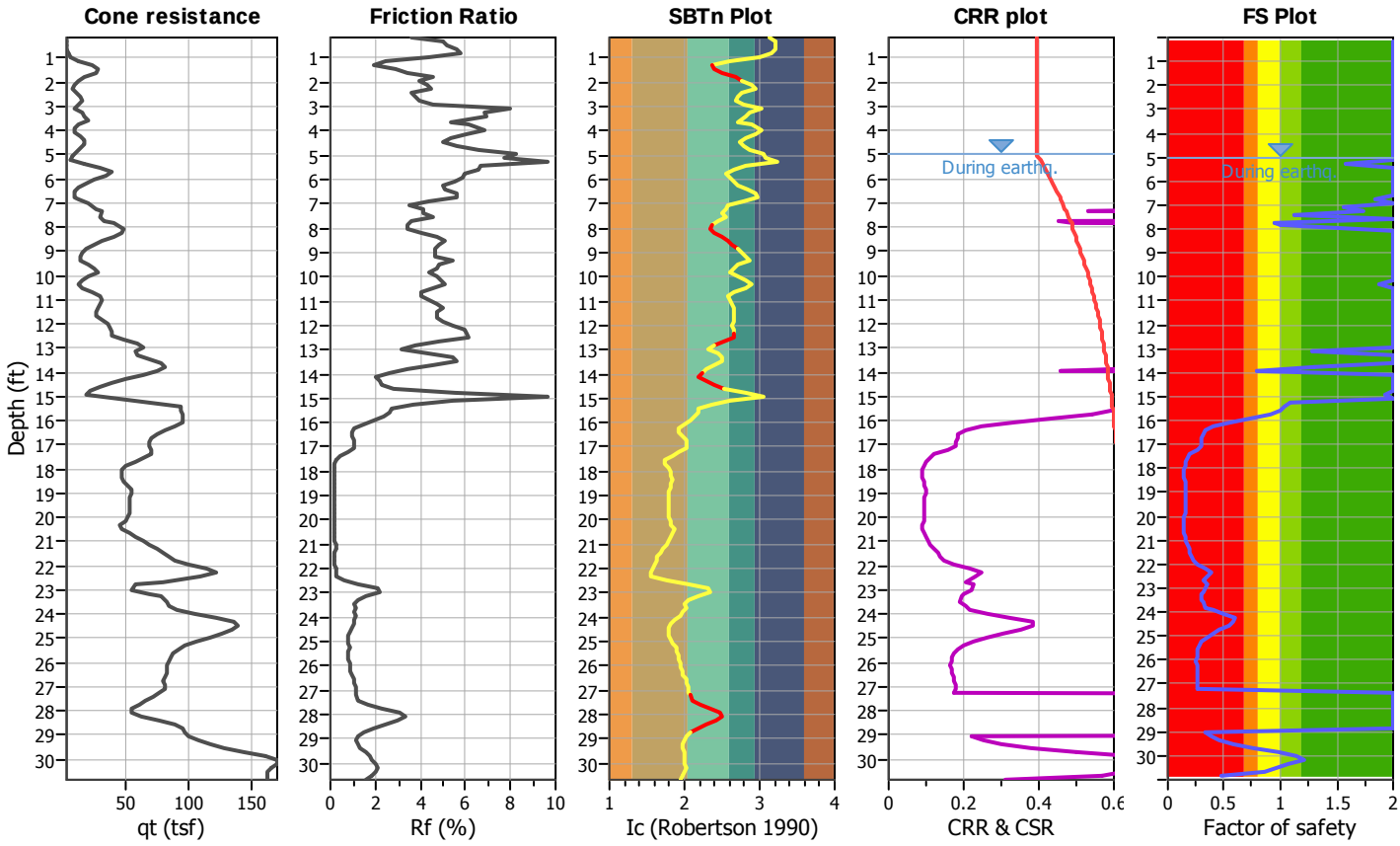
LIQUEFACTION ANALYSIS REPORT

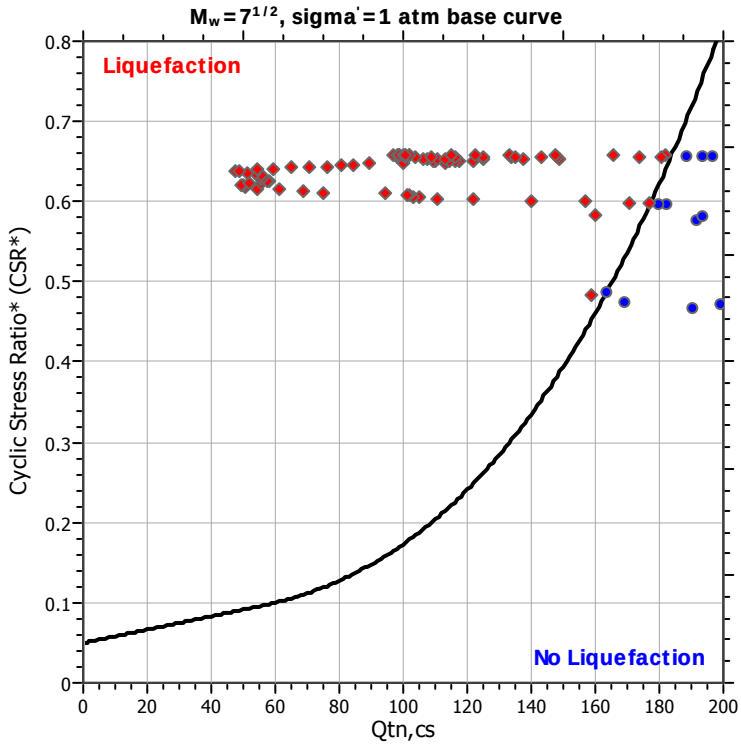
Project title : **Location :**

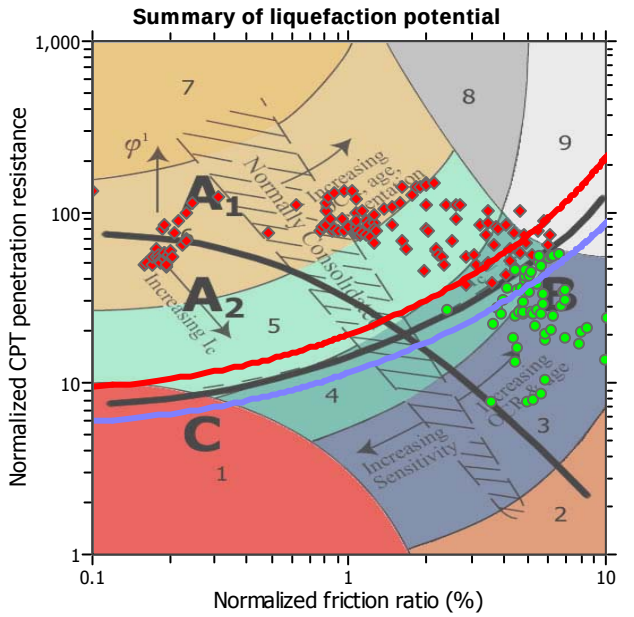
CPT file : CPT-02

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	11.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	5.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.57	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

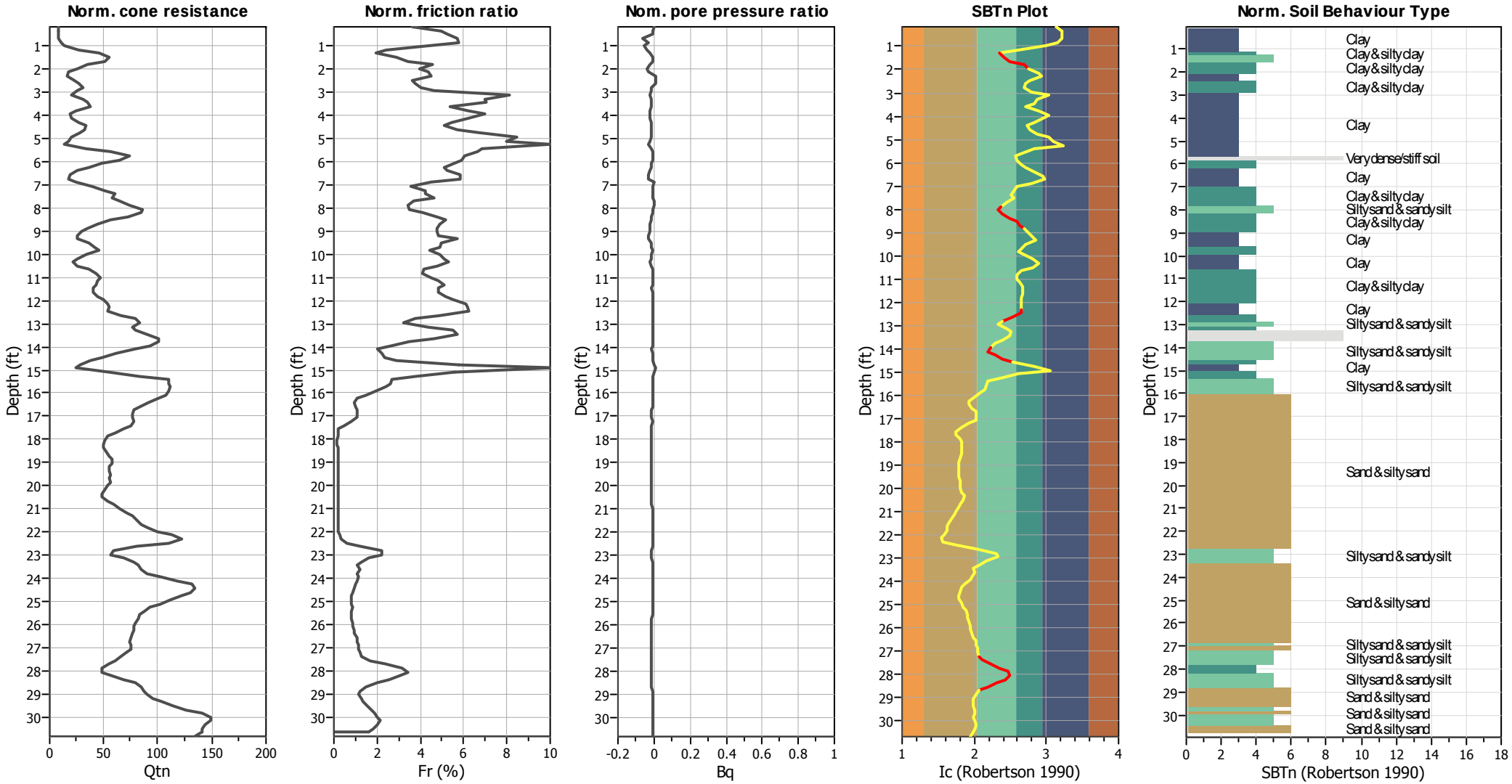






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



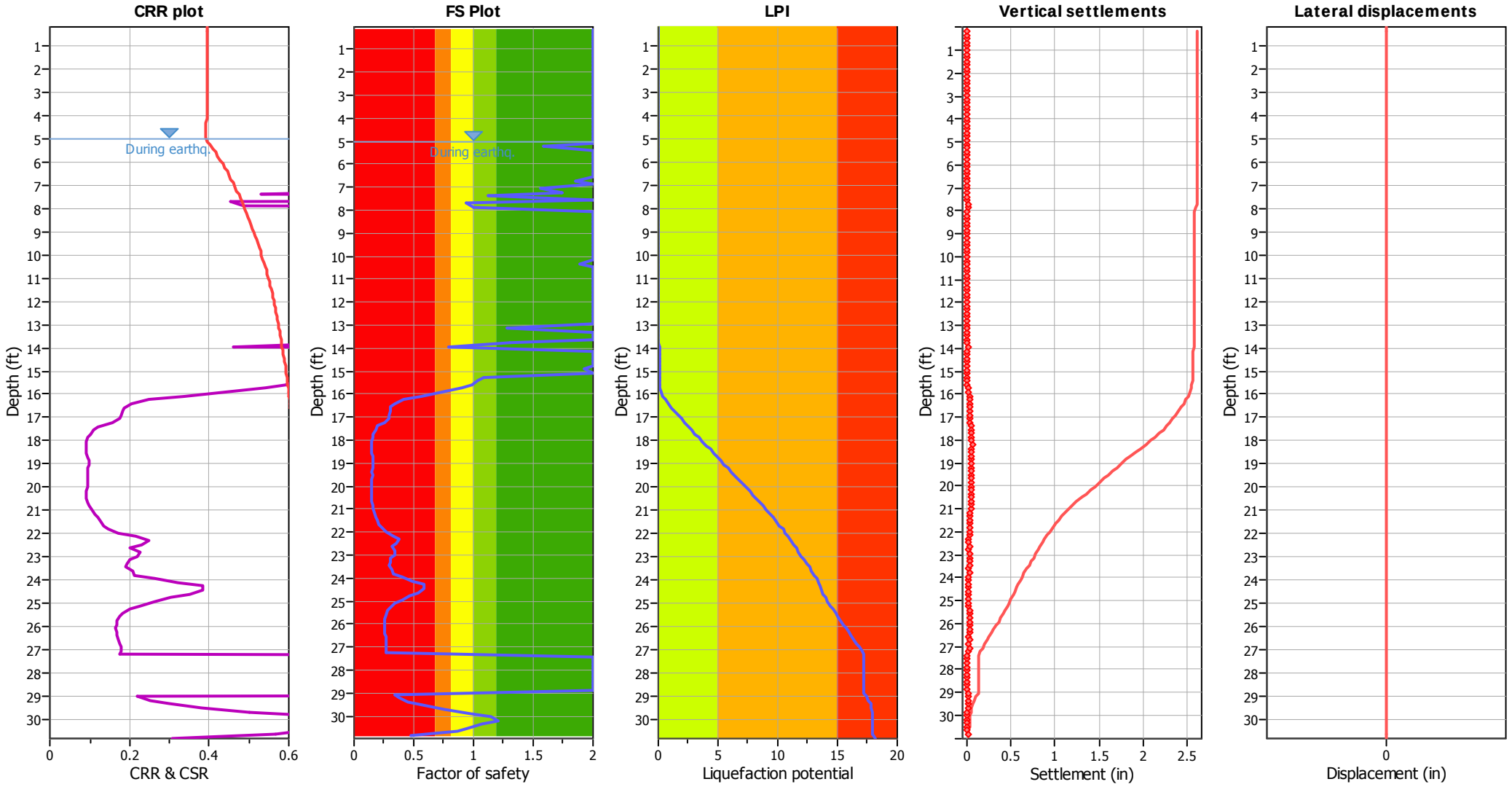
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	N/A

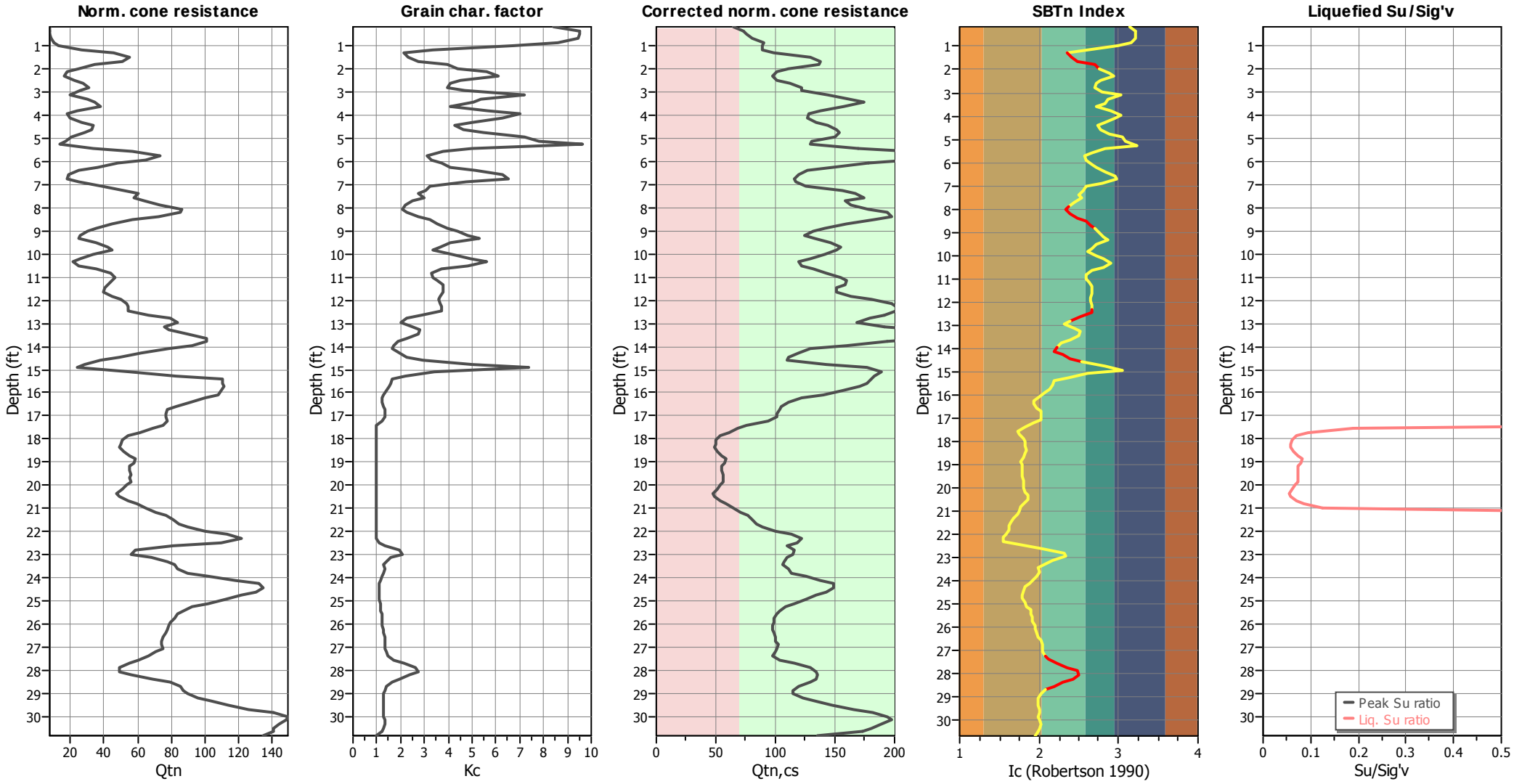
F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

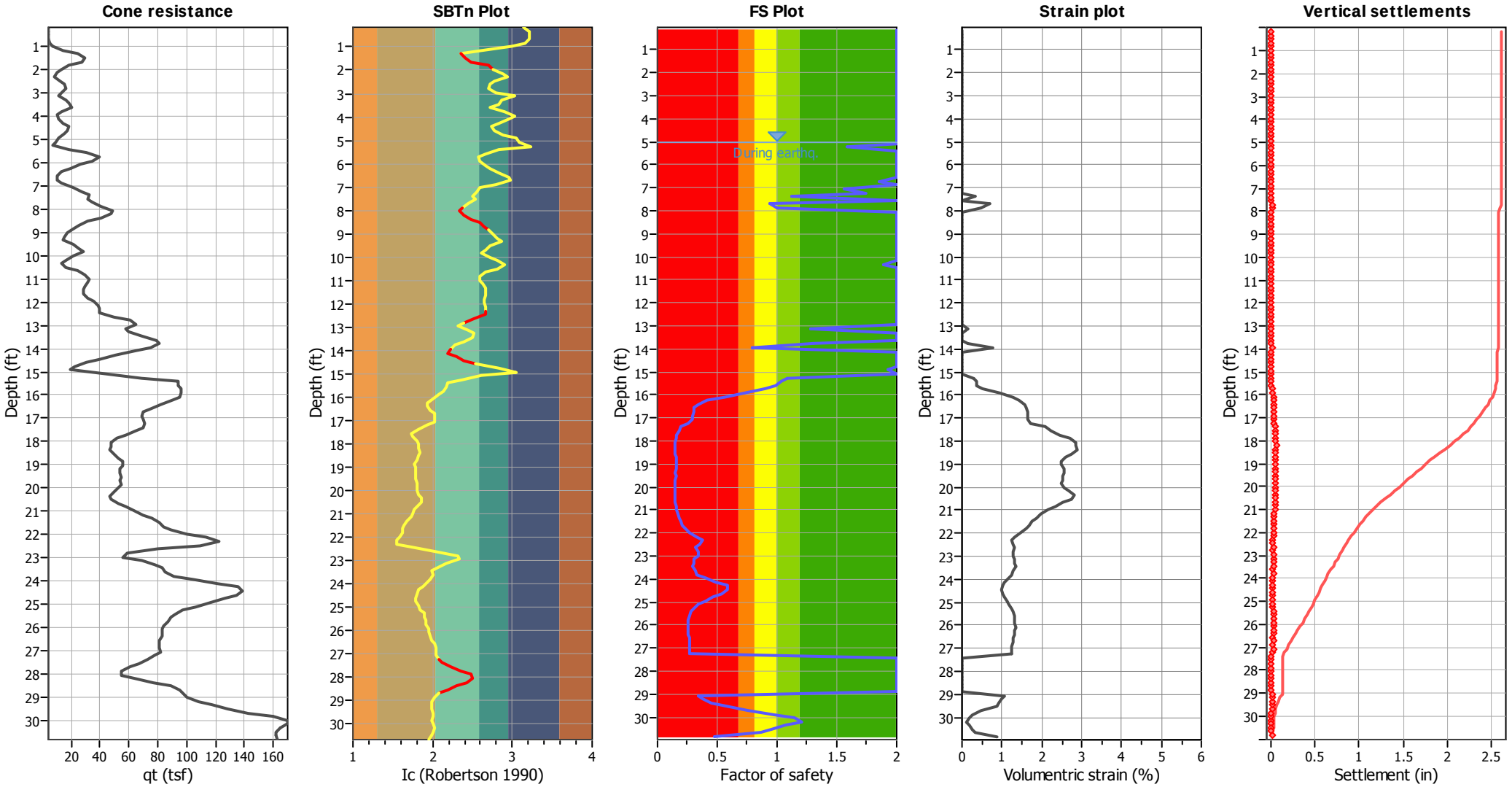
Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	11.00 ft	Fill height:	N/A	Limit depth:	N/A

Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Professional Service Industries, Inc.
6032 N. Cutter Circle
Suite 480
Portland, Oregon 97217

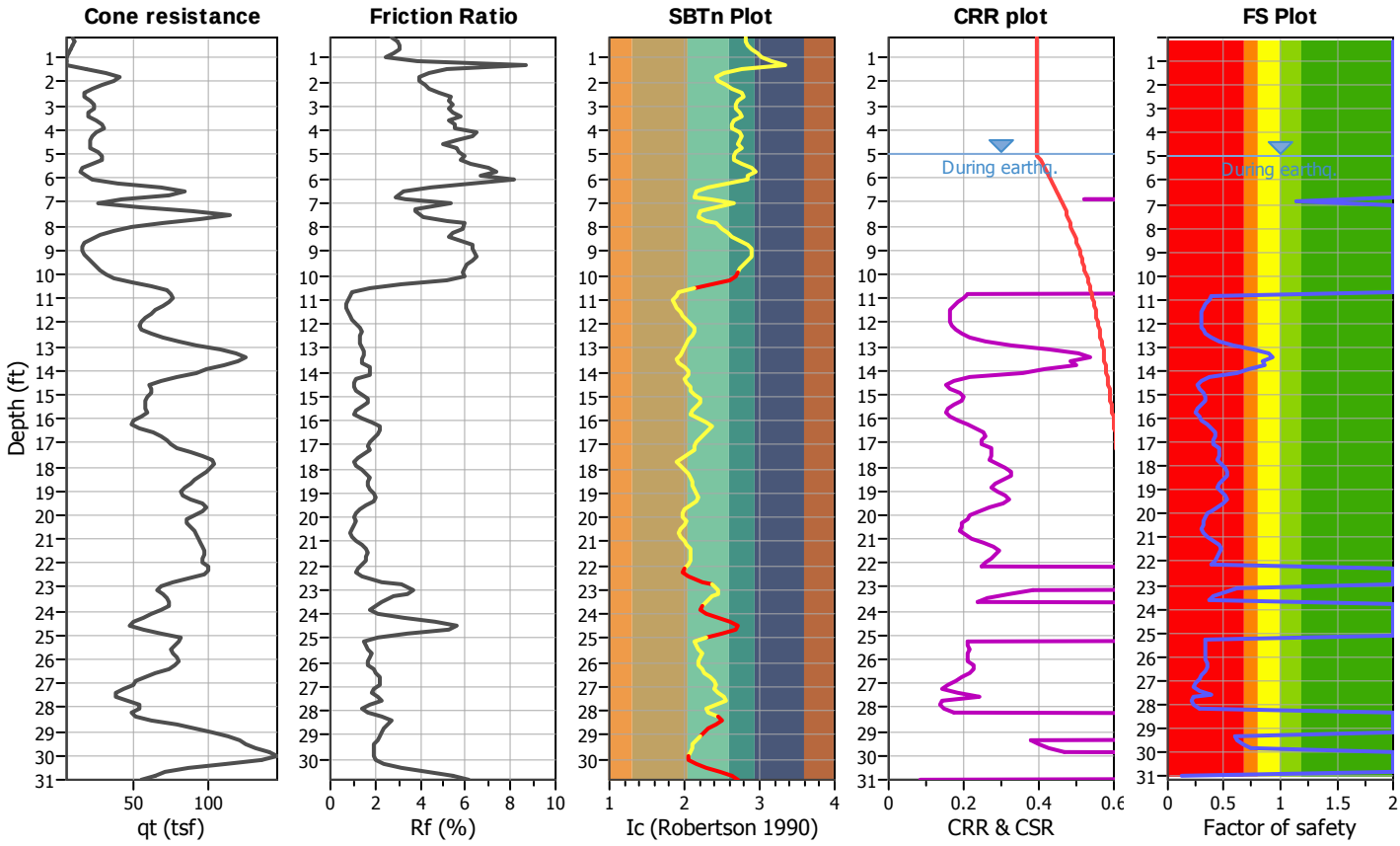
LIQUEFACTION ANALYSIS REPORT

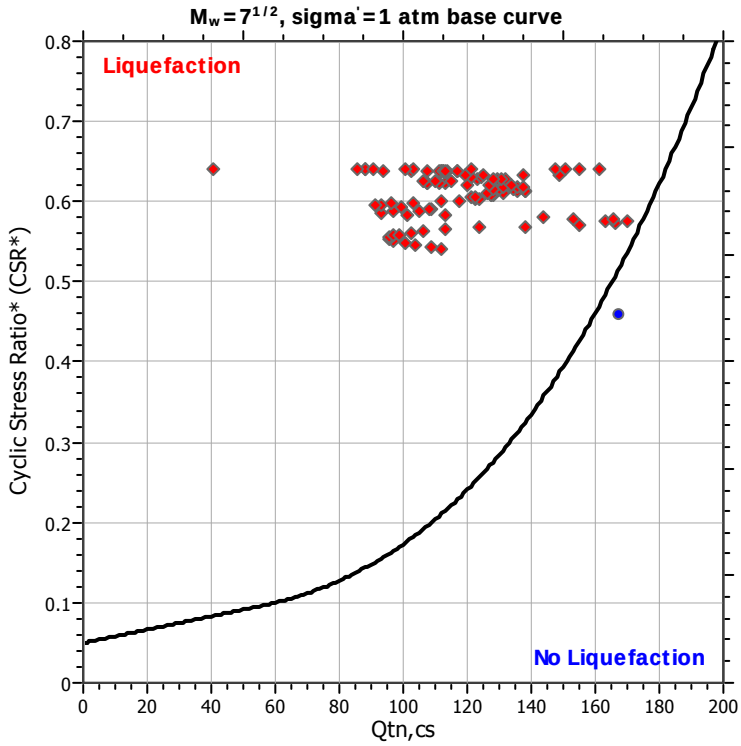
Project title : **Location :**

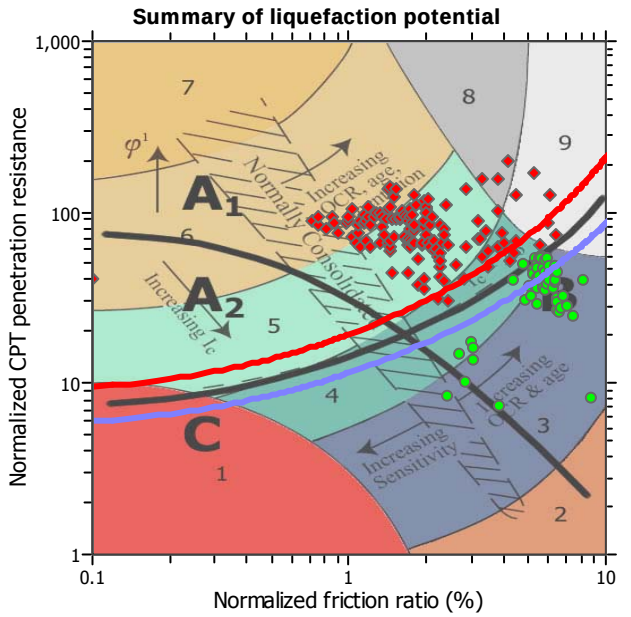
CPT file : CPT-03

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	12.85 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	5.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.57	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

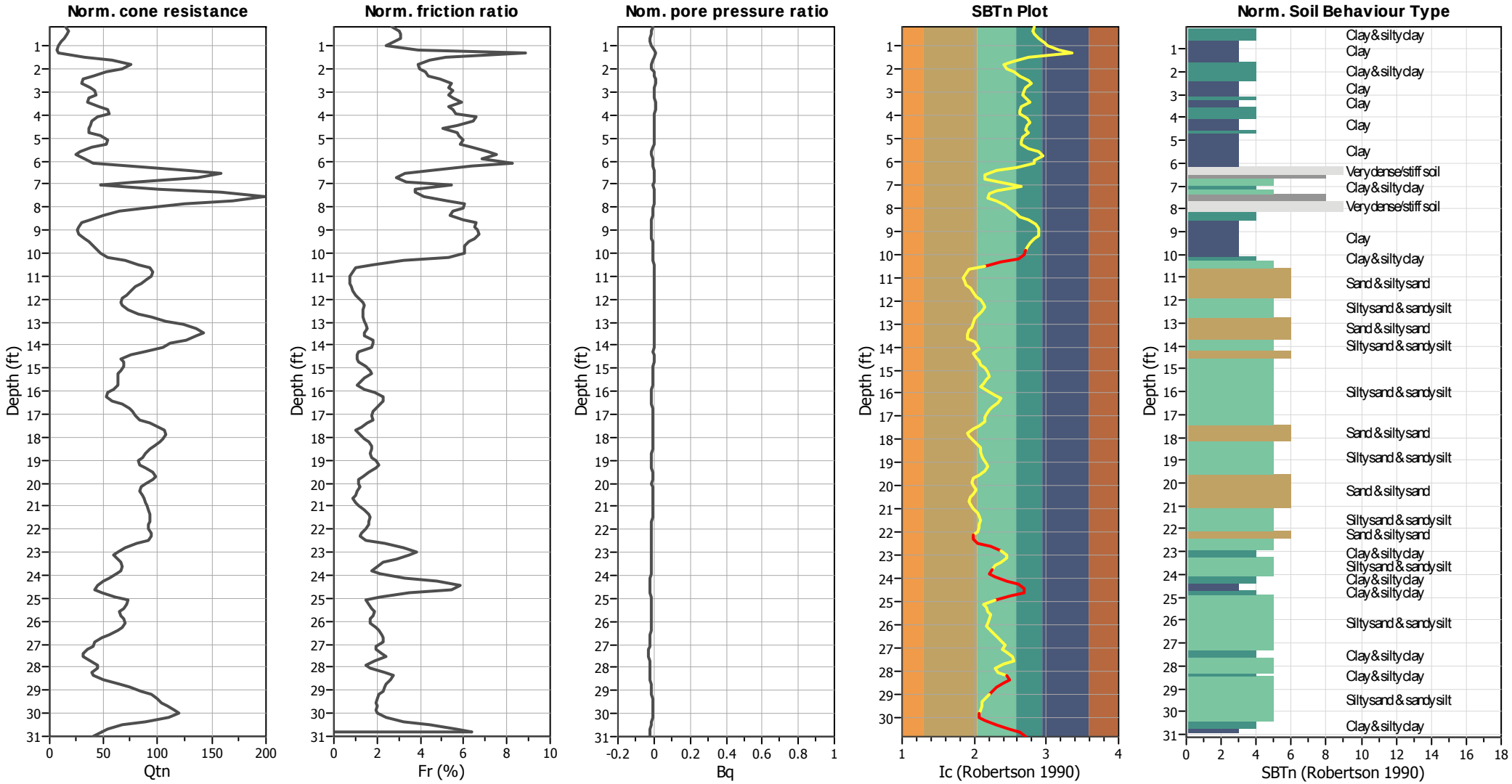






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots (normalized)



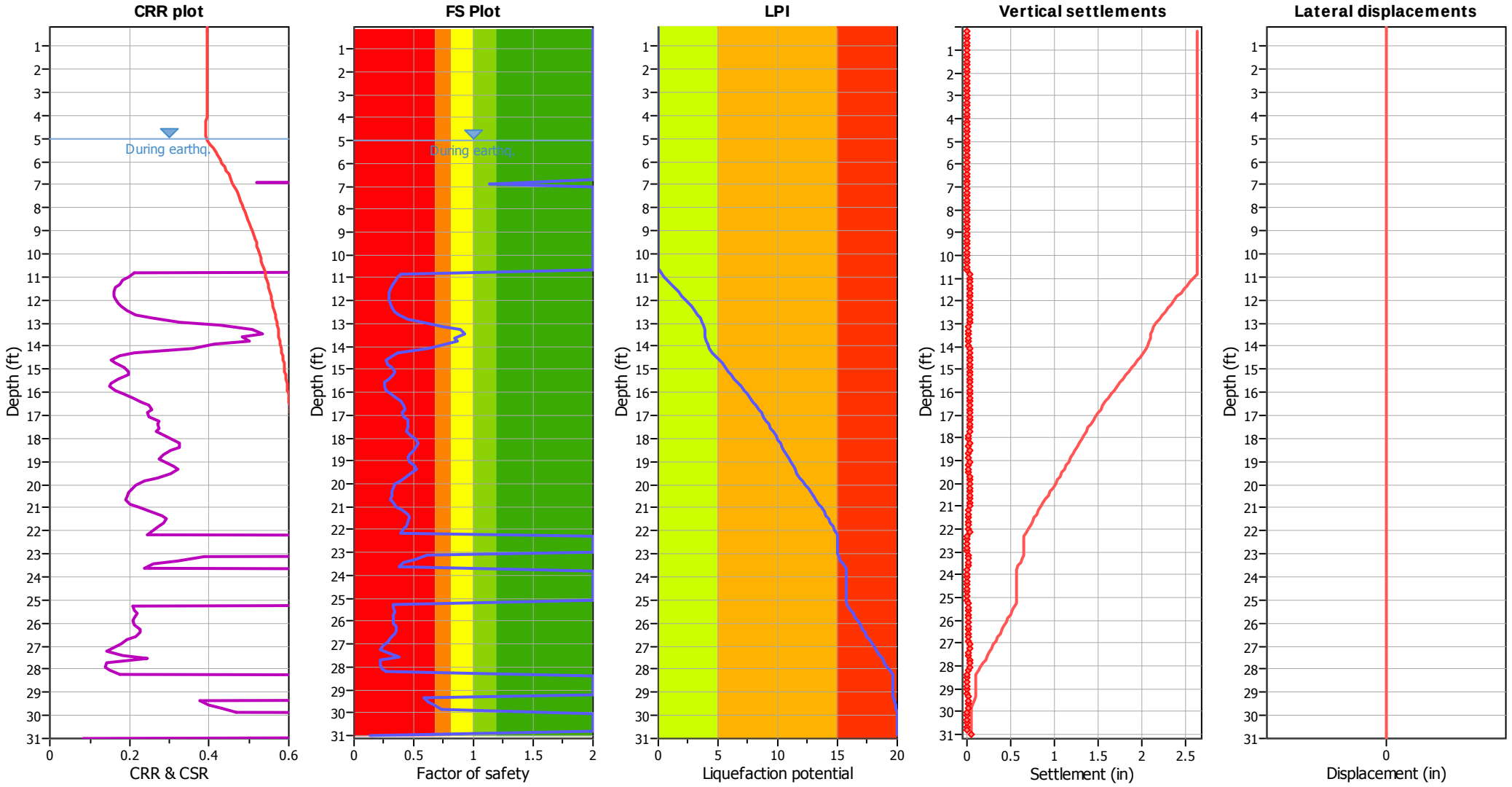
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.57	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	12.85 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots



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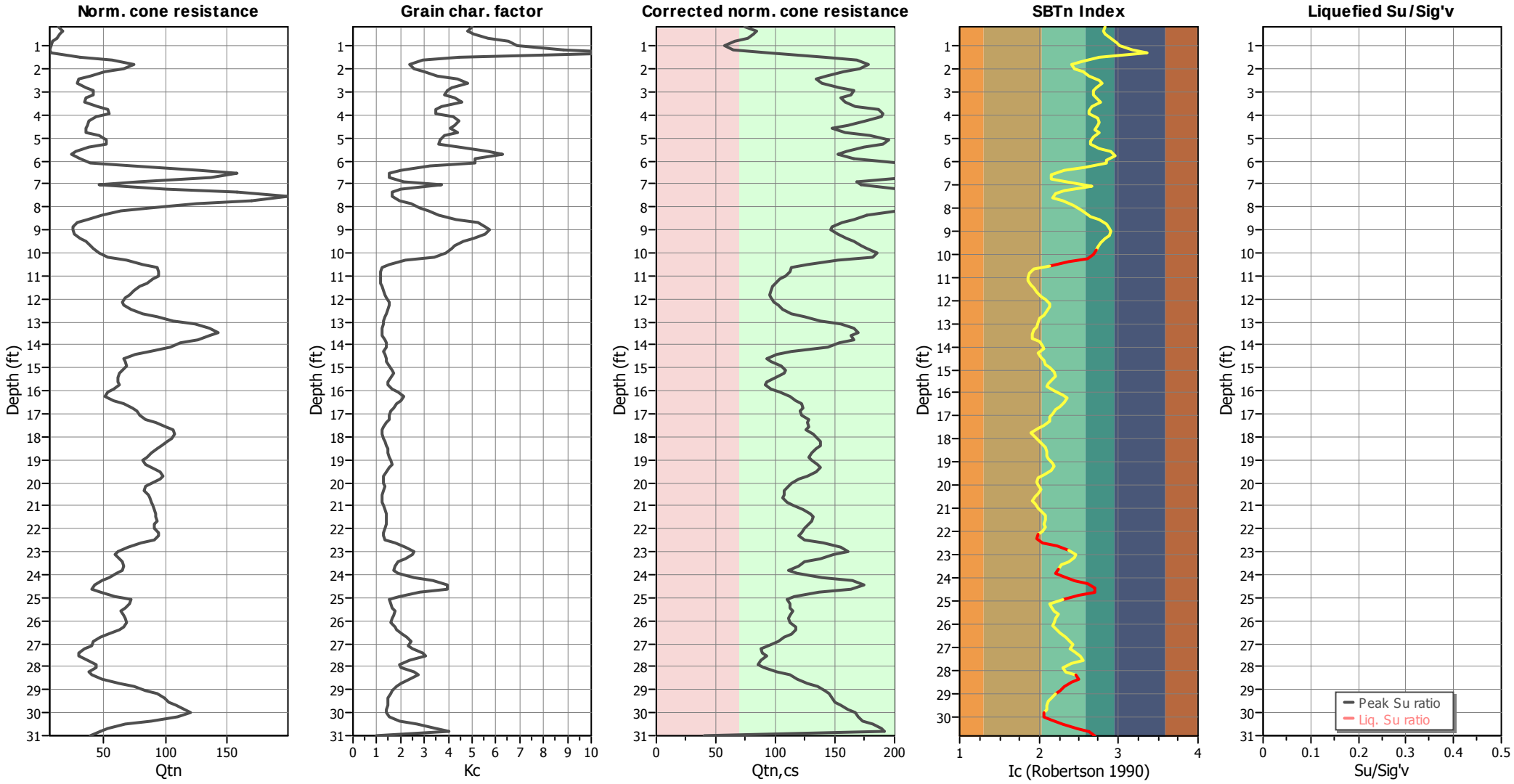
F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

Check for strength loss plots (Robertson (2010))



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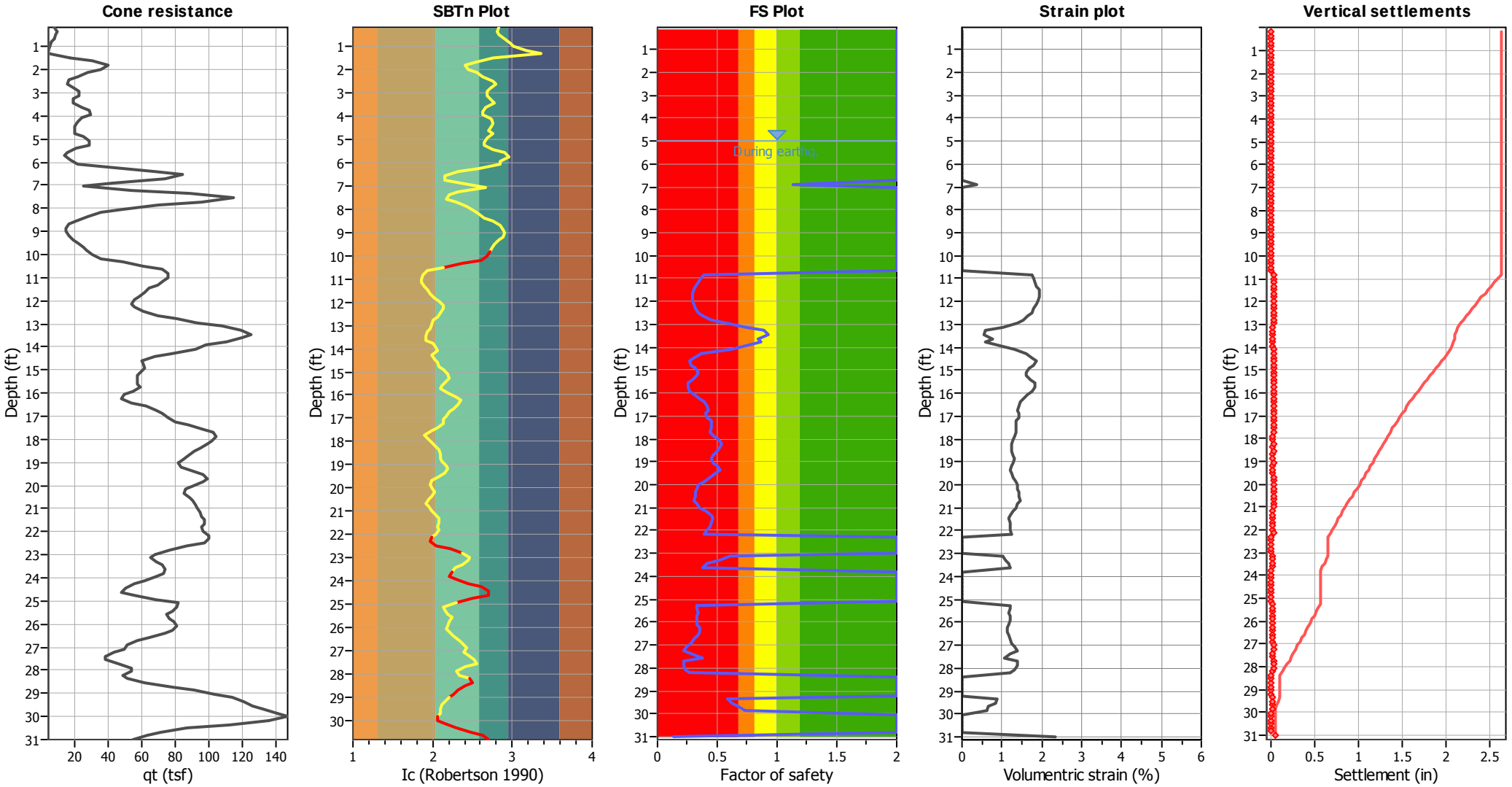
Estimation of post-earthquake settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
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FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Professional Service Industries, Inc.
6032 N. Cutter Circle
Suite 480
Portland, Oregon 97217

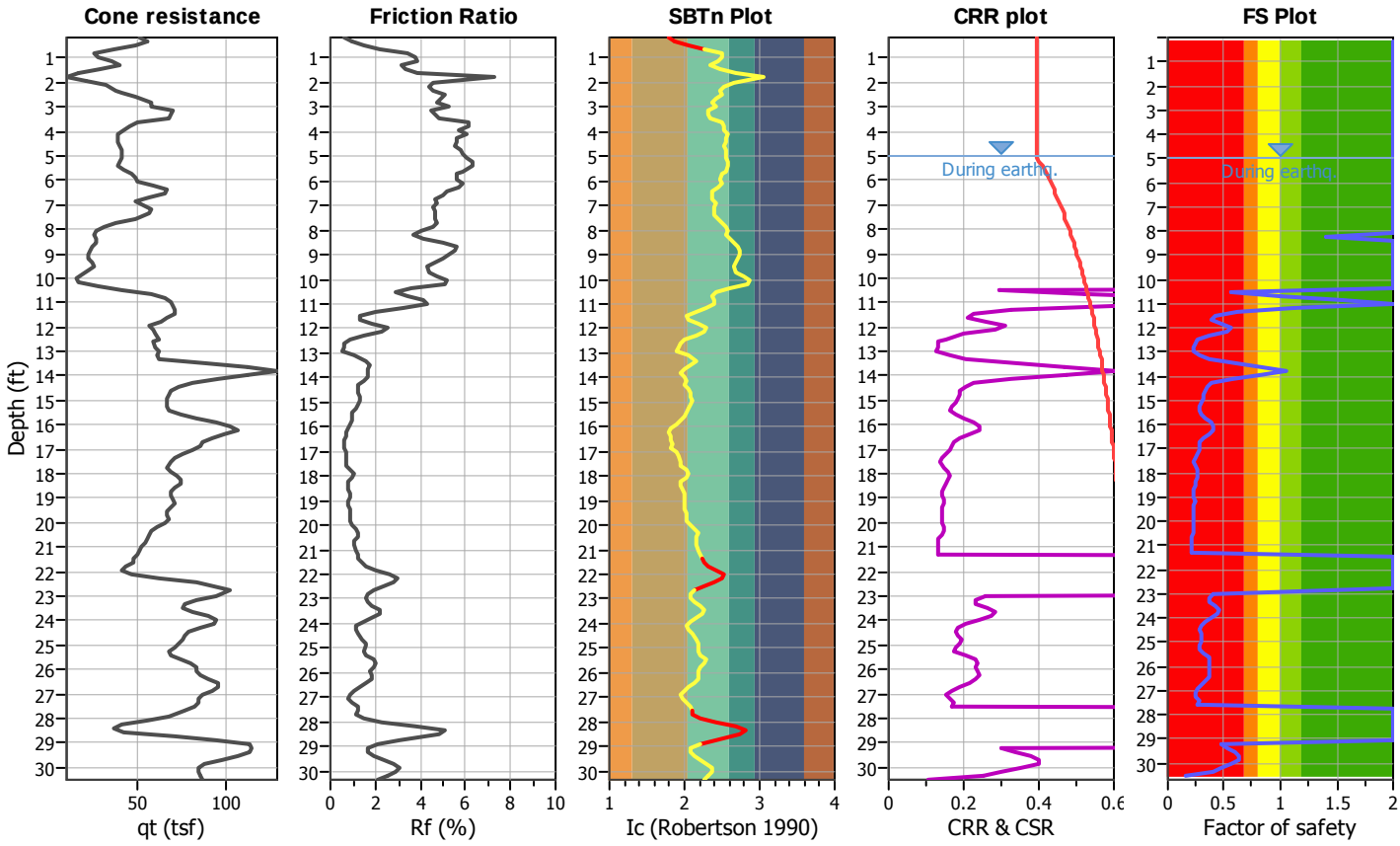
LIQUEFACTION ANALYSIS REPORT

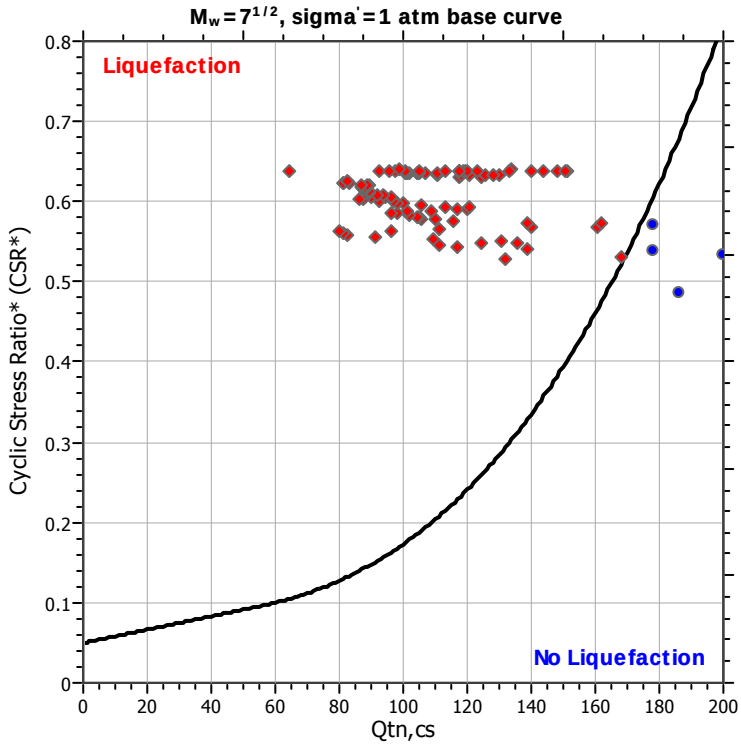
Project title : **Location :**

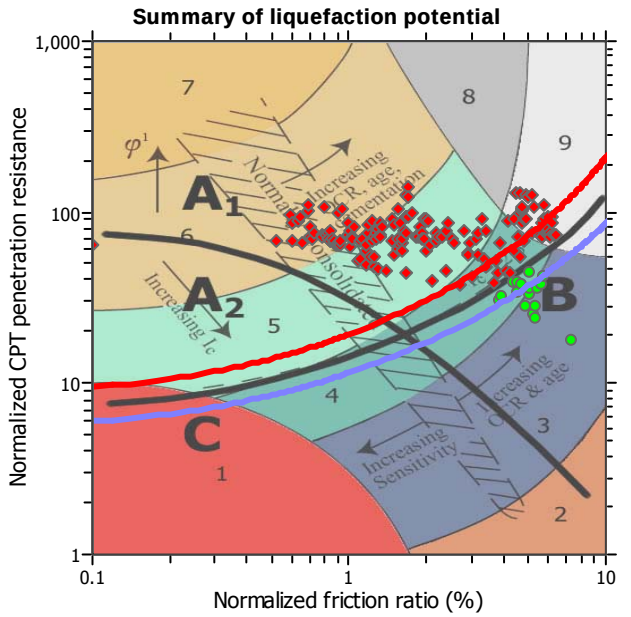
CPT file : CPT-04

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	13.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	5.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.57	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







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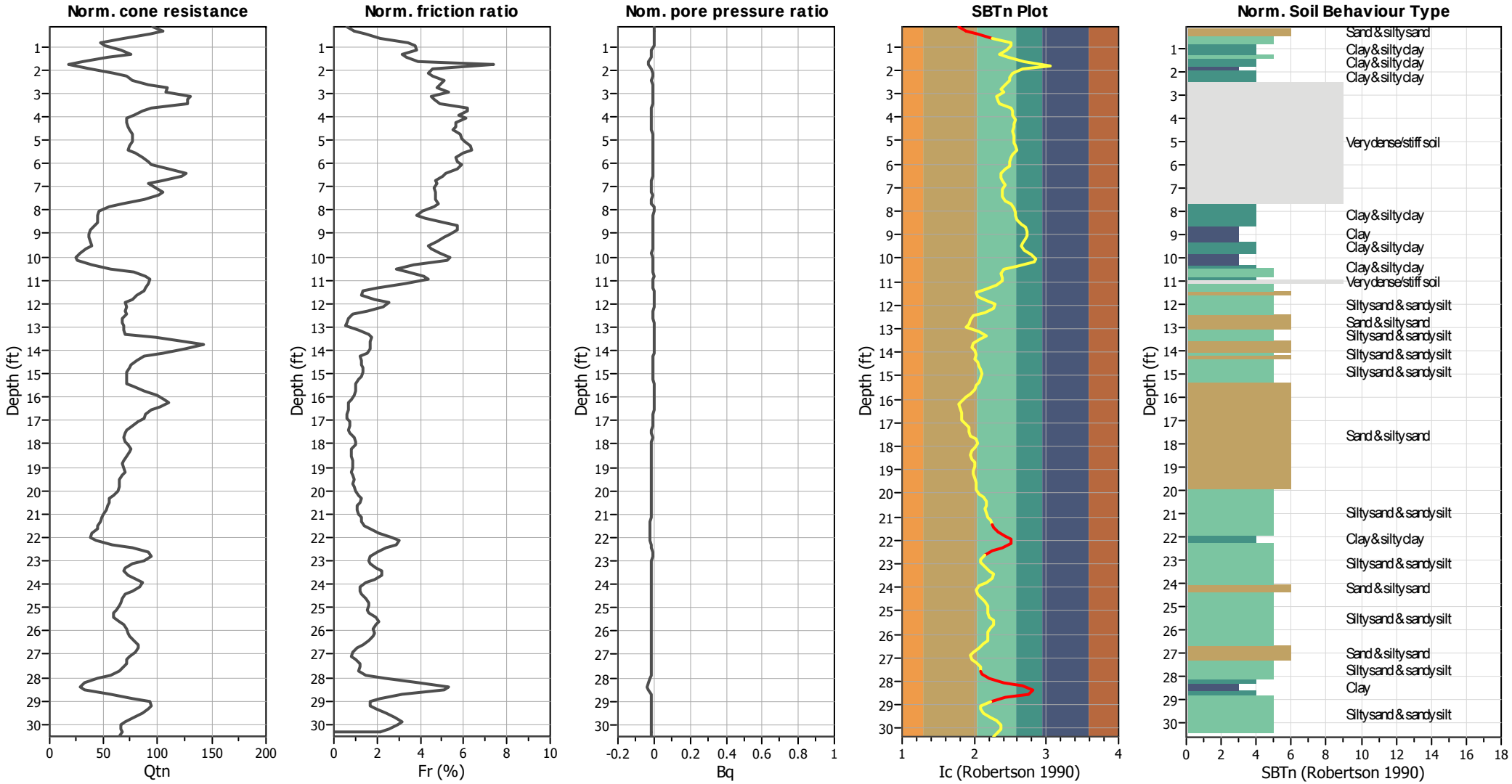

