LAND USE REVIEW EXHIBITS

NORTH VALLEY COMPLEX RENOVATION
26755 SW 95TH Ave.
Wilsonville, OR 97070

DATE: 03/22/2021
REV 1: 07/23/2021

SUBMITTED TO:
City of Wilsonville
29799 SW Town Center
Loop E
Wilsonville, OR 97070

APPLICANT:
SERA Architects
338 NW 5th Ave.
Portland, OR 97209

PROPERTY OWNER:
Oregon Department of Administrative Services
1225 Ferry St. SE
Salem, OR 97301

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LIST OF EXHIBITS

CITY LAND USE REVIEW APPLICATION
City Land Use Application
Plan Set Submittal Checklist
Reports and Other Documents Checklist

OWNER DOCUMENTATION
Deed Warranty
Plat Map – Easements, Dedications

PRE-APPLICATION MEETING
Application and Meeting Notes

AGENCY DOCUMENTATION
Traffic Report
Soils and Drainage Report (includes Geotechnical Report)
Fire Flow Test
Arborist Report
IPP Environmental Survey
Laboratories Summary
TVF&R Compliance Letter
Republic Services Compliance Letter

ARCHITECTURAL AND ENGINEERING DRAWING SET

C01 - COVER
C02 - TABLE OF CONTENTS
C03 - SITE CONTEXT
C04 - EXISTING CONDITIONS SURVEY NOTES
C05 - EXISTING CONDITIONS SURVEY - WEST
C06 - EXISTING CONDITIONS SURVEY - EAST
C07 - CIVIL COVER SHEET / KEY PLAN
C08 - SOUTHWEST CIVIL SITE PLAN
C09 - NORTHWEST CIVIL SITE PLAN
C10 - NORTHEAST CIVIL SITE PLAN
C11 - SOUTHEAST CIVIL SITE PLAN
C12 - CIVIL DETAIL / SECTIONS
C13 - WEST EROSION CONTROL PLAN
C14 - EAST EROSION CONTROL PLAN
C15 - EROSION CONTROL DETAILS
C16 - LANDSCAPE LEGEND
C17 - LANDSCAPE DETAILS
C18 - LANDSCAPE PLAN - WEST
C19 - LANDSCAPE PLAN - EAST
C20 - SITE MATERIALS BOARD
C21 - SITE DEVELOPMENT PLAN
C22 - FLOOR PLAN - LEVEL 01
C23 - FLOOR PLAN - MEZZANINE
C24 - FLOOR PLAN - ROOF
C25 - EXISTING BUILDING ELEVATIONS
C26 - EXISTING BUILDING ELEVATIONS
C27 - EXISTING BUILDING ELEVATIONS
C28 - PROPOSED BUILDING ELEVATIONS
C29 - PROPOSED BUILDING ELEVATIONS
C30 - PROPOSED BUILDING ELEVATIONS
C31 - ROOF SIGHTLINE BUILDING SECTIONS
C32 - ROOF SIGHTLINE BUILDING SECTIONS
C33 - DETAILS - ENTRY CANOPY AND AWNINGS
C34 - DETAILS - ENTRY CANOPY AND AWNINGS
C35 - BUILDING PERSPECTIVE
C36 - BUILDING MATERIALS BOARD
C37 - SIGN PLAN
C38 - SIGN DETAILS
C39 - SIGN ELEVATIONS
C40 - LUMINAIRE SCHEDULE
C41 - LIGHTING PLAN
C42 - LIGHTING PHOTOMETRIC PLAN
C43 - LIGHTING ELEVATIONS
C44 - MEP EQUIPMENT - DEMO PLAN
C45 - MEP EQUIPMENT - PLAN
C46 - EQUIPMENT SCHEDULES

Appendix:
Lighting Cutsheets
Lighting Energy Code Compliance
MEP Cutsheets

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PLAN SET SUBMITTAL CHECKLIST

General, Including Site Plan		WC	Sheet Reference
	1. On-site and immediately adjacent features:		
	a. Streets	4.035(.04)	C21
	b. Private drives	4.035(.04)	N/A
	c. Sidewalks and pathways	4.035(.04)	C21
	d. Off-street parking, including location and dimensions of each space	4.035(.04)	C21
	e. Direction of traffic flow into and out of off-street parking and loading areas	4.035(.04)	C21
	f. Turning and maneuvering areas	4.035(.04)	C21
	g. Garbage and recycling storage areas	4.035(.04) 4.179 (.01)	C21
	h. Utility services, including sanitary sewer, water, and storm drainage	4.035(.04)	C08-C11
	i. Location and dimension of all structures, primary and accessory	4.035(.04)	C21
	j. Utilization of structures	4.035(.04)	C22
	k. Number of residential units and average residential density per acre(as applicable)	4.035(.04)	N/A
	l. Tabulation of land area, in square feet, devoted to various uses such as building area (gross and net rentable), parking and paving coverage, landscaped area coverage.	4.035(.04)	Narrative response to 4.176.03
	m. Major existing landscape features including trees to be saved	4.035(.04)	C18-C19
	2. Off-site features		
	a. Distance of subject property to any structures on adjacent properties	4.035(.04)	C21
	b. Location and uses of streets, private drives, and driveways on adjacent properties.	4.035(.04)	C21
	3. Grading Plan	4.035(.04)	
	a. Existing and proposed contours and other topographic information sufficient to determine direction and percentage of slopes and drainage patterns. Additional topographic information needed for environmentally sensitive areas (See WC 4.035 (.04) A. 6. f.)	4.035(.04)	C08-C11
Stage II Final Plan			
	1. Preliminary building elevations (not needed if building elevations are being submitted and reviewed concurrently for Site Design Review)	4.140(.09)	C28-C30
	2. Preliminary landscaping plans (not needed if detailed landscape plans are being submitted and reviewed concurrently for Site Design Review)	4.140(.09)	C18-C19
	3. General type and location of signs (not needed if sign plan/permit is being submitted and reviewed concurrently)	4.140(.09)	C37
Site Design Review			
	1. Location and design of fences, walls	4.440(.01)	C21
	2. Landscape Plan		
	a. Location and design of landscape areas	4.440(.01)	C18-C19
	b. Number and placement of trees and plant materials		C18-C19
	c. The variety of trees and plant materials listed by scientific and common name	4.440 (.01) 4.176 (.09)	C16
	d. The size of trees and plant materials	4.440(.01)	C16
	e. Information, including condition, size and variety, of trees or other plant material being retained on the site	4.440(.01) 4.176 (.09)	Arborist Report
	f. Indication of water consumption categories (high, moderate, low, and interim or unique) See WC 4.176 (.09) A.-D.	4.440(.01) 4.176 (.09)	C16

	3. Tree survey showing all trees 4" or greater in caliper. Large area of trees being undisturbed only need the perimeter of the area shown.	4.440(.01)	Arborist Report
	4. Architectural drawings and sketches of all building and structures		
	a. Floor plans	4.440(.01)	C22-C24
	b. All elevations of proposed structures and other improvements	4.440(.01)	C28-C30
	c. Details of outdoor site furnishings (benches, outdoor tables, garbage cans, lighting, etc.)	4.440(.01)	C20
	5. Sign Plan, drawn to scale, showing the location, size, design, material, color and methods of illumination of all exterior signs	4.440(.01)	C37-C40
	6. Outdoor Lighting (as applicable):		
	a. All conformance methods:		
	i. Site lighting plan		C41
	ii. Intended lighting by type and location		C41
	iii. Aiming angles for adjustable luminaires		C41
Sign Plan			
	1. Sign drawings or descriptions of all materials, sign area and dimensions used to calculate areas, lighting methods, and other details sufficient to judge the full scale of the signs and related improvements;	4.156.02(.05)	C37-C39
	2. Documentation of the lengths of building or tenant space facades used in calculating maximum allowed sign area;	4.156.02(.05)	C37-C39
	3. Drawings of all building facades on which signs are proposed indicating the areas of the facades on which signs will be allowed;	4.156.02(.05)	C37-C39
Tree Plan			
	1. Topographical information (same as provided on other sheets)	4.610.40(.02)	C08-C11
	2. Shape and dimensions of the property	4.610.40(.02)	C07
	3. Location of existing and proposed structures or improvements	4.610.40(.02)	C07
	4. Location of each tree 6" or greater d.b.h. likely to be impacted	4.610.40(.02)	C07
	5. Spread and canopy of each tree (may be by numerical reference to list in arborist report)	4.610.40(.02)	Arborist Report (AR)
	6. Common and botanical name of each tree	4.610.40(.02)	AR
	7. Description of health and condition of each tree	4.610.40(.02)	AR
	8. Approximate location and name of any other trees on property	4.610.40(.02)	AR
	9. Where a stand of 20 or more contiguous trees exist on a site and the applicant does not propose to remove any of those trees, the required tree survey may be simplified to accurately show only the perimeter area of that stand of trees, including its drip line.	4.610.40(.02)	N/A
	10. Show all Oregon white oak, native yews, and any species listed by either the state or federal government as rare or endangered.	4.610.40(.02)	AR
	11. Location and dimension of existing and proposed easements	4.610.40(.02)	C21
	12. Setbacks required by existing zoning requirements	4.610.40(.02)	C21
	13. Grade changes proposed that may impact trees	4.610.40(.02)	N/A
	14. Tree Protection Plan	4.610.40(.02)	AR