Input parameters and analysis data

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SBTn legend

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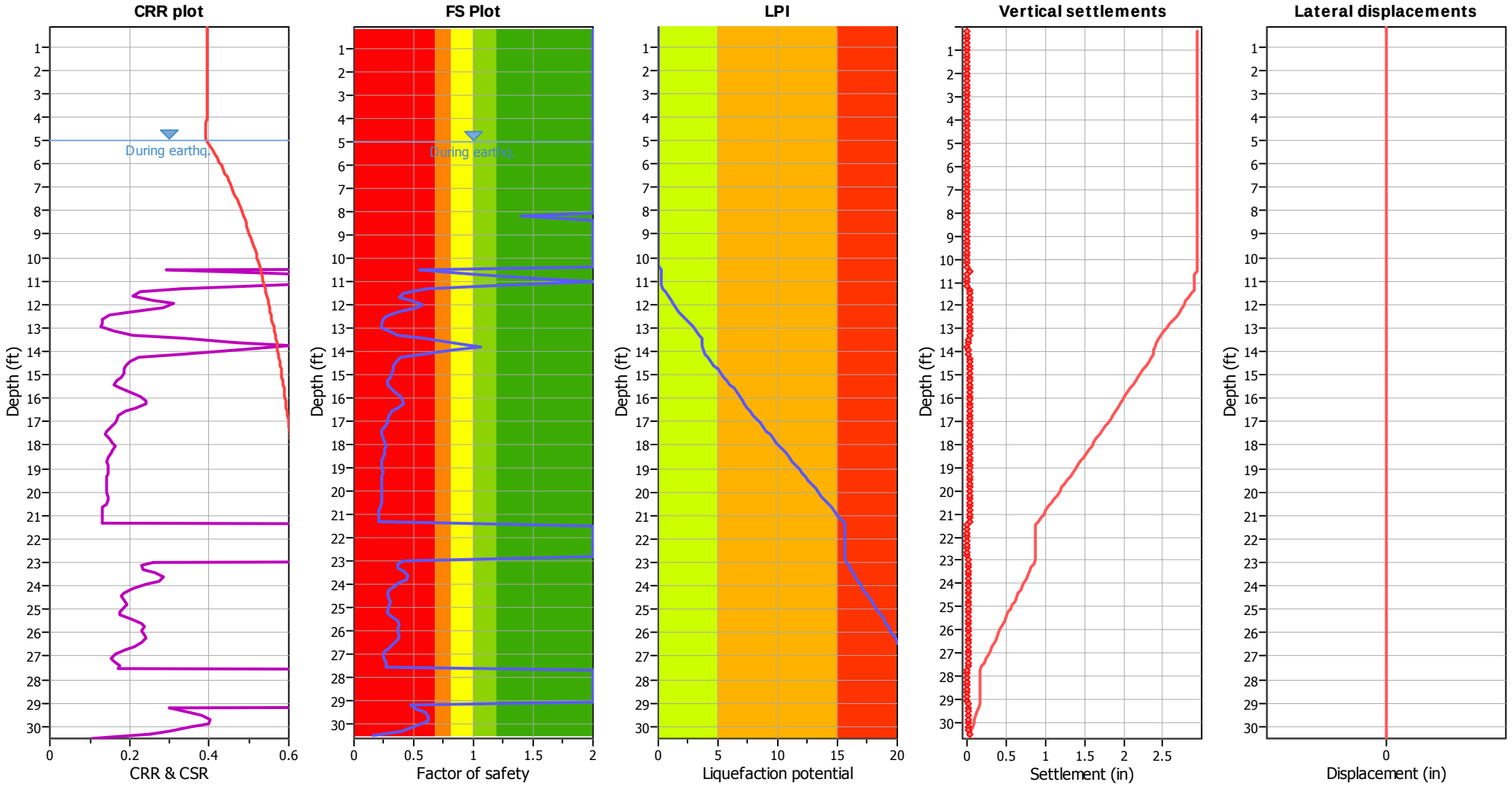

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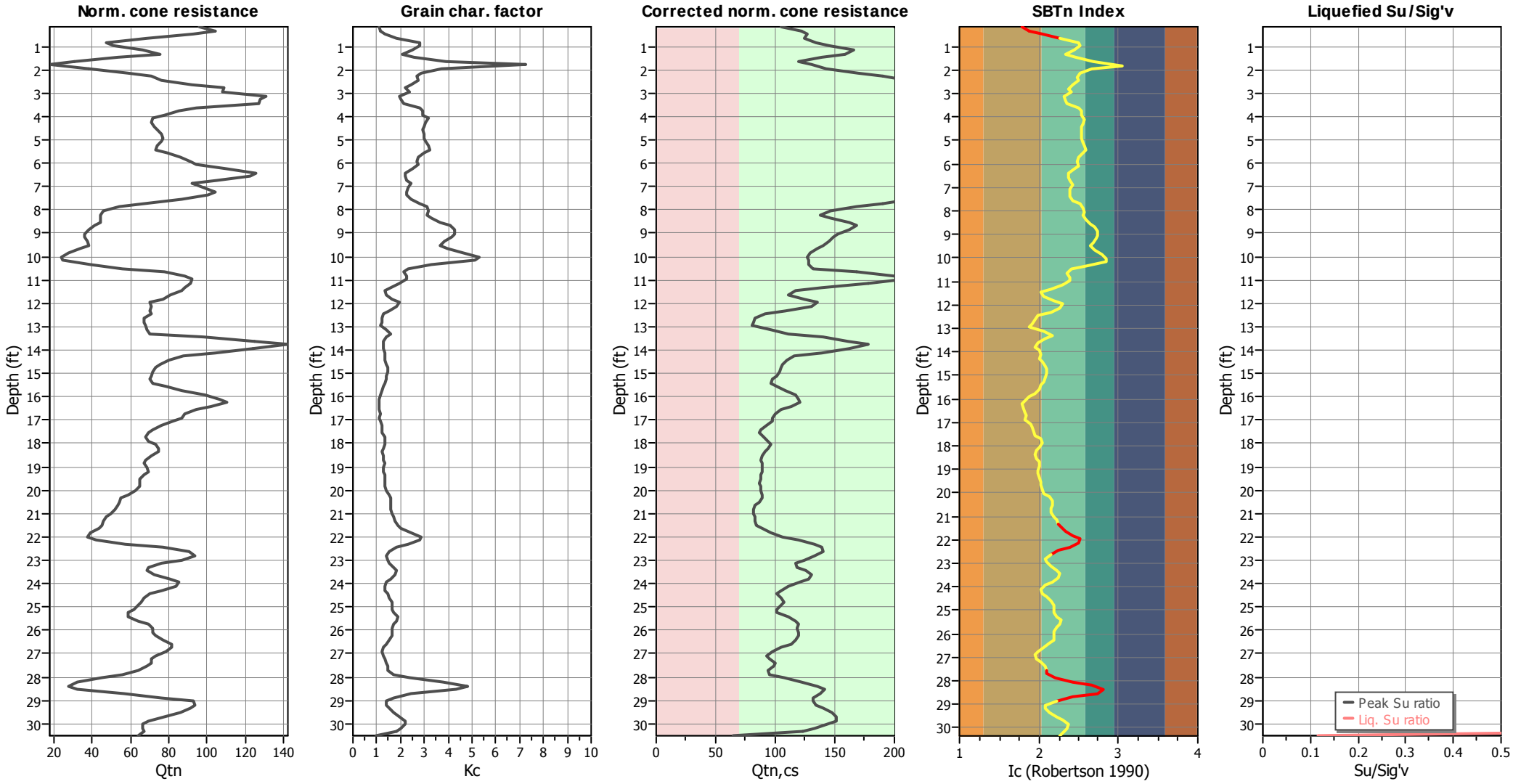

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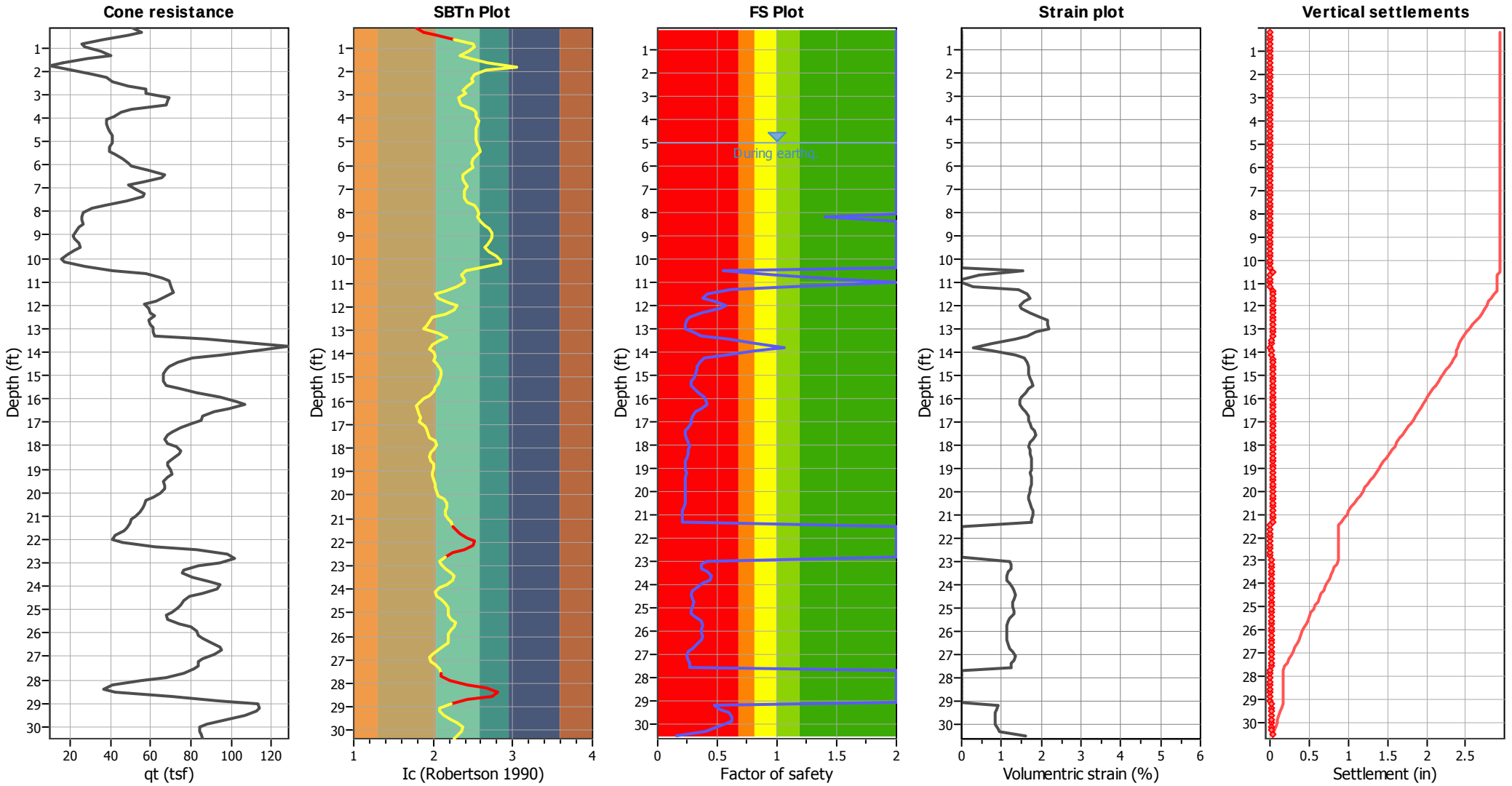
Estimation of post-earthquake settlements



Abbreviations

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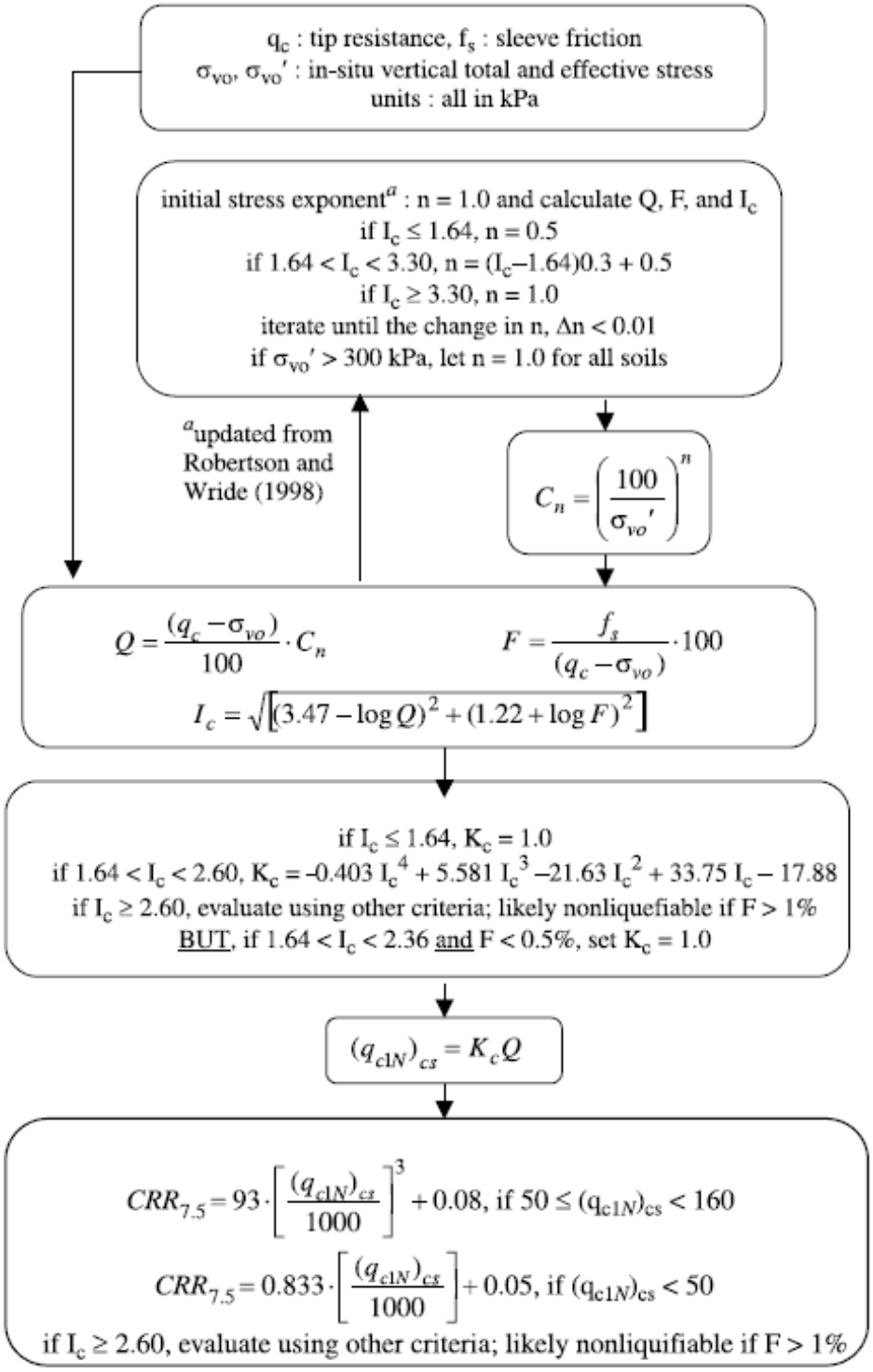
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Procedure for the evaluation of soil liquefaction resistance, NCEER (1998)

Calculation of soil resistance against liquefaction is performed according to the Robertson & Wride (1998) procedure. The procedure used in the software, slightly differs from the one originally published in NCEER-97-0022 (Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils). The revised procedure is presented below in the form of a flowchart[1]:



[1] "Estimating liquefaction-induced ground settlements from CPT for level ground", G. Zhang, P.K. Robertson, and R.W.I. Brachman

Procedure for the evaluation of soil liquefaction resistance (all soils), Robertson (2010)

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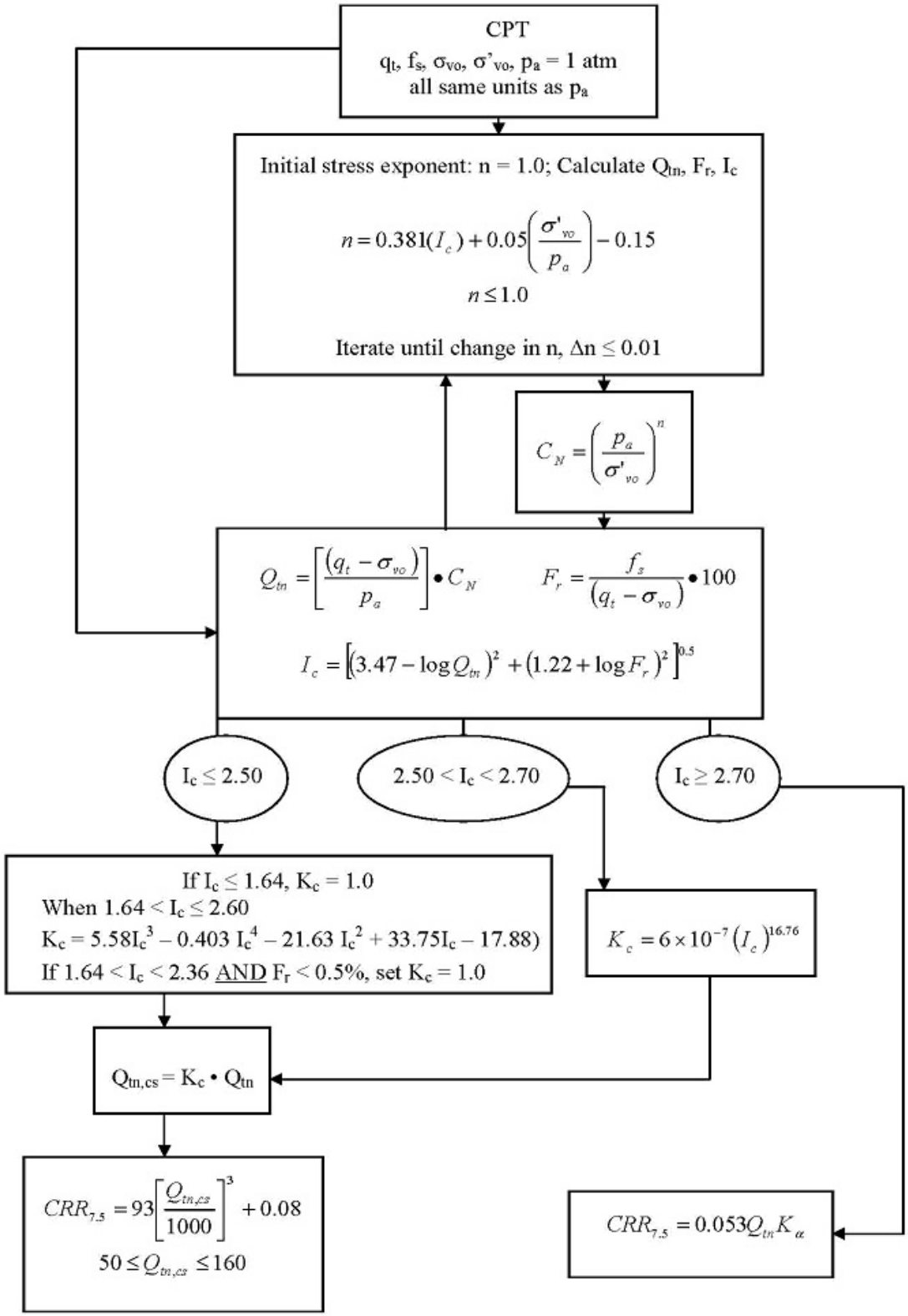
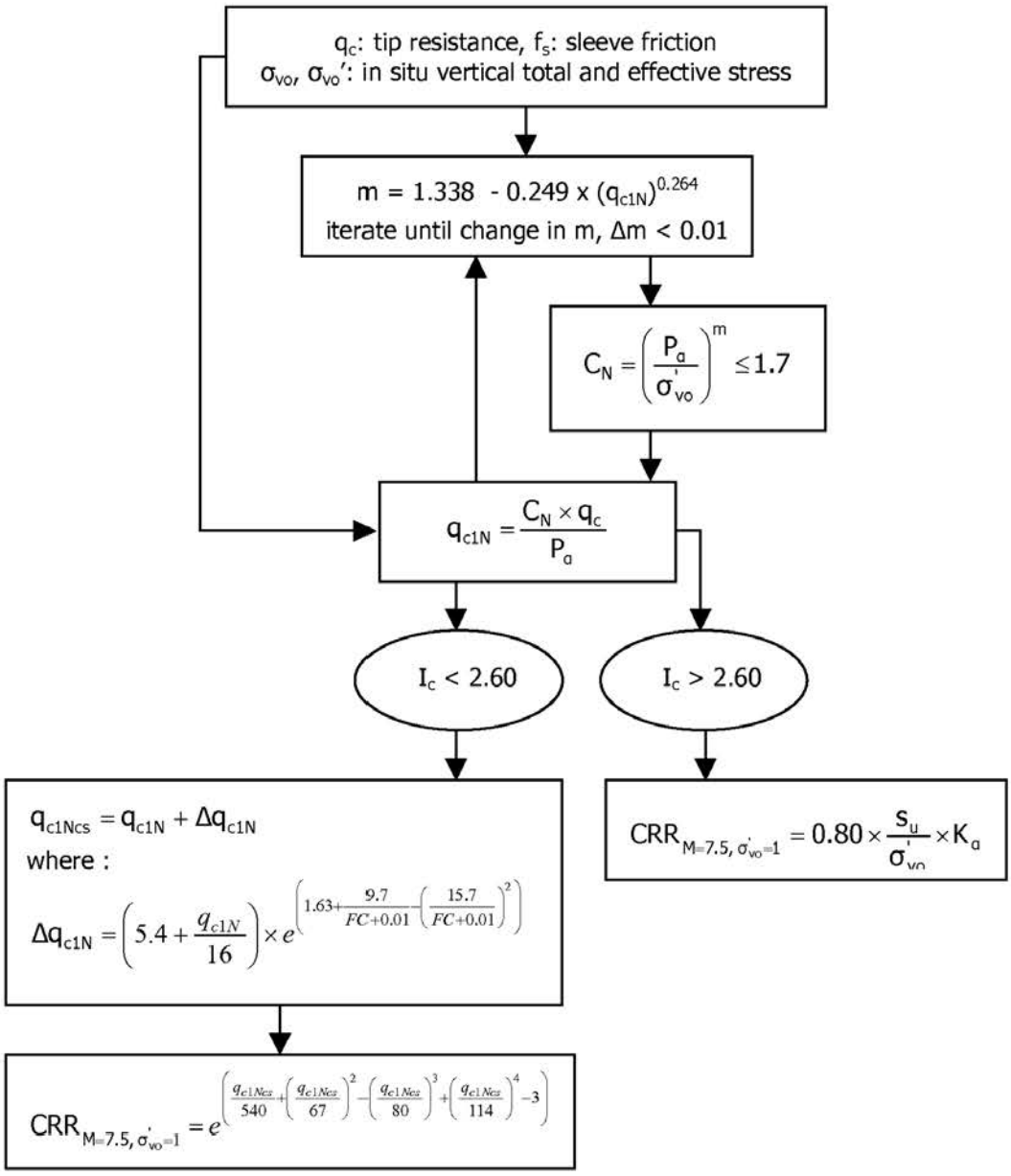
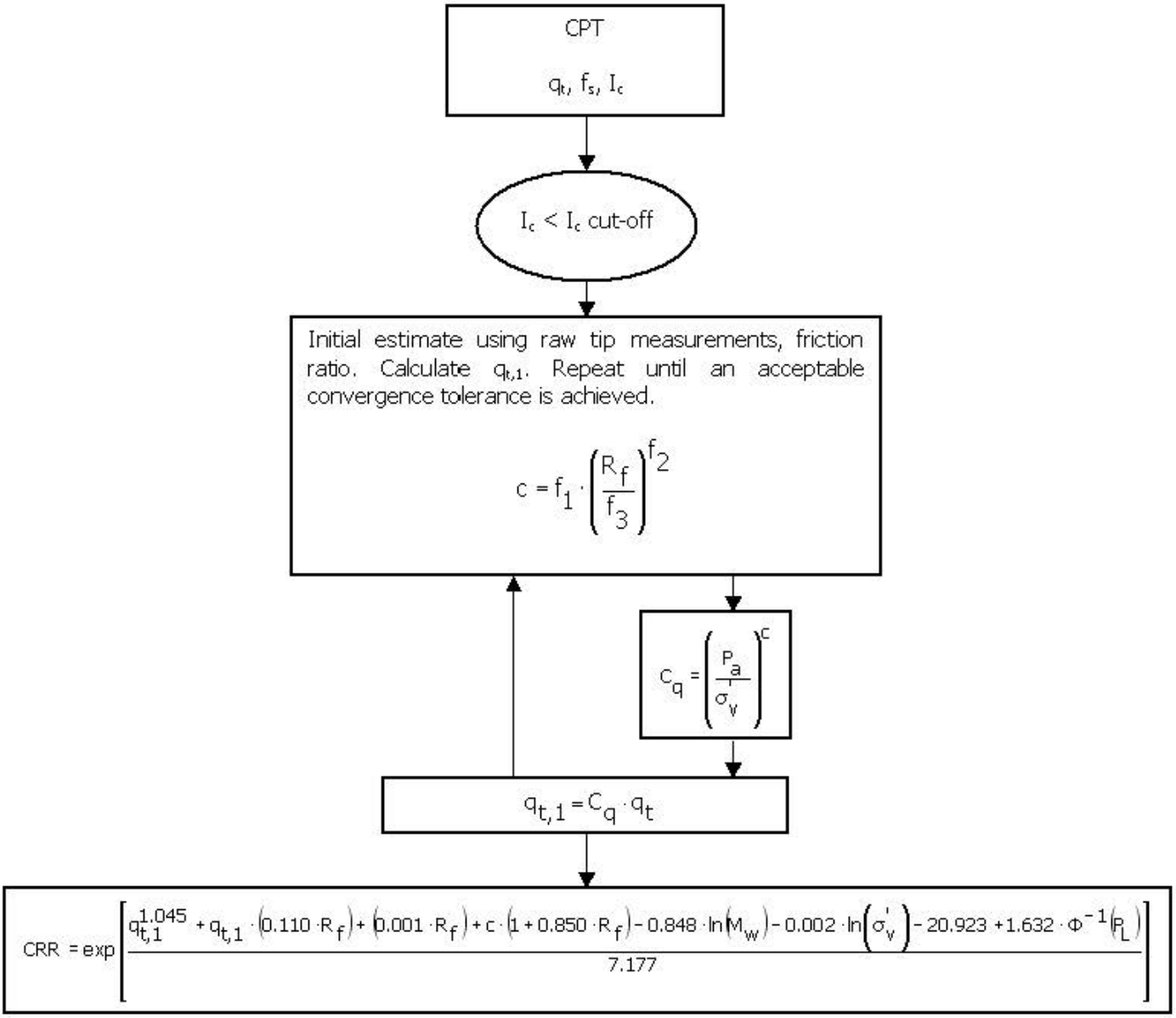


[1] P.K. Robertson, 2009. "Performance based earthquake design using the CPT", Keynote Lecture, International Conference on Performance-based Design in Earthquake Geotechnical Engineering – from case history to practice, IS-Tokyo, June 2009

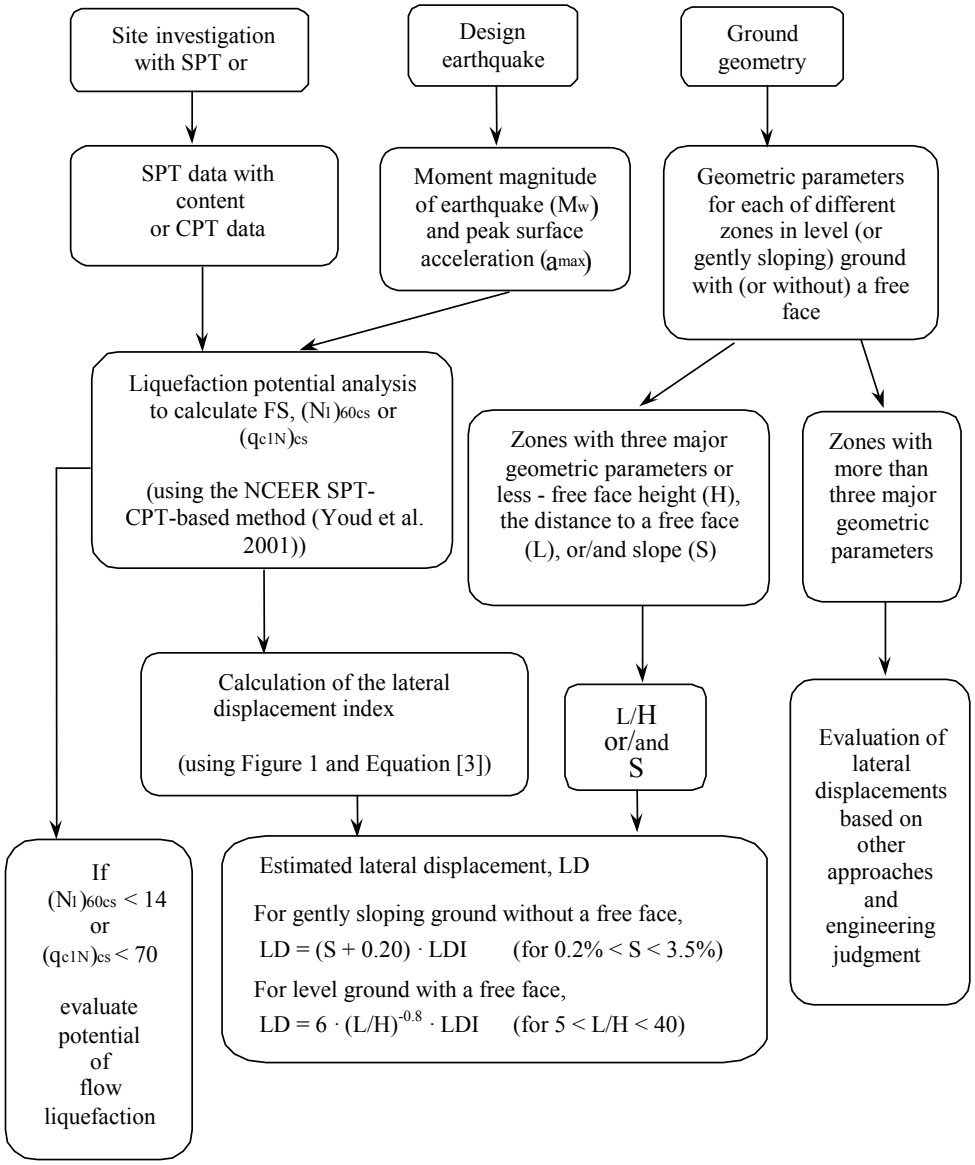
Procedure for the evaluation of soil liquefaction resistance, Idriss & Boulanger (2008)



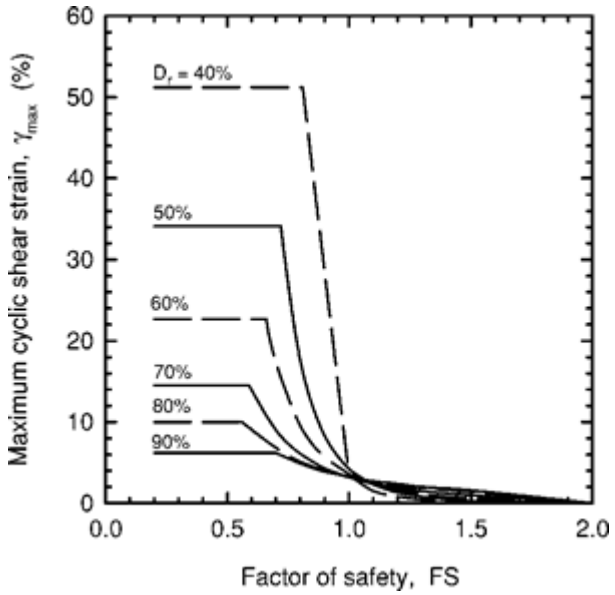
Procedure for the evaluation of soil liquefaction resistance (sandy soils), Moss et al. (2006)



Procedure for the evaluation of liquefaction-induced lateral spreading displacements



[1] Flow chart illustrating major steps in estimating liquefaction-induced lateral spreading displacements using the proposed approach



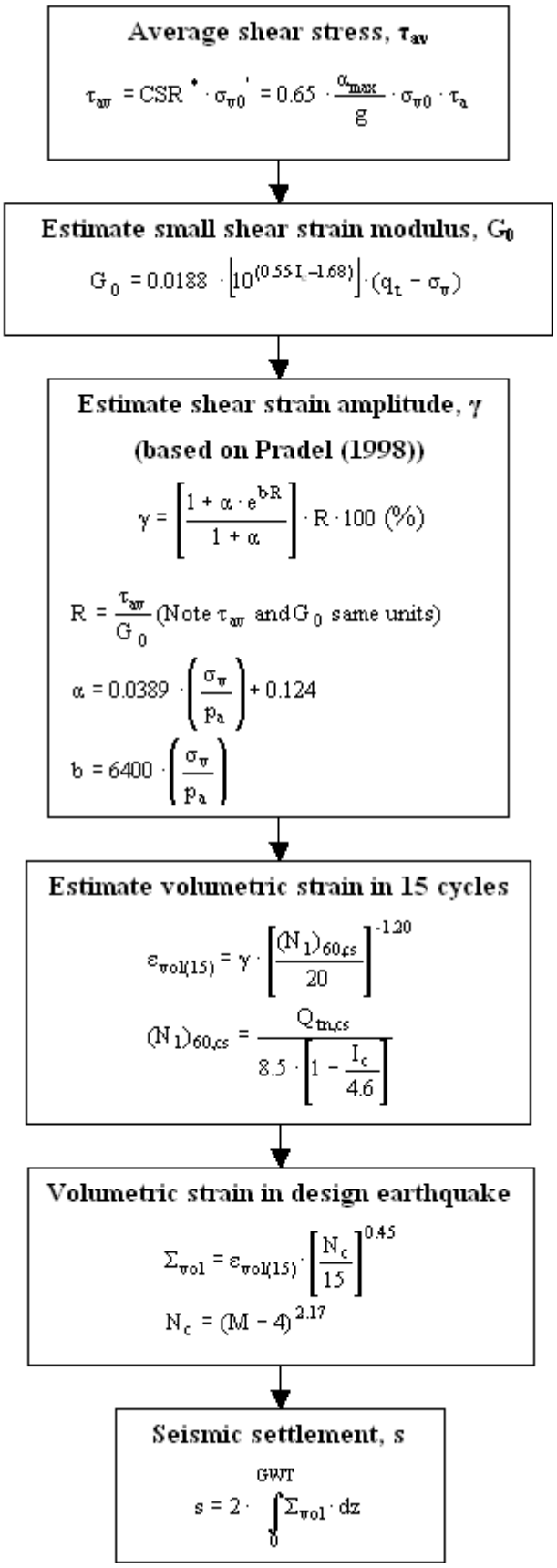
[1] **Figure 1**

$$LDI = \int_0^{z_{max}} \gamma_{max} dz$$

[1] **Equation [3]**

[1] "Estimating liquefaction-induced ground settlements from CPT for level ground", G. Zhang, P.K. Robertson, and R.W.I. Brachman

Procedure for the estimation of seismic induced settlements in dry sands



Robertson, P.K. and Lisheng, S., 2010, "Estimation of seismic compression in dry soils using the CPT" FIFTH INTERNATIONAL CONFERENCE ON RECENT ADVANCES IN GEOTECHNICAL EARTHQUAKE ENGINEERING AND SOIL DYNAMICS, Symposium in honor of professor I. M. Idriss, San Diego, CA

Liquefaction Potential Index (LPI) calculation procedure

Calculation of the Liquefaction Potential Index (LPI) is used to interpret the liquefaction assessment calculations in terms of severity over depth. The calculation procedure is based on the methology developed by Iwasaki (1982) and is adopted by AFPS.

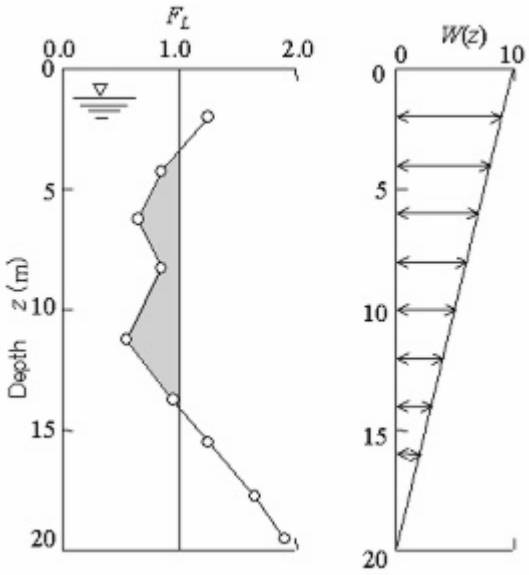
To estimate the severity of liquefaction extent at a given site, LPI is calculated based on the following equation:

$$\mathbf{LPI} = \int_0^{20} (10 - 0{,}5z) \times F_L \times dz$$

where:
F_L = 1 - F.S. when F.S. less than 1
F_L = 0 when F.S. greater than 1
z depth of measurment in meters

Values of LPI range between zero (0) when no test point is characterized as liquefiable and 100 when all points are characterized as susceptible to liquefaction. Iwasaki proposed four (4) discrete categories based on the numeric value of LPI:

- LPI = 0 : Liquefaction risk is very low
- 0 < LPI <= 5 : Liquefaction risk is low
- 5 < LPI <= 15 : Liquefaction risk is high
- LPI > 15 : Liquefaction risk is very high



Graphical presentation of the LPI calculation procedure

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- R. E. S. Moss, R. B. Seed, R. E. Kayen, J. P. Stewart, A. Der Kiureghian, K. O. Cetin, CPT-Based Probabilistic and Deterministic Assessment of In Situ Seismic Soil Liquefaction Potential, Journal of Geotechnical and Geoenvironmental Engineering, Vol. 132, No. 8, August 1, 2006

Important Information about Your

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you —* should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical-Engineering Report Is Based on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical-engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical-engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold-prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your GBA-Member Geotechncial Engineer for Additional Assistance

Membership in the GEOPROFESSIONAL BUSINESS ASSOCIATION exposes geotechnical engineers to a wide array of risk confrontaton techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your GBA-member geotechnical engineer for more information.

GEOPROFESSIONAL BUSINESS ASSOCIATION

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

IIGER03135.0MRP

Leveton Industrial Building

Transportation Impact Study

Tualatin, Oregon

Date:
June 2, 2017

Prepared for:
Dana Properties, LLC.

Prepared by:
Daniel Stumpf, EI
Michael Ard, PE

6/2/17
REGISTERED PROFESSIONAL ENGINEER
54983PE
OREGON
JULY 10, 2002
MICHAEL T. ARD
EXPIRES: 12/31/17

LANCASTER ENGINEERING

321 SW 4th Ave., Suite 400 | Portland, OR 97204 | 503.248.0313 | lancasterengineering.com

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Executive Summary

- The proposed Leveton Industrial Building will include the construction of a 35,728 square-foot light industrial/manufacting facility located at 12540 SW Leveton Drive in Tualatin, Oregon.
- The trip generation calculations show that the proposed development is projected to generate 33 site trips during the morning peak hour and 35 site trips during the evening peak hour.
- All study intersections are currently operating acceptably per City of Tualatin, Washington County, and ODOT standards and are projected to continue operating acceptably upon build-out of the proposed development through year 2019. No operational mitigation is necessary or recommended.
- The projected 95th percentile queues for the northeast-bound right-turn lane at the intersection of SW 124th Avenue at OR-99W extends beyond available lane storage during the morning peak hour for all analysis scenarios. Extended queues may utilize the shoulder of the roadway, which currently has ample length and width to store additional vehicles, or queues can extend into the outermost northwest-bound through travel lane without causing any significant operational issues at the intersection. All other projected 95th percentile queues at the study intersections are provided adequate vehicle storage space. No queuing related mitigation is necessary or recommended.
- No significant trends or crash patterns were identified at any of the study intersections and no specific safety mitigation is recommended.
- Based on the detailed analysis, adequate intersection sight distance will be available at both proposed site access locations upon removal of obstructing on-site foliage. No other sight distance mitigation is necessary or recommended.
- Left-turn lane warrants are not projected to be met for any of the proposed site access intersections along SW Leveton Drive under any of the analysis scenarios through the 2019 build-out year. No other new turn lanes are necessary or recommended.
- Due to insufficient main and side-street traffic volumes, traffic signal warrants are not projected to be met for any of the unsignalized study intersections under any of the analysis scenarios.

Project Description and Location

Introduction

The proposed Leveton Industrial Building will include the construction of a 35,728 square-foot light industrial/manufacting facility located at 12540 SW Leveton Drive in Tualatin, Oregon. This report addresses the impacts of the proposed development on the nearby street system. Based on correspondence with City of Tualatin staff, the report conducts safety and capacity/level-of-service analyses at the following intersections:

- SW 126th Place at SW Leveton Drive;
- West site access at SW Leveton Drive;
- East site access at SW Leveton Drive;
- SW 124th Avenue at SW Leveton Drive; and
- SW 124th Avenue at SW Pacific Highway (OR-99W).

The purpose of this study is to determine whether the transportation system within the vicinity of the site is capable of safely and efficiently supporting the existing and proposed uses and to determine any mitigation that may be necessary to do so. Detailed information on traffic counts, trip generation calculations, safety analyses, and level-of-service calculations is included in the appendix to this report.

Project and Location Description

The project site is located south of SW Leveton Drive and west of SW 124th Avenue in Tualatin, Oregon. The subject site is located within a developing industrial area, with industrial land-uses to the north, east, and west of the site and vacant lands to the south. The site includes a single tax lot, lot 4000, which encompasses an approximate total of 1.94 acres, and is currently undeveloped. Access to the site will be provided via two locations along SW Leveton Drive; a western right-out/left-in only access and an eastern full-movement access.

Vicinity Streets

OR-99W is classified by the City of Tualatin as a Major Arterial and by the Oregon Department of Transportation (ODOT) as a Statewide Highway. The roadway generally has two travel lanes in each direction, where directional travel lanes are separated by an unpaved, grass median. It has a posted speed of 45 mph to the northeast and 55 mph to the southwest of SW 124th Avenue. Bicycle lanes are provided along both sides of the roadway while curbs and sidewalks are intermittently provided.

SW Leveton Drive is classified by the City of Tualatin as a Minor Arterial east and a Commercial/Industrial Connector west of SW 124th Avenue. The roadway has a three-lane cross-section, with one travel lane in each direction and either a center median/two-way left-turn lane, and has a posted speed of 35 mph. Bicycle lanes

are provided along both sides of the roadway east of SW 124th Avenue. Curbs and sidewalks are provided along both sides of the roadway except along site frontage.

SW 126th Place is classified by the City of Tualatin as a Commercial/Industrial Connector. The roadway has a varying cross-section of two to three travel lanes and is subject to the basic speed rule. Curbs and sidewalks are provided along both sides of the roadway for approximately 600 feet north of SW Leveton Drive.

SW 124th Avenue is classified by the City of Tualatin as a Major Arterial. The roadway generally has a five-lane cross-section, with two travel lanes in each direction and a center raised median, and has a posted speed of 45 mph. Curbs, sidewalks, and bicycle lanes are provided along both sides of the roadway.

Study Intersections

The intersection of SW 124th Avenue at OR-99W is a three-legged intersection that is controlled by a traffic signal. The northwest-bound approach of SW 124th Avenue has two left-turn lanes, two right-turn lanes served by permitted/overlapping phasing, and a bicycle lane situated between the outermost left-turn lane and innermost right-turn lane. The northeast-bound approach has two through lanes, one right-turn lane served by permitted phasing, and a bicycle lane situated between the outermost through and right-turn lanes. The southwest-bound approach has two left-turn lane served by protected phasing, two through lanes, and a bicycle lane to the right of the outermost standard travel lane. Crosswalks are marked across the northeastern and southeastern intersection legs.

The intersection of SW 126th Place at SW Leveton Drive is a three-legged intersection that is stop-controlled on the southbound approach of SW 126th Place. The southbound approach has one left-turn lane and one right-turn lane. The eastbound approach has one left-turn lane and one through lane. The westbound approach has one shared lane for all turning movements. Crosswalks are unmarked across all three intersection legs.

The intersection of SW 124th Avenue at SW Leveton Drive is a four-legged intersection that is controlled by a traffic signal. The northbound and southbound approaches of SW 124th Avenue each have one left-turn lane served by Flashing-Yellow-Arrow phasing, one through lane, one shared through/right-turn lane, and a bicycle lane to the right of the outermost standard travel lane. The eastbound approach has one left-turn lane served by protected phasing and one shared through/right-turn lane. The westbound approach has one left-turn lane served by protected phasing, one shared through/right-turn lane, and a bicycle lane to the right of the outermost standard travel lane. Crosswalks are marked across all four intersections legs.

A vicinity map displaying the project site, vicinity streets, and the study intersections with their associated lane configurations is shown in Figure 1 on page 5.

Transit

The project site is located near two transit lines that have three stops within a half-mile walking/biking distance. These stops are located at/near the intersections of SW 130th Avenue at OR-99W and SW 124th Avenue at OR-99W. Upon build-out of the proposed development, including site frontage improvements, complete sidewalks and adequate crossing measures at intersections will be made available between the project site and each of the three described transit stop locations allowing for safe and comfortable travel for transit users.

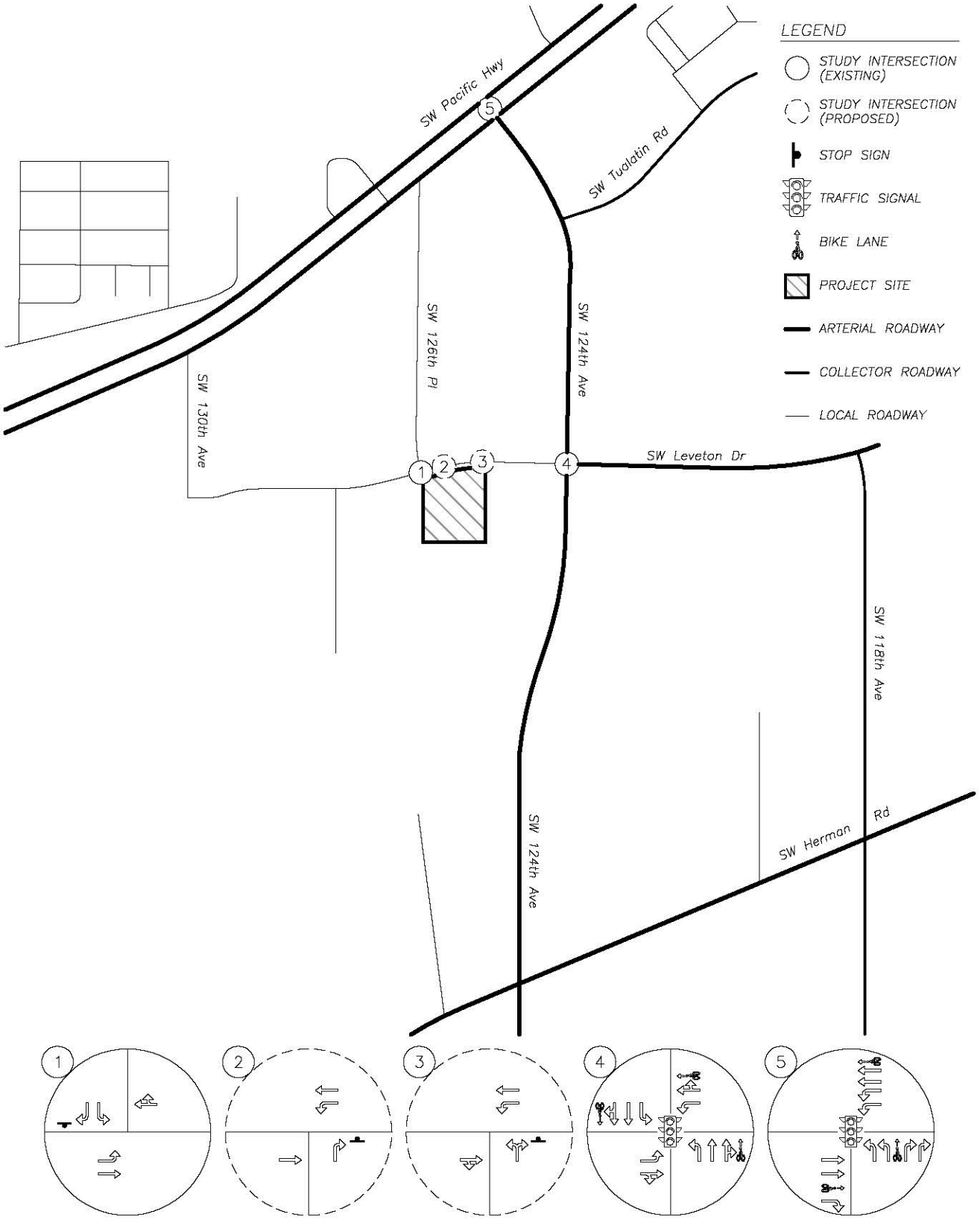
TriMet bus line *#93 – Tigard/Sherwood* provides service between the City of Sherwood and Tigard Transit Center. Weekday service is scheduled from approximately 4:30 AM to 1:15 AM and has headways of approximately 30 to 45 minutes and 60 minutes during the late evening hours. Weekend service is scheduled from approximately 4:30 AM to 1:15 AM and has headways of approximately 30 to 40 minutes.

TriMet bus line *#94 – Pacific Hwy/Sherwood* provides service between the City of Sherwood and Portland City Center, with notable stops near Tigard Transit Center and Barbur Transit Center. Weekday service is scheduled from approximately 5:45 AM to 8:30 PM and has headways of approximately 5 to 15 minutes during the peak periods of travel and 20 to 45 minutes during the off-peak hours of travel.

Traffic Counts

Traffic counts were conducted at the study intersections along SW Leveton Drive on Wednesday, May 3rd, 2017 from 7:00 AM to 9:00 AM and on Tuesday, May 2nd, 2017 from 4:00 PM to 6:00 PM. Traffic counts at the intersection of SW 124th Avenue at OR-99W were conducted on Thursday, May 11th, 2017 from 7:00 AM to 9:00 AM and on Wednesday, May 10th, 2017 from 4:00 PM to 6:00 PM. Data was used from each intersection's respective morning and evening peak hours.

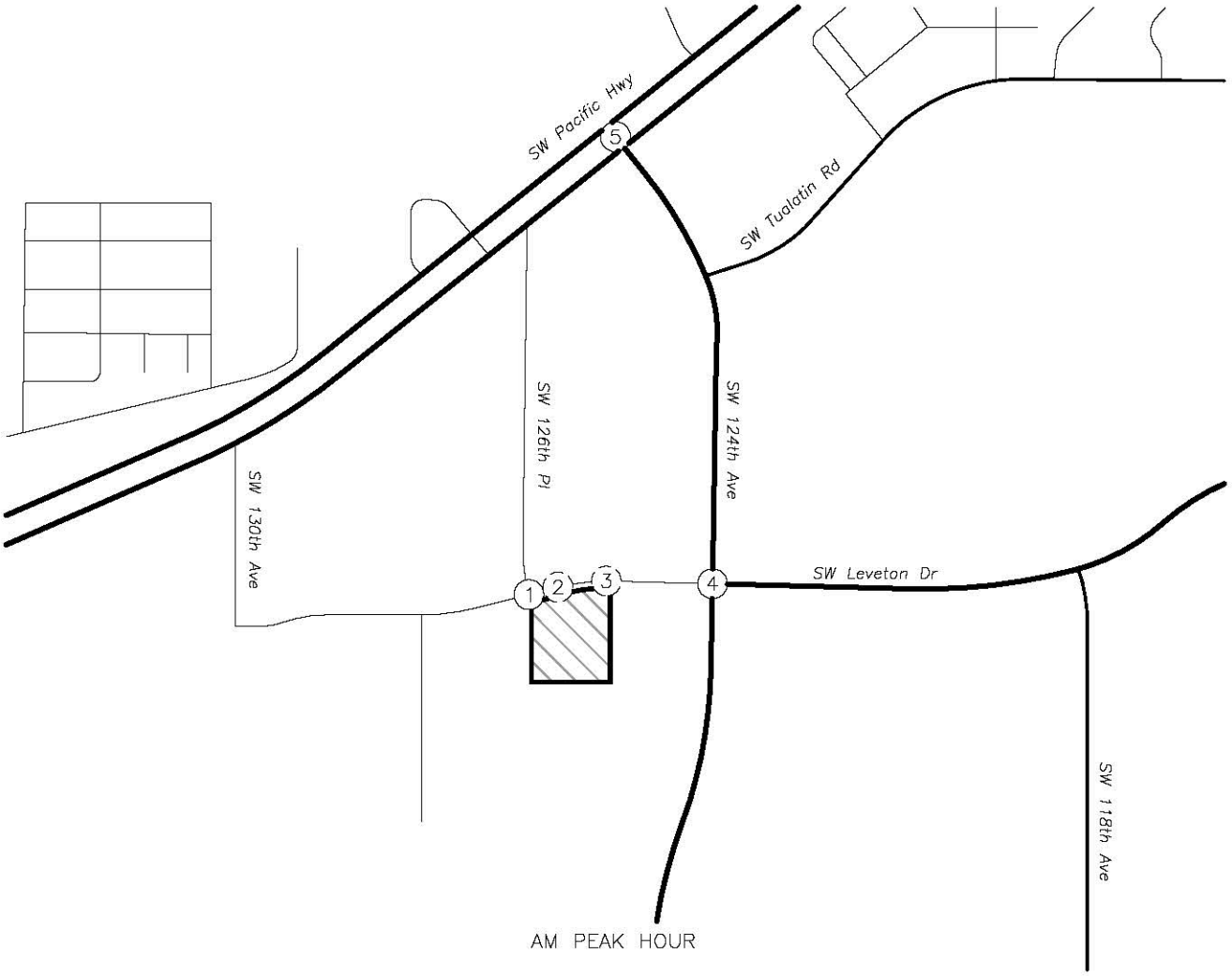
Figure 2 on page 6 shows the existing morning and evening peak hour traffic volumes at the study intersections.