REPORTS AND OTHER DOCUMENTS CHECKLIST

General			Reference
	Proof the property affected is in the exclusive ownership of the application or the applicant has the consent of all individuals or partners in ownership of affected property	4.035 (.04)	Exhibits
	Legal description of affected property (map and taxlot, address if available)	4.035 (.04)	Narrative
	Correspondence showing coordination with franchise garbage hauler of adequate trash and recycling storage area for planned containers and access for collection.	4.179 (.07)	Narrative
Stage II Final Plan			
	Traffic Report	4.140(.09)	Exhibits
	Soils and Drainage Report		Exhibits
	Draft copies of legal documents including easements, dedications, CC&R's.	4.140(.09)	Exhibits
Site Design Review			
	Color board displaying specifications as to type, color, and texture of exterior surfaces of proposed structures.		C36
	Outdoor Lighting (as applicable)	4.199.50 (.01)	C40-C43
	All conformance methods	4.199.50 (.01)	Narrative, Appendix
	For each luminaire type all of the following:	4.199.50 (.01)	
	Drawings, cut sheets or other documents containing:	4.199.50 (.01)	Appendix
	Luminaire description	4.199.50 (.01)	C40
	Mounting method	4.199.50 (.01)	C40
	Mounting height	4.199.50 (.01)	C40
	Lamp type and manufacturer	4.199.50 (.01)	C40
	Lamp watts	4.199.50 (.01)	C40
	Ballast	4.199.50 (.01)	C40
	Optical system/distribution	4.199.50 (.01)	C40
	Accessories such as shields	4.199.50 (.01)	C40
	Calculations demonstrating compliance with Oregon Energy Efficiency Specialty Code, Exterior Lighting	4.199.50 (.01)	Appendix
Tree Plan			
	Arborist Report		Exhibits

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Clackamas County Official Records
Sherry Hall, County Clerk

2019-075581

11/27/2019 08:45:18 AM

D-D Cnt=1 Stn=53 CINDY
$30.00 $16.00 $10.00 $62.00

$118.00

File No.: 19-308875

WFG Title 19-308875 COMM

Grantor
North Wilsonville Associates, a Washington L.L.C
Grantee
State of Oregon
After recording return to
State of Oregon 1225 Ferry St, SE, U100 Salem, OR 97301-4281
Until requested, all tax statements shall be sent to
State of Oregon 1225 Ferry St, SE, U100 Salem, OR 97301-4281 Tax Acct No(s): **31W11 01903, 01420000**

Reserved for Recorder's Use

STATUTORY WARRANTY DEED

North Wilsonville Associates, a Washington L.L.C., Grantor(s) convey and warrant to **State of Oregon, by and through the Department of Administrative Services**, Grantee(s), the real property described in the attached Exhibit A, subject only to those liens and encumbrances set forth on the attached Exhibit B.

The true consideration for this conveyance is **$23,950,000.00**. (Here comply with requirements of ORS 93.030)

BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON TRANSFERRING FEE TITLE SHOULD INQUIRE ABOUT THE PERSON'S RIGHTS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009, AND SECTIONS 2 TO 7, CHAPTER 8, OREGON LAWS 2010. THIS INSTRUMENT DOES NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY THAT THE UNIT OF LAND BEING TRANSFERRED IS A LAWFULLY ESTABLISHED LOT OR PARCEL, AS DEFINED IN ORS 92.010 OR 215.010, TO VERIFY THE APPROVED USES OF THE LOT OR PARCEL, TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES, AS DEFINED IN ORS 30.930, AND TO INQUIRE ABOUT THE RIGHTS OF NEIGHBORING PROPERTY OWNERS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009 AND SECTIONS 2 TO 7, CHAPTER 8, OREGON LAWS 2010.

Executed this 23rd day of November, 2019

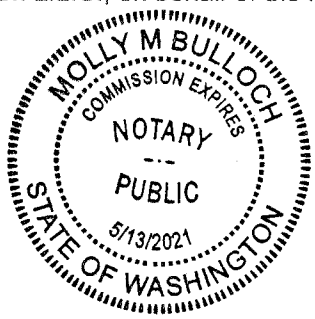
North Wilsonville Associates, a Washington L.L.C.

By: _____
Name: Jack Martin
Its: Manager

STATE OF Washington
COUNTY OF King

This instrument was acknowledged before me this 23rd day of November, 2019 by Jack Martin, as Manager, of North Wilsonville Associates, a Washington L.L.C., on behalf of the limited liability company.

Molly M. Bulloch
Print Name: Molly M Bulloch
Notary Public for ~~Oregon~~ Washington
My Commission Expires: 5/13/2021



APPROVED AS TO FORM AND ACCEPTED:

State of Oregon, by and through the Department of Administrative Services

By: _____
Name: Shannon Ryan
Its: Enterprise Asset Management

Executed this _____ day of November, 2019

North Wilsonville Associates, a Washington L.L.C.

By:_____
Name: Mackenzie Martin
Its: Authorized Signor

STATE OF _____
COUNTY OF _____

This instrument was acknowledged before me this _____ day of November, 2019 by Mackenzie Martin, as Authorized Signor, of North Wilsonville Associates, a Washington L.L.C., on behalf of the limited liability company.

_____
Print Name:
Notary Public for Oregon
My Commission Expires:

APPROVED AS TO FORM AND ACCEPTED:

State of Oregon, by and through the Department of Administrative Services

By: _____
Name: Shannon Ryan
Its: Enterprise Asset Management

EXHIBIT "A"
LEGAL DESCRIPTION

Parcel 1, PARTITION PLAT NO. 2001-119, in the City of Wilsonville, County of Clackamas and State of Oregon;

TOGETHER WITH an easement for ingress and egress as set forth in Reciprocal Access Easement recorded April 7, 1997 as No. 97-025076, Records of Clackamas County, Oregon and being more particularly described as follows:

A tract of land for reciprocal access easement purposes located in the Northeast one-quarter of Section 11, Township 3 South, Range 1 West of the Willamette Meridian in Clackamas County, Oregon, described as follows: Beginning at a point on the westerly right of way line of SW 95th Avenue, 62.00 feet wide, said point bears South 01°34'29" West, 1501.90 feet and South 88°45'35" East, 524.68 feet from the North one-quarter corner of said Section 11; thence along said westerly right of way line, North 01°18'30" East, 28.00 feet, thence leaving said westerly right of way line, North 88°41'30" West, 27.00 feet to a point on the arc of a tangent 40.00 foot radius curve left; thence along the arc of said curve 50.73 feet through a central angle of 72°39'30" (the long chord of which bears South 54°58'44" West, 47.39 feet) to a point of non-tangency; thence South 88°45'35" East, 65.18 feet to the point of beginning.

EXHIBIT "B"
Exceptions

1. Rights of governmental bodies in and to any portion of the premises lying within Tapman Creek, or unnamed creeks or tributaries, for flood control and protection of anadromous fish.

2. Easement, including the terms and provisions thereof:

For	:	Electric power transmission structures and appurtenant signal lines and appurtenances and the right to clear brush, timber, structures and fire hazards
Granted to	:	United States of America and its assigns
Recorded	:	July 3, 1967
Recording No.	:	Book 692, Page 808
Affects	:	Portion of premises as delineated on the Partition Plat

3. Easement, including the terms and provisions thereof:

For	:	Sanitary sewer
Granted to	:	City of Wilsonville, Oregon, its successors and assigns
Recorded	:	February 9, 1978
Recording No.	:	78-5702
Affects	:	Portion of premises as delineated on the Partition Plat

4. Reciprocal Access Easement, including the terms and provisions thereof:

Regarding	:	Access for subject property and adjacent property
Between	:	North Wilsonville Associates
And	:	Wilsonville R.V. Storage, an L.L.C.
Recorded	:	April 7, 1997
Recording No.	:	97025076
Affects	:	Portion of premises as delineated on the Partition Plat

5. Easement created on Partition Plat 2001-119:

For	:	Pipeline
Granted to	:	City of Wilsonville
Recorded	:	December 6, 2001
Recording No.	:	2001-102956
Affects	:	Portion of premises as delineated on the Partition Plat (in 3 locations)

6. Conditions, restrictions and tax implications established by City of Wilsonville Ordinance No. 725:

Recorded	:	December 19, 2013
Recording No.	:	2013-083295

And as amended by City of Wilsonville Ordinance No. 745:

Recorded	:	October 7, 2014
Recording No.	:	2014-051541

7. Conditions and Restrictions per City of Wilsonville Case File No. 98 AR 54, as shown on Partition Plat No. 2001-119:

Recorded	:	December 6, 2001
Recording No.	:	2001-102956

Tami Little
County Assessor

CLACKAMAS COUNTY

DEPARTMENT OF ASSESSMENT AND TAXATION

Development Services Building
150 Beavercreek Road | Oregon City, OR 97045

CERTIFICATE OF TAXES PAID

RE: Property Tax Account # 01420000

Assessor's Map # 31W11 0903

Situs: 26755 SW 95th Ave – Wilsonville, OR 97070

As of this date, all taxes, fees, assessment or other charges as provided by Oregon Revised Statute 311.411 on the parcel referenced above have been paid in full.

Payer: North Wilsonville Assoc

Amount Paid: $ 342,273.14

Date Paid: November 15, 2019

Assessor/Deputy

November 26, 2019
Date

Partition Plat No. 2001-119

NE 1/4 & NW 1/4 SEC. 11, T.3S., R.1W., W.M.
City of Wilsonville, Clackamas County
Oregon

SCALE: 1" = 100'
March 29, 2001

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

Narrative:

THE PURPOSE OF THIS SURVEY IS TO LOCATE AND MONUMENT THE BOUNDARIES OF THOSE TRACTS OF LAND DESCRIBED IN DEED FEE NO. 99-015690 AND 95-053803 EXCEPT THAT PORTION CONVEYED BY FEE NO. 97-025075, CLACKAMAS COUNTY DEED RECORDS, AND PARTITION SAID TRACTS ACCORDING TO THE CITY OF WILSONVILLE, CASE FILE NUMBER 98 AR 54.

THE NORTH AND SOUTH 1/4 CORNERS OF SECTION 11 WERE LOCATED TO ESTABLISH THE NORTH-SOUTH MID-SECTION LINE. S 01°34'29"W PER PS 23744 WAS USED ALONG THIS LINE FOR THE BASIS OF BEARING LOCATING THE NORTHERLY WEST LINE OF THE PROPERTY. DEED DISTANCE FROM THE NORTH 1/4 CORNER AND DEED ANGLE WERE APPLIED TO LOCATE THE WESTERLY NORTH PROPERTY LINE PER BOOK 692, PAGE 808. THE WEST LINE WAS LOCATED 164 FEET EAST AND 64 FEET EAST OF MONUMENTS FOUND PER PS 27108 AND STREET DEDICATION PER FEE NO. 99-068880. THE SOUTH LINE WAS LOCATED 35 FEET AND 25 FEET NORTH AS SHOWN PER MONUMENTS FOUND AT THE CENTERLINE OF SW FREEMAN COURT PER PS 18811, PS 25910, FEE NO. 92 53986 AND FEE NO. 99-068879. THE EAST LINE WAS LOCATED 31 FEET WESTERLY FROM FOUND CENTERLINE MONUMENTS PER PS 25910. THE EASTERLY NORTH LINE WAS LOCATED PER DEED DISTANCE FROM THE NORTH 1/4 CORNER AND DEED ANGLE PER FEE NO. 97-025075.

CLACKAMAS COUNTY SURVEY RECORDS:
(R-1) PS 23744
(R-2) PS 18811
(R-3) PS 23021
(R-4) PS 27108
(R-5) PS 25910
(R-6) PS 14498
(P-1) WILSONVILLE BUSINESS CENTER

CLACKAMAS COUNTY DEED RECORDS:
(D-1) FEE NO. 99-015690
(D-2) FEE NO. 95-053803
(D-3) FEE NO. 97-025075
(D-4) BOOK 692, PAGE 808
(D-5) FEE NO. 99-068879
(D-6) FEE NO. 99-072268
(D-7) FEE NO. 99-072267
(D-8) FEE NO. 99-068880
(D-9) FEE NO. 92 53986
(D-10) FEE NO. 92 53990
(D-11) BOOK 263 PAGE 682
(D-12) FEE NO. 99-100150

NOTES:

1. THE PROPERTY SHOWN HEREON IS SUBJECT TO CONDITIONS AND RESTRICTIONS PER CITY OF OF WILSONVILLE, CASE FILE NO. 98 AR 54.
2. THE SIDEWALK EASEMENT IN PARCEL 2 IS FOR THE BENEFIT OF THE CITY OF WILSONVILLE.
3. PERMANENT RIGHT-OF-WAY AND EASEMENT FOR PIPELINE, OVER AND ALONG EASEMENTS NO. 1, 2 AND 3, IN PARCEL 1, ARE GRANTED UNTO THE CITY OF WILSONVILLE.

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
JULY 11, 2000
GARY W. CHEEL
42649
EXPIRES DECEMBER 31, 2001

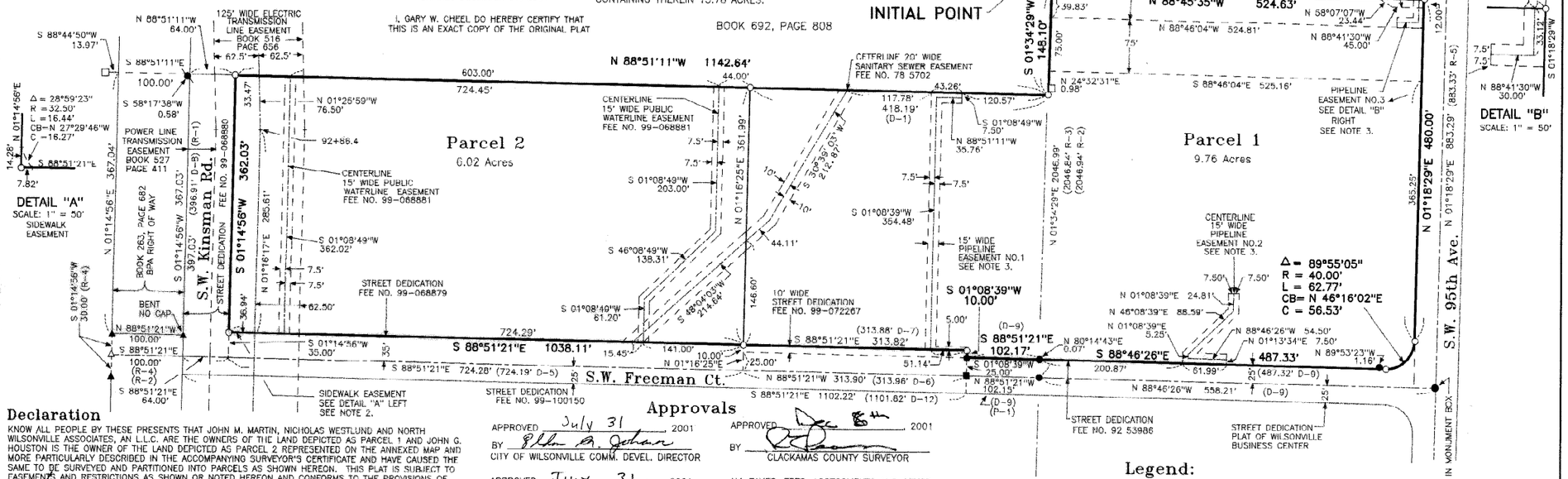
I, GARY W. CHEEL DO HEREBY CERTIFY THAT THIS IS AN EXACT COPY OF THE ORIGINAL PLAT