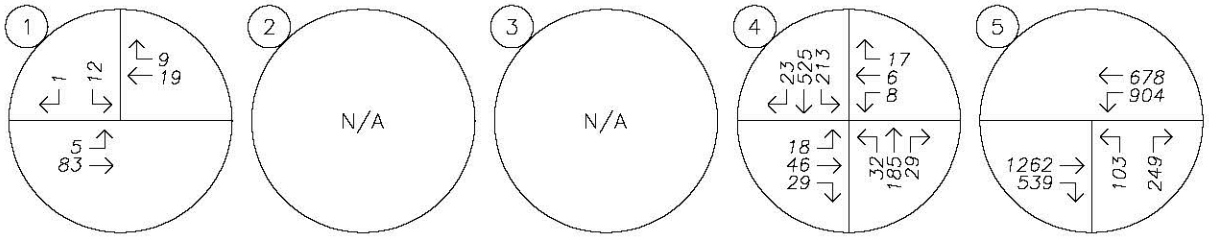
VICINITY MAP

no scale

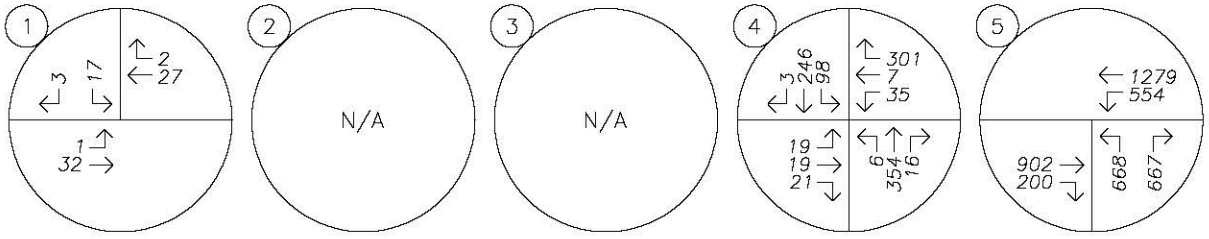
FIGURE 1



AM PEAK HOUR



PM PEAK HOUR



TRAFFIC VOLUMES
Existing Conditions
AM & PM Peak Hours

no scale

FIGURE 2

Site Trips

Trip Generation

The proposed Leveton Industrial Building includes the construction of a 35,728 square-foot light industrial/manufacturing facility. To estimate the number of trips that will be generated by the proposed development, trip rates from the *TRIP GENERATION MANUAL*[1] were used. Trip generation rates from three different land-uses which describe the proposed development were compared to determine the highest and most conservative estimate of trip generation for the site based on building square-footage: land-use code 110, *General Light Industrial*, land-use code 130, *Industrial Park*, and land-use code 140, *Manufacturing*. It was determined that land-use code 110 provides the highest estimate of trip generation; therefore, data from land-use code 110 was used to estimate the trip generation of the proposed development.

The trip generation calculations show that the proposed development is projected to generate 33 site trips during the morning peak hour and 35 site trips during the evening peak hour. The trip generation estimates of the proposed development are summarized in Table 1 below. Detailed trip generation calculations are included in the technical appendix to this report.

Table 1 - Trip Generation Summary

	ITE Code	Size	Morning Peak Hour			Evening Peak Hour			Weekday Total
			Enter	Exit	Total	Enter	Exit	Total	
General Light Industrial	110	35,728 square-feet	29	4	33	4	31	35	250

[1] Institute of Transportation Engineers (ITE), *TRIP GENERATION MANUAL*, 9th Edition, 2012.

Trip Distribution

The directional distribution of site trips to/from the project site was estimated based on locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and existing travel patterns at study intersections.

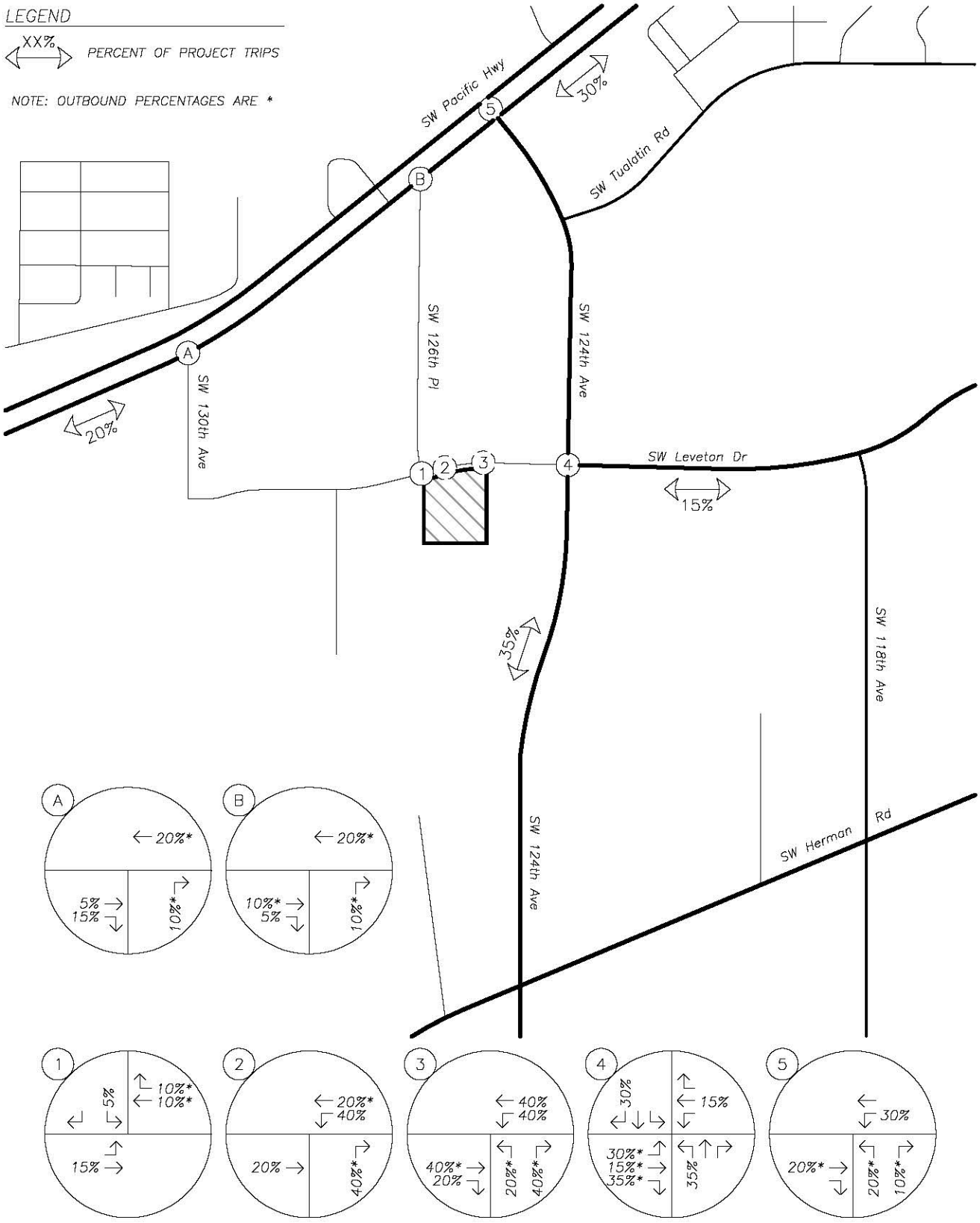
The following trip distribution was estimated and used for analysis:

- Approximately 35 percent of site trips will travel to/from the south along SW 124th Avenue;
- Approximately 30 percent of site trips will travel to/from the east along OR-99W;
- Approximately 20 percent of site trips will travel to/from the west along OR-99W; and
- Approximately 15 percent of site trips will travel to/from the east along SW Leveton Drive.

The proposed development is planned to have two points of access to the subject site from SW Leveton Drive: a western left-in/right-out access and an eastern full-movement access. Based on the site layout as well as the street layout of the surrounding site vicinity, site trips to and from the proposed development are anticipated to utilize the site access points as follows:

- Approximately 40 percent of site trips will utilize the western access; and
- Approximately 60 percent of site trips will utilize the eastern access.

The trip distribution percentages utilized for the site trips generated by the proposed development are shown in Figure 3 on page 9 at both the study intersections as well as relevant nearby vicinity intersections. The trip assignment for the site trips generated by the proposed development during the morning and evening peak hours are shown in Figure 4 on page 10.



SITE TRIP DISTRIBUTION
Inbound & Outbound Percentages – Site Trips
AM & PM Peak Hours

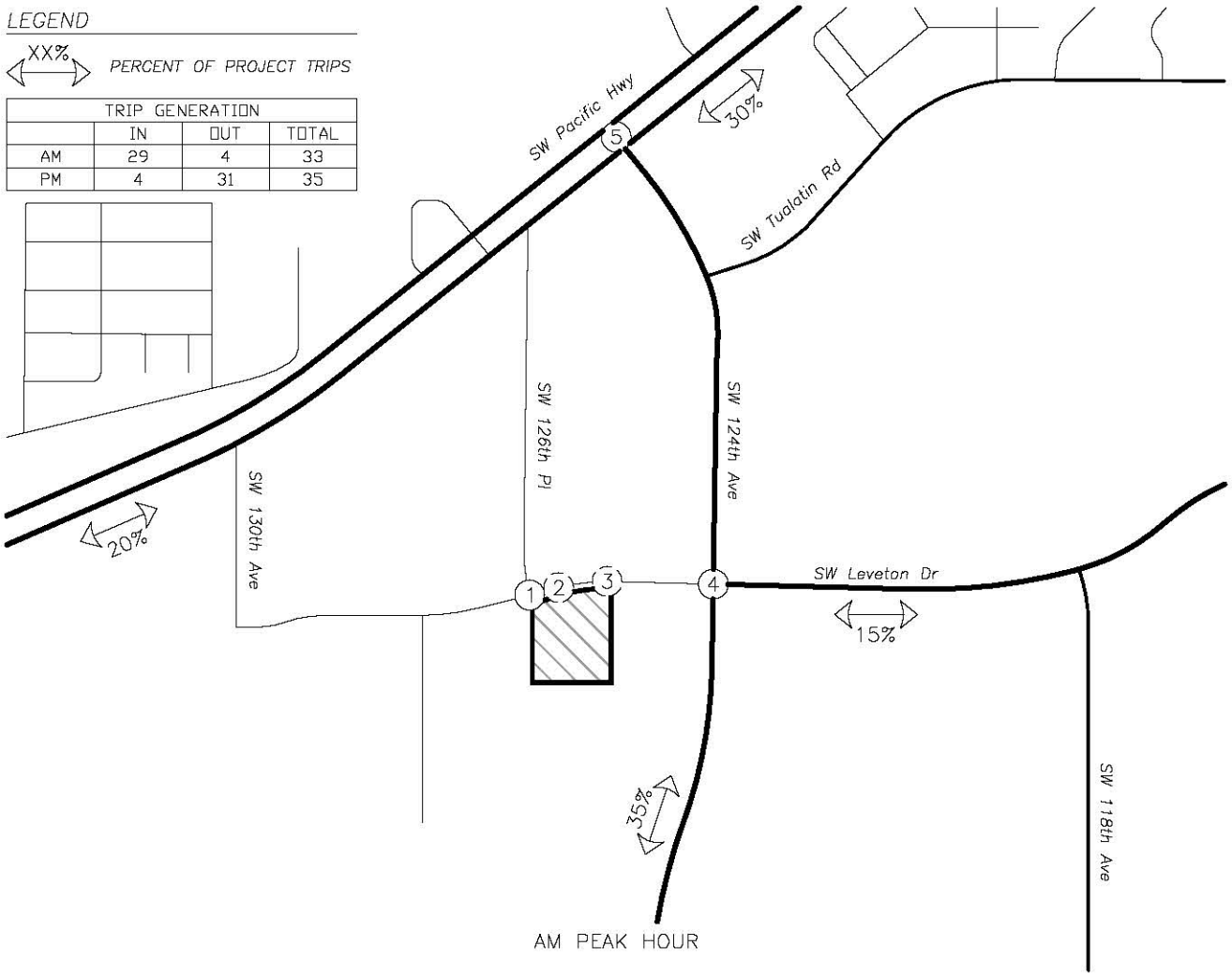
no scale

FIGURE 3

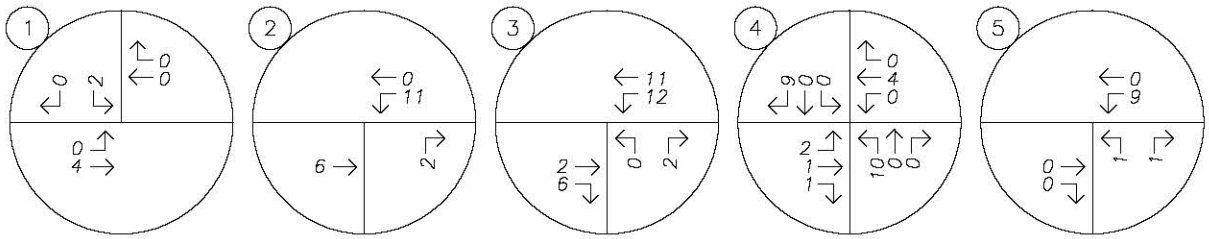
LEGEND

XX% PERCENT OF PROJECT TRIPS

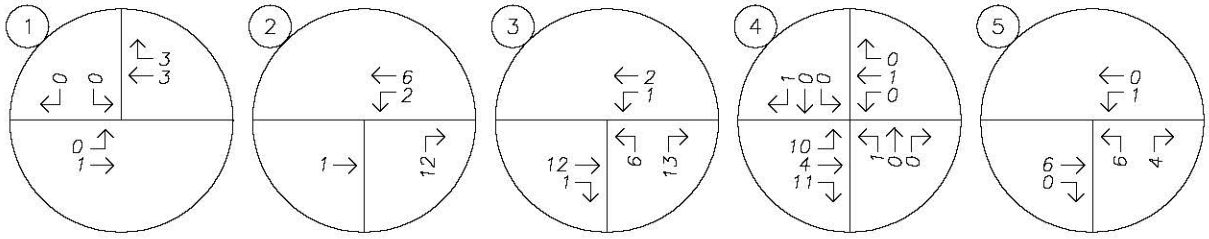
TRIP GENERATION			
	IN	OUT	TOTAL
AM	29	4	33
PM	4	31	35



AM PEAK HOUR



PM PEAK HOUR



SITE TRIP ASSIGNMENT
Proposed Development Plan – Site Trips
AM & PM Peak Hours

no scale

FIGURE 4

Operational Analysis

Background Volumes

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 for non-ODOT facilities, 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 2019 background conditions.

To estimate the future traffic volumes for ODOT facilities, a linear growth rate of 2.11 percent per year was calculated for the traffic volumes along OR-99W using ODOT's 2035 Future Volume Tables. This growth rate was applied to the measured existing traffic volumes over a two-year period to determine year 2019 background traffic volumes for the through traffic traveling along OR-99W. A compounded growth rate of two percent per year for an assumed build-out condition of two years was applied to all other turning movement traffic volumes.

In addition to the traffic volume growth described above, there are two in-process developments that are currently approved for construction near the site vicinity and are expected to impact nearby study intersections. The in-process developments include the Stein Oil development along OR-99W and the Ruth T. LLC Building along SW Herman Road. The two in-process developments are currently not contributing trips to the transportation system but may potentially be by the 2019 build-out year of the proposed development. Additional trips corresponding to each in-process development were added to the existing year traffic volumes plus the additional two years of traffic growth at each of the applicable study intersections.

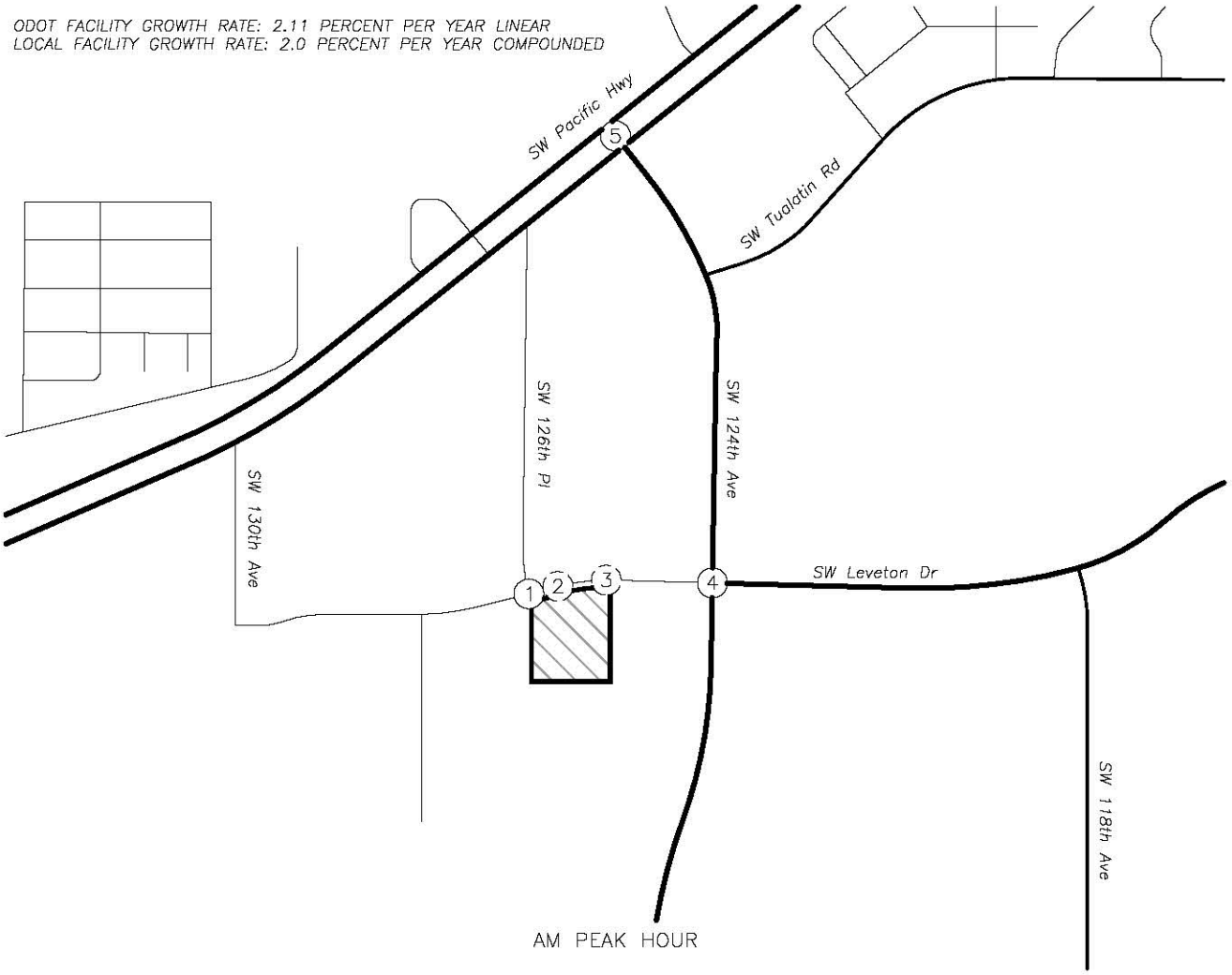
Figure 5 on page 12 show***s*** the projected year 2019 background traffic volumes at the study intersections during the morning and evening peak hours.

Background Volumes plus Site Trips

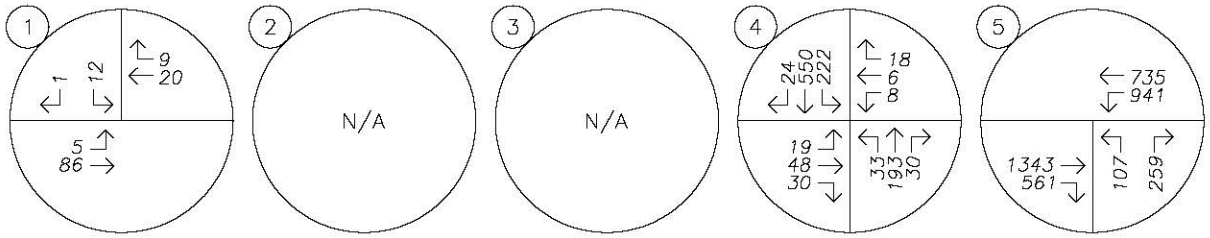
Peak hour trips calculated to be generated by the proposed development, as described earlier within the *Site Trips* section, were added to the projected year 2019 background traffic volumes to obtain the expected 2019 background volumes plus site trips.

Figure 6 on page 13 shows the projected year 2019 peak hour background traffic volumes plus proposed development site trips at the study intersections during the morning and evening peak hours.

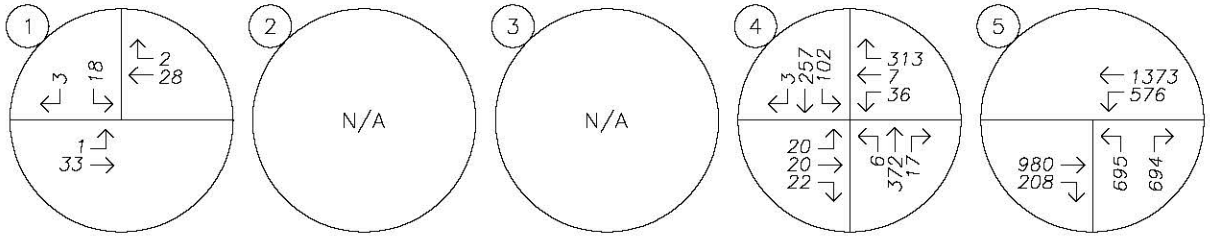
ODOT FACILITY GROWTH RATE: 2.11 PERCENT PER YEAR LINEAR
LOCAL FACILITY GROWTH RATE: 2.0 PERCENT PER YEAR COMPOUNDED



AM PEAK HOUR



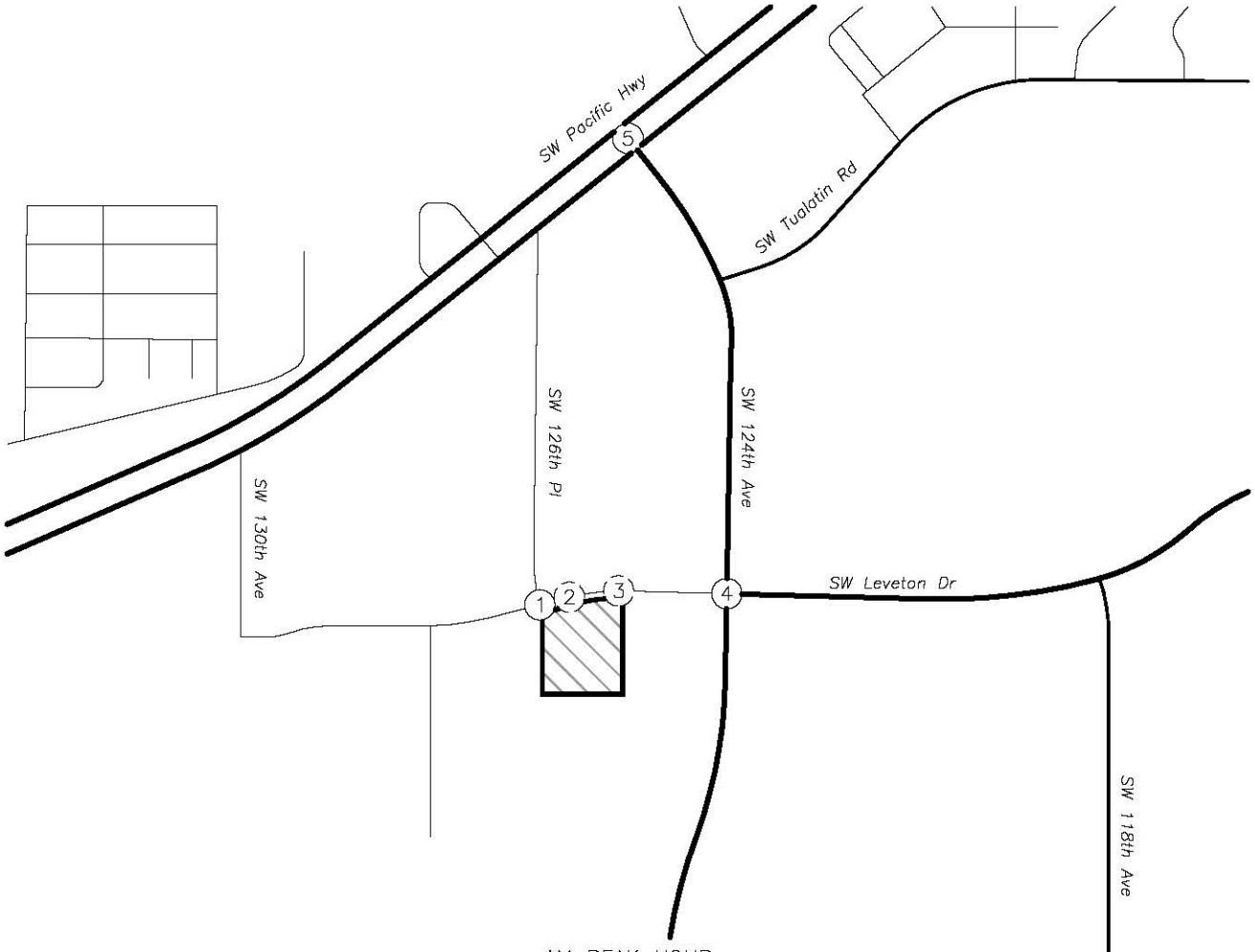
PM PEAK HOUR



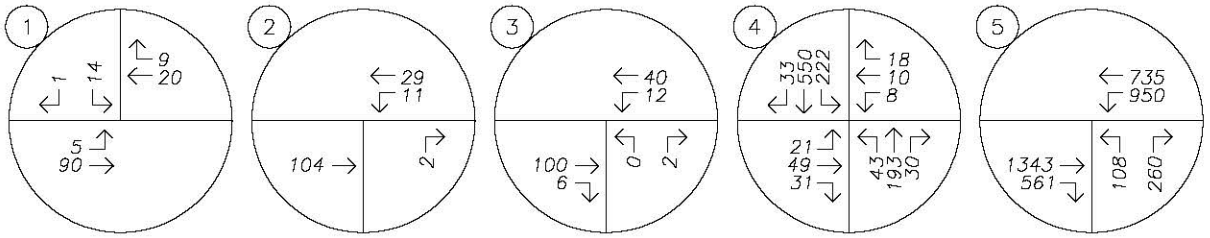
TRAFFIC VOLUMES
Year 2019 Background Conditions
AM & PM Peak Hours

no scale

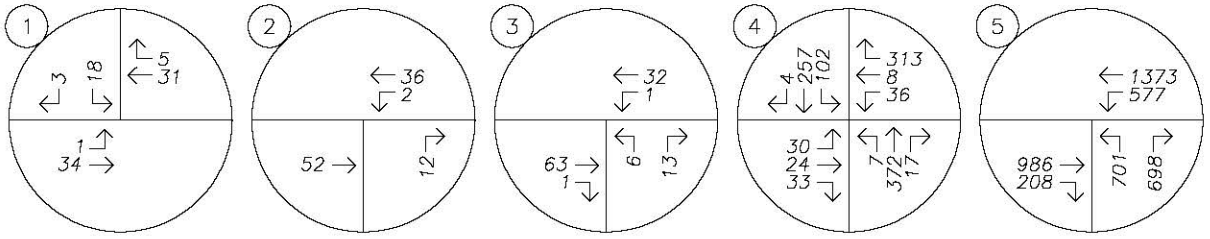
FIGURE 5



AM PEAK HOUR



PM PEAK HOUR



TRAFFIC VOLUMES
Year 2019 Background Conditions plus Site Trips
AM & PM Peak Hours

no scale

FIGURE 6

Capacity Analysis

A capacity and delay analysis was conducted for each of the study intersections per the signalized and unsignalized intersection analysis methodologies in the *HIGHWAY CAPACITY MANUAL*[2] (HCM). The level-of-service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection. Washington County standards require intersections operate with a v/c ratio of 0.99 or less while the City of Tualatin standards require a minimum LOS E or better. For both LOS and delay related to the analysis of unsignalized intersections, the reported result applies to the worst movement.

The intersection of SW 124th Avenue at OR-99W is under the jurisdiction of ODOT and must operate according to standards established in the *OREGON HIGHWAY PLAN* (OHP). Per the OHP, intersections within the Portland Metropolitan Region along OR-99W are required to operate with a v/c ratio of 0.99 or less along the major-street.

The intersection of SW 126th Place at SW Leveton Drive operations at LOS A with a v/c ratio of 0.03 or less during the morning and evening peak hours for all analysis scenarios.

Upon build-out of the proposed development, the west site access intersection along SW Leveton Drive is projected to operate at LOS A with a v/c ratio of 0.02 during both the morning and evening peak hours.

Upon build-out of the proposed development, the east site access intersection along SW Leveton Drive is projected to operate at LOS A with a v/c ratio of 0.03 or less during the morning and evening peak hours.

The intersection of SW 124th Avenue at SW Leveton Drive operates at LOS B with a v/c ratio of 0.43 or less during the morning and evening peak hours for all analysis scenarios.

The intersection of SW 124th Avenue at OR-99W operates at LOS C with a v/c ratio of 0.87 or less during the morning and evening peak hours for all analysis scenarios.

The v/c, delay, and LOS results of the capacity analysis are shown in Table 2 for the morning and evening peak hours. The reported results are generally based on the analysis methodologies provided in the HCM 2010; however, for intersections where the 2010 methodology fails to report either stop-controlled major-street or signalized intersection v/c ratios for either Washington County or ODOT facilities which require such operational measures, intersection operation was instead evaluated using the HCM 2000 methodologies. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

[2] Transportation Research Board, *HIGHWAY CAPACITY MANUAL 2000* and *HIGHWAY CAPACITY MANUAL 2010*.

Table 2 - Capacity Analysis Summary

	Morning Peak Hour			Evening Peak Hour		
	LOS	**Delay (s)**	**v/c**	**LOS**	**Delay (s)**	**v/c**
SW 126th Place at SW Leveton Drive						
2017 Existing Conditions	A	10	0.02	A	9	0.02
2019 Background Conditions	A	10	0.02	A	9	0.03
2019 Background plus Site Conditions	A	10	0.03	A	9	0.03
West Access at SW Leveton Drive						
2019 Background plus Site Conditions	A	9	0.02	A	9	0.02
East Access at SW Leveton Drive						
2019 Background plus Site Conditions	A	9	0.02	A	9	0.03
SW 124th Avenue at SW Leveton Drive						
2017 Existing Conditions	B	13	0.39	B	17	0.30
2019 Background Conditions	B	13	0.41	B	17	0.31
2019 Background plus Site Conditions	B	14	0.43	B	17	0.31
SW 124th Avenue at OR-99W						
2017 Existing Conditions	C	29	0.82	C	20	0.80
2019 Background Conditions	C	31	0.87	C	22	0.84
2019 Background plus Site Conditions	C	31	0.87	C	22	0.85

Based on the results of the operational analysis, all study intersections are currently operating acceptably per City of Tualatin, Washington County, and ODOT standards and are projected to continue operating acceptably upon build-out of the proposed development through year 2019. No operational mitigation is necessary or recommended.

Queuing Analysis

An analysis of projected queuing was conducted for the study intersections. The queue lengths for the intersections were projected based on the results of a Synchro/SimTraffic simulation, with the reported values based on the 95th percentile queue lengths. This means that 95 percent of the time the queue lengths will be less than or equal to the reported values.

The projected 95th percentile queue lengths reported by the Synchro/SimTraffic simulation are presented in Table 3 for the morning and evening peak hours. Available lane storage was measured and rounded to the nearest five feet. Detailed queuing analysis worksheets are included in the technical appendix to this report.

Table 3 - 95th Percentile Queuing Analysis Summary

	Available Storage (Feet)	2017 Existing Conditions		2019 Background Conditions		2019 Background + Site Conditions	
		AM	PM	AM	PM	AM	PM
SW 126th Place at SW Leveton Drive							
EB LT Lane	175	4	4	0	0	8	0
SB LT Lane	175	23	31	19	35	20	29
SB RT Lane	-	11	17	13	18	7	20
SW 124th Avenue at SW Leveton Drive							
EB LT Lane	125	61	48	62	44	58	52
EB Th/RT Lane	-	111	51	100	52	103	68
WB LT Lane	190	35	63	32	56	30	58
WB Th/RT Lane	-	50	118	56	119	52	142
NB LT Lane	210	58	19	56	17	58	20
NB Th Lane	-	55	96	70	96	58	101
NB Th/RT Lane	-	106	115	113	122	105	126
SB LT Lane	250	111	83	114	89	116	79
SB Th Lane	-	92	52	95	63	111	66
SB Th/RT Lane	-	113	81	120	89	141	93
SW 124th Avenue at OR-99W							
NEB Th Lanes	-	461	264	689	307	731	290
NEB RT Lane	250	**323**	112	**329**	193	**332**	148
SWB LT Lanes	600	428	262	546	281	552	327
SWB Th Lanes	-	90	175	360	182	243	191
NWB LT Lanes	-	100	191	107	204	102	209
NWB RT Lanes	300	112	143	109	142	128	154

BOLD indicates 95th percentile queue exceeds available lane storage.

Based on the SimTraffic model, the projected 95th percentile queues for the northeast-bound right-turn lane at the intersection of SW 124th Avenue at OR-99W extends beyond available lane storage during the morning peak hour for all analysis scenarios. Although the available lane storage of 250 feet is exceeded by up to 82 feet, for a total queue length of 332 feet, this extended queue can be accommodated in one of two ways: the extended queued vehicles may utilize the shoulder of the roadway, which currently has ample length and width to store additional vehicles, or the queue can extend into the outermost northwest-bound through travel lane without causing any significant operational issues at the intersection. All other projected 95th percentile queues at the study intersections are provided adequate vehicle storage space. No queuing related mitigation is necessary or recommended.

Safety Analysis

Crash Data Analysis

Using data obtained from the ODOT's Crash Analysis and Reporting Unit, a review of the most recent available five years of crash history (from January 2011 to December 2015) at the study 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 typically travel through the intersection. Crash rates were calculated using the common assumption that traffic counted during the evening peak period represents 10 percent of average daily traffic (ADT) at the intersection. Crash rates in excess of one to two crashes per million entering vehicles (CMEV) may be indicative of design deficiencies and therefore require a need for further investigation and possible mitigation.

The intersection of SW 124th Avenue at SW Leveton Drive had two reported crashes during the analysis period. The crashes consisted of one rear-end collision and one turning-movement collision. Of the reported crashes, one was classified as "Property Damage Only" (*PDO*) and the other was classified as "Possible Injury – Complaint of Pain" (*Injury C*). The crash rate at the intersection was calculated to be 0.10 CMEV.

The intersection of SW 124th Avenue at OR-99W had nine reported crashes during the analysis period. The crashes consisted of seven rear-end collisions and two turning-movement collisions. Of the reported crashes four were classified as *PDO* and five were classified as *Injury C*. The crash rate at the intersection was calculated to be 0.12 CMEV.

All other study intersections had no reported crashes during the analysis period.

Based on the most recent five years of crash data, no significant trends or crash patterns were identified at any of the study intersections and no specific safety mitigation is recommended.

Sight Distance Analysis

Sight distance was examined for the proposed site access intersections located along SW Leveton Drive. Intersection sight distance was measured and evaluated in accordance with the standards established in *A Policy on Geometric Design of Highways and Streets*[3]. 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. The major-street approach vehicle driver's eye-height is assumed to be 3.5 feet above the cross-street pavement.

Based on the posted speed of 35 mph along SW Leveton Drive, the minimum required intersection sight distance for maintaining relatively uninterrupted traffic flow along the roadway is 415 feet for left-turning vehicles (stopped minor-street driver viewing east and west), assuming the need to cross a distance equivalent to two travel lanes. Upon removal of any obstructing on-site foliage during construction of the proposed development, intersection sight distance at the west access was measured to be in excess of 600 feet to the west. At the east access, intersection sight distance was also measured to be in excess of 600 feet to the east and west.

Based on the detailed analysis, adequate intersection sight distance will be available at both proposed site access locations upon removal of obstructing on-site foliage. No other sight distance mitigation is necessary or recommended.

Warrant Analysis

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

A left-turn refuge lane is primarily a safety consideration for the major street, removing left-turning vehicles from the through traffic stream. The left-turn lane warrants used were developed from the National Cooperative Highway Research Project's (NCHRP) Report 457. Turn lane warrants were evaluated based on the number of advancing and opposing vehicles as well as the number of turning vehicles, the travel speed, and the number of through lanes.

Left-turn lane warrants are not projected to be met for any of the proposed site access intersections along SW Leveton Drive under any of the analysis scenarios through the 2019 build-out year. No other new turn lanes are necessary or recommended.

Traffic signal warrants were examined for unsignalized study intersections to determine whether the installation of any new traffic signal will be warranted at the intersections upon completion of the proposed development. Due to insufficient main and side-street traffic volumes, traffic signal warrants are not projected to be met for any of the unsignalized study intersections under any of the analysis scenarios.

[3] American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 6th Edition, 2011.

Conclusions

All study intersections are currently operating acceptably per City of Tualatin, Washington County, and ODOT standards and are projected to continue operating acceptably upon build-out of the proposed development through year 2019. No operational mitigation is necessary or recommended.

The projected 95th percentile queues for the northeast-bound right-turn lane at the intersection of SW 124th Avenue at OR-99W extends beyond available lane storage during the morning peak hour for all analysis scenarios. Extended queues may utilize the shoulder of the roadway, which currently has ample length and width to store additional vehicles, or queues can extend into the outermost northwest-bound through travel lane without causing any significant operational issues at the intersection. All other projected 95th percentile queues at the study intersections are provided adequate vehicle storage space. No queuing related mitigation is necessary or recommended.

No significant trends or crash patterns were identified at any of the study intersections and no specific safety mitigation is recommended.

Based on the detailed analysis, adequate intersection sight distance will be available at both proposed site access locations upon removal of obstructing on-site foliage. No other sight distance mitigation is necessary or recommended.

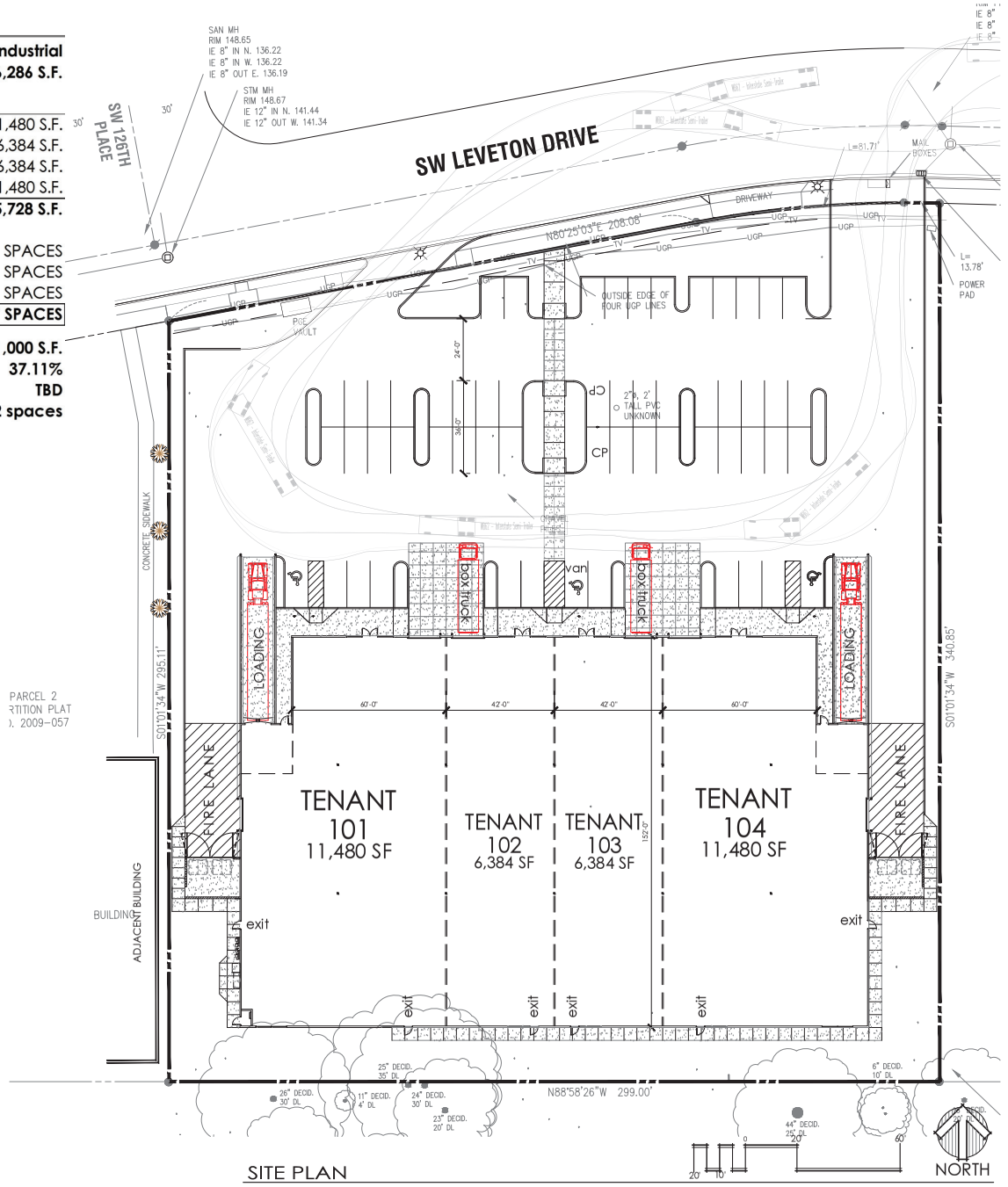
Left-turn lane warrants are not projected to be met for any of the proposed site access intersections along SW Leveton Drive under any of the analysis scenarios through the 2019 build-out year. No other new turn lanes are necessary or recommended.

Due to insufficient main and side-street traffic volumes, traffic signal warrants are not projected to be met for any of the unsignalized study intersections under any of the analysis scenarios.

Appendix

SITE DATA

Zoning		**ML - Light Industrial**
Site Area :		**2.21 ACRES 96,286 S.F.**
	Min. Parking req'd	
Tenant 101:	18.37	11,480 S.F.
Tenant 102 :	10.21	6,384 S.F.
Tenant 103 :	10.21	6,384 S.F.
Tenant 104 :	18.37	11,480 S.F.
Total Building GLA (Gross) :	57.20	**35,728 S.F.**
Standard Parking Provided :		52 SPACES
Handicap Parking Provided :		3 SPACES
Vanpool Parking Required :	(1/25 spaces)	2 SPACES
Total Parking Area :		**57 SPACES**
Parking Ratio :	1.60 / 1,000 SF	**1.60 SPACES/1,000 S.F.**
Site Coverage:		**37.11%**
Landscape Coverage :	15% min.	**TBD**
Loading Required :	(2) required -25k-60k	**2 spaces**



SGA
SG ARCHITECTURE, LLC

10940 SW Barnes Road #364
Portland, Oregon 97225
503.201.0725 | 503.347.4685

LEVETON INDUSTRIAL
SW Leveton Drive & SW 124th Ave.
Tualatin , Oregon

DANA PROPERTIES, LLC.
PO Box 5837
Aloha, Or 97006

Located
LEVETON COMMONS
No.2, Lot 8
NE: T02S., R01W., S21.
CITY OF TUALATIN
WASHINGTON , CO. OREGON

PROJECT NUMBER:
16-111

DATE:
May 2017

DRAWN BY:
KG/SS

Revisions:

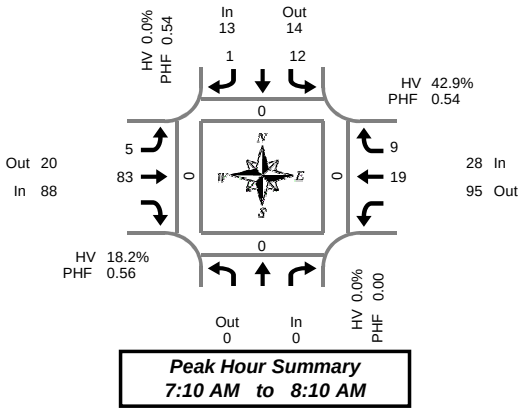
APPLICATION FOR
ARCHITECTURAL REVIEW (AR)

SITE PLAN
Sheet Number:

DR_1

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:10 AM to 8:10 AM

SW 126th Pl & SW Leveton Dr

Wednesday, May 03, 2017
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	0		0	0	1	9		0		3	0	0	13	0	0	0	0
7:05 AM				0	0		0	0	0	4		1		1	1	0	6	0	0	0	0
7:10 AM				0	0		0	0	0	8		0		0	1	0	9	0	0	0	0
7:15 AM				0	2		0	0	0	7		0		1	1	0	11	0	0	0	0
7:20 AM				0	0		0	0	1	4		0		1	0	0	6	0	0	0	0
7:25 AM				0	1		0	0	1	3		0		1	1	0	7	0	0	0	0
7:30 AM				0	2		0	0	0	4		0		1	0	0	7	0	0	0	0
7:35 AM				0	0		0	0	0	4		0		0	0	0	4	0	0	0	0
7:40 AM				0	2		1	0	1	4		0		1	1	0	10	0	0	0	0
7:45 AM				0	3		0	0	1	9		0		1	1	0	15	0	0	0	0
7:50 AM				0	0		0	0	0	17		0		2	2	0	21	0	0	0	0
7:55 AM				0	0		0	0	1	11		0		1	2	0	15	0	0	0	0
8:00 AM				0	1		0	0	0	6		0		5	0	0	12	0	0	0	0
8:05 AM				0	1		0	0	0	6		0		5	0	0	12	0	0	0	0
8:10 AM				0	0		0	0	1	7		0		0	0	0	8	0	0	0	0
8:15 AM				0	1		0	0	0	0		0		3	0	0	4	0	0	0	0
8:20 AM				0	0		0	0	0	2		0		3	1	0	6	0	0	0	0
8:25 AM				0	0		0	0	0	5		0		0	0	0	5	0	0	0	0
8:30 AM				0	0		0	0	0	5		0		0	2	0	7	1	0	0	0
8:35 AM				0	1		0	0	0	4		0		1	0	0	6	1	0	0	0
8:40 AM				0	0		0	0	0	4		0		1	1	0	6	0	0	0	0
8:45 AM				0	0		0	0	0	1		0		1	1	0	3	1	0	0	0
8:50 AM				0	1		0	0	0	4		0		1	1	0	7	0	0	0	0
8:55 AM				0	0		0	0	0	4		0		0	0	0	4	0	0	0	0
Total Survey				0	15		1	0	7	132		1		33	16	0	204	3	0	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	0		0	0	1	21		1		4	2	0	28	0	0	0	0
7:15 AM				0	3		0	0	2	14		0		3	2	0	24	0	0	0	0
7:30 AM				0	4		1	0	1	12		0		2	1	0	21	0	0	0	0
7:45 AM				0	3		0	0	2	37		0		4	5	0	51	0	0	0	0
8:00 AM				0	2		0	0	1	19		0		10	0	0	32	0	0	0	0
8:15 AM				0	1		0	0	0	7		0		6	1	0	15	0	0	0	0
8:30 AM				0	1		0	0	0	13		0		2	3	0	19	2	0	0	0
8:45 AM				0	1		0	0	0	9		0		2	2	0	14	1	0	0	0
Total Survey				0	15		1	0	7	132		1		33	16	0	204	3	0	0	0

Peak Hour Summary
7:10 AM to 8:10 AM

By Approach	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	13	14	27	0	88	20	108	0	28	95	123	0	129	0	0	0	0
%HV	0.0%				0.0%				18.2%				42.9%				21.7%				
PHF	0.00				0.54				0.56				0.54				0.63				

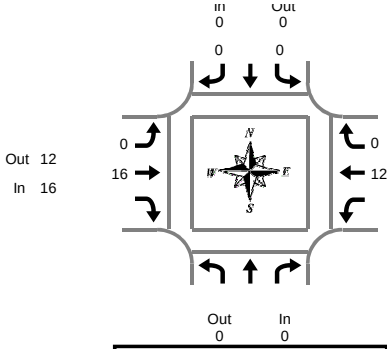
By Movement	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	12		1	13	5	83		88		19	9	28	129
%HV	NA	NA	NA	0.0%	0.0%	NA	0.0%	0.0%	0.0%	19.3%	NA	18.2%	NA	63.2%	0.0%	42.9%	21.7%
PHF				0.00	0.60		0.25	0.54	0.63	0.56		0.56		0.43	0.45	0.54	0.63

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	10		1	0	6	84		1		13	10	0	124	0	0	0	0
7:15 AM				0	12		1	0	6	82		0		19	8	0	128	0	0	0	0
7:30 AM				0	10		1	0	4	75		0		22	7	0	119	0	0	0	0
7:45 AM				0	7		0	0	3	76		0		22	9	0	117	2	0	0	0
8:00 AM				0	5		0	0	1	48		0		20	6	0	80	3	0	0	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



SW 126th Pl & SW Leveton Dr

Wednesday, May 03, 2017
7:00 AM to 9:00 AM

Peak Hour Summary
7:10 AM to 8:10 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		0	0	0	4		4		0	0	0	4
7:05 AM				0	0		0	0	0	2		2		0	0	0	2
7:10 AM				0	0		0	0	0	4		4		0	0	0	4
7:15 AM				0	0		0	0	0	3		3		0	0	0	3
7:20 AM				0	0		0	0	0	2		2		0	0	0	2
7:25 AM				0	0		0	0	0	1		1		0	0	0	1
7:30 AM				0	0		0	0	0	1		1		1	0	1	2
7:35 AM				0	0		0	0	0	1		1		0	0	0	1
7:40 AM				0	0		0	0	0	1		1		0	0	0	1
7:45 AM				0	0		0	0	0	1		1		0	0	0	1
7:50 AM				0	0		0	0	0	2		2		2	0	2	4
7:55 AM				0	0		0	0	0	0		0		0	0	0	0
8:00 AM				0	0		0	0	0	0		0		4	0	4	4
8:05 AM				0	0		0	0	0	0		0		5	0	5	5
8:10 AM				0	0		0	0	0	1		1		0	0	0	1
8:15 AM				0	0		0	0	0	0		0		1	0	1	1
8:20 AM				0	0		0	0	0	1		1		1	0	1	2
8:25 AM				0	0		0	0	0	0		0		0	0	0	0
8:30 AM				0	0		0	0	0	1		1		0	0	0	1
8:35 AM				0	0		0	0	0	0		0		1	0	1	1
8:40 AM				0	0		0	0	0	0		0		1	0	1	1
8:45 AM				0	0		0	0	0	1		1		0	0	0	1
8:50 AM				0	1		0	1	0	2		2		0	0	0	3
8:55 AM				0	0		0	0	0	1		1		0	0	0	1
Total Survey				0	1		0	1	0	29		29		16	0	16	46

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		0	0	0	10		10		0	0	0	10
7:15 AM				0	0		0	0	0	6		6		0	0	0	6
7:30 AM				0	0		0	0	0	3		3		1	0	1	4
7:45 AM				0	0		0	0	0	3		3		2	0	2	5
8:00 AM				0	0		0	0	0	1		1		9	0	9	10
8:15 AM				0	0		0	0	0	1		1		2	0	2	3
8:30 AM				0	0		0	0	0	1		1		2	0	2	3
8:45 AM				0	1		0	1	0	4		4		0	0	0	5
Total Survey				0	1		0	1	0	29		29		16	0	16	46

Heavy Vehicle Peak Hour Summary
7:10 AM to 8:10 AM

By Approach	Northbound SW 126th Pl			Southbound SW 126th Pl			Eastbound SW Leveton Dr			Westbound SW Leveton Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	0	0	0	16	12	28	12	16	28	28
PHF	0.00			0.00			0.44			0.33			0.78

By Movement	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	0		0	0	0	16		16		12	0	12	28
PHF				0.00	0.00		0.00	0.00	0.00	0.44		0.44		0.33	0.00	0.33	0.78

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

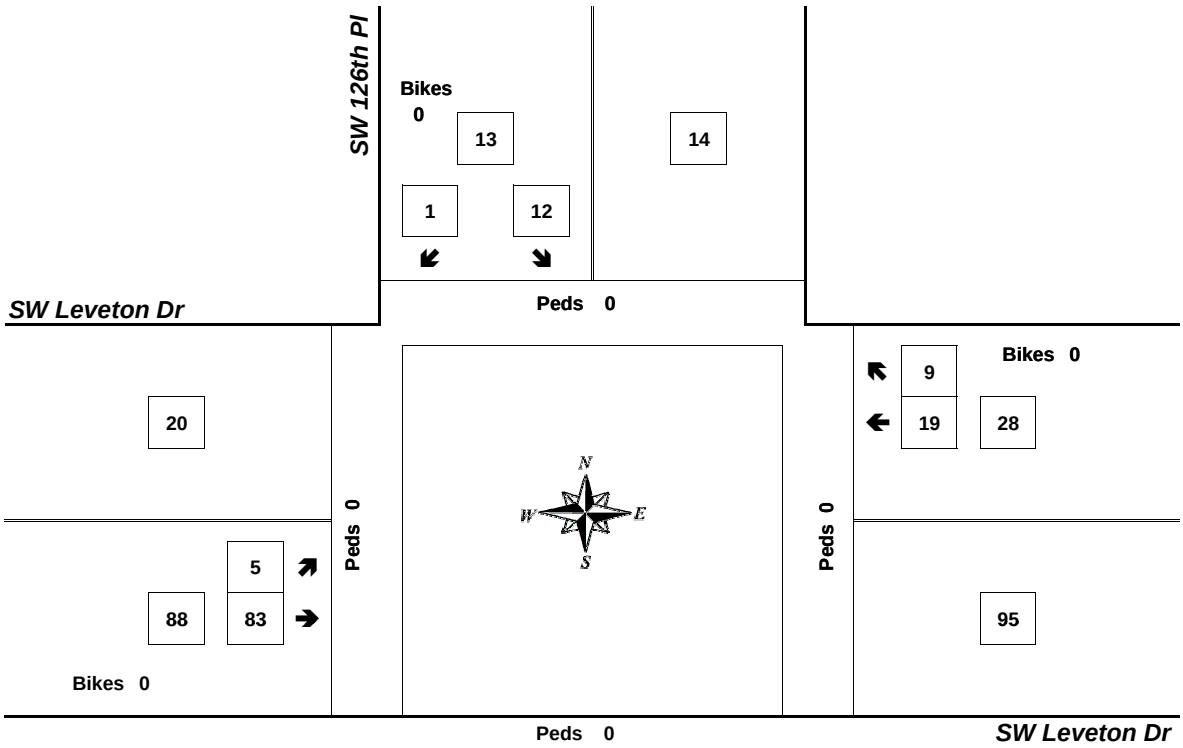
Interval Start Time	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		0	0	0	22		22		3	0	3	25
7:15 AM				0	0		0	0	0	13		13		12	0	12	25
7:30 AM				0	0		0	0	0	8		8		14	0	14	22
7:45 AM				0	0		0	0	0	6		6		15	0	15	21
8:00 AM				0	1		0	1	0	7		7		13	0	13	21

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SW 126th Pl & SW Leveton Dr

7:10 AM to 8:10 AM
Wednesday, May 03, 2017



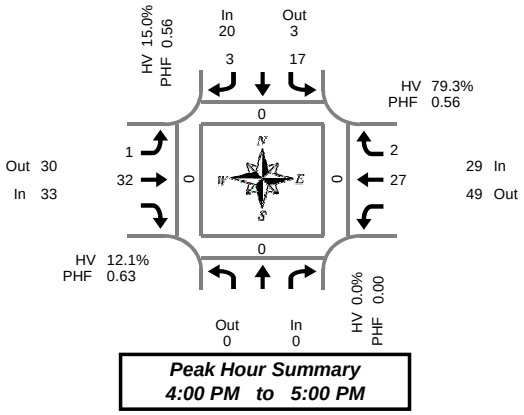
Bikes 0

Approach	PHF	HV%	Volume
EB	0.56	18.2%	88
WB	0.54	42.9%	28
NB	0.00	0.0%	0
SB	0.54	0.0%	13
Intersection	0.63	21.7%	129