Surveyor's Certificate

I, GARY W. CHEEL HEREBY DECLARE THAT I HAVE CORRECTLY SURVEYED AND MARKED WITH PROPER MONUMENTS THE LAND REPRESENTED ON THE ANNEXED PARTITION PLAT, BEING A TRACT OF LAND SITUATED IN THE NORTHEAST QUARTER AND NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 3 SOUTH, RANGE 1 WEST OF THE WILLAMETTE MERIDIAN, CITY OF WILSONVILLE, COUNTY OF CLACKAMAS AND STATE OF OREGON, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE INITIAL POINT, A SET 5/8" IRON ROD WITH A RED PLASTIC CAP INSCRIBED "GARY W. CHEEL PLS 42649" AT THE SOUTHWEST CORNER OF THAT TRACT OF LAND DESCRIBED IN FEE NO. 97-025075, CLACKAMAS COUNTY DEED RECORDS, SAID CORNER BEARS SOUTH 01°34'29" WEST, 1501.90 FEET FROM THE NORTH 1/4 CORNER OF SAID SECTION 11; THENCE CONTINUING SOUTH 01°34'29" WEST, 148.10 FEET TO THE SOUTHEAST CORNER OF THAT TRACT OF LAND DESCRIBED IN BOOK 692, PAGE 808, SAID DEED RECORDS; THENCE ALONG SAID SOUTH LINE NORTH 88°51'11" WEST, 1142.64 FEET TO THE EAST RIGHT OF WAY LINE OF SW KINSMAN ROAD, DEDICATED BY FEE NO. 99-068880, SAID DEED RECORDS; THENCE ALONG SAID EAST RIGHT OF WAY LINE SOUTH 01°14'56" WEST, 362.03 FEET TO THE NORTH RIGHT OF WAY LINE OF SW FREEMAN COURT, DEDICATED BY FEE NO. 99-068879, FEE NO. 99-072267 AND FEE NO. 92-053986, SAID DEED RECORDS; THENCE ALONG SAID NORTH RIGHT OF WAY LINE SOUTH 88°51'21" EAST, 1038.11 FEET TO AND ANGLE POINT; THENCE SOUTH 01°08'39" WEST, 10.00 FEET TO AN ANGLE POINT; THENCE SOUTH 88°51'21" EAST, 102.17 FEET TO AN ANGLE POINT; THENCE SOUTH 88°46'26" EAST, 487.33 FEET TO THE BEGINNING OF A 40.00 FOOT TANGENT CURVE TO THE LEFT; THENCE ALONG THE ARC OF SAID CURVE 62.77 FEET THROUGH A CENTRAL ANGLE OF 89°55'05" (THE LONG CHORD BEARS NORTH 46°16'02" EAST, 56.53 FEET) TO THE WEST RIGHT OF WAY LINE OF SW 95TH AVENUE, DEDICATED BY FEE NO. 92-053990, SAID DEED RECORDS; THENCE ALONG SAID WEST RIGHT OF WAY LINE NORTH 01°18'29" EAST, 480.00 FEET; THENCE LEAVING SAID WEST RIGHT OF WAY LINE NORTH 88°45'35" WEST, 524.63 FEET TO THE INITIAL POINT.

CONTAINING THEREIN 15.78 ACRES.



Declaration

KNOW ALL PEOPLE BY THESE PRESENTS THAT JOHN M. MARTIN, NICHOLAS WESTLUND AND NORTH WILSONVILLE ASSOCIATES, AN L.L.C. ARE THE OWNERS OF THE LAND DEPICTED AS PARCEL 1 AND JOHN G. HOUSTON IS THE OWNER OF THE LAND DEPICTED AS PARCEL 2 REPRESENTED ON THE ANNEXED MAP AND MORE PARTICULARLY DESCRIBED IN THE ACCOMPANYING SURVEYOR'S CERTIFICATE AND HAVE CAUSED THE SAME TO BE SURVEYED AND PARTITIONED INTO PARCELS AS SHOWN HEREON. THIS PLAT IS SUBJECT TO EASEMENTS AND RESTRICTIONS AS SHOWN OR NOTED HEREON AND CONFORMS TO THE PROVISIONS OF CHAPTER 92 OF THE OREGON REVISED STATUTES.

JOHN M. MARTIN, MEMBER AND MANAGER

NICHOLAS WESTLUND, MEMBER AND MANAGER

JOHN G. HOUSTON

Acknowledgement

STATE OF _____ } S.S.
COUNTY OF _____ }

KNOW ALL PEOPLE BY THESE PRESENTS, ON THIS ____ DAY OF _____, 2001, PERSONALLY APPEARED JOHN M. MARTIN AND NICHOLAS WESTLUND, BOTH MEMBERS AND MANAGERS OF NORTH WILSONVILLE ASSOCIATES, AN L.L.C., WHO BEING DULY SWORN DID SAY THAT THEY ACKNOWLEDGED THE FOREGOING INSTRUMENT FREELY AND VOLUNTARILY ON BEHALF OF SAID NORTH WILSONVILLE ASSOCIATES, L.L.C.

NOTARY PUBLIC FOR _____ MY COMMISSION EXPIRES March 15, 2002

Acknowledgement

STATE OF Oregon
COUNTY OF Clackamas } S.S.

KNOW ALL PEOPLE BY THESE PRESENTS, ON THIS 23 DAY OF May, 2001, PERSONALLY APPEARED JOHN G. HOUSTON, WHO BEING DULY SWORN DID SAY THAT HE ACKNOWLEDGED THE FOREGOING INSTRUMENT FREELY AND VOLUNTARILY.

NOTARY PUBLIC FOR OREGON

March 15, 2002
MY COMMISSION EXPIRES

OFFICIAL SEAL
JOY M CLARK
NOTARY PUBLIC-OREGON
COMMISSION NO. A310548
MY COMMISSION EXPIRES MARCH 15, 2002

Approvals

APPROVED July 31 2001
BY Eldon A. Johan
CITY OF WILSONVILLE COMM. DEVEL. DIRECTOR

APPROVED July 31 2001
BY _____
CITY OF WILSONVILLE PLANNING DIRECTOR

APPROVED _____ 2001
BY _____
CLACKAMAS COUNTY SURVEYOR

ALL TAXES, FEES, ASSESSMENTS AND OTHER CHARGES AS PROVIDED BY ORS 92.095 HAVE BEEN PAID THRU June 30, 2002
CERTIFIED December 6, 2001
Ray Erland
CLACKAMAS COUNTY ASSESSOR AND TAX COLLECTOR
BY _____ DEPUTY Craig Ferris
BY _____ DEPUTY Jeanette Wyman

STATE OF OREGON
COUNTY OF CLACKAMAS } SS

I DO HEREBY CERTIFY THAT THE ATTACHED PARTITION PLAT WAS RECEIVED FOR RECORD ON THE 6th DAY OF December, 2001, AT 3:20 O'CLOCK P. M.
John Kauffman
CLACKAMAS COUNTY CLERK
BY _____ DEPUTY Melissa Taylor

Legend:

- ○ 5/8" X 30" IRON ROD W/RPC INSCRIBED "GARY W. CHEEL PLS 42649" SET ON MARCH 29, 2001.
- FOUND 1/4 CORNER MONUMENT AS NOTED ON THE MAP.
- □ FOUND 3-1/2" ALUMINUM CAP IN CONCRETE STAMPED "U.S.D.O.E. BONNEVILLE PWR. ADM.", NO RECORD.
- ● FOUND 5/8" IRON ROD W/YPC INSCRIBED "PLS 1332" PER PS 25910.
- ■ FOUND 1-3/8" BRASS DISC STAMPED "PLS 1332" PER PS 25910.
- FOUND 5/8" IRON ROD, NO RECORD.
- △ FOUND 5/8" IRON ROD W/YPC INSCRIBED "ZAROSINSKI-TATONE LS 1349" PER PS 18811.
- ▲ FOUND 5/8" IRON ROD W/YPC INSCRIBED "WAKER ASSOC., INC." PER PS 27108.

W/YPC = WITH YELLOW PLASTIC CAP, W/RPC = WITH RED PLASTIC CAP

Job No. 3187PLAT

PRE-APPLICATION MEETING APPLICATION

receives the required fee and plans

Property Owner:

Name: Charles "Joe" Gill, project manager representative for Enterprise Asset Management, (Dept. of Administrative Services, State of Oregon

Mailing Address: 1225 Ferry St, SE

City, State, Zip: Salem, Oregon 97301-4281

Phone: (503) 510.5172 Fax:

E-mail: Charles.Gill@oregon.gov

Authorized Representative:

Name: Ben Rippe

Company: SERA Architects

Mailing Address: 338 NW 5th Ave

City, State, Zip: Portland, OR 97209

Phone: (503) 847.2105 Fax: N/A

E-mail: benr@seradesign.com

Property Owner's Signature (Required):

Printed Name: Charles "Joe" Gill Date: 6.23.2020

Property Description

Property Address (if available): 26755 SW 95th Ave

Location Description (if address not available): Parcel 1, Partition Plat No. 2001-119 in the City of Wilsonville

Legal Description: T3S-R1W Map _____ Tax Lot(s) 31W11 01903 County: X Clackamas/ ☐ Washington

Project Type:

☐ Residential ☒ Commercial ☐ Industrial ☐ Other: _____

Project Description:

The Project includes the renovation and upgrade of an existing 162,329 square foot, single-story concrete, tilt-up building (construction type IIIB) with a previously unoccupied interior mezzanine (14,800 sf) and associated site improvements.

Located on a 425,146 SF (9.76 AC) lot, it is sited in a Planned Development Industrial Zone (PDI). A Bonneville Power transmission line easement runs along the north side of the property and the creek to the west occurs within the Significant Resource Overlay Zone (SROZ). The site accommodates approximately 207 automobile parking spaces, and contains an equipment utility yard, perimeter area landscaping, and truck receiving and loading bays.

The proposed building uses include a multi-tenant laboratory facility with accessory storage and office spaces supporting the primary function of the labs and a continued use of high-bay storage and warehousing. State agency tenants will include: Oregon OSHA (lab), OR Department of Agriculture (laboratories), DEQ (lab), Oregon State Police (long-term evidence storage) and Dept. of Admin. Services Operations & Maintenance facilities. A portion of the building is projected to remain unassigned "shell" space. For the three main categories of use, approximately 30% of the building will be "office", 35% "storage & building service", and 55% "laboratory".