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



SW 126th Pl & SW Leveton Dr

Tuesday, May 02, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:00 PM to 5:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	0		0	0	0	2		0		2	0	0	4	0	0	0	0
4:05 PM				0	1		0	0	0	2		0		2	0	0	5	0	0	0	0
4:10 PM				0	5		0	0	0	1		0		4	0	0	10	0	0	0	0
4:15 PM				0	3		0	0	0	1		0		6	1	0	11	0	0	0	0
4:20 PM				0	0		0	0	0	2		0		2	0	0	4	0	0	0	0
4:25 PM				0	1		0	0	0	2		0		2	0	0	5	0	0	0	0
4:30 PM				0	1		0	0	0	2		0		3	0	0	6	0	0	0	0
4:35 PM				0	3		0	0	0	4		0		1	0	0	8	0	0	0	0
4:40 PM				0	2		1	0	1	3		0		1	0	0	8	0	0	0	0
4:45 PM				0	0		1	0	0	3		0		2	1	0	7	0	0	0	0
4:50 PM				0	0		1	0	0	3		0		1	0	0	5	0	0	0	0
4:55 PM				0	1		0	0	0	7		0		1	0	0	9	0	0	0	0
5:00 PM				0	0		0	0	0	1		0		1	0	0	2	0	0	0	0
5:05 PM				0	1		0	0	0	0		0		0	0	0	1	0	0	0	0
5:10 PM				0	2		0	0	0	2		0		1	0	0	5	0	0	0	0
5:15 PM				0	1		0	0	0	0		0		1	0	0	2	0	0	0	0
5:20 PM				0	0		0	0	0	1		0		1	0	0	2	0	0	0	0
5:25 PM				0	3		0	0	0	0		0		3	1	0	7	0	0	0	0
5:30 PM				0	1		0	0	0	2		0		0	0	0	3	0	0	0	0
5:35 PM				0	1		0	0	0	1		0		1	0	0	3	0	0	0	0
5:40 PM				0	0		0	0	0	0		0		1	0	0	1	0	0	0	0
5:45 PM				0	0		0	0	0	1		0		0	0	0	1	0	0	0	0
5:50 PM				0	1		0	0	0	3		0		0	0	0	4	0	0	0	0
5:55 PM				0	0		0	0	0	1		0		2	0	0	3	0	0	0	0
Total Survey				0	27		3	0	1	44		0		38	3	0	116	0	0	0	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	6		0	0	0	5		0		8	0	0	19	0	0	0	0
4:15 PM				0	4		0	0	0	5		0		10	1	0	20	0	0	0	0
4:30 PM				0	6		1	0	1	9		0		5	0	0	22	0	0	0	0
4:45 PM				0	1		2	0	0	13		0		4	1	0	21	0	0	0	0
5:00 PM				0	3		0	0	0	3		0		2	0	0	8	0	0	0	0
5:15 PM				0	4		0	0	0	1		0		5	1	0	11	0	0	0	0
5:30 PM				0	2		0	0	0	3		0		2	0	0	7	0	0	0	0
5:45 PM				0	1		0	0	0	5		0		2	0	0	8	0	0	0	0
Total Survey				0	27		3	0	1	44		0		38	3	0	116	0	0	0	0

Peak Hour Summary
4:00 PM to 5:00 PM

By Approach	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	20	3	23	0	33	30	63	0	29	49	78	0	82	0	0	0	0
%HV	0.0%				15.0%				12.1%				79.3%				36.6%				
PHF	0.00				0.56				0.63				0.56				0.79				

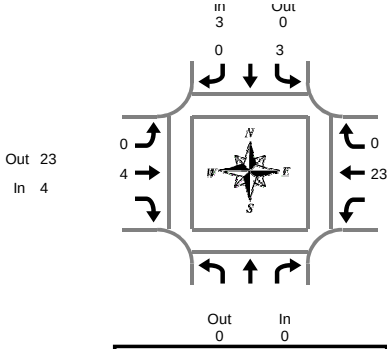
By Movement	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	17		3	20	1	32		33		27	2	29	82
%HV	NA	NA	NA	0.0%	17.6%	NA	0.0%	15.0%	0.0%	12.5%	NA	12.1%	NA	85.2%	0.0%	79.3%	36.6%
PHF				0.00	0.47		0.25	0.56	0.25	0.62		0.63		0.56	0.50	0.56	0.79

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	17		3	0	1	32		0		27	2	0	82	0	0	0	0
4:15 PM				0	14		3	0	1	30		0		21	2	0	71	0	0	0	0
4:30 PM				0	14		3	0	1	26		0		16	2	0	62	0	0	0	0
4:45 PM				0	10		2	0	0	20		0		13	2	0	47	0	0	0	0
5:00 PM				0	10		0	0	0	12		0		11	1	0	34	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



SW 126th Pl & SW Leveton Dr

Tuesday, May 02, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:00 PM to 5:00 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	0		0	0	0	0		0		2	0	2	2
4:05 PM				0	0		0	0	0	0		0		2	0	2	2
4:10 PM				0	1		0	1	0	0		0		2	0	2	3
4:15 PM				0	1		0	1	0	0		0		6	0	6	7
4:20 PM				0	0		0	0	0	0		0		2	0	2	2
4:25 PM				0	0		0	0	0	2		2		1	0	1	3
4:30 PM				0	1		0	1	0	0		0		3	0	3	4
4:35 PM				0	0		0	0	0	1		1		1	0	1	2
4:40 PM				0	0		0	0	0	0		0		1	0	1	1
4:45 PM				0	0		0	0	0	0		0		2	0	2	2
4:50 PM				0	0		0	0	0	0		0		1	0	1	1
4:55 PM				0	0		0	0	0	1		1		0	0	0	1
5:00 PM				0	0		0	0	0	0		0		0	0	0	0
5:05 PM				0	0		0	0	0	0		0		0	0	0	0
5:10 PM				0	0		0	0	0	0		0		0	0	0	0
5:15 PM				0	0		0	0	0	0		0		0	0	0	0
5:20 PM				0	0		0	0	0	0		0		1	0	1	1
5:25 PM				0	0		0	0	0	0		0		0	0	0	0
5:30 PM				0	0		0	0	0	0		0		0	0	0	0
5:35 PM				0	0		0	0	0	0		0		1	0	1	1
5:40 PM				0	0		0	0	0	0		0		0	0	0	0
5:45 PM				0	0		0	0	0	0		0		0	0	0	0
5:50 PM				0	0		0	0	0	0		0		0	0	0	0
5:55 PM				0	0		0	0	0	0		0		0	0	0	0
Total Survey				0	3		0	3	0	4		4		25	0	25	32

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	1		0	1	0	0		0		6	0	6	7
4:15 PM				0	1		0	1	0	2		2		9	0	9	12
4:30 PM				0	1		0	1	0	1		1		5	0	5	7
4:45 PM				0	0		0	0	0	1		1		3	0	3	4
5:00 PM				0	0		0	0	0	0		0		0	0	0	0
5:15 PM				0	0		0	0	0	0		0		1	0	1	1
5:30 PM				0	0		0	0	0	0		0		1	0	1	1
5:45 PM				0	0		0	0	0	0		0		0	0	0	0
Total Survey				0	3		0	3	0	4		4		25	0	25	32

Heavy Vehicle Peak Hour Summary
4:00 PM to 5:00 PM

By Approach	Northbound SW 126th Pl			Southbound SW 126th Pl			Eastbound SW Leveton Dr			Westbound SW Leveton Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	3	0	3	4	23	27	23	7	30	30
PHF	0.00			0.38			0.33			0.58			0.63

By Movement	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	3		0	3	0	4		4		23	0	23	30
PHF				0.00	0.38		0.00	0.38	0.00	0.33		0.33		0.58	0.00	0.58	0.63

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

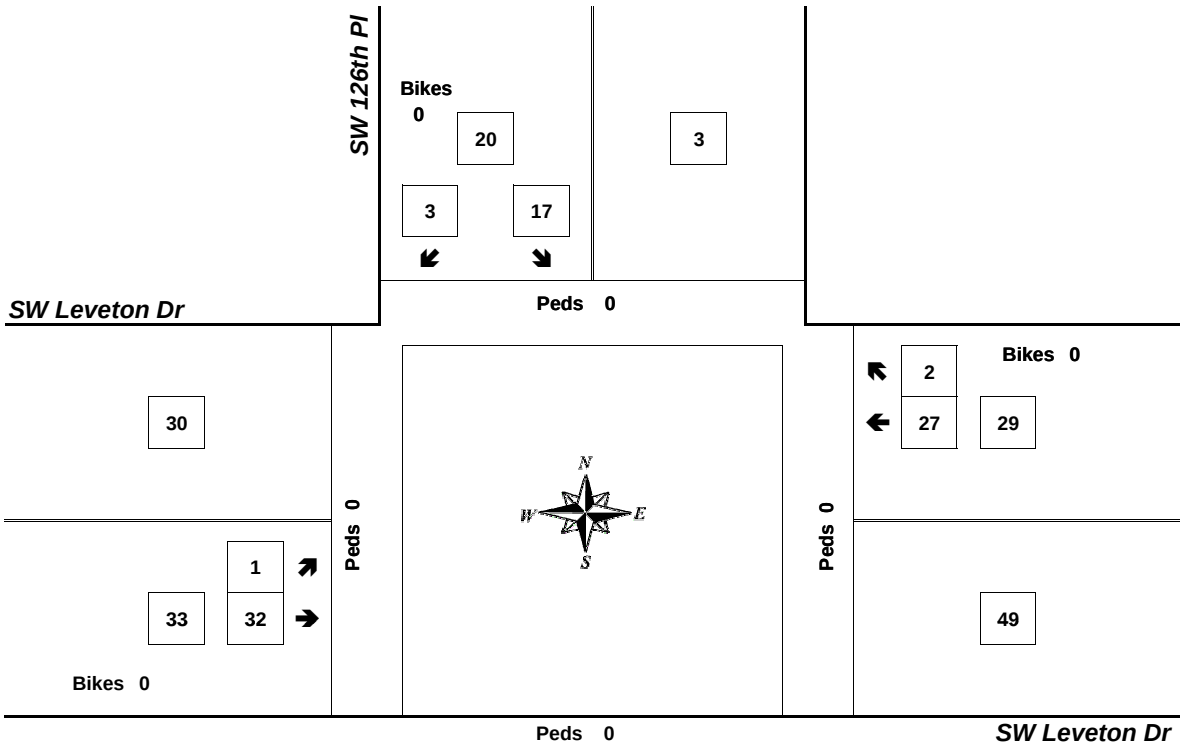
Interval Start Time	Northbound SW 126th Pl				Southbound SW 126th Pl				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	3		0	3	0	4		4		23	0	23	30
4:15 PM				0	2		0	2	0	4		4		17	0	17	23
4:30 PM				0	1		0	1	0	2		2		9	0	9	12
4:45 PM				0	0		0	0	0	1		1		5	0	5	6
5:00 PM				0	0		0	0	0	0		0		2	0	2	2

Peak Hour Summary

Clay Carney
(503) 833-2740

SW 126th Pl & SW Leveton Dr

4:00 PM to 5:00 PM
Tuesday, May 02, 2017



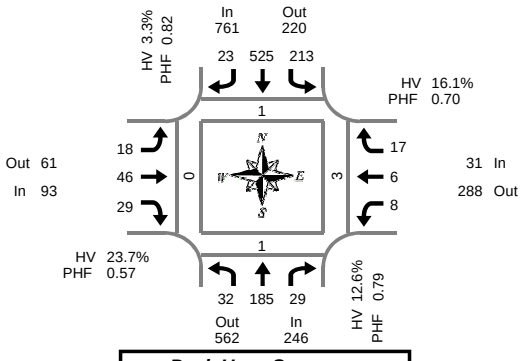
Bikes
0

Approach	PHF	HV%	Volume
EB	0.63	12.1%	33
WB	0.56	79.3%	29
NB	0.00	0.0%	0
SB	0.56	15.0%	20
Intersection	0.79	36.6%	82

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:00 AM to 8:00 AM

SW 124th Ave & SW Leveton Dr

Wednesday, May 03, 2017
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				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	19	2	0	17	38	2	0	1	3	5	0	1	1	1	0	92	0	0	0	0
7:05 AM	3	20	3	0	9	46	1	0	2	1	0	0	1	1	0	0	87	0	0	0	0
7:10 AM	2	7	0	0	10	33	5	0	3	4	0	0	1	0	3	0	68	1	0	0	0
7:15 AM	1	8	0	0	11	43	3	0	3	4	2	0	0	0	2	0	77	0	0	0	0
7:20 AM	2	14	1	0	11	28	0	0	2	2	0	0	0	0	1	0	61	0	1	1	0
7:25 AM	5	21	5	0	18	42	1	0	1	1	2	0	0	0	3	0	99	0	0	0	0
7:30 AM	3	16	4	0	18	51	1	0	2	2	1	0	0	1	1	0	100	0	0	1	0
7:35 AM	3	19	2	0	20	44	2	0	1	3	3	0	4	1	0	0	102	0	0	0	0
7:40 AM	2	18	1	0	22	52	1	1	1	2	1	0	1	0	3	0	104	0	0	0	0
7:45 AM	1	18	2	0	14	54	1	0	2	8	5	0	0	1	0	0	106	0	0	1	0
7:50 AM	3	16	4	0	33	50	5	0	0	11	6	0	0	0	0	0	128	0	0	0	0
7:55 AM	5	9	5	0	30	44	1	0	0	5	4	0	0	1	3	0	107	0	0	0	0
8:00 AM	1	10	4	0	25	22	5	0	0	7	2	0	0	3	3	0	82	0	0	0	0
8:05 AM	4	9	2	0	18	20	2	1	0	1	3	0	2	3	1	0	65	0	0	1	0
8:10 AM	0	12	1	0	17	32	1	0	0	4	2	0	2	0	1	0	72	0	0	0	0
8:15 AM	4	12	7	0	23	24	1	0	0	0	2	0	0	1	0	0	74	0	0	0	0
8:20 AM	4	9	2	0	23	19	1	0	1	0	1	0	1	0	3	0	64	0	0	0	0
8:25 AM	1	16	2	0	19	13	1	0	0	4	1	0	0	0	3	0	60	0	0	0	1
8:30 AM	2	14	1	0	14	13	1	0	0	3	0	0	0	1	0	0	49	0	0	0	0
8:35 AM	1	11	3	0	13	20	1	0	0	5	0	0	1	1	2	0	58	0	0	0	0
8:40 AM	1	14	5	0	9	19	1	0	1	4	0	0	1	0	3	0	58	0	0	0	0
8:45 AM	1	9	2	0	15	14	2	0	0	1	1	0	1	1	1	0	48	0	0	1	0
8:50 AM	0	12	2	1	8	24	1	0	2	2	2	0	0	0	0	0	53	0	0	0	0
8:55 AM	1	10	1	0	14	20	0	1	2	2	0	0	2	0	2	0	54	0	0	0	0
Total Survey	52	323	61	1	411	765	40	3	24	79	43	0	18	16	36	0	1,868	1	1	5	1

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				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	7	46	5	0	36	117	8	0	6	8	5	0	3	2	4	0	247	1	0	0	0
7:15 AM	8	43	6	0	40	113	4	0	6	7	4	0	0	0	6	0	237	0	1	1	0
7:30 AM	8	53	7	0	60	147	4	1	4	7	5	0	5	2	4	0	306	0	0	1	0
7:45 AM	9	43	11	0	77	148	7	0	2	24	15	0	0	2	3	0	341	0	0	1	0
8:00 AM	5	31	7	0	60	74	8	1	0	12	7	0	4	6	5	0	219	0	0	1	0
8:15 AM	9	37	11	0	65	56	3	0	1	4	4	0	1	1	6	0	198	0	0	0	1
8:30 AM	4	39	9	0	36	52	3	0	1	12	0	0	2	2	5	0	165	0	0	0	0
8:45 AM	2	31	5	1	37	58	3	1	4	5	3	0	3	1	3	0	155	0	0	1	0
Total Survey	52	323	61	1	411	765	40	3	24	79	43	0	18	16	36	0	1,868	1	1	5	1

Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	246	562	808	0	761	220	981	1	93	61	154	0	31	288	319	0	1,131	1	1	3	0
%HV	12.6%				3.3%				23.7%				16.1%				7.3%				
PHF	0.79				0.82				0.57				0.70				0.83				

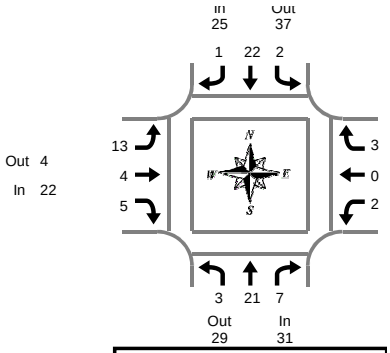
By Movement	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	32	185	29	246	213	525	23	761	18	46	29	93	8	6	17	31	1,131
%HV	9.4%	11.4%	24.1%	12.6%	0.9%	4.2%	4.3%	3.3%	72.2%	8.7%	17.2%	23.7%	25.0%	0.0%	17.6%	16.1%	7.3%
PHF	0.73	0.83	0.66	0.79	0.69	0.84	0.64	0.82	0.56	0.48	0.48	0.57	0.40	0.75	0.71	0.70	0.83

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				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	32	185	29	0	213	525	23	1	18	46	29	0	8	6	17	0	1,131	1	1	3	0
7:15 AM	30	170	31	0	237	482	23	2	12	50	31	0	9	10	18	0	1,103	0	1	4	0
7:30 AM	31	164	36	0	262	425	22	2	7	47	31	0	10	11	18	0	1,064	0	0	3	1
7:45 AM	27	150	38	0	238	330	21	1	4	52	26	0	7	11	19	0	923	0	0	2	1
8:00 AM	20	138	32	1	198	240	17	2	6	33	14	0	10	10	19	0	737	0	0	2	1

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



SW 124th Ave & SW Leveton Dr

Wednesday, May 03, 2017
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	1	1	0	3	0	3	1	1	1	3	0	0	0	0	7
7:05 AM	0	2	0	2	1	2	0	3	2	0	0	2	0	0	0	0	7
7:10 AM	0	0	0	0	0	2	0	2	3	1	0	4	1	0	2	3	9
7:15 AM	0	2	0	2	0	2	0	2	2	1	0	3	0	0	0	0	7
7:20 AM	0	3	0	3	1	1	0	2	2	0	0	2	0	0	0	0	7
7:25 AM	0	3	1	4	0	0	0	0	1	0	0	1	0	0	0	0	5
7:30 AM	1	3	0	4	0	1	0	1	1	0	0	1	0	0	0	0	6
7:35 AM	0	1	1	2	0	0	0	0	0	1	1	2	1	0	0	1	5
7:40 AM	0	3	1	4	0	1	0	1	0	0	1	1	0	0	0	0	6
7:45 AM	0	1	0	1	0	5	0	5	1	0	0	1	0	0	0	0	7
7:50 AM	1	3	1	5	0	0	1	1	0	0	1	1	0	0	0	0	7
7:55 AM	1	0	2	3	0	5	0	5	0	0	1	1	0	0	1	1	10
8:00 AM	0	2	2	4	0	1	2	3	0	0	0	0	0	2	1	3	10
8:05 AM	0	2	0	2	2	0	0	2	0	0	0	0	0	3	0	3	7
8:10 AM	0	1	0	1	1	3	0	4	0	0	1	1	2	0	0	2	8
8:15 AM	0	0	0	0	0	1	1	2	0	0	1	1	0	0	0	0	3
8:20 AM	1	1	0	2	0	4	0	4	0	0	0	0	0	0	1	1	7
8:25 AM	0	3	1	4	0	3	0	3	0	0	1	1	0	0	0	0	8
8:30 AM	1	5	0	6	0	2	0	2	0	0	0	0	0	0	0	0	8
8:35 AM	0	3	2	5	1	3	0	4	0	0	0	0	1	1	0	2	11
8:40 AM	0	6	2	8	0	2	1	3	0	0	0	0	1	0	0	1	12
8:45 AM	0	3	1	4	0	2	0	2	0	1	0	1	1	0	0	1	8
8:50 AM	0	6	0	6	0	0	0	0	2	0	1	3	0	0	0	0	9
8:55 AM	0	2	0	2	0	1	0	1	1	0	0	1	1	0	0	1	5
Total Survey	5	55	15	75	6	44	5	55	16	5	9	30	8	6	5	19	179

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	2	1	3	1	7	0	8	6	2	1	9	1	0	2	3	23
7:15 AM	0	8	1	9	1	3	0	4	5	1	0	6	0	0	0	0	19
7:30 AM	1	7	2	10	0	2	0	2	1	1	2	4	1	0	0	1	17
7:45 AM	2	4	3	9	0	10	1	11	1	0	2	3	0	0	1	1	24
8:00 AM	0	5	2	7	3	4	2	9	0	0	1	1	2	5	1	8	25
8:15 AM	1	4	1	6	0	8	1	9	0	0	2	2	0	0	1	1	18
8:30 AM	1	14	4	19	1	7	1	9	0	0	0	0	2	1	0	3	31
8:45 AM	0	11	1	12	0	3	0	3	3	1	1	5	2	0	0	2	22
Total Survey	5	55	15	75	6	44	5	55	16	5	9	30	8	6	5	19	179

Heavy Vehicle Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound SW 124th Ave			Southbound SW 124th Ave			Eastbound SW Leveton Dr			Westbound SW Leveton Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	31	29	60	25	37	62	22	4	26	5	13	18	83
PHF	0.70			0.57			0.61			0.42			0.86

By Movement	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	3	21	7	31	2	22	1	25	13	4	5	22	2	0	3	5	83
PHF	0.38	0.58	0.58	0.70	0.50	0.55	0.25	0.57	0.46	0.50	0.63	0.61	0.50	0.00	0.38	0.42	0.86

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	3	21	7	31	2	22	1	25	13	4	5	22	2	0	3	5	83
7:15 AM	3	24	8	35	4	19	3	26	7	2	5	14	3	5	2	10	85
7:30 AM	4	20	8	32	3	24	4	31	2	1	7	10	3	5	3	11	84
7:45 AM	4	27	10	41	4	29	5	38	1	0	5	6	4	6	3	13	98
8:00 AM	2	34	8	44	4	22	4	30	3	1	4	8	6	6	2	14	96

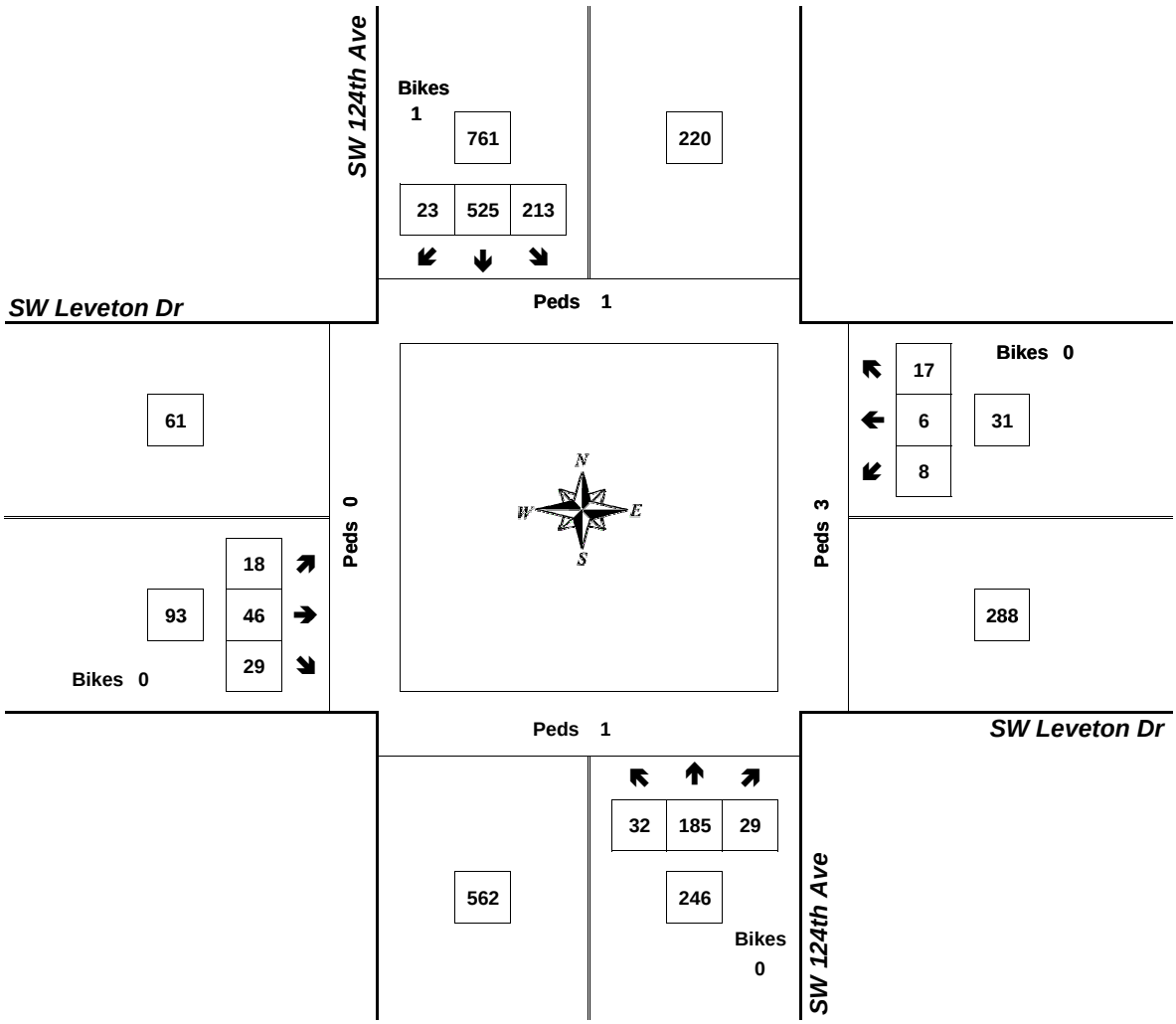
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

SW 124th Ave & SW Leveton Dr

7:00 AM to 8:00 AM
Wednesday, May 03, 2017

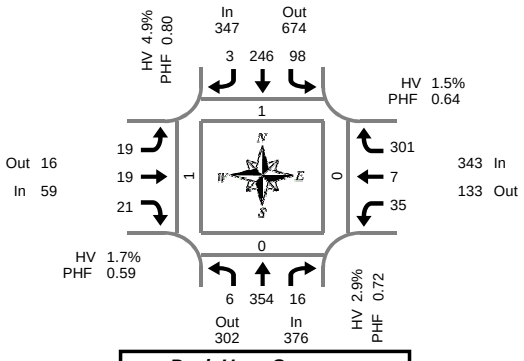


Approach	PHF	HV%	Volume
EB	0.57	23.7%	93
WB	0.70	16.1%	31
NB	0.79	12.6%	246
SB	0.82	3.3%	761
Intersection	0.83	7.3%	1,131

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

SW 124th Ave & SW Leveton Dr

Tuesday, May 02, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				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	2	39	0	0	1	21	3	0	4	1	1	0	3	2	19	0	96	0	0	0	0
4:05 PM	1	55	2	0	2	10	0	0	2	2	1	0	2	0	25	0	102	1	0	0	0
4:10 PM	3	40	1	0	5	12	3	0	3	2	2	0	4	0	19	0	94	0	0	0	0
4:15 PM	3	26	2	0	4	20	3	0	4	1	4	0	1	1	10	0	79	0	0	1	0
4:20 PM	1	23	0	0	4	20	0	0	0	2	0	0	0	1	15	0	66	0	0	0	0
4:25 PM	1	22	1	0	7	23	0	0	2	1	0	0	0	1	13	0	71	0	0	0	0
4:30 PM	2	27	0	0	4	17	2	0	9	3	1	0	1	0	18	0	84	0	0	0	0
4:35 PM	0	40	1	0	5	21	0	0	2	4	3	0	1	1	24	0	102	0	0	0	0
4:40 PM	0	23	0	0	11	18	0	0	3	5	2	0	3	1	17	0	83	0	0	0	0
4:45 PM	1	41	3	0	23	25	1	0	1	2	2	0	1	2	13	0	115	0	0	0	0
4:50 PM	0	15	0	0	10	19	0	1	1	4	0	0	0	0	9	1	58	0	0	0	0
4:55 PM	0	24	1	0	15	16	0	0	1	5	3	0	1	1	24	0	91	0	0	0	0
5:00 PM	1	33	2	1	16	25	0	0	3	1	3	0	2	0	26	0	112	0	0	0	0
5:05 PM	0	41	3	0	4	32	0	0	2	0	7	0	2	0	29	0	120	0	0	0	0
5:10 PM	1	49	0	0	6	25	0	0	2	2	1	0	2	0	23	0	111	1	0	0	1
5:15 PM	0	27	2	0	3	14	0	0	3	0	2	0	4	1	25	0	81	0	0	0	0
5:20 PM	0	29	0	0	7	17	0	0	2	1	0	0	3	1	12	0	72	0	0	0	0
5:25 PM	2	25	2	0	2	19	1	0	2	0	2	0	4	1	22	0	82	0	0	0	0
5:30 PM	0	23	0	0	2	18	0	0	1	1	0	0	4	0	40	0	89	0	0	0	0
5:35 PM	1	26	2	0	3	15	0	0	1	3	0	0	7	0	41	0	99	0	0	0	0
5:40 PM	0	21	1	0	7	21	1	0	0	0	1	0	5	1	37	0	95	0	0	0	0
5:45 PM	0	18	2	0	3	17	0	0	0	1	0	0	1	0	29	0	71	0	0	0	0
5:50 PM	0	12	0	0	2	24	0	0	0	2	2	0	2	0	28	0	72	0	0	1	0
5:55 PM	1	22	0	0	1	19	1	0	3	0	1	0	2	0	15	0	65	0	0	0	0
Total Survey	20	701	25	1	147	468	15	1	51	43	38	0	55	14	533	1	2,110	2	0	2	1

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				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	6	134	3	0	8	43	6	0	9	5	4	0	9	2	63	0	292	1	0	0	0
4:15 PM	5	71	3	0	15	63	3	0	6	4	4	0	1	3	38	0	216	0	0	1	0
4:30 PM	2	90	1	0	20	56	2	0	14	12	6	0	5	2	59	0	269	0	0	0	0
4:45 PM	1	80	4	0	48	60	1	1	3	11	5	0	2	3	46	1	264	0	0	0	0
5:00 PM	2	123	5	1	26	82	0	0	7	3	11	0	6	0	78	0	343	1	0	0	1
5:15 PM	2	81	4	0	12	50	1	0	7	1	4	0	11	3	59	0	235	0	0	0	0
5:30 PM	1	70	3	0	12	54	1	0	2	4	1	0	16	1	118	0	283	0	0	0	0
5:45 PM	1	52	2	0	6	60	1	0	3	3	3	0	5	0	72	0	208	0	0	1	0
Total Survey	20	701	25	1	147	468	15	1	51	43	38	0	55	14	533	1	2,110	2	0	2	1

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	376	302	678	1	347	674	1,021	1	59	16	75	0	343	133	476	1	1,125	1	0	0	1
%HV	2.9%				4.9%				1.7%				1.5%				3.0%				
PHF	0.72				0.80				0.59				0.64				0.82				

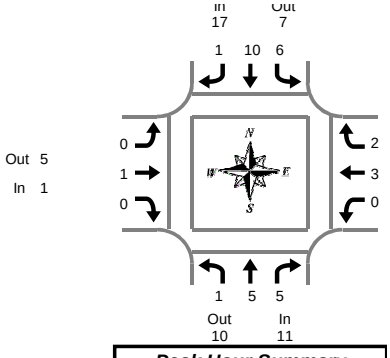
By Movement	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	6	354	16	376	98	246	3	347	19	19	21	59	35	7	301	343	1,125
%HV	16.7%	1.4%	31.3%	2.9%	6.1%	4.1%	33.3%	4.9%	0.0%	5.3%	0.0%	1.7%	0.0%	42.9%	0.7%	1.5%	3.0%
PHF	0.50	0.72	0.67	0.72	0.51	0.75	0.75	0.80	0.68	0.43	0.40	0.59	0.55	0.58	0.64	0.64	0.82

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				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	14	375	11	0	91	222	12	1	32	32	19	0	17	10	206	1	1,041	1	0	1	0
4:15 PM	10	364	13	1	109	261	6	1	30	30	26	0	14	8	221	1	1,092	1	0	1	1
4:30 PM	7	374	14	1	106	248	4	1	31	27	26	0	24	8	242	1	1,111	1	0	0	1
4:45 PM	6	354	16	1	98	246	3	1	19	19	21	0	35	7	301	1	1,125	1	0	0	1
5:00 PM	6	326	14	1	56	246	3	0	19	11	19	0	38	4	327	0	1,069	1	0	1	1

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



SW 124th Ave & SW Leveton Dr

Tuesday, May 02, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:45 PM to 5:45 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	1	2	0	3	0	3	3	6	0	0	0	0	0	1	0	1	10
4:05 PM	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
4:10 PM	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	2
4:15 PM	3	0	1	4	0	1	3	4	2	0	0	2	0	1	0	1	11
4:20 PM	0	0	0	0	1	3	0	4	0	0	0	0	0	1	1	2	6
4:25 PM	1	0	0	1	0	1	0	1	1	0	0	1	0	1	0	1	4
4:30 PM	0	1	0	1	0	1	2	3	0	0	0	0	0	0	0	0	4
4:35 PM	0	0	0	0	0	1	0	1	1	0	0	1	1	1	0	2	4
4:40 PM	0	1	0	1	0	0	0	0	0	1	0	1	1	1	0	2	4
4:45 PM	0	1	2	3	0	3	1	4	0	0	0	0	0	2	1	3	10
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:55 PM	0	2	1	3	1	1	0	2	0	1	0	1	0	0	0	0	6
5:00 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
5:05 PM	0	0	1	1	0	2	0	2	0	0	0	0	0	0	0	0	3
5:10 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:15 PM	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	2
5:20 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	2
5:25 PM	0	0	0	0	2	1	0	3	0	0	0	0	0	0	0	0	3
5:30 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
5:35 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	2
5:40 PM	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	2
5:45 PM	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3
5:50 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	7	9	6	22	7	26	11	44	4	2	0	6	2	9	3	14	86

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	2	0	4	0	4	5	9	0	0	0	0	0	1	0	1	14
4:15 PM	4	0	1	5	1	5	3	9	3	0	0	3	0	3	1	4	21
4:30 PM	0	2	0	2	0	2	2	4	1	1	0	2	2	2	0	4	12
4:45 PM	0	3	3	6	1	4	1	6	0	1	0	1	0	2	1	3	16
5:00 PM	0	0	1	1	0	5	0	5	0	0	0	0	0	0	0	0	6
5:15 PM	0	1	1	2	3	1	0	4	0	0	0	0	0	1	0	1	7
5:30 PM	1	1	0	2	2	0	0	2	0	0	0	0	0	0	1	1	5
5:45 PM	0	0	0	0	0	5	0	5	0	0	0	0	0	0	0	0	5
Total Survey	7	9	6	22	7	26	11	44	4	2	0	6	2	9	3	14	86

Heavy Vehicle Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound SW 124th Ave			Southbound SW 124th Ave			Eastbound SW Leveton Dr			Westbound SW Leveton Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	11	10	21	17	7	24	1	5	6	5	12	17	34
PHF	0.46			0.71			0.25			0.42			0.53

By Movement	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	5	5	11	6	10	1	17	0	1	0	1	0	3	2	5	34
PHF	0.25	0.42	0.42	0.46	0.38	0.50	0.25	0.71	0.00	0.25	0.00	0.25	0.00	0.38	0.50	0.42	0.53

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Leveton Dr				Westbound SW Leveton Dr				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	6	7	4	17	2	15	11	28	4	2	0	6	2	8	2	12	63
4:15 PM	4	5	5	14	2	16	6	24	4	2	0	6	2	7	2	11	55
4:30 PM	0	6	5	11	4	12	3	19	1	2	0	3	2	5	1	8	41
4:45 PM	1	5	5	11	6	10	1	17	0	1	0	1	0	3	2	5	34
5:00 PM	1	2	2	5	5	11	0	16	0	0	0	0	0	1	1	2	23

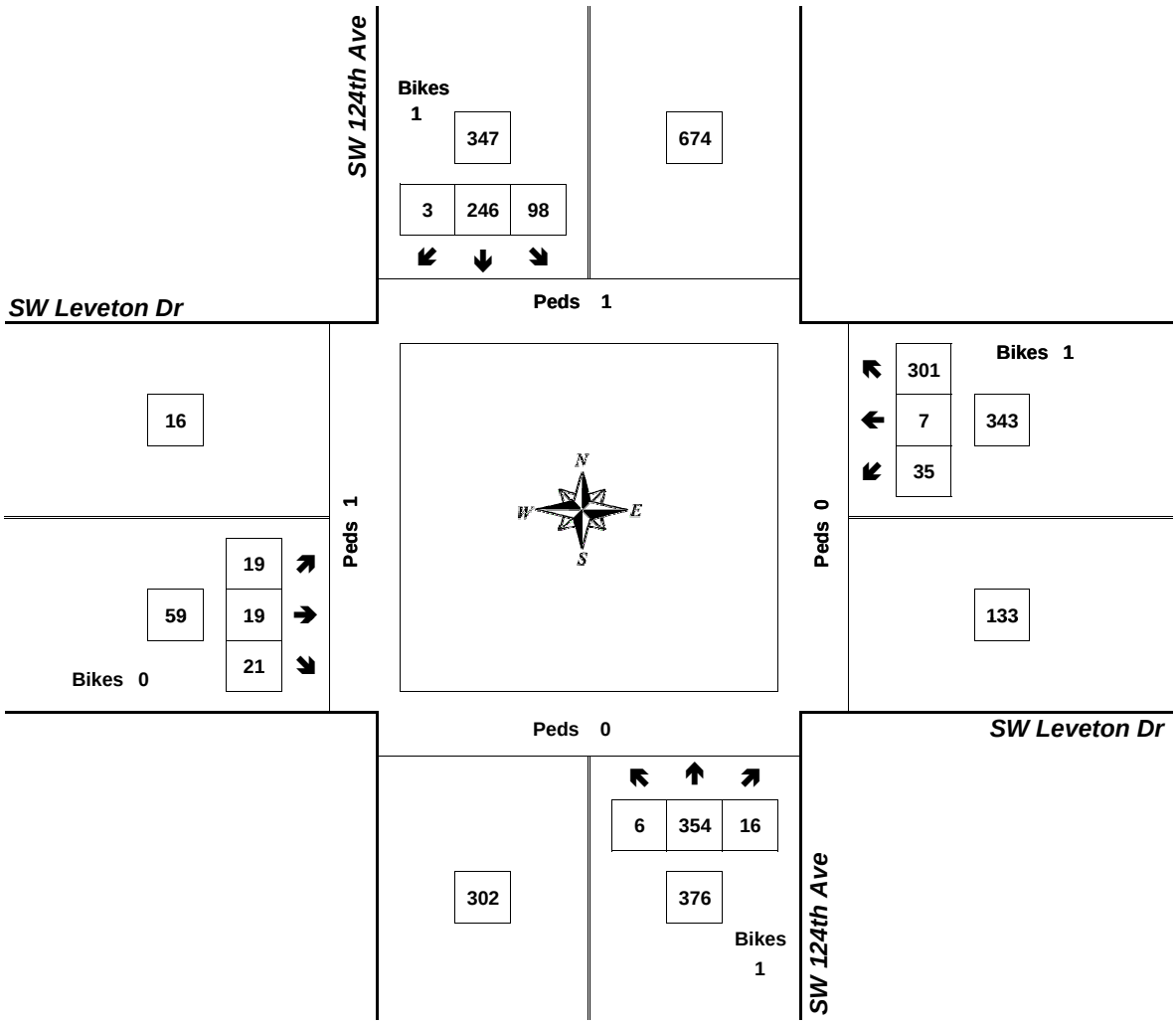
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

SW 124th Ave & SW Leveton Dr

4:45 PM to 5:45 PM
Tuesday, May 02, 2017

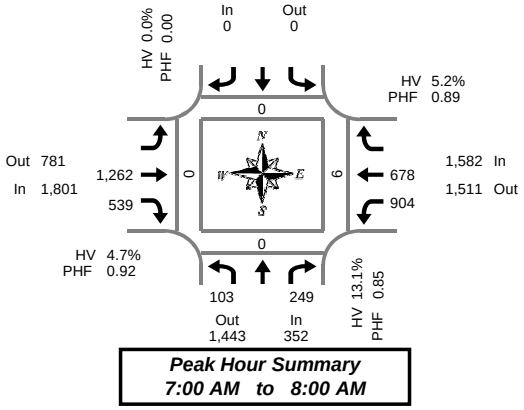


Approach	PHF	HV%	Volume
EB	0.59	1.7%	59
WB	0.64	1.5%	343
NB	0.72	2.9%	376
SB	0.80	4.9%	347
Intersection	0.82	3.0%	1,125

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



SW 124th Ave & Hwy 99W

Thursday, May 11, 2017
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes	T	R	Bikes	L	T		Bikes		North	South	East	West
7:00 AM	8		13	0				0	105	37	0	79	61		0	303	0	0	1	0
7:05 AM	8		22	0				0	131	36	0	52	47		0	296	0	0	0	0
7:10 AM	10		19	0				0	147	32	0	33	54		0	295	0	0	0	0
7:15 AM	6		22	0				0	96	34	0	92	51		0	301	0	0	0	0
7:20 AM	8		19	0				0	128	52	0	52	63		0	322	0	0	0	0
7:25 AM	10		16	0				0	87	28	0	94	53		0	288	0	0	2	0
7:30 AM	10		24	0				0	86	41	0	93	53		0	307	0	0	0	0
7:35 AM	9		23	0				0	106	51	0	82	56		0	327	0	0	0	0
7:40 AM	3		18	0				0	134	51	0	78	74		0	358	0	0	0	0
7:45 AM	8		26	0				0	75	53	0	94	61		0	317	0	0	0	0
7:50 AM	8		15	0				0	87	72	0	77	58		0	317	0	0	3	0
7:55 AM	15		32	0				0	80	52	0	78	47		0	304	0	0	0	0
8:00 AM	10		17	0				0	87	50	0	72	62		0	298	0	0	1	0
8:05 AM	15		22	0				0	110	33	0	56	34		0	270	0	0	1	0
8:10 AM	18		23	0				0	85	43	0	64	49		0	282	0	0	1	0
8:15 AM	10		20	0				0	100	44	0	48	40		1	262	0	0	1	0
8:20 AM	9		24	0				0	117	33	0	42	52		0	277	0	0	1	0
8:25 AM	7		19	0				0	123	32	0	54	38		0	273	0	0	0	0
8:30 AM	6		18	0				0	113	17	0	58	49		0	261	0	0	0	0
8:35 AM	12		16	0				0	79	23	0	30	61		0	221	0	0	0	0
8:40 AM	10		19	0				0	76	27	0	40	47		0	219	0	0	0	0
8:45 AM	7		10	0				0	99	21	0	34	71		0	242	0	0	0	0
8:50 AM	10		24	0				0	98	19	0	51	39		0	241	0	0	0	0
8:55 AM	13		13	0				0	85	11	0	32	50		0	204	0	0	0	0
Total Survey	230		474	0				0	2,434	892	0	1,485	1,270		1	6,785	0	0	11	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes	T	R	Bikes	L	T		Bikes		North	South	East	West
7:00 AM	26		54	0				0	383	105	0	164	162		0	894	0	0	1	0
7:15 AM	24		57	0				0	311	114	0	238	167		0	911	0	0	2	0
7:30 AM	22		65	0				0	326	143	0	253	183		0	992	0	0	0	0
7:45 AM	31		73	0				0	242	177	0	249	166		0	938	0	0	3	0
8:00 AM	43		62	0				0	282	126	0	192	145		0	850	0	0	3	0
8:15 AM	26		63	0				0	340	109	0	144	130		1	812	0	0	2	0
8:30 AM	28		53	0				0	268	67	0	128	157		0	701	0	0	0	0
8:45 AM	30		47	0				0	282	51	0	117	160		0	687	0	0	0	0
Total Survey	230		474	0				0	2,434	892	0	1,485	1,270		1	6,785	0	0	11	0

Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	352	1,443	1,795	0	0	0	0	0	1,801	781	2,582	0	1,582	1,511	3,093	0	3,735	0	0	6	0
%HV	13.1%				0.0%				4.7%				5.2%				5.7%				
PHF	0.85				0.00				0.92				0.89				0.93				

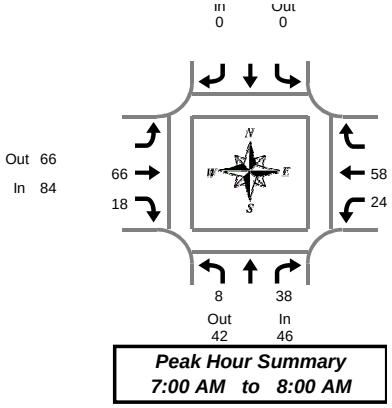
By Movement	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Total
	L		R	Total				Total		T	R	Total	L	T		Total	
Volume	103		249	352				0		1,262	539	1,801	904	678		1,582	3,735
%HV	7.8%	NA	15.3%	13.1%	NA	NA	NA	0.0%	NA	5.2%	3.3%	4.7%	2.7%	8.6%	NA	5.2%	5.7%
PHF	0.83		0.85	0.85				0.00		0.82	0.76	0.92	0.84	0.88		0.89	0.93

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes	T	R	Bikes	L	T		Bikes		North	South	East	West
7:00 AM	103		249	0				0	1,262	539	0	904	678		0	3,735	0	0	6	0
7:15 AM	120		257	0				0	1,161	560	0	932	661		0	3,691	0	0	8	0
7:30 AM	122		263	0				0	1,190	555	0	838	624		1	3,592	0	0	8	0
7:45 AM	128		251	0				0	1,132	479	0	713	598		1	3,301	0	0	8	0
8:00 AM	127		225	0				0	1,172	353	0	581	592		1	3,050	0	0	5	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



SW 124th Ave & Hwy 99W

Thursday, May 11, 2017
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Interval Total
	L		R	Total				Total	T	R	Total		L	T		Total	
7:00 AM	0		2	2				0	4	2	6		7	8		15	23
7:05 AM	0		4	4				0	5	0	5		1	2		3	12
7:10 AM	3		4	7				0	10	0	10		3	4		7	24
7:15 AM	0		4	4				0	5	3	8		2	4		6	18
7:20 AM	0		2	2				0	6	1	7		0	7		7	16
7:25 AM	2		4	6				0	7	0	7		1	7		8	21
7:30 AM	2		4	6				0	5	2	7		3	6		9	22
7:35 AM	0		2	2				0	5	1	6		2	3		5	13
7:40 AM	0		2	2				0	6	3	9		0	2		2	13
7:45 AM	0		3	3				0	3	2	5		2	3		5	13
7:50 AM	1		1	2				0	3	3	6		1	8		9	17
7:55 AM	0		6	6				0	7	1	8		2	4		6	20
8:00 AM	0		0	0				0	5	3	8		3	2		5	13
8:05 AM	2		4	6				0	6	2	8		4	2		6	20
8:10 AM	1		4	5				0	4	1	5		2	3		5	15
8:15 AM	3		2	5				0	3	1	4		0	1		1	10
8:20 AM	1		4	5				0	8	1	9		2	4		6	20
8:25 AM	1		5	6				0	9	1	10		4	1		5	21
8:30 AM	2		1	3				0	8	1	9		4	5		9	21
8:35 AM	6		4	10				0	5	3	8		3	7		10	28
8:40 AM	4		6	10				0	7	0	7		3	3		6	23
8:45 AM	4		2	6				0	5	1	6		6	5		11	23
8:50 AM	1		11	12				0	5	1	6		5	2		7	25
8:55 AM	4		2	6				0	2	0	2		3	6		9	17
Total Survey	37		83	120				0	133	33	166		63	99		162	448

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Interval Total
	L		R	Total				Total	T	R	Total		L	T		Total	
7:00 AM	3		10	13				0	19	2	21		11	14		25	59
7:15 AM	2		10	12				0	18	4	22		3	18		21	55
7:30 AM	2		8	10				0	16	6	22		5	11		16	48
7:45 AM	1		10	11				0	13	6	19		5	15		20	50
8:00 AM	3		8	11				0	15	6	21		9	7		16	48
8:15 AM	5		11	16				0	20	3	23		6	6		12	51
8:30 AM	12		11	23				0	20	4	24		10	15		25	72
8:45 AM	9		15	24				0	12	2	14		14	13		27	65
Total Survey	37		83	120				0	133	33	166		63	99		162	448

Heavy Vehicle Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound SW 124th Ave			Southbound SW 124th Ave			Eastbound Hwy 99W			Westbound Hwy 99W			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	46	42	88	0	0	0	84	66	150	82	104	186	212
PHF	0.77			0.00			0.84			0.82			0.90

By Movement	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Total
	L		R	Total				Total	T	R	Total		L	T		Total	
Volume	8		38	46				0	66	18	84		24	58		82	212
PHF	0.50		0.79	0.77				0.00	0.79	0.56	0.84		0.55	0.73		0.82	0.90

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

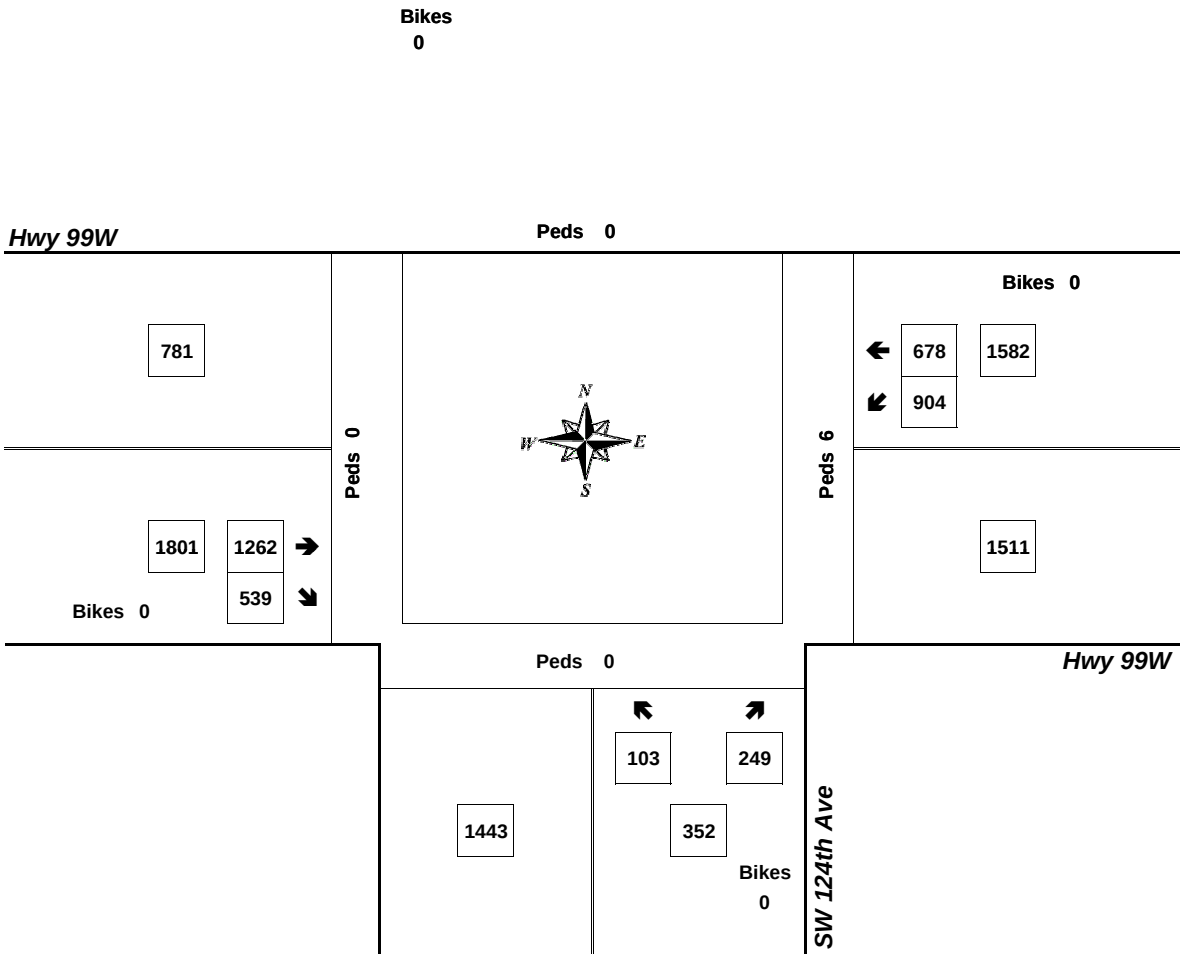
Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Interval Total
	L		R	Total				Total	T	R	Total		L	T		Total	
7:00 AM	8		38	46				0	66	18	84		24	58		82	212
7:15 AM	8		36	44				0	62	22	84		22	51		73	201
7:30 AM	11		37	48				0	64	21	85		25	39		64	197
7:45 AM	21		40	61				0	68	19	87		30	43		73	221
8:00 AM	29		45	74				0	67	15	82		39	41		80	236

Peak Hour Summary

Clay Carney
(503) 833-2740

SW 124th Ave & Hwy 99W

7:00 AM to 8:00 AM
Thursday, May 11, 2017

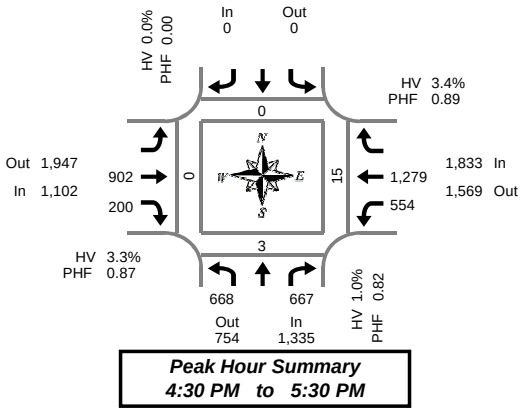


Approach	PHF	HV%	Volume
EB	0.92	4.7%	1,801
WB	0.89	5.2%	1,582
NB	0.85	13.1%	352
SB	0.00	0.0%	0
Intersection	0.93	5.7%	3,735

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



SW 124th Ave & Hwy 99W

Wednesday, May 10, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes	T	R	Bikes	L	T		Bikes		North	South	East	West
4:00 PM	43		48	0				0	66	13	0	38	116		0	324	0	0	0	0
4:05 PM	48		74	0				0	97	11	0	41	60		0	331	0	0	0	0
4:10 PM	55		71	0				0	77	14	0	25	41		0	283	0	0	0	0
4:15 PM	46		59	0				0	70	9	0	50	98		0	332	0	0	0	0
4:20 PM	53		50	0				0	70	18	0	25	101		0	317	0	0	1	0
4:25 PM	25		39	0				0	71	14	0	56	88		0	293	0	1	1	0
4:30 PM	68		53	0				0	76	26	0	34	88		0	345	0	0	2	0
4:35 PM	53		49	0				0	61	15	0	61	123		1	362	0	0	1	0
4:40 PM	49		45	0				0	113	25	0	41	119		0	392	0	1	1	0
4:45 PM	54		49	0				0	62	18	0	58	114		0	355	0	0	3	0
4:50 PM	47		60	0				0	68	17	0	49	91		0	332	0	0	0	0
4:55 PM	35		43	1				0	69	24	0	45	110		0	326	0	0	1	0
5:00 PM	50		38	0				0	66	17	0	56	122		0	349	0	0	1	0
5:05 PM	77		81	0				0	52	12	0	53	81		0	356	0	0	2	0
5:10 PM	64		57	0				0	103	13	0	33	95		0	365	0	2	2	0
5:15 PM	55		74	1				0	63	11	0	48	131		0	382	0	0	0	0
5:20 PM	65		61	0				0	87	9	0	38	104		0	364	0	0	0	0
5:25 PM	51		57	0				0	82	13	0	38	101		0	342	0	0	2	0
5:30 PM	50		43	0				0	65	19	0	41	98		0	316	0	0	0	0
5:35 PM	56		63	0				0	80	11	0	49	125		0	384	0	0	0	0
5:40 PM	44		39	0				0	73	16	0	48	118		0	338	0	0	0	0
5:45 PM	51		52	0				0	55	12	0	33	106		0	309	0	0	2	0
5:50 PM	45		44	0				0	67	15	0	49	130		0	350	0	0	0	0
5:55 PM	20		40	0				0	73	18	0	42	89		0	282	0	0	0	0
Total Survey	1,204		1,289	2				0	1,766	370	0	1,051	2,449		1	8,129	0	4	19	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes	T	R	Bikes	L	T		Bikes		North	South	East	West
4:00 PM	146		193	0				0	240	38	0	104	217		0	938	0	0	0	0
4:15 PM	124		148	0				0	211	41	0	131	287		0	942	0	1	2	0
4:30 PM	170		147	0				0	250	66	0	136	330		1	1,099	0	1	4	0
4:45 PM	136		152	1				0	199	59	0	152	315		0	1,013	0	0	4	0
5:00 PM	191		176	0				0	221	42	0	142	298		0	1,070	0	2	5	0
5:15 PM	171		192	1				0	232	33	0	124	336		0	1,088	0	0	2	0
5:30 PM	150		145	0				0	218	46	0	138	341		0	1,038	0	0	0	0
5:45 PM	116		136	0				0	195	45	0	124	325		0	941	0	0	2	0
Total Survey	1,204		1,289	2				0	1,766	370	0	1,051	2,449		1	8,129	0	4	19	0

Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	1,335	754	2,089	2	0	0	0	0	1,102	1,947	3,049	0	1,833	1,569	3,402	1	4,270	0	3	15	0
%HV	1.0%				0.0%				3.3%				3.4%				2.6%				
PHF	0.82				0.00				0.87				0.89				0.96				

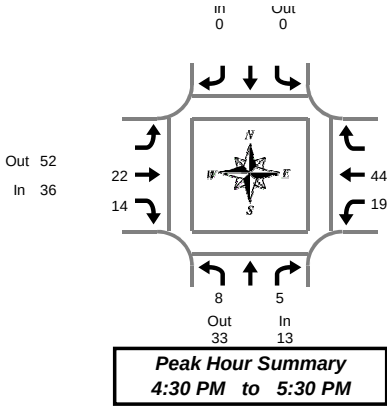
By Movement	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Total
	L		R	Total				Total		T	R	Total	L	T		Total	
Volume	668		667	1,335				0		902	200	1,102	554	1,279		1,833	4,270
%HV	1.2%	NA	0.7%	1.0%	NA	NA	NA	0.0%	NA	2.4%	7.0%	3.3%	3.4%	3.4%	NA	3.4%	2.6%
PHF	0.85		0.79	0.82				0.00		0.89	0.76	0.87	0.87	0.90		0.89	0.96

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes	T	R	Bikes	L	T		Bikes		North	South	East	West
4:00 PM	576		640	1				0	900	204	0	523	1,149		1	3,992	0	2	10	0
4:15 PM	621		623	1				0	881	208	0	561	1,230		1	4,124	0	4	15	0
4:30 PM	668		667	2				0	902	200	0	554	1,279		1	4,270	0	3	15	0
4:45 PM	648		665	2				0	870	180	0	556	1,290		0	4,209	0	2	11	0
5:00 PM	628		649	1				0	866	166	0	528	1,300		0	4,137	0	2	9	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



SW 124th Ave & Hwy 99W

Wednesday, May 10, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:30 PM to 5:30 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Interval Total
	L		R	Total				Total		T	R	Total	L	T		Total	
4:00 PM	0		3	3				0		1	1	2	2	4		6	11
4:05 PM	0		0	0				0		4	0	4	5	4		9	13
4:10 PM	0		4	4				0		2	1	3	3	2		5	12
4:15 PM	0		3	3				0		2	0	2	4	4		8	13
4:20 PM	0		0	0				0		4	1	5	0	5		5	10
4:25 PM	0		0	0				0		2	0	2	4	4		8	10
4:30 PM	1		0	1				0		4	2	6	4	3		7	14
4:35 PM	1		1	2				0		2	0	2	3	3		6	10
4:40 PM	0		1	1				0		1	1	2	1	2		3	6
4:45 PM	0		1	1				0		1	1	2	1	4		5	8
4:50 PM	3		0	3				0		1	1	2	2	5		7	12
4:55 PM	0		0	0				0		2	3	5	1	3		4	9
5:00 PM	0		1	1				0		2	1	3	2	7		9	13
5:05 PM	0		0	0				0		1	2	3	1	6		7	10
5:10 PM	1		0	1				0		2	1	3	2	2		4	8
5:15 PM	2		1	3				0		1	1	2	0	0		0	5
5:20 PM	0		0	0				0		2	1	3	0	5		5	8
5:25 PM	0		0	0				0		3	0	3	2	4		6	9
5:30 PM	0		1	1				0		1	0	1	0	3		3	5
5:35 PM	0		0	0				0		1	1	2	2	2		4	6
5:40 PM	2		0	2				0		2	3	5	0	3		3	10
5:45 PM	0		0	0				0		2	1	3	2	5		7	10
5:50 PM	0		1	1				0		1	2	3	0	1		1	5
5:55 PM	0		0	0				0		2	2	4	1	3		4	8
Total Survey	10		17	27				0		46	26	72	42	84		126	225

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Interval Total
	L		R	Total				Total		T	R	Total	L	T		Total	
4:00 PM	0		7	7				0		7	2	9	10	10		20	36
4:15 PM	0		3	3				0		8	1	9	8	13		21	33
4:30 PM	2		2	4				0		7	3	10	8	8		16	30
4:45 PM	3		1	4				0		4	5	9	4	12		16	29
5:00 PM	1		1	2				0		5	4	9	5	15		20	31
5:15 PM	2		1	3				0		6	2	8	2	9		11	22
5:30 PM	2		1	3				0		4	4	8	2	8		10	21
5:45 PM	0		1	1				0		5	5	10	3	9		12	23
Total Survey	10		17	27				0		46	26	72	42	84		126	225

Heavy Vehicle Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound SW 124th Ave			Southbound SW 124th Ave			Eastbound Hwy 99W			Westbound Hwy 99W			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	13	33	46	0	0	0	36	52	88	63	27	90	112
PHF	0.65			0.00			0.82			0.79			0.82

By Movement	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Total
	L		R	Total				Total		T	R	Total	L	T		Total	
Volume	8		5	13				0		22	14	36	19	44		63	112
PHF	0.67		0.42	0.65				0.00		0.79	0.58	0.82	0.59	0.69		0.79	0.82

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

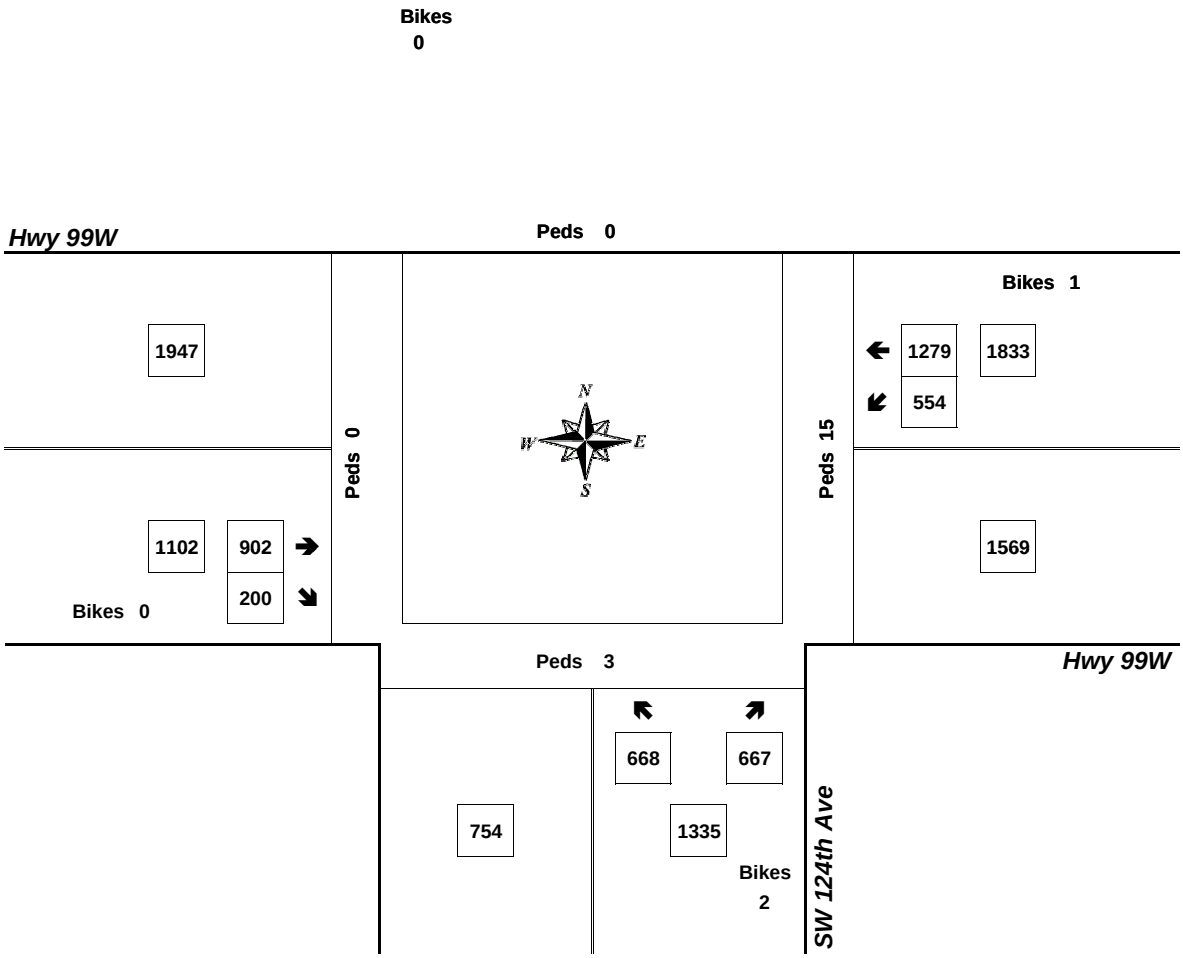
Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound Hwy 99W				Westbound Hwy 99W				Interval Total
	L		R	Total				Total		T	R	Total	L	T		Total	
4:00 PM	5		13	18				0		26	11	37	30	43		73	128
4:15 PM	6		7	13				0		24	13	37	25	48		73	123
4:30 PM	8		5	13				0		22	14	36	19	44		63	112
4:45 PM	8		4	12				0		19	15	34	13	44		57	103
5:00 PM	5		4	9				0		20	15	35	12	41		53	97

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SW 124th Ave & Hwy 99W

4:30 PM to 5:30 PM
Wednesday, May 10, 2017



Approach	PHF	HV%	Volume
EB	0.87	3.3%	1,102
WB	0.89	3.4%	1,833
NB	0.82	1.0%	1,335
SB	0.00	0.0%	0
Intersection	0.96	2.6%	4,270

Count Period: 4:00 PM to 6:00 PM

TRIP GENERATION CALCULATIONS

Land Use: General Light Industrial
Land Use Code: 110
Variable: 1,000 Square Feet
Variable Quantity: 35.73

AM PEAK HOUR

Trip Rate: 0.92

	Enter	Exit	Total
Directional Distribution	88%	12%	
Trip Ends	**29**	**4**	**33**

PM PEAK HOUR

Trip Rate: 0.97

	Enter	Exit	Total
Directional Distribution	12%	88%	
Trip Ends	**4**	**31**	**35**

WEEKDAY

Trip Rate: 6.97

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**125**	**125**	**250**

SATURDAY

Trip Rate: 1.32

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**24**	**24**	**48**

Source: TRIP GENERATION, Ninth Edition

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

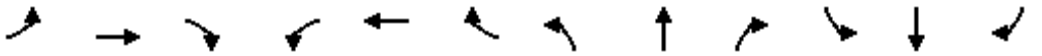
Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	83	19	9	12	1
Future Vol, veh/h	5	83	19	9	12	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	175	-	-	-	175	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	18	18	43	43	0	0
Mvmt Flow	8	132	30	14	19	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	44	0	-	0	185	37
Stage 1	-	-	-	-	37	-
Stage 2	-	-	-	-	148	-
Critical Hdwy	4.28	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.362	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1467	-	-	-	809	1041
Stage 1	-	-	-	-	991	-
Stage 2	-	-	-	-	884	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1467	-	-	-	805	1041
Mov Cap-2 Maneuver	-	-	-	-	805	-
Stage 1	-	-	-	-	991	-
Stage 2	-	-	-	-	879	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1467	-	-	-	805	1041
HCM Lane V/C Ratio	0.005	-	-	-	0.024	0.002
HCM Control Delay (s)	7.5	-	-	-	9.6	8.5
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	46	29	8	6	17	32	185	29	213	525	23
Future Volume (vph)	18	46	29	8	6	17	32	185	29	213	525	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		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	
Frt	1.00	0.94		1.00	0.89		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1456	1436		1556	1442		1597	3119		1750	3480	
Flt Permitted	0.95	1.00		0.95	1.00		0.40	1.00		0.50	1.00	
Satd. Flow (perm)	1456	1436		1556	1442		673	3119		915	3480	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	22	55	35	10	7	20	39	223	35	257	633	28
RTOR Reduction (vph)	0	31	0	0	18	0	0	17	0	0	4	0
Lane Group Flow (vph)	22	59	0	10	9	0	39	241	0	257	657	0
Confl. Peds. (#/hr)	1		1	1		1			3	3		
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	24%	24%	24%	16%	16%	16%	13%	13%	13%	3%	3%	3%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)	5.5	8.2		5.4	8.1		26.3	23.5		37.9	30.6	
Effective Green, g (s)	5.5	8.2		5.4	8.1		26.3	23.5		37.9	30.6	
Actuated g/C Ratio	0.08	0.13		0.08	0.12		0.40	0.36		0.58	0.47	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	123	181		129	179		312	1127		660	1638	
v/s Ratio Prot	c0.02	c0.04		0.01	0.01		0.01	0.08		c0.06	c0.19	
v/s Ratio Perm							0.05			0.17		
v/c Ratio	0.18	0.33		0.08	0.05		0.12	0.21		0.39	0.40	
Uniform Delay, d1	27.7	25.9		27.5	25.1		11.8	14.4		6.8	11.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	1.1		0.3	0.1		0.2	0.4		0.4	0.7	
Delay (s)	28.4	27.0		27.8	25.2		12.0	14.8		7.2	12.0	
Level of Service	C	C		C	C		B	B		A	B	
Approach Delay (s)		27.2			25.9			14.4			10.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	103	249	1262	539	904	678
Future Volume (vph)	103	249	1262	539	904	678
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.88	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3099	2496	3438	1538	3335	3438
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3099	2496	3438	1538	3335	3438
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	111	268	1357	580	972	729
RTOR Reduction (vph)	0	13	0	202	0	0
Lane Group Flow (vph)	111	255	1357	378	972	729
Confl. Peds. (#/hr)		6				
Heavy Vehicles (%)	13%	13%	5%	5%	5%	5%
Turn Type	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases	2	3	4		3	8
Permitted Phases		2		4		
Actuated Green, G (s)	9.3	46.8	50.5	50.5	37.5	92.5
Effective Green, g (s)	9.3	46.8	50.5	50.5	37.5	92.5
Actuated g/C Ratio	0.08	0.42	0.46	0.46	0.34	0.83
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	260	1155	1566	700	1128	2870
v/s Ratio Prot	c0.04	0.07	c0.39		c0.29	0.21
v/s Ratio Perm		0.03		0.25		
v/c Ratio	0.43	0.22	0.87	0.54	0.86	0.25
Uniform Delay, d1	48.2	20.4	27.1	21.8	34.2	1.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.1	6.7	3.0	8.7	0.2
Delay (s)	49.3	20.5	33.8	24.7	42.9	2.1
Level of Service	D	C	C	C	D	A
Approach Delay (s)	28.9		31.1			25.5
Approach LOS	C		C			C

Intersection Summary			
HCM 2000 Control Delay	28.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	110.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

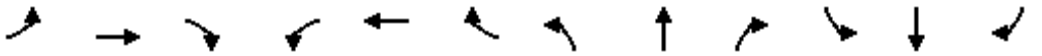
Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	32	27	2	17	3
Future Vol, veh/h	1	32	27	2	17	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	175	-	-	-	175	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	12	12	79	79	15	15
Mvmt Flow	1	41	34	3	22	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	37	0	-	0	78	35
Stage 1	-	-	-	-	35	-
Stage 2	-	-	-	-	43	-
Critical Hdwy	4.22	-	-	-	6.55	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.55	-
Follow-up Hdwy	2.308	-	-	-	3.635	3.435
Pot Cap-1 Maneuver	1511	-	-	-	894	1002
Stage 1	-	-	-	-	955	-
Stage 2	-	-	-	-	947	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1511	-	-	-	893	1002
Mov Cap-2 Maneuver	-	-	-	-	893	-
Stage 1	-	-	-	-	955	-
Stage 2	-	-	-	-	946	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1511	-	-	-	893	1002
HCM Lane V/C Ratio	0.001	-	-	-	0.024	0.004
HCM Control Delay (s)	7.4	-	-	-	9.1	8.6
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	19	21	35	7	301	6	354	16	98	246	3
Future Volume (vph)	19	19	21	35	7	301	6	354	16	98	246	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		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	
Frt	1.00	0.92		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1714		1770	1567		1751	3478		1719	3430	
Flt Permitted	0.95	1.00		0.95	1.00		0.57	1.00		0.40	1.00	
Satd. Flow (perm)	1770	1714		1770	1567		1044	3478		716	3430	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	23	23	26	43	9	367	7	432	20	120	300	4
RTOR Reduction (vph)	0	23	0	0	317	0	0	4	0	0	1	0
Lane Group Flow (vph)	23	26	0	43	59	0	7	448	0	120	303	0
Confl. Peds. (#/hr)	1					1	1					1
Confl. Bikes (#/hr)						1			1			1
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)	6.0	8.5		6.4	8.9		27.3	26.1		36.6	30.9	
Effective Green, g (s)	6.0	8.5		6.4	8.9		27.3	26.1		36.6	30.9	
Actuated g/C Ratio	0.09	0.13		0.10	0.14		0.42	0.40		0.56	0.48	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	163	224		174	214		451	1396		495	1630	
v/s Ratio Prot	0.01	0.02		c0.02	c0.04		0.00	c0.13		c0.02	0.09	
v/s Ratio Perm							0.01			0.11		
v/c Ratio	0.14	0.12		0.25	0.28		0.02	0.32		0.24	0.19	
Uniform Delay, d1	27.1	24.9		27.1	25.2		11.0	13.4		7.0	9.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2		0.7	0.7		0.0	0.6		0.3	0.3	
Delay (s)	27.5	25.2		27.8	25.9		11.0	14.0		7.2	10.1	
Level of Service	C	C		C	C		B	B		A	B	
Approach Delay (s)		25.9			26.1			13.9			9.3	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	668	667	902	200	554	1279
Future Volume (vph)	668	667	902	200	554	1279
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.88	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	0.97	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3467	2740	3505	1544	3400	3505
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3467	2740	3505	1544	3400	3505
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	696	695	940	208	577	1332
RTOR Reduction (vph)	0	18	0	139	0	0
Lane Group Flow (vph)	696	677	940	69	577	1332
Confl. Peds. (#/hr)		15		3	3	
Confl. Bikes (#/hr)		2				
Heavy Vehicles (%)	1%	1%	3%	3%	3%	3%
Turn Type	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases	2	3	4		3	8
Permitted Phases		2		4		
Actuated Green, G (s)	17.3	32.3	22.5	22.5	15.0	42.0
Effective Green, g (s)	17.3	32.3	22.5	22.5	15.0	42.0
Actuated g/C Ratio	0.25	0.47	0.33	0.33	0.22	0.61
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	878	1476	1154	508	746	2155
v/s Ratio Prot	c0.20	0.10	c0.27		c0.17	0.38
v/s Ratio Perm		0.15		0.04		
v/c Ratio	0.79	0.46	0.81	0.13	0.77	0.62
Uniform Delay, d1	23.8	12.1	21.0	16.1	25.1	8.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.0	0.2	6.4	0.6	7.7	1.3
Delay (s)	28.8	12.3	27.4	16.6	32.7	9.5
Level of Service	C	B	C	B	C	A
Approach Delay (s)	20.6		25.4			16.5
Approach LOS	C		C			B

Intersection Summary			
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	68.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

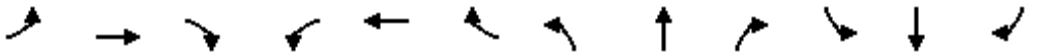
Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	86	20	9	12	1
Future Vol, veh/h	5	86	20	9	12	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	175	-	-	-	175	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	18	18	43	43	0	0
Mvmt Flow	8	137	32	14	19	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	46	0	-	0	191	39
Stage 1	-	-	-	-	39	-
Stage 2	-	-	-	-	152	-
Critical Hdwy	4.28	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.362	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1465	-	-	-	803	1038
Stage 1	-	-	-	-	989	-
Stage 2	-	-	-	-	881	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1465	-	-	-	799	1038
Mov Cap-2 Maneuver	-	-	-	-	799	-
Stage 1	-	-	-	-	989	-
Stage 2	-	-	-	-	876	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1465	-	-	-	799	1038
HCM Lane V/C Ratio	0.005	-	-	-	0.024	0.002
HCM Control Delay (s)	7.5	-	-	-	9.6	8.5
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	48	30	8	6	18	33	193	30	222	550	24
Future Volume (vph)	19	48	30	8	6	18	33	193	30	222	550	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		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	
Frt	1.00	0.94		1.00	0.89		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1456	1437		1556	1437		1597	3120		1750	3480	
Flt Permitted	0.95	1.00		0.95	1.00		0.39	1.00		0.49	1.00	
Satd. Flow (perm)	1456	1437		1556	1437		653	3120		905	3480	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	23	58	36	10	7	22	40	233	36	267	663	29
RTOR Reduction (vph)	0	31	0	0	19	0	0	17	0	0	4	0
Lane Group Flow (vph)	23	63	0	10	10	0	40	252	0	267	688	0
Confl. Peds. (#/hr)	1		1	1		1			3	3		
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	24%	24%	24%	16%	16%	16%	13%	13%	13%	3%	3%	3%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)	5.5	8.3		5.4	8.2		26.2	23.4		37.8	30.5	
Effective Green, g (s)	5.5	8.3		5.4	8.2		26.2	23.4		37.8	30.5	
Actuated g/C Ratio	0.08	0.13		0.08	0.13		0.40	0.36		0.58	0.47	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	123	183		129	181		303	1123		654	1632	
v/s Ratio Prot	c0.02	c0.04		0.01	0.01		0.01	0.08		c0.06	c0.20	
v/s Ratio Perm							0.05			0.17		
v/c Ratio	0.19	0.34		0.08	0.05		0.13	0.22		0.41	0.42	
Uniform Delay, d1	27.7	25.9		27.5	25.0		11.9	14.5		6.9	11.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	1.1		0.3	0.1		0.2	0.5		0.4	0.8	
Delay (s)	28.4	27.0		27.8	25.1		12.1	14.9		7.3	12.2	
Level of Service	C	C		C	C		B	B		A	B	
Approach Delay (s)		27.3			25.8			14.6			10.9	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	107	259	1343	561	941	735
Future Volume (vph)	107	259	1343	561	941	735
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.88	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3099	2496	3438	1538	3335	3438
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3099	2496	3438	1538	3335	3438
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	115	278	1444	603	1012	790
RTOR Reduction (vph)	0	10	0	203	0	0
Lane Group Flow (vph)	115	268	1444	400	1012	790
Confl. Peds. (#/hr)		6				
Heavy Vehicles (%)	13%	13%	5%	5%	5%	5%
Turn Type	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases	2	3	4		3	8
Permitted Phases		2		4		
Actuated Green, G (s)	9.5	46.4	50.9	50.9	36.9	92.3
Effective Green, g (s)	9.5	46.4	50.9	50.9	36.9	92.3
Actuated g/C Ratio	0.09	0.42	0.46	0.46	0.33	0.83
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	265	1146	1579	706	1110	2863
v/s Ratio Prot	c0.04	0.08	c0.42		c0.30	0.23
v/s Ratio Perm		0.03		0.26		
v/c Ratio	0.43	0.23	0.91	0.57	0.91	0.28
Uniform Delay, d1	48.1	20.7	27.9	21.9	35.4	2.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.1	9.7	3.3	12.7	0.2
Delay (s)	49.2	20.8	37.7	25.2	48.1	2.2
Level of Service	D	C	D	C	D	A
Approach Delay (s)	29.2		34.0			28.0
Approach LOS	C		C			C

Intersection Summary			
HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	110.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

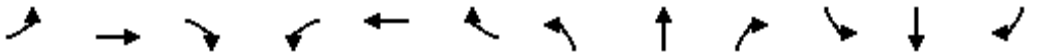
Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	33	28	2	18	3
Future Vol, veh/h	1	33	28	2	18	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	175	-	-	-	175	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	12	12	79	79	15	15
Mvmt Flow	1	42	35	3	23	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	38	0	-	0	81	37
Stage 1	-	-	-	-	37	-
Stage 2	-	-	-	-	44	-
Critical Hdwy	4.22	-	-	-	6.55	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.55	-
Follow-up Hdwy	2.308	-	-	-	3.635	3.435
Pot Cap-1 Maneuver	1510	-	-	-	890	999
Stage 1	-	-	-	-	953	-
Stage 2	-	-	-	-	946	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1510	-	-	-	889	999
Mov Cap-2 Maneuver	-	-	-	-	889	-
Stage 1	-	-	-	-	953	-
Stage 2	-	-	-	-	945	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1510	-	-	-	889	999
HCM Lane V/C Ratio	0.001	-	-	-	0.026	0.004
HCM Control Delay (s)	7.4	-	-	-	9.2	8.6
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	20	22	36	7	313	6	372	17	102	257	3
Future Volume (vph)	20	20	22	36	7	313	6	372	17	102	257	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		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	
Frt	1.00	0.92		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1715		1770	1567		1751	3478		1719	3431	
Flt Permitted	0.95	1.00		0.95	1.00		0.56	1.00		0.38	1.00	
Satd. Flow (perm)	1770	1715		1770	1567		1031	3478		691	3431	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	24	24	27	44	9	382	7	454	21	124	313	4
RTOR Reduction (vph)	0	23	0	0	329	0	0	4	0	0	1	0
Lane Group Flow (vph)	24	28	0	44	62	0	7	471	0	124	316	0
Confl. Peds. (#/hr)	1					1	1					1
Confl. Bikes (#/hr)						1			1			1
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)	5.9	8.6		6.3	9.0		27.3	26.1		36.6	30.9	
Effective Green, g (s)	5.9	8.6		6.3	9.0		27.3	26.1		36.6	30.9	
Actuated g/C Ratio	0.09	0.13		0.10	0.14		0.42	0.40		0.56	0.48	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	160	226		171	216		446	1396		483	1631	
v/s Ratio Prot	0.01	0.02		c0.02	c0.04		0.00	c0.14		c0.02	0.09	
v/s Ratio Perm							0.01			0.12		
v/c Ratio	0.15	0.12		0.26	0.29		0.02	0.34		0.26	0.19	
Uniform Delay, d1	27.2	24.9		27.2	25.1		11.0	13.5		7.0	9.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2		0.8	0.7		0.0	0.7		0.3	0.3	
Delay (s)	27.7	25.1		28.0	25.9		11.0	14.1		7.3	10.1	
Level of Service	C	C		C	C		B	B		A	B	
Approach Delay (s)		25.9			26.1			14.1			9.3	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	695	694	980	208	576	1373
Future Volume (vph)	695	694	980	208	576	1373
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.88	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	0.97	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3467	2738	3505	1544	3400	3505
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3467	2738	3505	1544	3400	3505
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	724	723	1021	217	600	1430
RTOR Reduction (vph)	0	13	0	146	0	0
Lane Group Flow (vph)	724	710	1021	71	600	1430
Confl. Peds. (#/hr)		15		3	3	
Confl. Bikes (#/hr)		2				
Heavy Vehicles (%)	1%	1%	3%	3%	3%	3%
Turn Type	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases	2	3	4		3	8
Permitted Phases		2		4		
Actuated Green, G (s)	17.8	32.3	22.5	22.5	14.5	41.5
Effective Green, g (s)	17.8	32.3	22.5	22.5	14.5	41.5
Actuated g/C Ratio	0.26	0.47	0.33	0.33	0.21	0.61
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	903	1475	1154	508	721	2129
v/s Ratio Prot	c0.21	0.10	c0.29		c0.18	0.41
v/s Ratio Perm		0.16		0.05		
v/c Ratio	0.80	0.48	0.88	0.14	0.83	0.67
Uniform Delay, d1	23.6	12.3	21.7	16.1	25.7	8.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.2	0.2	10.0	0.6	10.8	1.7
Delay (s)	28.8	12.5	31.7	16.7	36.6	10.6
Level of Service	C	B	C	B	D	B
Approach Delay (s)	20.7		29.1			18.3
Approach LOS	C		C			B

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	68.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	90	20	9	14	1
Future Vol, veh/h	5	90	20	9	14	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	175	-	-	-	175	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	18	18	43	43	0	0
Mvmt Flow	8	143	32	14	22	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	46	0	-	0	198	39
Stage 1	-	-	-	-	39	-
Stage 2	-	-	-	-	159	-
Critical Hdwy	4.28	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.362	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1465	-	-	-	795	1038
Stage 1	-	-	-	-	989	-
Stage 2	-	-	-	-	875	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1465	-	-	-	791	1038
Mov Cap-2 Maneuver	-	-	-	-	791	-
Stage 1	-	-	-	-	989	-
Stage 2	-	-	-	-	870	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1465	-	-	-	791	1038
HCM Lane V/C Ratio	0.005	-	-	-	0.028	0.002
HCM Control Delay (s)	7.5	-	-	-	9.7	8.5
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↖	↑		↗
Traffic Vol, veh/h	104	0	11	29	0	2
Future Vol, veh/h	104	0	11	29	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	18	18	43	43	20	20
Mvmt Flow	165	0	17	46	0	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	165	0	-	165
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.53	-	-	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.587	-	-	3.48
Pot Cap-1 Maneuver	-	0	1199	-	0	835
Stage 1	-	0	-	-	0	-
Stage 2	-	0	-	-	0	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	1199	-	-	835
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.2	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	WBL	WBT
Capacity (veh/h)	835	-	1199	-
HCM Lane V/C Ratio	0.004	-	0.015	-
HCM Control Delay (s)	9.3	-	8	-
HCM Lane LOS	A	-	A	-
HCM 95th %tile Q(veh)	0	-	0	-

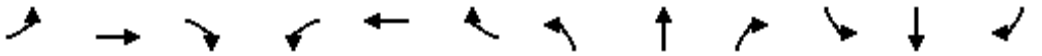
Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	100	6	12	40	0	2
Future Vol, veh/h	100	6	12	40	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	18	18	43	43	20	20
Mvmt Flow	159	10	19	63	0	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	168	0	265	163
Stage 1	-	-	-	-	163	-
Stage 2	-	-	-	-	102	-
Critical Hdwy	-	-	4.53	-	6.6	6.4
Critical Hdwy Stg 1	-	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	5.6	-
Follow-up Hdwy	-	-	2.587	-	3.68	3.48
Pot Cap-1 Maneuver	-	-	1196	-	687	837
Stage 1	-	-	-	-	824	-
Stage 2	-	-	-	-	879	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1196	-	676	837
Mov Cap-2 Maneuver	-	-	-	-	676	-
Stage 1	-	-	-	-	824	-
Stage 2	-	-	-	-	865	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.9	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	837	-	-	1196	-
HCM Lane V/C Ratio	0.004	-	-	0.016	-
HCM Control Delay (s)	9.3	-	-	8.1	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	49	31	8	10	18	43	193	30	222	550	33
Future Volume (vph)	21	49	31	8	10	18	43	193	30	222	550	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		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	
Frt	1.00	0.94		1.00	0.90		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1456	1436		1556	1466		1597	3120		1750	3471	
Flt Permitted	0.95	1.00		0.95	1.00		0.38	1.00		0.49	1.00	
Satd. Flow (perm)	1456	1436		1556	1466		646	3120		905	3471	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	25	59	37	10	12	22	52	233	36	267	663	40
RTOR Reduction (vph)	0	32	0	0	19	0	0	17	0	0	5	0
Lane Group Flow (vph)	25	64	0	10	15	0	52	252	0	267	698	0
Confl. Peds. (#/hr)	1		1	1		1			3	3		
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	24%	24%	24%	16%	16%	16%	13%	13%	13%	3%	3%	3%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)	5.5	8.4		5.4	8.3		27.6	23.3		37.7	28.9	
Effective Green, g (s)	5.5	8.4		5.4	8.3		27.6	23.3		37.7	28.9	
Actuated g/C Ratio	0.08	0.13		0.08	0.13		0.42	0.36		0.58	0.44	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	123	185		129	187		337	1118		653	1543	
v/s Ratio Prot	c0.02	c0.04		0.01	0.01		0.01	0.08		c0.06	c0.20	
v/s Ratio Perm							0.06			0.17		
v/c Ratio	0.20	0.34		0.08	0.08		0.15	0.23		0.41	0.45	
Uniform Delay, d1	27.7	25.8		27.5	25.0		11.1	14.6		7.0	12.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.1		0.3	0.2		0.2	0.5		0.4	1.0	
Delay (s)	28.5	26.9		27.8	25.2		11.3	15.0		7.4	13.5	
Level of Service	C	C		C	C		B	B		A	B	
Approach Delay (s)		27.2			25.8			14.4			11.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	108	260	1343	561	950	735
Future Volume (vph)	108	260	1343	561	950	735
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.88	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3099	2496	3438	1538	3335	3438
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3099	2496	3438	1538	3335	3438
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	116	280	1444	603	1022	790
RTOR Reduction (vph)	0	10	0	209	0	0
Lane Group Flow (vph)	116	270	1444	394	1022	790
Confl. Peds. (#/hr)		6				
Heavy Vehicles (%)	13%	13%	5%	5%	5%	5%
Turn Type	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases	2	3	4		3	8
Permitted Phases		2		4		
Actuated Green, G (s)	9.5	46.0	50.5	50.5	36.5	91.5
Effective Green, g (s)	9.5	46.0	50.5	50.5	36.5	91.5
Actuated g/C Ratio	0.09	0.42	0.46	0.46	0.33	0.83
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	267	1145	1578	706	1106	2859
v/s Ratio Prot	c0.04	0.08	c0.42		c0.31	0.23
v/s Ratio Perm		0.03		0.26		
v/c Ratio	0.43	0.24	0.92	0.56	0.92	0.28
Uniform Delay, d1	47.7	20.7	27.7	21.6	35.4	2.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.1	9.8	3.2	14.0	0.2
Delay (s)	48.8	20.8	37.5	24.8	49.5	2.3
Level of Service	D	C	D	C	D	A
Approach Delay (s)	29.0		33.8			28.9
Approach LOS	C		C			C

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	34	31	5	18	3
Future Vol, veh/h	1	34	31	5	18	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	175	-	-	-	175	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	12	12	79	79	15	15
Mvmt Flow	1	43	39	6	23	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	46	0	-	0	88	42
Stage 1	-	-	-	-	42	-
Stage 2	-	-	-	-	46	-
Critical Hdwy	4.22	-	-	-	6.55	6.35
Critical Hdwy Stg 1	-	-	-	-	5.55	-
Critical Hdwy Stg 2	-	-	-	-	5.55	-
Follow-up Hdwy	2.308	-	-	-	3.635	3.435
Pot Cap-1 Maneuver	1500	-	-	-	882	993
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	944	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1500	-	-	-	881	993
Mov Cap-2 Maneuver	-	-	-	-	881	-
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	943	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1500	-	-	-	881	993
HCM Lane V/C Ratio	0.001	-	-	-	0.026	0.004
HCM Control Delay (s)	7.4	-	-	-	9.2	8.6
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↖	↑		↱
Traffic Vol, veh/h	52	0	2	36	0	12
Future Vol, veh/h	52	0	2	36	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	12	12	79	79	20	20
Mvmt Flow	66	0	3	46	0	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	66	0	-	66
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	4.89	-	-	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	2.911	-	-	3.48
Pot Cap-1 Maneuver	-	0	1161	-	0	950
Stage 1	-	0	-	-	0	-
Stage 2	-	0	-	-	0	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	1161	-	-	950
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	WBL	WBT
Capacity (veh/h)	950	-	1161	-
HCM Lane V/C Ratio	0.016	-	0.002	-
HCM Control Delay (s)	8.9	-	8.1	-
HCM Lane LOS	A	-	A	-
HCM 95th %tile Q(veh)	0	-	0	-

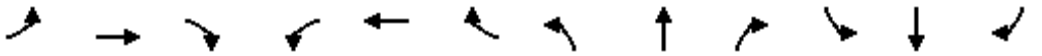
Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	63	1	1	32	6	13
Future Vol, veh/h	63	1	1	32	6	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	12	12	79	79	20	20
Mvmt Flow	80	1	1	41	8	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	81	0	123	80
Stage 1	-	-	-	-	80	-
Stage 2	-	-	-	-	43	-
Critical Hdwy	-	-	4.89	-	6.6	6.4
Critical Hdwy Stg 1	-	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	5.6	-
Follow-up Hdwy	-	-	2.911	-	3.68	3.48
Pot Cap-1 Maneuver	-	-	1145	-	831	932
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	935	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1145	-	830	932
Mov Cap-2 Maneuver	-	-	-	-	830	-
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	934	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	897	-	-	1145	-
HCM Lane V/C Ratio	0.027	-	-	0.001	-
HCM Control Delay (s)	9.1	-	-	8.1	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	24	33	36	8	313	7	372	17	102	257	4
Future Volume (vph)	30	24	33	36	8	313	7	372	17	102	257	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		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	
Frt	1.00	0.91		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1701		1770	1568		1751	3478		1719	3429	
Flt Permitted	0.95	1.00		0.95	1.00		0.56	1.00		0.38	1.00	
Satd. Flow (perm)	1770	1701		1770	1568		1030	3478		689	3429	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	37	29	40	44	10	382	9	454	21	124	313	5
RTOR Reduction (vph)	0	35	0	0	328	0	0	4	0	0	1	0
Lane Group Flow (vph)	37	34	0	44	64	0	9	471	0	124	317	0
Confl. Peds. (#/hr)	1					1	1					1
Confl. Bikes (#/hr)						1			1			1
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)	6.2	8.9		6.3	9.0		27.1	25.9		36.3	30.6	
Effective Green, g (s)	6.2	8.9		6.3	9.0		27.1	25.9		36.3	30.6	
Actuated g/C Ratio	0.10	0.14		0.10	0.14		0.42	0.40		0.56	0.47	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	168	232		171	217		442	1385		478	1614	
v/s Ratio Prot	0.02	0.02		c0.02	c0.04		0.00	c0.14		c0.02	0.09	
v/s Ratio Perm							0.01			0.12		
v/c Ratio	0.22	0.15		0.26	0.29		0.02	0.34		0.26	0.20	
Uniform Delay, d1	27.2	24.7		27.2	25.1		11.1	13.6		7.2	10.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.3		0.8	0.8		0.0	0.7		0.3	0.3	
Delay (s)	27.8	25.0		28.0	25.9		11.1	14.3		7.5	10.3	
Level of Service	C	C		C	C		B	B		A	B	
Approach Delay (s)		26.0			26.1			14.2			9.5	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	701	698	986	208	577	1373
Future Volume (vph)	701	698	986	208	577	1373
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.88	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	0.97	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3467	2737	3505	1544	3400	3505
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3467	2737	3505	1544	3400	3505
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	730	727	1027	217	601	1430
RTOR Reduction (vph)	0	13	0	146	0	0
Lane Group Flow (vph)	730	714	1027	71	601	1430
Confl. Peds. (#/hr)		15		3	3	
Confl. Bikes (#/hr)		2				
Heavy Vehicles (%)	1%	1%	3%	3%	3%	3%
Turn Type	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases	2	3	4		3	8
Permitted Phases		2		4		
Actuated Green, G (s)	17.9	32.4	22.5	22.5	14.5	41.5
Effective Green, g (s)	17.9	32.4	22.5	22.5	14.5	41.5
Actuated g/C Ratio	0.26	0.47	0.33	0.33	0.21	0.61
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	907	1476	1152	507	720	2126
v/s Ratio Prot	c0.21	0.10	c0.29		c0.18	0.41
v/s Ratio Perm		0.16		0.05		
v/c Ratio	0.80	0.48	0.89	0.14	0.83	0.67
Uniform Delay, d1	23.6	12.3	21.8	16.1	25.8	8.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.3	0.3	10.6	0.6	11.0	1.7
Delay (s)	28.9	12.5	32.3	16.7	36.8	10.7
Level of Service	C	B	C	B	D	B
Approach Delay (s)	20.7		29.6			18.4
Approach LOS	C		C			B

Intersection Summary			
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	68.4	Sum of lost time (s)	13.5
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection: 1: SW Leveton Drive & SW 126th Place

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	6	28	15
Average Queue (ft)	0	7	1
95th Queue (ft)	4	23	11
Link Distance (ft)			825
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	175	175	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: West Site Access & SW Leveton Drive

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 3: East Site Access & SW Leveton Drive

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: SW 124th Avenue & SW Leveton Drive

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	84	134	49	66	72	76	129	143	120	137
Average Queue (ft)	20	55	9	17	21	22	51	60	44	65
95th Queue (ft)	61	111	35	50	58	55	106	111	92	113
Link Distance (ft)		297		611		548	548		1579	1579
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	125		190		210			250		
Storage Blk Time (%)		0								
Queuing Penalty (veh)		0								

Intersection: 5: OR-99W & SW 124th Avenue

Movement	NW	NW	NW	NW	NE	NE	NE	SW	SW	SW	SW
Directions Served	L	L	R	R	T	T	R	L	L	T	T
Maximum Queue (ft)	127	103	139	113	509	520	275	429	464	70	112
Average Queue (ft)	52	34	57	43	307	300	233	266	310	21	39
95th Queue (ft)	100	82	112	95	447	461	323	383	428	59	90
Link Distance (ft)	1579	1579			1420	1420				1079	1079
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)			300	300			250	600	600		
Storage Blk Time (%)						8	5				
Queuing Penalty (veh)						42	31				

Network Summary

Network wide Queuing Penalty: 73

Intersection: 1: SW Leveton Drive & SW 126th Place

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	6	44	30
Average Queue (ft)	0	9	3
95th Queue (ft)	4	31	17
Link Distance (ft)			825
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	175	175	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: West Site Access & SW Leveton Drive

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 3: East Site Access & SW Leveton Drive

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: SW 124th Avenue & SW Leveton Drive

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	64	57	82	144	33	113	146	106	68	104
Average Queue (ft)	15	20	25	70	4	48	59	39	17	37
95th Queue (ft)	48	51	63	118	19	96	115	83	52	81
Link Distance (ft)		297		611		548	548		1579	1579
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	125		190		210			250		
Storage Blk Time (%)				0						
Queuing Penalty (veh)				0						

Intersection: 5: OR-99W & SW 124th Avenue

Movement	NW	NW	NW	NW	NE	NE	NE	SW	SW	SW	SW
Directions Served	L	L	R	R	T	T	R	L	L	T	T
Maximum Queue (ft)	213	210	164	146	288	271	141	248	283	179	203
Average Queue (ft)	134	122	89	71	184	162	56	143	184	97	107
95th Queue (ft)	191	184	143	123	264	242	112	230	262	155	175
Link Distance (ft)	1579	1579			1420	1420				1079	1079
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)			300	300			250	600	600		
Storage Blk Time (%)						0	0				
Queuing Penalty (veh)						1	0				

Network Summary

Network wide Queuing Penalty: 1

Intersection: 1: SW Leveton Drive & SW 126th Place

Movement	SB	SB
Directions Served	L	R
Maximum Queue (ft)	20	25
Average Queue (ft)	5	2
95th Queue (ft)	19	13
Link Distance (ft)		825
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	175	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: West Site Access & SW Leveton Drive

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 3: East Site Access & SW Leveton Drive

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: SW 124th Avenue & SW Leveton Drive

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	93	129	57	81	76	110	140	149	115	140
Average Queue (ft)	20	48	7	20	21	27	59	63	46	66
95th Queue (ft)	62	100	32	56	56	70	113	114	95	120
Link Distance (ft)		297		611		548	548		1579	1579
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	125		190		210			250		
Storage Blk Time (%)	0	0								
Queuing Penalty (veh)	0	0								

Intersection: 5: OR-99W & SW 124th Avenue

Movement	NW	NW	NW	NW	NE	NE	NE	SW	SW	SW	SW
Directions Served	L	L	R	R	T	T	R	L	L	T	T
Maximum Queue (ft)	128	131	118	120	696	761	275	546	565	559	455
Average Queue (ft)	54	39	60	49	395	419	247	332	370	61	53
95th Queue (ft)	107	93	109	103	634	689	329	509	546	360	227
Link Distance (ft)	1579	1579			1420	1420				1079	1079
Upstream Blk Time (%)										0	
Queuing Penalty (veh)										0	
Storage Bay Dist (ft)			300	300			250	600	600		
Storage Blk Time (%)						17	7	0	1	0	
Queuing Penalty (veh)						96	48	1	5	0	

Network Summary

Network wide Queuing Penalty: 151

Intersection: 1: SW Leveton Drive & SW 126th Place

Movement	SB	SB
Directions Served	L	R
Maximum Queue (ft)	46	32
Average Queue (ft)	11	3
95th Queue (ft)	35	18
Link Distance (ft)		825
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	175	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: West Site Access & SW Leveton Drive

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 3: East Site Access & SW Leveton Drive

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: SW 124th Avenue & SW Leveton Drive

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	48	58	61	145	31	112	154	110	83	103
Average Queue (ft)	16	25	24	71	3	48	62	43	20	42
95th Queue (ft)	44	52	56	119	17	96	122	89	63	89
Link Distance (ft)		297		611		548	548		1579	1579
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	125		190		210			250		
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 5: OR-99W & SW 124th Avenue

Movement	NW	NW	NW	NW	NE	NE	NE	SW	SW	SW	SW
Directions Served	L	L	R	R	T	T	R	L	L	T	T
Maximum Queue (ft)	226	212	158	150	340	322	274	273	297	195	212
Average Queue (ft)	141	127	94	79	213	196	81	160	200	113	114
95th Queue (ft)	204	186	142	132	307	296	193	249	281	175	182
Link Distance (ft)	1579	1579			1420	1420				1079	1079
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)			300	300			250	600	600		
Storage Blk Time (%)						3	0				
Queuing Penalty (veh)						5	0				

Network Summary

Network wide Queuing Penalty: 5

Intersection: 1: SW Leveton Drive & SW 126th Place

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	18	20	19
Average Queue (ft)	1	6	1
95th Queue (ft)	8	20	7
Link Distance (ft)			825
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	175	175	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: West Site Access & SW Leveton Drive

Movement	WB	NB
Directions Served	L	R
Maximum Queue (ft)	43	16
Average Queue (ft)	2	1
95th Queue (ft)	19	7
Link Distance (ft)		185
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: East Site Access & SW Leveton Drive

Movement	WB	WB	NB
Directions Served	L	T	LR
Maximum Queue (ft)	44	10	22
Average Queue (ft)	3	0	1
95th Queue (ft)	22	7	11
Link Distance (ft)		297	197
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: SW 124th Avenue & SW Leveton Drive

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	80	130	49	65	76	78	120	151	136	180
Average Queue (ft)	20	53	6	19	24	20	55	63	51	77
95th Queue (ft)	58	103	30	52	58	58	105	116	111	141
Link Distance (ft)		297		611		548	548		1579	1579
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	125		190		210			250		
Storage Blk Time (%)		0								
Queuing Penalty (veh)		0								

Intersection: 5: OR-99W & SW 124th Avenue

Movement	NW	NW	NW	NW	NE	NE	NE	SW	SW	SW	SW
Directions Served	L	L	R	R	T	T	R	L	L	T	T
Maximum Queue (ft)	125	102	137	132	723	739	275	576	595	365	218
Average Queue (ft)	55	34	69	54	384	400	246	324	369	41	42
95th Queue (ft)	102	80	128	113	683	731	332	516	552	243	142
Link Distance (ft)	1579	1579			1420	1420				1079	1079
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)			300	300			250	600	600		
Storage Blk Time (%)						16	6	0	0		
Queuing Penalty (veh)						88	38	0	2		

Network Summary

Network wide Queuing Penalty: 128

Intersection: 1: SW Leveton Drive & SW 126th Place

Movement	SB	SB
Directions Served	L	R
Maximum Queue (ft)	37	37
Average Queue (ft)	9	4
95th Queue (ft)	29	20
Link Distance (ft)		825
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	175	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: West Site Access & SW Leveton Drive

Movement	EB	WB	NB
Directions Served	T	L	R
Maximum Queue (ft)	6	10	53
Average Queue (ft)	0	0	12
95th Queue (ft)	4	7	38
Link Distance (ft)	45		185
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)		100	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: East Site Access & SW Leveton Drive

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	10	56
Average Queue (ft)	0	16
95th Queue (ft)	7	46
Link Distance (ft)		197
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: SW 124th Avenue & SW Leveton Drive

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	64	87	72	184	30	126	157	91	89	118
Average Queue (ft)	19	33	24	80	4	50	64	40	23	43
95th Queue (ft)	52	68	58	142	20	101	126	79	66	93
Link Distance (ft)		297		611		548	548		1579	1579
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	125		190		210			250		
Storage Blk Time (%)		0		0						
Queuing Penalty (veh)		0		0						

Intersection: 5: OR-99W & SW 124th Avenue

Movement	NW	NW	NW	NW	NE	NE	NE	SW	SW	SW	SW
Directions Served	L	L	R	R	T	T	R	L	L	T	T
Maximum Queue (ft)	217	219	182	158	328	322	210	309	339	206	224
Average Queue (ft)	146	133	95	77	201	184	67	171	206	116	121
95th Queue (ft)	209	194	154	129	290	278	148	291	327	180	191
Link Distance (ft)	1579	1579			1420	1420				1079	1079
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)			300	300			250	600	600		
Storage Blk Time (%)						2	0				
Queuing Penalty (veh)						3	0				

Network Summary

Network wide Queuing Penalty: 3

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

LEVETON DR at 124TH AVE, City of Tualatin, Washington County, 01/01/2011 to 12/31/2015

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2015														
TURNING MOVEMENTS	0	1	0	1	0	1	0	0	1	1	0	1	0	0
YEAR 2015 TOTAL	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**1**	**0**	**0**
YEAR: 2011														
REAR-END	0	0	1	1	0	0	0	0	1	1	0	1	0	0
YEAR 2011 TOTAL	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**1**	**0**	**0**
FINAL TOTAL	**0**	**1**	**1**	**2**	**0**	**1**	**0**	**0**	**2**	**2**	**0**	**2**	**0**	**0**

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

CITY OF TUALATIN, WASHINGTON COUNTY

LEVETON DR at 124TH AVE, City of Tualatin, Washington County, 01/01/2011 to 12/31/2015

Total crash records: 2

SER# / INVEST	S P E D / A L C	R U G S	S C H L	W O R K	DATE / DAY / TIME	CLASS / DIST FROM	CITY STREET / FIRST STREET / SECOND STREET	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF-CONTL	OFFRD RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
00094	N	N	N		01/07/2011	16	LEVETON DR	INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT										27
NONE					FR	0	124TH AVE	N		TRF SIGNAL	N	WET	REAR		PRVTE	N -S								000		00
					10A			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	52	M	OR-Y OR<25		016,026	038	27
														02	UNKN 0	STOP										
															PRVTE	N -S								011		00
															PSNGR CAR		01	DRVR	NONE	54	F	OR-Y OR<25		000	000	00
06999	N	N	N	N	11/19/2015	16	SW LEVETON DR	INTER	CROSS	N	N	RAIN	O-1 L-TURN	01	NONE 0	STRGHT										02
CITY					TH	0	124TH AVE	CN		TRF SIGNAL	N	WET	TURN		PRVTE	S -N								000		00
					7A			04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	45	F	OR-Y OR<25		000	000	00
														02	NONE 0	TURN-L										
															PRVTE	N -E								000		00
															PSNGR CAR		01	DRVR	NONE	58	M	OR-Y OR<25		004,028	000	02

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

124TH AVE at PACIFIC HY 99W, City of Tualatin, Washington County, 01/01/2011 to 12/31/2015

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2014														
REAR-END	0	2	0	2	0	2	0	1	1	2	0	2	0	0
YEAR 2014 TOTAL	**0**	**2**	**0**	**2**	**0**	**2**	**0**	**1**	**1**	**2**	**0**	**2**	**0**	**0**
YEAR: 2013														
REAR-END	0	1	1	2	0	1	0	2	0	2	0	2	0	0
YEAR 2013 TOTAL	**0**	**1**	**1**	**2**	**0**	**1**	**0**	**2**	**0**	**2**	**0**	**2**	**0**	**0**
YEAR: 2012														
REAR-END	0	1	0	1	0	2	0	1	0	1	0	1	0	0
TURNING MOVEMENTS	0	1	1	2	0	1	0	2	0	1	1	2	0	0
YEAR 2012 TOTAL	**0**	**2**	**1**	**3**	**0**	**3**	**0**	**3**	**0**	**2**	**1**	**3**	**0**	**0**
YEAR: 2011														
REAR-END	0	0	2	2	0	0	0	2	0	1	1	2	0	0
YEAR 2011 TOTAL	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**2**	**0**	**1**	**1**	**2**	**0**	**0**
FINAL TOTAL	**0**	**5**	**4**	**9**	**0**	**6**	**0**	**8**	**1**	**7**	**2**	**9**	**0**	**0**

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

CITY OF TUALATIN, WASHINGTON COUNTY

124TH AVE at PACIFIC HY 99W, City of Tualatin, Washington County, 01/01/2011 to 12/31/2015