PRE-APPLICATION MEETING APPLICATION

Services	Waiver	Demeaning of Traffic	Issues

Applicant: ☐ **Owner** ☒ **Authorized Agent**			**Site Information**	
Applicant: Dept. of Administrative Services, State of Oregon			Project Name: DAS North Valley Complex	
Address: 1225 Ferry St, SE			Project Address: 26755 SW 95th Ave	
City: Salem	State: OR	97301-4281	Tax Lot #: 31W11 01903	Lot Size: 9.76 AC
Email Address: Charles.Gill@oregon.gov				
Additional Information and Fees				
Is work related to a Proposed Development: Yes ☒ No ☐			Land Use Case File Number: TBD	
Is work related to a CIP: Yes ☐ No ☒			CIP Number:	
Fee: Traffic Impact Study's Fee determined by the City's traffic consultant based on Scope of Services plus 15% for City overhead				

I, the applicant, certify that:

- To the best of my knowledge, all the information provided within this application package is complete and accurate.
- The above request does not violate any recorded deed restrictions that may be attached to or imposed upon the subject property.
- If the application is granted, I will exercise the rights granted in accordance with the terms and subject to all the conditions and limitations of the approval.

Applicant's or Authorized Agent's Signature	Print Name	Date
	Charles "Joe" Gill, project manager	6/23/2020

Property Owner's Signature (If not Applicant)	Print Name	Date
Address:	City/State/Zip:	Phone:

*Process: A Request, along with a site plan and project description must be submitted to the Engineering Division. The request is forwarded to the City's traffic consultant who will prepare a Scope of Services, which will include the necessary fee. The prepared Scope will be reviewed by the Engineering Division, and once approved, will be forwarded to the applicant/authorized agent listed above. When the applicant/authorized agent reviews and submits the fee indicated in the Scope of Services plus 15 percent for City overhead, the Scope will be authorized by Staff and forwarded to the traffic consultant. When the traffic impact study has been received and approved by the City's Engineering Division, it will be forwarded to the applicant/authorized agent and the Planning Division.

A Request for a Waiver from a Traffic Impact Study will be reviewed by the Community Director and the Engineering Division and the requestor will be notified by mail.

Note: If the project description and/or site plan change from what was originally submitted, additional traffic analysis and fees may be required.

City's Building and Engineering Divisions **and are not issued as part of the Site Development Permit.** Representatives from the City's Planning, Building, Engineering Divisions, Natural Resources Program, and Environmental Services will be at the pre-application meeting to discuss the requirements for these permits.

Following are some items you should know about the City's pre-application meeting process.

1. Pre-application meetings are held on a weekly basis (currently Thursday mornings at 9:00 and 10:30 a.m.). Scheduling of these meetings is subject to availability of time and will be scheduled in the order requests are received.
2. Pre-application meetings are scheduled approximately two weeks after Planning Division Staff receives the required fee and 10 copies of site plans and narrative for your proposed project. Electronic versions of your plans are preferred. **Staff will not schedule a meeting until these materials are received and the Pre-Application Meeting Fee has been paid.**
3. The content of a pre-application meeting is considered public information unless requested confidential by the applicant.
4. Information conveyed by City staff during a pre-application meeting is preliminary and in response to information submitted by the applicant. Any change of plans or incorrect information submitted may invalidate the information relayed. Requests to review plans modified after a pre-application meeting may require an additional pre-application meeting(s) and fee(s).
5. Analysis of a proposed project by City staff during pre-application meetings is preliminary and does not substitute for a Site Development Permit application and should not be construed as a final planning decision. **Review of your applications during the Site Development Permit review process may reveal additional requirements that are applicable to your project.**
6. Development conditions in the City can change quickly. Staff reserves the right to require additional application meeting(s) should changes in these conditions affect the development potential of your property.
7. A written summary of the meeting may be requested by the applicant. Such request must be submitted in writing at least one week prior to the scheduled meeting. **Requested transcript of meeting will be billed to the applicant at the City's current transcription service rate.**

Attached Documents:

Pre-Application Meeting Request Form
Traffic Study Request/Waiver Form

Contact to schedule the pre-application meeting:

Georgia McAlister, Associate Planner 503-682-4960 gmcalister@ci.wilsonville.or.us

Pre-application Fee:

Residential: $424 if <10 lots/units
Signs Only: $202
All Others: $886

Helpful Web Site Pages

Community Development Planning Permits and Forms Planning Fee Schedule

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PRE-APPLICATION MEETING NOTES

Nicole Holt

From: Luxhoj, Cindy <luxhoj@ci.wilsonville.or.us>
Sent: Friday, July 31, 2020 10:24 AM
To: Ben Rippe
Cc: David Lintz; Laura Pedersen; GILL Charles * DAS; Pauly, Daniel; Bateschell, Miranda
Subject: RE: Pre-Application Meeting Follow-up - 26755 SW 95th Avenue

Follow Up Flag: Follow up
Flag Status: Flagged

[EXTERNAL EMAIL]

Hi Ben,

I apologize for the delay is response, but was checking with staff in other Divisions about your notes from the Pre-Application Meeting. They've all confirmed that the notes look accurate.

I agree with your notes about Planning items as well with one exception – Item 9(b):
Is there a minimum threshold of modification that trippers development standards to be applied throughout the site?
Your notes say: *Not anticipated.*
I wanted to remind you that the trigger is the extent of modification that is proposed. Section 4.030 (.01) B. 1. regarding Class II Administrative Review allows the Planning Director to approve, approve with conditions, deny, or refer the application to the Development Review Board (DRB) for hearing when there are "minor alterations to existing buildings or site improvements of less than 25% of the previous floor area of a building, but not to exceed 1,250 square feet, or including the addition or removal of not more than 10 parking spaces". If modifications exceed this threshold, DRB review is required.

On the parking question, we think it seems reasonable to apply the 1.6 spaces/1,000 sf to laboratory use; however, we request that the comprehensive parking analysis include additional data to support using this multiplier. For instance, the factor for comparable use based on the ITE Trip Generation Manual, or examples from laboratory use in other DAS facilities. This enables us to write findings that are clearly supported by evidence.

Also on parking, your email doesn't discuss which factor will be used to calculate parking for the warehousing/storage space in the building. We assume you'll use 0.3 spaces/1,000 sf, but want to confirm.

Please let me know if you have any other questions, Ben.

Thanks,

Cindy

Cindy Luxhoj AICP
Associate Planner
City of Wilsonville

503.570.1572
luxhoj@ci.wilsonville.or.us
www.ci.wilsonville.or.us
Facebook.com/CityofWilsonville

29799 SW Town Center Loop East, Wilsonville, OR 97070

City Hall is now open, with physical distancing controls in place. During COVID-19, we wish to remain responsive while prioritizing the health and safety of the Wilsonville community. We are happy to meet by call or teleconference as an alternative to face-to-face meetings.

Disclosure Notice: Messages to and from this e-mail address may be subject to the Oregon Public Records Law.

From: Ben Rippe <benr@seradesign.com>
Sent: Thursday, July 30, 2020 5:42 PM
To: Luxhoj, Cindy <luxhoj@ci.wilsonville.or.us>
Cc: David Lintz <David.Lintz@otak.com>; Laura Pedersen <Laura.Pedersen@otak.com>; GILL Charles * DAS <charles.gill@oregon.gov>
Subject: RE: Pre-Application Meeting Follow-up - 26755 SW 95th Avenue

[This email originated outside of the City of Wilsonville]

Hi Cindy,

Just following up on this email. I'm sure things are very busy there. Thanks for your consideration!

Ben Rippe
d: 503.847.2105
seradesign.com

From: Luxhoj, Cindy <luxhoj@ci.wilsonville.or.us>
Sent: Monday, July 27, 2020 8:49 AM
To: Ben Rippe <benr@seradesign.com>; charles.gill@oregon.gov; RYAN Shannon * DAS <Shannon.RYAN@oregon.gov>; jeremy.w.miller@oregon.gov; Scott.NEBEKER@oregon.gov
Cc: Pauly, Daniel <pauly@ci.wilsonville.or.us>; David Lintz <David.Lintz@otak.com>; Laura Pedersen <Laura.Pedersen@otak.com>; Becky Epstein <beckye@seradesign.com>; Bill Poulos <billp@seradesign.com>
Subject: Re: Pre-Application Meeting Follow-up - 26755 SW 95th Avenue

[EXTERNAL EMAIL]

Hi Ben,

This is to let you know that I received your email and will have responses to your questions by mid-week.

Thank you,

Cindy

Cindy Luxhoj AICP
Associate Planner
City of Wilsonville

503.570.1572
luxhoj@ci.wilsonville.or.us
www.ci.wilsonville.or.us
Facebook.com/CityofWilsonville
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Disclosure Notice: Messages to and from this e-mail address may be subject to the Oregon Public Records Law.