Total crash records: 9

SER# / INVEST	SPEED	ALCHL	DRUGS	RSLK	SCHL	WORK	DATE / DAY / TIME	CLASS / DIST / FROM	CITY STREET / FIRST STREET / SECOND STREET	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
02767	N	N	N	N	N	N	05/29/2012	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
CITY							TU		SW 124TH AVE	NE		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE									000		00
							1P			05	1		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	56	F	OR-Y OR<25		043,026	000		07
																02	NONE 0	STOP											
																	PRVTE	SW-NE									011		00
																	PSNGR CAR		01	DRVR	INJC	65	M	OR-Y OR<25		000	000		00
																02	NONE 0	STOP											
																	PRVTE	SW-NE									011		00
																	PSNGR CAR		02	PSNG	INJC	61	F			000	000		00
07063	N	N	N	N	N	N	11/22/2014	14	SW PACIFIC HY 99W	INTER	3-LEG	N	N	CLD	S-1STOP	01	NONE 0	STRGHT											07
CITY							SA		SW 124TH AVE	NE		TRF SIGNAL	N	WET	REAR		PRVTE	NE-SW									000		00
							4P			06	1		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	84	M	OR-Y OR<25		043,026	000		07
																02	NONE 0	STOP											
																	PRVTE	NE-SW									011		00
																	PSNGR CAR		01	DRVR	INJC	54	F	OR-Y OR<25		000	000		00
02236	N	N	N				05/02/2013	16	SW PACIFIC HY 99W	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											099	07
NO RPT							TH	0	SW 124TH AVE	SE		TRF SIGNAL	N	DRY	REAR		PRVTE	SE-NW									000		00
							4P			06	1		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	24	F	OR-Y OR<25		026	000	099	07
																02	NONE 0	STOP											
																	PRVTE	SE-NW									011		00
																	PSNGR CAR		01	DRVR	NONE	59	M	OR-Y OR<25		000	000		00
04829	N	N	N				09/06/2011	14	SW PACIFIC HY 99W	INTER	3-LEG	N	N	CLR	S-1STOP	01	UNKN 0	STRGHT											07
NONE							TU		SW 124TH AVE	SW		TRF SIGNAL	N	DRY	REAR		UNKN	SW-NE									000		00
							9P			06	1		N	DARK	PDO		UNKNOWN		01	DRVR	NONE	00	F	OR-Y OR<25		026	000		07
																02	NONE 0	STOP											
																	RENTL	SW-NE									011		00
																	PSNGR CAR		01	DRVR	NONE	68	M	OR-Y OR>25		000	000		00
00041	N	N	N				01/03/2013	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
NONE							TH		SW 124TH AVE	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE									000		00
							12P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	27	F	OR-Y OR<25		026	000		07
																02	NONE 0	STOP											
																	PRVTE	SW-NE									011		00
																	PSNGR CAR		01	DRVR	NONE	52	M	OR-Y OR<25		000	000		00
																02	NONE 0	STOP											
																	PRVTE	SW-NE									011		00
																	PSNGR CAR		02	PSNG	INJC	65	F			000	000		00
02734	N	N	N	N	N	N	05/14/2014	14	SW PACIFIC HY 99W	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											32,16,29
CITY							WE		SW 124TH AVE	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE									000		00
							5P			06	1		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	21	M	OR-Y		052,026	025		32,16,29

CITY OF TUALATIN, WASHINGTON COUNTY

124TH AVE at PACIFIC HY 99W, City of Tualatin, Washington County, 01/01/2011 to 12/31/2015

Total crash records: 9

SER# / INVEST	S P E D A L C	R U S	S C L	W O R K	DATE / DAY / TIME	CLASS / DIST FROM	CITY STREET / FIRST STREET / SECOND STREET	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
																						OR<25				
														02	NONE 0	STOP										
															PRVTE	SW-NE									011	00
															PSNGR CAR		01	DRVR	INJC	47	M	OR-Y		000	000	00
																						OR<25				
06352	N	N	N	N	N 11/12/2011	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLD	S-1STOP	01	NONE 0	STRGHT										07
CITY					SA		SW 124TH AVE	CN		TRF SIGNAL	N	DRY	REAR		PRVTE	SW-NE									000	00
					11A			03	2		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	40	M	OR-Y		026	000	07
																						OR<25				
														02	NONE 0	STOP										
															PRVTE	SW-NE									011	00
															PSNGR CAR		01	DRVR	NONE	41	F	OR-Y		000	000	00
																						OR>25				
00035	N	N	N	N	N 01/04/2012	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										02
CITY					WE		SW 124TH AVE	CN		TRF SIGNAL	N	DRY	TURN		PRVTE	SW-NE									000	00
					8A			02	1		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	24	F	OR-Y		000	000	00
																						OR<25				
														02	NONE 0	TURN-L										
															PRVTE	SE-SW									016	00
															PSNGR CAR		01	DRVR	NONE	16	M	OR-Y		028	000	02
																						OR<25				
04773	N	N	N	N	N 09/10/2012	14	SW PACIFIC HY 99W	INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT										04
CITY					MO		SW 124TH AVE	CN		TRF SIGNAL	N	DRY	TURN		PRVTE	SW-NE									000	00
					10P			04	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	INJC	18	M	OR-Y		020	000	04
																						OR<25				
														02	NONE 0	TURN-L										
															PRVTE	NE-SE									000	00
															PSNGR CAR		01	DRVR	NONE	25	M	OR-Y		000	000	00
																						OR<25				
														03	NONE 0	TURN-L										
															PRVTE	NE-SE									022	00
															PSNGR CAR		01	DRVR	NONE	40	M	OR-Y		000	000	00
																						OR<25				

Left-Turn Lane Warrant Analysis

Project: 17076 - 12540 SW Leveton Drive
Intersection: West Site Access at SW Leveton Drive
Date: 5/9/2017
Scenario: 2019 Background plus Site Conditions - AM Peak Hour

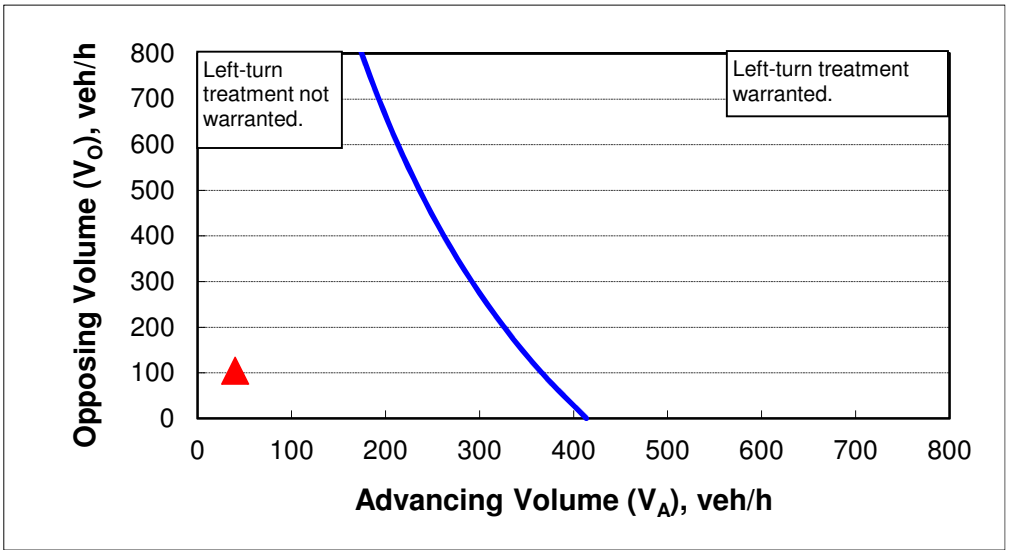
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	28%
Advancing volume (V_A), veh/h:	40
Opposing volume (V_O), veh/h:	104

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	364
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: 17076 - 12540 SW Leveton Drive
Intersection: West Site Access at SW Leveton Drive
Date: 5/9/2017
Scenario: 2019 Background plus Site Conditions - PM Peak Hour

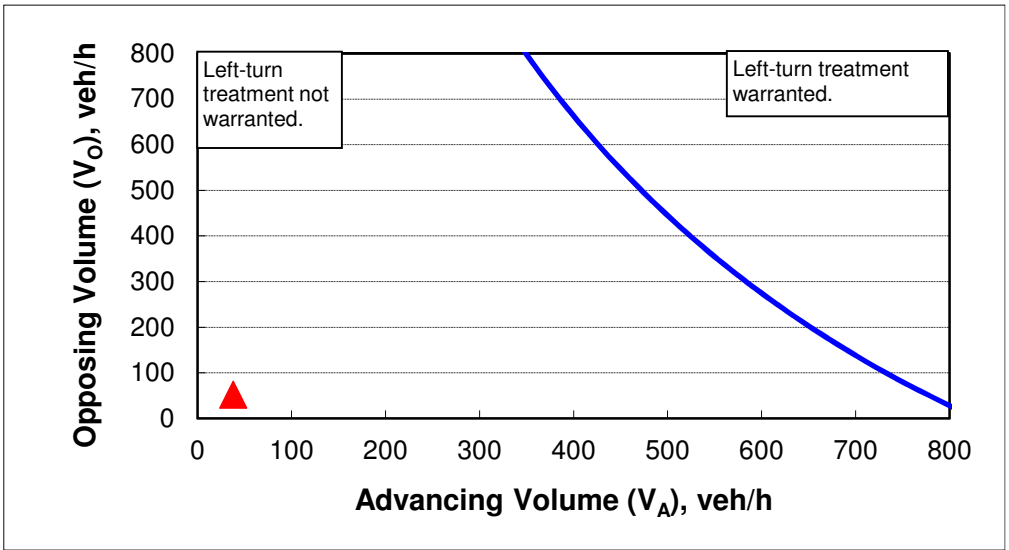
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	5%
Advancing volume (V_A), veh/h:	38
Opposing volume (V_O), veh/h:	52

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	776
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: 17076 - 12540 SW Leveton Drive
Intersection: East Site Access at SW Leveton Drive
Date: 5/9/2017
Scenario: 2019 Background plus Site Conditions - AM Peak Hour

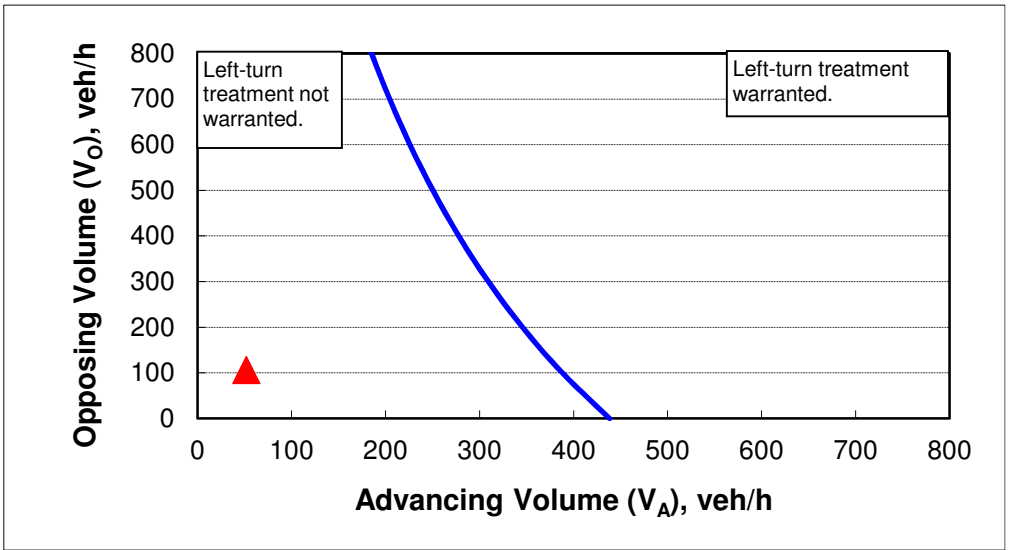
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	23%
Advancing volume (V_A), veh/h:	52
Opposing volume (V_O), veh/h:	106

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	385
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Project: 17076 - 12540 SW Leveton Drive
Intersection: East Site Access at SW Leveton Drive
Date: 5/9/2017
Scenario: 2019 Background plus Site Conditions - PM Peak Hour

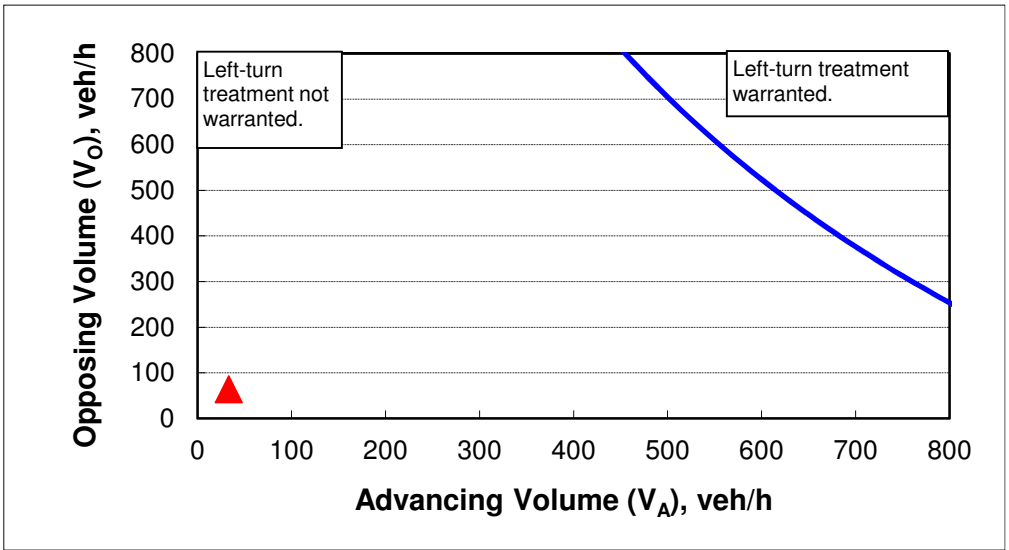
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	3%
Advancing volume (V_A), veh/h:	33
Opposing volume (V_O), veh/h:	64

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	996
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Traffic Signal Warrant Analysis

Project: 17076 - 12540 SW Leveton Drive
Date: 5/25/2017
Scenario: Year 2019 Background plus Site Conditions

Major Street:	SW Leveton Drive	Minor Street:	SW 126th Place
Number of Lanes:	1	Number of Lanes:	2
PM Peak Hour Volumes:	71	PM Peak Hour Volumes:	20

Warrant Used:

X 100 percent of standard warrants used

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

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

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

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	710	8,850	
Minor Street*	200	3,550	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	710	13,300	
Minor Street*	200	1,750	**No**
Combination Warrant			
Major Street	710	10,640	
Minor Street*	200	2,840	**No**

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

Traffic Signal Warrant Analysis

Project: 17076 - 12540 SW Leveton Drive
Date: 5/25/2017
Scenario: Year 2019 Background plus Site Conditions

Major Street:	SW Leveton Drive	Minor Street:	West Site Access
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	90	PM Peak Hour Volumes:	9

Warrant Used:

X 100 percent of standard warrants used

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

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

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

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	900	8,850	
Minor Street*	90	2,650	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	900	13,300	
Minor Street*	90	1,350	**No**
Combination Warrant			
Major Street	900	10,640	
Minor Street*	90	2,120	**No**

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

Traffic Signal Warrant Analysis

Project: 17076 - 12540 SW Leveton Drive
Date: 5/25/2017
Scenario: Year 2019 Background plus Site Conditions

Major Street:	SW Leveton Drive	Minor Street:	East Site Access
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	97	PM Peak Hour Volumes:	16

Warrant Used:

X 100 percent of standard warrants used

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

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

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

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	970	8,850	
Minor Street*	160	2,650	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	970	13,300	
Minor Street*	160	1,350	**No**
Combination Warrant			
Major Street	970	10,640	
Minor Street*	160	2,120	**No**

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

EXHIBIT - 19

ARCHITECTURAL REVIEW
CERTIFICATION OF SIGN POSTING

The applicant shall provide and post a sign pursuant to Tualatin Development Code (TDC) 31.064(2). Additionally, the 18" x 24" sign must contain the application number, and the block around the word "NOTICE" must remain **primary yellow** composed of the **RGB color values Red 255, Green 255, 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>.

NOTE: For larger projects, the Community Development Department may require the posting of additional signs in conspicuous locations.

As the applicant for the LEVETON INDUSTRIAL project, I hereby certify that on this day, June 13, 2017, 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.

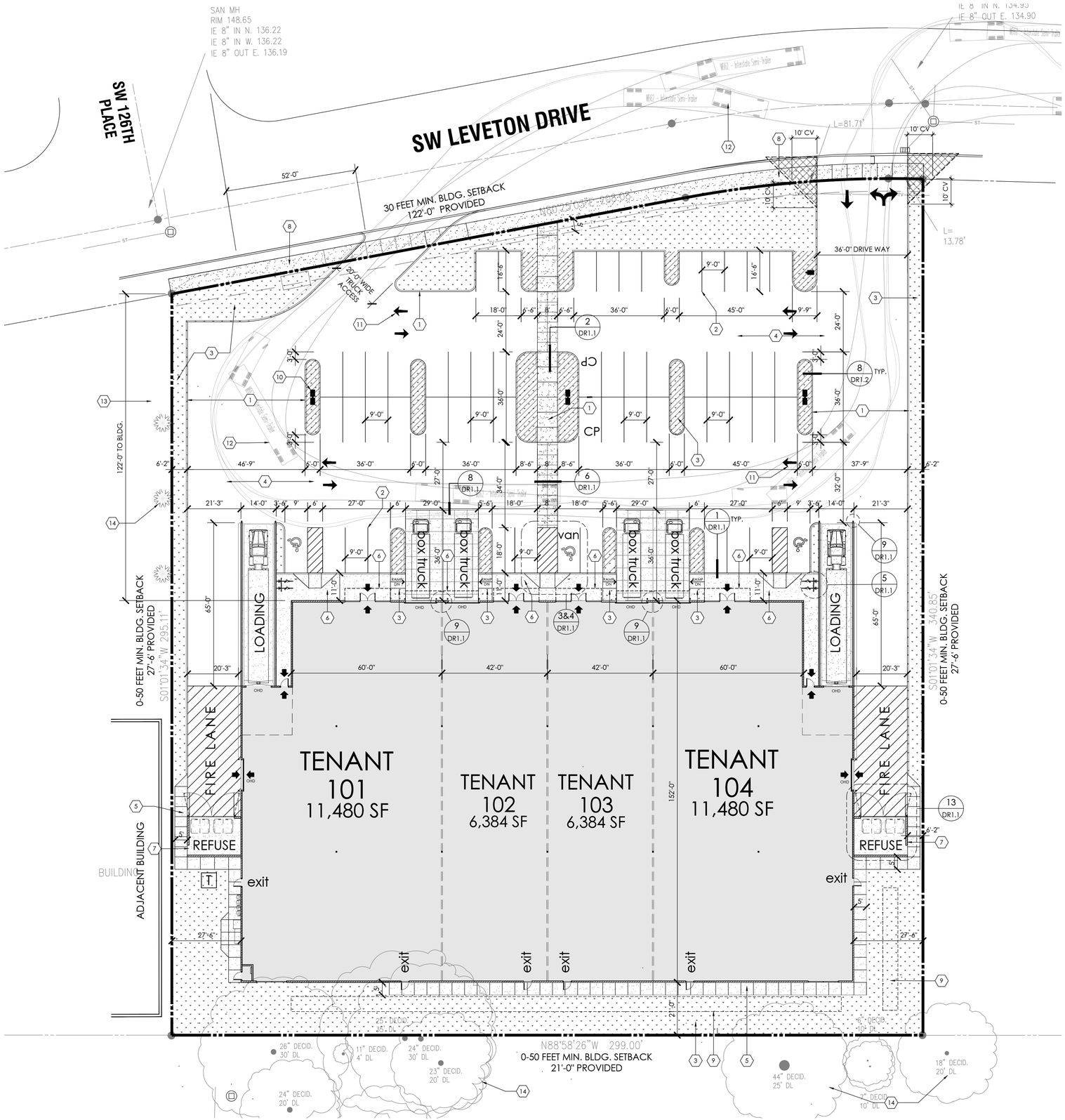
Applicant's Name: KEVIN GODWIN - SG ARCHITECTURE, LLC
(PLEASE PRINT)

Applicant's Signature: _____

Date: June 13, 2017


NOTICE
ARCHITECTURAL
REVIEW AR-17-0003
For more information call
503-691-3026 or visit
www.tualatinoregon.gov


NOTICE
ARCHITECTURAL
REVIEW AR-17-0003
For more information call
503-691-3026 or visit
www.tualatinoregon.gov



SITE DATA

Zoning			**ML - Light Industrial**
Site Area :		**2.21 ACRES**	**96,286 S.F.**
	Min. Parking req'd		Provided
Tenant 101:	18.37		11,480 S.F.
Tenant 102 :	10.21		6,384 S.F.
Tenant 103 :	10.21		6,384 S.F.
Tenant 104 :	18.37		11,480 S.F.
Total Building GLA (Gross) :	57.20		**35,728 S.F.**
Standard Parking Provided :			52 SPACES
Handicap Parking Provided :			3 SPACES
Vanpool Parking Required :	(1/25 spaces)		2 SPACES
Total Parking Area :			**57 SPACES**
Parking Ratio :	1.60 / 1,000 SF fig. 73.3 (i) Manufacturing		**1.60 SPACES/1,000 S.F.**
Site Coverage:			**37.11%**
Landscape Coverage :	15% min.	**16,028 SF**	**16.65%**
Loading Required :	(2) required -25k-60k (12 feet X 35 feet & 12 feet x 65 feet)		**6 SPACES**
Bicycle Spaces :	(4) required (0.10 / 1,000 sf gross gla)		**4 SPACES**
Solid Waste:	**35,728 / 1,000 sf x 6.0 sf = 214 min req'd.** 21'-4" x 16'-0" = 341.28 sf - ea. Encls. X 2 = wholesale/warehouse / manufacturing		**683 SF**

LEGEND

- NEW BUILDING FOOTPRINT - SEE DR3
- INTERIOR LANDSCAPING ISLAND CALCULATION (1 SPACE X 25 sf)
- LANDSCAPING - SEE sheet L-1
- CONCRETE PLAZAS
- CONCRETE PEDESTRIAN WALKS - SEE DR1.1
- CP - CARPOOL SPACE
- BUILDING ENTRANCES
- CVT - 10' CLEAR VISION TRIANGLE LOCAL STREET
- PROPERY LINE
- T — TRANSFORMER
- BICYCLE RACKS
- LP — SITE LIGHTING - SEE PHOTOMETRIC PLAN FOR LIGHTING LOCATIONS ON BUILDING & PLAZAS
- GAS METERS
- ELECTRICAL SWITCH GEAR

KEYNOTES

1. CONCRETE CURBS
2. PAINTED PARKING STALLS
3. LANDSCAPING
4. ASPHALT PAVING
5. CONCRETE SIDEWALKS / PLAZAS
6. BUILDING CANOPIES
7. TRASH ENCLOSURE
8. NEW PUBLIC SIDEWALK
9. WATER QUALITY CHAMBERS (SEE CIVIL)
10. LIGHT POLES - SEE SHEET E1.0
11. DIRECTIONAL SIGNAGE
12. DELIVERY TRUCK MANEUVERING PATH (65'-0" SEMI -WB 62)
13. EXISTING SIDEWALK
14. EXISTING TREES ON ADJACENT PROPERTY

EXHIBIT #20

SGA
SG ARCHITECTURE, LLC
10940 SW Barnes Road #364
Portland, Oregon 97225
503.201.0725 | 503.347.4685

LEVETON INDUSTRIAL

SW Leveton Drive & SW 124th Ave.
Tualatin , Oregon

DANA PROPERTIES, LLC.
PO Box 5837
Aloha, Or 97006

Located
LEVETON COMMONS
No.2, Lot 8
NE: T02S., R01W., S21.
CITY OF TUALATIN
WASHINGTON , CO. OREGON

PROJECT NUMBER:
16-111

DATE:
June 12, 2017

DRAWN BY:

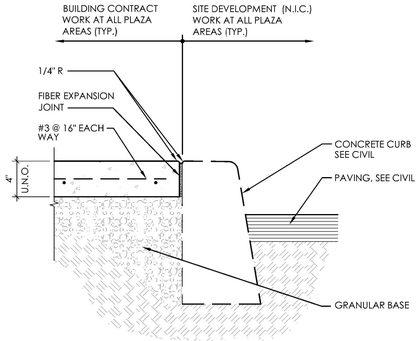
Revisions:
REVISED A/R COMMENTS
6-21-2017

APPLICATION FOR
ARCHITECTURAL REVIEW (AR)

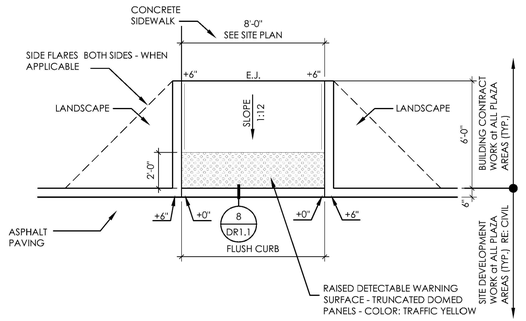
SITE PLAN
Sheet Number:

DR-1

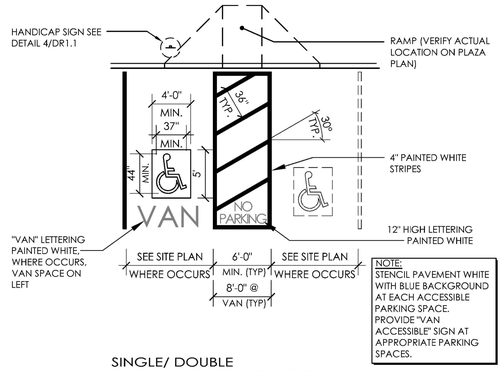
\\SGACLOUD_sgarch\01 Projects\2016\16-113 Tualatin Industrial\Site Plan Review (AR)\DWGS\16-113 DR_1 Site Plan(Rev #1).dwg



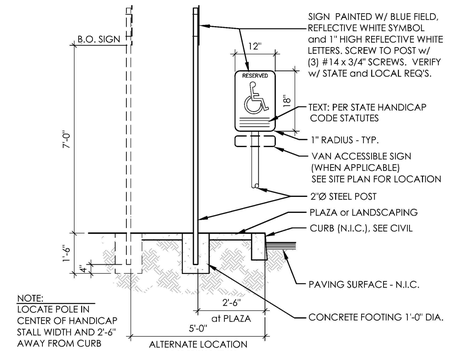
1 PERIMETER CURB
SCALE: 1 1/2" = 1'-0"



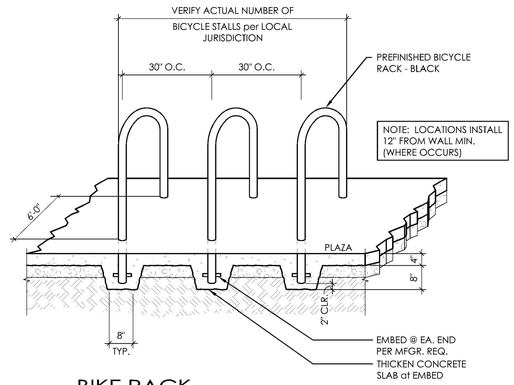
2 CONCRETE RAMP
SCALE: 1/8" = 1'-0"



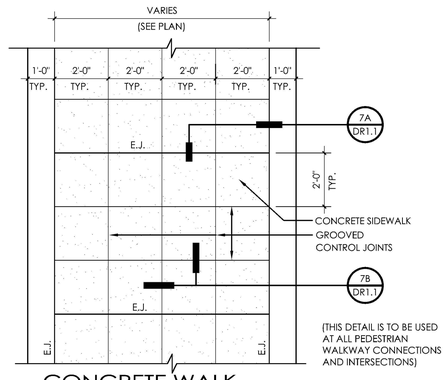
SINGLE/ DOUBLE
3 HANDICAP SPACE
SCALE: 1/8" = 1'-0"



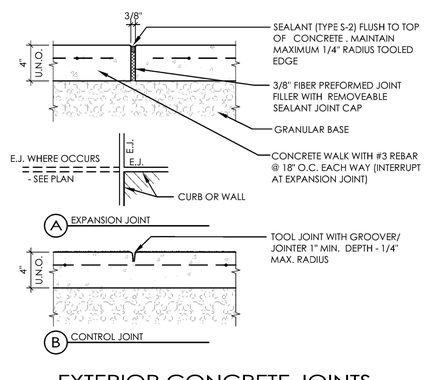
4 HANDICAP SIGN
3/8" = 1'-0"



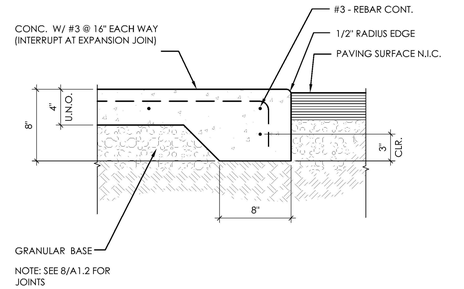
5 BIKE RACK
SCALE: 1/2" = 1'-0"



6 CONCRETE WALK
SCALE: 3/8" = 1'-0"

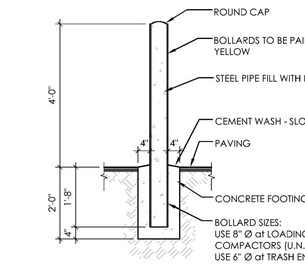


7 EXTERIOR CONCRETE JOINTS
SCALE: 1 1/2" = 1'-0"

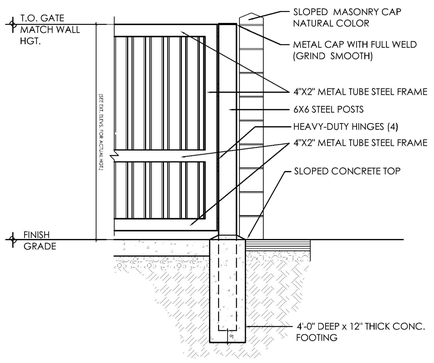


NOTE: SEE 8/A1.2 FOR JOINTS

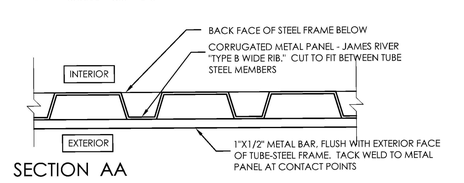
8 FLUSH TRANSISTION
SCALE: 1 1/2" = 1'-0"



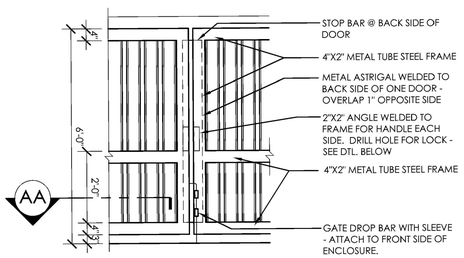
9 PAINTED STL. BOLLARDS
SCALE: 1/2" = 1'-0"



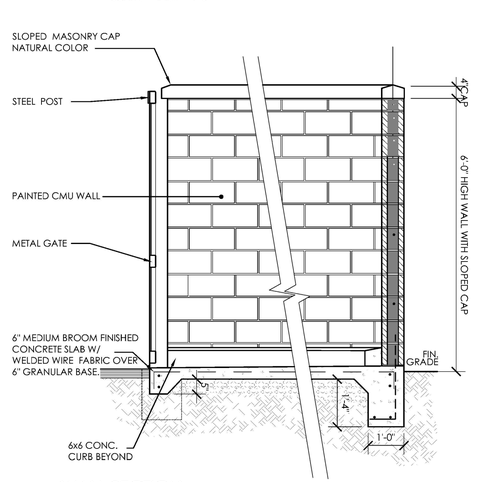
DOOR ATTACHMENT
10 TRASH ENCLOSURE DETAIL
SCALE: 1/2" = 1'-0"



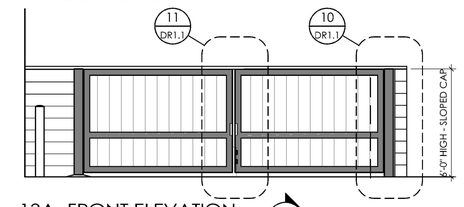
SECTION AA



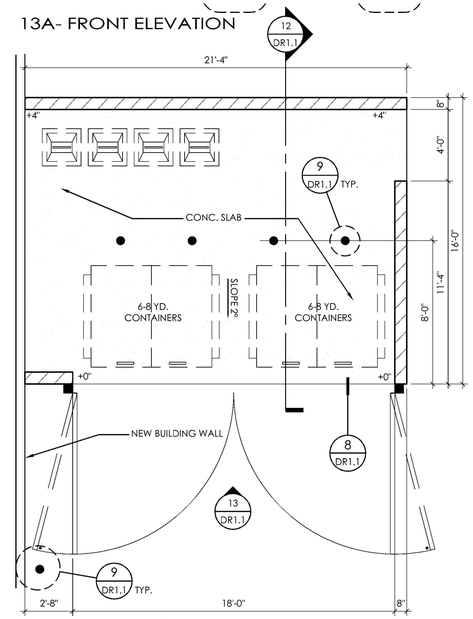
11 FRONT GATE DOOR
SCALE: 1 1/2" = 1'-0"



WALL SECTION
12 TRASH ENCLOSURE DETAIL
SCALE: 1/2" = 1'-0"



13A- FRONT ELEVATION



13 TRASH ENCLOSURE
SCALE: 1/4" = 1'-0"

SGA
SG ARCHITECTURE, LLC
10940 SW Barnes Road #364
Portland, Oregon 97225
503.201.0725 | 503.347.4685

LEVETON INDUSTRIAL
SW Leveton Drive & SW 124th Ave.
Tualatin , Oregon

DANA PROPERTIES, LLC.
PO Box 5837
Aloha, Or 97006

Located
LEVETON COMMONS
No.2, Lot 8
NE: T02S., R01W., S21.
CITY OF TUALATIN
WASHINGTON , CO. OREGON

PROJECT NUMBER:
16-111

DATE:
June 12, 2017

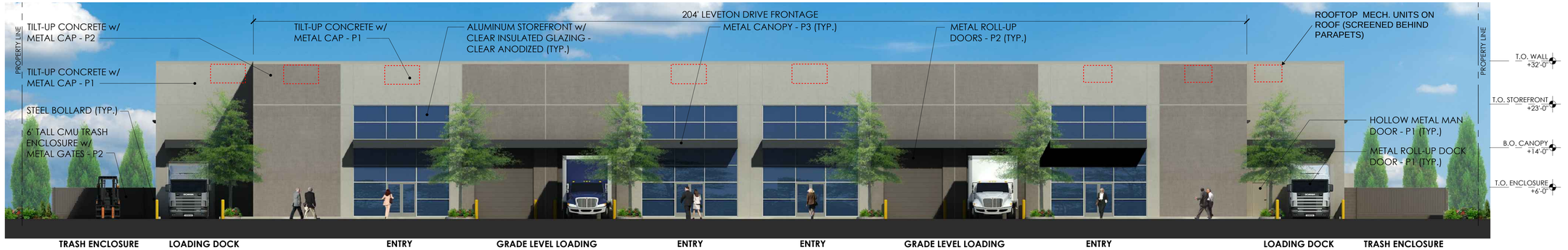
DRAWN BY:

Revisions:

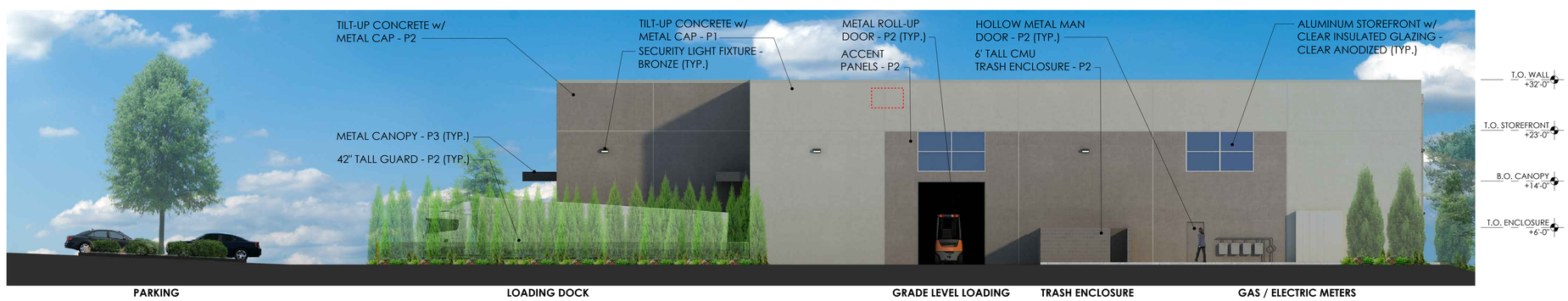
APPLICATION FOR
ARCHITECTURAL REVIEW (AR)

SITE DETAILS
Sheet Number:

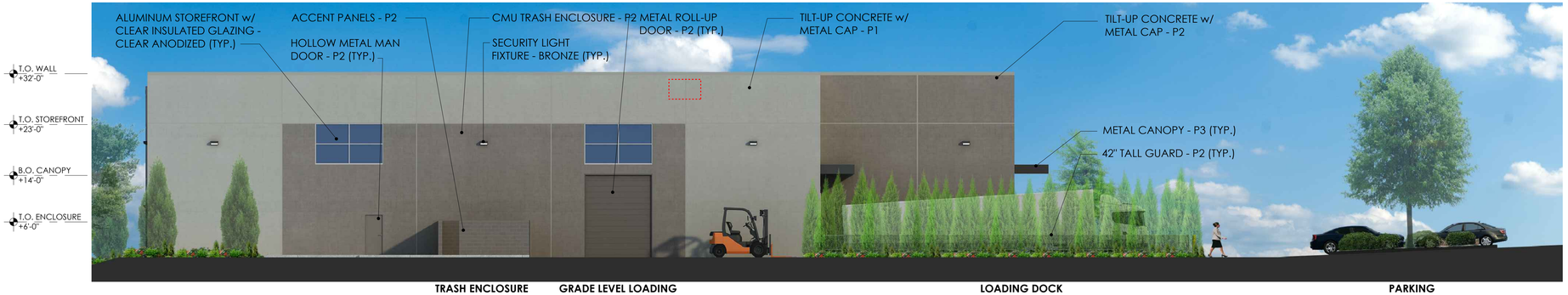
DR1.1



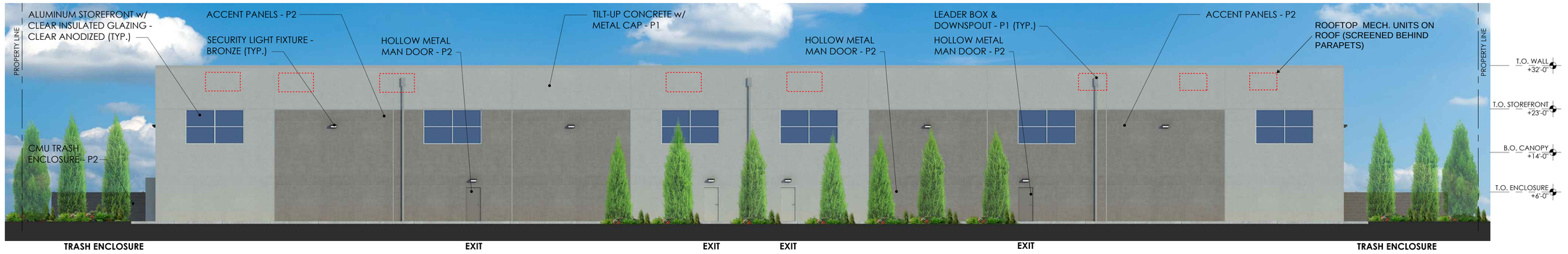
SW LEVETON DRIVE ELEVATION (NORTH)



SIDE ELEVATION (WEST)



SIDE ELEVATION (EAST)



REAR ELEVATION (SOUTH)

MATERIALS

ELEVATIONS | MATERIALS

0 10'-8" 32'
10'-8" 5'-4"
3/32" = 1'-0"

LEVETON INDUSTRIAL • TUALATIN

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Portland, Oregon 97225
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No.2, Lot 8
NE: T02S., R01W., S21.
CITY OF TUALATIN
WASHINGTON , CO.
OREGON

PROJECT NUMBER:
16-111

DATE:
May 2017

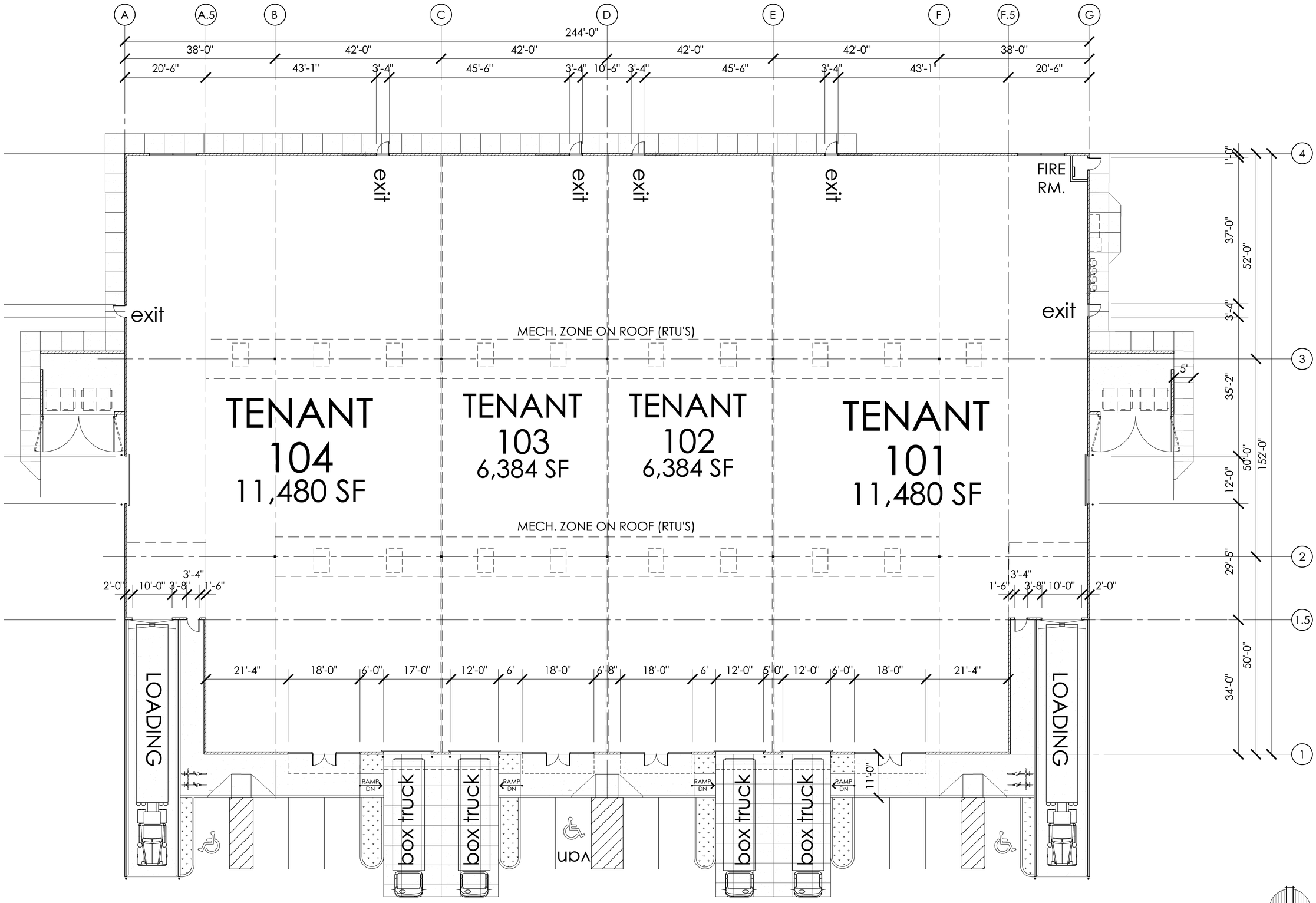
DRAWN BY:
KG/SS

Revisions:

APPLICATION FOR
ARCHITECTURAL REVIEW (AR)

EXTERIOR ELEVATION
Sheet Number:

DR-2



FLOOR PLAN

SCALE: 3/32" = 1'-0"

NORTH

SGA

SG ARCHITECTURE, LLC

10940 SW Barnes Road #364
Portland, Oregon 97225
503.201.0725 | 503.347.4685

LEVETON INDUSTRIAL

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Tualatin , Oregon

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Located
LEVETON COMMONS No.2, Lot 8
NE: T02S., R01W., S21.
CITY OF TUALATIN
WASHINGTON , CO. OREGON

PROJECT NUMBER:
16-111

DATE:
June 12, 2017

DRAWN BY:

Revisions:

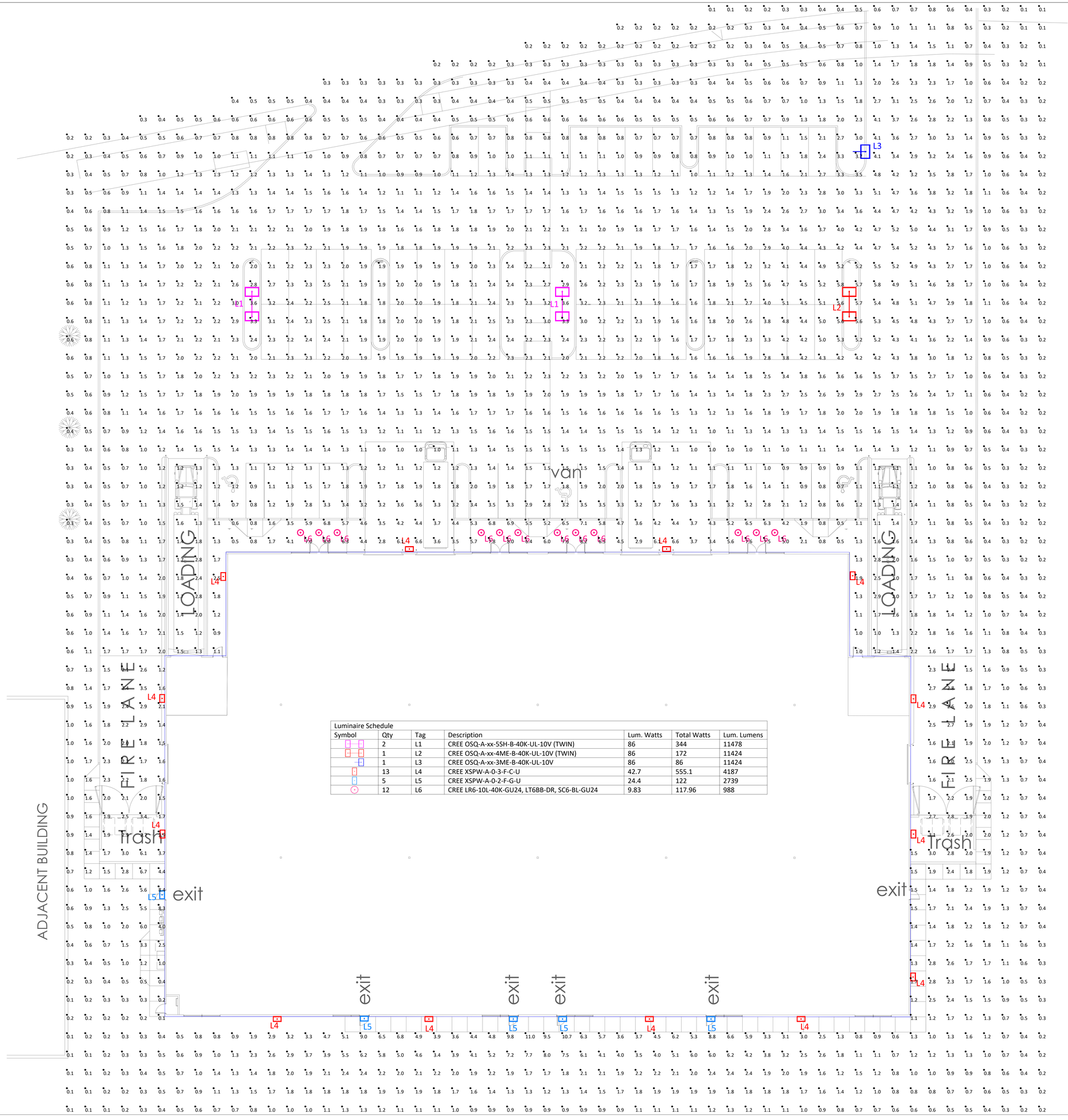
APPLICATION FOR
ARCHITECTURAL REVIEW (AR)

FLOOR PLAN

Sheet Number:

DR-3

\\SGACLOUD_sgarch\01 Projects\2016\16-113 Tualatin Industrial\Site Plan Review (AR)\DWGS\16-113 DR_1 Site Plan.dwg



Luminaire Schedule						
Symbol	Qty	Tag	Description	Lum. Watts	Total Watts	Lum. Lumens
	2	L1	CREE OSQ-A-xx-5SH-B-40K-UL-10V (TWIN)	86	344	11478
	1	L2	CREE OSQ-A-xx-4ME-B-40K-UL-10V (TWIN)	86	172	11424
	1	L3	CREE OSQ-A-xx-3ME-B-40K-UL-10V	86	86	11424
	13	L4	CREE XSPW-A-0-3-F-C-U	42.7	555.1	4187
	5	L5	CREE XSPW-A-0-2-F-G-U	24.4	122	2739
	12	L6	CREE LR6-10L-40K-GU24, LT6BB-DR, SC6-BL-GU24	9.83	117.96	988

E-1

TLP

THE LIGHTING PROJECT

#	Date	Comments
1	Date	Notes Regarding Deliverable

Revisions

Drawn By: JOHN M.
The Lighting Project / www.tlpnw.com
Date:5/30/2017
Scale:

Leveton Industrial

SITE LIGHTING

OSQ™ LED Area/Flood Luminaire – Medium

Tenon EPA

Part Number	EPA
PB-1A*	None
PB-2A*	0.82
PB-3A*	1.52
PB-4A*(180)	2.22
PB-4A*(90)	1.11
PB-2R2.375	0.92
PB-3R2.375	1.62
PB-4R2.375	2.32
PD Series Tenons	0.09
PT Series Tenons	0.10
PW-1A3**	0.47
PW-2A3**	0.94
WM-2	0.08
WM-4	0.25
WM-DM	None

* Specify pole size: 3 (3"), 4 (4"), 5 (5"), or 6 (6") for single, double or triple luminaire orientation or 4 (4"), 5 (5"), or 6 (6") for quad luminaire orientation
** These EPA values must be multiplied by the following ratio: Fixture Mounting Height/Total Pole Height. Specify pole size: 3 (3"), 4 (4"), 5 (5"), or 6 (6")

Tenons and Brackets‡ (must specify color)

Square Internal Mount Vertical Tenons (Steel)
- Mounts to 3-6" (76-152mm) square aluminum or steel poles
PB-1A* – Single; PB-2A* – 180° Twin; PB-3A* – 180° Triple; PB-4A*(90) – 90° Quad; PB-4A*(180) – 180° Quad

Square Internal Mount Horizontal Tenons (Aluminum)
- Mounts to 4" (102mm) square aluminum or steel poles
PD-2A4(90) – 90° Twin; PD-2A4(180) – 180° Twin; PD-3A4(90) – 90° Triple; PD-4A4(90) – 90° Quad

Wall Mount Brackets
- Mounts to wall or roof
WM-2 – Horizontal for OSQ-AA mount
WM-4 – L-Shape for OSQ-AA mount
WM-DM – Plate for OSQ-DA mount

Round External Mount Vertical Tenons (Steel)
- Mounts to 2.375" (60mm) O.D. round aluminum or steel poles or tenons
PB-2R2.375 – Twin; PB-3R2.375 – Triple; PB-4R2.375 – Quad

Round External Mount Horizontal Tenons (Aluminum)
- Mounts to 2.375" (60mm) O.D. round aluminum or steel poles or tenons
- Mounts to square pole with PB-1A* tenon
PT-1 – Single (Vertical); PT-2(90) – 90° Twin; PT-2(180) – 180° Twin; PT-3(90) – 90° Triple; PT-4(90) – 90° Quad

Mid-Pole Bracket
- Mounts to square pole
PW-1A3** – Single; PW-2A3** – Double

Ground Mount Post
- For ground mounted flood luminaires
PGM-1 – for OSQ-AA mount

‡ Refer to the Bracket and Tenons spec sheet for more details

Direct Mount Configurations

Compatibility with OSQ-DA Direct Mount Bracket					
Input Power Designator	2 @ 90°	2 @ 180°	3 @ 90°	3 @ 120°	4 @ 90°
3" Square					
B & K	N/A	✓	N/A	N/A	N/A
3" Round					
B & K	N/A	✓	N/A	N/A	N/A
4" Square					
B & K	✓	✓	✓	N/A	✓
4" Round					
B & K	✓	✓	✓	✓	✓
5" Square					
B & K	✓	✓	✓	N/A	✓
5" Round					
B & K	✓	✓	✓	✓	✓
6" Square					
B & K	✓	✓	✓	N/A	✓
6" Round					
B & K	✓	✓	✓	✓	✓

OSQ™ LED Area/Flood Luminaire – Medium

Luminaire EPA

Fixed Arm Mount – OSQ-DA Weight: 26.5 lbs. (12kg)					
Single	2 @ 180°	2 @ 90°	3 @ 90°	3 @ 120°	4 @ 90°
0.74	1.48	1.19	1.93	1.63	2.38
L3	L1 and L2				

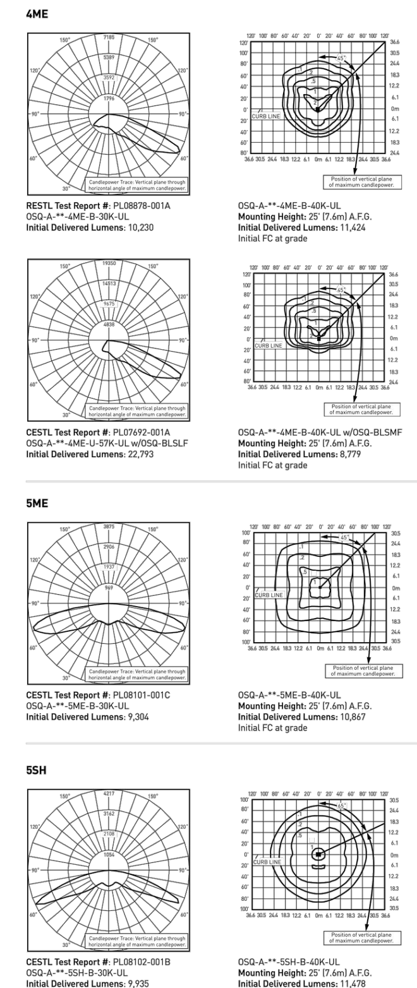
Adjustable Arm Mount – OSQ-AA Weight: 26.5 lbs. (12kg)							
Single	2 @ 180°	2 @ 90°	3 @ 90°	3 @ 120°	3 @ 180°	4 @ 180°	4 @ 90°
Tenon Configuration (0°-80° Tilt); If used with Cree tenons, please add tenon EPA with Luminaire EPA							
PB-1A*; PT-1; PW-1A3**	PB-2A*; PB-2R2.375; PD-2A4(180); PT-2(180); PW-2A3**	PB-2A*; PD-2A4(90); PT-2(90)	PB-3A*; PD-3A4(90); PT-3(90)	PB-3A*; PT-3(120)	PB-3A*; PB-3R2.375	PB-4A*(180)	PB-4A*(90); PB-4R2.375; PD-4A4(90); PT-4(90)
0° Tilt							
0.74	1.48	1.19	1.93	1.63	3.33	4.66	2.38
10° Tilt							
0.75	1.48	1.49	2.23	2.15	4.22	5.84	2.98
20° Tilt							
1.12	1.48	1.86	2.60	2.85	5.31	7.32	3.72
30° Tilt							
1.46	1.48	2.20	2.94	3.56	6.34	8.68	4.40
45° Tilt							
1.96	1.96	2.69	3.43	4.54	7.83	10.68	5.38
60° Tilt							
2.33	2.33	3.07	3.81	5.11	8.94	12.16	6.14
70° Tilt							
2.49	2.49	3.23	3.97	5.11	9.43	12.80	6.46
80° Tilt							
2.58	2.58	3.32	4.06	5.11	9.71	13.16	6.64
Tenon Configuration (90° Tilt); If used with Cree tenons, please add tenon EPA with Luminaire EPA							
PB-1A*; PT-1; PW-1A3**	PB-2A*; PB-2R2.375; PD-2A4(180); PT-2(180); PW-2A3**	PB-2A*	PB-3A*	PB-3A*; PT-3(120)	PB-3A*; PB-3R2.375	PB-4A*(180)	PB-4A*(90); PB-4R2.375
90° Tilt							
2.61	2.61	4.44	6.05	5.11	9.79	13.28	10.39

* Specify pole size: 3 (3"), 4 (4"), 5 (5"), or 6 (6") for single, double or triple luminaire orientation or 4 (4"), 5 (5"), or 6 (6") for quad luminaire orientation
** These EPA values must be multiplied by the following ratio: Fixture Mounting Height/Total Pole Height. Specify pole size: 3 (3"), 4 (4"), 5 (5"), or 6 (6")

OSQ™ LED Area/Flood Luminaire – Medium

Photometry

All published luminaire photometric testing performed to IESNA LM-79-08 standards by a NVLAP accredited laboratory. To obtain an IES file specific to your project consult: http://lighting.cree.com/products/outdoor/area/osq-series



4ME

RESTL Test Report #: PL08878-001A
OSQ-A-**-4ME-B-30K-UL
Initial Delivered Lumens: 10,230

OSQ-A-**-4ME-B-40K-UL
Mounting Height: 25' (7.6m) A.F.G.
Initial Delivered Lumens: 11,424
Initial FC at grade

Type IV Medium Distribution						
Input Power Designator	3000K Initial Delivered Lumens*	3000K BUG Ratings** Per TM-15-11	4000K Initial Delivered Lumens*	4000K BUG Ratings** Per TM-15-11	5700K Initial Delivered Lumens*	5700K BUG Ratings** Per TM-15-11
B	10,738	B2 U0 G2	11,424	B2 U0 G2	11,648	B2 U0 G2
K	16,022	B3 U0 G3	16,959	B3 U0 G3	17,291	B3 U0 G3

* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -10 and +10% of initial delivered lumens
** For more information on the IES BUG (Backlight-Uplight-Glare) Rating visit: www.ies.org/PDF/Erratas/TM-15-11BugRatingsAddendum.pdf. Valid with no tilt

CESTL Test Report #: PL07692-001A
OSQ-A-**-4ME-U-57K-UL w/OSQ-BLSLF
Initial Delivered Lumens: 22,793

OSQ-A-**-4ME-B-40K-UL w/OSQ-BLSMF
Mounting Height: 25' (7.6m) A.F.G.
Initial Delivered Lumens: 8,779
Initial FC at grade

Type IV Medium w/BLS Distribution						
Input Power Designator	3000K Initial Delivered Lumens*	3000K BUG Ratings** Per TM 15 11	4000K Initial Delivered Lumens*	4000K BUG Ratings** Per TM 15 11	5700K Initial Delivered Lumens*	5700K BUG Ratings** Per TM 15 11
B	8,251	B1 U0 G2	8,779	B1 U0 G2	8,950	B1 U0 G2
K	12,312	B2 U0 G2	13,032	B2 U0 G2	13,286	B2 U0 G2

* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -10 and +10% of initial delivered lumens
** For more information on the IES BUG (Backlight-Uplight-Glare) Rating visit: www.ies.org/PDF/Erratas/TM-15-11BugRatingsAddendum.pdf. Valid with no tilt

5ME

CESTL Test Report #: PL08101-001C
OSQ-A-**-5ME-B-30K-UL
Initial Delivered Lumens: 9,304

OSQ-A-**-5ME-B-40K-UL
Mounting Height: 25' (7.6m) A.F.G.
Initial Delivered Lumens: 10,867
Initial FC at grade

Type V Medium Distribution						
Input Power Designator	3000K Initial Delivered Lumens*	3000K BUG Ratings** Per TM-15-11	4000K Initial Delivered Lumens*	4000K BUG Ratings** Per TM-15-11	5700K Initial Delivered Lumens*	5700K BUG Ratings** Per TM-15-11
B	9,387	B3 U0 G3	10,867	B4 U0 G4	11,056	B4 U0 G4
K	13,819	B4 U0 G4	15,999	B4 U0 G5	16,277	B4 U0 G5

* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -10 and +10% of initial delivered lumens
** For more information on the IES BUG (Backlight-Uplight-Glare) Rating visit: www.ies.org/PDF/Erratas/TM-15-11BugRatingsAddendum.pdf. Valid with no tilt

5SH

CESTL Test Report #: PL08102-001B
OSQ-A-**-5SH-B-30K-UL
Initial Delivered Lumens: 9,935

OSQ-A-**-5SH-B-40K-UL
Mounting Height: 25' (7.6m) A.F.G.
Initial Delivered Lumens: 11,478
Initial FC at grade

Type V Short Distribution						
Input Power Designator	3000K Initial Delivered Lumens*	3000K BUG Ratings** Per TM 15 11	4000K Initial Delivered Lumens*	4000K BUG Ratings** Per TM 15 11	5700K Initial Delivered Lumens*	5700K BUG Ratings** Per TM 15 11
B	9,914	B4 U0 G3	11,478	B4 U0 G3	11,678	B4 U0 G3
K	14,595	B4 U0 G3	16,897	B4 U0 G3	17,191	B4 U0 G3

* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -10 and +10% of initial delivered lumens
** For more information on the IES BUG (Backlight-Uplight-Glare) Rating visit: www.ies.org/PDF/Erratas/TM-15-11BugRatingsAddendum.pdf. Valid with no tilt

OSQ™ LED Area/Flood Luminaire – Medium

Photometry

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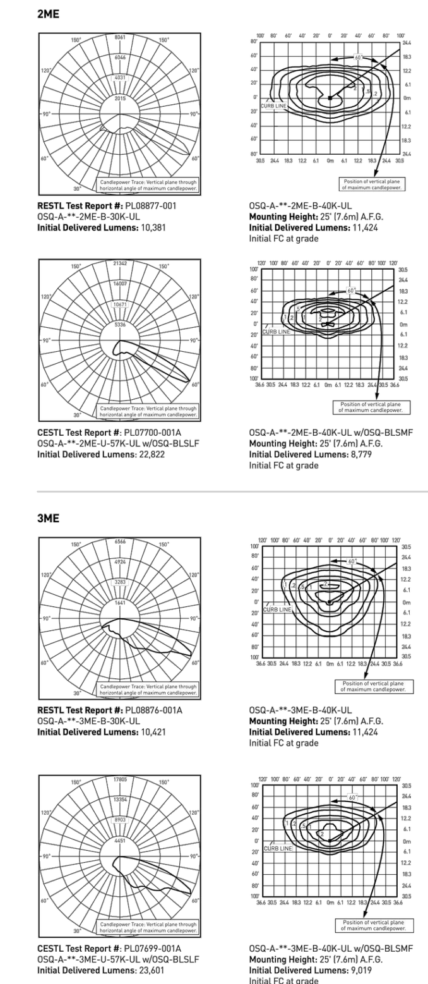


2ME

RESTL Test Report #: PL08877-001
OSQ-A-**-2ME-B-30K-UL
Initial Delivered Lumens: 10,381

OSQ-A-**-2ME-B-40K-UL
Mounting Height: 25' (7.6m) A.F.G.
Initial Delivered Lumens: 11,424
Initial FC at grade

Type II Medium Distribution						
Input Power Designator	3000K Initial Delivered Lumens*	3000K BUG Ratings** Per TM-15-11	4000K Initial Delivered Lumens*	4000K BUG Ratings** Per TM-15-11	5700K Initial Delivered Lumens*	5700K BUG Ratings** Per TM-15-11
B	10,738	B2 U0 G2	11,424	B2 U0 G2	11,648	B2 U0 G2
K	16,022	B3 U0 G3	16,959	B3 U0 G3	17,291	B3 U0 G3

* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -10 and +10% of initial delivered lumens
** For more information on the IES BUG (Backlight-Uplight-Glare) Rating visit: www.ies.org/PDF/Erratas/TM-15-11BugRatingsAddendum.pdf. Valid with no tilt

CESTL Test Report #: PL07700-001A
OSQ-A-**-2ME-U-57K-UL w/OSQ-BLSLF
Initial Delivered Lumens: 22,822

OSQ-A-**-2ME-B-40K-UL w/OSQ-BLSMF
Mounting Height: 25' (7.6m) A.F.G.
Initial Delivered Lumens: 8,779
Initial FC at grade

Type II Medium w/BLS Distribution						
Input Power Designator	3000K Initial Delivered Lumens*	3000K BUG Ratings** Per TM 15 11	4000K Initial Delivered Lumens*	4000K BUG Ratings** Per TM 15 11	5700K Initial Delivered Lumens*	5700K BUG Ratings** Per TM 15 11
B	8,251	B2 U0 G2	8,779	B2 U0 G2	8,950	B2 U0 G2
K	12,312	B2 U0 G2	13,032	B2 U0 G2	13,286	B2 U0 G2

* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -10 and +10% of initial delivered lumens
** For more information on the IES BUG (Backlight-Uplight-Glare) Rating visit: www.ies.org/PDF/Erratas/TM-15-11BugRatingsAddendum.pdf. Valid with no tilt

3ME

RESTL Test Report #: PL08876-001A
OSQ-A-**-3ME-B-30K-UL
Initial Delivered Lumens: 10,621

OSQ-A-**-3ME-B-40K-UL
Mounting Height: 25' (7.6m) A.F.G.
Initial Delivered Lumens: 11,424
Initial FC at grade

Type III Medium Distribution						
Input Power Designator	3000K Initial Delivered Lumens*	3000K BUG Ratings** Per TM 15 11	4000K Initial Delivered Lumens*	4000K BUG Ratings** Per TM 15 11	5700K Initial Delivered Lumens*	5700K BUG Ratings** Per TM 15 11
B	10,738	B3 U0 G3	11,424	B3 U0 G3	11,648	B3 U0 G3
K	16,022	B3 U0 G3	16,959	B3 U0 G3	17,291	B3 U0 G3

* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -10 and +10% of initial delivered lumens
** For more information on the IES BUG (Backlight-Uplight-Glare) Rating visit: www.ies.org/PDF/Erratas/TM-15-11BugRatingsAddendum.pdf. Valid with no tilt

CESTL Test Report #: PL07699-001A
OSQ-A-**-3ME-U-57K-UL w/OSQ-BLSLF
Initial Delivered Lumens: 23,601

OSQ-A-**-3ME-B-40K-UL w/OSQ-BLSMF
Mounting Height: 25' (7.6m) A.F.G.
Initial Delivered Lumens: 9,019
Initial FC at grade

Type III Medium w/BLS Distribution						
Input Power Designator	3000K Initial Delivered Lumens*	3000K BUG Ratings** Per TM-15-11	4000K Initial Delivered Lumens*	4000K BUG Ratings** Per TM-15-11	5700K Initial Delivered Lumens*	5700K BUG Ratings** Per TM-15-11
B	8,477	B1 U0 G2	9,019	B1 U0 G2	9,196	B1 U0 G2
K	12,649	B2 U0 G2	13,389	B2 U0 G2	13,650	B2 U0 G2

* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -10 and +10% of initial delivered lumens
** For more information on the IES BUG (Backlight-Uplight-Glare) Rating visit: www.ies.org/PDF/Erratas/TM-15-11BugRatingsAddendum.pdf. Valid with no tilt

OSQ™ LED Area/Flood Luminaire – Medium

Product Specifications

CONSTRUCTION & MATERIALS
- Slim, low profile design minimizes wind load requirements
- Luminaire housing is rugged die cast aluminum with an integral, weathertight LED driver compartment and high performance heat sink
- Convenient interlocking mounting method on direct arm mount. Mounting adaptor is rugged die cast aluminum and mounts to 3-6" (76-152mm) square or round pole, secured by two 5/16-18 UNC bolts spaced on 2" (51mm) centers
- Mounting for the adjustable arm mount adaptor is rugged die cast aluminum and mounts to 2" (51mm) IP, 2.375" (60mm) O.D. tenon
- Adjustable arm mount can be adjusted 180° in 2.5° increments
- Designed for uplight and downlight applications
- Exclusive Colorfast DeltaGuard® finish features an E-Coat epoxy primer with an ultra-durable powder topcoat, providing excellent resistance to corrosion, ultraviolet degradation and abrasion. Silver, bronze, black, and white are available
- **Weight:** 26.5 lbs. (12kg)

ELECTRICAL SYSTEM
- **Input Voltage:** 120-277V or 347-480V, 50/60Hz, Class 1 drivers
- **Power Factor:** > 0.9 at full load
- **Total Harmonic Distortion:** < 20% at full load
- Integral 10kV surge suppression protection standard
- When code dictates fusing, a slow blow fuse or type C/D breaker should be used to address inrush current
- **10V Source Current:** 0.15mA

REGULATORY & VOLUNTARY QUALIFICATIONS
- cULus Listed
- Suitable for wet locations
- Enclosure rated IP66 per IEC 60529 when ordered without R option
- Consult factory for CE Certified products
- Certified to ANSI C136.31-2001, 3G bridge and overpass vibration standards
- 10kV surge suppression protection tested in accordance with IEEE/ANSI C62.41.2
- Meets FCC Part 15 , Subpart B, Class A standards for conducted and radiated emissions
- Luminaire and finish endurance tested to withstand 5,000 hours of elevated ambient salt fog conditions as defined in ASTM Standard B 117
- Meets Buy American requirements within ARRA
- DLC and DLC Premium qualified versions available. Some exceptions apply. Please refer to www.designlights.org/QPL for most current information
- RoHS compliant. Consult factory for additional details
- Dark Sky Friendly, IDA Approved when ordered with 30K CCT. Please refer to http://darksky.org/fsa/fsa-products/for most current information

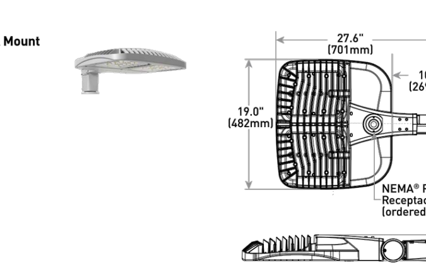
Electrical Data*							
Input Power Designator	System Watts 120-480V	Total Current (A) 120V	208V	240V	277V	347V	480V
B	86	0.73	0.43	0.37	0.32	0.25	0.19
K	130	1.09	0.65	0.56	0.49	0.38	0.28

* Electrical data at 25°C (77°F). Actual wattage may differ by +/- 10% when operating between 120-480V +/- 10%

Recommended OSQ Series Lumen Maintenance Factors (LMF)[1]						
Ambient	Optic	Initial LMF	25K hr Projected[2] LMF	50K hr Projected[2] LMF	75K hr Projected[2] LMF	100K hr Calculated[3] LMF
5°C (41°F)	Asymmetric	1.04	0.99	0.93	0.89	0.84
	Symmetric	1.05	1.00	0.96[3]	0.92[3]	0.88[3]
10°C (50°F)	Asymmetric	1.03	0.98	0.93	0.88	0.83
	Symmetric	1.04	0.99	0.95[3]	0.91[3]	0.87[3]
15°C (59°F)	Asymmetric	1.02	0.97	0.92	0.87	0.82
	Symmetric	1.02	0.98	0.94[3]	0.90[3]	0.87[3]
20°C (68°F)	Asymmetric	1.01	0.96	0.91	0.86	0.82
	Symmetric	1.01	0.96	0.92[3]	0.88[3]	0.85[3]
25°C (77°F)	Asymmetric	1.00	0.95	0.90	0.85	0.81
	Symmetric	1.00	0.95	0.91[3]	0.88[3]	0.84[3]

[1] Lumen maintenance values at 25°C (77°F) are calculated per TM-21 based on LM-80 data and in-situ luminaire testing
[2] In accordance with IESNA TM-21-11, Projected Values represent interpolated value based on time durations that are within six times (6X) the IESNA LM-80-08 total test duration (in hours) for the device under testing ((DUT) i.e. the packaged LED chip)
[3] In accordance with IESNA TM-21-11, Calculated Values represent time durations that exceed six times (6X) the IESNA LM-80-08 total test duration (in hours) for the device under testing ((DUT) i.e. the packaged LED chip)

AA Mount



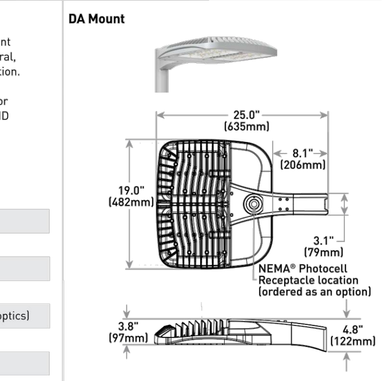
Weight
26.5 lbs. (12kg)

OSQ Series
OSQ™ LED Area/Flood Luminaire – Medium

Product Description

The OSQ™ Area/Flood luminaire blends extreme optical control, advanced thermal management and modern, clean aesthetics. Built to last, the housing is rugged cast aluminum with an integral, weathertight LED driver compartment. Versatile mounting configurations offer simple installation. Its slim, low-profile design minimizes wind load requirements and blends seamlessly into the site providing even, quality illumination. The 'B' Input power designator is a suitable upgrade for HID applications up to 250 Watt, and the 'K' Input power designator is a suitable upgrade for HID applications up to 400 Watt.
Applications: Parking lots, walkways, campuses, car dealerships, office complexes, and internal roadways

DA Mount



Performance Summary

- NanoOptic® Precision Delivery Grid™ optic
- Made in the U.S.A. of U.S. and imported parts
- **Initial Delivered Lumens:** Up to 17,291
- **Efficacy:** Up to 136 LPW
- **CRI:** Minimum 70 CRI (4000K & 5700K; 3000K asymmetric optics); 80 CRI (3000K symmetric optics)
- **CCT:** 3000K (+/- 300K), 4000K (+/- 300K), 5700K (+/- 500K)
- **Limited Warranty†:** 10 years on luminaire/10 years on Colorfast DeltaGuard® finish

† See http://lighting.cree.com/warranty for warranty terms

Weight
26.5 lbs. (12kg)

Accessories

Field-Installed	
Backlight Shield OSQ-BLSMF – Front facing optics OSQ-BLSMR – Rotated optics	**Hand-Held Remote** XA-SENSREM - For successful implementation of the programmable multi-level option, a minimum of one hand-held remote is required

Ordering Information

Fully assembled luminaire is composed of two components that must be ordered separately:
Example: **Mount:** OSQ-AASV + **Luminaire:** OSQ-A-NM-2ME-B-40K-UL-SV

Mount (Luminaire must be ordered separately)		
OSQ-		
OSQ-AA Adjustable Arm **OSQ-DA** Direct Arm	**Color Options:** **SV** Silver, **BK** Black	**BZ** Bronze, **WH** White

Luminaire (Mount must be ordered separately)								
OSQ	A	NM						
Product	Version	Mounting	Optic	Input Power Designator	CCT	Voltage	Color Options	Options
OSQ	A	**NM** No Mount	Asymmetric: **2ME*** Type II Medium; **3ME*** Type III Medium (L3); **4ME*** Type IV Medium (L1) Symmetric: **5ME** Type V Medium; **5SH** Type V Short (L2); **WSN** Wide Sign; **15D** 15° Flood; **25D** 25° Flood; **40D** 40° Flood; **60D** 60° Flood	**B** 86W **K** 130W	**30K** 3000K **40K** 4000K **57K** 5700K	**UL** Universal 120-277V **UH** Universal 347-480V	**BK** Black **BZ** Bronze **SV** Silver **WH** White	**DIM** 0-10V Dimming – Control by others – Refer to Dimming spec sheet for details – Can't exceed wattage of specified input power designator **F** Fuse – When code dictates fusing, use time delay fuse **ML** Multi-Level – Refer to ML spec sheet for details – High: 100%, Low: 30% – Available with UL voltage only – Intended for downlight applications at 0° tilt **PML** Programmable Multi-Level, 20-40' Mounting Height – Refer to PML spec sheet for details – Available with UL voltage only – Intended for downlight applications at 0° tilt **PML2** Programmable Multi-Level, 10-30' Mounting Height – Refer to PML spec sheet for details – Available with UL voltage only – Intended for downlight applications at 0° tilt **Q9** Field Adjustable Output – Refer to Field Adjustable Output spec sheet for details **R** NEMA® Photocell Receptacle – Intended for downlight applications with maximum 45° tilt – 3-pin receptacle per ANSI C136.10 – Photocell and shorting cap by others **RL** Rotate Left – LED and optic are rotated to the left **RR** Rotate Right – LED and optic are rotated to the right

* Available with Backlight Shield when ordered with field-installed accessory (see table above)

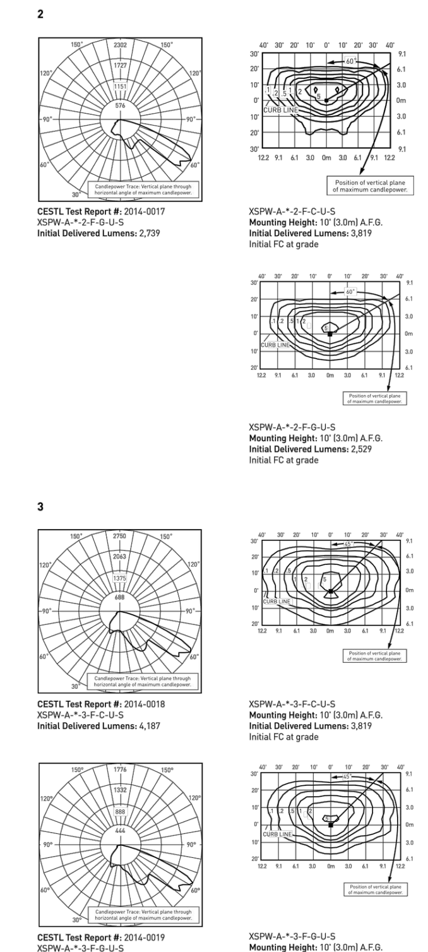
Rev. Date: V11 09/27/2016

LIGHT FIXTURE - L1 / L2 / L3

XSPW™ LED Wall Mount Luminaire

Photometry

All published luminaire photometric testing performed to IESNA LM-79-08 standards by a NVLAP accredited laboratory. To obtain an IES file specific to your project consult: http://lighting.cree.com/products/outdoor/wall-mount/xsp-series-wall



2

CESTL Test Report #: 2014-0017
XSPW-A-*-2-F-G-U-S
Initial Delivered Lumens: 2,739

XSPW-A-*-2-F-C-U-S
Mounting Height: 10' (3.0m) A.F.G.
Initial Delivered Lumens: 3,819
Initial FC at grade

XSPW-A-*-2-F-G-U-S
Mounting Height: 10' (3.0m) A.F.G.
Initial Delivered Lumens: 2,529
Initial FC at grade

Type II Medium Distribution				
Input Power Designator	4000K Initial Delivered Lumens*	4000K BUG Ratings** Per TM-15-11	5700K Initial Delivered Lumens*	5700K BUG Ratings** Per TM-15-11
C	3,819	B1 U0 G1	4,109	B1 U0 G1
G	2,529	B1 U0 G1	2,722	B1 U0 G1

* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -10 and +10% of initial delivered lumens
** For more information on the IES BUG (Backlight-Uplight-Glare) Rating visit: www.ies.org/PDF/Erratas/TM-15-11BugRatingsAddendum.pdf

3

CESTL Test Report #: 2014-0018
XSPW-A-*-3-F-C-U-S
Initial Delivered Lumens: 4,187

XSPW-A-*-3-F-C-U-S
Mounting Height: 10' (3.0m) A.F.G.
Initial Delivered Lumens: 3,819
Initial FC at grade

CESTL Test Report #: 2014-0019
XSPW-A-*-3-F-G-U-S
Initial Delivered Lumens: 2,692

XSPW-A-*-3-F-G-U-S
Mounting Height: 10' (3.0m) A.F.G.
Initial Delivered Lumens: 2,529
Initial FC at grade

Type III Medium Distribution				
Input Power Designator	4000K Initial Delivered Lumens*	4000K BUG Ratings** Per TM-15-11	5700K Initial Delivered Lumens*	5700K BUG Ratings** Per TM-15-11
C	3,819	B1 U0 G1	4,109	B1 U0 G1
G	2,529	B1 U0 G1	2,722	B1 U0 G1

* Initial delivered lumens at 25°C (77°F). Actual production yield may vary between -10 and +10% of initial delivered lumens
** For more information on the IES BUG (Backlight-Uplight-Glare) Rating visit: www.ies.org/PDF/Erratas/TM-15-11BugRatingsAddendum.pdf

XSPW™ LED Wall Mount Luminaire

Product Specifications

CONSTRUCTION & MATERIALS
- Slim, low profile design
- Luminaire housing specifically designed for LED applications with advanced LED thermal management and driver
- Luminaire mounting box designed for installation over standard single gang J-Boxes and mud ring single gang J-Boxes
- Luminaire can also be direct mounted to a wall and surface wired
- Secures to wall with four 3/16" (5mm) screws (by others)
- Conduit entry from top, bottom, sides, and rear
- Designed and UL approved for easy through-wiring
- Designed for downlight applications only
- Exclusive Colorfast DeltaGuard® finish features an E-coat epoxy primer with an ultra-durable powder topcoat, providing excellent resistance to corrosion, ultraviolet degradation and abrasion. Silver, black, white and bronze are available
- **Weight:** 9.5lbs. (4.3kg)

ELECTRICAL SYSTEM
- **Input Voltage:** 120-277V or 347V, 50/60Hz
- **Power Factor:** > 0.9 at full load
- **Total Harmonic Distortion:** < 20% at full load
- Class 2 driver
- Integral 10kV surge suppression protection standard
- When code dictates fusing, a slow blow fuse or type C/D breaker should be used to address inrush current
- C Input Power Designator is designed with 0-10V dimming capabilities standard. Controls by others
- **10V Source Current:** 0.15 mA

REGULATORY & VOLUNTARY QUALIFICATIONS
- cULus Listed
- Suitable for wet locations
- Enclosure rated IP66 per IEC 60529
- DLC qualified. Please refer to www.designlights.org/QPL for most current information
- 10kV surge suppression protection tested in accordance with IEEE/ANSI C62.41.2
- Meets FCC Part 15, Subpart B, Class A standards for conducted and radiated emissions
- Luminaire and finish endurance tested to withstand 5,000 hours of elevated ambient salt fog conditions as defined in ASTM Standard B 117
- Meets Buy American requirements within ARRA
- RoHS compliant. Consult factory for additional details

Electrical Data*							
Input Power Designator	System Watts 120-277V	System Watts 347V	Total Current (A) 120V	208V	240V	277V	347V
C	42	46	0.36	0.21	0.19	0.16	0.14
G	25	27	0.22	0.13	0.11	0.10	0.08

* Electrical data at 25°C (77°F). Actual wattage may differ by +/- 10% when operating between 120-347V +/- 10%

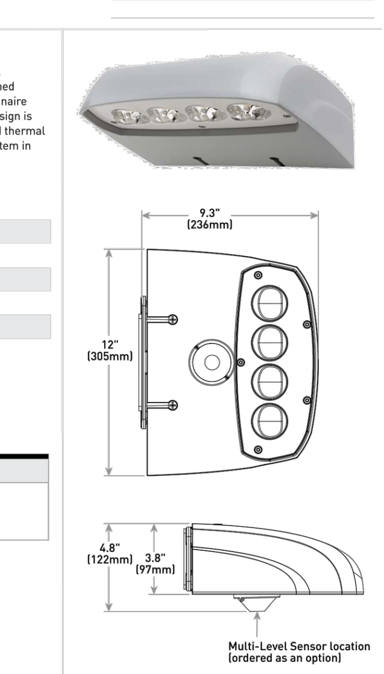
Recommended XSPW Series Lumen Maintenance Factors (LMF)[1]						
Ambient	Input Power Designator	Initial LMF	25K hr Projected[2] LMF	50K hr Projected[2] LMF	75K hr Projected[2] LMF	100K hr Calculated[3] LMF
5°C (41°F)	C / G	1.04	1.02	1.01	1.00	1.00
10°C (50°F)	C / G	1.03	1.01	1.00	0.99	0.99
15°C (59°F)	C / G	1.02	1.00	0.99	0.98	0.98
20°C (68°F)	C / G	1.01	0.99	0.98	0.97	0.97
25°C (77°F)	C / G	1.00	0.98	0.97	0.96	0.96

[1] Lumen maintenance values at 25°C (77°F) are calculated per TM-21 based on LM-80 data and in-situ luminaire testing
[2] In accordance with IESNA TM-21-11, Projected Values represent interpolated value based on time durations that are within six times (6X) the IESNA LM-80-08 total test duration (in hours) for the device under testing ((DUT) i.e. the packaged LED chip)
[3] In accordance with IESNA TM-21-11, Calculated Values represent time durations that exceed six times (6X) the IESNA LM-80-08 total test duration (in hours) for the device under testing ((DUT) i.e. the packaged LED chip)

XSP Series
XSPW™ LED Wall Mount Luminaire

Product Description

The XSPW™ LED wall mount luminaire has a slim, low profile design intended for outdoor wall mounted applications. The rugged lightweight aluminum housing and mounting box are designed for installation over standard single gang J-Boxes and mud ring single gang J-Boxes. The luminaire allows for through-wired or conduit entry from the top, bottom, sides and rear. The housing design is intended specifically for LED technology including a weathertight LED driver compartment and thermal management. Optic design features industry-leading NanoOptic® Precision Delivery Grid™ system in multiple distributions.
Applications: General area and security lighting



Performance Summary

- NanoOptic® Precision Delivery Grid™ optic
- Made in the U.S.A. of U.S. and imported parts
- **CRI:** Minimum 70 CRI
- **CCT:** 4000K (+/- 300K), 5700K (+/- 500K)
- **Limited Warranty†:** 10 years on luminaire/10 years on Colorfast DeltaGuard® finish

† See http://lighting.cree.com/warranty for warranty terms

Accessories

Field-Installed
Beauty Plate WM-PLT12** - 12" (305mm) Square WM-PMT14** - 14" (356mm) Square - Covers holes left by incumbent wall packs

** Must specify color

Weight
9.5 lbs. (4.3kg)

Ordering Information

Example: XSPW-A-0-2-F-C-U-Z

XSPW	A	0						
Product	Version	Mounting	Optic	Modules	Input Power Designator	Voltage	Color Options	Options
XSPW	A	**0** Wall	**2** Type II Medium **3** Type III Medium	**F** 4000K **M** 5700K	**C** 42W (L4) **G** 25W (L5)	**U** Universal 120-277V **1** 120V **2** 208-277V **6*** 347V	**S** Silver **T** Black **W** White **Z** Bronze	**K** Multi-Level – Refer to ML spec sheet for details – Available with Input Power Designator C only – Available with U voltage only **P** Photocell – Not available with K option – Must specify 1, 2, or 6 voltage

* Available in Canada only. 347V utilizes magnetic step-down transformer. For input power for 347V, refer to the Electrical Data table
NOTE: Price adder may apply depending on configuration

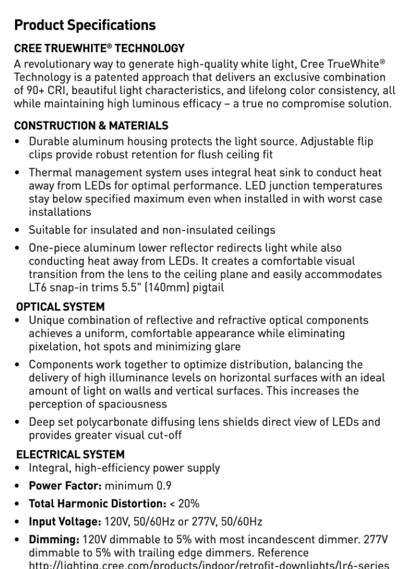
Rev. Date: V7 08/11/2016

LIGHT FIXTURE - L4 / LP5

SC6
Surface Mount Housing

Product Description

The SC6 cylindrical surface mount housing is designed to accommodate all Cree 277V and GU24-based six-inch downlights in a variety of architectural applications. It is rated for use with luminaires that consume low energy, such as the LR6 and CR6, optimizing energy density calculations for easier energy code compliance and LEED certification. The SC6 housing also features a subtle, unobtrusive design that integrates cleanly into the interior space.



Product Specifications

CONSTRUCTION & MATERIALS
- Rugged spun aluminum housing with textured polyester powder paint accommodates Cree GU24 and 277V 6" led downlights
- Housing attaches directly to standard 4" electrical junction boxes

REGULATORY & VOLUNTARY QUALIFICATIONS
- cETLus Listed
- Suitable for damp locations

NOTE: Not designed for pendant or cord mounting

Compatible Downlights

SC6-GU24	SC6-277V
CR6-GU24 LR6-GU24 LR6C-GU24 LE6-GU24 LE6C-GU24 LR6-DR Series (120V GU24)	LR6-277V LR6C-277V LR6-DR Series (277V US)

Ordering Information

Example: RR4

Product
SC6-GU24 120V, Textured white, GU24 Socket **SC6-GU24 US** 120V, Textured white, GU24 Socket, US Manufacturer **SC6-BL-GU24** 120V, Textured black, GU24 Socket **SC6-277V** 277V, Textured white, 277V Connector **SC6-BL-277V** 277V, Textured black, 277V Connector

Intertek

Rev. Date: V3 10/05/2016

LR6™ LED Downlight – 6"

Product Specifications

CREE TRUEWHITE® TECHNOLOGY
A revolutionary way to generate high-quality white light, Cree TrueWhite® Technology is a patented approach that delivers an exclusive combination of 90+ CRI, beautiful light characteristics, and lifelong color consistency, all while maintaining high luminous efficacy – a true no compromise solution.

CONSTRUCTION & MATERIALS
- Durable aluminum housing protects the light source. Adjustable flip clips provide robust retention for flush ceiling fit
- Thermal management system uses integral heat sink to conduct heat away from LEDs for optimal performance. LED junction temperatures stay below specified maximum even when installed in with worst case installations
- Suitable for insulated and non-insulated ceilings
- One-piece aluminum lower reflector redirects light while also conducting heat away from LEDs. It creates a comfortable visual transition from the lens to the ceiling plane and easily accommodates LT6 snap-in trims 5.5" (140mm) pigtail

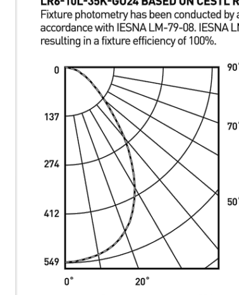
OPTICAL SYSTEM
- Unique combination of reflective and refractive optical components achieves a uniform, comfortable appearance while eliminating pixelation, hot spots and minimizing glare
- Components work together to optimize distribution, balancing the delivery of high illuminance levels on horizontal surfaces with an ideal amount of light on walls and vertical surfaces. This increases the perception of spaciousness
- Deep set polycarbonate diffusing lens shields direct view of LEDs and provides greater visual cut-off

ELECTRICAL SYSTEM
- Integral, high-efficiency power supply
- **Power Factor:** minimum 0.9
- **Total Harmonic Distortion:** < 20%
- **Input Voltage:** 120V, 50/60Hz or 277V, 50/60Hz
- **Dimming:** 120V dimmable to 5% with most incandescent dimmer. 277V dimmable to 5% with trailing edge dimmers. Reference http://lighting.cree.com/products/indoor/retrofit-downlights/lr6-series for recommended dimmers
- **Operating Temperature Range:** -20°C - +35°C (-4°F - +95°F)

REGULATORY & VOLUNTARY QUALIFICATIONS
- cULus Classified
- Suitable for wet locations for covered ceilings only
- ENERGY STAR® qualified. Please refer to www.energystar.gov/certified-products/certified-products?c=products.pr_find_es_products&s=mega for most current information
- Exceeds California Title-24 high efficacy luminaire requirements when ordered with GU24 base or 277V. Please refer to https://cacertappliances.energy.ca.gov/Pages/ApplianceSearch.aspx for most current information
- Meets FCC Part 15 standards for conducted and radiated emissions
- RoHS Compliant. Consult factory for additional details

Photometry

LR6-10L-35K-GU24 BASED ON CESTL REPORT TEST #: PL06010-001
Fixture photometry has been conducted by a NVLAP accredited testing laboratory in accordance with IESNA LM-79-08. IESNA LM-79-08 specifies the entire luminaire as the source resulting in a fixture efficiency of 100%.



Coefficients Of Utilization – Zonal Cavity Method				
RC %:	80			
RW %:	70	50	30	10
RCR: 0	119	119	119	119
1	111	107	103	100
2	103	96	90	85
3	95	86	79	74
4	88	78	70	65
5	82	71	63	57
6	77	65	57	51
7	72	60	52	46
8	67	55	47	42
9	63	51	44	39
10	60	48	40	36

Effective Floor Cavity Reflectance: 20%

Average Luminance Table (cd/m²)			
Vertical Angle	Horizontal Angle 0°	45°	90°
45°	13,215	13,215	13,215
55°	8,204	8,204	8,204
65°	5,541	5,541	5,541
75°	3,834	3,834	3,834
85°	1,165	1,165	1,165

Zonal Lumen Summary			
Zone	Lumens	% Lamp	Luminaire
0-30	403	N/A	41.9%
0-40	605	N/A	62.9%
0-60	854	N/A	88.7%
0-90	962	N/A	100%
0-180	962	N/A	100%

Reference http://lighting.cree.com/products/indoor/retrofit-downlights/lr6-series for detailed photometric data

Installation

- Designed to easily install in standard 6" (152mm) downlight housings with minimum depth 6.5" (165mm) and diameter of 5.75" - 6.25" (146mm - 159mm)
- Quick install system utilizes a unique retention feature. Simply attach socket to LR6 downlight. Move light to ready position and slide into housing

NOTE: Reference http://lighting.cree.com/products/indoor/retrofit-downlights/lr6-series for detailed installation instructions

Application Reference

Open Space					
Spacing	Lumens	Wattage	LPW	w/ft²	Average FC
4 x 4	1,050	10.5	100	0.63	62
6 x 6				0.29	29
8 x 8				0.16	16
10 x 10				0.11	11

10' Ceiling, 80/50/20 Reflectances, 2.5 workplane. LLF: 1.0 Initial. Open Space: 50' x 40' x 10

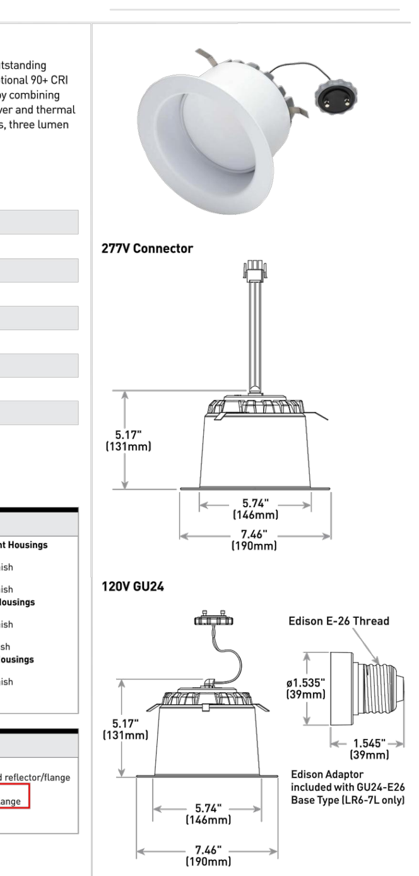
Corridor					
Spacing	Lumens	Wattage	LPW	w/ft²	Average FC
4' on Center	1,050	10.5	100	0.44	27
6' on Center				0.28	17
8' on Center				0.21	13
10' on Center				0.18	11

10' Ceiling, 80/50/20 Reflectances, Light levels on the ground. LLF: 1.0 Initial. Corridor: 6' Wide x 100' Long

LR Series
LR6™ LED Downlight - 6"

Product Description

The LR6™ downlight is an unparalleled combination of light quality and efficacy – bringing outstanding performance and value to the retrofit downlight space. Delivering up to 1800 lumens of exceptional 90+ CRI light while achieving up to 100 lumens per watt, this breakthrough performance is achieved by combining the high efficacy and high-quality light of Cree TrueWhite® Technology, with an integrated driver and thermal management design. The LR6™ downlight is available in warm or neutral color temperatures, three lumen packages, and offers a variety of trim options.
Applications: Commercial new construction and retrofit



Performance Summary

- Utilizes Cree TrueWhite® Technology
- **Initial Delivered Lumens:** 650-1,800 lumens
- **Input Power:** 7.5-22 watts
- **CRI:** 90
- **CCT:** 2700K, 3500K, 4000K
- **Limited Warranty†:** 10 years
- **Lifetime:** Designed to last 50,000 hours
- **Dimming:** Dimmable to 5%
- Must order in multiples of master carton (MC) quantities of 5

† See http://lighting.cree.com/warranty for warranty terms

Housings & Trims

Reference Housing & Accessory documents for more details.

Housings		
120V GU24 Base Recessed Housings H6-GU24 - Architectural new construction RC6-GU24 - New construction RR6-GU24 - Retrofit **120V GU24 Base Surface Mount Housings** SC6-GU24 - Textured white finish SC6-BL-GU24 - Textured black finish	**120V GU24 Base Cord Mount Housings** SC6-CM-GU24 - Textured white finish SC6-CM-BL-GU24 -Textured black finish **120V GU24 Base Wall Mount Housings** SC6-WM-GU24 - Textured white finish **277V Recessed Housings** H6-277V - Architectural new construction RC6-277V - New construction RR6-277V - Retrofit	**277V Surface Mount Housings** SC6-277V - Textured white finish SC6-BL-277V - Textured black finish **277V Cord Mount Housings** SC6-CM-277V - Textured white finish SC6-CM-BL-277V -Textured black finish **277V Wall Mount Housings** SC6-WM-277V - Textured white finish

Trims		
LT6A-DR Diffuse anodized reflector w/white flange **LT6AW-DR** Wheat diffuse anodized reflector w/white flange	**LT6AP-DR** Pewter diffuse anodized reflector w/white flange **LT6AB-DR** Black anodized reflector w/white flange	**LT6WH-DR** Smooth white painted reflector/flange **LT6BB-DR** Flat black reflector/flange

Ordering Information

Example: LR6-7L-27K-GU24-E26

LR6				
Series	Initial Delivered Lumens*	CCT	Voltage	Base Type
LR6**	**7L** 7.5W, 650 lumens – 87 LPW **10L** 10.5W, 1,050 lumens – 100 LPW **18L** 22W, 1,800 lumens – 82 LPW	**27K** 2700K **35K** 3500K **40K** 4000K	**Blank** 120 Volts **277V** 277 Volts	**Blank** 277V Connector - Must be used with Cree six-inch 277V housings (see Housings table above) **GU24** - GU24 base - Available only with LR6-10L and LR6-18L **GU24-E26** - GU24 base w/Edison adaptor - Available only with the LR6-7L

* Actual lumens vary based on color temperature
** LR6 must be ordered in Master Carton quantities of 5

Rev. Date: V3 10/05/2016

LIGHT FIXTURE - L6

SGA
SG ARCHITECTURE, LLC
10940 SW Barnes Road #364
Portland, Oregon 97225
503.201.0725 | 503.347.4685

LEVETON INDUSTRIAL
SW Leveton Drive & SW 124th Ave.
Tualatin , Oregon

DANA PROPERTIES, LLC.
PO Box 5837
Aloha, Or 97006

Located
LEVETON
COMMONS
No.2, Lot 8
NE: T02S., R01W., S21.
CITY OF TUALATIN
WASHINGTON , CO. OREGON

PROJECT NUMBER:
16-111

DATE:
June 5, 2017

DRAWN BY:

Revisions:

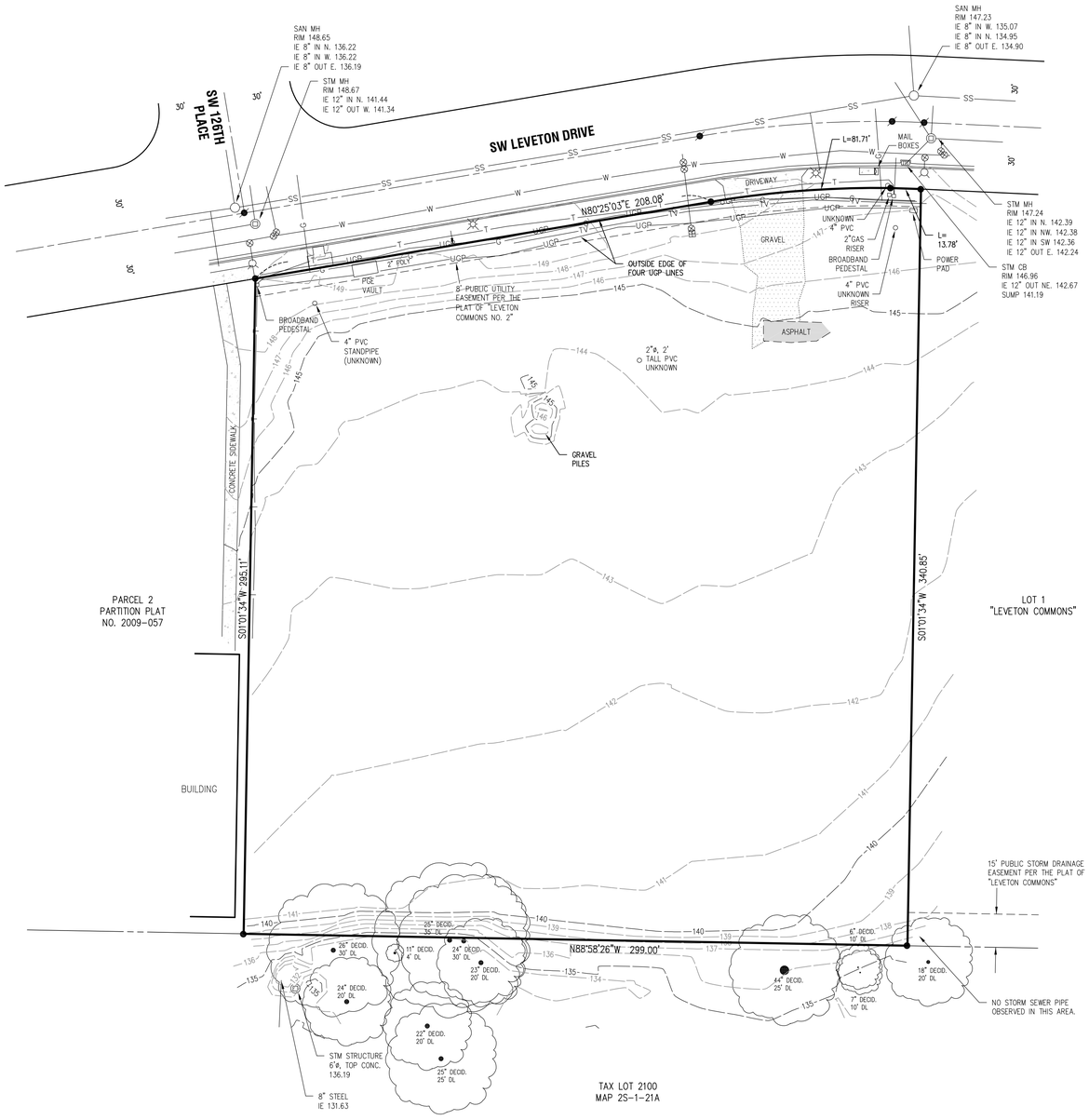
APPLICATION FOR
ARCHITECTURAL REVIEW (AR)

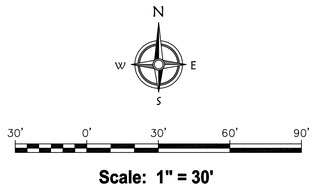
Site
Photometric
CUT-SHEETS

Sheet Number:

E2.0

\\SGACLOUD_sgarch\01 Projects\2016\16-113 Tualatin Industrial\Site Plan Review (AR)\DWGS\16-113 DR_ ELECT.dwg





Scale: 1" = 30'

Notes:

1. UTILITY INFORMATION SHOWN ON THIS MAP IS BASED UPON TONE MARKS PROVIDED BY PUBLIC UTILITY LOCATORS AS A RESULT OF OUR REQUEST TO THE OUNC FOR MARKINGS OF PUBLIC UTILITY LINES IN THE AREA SHOWN ON THIS MAP. IT IS ALSO BASED UPON SURFACE FEATURES OBSERVED AT THE TIME OF THE FIELD SURVEY WORK. NO WARRANTIES ARE MADE WITH REGARDS TO THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. ADDITIONAL UTILITIES MAY EXIST. INTERESTED PARTIES ARE HEREBY ADVISED THAT ALL UTILITY LOCATIONS SHOULD BE VERIFIED PRIOR TO DESIGN OR CONSTRUCTION OF ANY CRITICAL ITEMS. THE FOLLOWING UTILITIES WERE CONTACTED BY THE OUNC, THROUGH TICKET NUMBER 16270723, TO PROVIDE MARKINGS REGARDING PUBLIC UTILITY LINES ON THIS PROJECT:
PGE (503-255-4634)
COMCAST CABLE (801-364-1063)
FRONTIER COMMUNICATIONS (800-778-9140)
NW NATURAL GAS (503-220-2415)
CITY OF TUALATIN (503-691-3091)
WASHINGTON COUNTY LUT (503-846-7950)

2. VERTICAL DATUM: NGVD '29

3. CONTOUR INTERVAL IS ONE FOOT.

4. TOPOGRAPHIC FEATURES SHOWN ON THIS MAP WERE LOCATED USING STANDARD PRECISION TOPOGRAPHIC MAPPING PROCEDURES. THIRD PARTY USERS OF DATA FROM THIS MAP PROVIDED VIA AUTOCAD DRAWING FILES OR DATA EXCHANGE FILES SHOULD NOT RELY ON ANY AUTOCAD GENERATED INFORMATION WHICH IS BEYOND THE LIMITS OF PRECISION OF THIS MAP. THIRD PARTIES USING DATA FROM THIS MAP IN AN AUTOCAD FORMAT SHOULD VERIFY ANY ELEMENTS REQUIRING PRECISE LOCATIONS PRIOR TO COMMENCEMENT OF ANY CRITICAL DESIGN OR CONSTRUCTION. CONTACT COMPASS LAND SURVEYORS FOR FURTHER INFORMATION. FURTHERMORE, COMPASS LAND SURVEYORS WILL NOT BE RESPONSIBLE NOR HELD LIABLE FOR ANY DESIGN OR CONSTRUCTION RELATED PROBLEMS THAT ARISE OUT OF THIRD PARTY USAGE OF THIS MAP (IN AUTOCAD OR OTHER FORMAT) FOR ANY PURPOSE OTHER THAN SPECIFICALLY STATED HEREIN. THIS STATEMENT IS AN OFFICIAL PART OF THIS MAP.