From: Ben Rippe <benr@seradesign.com>
Sent: Friday, July 24, 2020 4:39:11 PM
To: Luxhoj, Cindy; charles.gill@oregon.gov; RYAN Shannon * DAS; jeremy.w.miller@oregon.gov; Scott.NEBEKER@oregon.gov
Cc: Pauly, Daniel; David Lintz; Laura Pedersen; Becky Epstein; Bill Poulos
Subject: RE: Pre-Application Meeting Follow-up - 26755 SW 95th Avenue

[This email originated outside of the City of Wilsonville]

Hi Cindy,

Thank you for outlining Land Use Review processes, submittal requirements, and applicable code sections.

Because the Zoom recording will not be available to us as a reference, I've attached the questions we sent in advance and added my recollection of the responses we received. Please review and confirm for accuracy.

One additional question we asked during the meeting was for clarification of the parking requirement for Lab Use, which is not listed in Section 4.155 – Table 5. We request that 1.6 per 1,000 sf be applied for Lab Use, which is a similar parking requirement to Manufacturing Use. Where a parking requirement for use is not specifically identified in the Development Code, a similar use requirement can apply as determined by Planning staff. Lab uses will have similar occupant densities to manufacturing areas due to the footprint of equipment (freezers, fridges, hoods, bio-safety cabinets, etc) and lab casework that occupies much of the floor area. The following is an analysis of the parking needs generated through a Programming Analysis for the facility as a basis for comparing a ratio of staff to building areas with the ratio of required parking.

Based on programming interviews with lab tenants and their survey responses indicating staffing levels, there are ~190 building occupants that will occupy both lab and office areas (they will split time between working in the lab and working at a desk in the office environment). Programmed areas for Lab and Office uses are summarized below.

There is ~55,000 gsf anticipated new lab and lab support areas.

There is ~41,500 gsf existing office area that will remain.

Together this is ~ 96,000 gsf, with an occupant density ratio of 2.0 per 1,000 sf in *combined* lab and office environments.

Wilsonville Dev Code parking standards require a parking ratio of 2.7 per 1,000 sf for offices.

For ~41,500 gsf office area, this requires 112 spaces.

For the lab area, we propose that a similar use to labs is Manufacturing, requiring 1.6 per 1,000 sf parking ratio.

For ~55,000 gsf lab area, this equates to 88 spaces.

The resulting parking requirement of 200 spaces is consistent with actual projected staff/occupants of ~190 and exceeds it slightly.

Therefore, we propose that a 1.6 per 1,000 sf is a reasonable parking ratio to establish parking requirements for lab use.

Please review this requirement and confirm if 1.6:1,000 sf is acceptable to apply to lab use. If so, it will be incorporated into a comprehensive parking analysis for the facility including all gross building areas at the time of submittal.

Thank you,

Ben Rippe
d: 503.847.2105
seradesign.com

From: Luxhoj, Cindy <luxhoj@ci.wilsonville.or.us>
Sent: Tuesday, July 14, 2020 10:12 AM
To: charles.gill@oregon.gov; Ben Rippe <benr@seradesign.com>
Cc: Pauly, Daniel <pauly@ci.wilsonville.or.us>
Subject: Pre-Application Meeting Follow-up - 26755 SW 95th Avenue

[EXTERNAL EMAIL]

Thank you for taking the time to discuss the proposed modifications at 26755 SW 95th Avenue with us on July 9th. I wanted to follow up with an email with additional information.

Although we recorded the Zoom meeting, unfortunately the recording was corrupted during download and isn't available for review. We sincerely apologize for this inconvenience and invite you to contact me with any questions you may have that aren't answered by the information in this email.

As you look at what you need to submit for land use review, the following list will aid you in what to submit and what code criteria to respond to in your project narrative. If you have further questions of what a project narrative should look like or what to submit please don't hesitate to contact a planner and ask. You can access the City's Development Code in pdf and Microsoft Word document formats at https://www.ci.wilsonville.or.us/planning/page/development-code. Please keep in mind the burden to show compliance with applicable City standards falls on the applicant (see Wilsonville Code 4.014). Please ensure you have the appropriate professionals, engineers, architects, planners, landscape architects, as necessary, to ensure a complete and adequate application.

As a reminder the land use review process is separate from and occurs prior to building and other construction permitting. We do allow for some concurrent review of building permits, but do not submit building permits prior to your land use application being complete and a public notice being sent. Building permits cannot be issued until the land use decision is final after the conclusion of the local appeal period.

This email includes 5 sections

1. Land Use Review Steps
2. Anticipated/Potential Land Use Applications for Project
3. Submittal Requirements
4. Applicable Development Code Sections
5. Other Specific Concerns/Discussion Items for Project

1. Land Use Review Steps

Land use review has a number of steps as follows:

Step 1. Submittal (see Section 3 and attached checklist for more details on submittal requirements): Applicant submits application including:
- Signed application form
- All land use application fees
- 3 paper copies, and 1 electronic copy in flattened pdf format on CD, DVD, flash drive, or via file storage site or email of the following:
  - Project narrative (please include in MS Word document format in addition to pdf)
  - Full size, and reduced (11X17 or smaller) of plans related to land use review
  - Reports such as arborist report, stormwater drainage report, traffic report

Step 2. Initial City Review "Completeness Review": The assigned Wilsonville planner reviews the application to determine if all materials required to review the application are submitted. We call this step "completeness review." In concludes with a determination of whether the submitted application package is "complete" or "incomplete." The applicant will be notified by letter about the determination. If the determination is "incomplete" the letter includes the specific items needed to make the application "complete." If application is "complete" the next step is Step 6.

Step 3. Indication of Intention for Incomplete Applications: If the application is "incomplete" the applicant either indicates whether they intend to submit the items identified in the "incompleteness letter". This is done by signing and returning a page enclosed with the "incompleteness letter." If the applicant refuses to submit additional materials the application with proceed to step 6, noting that failure to provide sufficient information can be grounds for denying an application.

Step 4. Applicant Prepares Additional Request Materials and Resubmits Application: If the application is "incomplete" and the applicant intends to address the items identified in the "incompleteness letter" the applicant prepares the identified items. Once the applicant prepares all the items they resubmit the application as identified in Step 1. Occasionally if the additional materials are minor the previous submittal package can be supplemented or pages switches out. In most cases complete new copies of the entire submittal package will be submitted.

Step 5. City Reviews Resubmitted Package "2nd Completeness Review". The assigned Wilsonville planner reviews the revised application to determine if all materials required to review the application are submitted. A

determination of "complete" or "incomplete" will again occur with the corresponding letter being sent to the applicant.

Steps 6-9 for Class II Administrative Review:

Step 6. Public Notice and Comment Period, City Prepares Decision. Once the application is "complete" a public notice soliciting comments is sent by the City to all properties within 250 feet of the subject property using a mailing list the City generates based on county assessor data. The notice period is 10 days during which the a decision cannot be issued. As applicable, the Assigned Planner also solicits comments and conditions of approval from various City Departments and Divisions as well as partner agencies and service providers such as TVF&R, NW Natural, and Republic Service (franchise waste collector).
Step 7. Decision Issued. Following the 10 day notice period the City can issue a decision on the application. The decision is typically issued within a few days of the end of the notice period, but can be longer under certain circumstances. You will be notified by mail, and typically email as well, of the decision. In many cases the notice of the decision includes a form accepting conditions of approval the applicant must sign and return.
Step 8. Appeal/Call Up Period. The Notice of Decision includes notification of the 14-day appeal period from the date the decision is mailed. During this 14-day period the City's Development Review Board can call up staff's decision on the application for further review. Appeals and call ups of administrative decisions have historically been quite rare.
Step 9. Final Approval and Issuing Construction Permits. If the appeal period lapses with no appeal and the form accepting condition of approval, as applicable, is signed and returned construction permits consistent the approval can then be processed and issued.