Legend:

- G — GAS LINE
- SS — SANITARY SEWER LINE
- ST — STORM SEWER LINE
- UGP — UNDERGROUND POWER LINE
- T — UNDERGROUND PHONE LINE
- TV — UNDERGROUND CABLE TV LINE
- W — WATER LINE
- FIRE HYDRANT
- LIGHT POLE
- WATER METER
- WATER VALVE
- FOUND 5/8" IRON ROD WITH ALUMINUM CAP MARKED "WESTLAKE CONSULTANTS, INC."
- FOUND 5/8" IRON ROD WITH A YELLOW PLASTIC CAP MARKED "WESTLAKE CONSULTANTS"

TOPO

TOPOGRAPHIC SITE MAP

DATE	NO.	REVISION				
			DRAWN	MMM	CHECK	DD
			SCALE	1" = 30'	DATE	NOV., 2016
			PLAN	7818 Topo.dwg		

COMPASS Land Surveyors
4107 SE International Way, Suite 705
Milwaukie, Oregon 97222 503-653-9093

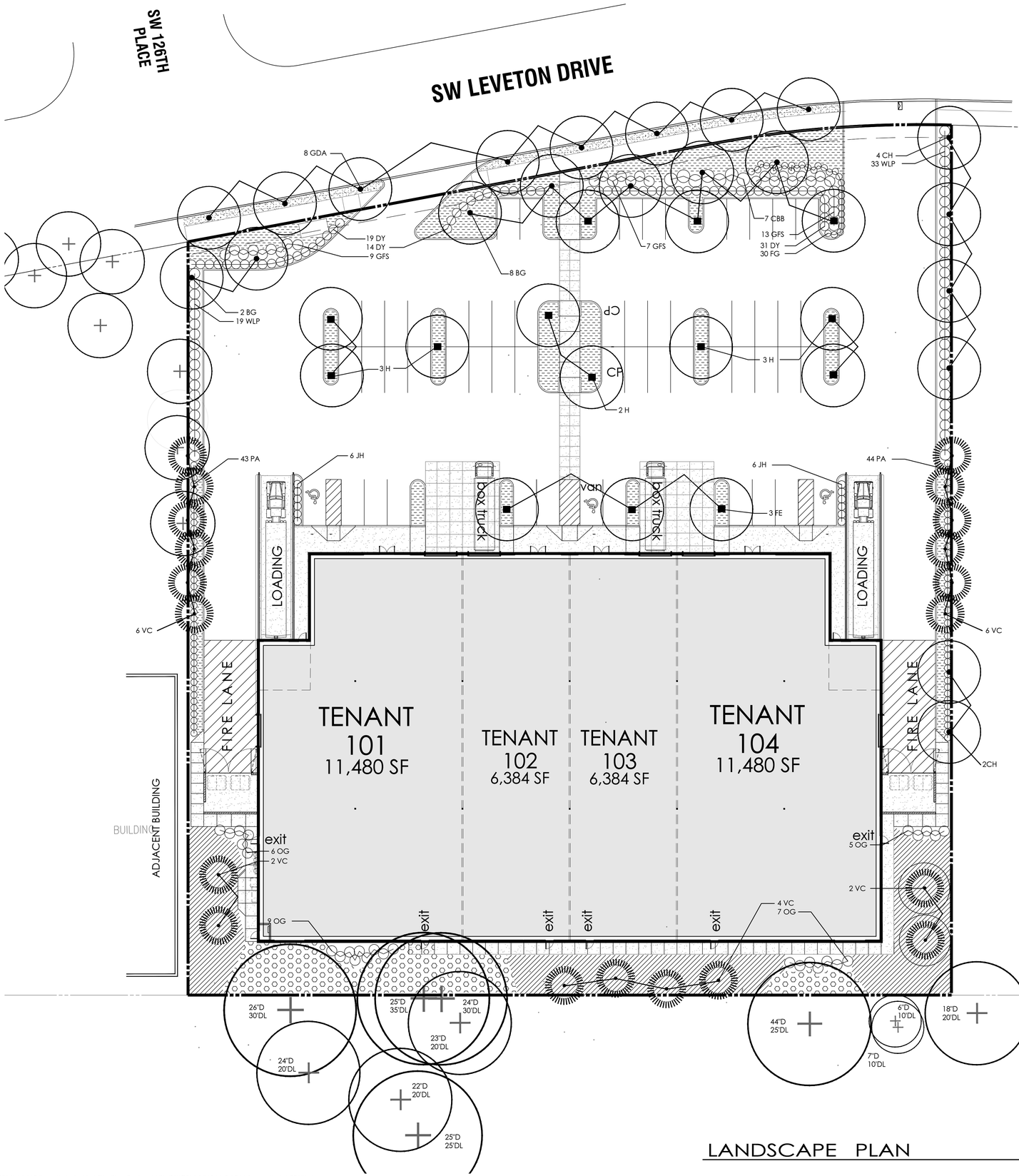
INLINE COMMERCIAL CONSTRUCTION
18880 SW SHAW STREET
ALOHA, OREGON 97007

LOT 8, "LEVETON COMMONS NO. 2"
TAX LOT 4000, MAP 2S-1-21A
CITY OF TUALATIN, WASHINGTON COUNTY, OREGON

CHRISTOPHER FRESHLEY
LANDSCAPE ARCHITECT
3944 S.W. 38TH PLACE * PORTLAND, OREGON 97221 * 503/222-9881
(E-MAIL): CHRIS@FRESHLEYLANDSCAPEARCHITECT.COM

SGA
SG ARCHITECTURE, LLC
10940 SW Barnes Road #364
Portland, Oregon 97225
503.201.0725 | 503.347.4685

REGISTERED 74 CHRISTOPHER J. FRESHLEY OREGON LANDSCAPE ARCHITECT



LANDSCAPE LEGEND

SYMBOL	COMMON NAME / BOTANICAL NAME	SIZE/COND.	SPACING
TREES			
BG	Black Gum Nyssa sylvatica	1.5" Cal.	30' o.c.
CH	Columnar Hornbeam Carpinus betulus 'Fastigiata'	1.5" Cal.	30' o.c.
FE	Frontier Elm Ulmus 'Frontier'	1.5" Cal.	as shown
GDA	Golden Desert Ash Fraxinus excelsior 'Aureafolia'	1.5" Cal.	30' o.c.
H	Hackberry Celtis occidentalis	1.5" Cal.	as shown
VC	Virescens Cedar Thuja plicata 'Virescens'	5'-6'	15' o.c.
SHRUBS			
CBB	Cherry Bomb Barberry Berberis thunbergii 'Monomb'	5 Gal.	5' o.c.
DY	Dense Yew Taxus densiformis	24"-30"	3.5' o.c.
FG	Fountain Grass Pennisetum alopecuroides 'Hamelin'	1 Gal.	2.5' o.c.
GFS	Gold Flame Spirea Spirea bumalda 'Gold Flame'	5 Gal.	4' o.c.
JH	Japanese Holly Ilex crenata 'Compacta'	24"-30"	3' o.c.
OG	Oregon Grape Mahonia aquifolium	3 Gal.	3' o.c.
PA	Pyramidal Arborvitae Thuja occidentalis 'Smaragd'	7'-8'	2.5' o.c.
WLP	Waxleaf Privet Ligustrum texanum	24"-30"	4' o.c.
GROUNDCOVER			
	Kinnikinnick Arctostylos uva-ursi 'Emerald Carpet'	1 Gal.	24" o.c.
	Bearberry Cotoneaster Cotoneaster dammeri	1 Gal.	30" o.c.
	2" layer Bark Mulch under drip line of exist. trees		
	Sod Lawn		

NOTES

1. Installation must fully comply with all landscape code requirements and any City of Tualatin conditions of approval.
2. Irrigation to be provided by a fully automatic underground irrigation system, plans to be submitted at Building Permit.
3. Existing on site topsoil will be reused for landscape. Soil will be tested by a soils laboratory and amended as per their recommendations to produce topsoil for healthy viable plant growth. 18" of topsoil will be placed over a crossripped/rototilled subgrade.
4. All landscape plantings are guaranteed for one year. All landscape plantings will be maintained by a professional landscape maintenance company for a viable healthy landscape. Plantings will be monitored on a weekly basis during the growing season.

LANDSCAPE SYMBOLS LEGEND

23"D 20'DL — Existing Adjacent Deciduous Tree to Remain
To be protected during construction
23"D= Caliper inches at DBH and Deciduous Tree
20'DL= Drip Line radius from tree trunk

Parking Lot Tree
57 stalls dived by 4 = 14 trees required
14 trees provided

CONIFER TREE

LANDSCAPE PLAN

0 30' 90'
30' 15'
NORTH

LEVETON INDUSTRIAL
SW Leveton Drive & SW 124th Ave.
Tualatin , Oregon

DANA PROPERTIES, LLC.
PO Box 5837
Aloha, Or 97006

Located
LEVETON COMMONS
No.2, Lot 8
NE: T02S., R01W., S21.
CITY OF TUALATIN
WASHINGTON , CO. OREGON

PROJECT NUMBER:
16-111

DATE:
June 5, 2017

DRAWN BY:
CF

Revisions:

APPLICATION FOR
ARCHITECTURAL REVIEW (AR)

LANDSCAPE PLAN

Sheet Number:

L-1

proposed tree species


VC - virescens cedar


H-hackberry


GDA-golden desert ash


FE-fontier elm


CH-columnar hornbeam

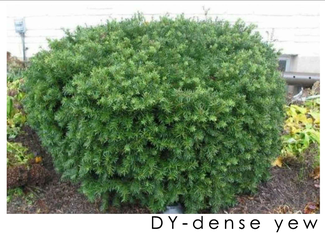

BG-black gum

proposed shrub species


JH-japanese holly


GFS-gold flame spirea


FG-fountain grass


DY-dense yew


CCB-cherry bomb barberry


WLP-waxleaf privet


PA-pyamidal arborvitae


OG-oregon grape

proposed ground cover


sod lawn


kinnikinnick


bearberry cotoneaster


bark mulch

landscape legend

SYMBOL	COMMON NAME / BOTANICAL NAME	SIZE/COND.	SPACING
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	2" layer Bark Mulch under drip line of exist. trees		
	Sod Lawn		

23"D
20'DL

Existing Adjacent Deciduous Tree to Remain
To be protected during construction
23"D= Caliper inches at DBH and Deciduous Tree
20'DL= Drip Line radius from tree trunk

Parking Lot Tree
57 stalls dived by 4 = 14 trees required
14 trees provided

PLANT LIST

SGA
SG ARCHITECTURE, LLC
10940 SW Barnes Road #364
Portland, Oregon 97225
503.201.0725 | 503.347.4685

REGISTERED 74 CHRISTOPHER J. FRESHLEY OREGON LANDSCAPE ARCHITECT

LEVETON INDUSTRIAL
SW Leveton Drive & SW 124th Ave.
Tualatin , Oregon

DANA PROPERTIES, LLC.
PO Box 5837
Aloha, Or 97006

Located LEVETON COMMONS No.2, Lot 8
NE: T02S., R01W., S21.
CITY OF TUALATIN
WASHINGTON , CO. OREGON

PROJECT NUMBER:
16-111

DATE:
June 5, 2017

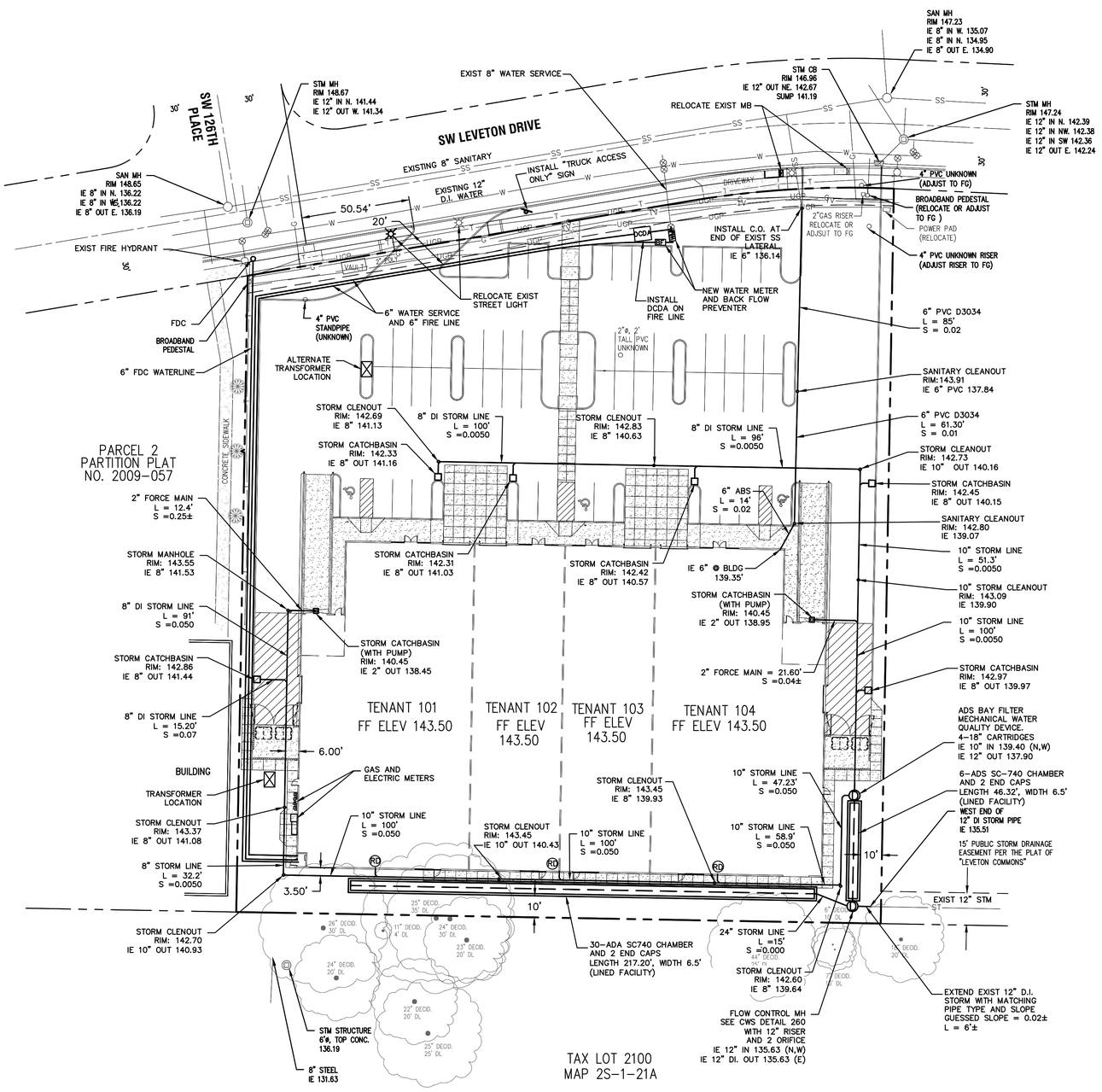
DRAWN BY:

Revisions:

APPLICATION FOR
ARCHITECTURAL REVIEW (AR)

PLANT LIST
Sheet Number:

L-2



N

GRAPHIC SCALE

30 0 15 30 60

(IN FEET)

1 INCH = 30 FT.

REVISIONS	BY

LEVETON INDUSTRIAL

DANA PROPERTIES, LLC.

Preliminary Utility Plan

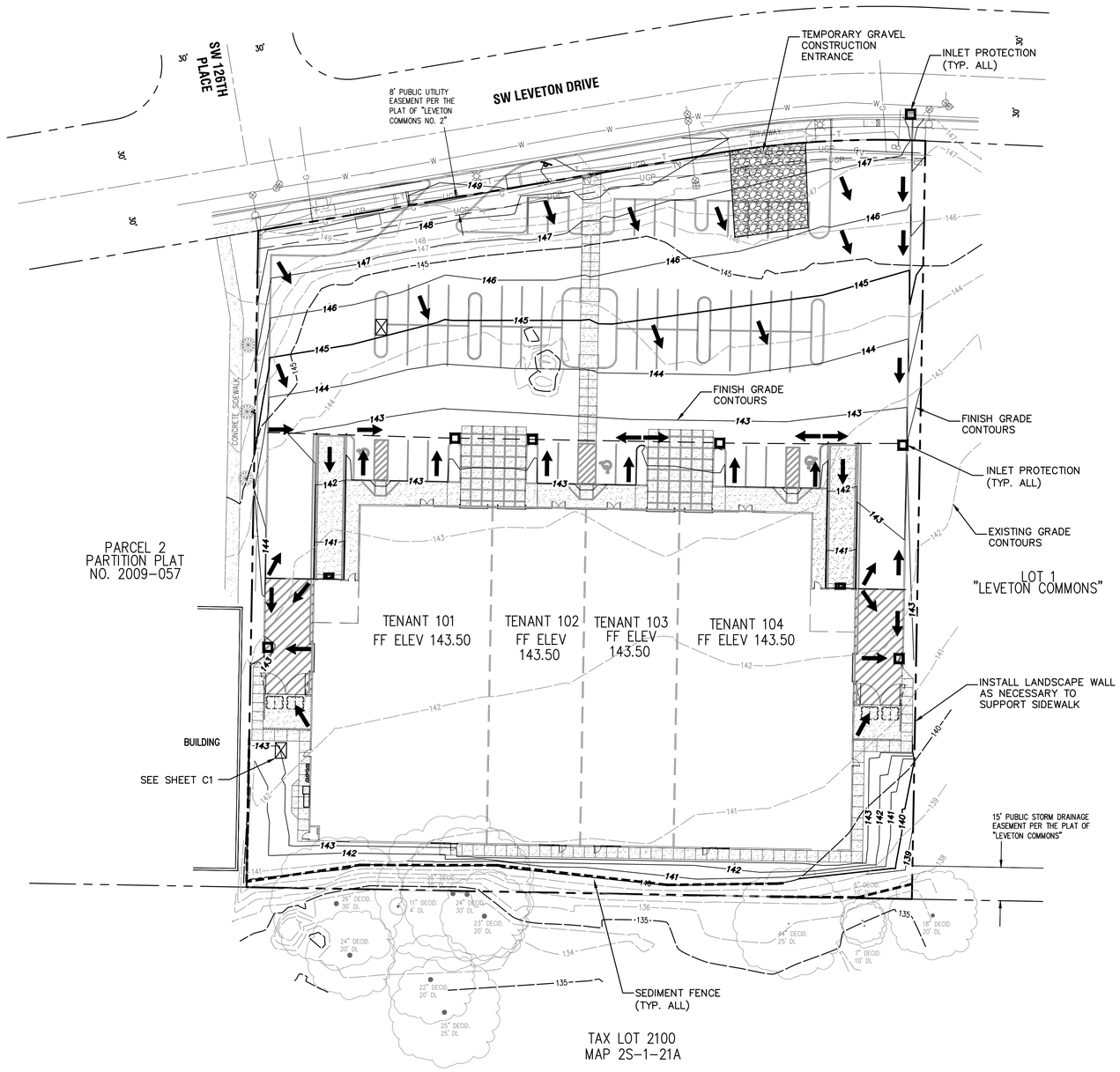
SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

DRAWING: SCL 16-075-Utilities.DWG

REGISTERED PROFESSIONAL ENGINEER
72761PE
OREGON
JUNE 2, 2010
JAMES M. FOX

EXPIRES: 12/31/2017

DATE	MAY 2017
SCALE	AS NOTED
DRAWN	JMF
JOB	16-075
SHEET	C1
OF 2	SHEETS



N

GRAPHIC SCALE

30 0 15 30 60

(IN FEET)
1 INCH = 30 FT.

REVISIONS	BY

LEVETON INDUSTRIAL

DANA PROPERTIES, LLC.

Preliminary Grading Plan

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

DRAWING: SGL 16-075-Grading.DWG

REGISTERED PROFESSIONAL ENGINEER
72761PE
OREGON
JUNE 2, 2010
JAMES M. FOX
EXPIRES: 12/31/2017

DATE	MAY 2017
SCALE	AS NOTED
DRAWN	JMF
JOB	16-075
SHEET	C2
OF	2 SHEETS

3-2-020 Application, Permit and *Inspection* Procedure.

(1) No person shall connect to any part of the sanitary sewer system without first making an application and securing a permit from the City for such connection, nor may any person substantially increase the flow, or alter the character of sewage, without first obtaining an additional permit and paying such charges therefore as may be fixed by the City, including such charges as inspection charges, connection charges and monthly service charges***. A permit will be made to allow connection to the City's sanitary sewer system.***

3-2-030 Materials and Manner of Construction.

(1) All building sewers, side sewers and connections to the main sewer shall be so constructed as to conform to the requirements of the Oregon State Plumbing Laws and rules and regulations and specifications for sewerage construction of the City. ***A sanitary sewer service lateral was installed to the site as a part of the Leveton Common No. 2 subdivision. Extension of that sewer lateral to the City will be done performed under Oregon State Plumbing Laws.***

3-2-060 Use of Public Sewers Required.

(1) No person shall discharge to a natural outlet within the City of Tualatin, or in an area under the jurisdiction of the City, any sewage or polluted waters, except where suitable treatment has been provided in accordance with this ordinance. ***Sewer connection will be made to the sanitary sewer****.*

3-3-030 Application for Service.

(1) No water service will be provided without a signed application containing the following information**:** ***A proper application for service will be made****.*

3-3-040 Separate Services Required.

(2) For nonresidential uses, separate meters shall be provided for each structure. Separate meters shall also be provided to each buildable lot or parcel on which water service is or will be provided. ***The proposed industrial site development will be a single building at this time a single City meter is proposed, with the possibility that private sub-metering will be done at the building.***

3-3-080 Fire Protection Service.

Fire protection facilities will be allowed under the following conditions:

(1) The owner of a fire protection system shall furnish and install a service meter approved by the City. ***Noted.***

(2) When a building has a fire protection service which is separate from the regular water service to the building, an appropriate backflow device, but not less than a double check detector check, approved by the Operations Director, shall be used in place of a service meter. Water supplied through this service shall not be used for any purpose except for suppressing a fire or testing of the fire protection system. If registration of regular water usage is recorded on the detector check meter, the City

may require installation of a service meter or removal of the fire protection service. ***A separate fire line will be required to meet Fire Code requirements and the installation of an acceptable backflow device per State and City requirements will be installed.***

3-3-100 Meters.

(1) Meters up to and including two inches will be furnished by the City. Meters larger than two inches may be furnished by the customer upon approval of the Operations Director. ***At this time it is not anticipated that a meter larger than 2 inch will be needed.***

3-3-110 Construction Standards.

All water line construction and installation of services and equipment shall be in conformance with the City of Tualatin Public Works Construction Code. In addition, whenever a property owner extends a water line, which upon completion, is intended to be dedicated to the City as part of the public water system, said extension shall be carried to the opposite property line or to such other point as determined by the City Engineer. Water line size shall be determined by the City Engineer in accordance with the City's Development Code or implementing ordinances and the Public Works Construction Code. ***As an 8 inch water line has been installed by the developer of the Leveton Commons No. 2 subdivision, to the parcel it is anticipated that no public sewer extension will be required.***

3-3-120 Backflow Prevention Devices and Cross Connections.

(1) Except where this ordinance provides more stringent requirements, the definitions, standards, requirements and regulations set forth in the Oregon Administrative Rules pertaining to public water supply systems and specifically OAR 333 Division 61 in effect on the date this ordinance becomes effective are hereby adopted and incorporated by reference. ***A backflow appropriate for the domestic water use inside the building and a double check backflow device for the fire line service will be installed accordingly.***

3-3-130 Control Valves.

The customer shall install a suitable valve, as close to the meter location as practical, the operation of which will control the entire water supply from the service. The operation by the customer of the curb stop in the meter box is prohibited. ***A control valve will be installed on the building side of the domestic water meter.***

EROSION CONTROL

3-5-040 Erosion Prohibited.

Visible or measurable erosion which enters, or is likely to enter, the public storm and surface water system or leaves the property on which it originates, is prohibited, and is a violation of this ordinance. The owner of the property from which erosion originates and any

person whose activity on the property causes such erosion, shall be deemed responsible for causing such erosion and shall be responsible to stop erosion, cleanup past erosion, and prevent erosion from occurring in the future. ***Erosion and Sediment Control measures will be a part of the construction documents and construction management of the site.***

3-5-050 Erosion Control Permits.

(2) No construction, land development, grading, excavation, fill, or the clearing of land is allowed until the City has issued an Erosion Control Permit covering such work, or the City has determined that no such permit is required. No public agency or body shall undertake any public works project without first obtaining from the City an Erosion Control Permit covering such work, or receiving a determination from the City that none is required. ***Proper permitting for a 12000-CN permit as required will be obtain prior to site work beginning on the site.***

3-5-060 Permit Process.

(1) Applications for an Erosion Control Permit. Application for an Erosion Control Permit shall include an Erosion Control Plan which contains methods and interim facilities to be constructed or used concurrently and to be operated during construction to control erosion. ***The required EC permit, a 1200-CN permit will be applied for meeting the specific requirements for submitting such*:**

3-5-070 Maintenance.

The property owner or holder of an erosion control permit shall maintain the facilities and techniques contained in the approved Erosion Control Plan so as to continue to be effective during the construction or other permitted activity. If the facilities and techniques approved in an Erosion Control Plan are not effective or sufficient as determined by the City site inspection, the permittee shall submit a revised plan within three days, (excluding Saturday, Sunday and holidays) of written notification either by personal delivery or regular mail, from the City. Upon approval of the revised plan by the City, the permittee shall immediately implement the additional or revised facilities and techniques of the revised plan. In cases where erosion is occurring, the City may require the applicant to install interim control measures prior to submittal of the revised Erosion Control Plan. In no event will the City be responsible for the success or failure of any approved Erosion Control Plan**.** ***Noted.***

3-5-090 Physical Erosion.

No person shall drag, drop, track or otherwise place or deposit, or allow to be placed or deposited mud, dirt, rock or other debris upon a public street or into any part of a public storm and surface water system, or into any part of a private storm and surface water system which drains or connects to the public storm and surface water system. Any such deposit of material shall be immediately removed using hand labor or mechanical means. No material shall be washed or flushed into any part of the storm and surface water system without approved erosion control measures first being installed to the satisfaction of the City***. Noted.***

3-5-110 Air Pollution - Dust, Fumes, Smoke and Odors.

(1) Dust shall be minimized to the extent practicable, utilizing all measures necessary, including, ***Noted.***

3-5-140 Control of Noise Levels.
Construction noise shall be minimized by the use of proper engine mufflers, protective sound reducing enclosures, and other sound barriers. Construction activities producing excessive noise that cannot be reduced by mechanical means shall be restricted to locations where their sound impact is reduced to a minimum at the edge of work area. ***Noted.***

3-5-150 Natural Vegetation.

(1) As far as is practicable, the natural vegetation shall be protected and left in place. Work areas shall be carefully located and marked to reduce potential damage. Trees shall not be used as anchors for stabilizing working equipment. ***Noted.***

(2) During clearing operations, trees shall not be permitted to fall outside the work area. In areas designated for selective cutting or clearing, care in falling and removing trees and brush shall be taken to avoid injuring trees and shrubs to be left in place. ***Noted.***

(3) Where natural vegetation has been removed, or the original land contours disturbed, the site shall be re-vegetated, and the vegetation established, as soon as practicable after construction has commenced, except where construction of sewers will be followed by paving. ***Noted.***

ADDITIONAL SURFACE WATER MANAGEMENT STANDARDS

3-5-200 Downstream Protection Requirement.

Each new development is responsible for mitigating the impacts of that development upon the public storm water quantity system. The development may satisfy this requirement through the use of any of the following techniques, subject to the limitations and requirements in TMC 3-5-210:

(1) Construction of permanent on-site stormwater quantity detention facilities designed in accordance with this title; ***On-site stormwate quantity detention facilities will be a part of the design of the improvements.***

3-5-210 Review of Downstream System.
For new development other than the construction of a single family house or duplex, plans shall document review by the design engineer of the downstream capacity of any existing storm drainage facilities impacted by the proposed development. That review shall extend downstream to a point where the impacts to the water surface elevation from the development will be insignificant, or to a point where the conveyance system has adequate capacity, as determined by the City Engineer.

To determine the point at which the downstream impacts are insignificant or the drainage system has adequate capacity, the design engineer shall submit an analysis using the following guidelines:

(1) evaluate the downstream drainage system for at least ¼ mile;

(2) evaluate the downstream drainage system to a point at which the runoff from the development in a build out condition is less than 10 percent of the total runoff of the basin in its current development status. Developments in the basin that have been approved may be considered in place and their conditions of approval to exist if the work has started on those projects;

(3) evaluate the downstream drainage system throughout the following range of storms: 2, 5, 10, 25 year;

(4) The City Engineer may modify items 1, 2, 3 to require additional information to determine the impacts of the development or to delete the provision of unnecessary information.

If the increase in surface waters leaving a development will cause or contribute to damage from flooding, then the identified capacity deficiency shall be corrected prior to development or the development must construct onsite detention. To determine if the runoff from the development will cause or contribute to damage from flooding the City Engineer will consider the following factors:

(1) The potential for or extent of flooding or other adverse impacts from the run-off of the development on downstream properties;

(2) The potential for or extent of possibility of inverse condemnation claims;

(3) Incremental impacts of runoff from the subject and other developments in the basin; and

(4) Other factors that may be relevant to the particular situation.

The purpose of the City Engineer's review is to protect the City and its inhabitants from the impacts or damage caused by runoff from development while recognizing all appropriate limitations on exactions from the development. ***The subdivision for which this parcel is a part of, would have run drainage calculations for downstream impacts. This site will will have storm drain facilities, detaining runoff through the 25 year event.***

3-5-220 Criteria for Requiring On-Site Detention to be Constructed.
The City shall determine whether the onsite facility shall be constructed. If the onsite facility is constructed, the development shall be eligible for a credit against Storm and Surface Water System Development Charges, as provided in City ordinance.

On-site facilities shall be constructed when any of the following conditions exist:

(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.

(3) There is a site within the boundary of the development which would qualify as a regional detention site under criteria or capital plan adopted by the Unified Sewerage Agency.

(4) The site is located in the Hedges Creek Subbasin as identified in the Tualatin Drainage Plan and surface water runoff from the site flows directly or indirectly into the Wetland Protected Area (WPA) as defined in TDC 71.020. Properties located within the Wetland Protection District as described in TDC 71.010, or within the portion of the subbasin east of SW Tualatin Road are excepted from the on-site detention facility requirement. ***An on-site storm drain detention facility will be constructed.***

3-5-230 On-Site Detention Design Criteria.

(1) Unless designed to meet the requirements of an identified downstream deficiency as defined in TMC 3-5.210, stormwater quantity onsite detention facilities shall be designed to capture run-off so the run-off rates from the site after development do not exceed predevelopment conditions, based upon a 25-year, 24-hour return storm.

(2) When designed to meet the requirements of an identified downstream deficiency as defined in TMC 3-5.210, stormwater quantity on-site detention facilities shall be designed such that the peak runoff rates will not exceed predevelopment rates for the 2 through 100 year storms, as required by the determined downstream deficiency.

(3) Construction of on-site detention shall not be allowed as an option if such a detention facility would have an adverse effect upon receiving waters in the basin or subbasin in the event of flooding, or would increase the likelihood or severity of flooding problems downstream of the site. ***As there are no known downstream deficiencies run-off rates through the 25 year event will be matched via on-site detention facilities.***

3-5-240 On-Site Detention Design Method.

(1) The procedure for determining the detention quantities is set forth in Section 4.4 Retention/Detention Facility Analysis and Design, King County, Washington, Surface Water Design Manual, January, 1990, except subchapters 4.4.5 Tanks, 4.4.6 Vaults and Figure 4.4.4G Permanent Surface Water Control Pond Sign. This reference shall be used for procedure only. The design criteria shall be as noted herein. Engineers desiring to utilize a procedure other than that set forth herein shall obtain City approval prior to submitting calculations utilizing the proposed procedure.

(2) For single family and duplex residential subdivisions, stormwater quantity detention facilities shall be sized for the impervious areas to be created by the subdivision, including all residences on individual lots at a rate of 2640 square feet of impervious surface area per dwelling unit, plus all roads which are assessed a surface water management monthly fee under Unified Sewerage Agency rules. Such facilities shall be constructed as a part of the subdivision public improvements. Construction of a single family or duplex residence on an existing lot of record is not required to construct stormwater quantity detention facilities.

(3) All developments other than single family and duplex, whether residential, multi-family, commercial, industrial, or other uses, the sizing of stormwater quantity detention facilities shall be based on the impervious area to be created by the development, including structures and all roads and impervious areas which are assessed a surface water management monthly fee under Unified Sewerage Agency rules. Impervious surfaces shall be determined based upon building permits, construction plans, site visits or other appropriate methods deemed reliable by City. ***Acceptable methodology for design will be followed.***

PERMANENT ON-SITE WATER QUALITY FACILITIES

3-5-340 Facilities Required.

For new development, subject to the exemptions of TMC 3-5-310, no permit for construction, or land development, or plat or site plan shall be approved unless the conditions of the plat, plan or permit approval require permanent stormwater quality control facilities in accordance with this Title III. ***Stormwater quality control facilities will be a part of the site improvements.***

3-5-350 Phosphorous Removal Standard.

The stormwater quality control facilities shall be designed to remove 65 percent of the phosphorous from the runoff from 100 percent of the newly constructed impervious surfaces. Impervious surfaces shall include pavement, buildings, public and private roadways, and all other surfaces with similar runoff characteristics. ***This standard will be met.***

3-5-360 Design Storm.

The stormwater quality control facilities shall be designed to meet the removal efficiency of TMC 3-5-350 for a mean summertime storm event totaling 0.36 inches of precipitation falling in four hours with an average return period of 96 hours. ***This storm event will be used for the water quality design.***

STANDARD SPECIFICATIONS FOR BUILDING AND SIDE SEWERS

3-5-450 Building Sewers.

Design will be in accordance with the requirements stated under this section.

Chapter 75

Section 75.030 Freeways and Arterials Defined.

This section shall apply to all City, County and State public streets, roads and highways within the City and to all properties that abut these streets, roads and highways.

(1) Access shall be in conformance with TDC Chapter 73 unless otherwise noted below. ***Noted.***

(2) Freeways and Arterials Designated.
For the purposes of this chapter the following are freeways and arterials:

(n) Leveton Drive from 108th Avenue to 124th Avenue; ***This site lies on Leveton Drive west of SW 124th and thus its frontage is <u>not</u> an arterial street.***

(3) Applicability

(a) This chapter applies to all developments, permit approvals, land use approvals, partitions, subdivisions, or any other actions taken by the City Council or any administrative officer of the City pertaining to property abutting any road or street listed in TDC 75.030. In addition, any parcel not abutted by a road or street listed in TDC 75.030, but having access to an arterial by any easement or prescriptive right, shall be treated as if it did abut the arterial and this chapter applies. This chapter shall take precedence over any other TDC chapter and over any other ordinance of the City when considering any development, land use approval or other proposal for property abutting an arterial or any property having an access right to an arterial. ***This is not applicable.***

Section 75.060 Existing Driveways and Street Intersections.

(1) Existing driveways with access onto arterials on the date this chapter was originally adopted shall be allowed to remain. If additional development occurs on properties with existing driveways with access onto arterials then this chapter applies and the entire site shall be made to conform with the requirements of this chapter. ***This is not applicable to this site.***

(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. ***Such is noted.***

Section 75.070 New Intersections.

Except as shown in <u>TDC Chapter 11</u>, Transportation, (<u>Figures 11-1</u> and <u>11-3</u>), all new intersections with arterials shall have a minimum spacing of ½ mile between intersections. ***This is not applicable to this site.***

Section 75.080 Alternate Access.

Except as provided in 75.090 all properties which abut two roadways shall have access on the lowest classification road-way, preferable on a local street. ***This is not applicable to this site.***

Section 75.090 Interim Access.
When a property abuts a freeway or arterial and a future street shown in TDC Chapter 11, Transportation, (Figures 11-1 and 11-3), or abuts or bisects the property, the City Engineer may approve an interim access on the arterial subject to the following conditions: ***This is not applicable to this site.***

Section 75.100 Exceptions.
If the City Engineer finds that it is physically impossible for a property to receive access from any other street or road than an arterial as defined in TDC 75.030 and that the property cannot physically be served by any new street as shown in TDC Chapter 11, Transportation, (Figures 11-1 and 11-3), or any logical extension of or addition thereto, the City Engineer may grant a permanent access directly to an arterial. In doing so the City Engineer may impose conditions on the construction of said access including, but not limited to: ***This is not applicable to this site.***

Section 75.120 Existing Streets.

The following list describes in detail the freeways and arterials as defined in TDC 75.030 with respect to access. Recommendations are made for future changes in accesses and location of future accesses. These recommendations are examples of possible solutions and shall not be construed as limiting the City' s authority to change or impose different conditions if additional studies result in different recommendations from those listed below.

(15) LEVETON DRIVE

(a) 108th Avenue to 118th Avenue:
On the north side of Leveton Drive, JAE (2S122B 200) shall align a driveway across from 118th Avenue and be permitted a second driveway approximately 50 feet from their east property line. Novellus (2S122AA 500 and 2S122AB 100) shall be permitted three driveways located approximately 25 feet and 950 feet from the west property line for Tax Lot 100 and 600 feet west of 108th Avenue for Tax Lot 500.

On the south side, Phight Inc. (2S122 300) shall be allowed a driveway aligned with the west Novellus (2S122AB 100) driveway and a driveway adjacent to their east property line. Fujimi (2S122 400) shall be allowed a driveway adjacent to their west property line and east property line. Tofle (2S122AD 400) shall be allowed a driveway aligning across from the Novellus (2S122AA 500) driveway and a second driveway approximately 260 feet west of 108th Avenue.

(b) 118th Avenue to 124th Avenue:
The existing driveways will be allowed to remain. No new driveways will be permitted.

The site lies outside these portions of Leveton Drive and thus this code section is not applicable.

Section 75.130 Joint Accesses Required.

When the City Engineer determines that joint accesses are required by properties undergoing development or redevelopment, an overall access plan shall be prescribed by the City Engineer and all properties shall adhere to this. Interim accesses may be allowed in accordance with TDC 75.090 of this chapter to provide for the eventual implementation of the overall access plan. ***A joint access is not proposed nor is such anticipated to be required.***

Section 75.140 Collector Streets.

(a) Major Collectors. Direct access from newly constructed single family homes, duplexes or triplexes shall not be permitted. As major collectors in residential areas are fully improved, or adjacent land redevelops, direct access should be relocated to the nearest local street where feasible. ***This is not applicable as the proposed development is industrial, residential.***

(b) Minor Collectors. Residential, commercial and industrial driveways where the frontage is greater or equal to 70 feet are permitted. Minimum spacing at 100 feet. Uses with less than 50 feet of frontage shall use a common (joint) access where available. ***The portion of Leveton Drive along the site's frontage is classified as a "Connector" street and thus this is code section is not applicable.***

(c) If access is not able to be relocated to the nearest local street, the City Engineer may allow interim access in accordance with 75.090 of this chapter to provide for the eventual implementation of the overall access plan. ***This is not applicable.***

CHAPTER 74

Section 74.140 Construction Timing.

(1) All the public improvements required under this chapter shall be completed and accepted by the City prior to the issuance of a Certificate of Occupancy; or, for subdivision and partition applications, in accordance with the requirements of the Subdivision regulations. ***Such is noted.***

(2) All private improvements required under this chapter shall be approved by the City prior to the issuance of a Certificate of Occupancy; or for subdivision and partition applications, in accordance with the requirements of the Subdivision regulations. ***Such is noted.***

RIGHT-OF-WAY

Section 74.210 Minimum Street Right-of-Way Widths.

The width of streets in feet shall not be less than the width required to accommodate a street improvement needed to mitigate the impact of a proposed development. In cases where a street is required to be improved according to the standards of the TDC, the width of the right-of-way shall not be less than the minimums indicated in TDC Chapter 74, Public Improvement Requirements, Figures 74-2A through 74-2G. ***The street from curb to curb was fully developed at the time of the Leveton Commons No. 2 in 2005. Full right-of-way width was also dedicated at that time as well.***

(1) For subdivision and partition applications, wherever existing or future streets adjacent to property proposed for development are of inadequate right-of-way width the additional right-of-way necessary to comply with TDC Chapter 74, Public Improvement Requirements, Figures 74-2A through 74-2G shall be shown on the final subdivision or partition plat prior to approval of the plat by the City. This right-of-way dedication shall be for the full width of the property abutting the roadway and, if required by the City Engineer, additional dedications shall be provided for slope and utility easements if deemed necessary. ***A subdivision or partition is not proposed.***

(2) For development applications other than subdivisions and partitions, wherever existing or future streets adjacent to property proposed for development are of inadequate right-of-way width, the additional right-of-way necessary to comply with TDC Chapter 74, Public Improvement Requirements, Figures 74-2A through 74-2G of the Tualatin Community Plan shall be dedicated to the City for use by the public prior to issuance of any building permit for the proposed development. This right-of-way dedication shall be for the full width of the property abutting the roadway and, if required by the City Engineer, additional dedications shall be provided for slope and utility easements if deemed necessary. ***No dedications for right-of-way or additional easements are expected.***

(3) For development applications that will impact existing streets not adjacent to the applicant's property, and to construct necessary street improvements to mitigate those impacts would require additional right-of-way, the applicant shall be responsible for obtaining the necessary right-of-way from the property owner. A right-of-way dedication deed form shall be obtained from the City Engineer and upon completion returned to the City Engineer for acceptance by the City. On subdivision and partition plats the right-of-way dedication shall be accepted by the City prior to acceptance of the final plat by the City. On other development applications the right-of-way dedication shall be accepted by the City prior to issuance of building permits. The City may elect to exercise eminent domain and condemn necessary off-site right-of-way at the applicant's request and expense. The City Council shall determine when condemnation proceedings are to be used. ***There is not expected to be any additional impacts to not adjacent to the site that would require any upgrades and thus this code section is not applicable.***

(4) If the City Engineer deems that it is impractical to acquire the additional right-of-way as required in subsections (1)-(3) of this section from both sides of the center-line in equal amounts, the City Engineer may require that the right-of-way be dedicated in a manner that would result in unequal dedication from each side of the road. This requirement will also apply to slope and utility easements as discussed in TDC 74.320 and 74.330. The City Engineer's recommendation shall be presented to the City Council in the preliminary plat approval for subdivisions and partitions, and in the recommended decision on all other development applications, prior to finalization of the right-of-way dedication requirements. ***No additional dedication is expected to be required.***

(5) Whenever a proposed development is bisected by an existing or future road or street that is of inadequate right-of-way width according to TDC Chapter 74, Public Improvement Requirements, Figures 74-2A through 74-2G, additional right-of-way shall be dedicated from both sides or from one side only as determined by the City Engineer to bring the road right-of-way in compliance with this section. ***This is not applicable.***

(6) When a proposed development is adjacent to or bisected by a street proposed in TDC Chapter 11, Transportation Plan (Figure 11-3) and no street right-of-way exists at the time the development is proposed, the entire right-of-way as shown in TDC Chapter 74, Public Improvement Requirements,Figures 74-2A through 74-2G shall be dedicated by the applicant. The dedication of right-of-way required in this subsection shall be along the route of the road as determined by the City. ***This is not applicable.***

TRANSPORTATION

Section 74.410 Future Street Extensions.

(1) Streets shall be extended to the proposed development site boundary where necessary to: ***No street extensions are needed.***

(a) give access to, or permit future development of adjoining land;

(b) provide additional access for emergency vehicles;

(c) provide for additional direct and convenient pedestrian, bicycle and vehicle circulation;

(d) eliminate the use of cul-de-sacs except where topography, barriers such as railroads or freeways, existing development, or environmental constraints such as major streams and rivers prevent street extension.

(e) eliminate circuitous routes. The resulting dead end streets may be approved without a turnaround. A reserve strip may be required to preserve the objectives of future street extensions.

(2) Proposed streets shall comply with the general location, orientation and spacing identified in the Functional Classification Plan (Figure 11-1), Local Streets Plan (TDC 11.630 and Figure 11-3) and the Street Design Standards (Figures 74-2A through 74-2G). ***No new streets are proposed.***

(a) Streets and major driveways, as defined in TDC 31.060, proposed as part of new residential or mixed residential/commercial developments shall comply with the following standards: ***This section is not applicable.***

(b) Streets proposed as part of new industrial or commercial development shall comply with TDC 11.630, Figure 11-1, and Figures 74-2A through 74-2G. ***No new streets are proposed.***

(3) During the development application process, the location, width, and grade of streets shall be considered in relation to existing and planned streets, to topographical conditions, to public convenience and safety, and to the proposed use of the land to be served by the streets. The arrangement of streets in a subdivision shall either: ***A subdivision is not proposed and thus this code section is not applicable.***

(4) The City Engineer may require the applicant to submit a street plan showing all existing, proposed, and future streets in the area of the proposed development. ***The applicant has not been asked to provide such.***

(5) The City Engineer may require the applicant to participate in the funding of future off-site street extensions when the traffic impacts of the applicant's development warrant such a condition. ***No such request is expected.***

Section 74.420 Street Improvements.
When an applicant proposes to develop land adjacent to an existing or proposed street, including land which has been excluded under TDC 74.220, the applicant should be responsible for the improvements to the adjacent existing or proposed street that will bring the improvement of the street into conformance with the Transportation Plan (TDC Chapter 11), TDC 74.425 (Street Design Standards), and the City' s Public Works Construction Code, subject to the following provisions:

(1) For any development proposed within the City, roadway facilities within the right-of-way described in TDC 74.210 shall be improved to standards as set out in the Public Works Construction Code. ***Public sidewalk and driveway improvements will be a part of the development improvements.***

(2) The required improvements may include the rebuilding or the reconstruction of any existing facilities located within the right-of-way adjacent to the proposed development to bring the facilities into compliance with the Public Works Construction Code. ***This is noted.***

(3) The required improvements may include the construction or rebuilding of off-site improvements which are identified to mitigate the impact of the development. ***No off-site improvements are expected to be required to due impacts of the proposed development.***

(4) Where development abuts an existing street, the improvement required shall apply only to that portion of the street right-of-way located between the property line of the parcel proposed for development and the centerline of the right-of-way, plus any additional pavement beyond the centerline deemed necessary by the City Engineer to ensure a smooth transition between a new improvement and the existing roadway (half-street improvement). Additional right-of-way and street improvements and off-site right-of-way and street improvements may be required by the City to mitigate the impact of the development. The new pavement shall connect to the existing pavement at the ends of the section being improved by tapering in accordance with the Public Works Construction Code. ***It is noted.***

(5) If additional improvements are required as part of the Access Management Plan of the City, TDC Chapter 75, the improvements shall be required in the same manner as the half-street improvement requirements. ***We are not aware of any additional improvements would be required.***

(6) All required street improvements shall include curbs, sidewalks with appropriate buffering, storm drainage, street lights, street signs, street trees, and, where designated, bikeways and transit facilities. ***Improvements as will be required will be improved, with development of sidewalk and driveway improvements***

(7) For subdivision and partition applications, the street improvements required by TDC Chapter 74 shall be completed and accepted by the City prior to signing the final subdivision or partition plat, or prior to releasing the security pro-vided by the applicant to assure completion of such improvements or as otherwise specified in the development application approval. ***A subdivision or partition is not a part of this request.***

(8) For development applications other than subdivisions and partitions, all street improvements required by this section shall be completed and accepted by the City prior to the issuance of a Certificate of Occupancy. ***It is understood.***

(9) In addition to land adjacent to an existing or proposed street, the requirements of this section shall apply to land separated from such a street only by a railroad right-of-way. ***This is not applicable to this site.***

(10) Streets within, or partially within, a proposed development site shall be graded for the entire right-of-way width and constructed and surfaced in accordance with the Public Works Construction Code. ***This is not applicable to this site.***

(11) Existing streets which abut the pro-posed development site shall be graded, constructed, reconstructed, surfaced or repaired as necessary in accordance with the Public Works Construction Code and TDC Chapter 11, Transportation Plan, and TDC 74.425 (Street Design Standards). ***This is noted.***

(12) Sidewalks with appropriate buffering shall be constructed along both sides of each internal street and at a minimum along the development side of each external street in accordance with the Public Works Construction Code. ***A sidewalk will be constructed along the external street.***

(13) The applicant shall comply with the requirements of the Oregon Department of Transportation (ODOT), Tri-Met, Washington County and Clackamas County when a proposed development site is adjacent to a roadway under any of their jurisdictions, in addition to the requirements of this chapter. ***This is not applicable to this site.***

(14) The applicant shall construct any required street improvements adjacent to parcels excluded from development, as set forth in TDC 74.220 of this chapter. ***This is not applicable to this site.***

(15) Except as provided in TDC 74.430, whenever an applicant proposes to develop land with frontage on certain arterial streets and, due to the access management provisions of TDC Chapter 75, is not allowed direct access onto the arterial, but instead must take access from another existing or future public street thereby providing an alternate to direct arterial access, the applicant shall be required to construct and place at a minimum street signage, a sidewalk, street trees and street lights along that portion of the arterial street adjacent to the applicant's property. The three certain arterial streets are S.W. Tualatin-Sherwood Road, S.W. Pacific Highway (99W) and S.W. 124th Avenue. In addition, the applicant may be required to construct and place on the arterial at the intersection of the arterial and an existing or future public non-arterial street warranted traffic control devices (in accordance with the Manual on Uniform Traffic Control Devices, latest edition), pavement markings, street tapers and turning lanes, in accordance with the Public Works Construction Code. ***Leveton Drive is not an arterial and thus this is not applicable.***

(16) The City Engineer may determine that, although concurrent construction and placement of the improvements in (14) and (15) of this section, either individually or collectively, are impractical at the time of development, the improvements will be necessary at some future date. In such a case, the applicant shall sign a written agreement guaranteeing future performance by the applicant and any successors in interest of the property being developed. The agreement shall be subject to the City's approval. ***Neither sections 14 or 15 are applicable to this site and thus the section is not applicable either.***

(17) Intersections should be improved to operate at a level of service of at least D and E for signalized and unsignalized intersections, respectively. ***All intersections will operate at adequate levels of service after development of the subject site as proposed.***

(18) Pursuant to requirements for off-site improvements as conditions of development approval in TDC 73.055(2)(e) and TDC 36.160(8), proposed multi-family residential, commercial, or institutional uses that are adjacent to a major transit stop will be required to comply with the City’s Mid-Block Crossing Policy. ***This is not applicable to this site, as the improvement are tied to an industrial use and there are not transit stops along Leveton Drive.***

Section 74.425 Street Design Standards.

(1) Street design standards are based on the functional and operational characteristics of streets such as travel volume, capacity, operating speed, and safety. They are necessary to ensure that the system of streets, as it develops, will be capable of safely and efficiently serving the traveling public while also accommodating the orderly development of adjacent lands. ***It is noted.***

(2) The proposed street design standards are shown in Figures 72A through 72G. The typical roadway cross sections comprise the following elements: right-of-way, number of travel lanes, bicycle and pedestrian facilities, and other amenities such as landscape strips. These figures are intended for planning purposes for new road construction, as well as for those locations where it is physically and economically feasible to improve existing streets. ***What exists matches the standard for a Connector street per Tualatin's standard, except the sidewalk along the frontage has not been developed. The sidewalk will be constructed with the development.***

(3) In accordance with the Tualatin Basin Program for fish and wildlife habitat it is the intent of Figures 74-2A through 74-2G to allow for modifications to the standards when deemed appropriate by the City Engineer to address fish and wildlife habitat. ***This is not applicable to this site.***

(4) All streets shall be designed and constructed according to the preferred standard. The City Engineer may reduce the requirements of the preferred standard based on specific site conditions, but in no event will the requirement be less than the minimum standard. The City Engineer shall take into consideration the following factors when deciding whether the site conditions warrant a reduction of the preferred standard:

(c) Local Streets:

(i) Local streets proposed within areas which have environmental constraints and/or sensitive areas and will not have direct residential access may utilize the minimum design standard. When the minimum design standard is allowed, the City Engineer may determine that no parking signs are required on one or both sides of the street. ***The local street was developed in accordance with the requirements at the time the industrial subdivision "Leveton Commons No. 2" was constructed. A sidewalk along the site's frontage will be constructed in conjunction with the site's development to complete the street frontage improvements.***

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

(1) When, in the opinion of the City Engineer, the construction of street improvements in accordance with TDC 74.420 would result in the creation of a hazard, or would be

impractical, or would be detrimental to the City, the City Engineer may modify the scope of the required improvement to eliminate such hazardous, impractical, or detrimental results. Examples of conditions requiring modifications to improvement requirements include but are not limited to horizontal alignment, vertical alignment, significant stands of trees, fish and wildlife habitat areas, the amount of traffic generated by the proposed development, timing of the development or other conditions creating hazards for pedestrian, bicycle or motor vehicle traffic. The City Engineer may determine that, although an improvement may be impractical at the time of development, it will be necessary at some future date. In such cases, a written agreement guaranteeing future performance by the applicant in installing the required improvements must be signed by the applicant and approved by the City. ***No modification is requested.***

(2) When the City Engineer determines that modification of the street improvement requirements in TDC 74.420 is warranted pursuant to subsection (1) of this section, the City Engineer shall prepare written findings of modification. The City Engineer shall forward a copy of said findings and description of modification to the applicant, or his authorized agent, as part of the Utility Facilities Review for the proposed development, as provided by TDC 31.072. The decision of the City Engineer may be appealed to the City Council in accordance with TDC 31.076 and 31.077. ***It is noted.***

(3) To accommodate bicyclists on streets prior to those streets being upgraded to the full standards, an interim standard may be implemented by the City. These interim standards include reduction in motor vehicle lane width to 10 feet [the minimum specified in AASHTO's A Policy on Geo-metric Design of Highways and Streets (1990)], a reduction of bike lane width to 4-feet (as measured from the longitudinal gutter joint to the centerline of the bike lane stripe), and a paint-striped separation 2 to 4 feet wide in lieu of a center turn lane. Where available roadway width does not provide for these minimums, the roadway can be signed for shared use by bicycle and motor vehicle travel. When width constraints occur at an intersection, bike lanes should terminate 50 feet from the intersection with appropriate signing. ***Street upgrades are not expected to be required.***

Section 74.440 Streets, Traffic Study Required.

(1) The City Engineer may require a traffic study to be provided by the applicant and furnished to the City as part of the development approval process as provided by this Code, when the City Engineer determines that such a study is necessary in connection with a proposed development project in order to: ***A traffic analysis was requested by the City Engineering staff and submitted with the application.***

(4) The applicant shall implement all or a portion of the improvements called for in the traffic study as determined by the City Engineer. ***No improvements were called for in the traffic analysis.***

Section 74.450 Bikeways and Pedestrian Paths.

(1) Where proposed development abuts or contains an existing or proposed bikeway, pedestrian path, or multi-use path, as set forth in TDC Chapter 11, Transportation Figure 11-4, the City may require that a bikeway, pedestrian path, or multi-use path be constructed, and an easement or dedication provided to the City. ***This is not applicable to this site.***

Section 74.485 Street Trees.

(1) Prior to approval of a residential subdivision or partition final plat, the applicant shall pay the City a non-refundable 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. ***This is not applicable to this site as it is not a partition or subdivision.***

(2) In nonresidential subdivisions and partitions street trees shall be planted by the owners of the individual lots as development occurs. ***There are no existing street trees along this site's frontage.***

(3) The Street Tree Ordinance specifies the species of tree which is to be planted and the spacing between trees. ***It is noted.***

UTILITIES

Section 74.610 Water Service.

(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. ***Water service was stubbed into the property, during the subdivision development, for use by the proposed development.***

(2) If there are undeveloped properties adjacent to the subject site, public water lines shall be extended by the applicant to the common boundary line of these properties. The lines shall be sized to provide service to future development, in accordance with the City's Water System Master Plan,TDC Chapter 12. ***This is not applicable to the site.***

(3) As set forth is 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. If the development site is located on a boundary line between two service levels the applicant shall be required to connect to the service level with the higher reservoir elevation. The applicant may also be required to install or provide pressure reducing valves to supply appropriate water pressure to the properties in the proposed development site. ***This is not applicable to this site.***

Section 74.620 Sanitary Sewer Service.

(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. ***A sanitary sewer service lateral has been stubbed into the property as a part of the subdivision development.***

Section 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. ***A storm drain line has been stubbed to the southeast corner of the site to serve as a storm drain lateral for the site. Storm drainage construction plans and calculations will be submitted to the City Engineer for review and approval as a part of the construction permitting.***

(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. ***On-site stormwater detention will be provided, as development of the industrial subdivision that is parcel was created from, should have studied downstream facilities and upsized such if such was required.***

(3) If there are undeveloped properties adjacent to the proposed development site which can be served by the storm drainage system on the proposed development site, the applicant shall extend storm drainage lines to the common boundary line with these properties. The lines shall be sized to convey expected flows to include all future development from all up stream areas that will drain through the lines on the site, in accordance with the Tualatin Drainage Plan in TDC Chapter 14. ***This is not applicable to this site.***

Section 74.640 Grading.

(1) Development sites shall be graded to minimize the impact of storm water runoff onto adjacent properties and to allow adjacent properties to drain as they did before the new development. ***All improvement areas within the site will be graded so as***

the runoff is collected by the on-site drainage facilities. Only some landscape areas along boundary of the site may drain off-site, but overall the total overland flow across the parcel's boundaries will be greatly reduced.

(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 material from the development site. ***All drainage will be via gravity drainage, no building crawl spaces will be created.***

Section 74.650 Water Quality, Storm Water Detention and Erosion Control.
The applicant shall comply with the water quality, storm water detention and erosion control requirements in the Surface Water Management Ordinance. If required:

(1) On subdivision and partition development applications, prior to approval of the final plat, the applicant shall arrange to construct a permanent on-site water quality facility and storm water detention facility and submit a design and calculations indicating that the requirements of the Surface Water Management Ordinance will be satisfied and obtain a Stormwater Connection Permit from Clean Water Services; or ***This is not a subdivision or a partition, so this section is not applicable.***

(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 storm water 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. ***Storm drainage design and calculations will be submitted.***

(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. ***This is noted.***

Section 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**.** ***Utility lines will be placed underground within the site. There will be some surface mounted connection boxes, transformers and meter boxes.***

(2) Any existing overhead utilities may not be upgraded to serve any proposed development. If existing overhead utilities are not adequate to serve the proposed development, the applicant shall, at their own expense, provide an underground system. The applicant shall be responsible for obtaining any off-site deeds and/or easements necessary to provide utility service to this site; the deeds and/or easements shall be submitted to the City Engineer for acceptance by the City prior to issuance of the Public Works Permit. ***No overhead utility lines currently exists within the boundaries of the site and none will be required.***

Section 74.765 Street Tree Species and Planting Locations.
All trees, plants or shrubs planted in the right-of-way of the City shall conform in species and location and in accordance with the street tree plan in Schedule A. If the Operations Director determines that none of the species in Schedule A is appropriate or finds appropriate a species not listed, the Director may substitute an unlisted species. ***This is noted.***