Steps 6-10 for DRB Review:

Step 6. Hearing Scheduled, City Staff Prepares Report, Public Notice and Comment Period. Once the application is "complete" the project is scheduled for a hearing before one of two Development Review Board panels. The hearing is typically scheduled 30-45 days from when the application is deemed "complete." 20 days prior to the hearing the Assigned Planner sends out a Public Hearing Notice soliciting comments from the public. The Assigned Planner also solicits comments and conditions of approval from various City Departments and Divisions as well as partner agencies and service providers such as TVF&R, NW Natural, and Republic Service (franchise waste collector). One week prior to the hearing a Staff Report is published for public review.
Step 7. Public Hearing. Development Review Board (DRB) public hearings are typically 6:30 p.m. on the 2nd and 4th Monday of the month at Wilsonville City Hall. The public hearing typically follows the following format:

- Assigned Planner presents their report to the DRB often with support from Engineering and Natural Resource staff and answers board's questions. The staff presentation typically thoroughly describes the project including layout, design, and impacts.
- The applicant is given the opportunity to present. The applicant can say as little as they want, but the DRB typically prefers some description and explanation of the motivation behind and goals of the project adding color to staff's description of the project. The DRB can ask questions of the applicant.
- Others in attendance can testify, the DRB can ask questions of them
- The applicant gets an opportunity to rebut any testimony
- After all testimony and questioning the DRB chair closes the Public Hearing
- A DRB member makes a motion
- DRB discussion and deliberation
- DRB decision

Step 8. Notice of Decision and Appeal Period. Typically the next day a Notice of Decision is sent by the City. In most cases this includes a form accepting the conditions of approval the applicant must sign and return. The Notice of Decision includes notification of the 14-day appeal period from the date the decision is mailed.
Step 9 (if City Council). City Council Review and Action. DRB action on certain applications including annexation, comprehensive plan map amendments, and zone map amendments are recommendations to the City Council. If the project involves one or more of these requests the DRB approval is contingent on City Council approval of the relevant applications. Following DRB review a public hearing will be scheduled before the City Council to consider adoption of the necessary ordinances. No additional submittals are required by the applicant. The public hearing will be conducted similar to the DRB hearing described in Step 7. The hearing is typically about 30 days after the DRB hearing. The implementing ordinances become effective 30 days after City Council adoption, thus the typical duration from DRB approval/recommendation and the approval being final is about 60 days.
Step (9 or 10). If the appeal period lapses with no appeal, applicable ordinances become effective, and the form accepting conditions of approval is signed and returned. Construction permits consistent the DRB approval can then be processed and issued.

2. Anticipated/Potential Land Use Applications for Project

   - Class II Administrative Review of minor modification of previous site plan/architectural approvals

   OR

   - DRB Review, if other than minor modifications:
     - Stage II Final Plan Modification
     - Site Design Review
     - Tree Removal Plan, if any trees will be removed
     - Sign Plan, if major modification to approved sign plan

3. Submittal Requirements (can use as a checklist)
   We have tried to make this as complete as possible, and may not include everything required.

   The submittal package needs to include:

   1. An application form signed by the property owner
   2. All applicable planning application fees ($1455 for Class II Administrative Review)
   3. A project narrative Including the following sections (paper copy, pdf, and ms word):
      a. Summary of Proposal (1 page or less typically) including key numbers (i.e. acreage, square feet of buildings, number of units, etc.)
      b. Background Information (1 page or less typically)
      c. Discussion of key issues or discussion items (1-2 pages), include discussion of any neighborhood outreach
      d. Response Findings to Code Criteria (numerous pages), in the following basic format:
         - Code Criteria Reference and Language
         - Response (from applicant): The written response needs to be specific and clear. It needs to go beyond saying a criteria is met to clearly and specifically explaining how it is met. As an example, if the criteria is "Parking standards shown in Table A shall be met," the response should state, "the proposal provides 52 parking spaces, 2 more than the 50 parking spaces required. See parking layout on the site plan, Exhibit B2" not something unspecific like "the proposal provides sufficient parking".
   4. Plan set including the information in the attached "Plan Set Submittal Checklist": (you can use the sheet reference field to write in a reference to where the information is).
   5. Other reports and documents (traffic report, arborist report, etc.). Include in notebook or packet with narrative. A checklist of requirement documents is attached as "Reports and Other Documents Checklist"

4. Applicable Development Code Sections
   These are the applicable code sections to consider in preparing your narrative and designing your site. For the most part it does not include code sections related to procedures. The code can be accessed online by following this link.

   Planned Development Standards and Regulations for all Planned Development (PD) Zones

   - Standards applying to all Planned Development (PD) Zones: Section 4.118
   - Planned Development Regulations: Section 4.140

   Industrial Development Standards and Industrial Zoning

   - Standards applying to Industrial Development in Any Zone: Section 4.117
   - PDI – Planned Development Industrial Zone: Section 4.135

   General Development Regulations and Standards

   - On-Site Pedestrian Access and Circulation: Section 4.154
   - Parking, Loading, and Bicycle Parking: Section 4.155
   - Street Improvement Standards: Section 4.177
   - Landscaping, Screening, and Buffering: Section 4.176
   - Mixed Solid Waste and Recycling: Section 4.179
   - Outdoor Lighting: Sections 4.199 through 4.199.60
   - Underground Utilities: Sections 4.300 through 4.320
   - Protection of Natural and Other Features: Section 4.171

- Public Safety and Crime Prevention: 4.175

Waivers to Typical Development Standards

- Waivers to Development Standards: Subsections 4.118 (.03) and 4.140 (.01)

Site Design Review (Detailed Review of Architecture, Landscaping, Signs and other Design Elements)

- Site Design Review: Sections 4.400 through 4.450

Signs

- Signs: Sections 4.156.01 through 4.156.11

Tree Removal

- Tree Preservation and Protection: Sections 4.600 through 4.640.20

Definitions of Terms

- Definitions of Terms: Section 4.001

5. Other Specific Concerns/Discussion Items for Project

   Building Permit Fees and Estimated SDCs: Please contact Becky White in our Building Division for more information: white@ci.wilsonville.or.us or 503.682.4960.

   Industrial Pretreatment Program Environmental Survey and Laboratory Questions: These documents are attached. Please complete and include in your application submittal. Please direct questions to Mia Pan, Industrial Pretreatment Coordinator: mpan@ci.wilsonville.or.us or 503.570.1551.

   Fire Flow Test Information: A test was recently completed just north of the site. The test results are attached. Please direct questions to Melissa Gitt, Lead Building Inspector/Plans Examiner IV: gitt@ci.wilsonville.or.us or 503.570.1537.

   SROZ Boundary Delineation/Map Verification: There was discussion about the SROZ and accuracy of the boundary. Please coordinate with Kerry Rappold, Natural Resources Program Manager: rappold@ci.wilsonville.or.us or 503.570.1570.

   Traffic Study: Please contact Khoi Le, Development Engineering Manager, for questions related to traffic study requests or waivers: kle@ci.wilsonville.or.us or 503.570.1566.

Thank you,

Cindy

Cindy Luxhoj AICP
Associate Planner
City of Wilsonville

503.570.1572
luxhoj@ci.wilsonville.or.us
www.ci.wilsonville.or.us
Facebook.com/CityofWilsonville

WILSONVILLE
OREGON

29799 SW Town Center Loop East, Wilsonville, OR 97070

DKS 117 COMMERCIAL STREET NE, SUITE 310, SALEM, OR 97301 • 503.391.8773 • DKSASSOCIATES.COM

MEMORANDUM

DATE: January 27, 2021

TO: Khoi Le, P.E. | City of Wilsonville

FROM: Scott Mansur, P.E., PTOE | DKS Associates
Jenna Bogert, E.I. | DKS Associates
Travis Larson, E.I. | DKS Associates

SUBJECT: Wilsonville North Valley Center Trip Generation Memo Project #19006-007

This memorandum documents trip generation estimates for the proposed repurposing of the existing Microsoft building located at 26755 SW 95th Avenue in Wilsonville, Oregon. The project site contains an existing one-story, 174,700 square foot building with a parking lot containing over 200 parking stalls. The proposed building uses include a multi-tenant laboratory facility with accessory storage and office spaces supporting the primary function of the labs and a continued use of high-bay storage and warehousing. The building will be comprised of approximately 30% office space, 35% storage & building service, and 35% laboratory.

The purpose of this memorandum is to first estimate the weekday and PM peak hour trip generation for both the building's prior use and its proposed use. Then compare the trip generations to determine the change in expected traffic generation. That is followed by a site plan review which evaluates site access, internal circulation, bicycle and pedestrian needs, and parking.

TRIP GENERATION EVALUATION

This section evaluates the expected net increase or decrease in traffic demand from the historical land use to the proposed land use.

HISTORICAL LAND USE TRIPS

Trip generation is the method used to estimate the number of vehicles that are added to the roadway network by the proposed project during a specified period, which in this case is the PM peak hour. A previous TIA[1] conducted in 2013 reported a trip generation of 122 PM peak-hour trips for the historical Microsoft office building.

[1] Microsoft/PPI Tenant Improvement Transportation Impact Study, DKS Associates, September 2013.

PROPOSED LAND USE TRIPS

Trip generation was analyzed for the proposed site plan using the Institute of Transportation Engineers (ITE) Trip Generation Manual[2]. The manual estimates the number of vehicles generated by a particular land use based on its size. As stated earlier, the building will be utilized for three uses, approximately 30% of the building will be office, 35% storage & building service, and 35% laboratory. Table 1 documents the trip generation for each land use in the site plan. The proposed site is estimated to generate a total of 142 PM peak hour trips and 1,539 weekday trips.

TABLE 1: SITE TRIP GENERATION

LAND USE (ITE CODE)	SIZE	PM PEAK HOUR TRIPS			WEEKDAY TRIPS
		IN	OUT	TOTAL	
HISTORIC LAND USE					
MIXED USE BUILDING	177.2 KSF	**21**	**101**	**122**	**1,102** [a]
PROPOSED LAND USE					
GENERAL OFFICE BUILDING (710)	52.5 KSF	10	52	62	567
WAREHOUSING (150)	61.1 KSF	9	26	35	142
RESEARCH AND DEVELOPMENT CENTER (760)	61.1 KSF	7	38	45	830
	TOTAL	**26**	**116**	**142**	**1,539**
	NET DIFFERENCE (PROPOSED – HISTORIC)	***+5***	***+15***	***+20***	***+437***

[a] The weekday trips for the historic land use were not provided in the previous 2013 TIA and therefore were estimated as part of this analysis to determine the net new weekday trip generation.

NET TRIPS/TRANSPORTATION IMPACT STUDY REQUIREMENT

As shown in the table above, the trip generation for the proposed site plan was compared to how the site was historically used. The proposed land use will generate 142 PM peak hour trips and 1,539 weekday trips and the historical approved land use generated 122 PM peak hour trips and 1,102 weekday trips, this equates to an increase of 20 net new PM peak trips and 437 net new weekday trips.

[2] Trip Generation Manual, Institute of Transportation Engineers, 10th Edition, 2017.

Since the net increase in PM peak hour trips is only 20 PM peak hour trips and recent transportation studies in the area did not identify capacity issues that would be impacted by this trip level, a full study is not recommended.

PROJECT TRIPS THROUGH I-5 INTERCHANGE AREAS

A Select Zone Analysis for the site was ran using the City of Wilsonville Travel Demand Model. The model showed that approximately 45% of the trips generated by the site are expected to travel through the I-5/Elligsen Road interchange and 10% are expected to travel through the I-5/Wilsonville Road interchange. Therefore, the proposed land use is expected to generate 9 total net new pm peak hour trips through the I-5/Elligsen Road interchange area and 2 total net new pm peak hour trips through the I-5/Wilsonville Road interchange area.

SITE PLAN EVALUATION

This section reviews the proposed site plan including site access, internal circulation, bicycle and pedestrian needs, and parking.

SITE ACCESS

The site currently has three driveway access points along SW Freeman Drive and one access point along SW 95th Avenue. The driveways along SW Freeman Drive are spaced approximately 170 ft apart (edge-to-edge) and the street is classified as a Local Street. The one driveway along SW 95th Avenue is spaced approximately 500 ft from the intersection of Freeman and 95th and is classified as a Minor Arterial. The Wilsonville Public Works Standards[3] state that for Minor Arterials, the minimum access spacing between driveways is 600 ft and that driveways for commercial or industrial developments need to be at least 100 ft away the closest intersection. For Local Streets, there is to be access provided to each lot. The site access requirements are met and are not planned to be modified as part of this project. Prior to occupancy, sight distance at any existing or proposed access points will need to be verified, documented, and stamped by a registered professional Civil or Traffic Engineer licensed in the State of Oregon.

INTERNAL CIRCULATION

The proposed site plan is maintaining the same site circulation plan that is currently used. The front of the building has a large parking aisle width of approximately 35 ft. The back of the building has a parking aisle width of approximately 23 ft where there is two-way traffic with 90-degree vehicular parking and a parking aisle width of approximately 12 ft where there is one-way traffic with angled vehicular parking. Based on the site plan, the internal roadway network appears to provide adequate turning radii to allow safe circulation.

[3] Table 2.12, Wilsonville Public Works Standards, Community Development Department, September 2017.

BICYCLE AND PEDESTRIAN FACILITIES

The site currently has sidewalks and bicycle lanes on both sides of SW Freeman Drive and SW 95th Avenue. Existing stripped pedestrian crosswalks in the parking lot will be maintained. As per the site plan, a new accessible path extending from the main building entrance in the SW corner of the building out to SW Freeman Drive will be added. The existing pedestrian facilities are sufficient for the site, but the new pedestrian path will improve pedestrian connectivity from the building to the public right of way.

PARKING

The proposed site plan is required to comply with the Wilsonville Development Code's requirements[4] on vehicular and bicycle parking. However, there is not a designated parking requirement for a laboratory land use in the City's code. Therefore, a parking analysis was completed by SERA Architects[5] to evaluate the vehicular parking demand for the site. It was determined that 190 vehicular parking spaces must be provided based on the number of expected employees. This analysis was conducted by applying the City's parking requirements for office and storage/warehouse space, utilizing a study that provided average parking for laboratories, and applying a the shared-use facility reduction from Institute of Transportation Engineers (ITE) Parking Generation Manual. The site plan shows a total of 210 vehicular parking stalls that are expected to be conserved on-site, meeting the parking demand of 190 vehicular parking stalls.

For bicycle parking, the City requires a minimum of 1 bicycle stall per 5000 sq. ft of office space and 1 bicycle stall per 20,000 sq. ft of warehousing/storage space. No value is given for laboratory space. If the building is assumed to be 50%/50% office and warehousing/storage as there is no value provided for laboratory space, this would equal 2 bicycle stalls per 25,000 sq. ft of space, totaling 14 bicycle parking stalls. The current site plan does not designate a specific number of bicycle parking stalls, but it is recommended that the site plan provide a minimum of 14 bicycle parking stalls to satisfy the development code requirements.

SUMMARY

Key findings of the trip generation memo are as follows:

- The proposed land use is estimated to generate 20 net new PM peak hour trips and 437 net new weekday trips.
- Since the net increase in PM peak hour trips is only 20 PM peak hour trips and recent transportation studies in the area did not identify capacity issues that would be impacted by this trip level, a full study is not recommended.

[4] Section 4.155, Wilsonville Planning and Land Development Ordinance, June 2020.

[5] Parking Analysis, SERA Architects, September 2020.

- It is expected that 9 net new PM peak hour trips will travel through the I-5/Elligsen Road interchange area and 2 PM peak hour trips will travel through the I-5/Wilsonville Road interchange area.
- Prior to occupancy, sight distance at any existing or proposed access points will need to be verified, documented, and stamped by a registered professional Civil or Traffic Engineer licensed in the State of Oregon.
- The proposed site plan provides adequate site access, internal circulation, and bicycle and pedestrian facilities.
- It is recommended that the site provide a minimum of 14 bicycle parking spaces as required by City Code.

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JTE
Janet Turner Engineering, LLC

PRELIMINARY
STORM DRAINAGE REPORT

North Valley Complex (NVC) Restoration

26755 SW 95th Avenue, Wilsonville, OR 97070

BY: Janet L Turner, P.E.
Janet Turner Engineering, LLC
16869 65th Avenue, #194, Lake Oswego OR 97035
(541) 510-0878

Owner/Developer: State of Oregon
Department of Administration Services
155 Cottage Street NE, #U90, Salem, OR 97301
(503) 378-3104

Architect: SERA Architecture
1645 NW Hoyt Street
Portland, OR 97209
(503) 444-2200

Report Date: March 9, 2021

JTE
Janet Turner Engineering, LLC

North Valley Complex (NVC) Renovation
Preliminary
Storm Drainage Report

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Report Sections:

Appendices:

Preliminary Storm Drainage Report Narrative

JTE
Janet Turner Engineering, LLC

To: City of Wilsonville, Oregon

From: Janet Turner, P.E., Janet Turner Engineering, LLC

cc:

Date: March 9, 2021

Re: North Valley Complex (NVC) Renovation – Preliminary Storm Drainage Report

Section A - Project Overview and Description

Proposed is the renovation of the existing manufacturing warehouse purchased by the Oregon Department of Administrative Services (DAS). The 9.76-acres site contains an existing approximately 175,600 square feet building, surrounded by a paved parking lot. The project site is bound by SW 95th Avenue on the east, SW Freeman Drive on the south, a ravine and foodservice supply company to the west, and a recreational vehicle parking lot to the north in Wilsonville, Oregon.

The existing single-story building currently includes Corporate style Class-A office space, a manufacturing floor, clean rooms, testing labs and a shipping/receive warehouse. The proposed renovation will be focused on creating a space that can be shared, allowing for the consolidation and resource-sharing of multiple agencies, including Oregon Department of Agriculture, Occupational Safety and Health Administration (OSHA), Department of Environmental Quality (DEQ), Oregon State Police (OSP) and other future tenants, in addition to DAS. Proposed uses of the renovated space includes office, storage, and laboratories.

The existing landscaping consists primarily of trees and shrubs around the perimeter of the site. The site is relatively level, with elevations typically ranging from approximately 227 to 230 feet, except for the northeast corner of the site where elevations are up to approximately 233 feet. The ravine west of the site slopes down at an approximately 2H:1V slope or flatter to an elevation of approximately 218 feet.

The existing site stormwater runoff sheet flows across the paved areas and into various catch basins arranged around the site. Runoff from the catch basins and roof downspouts to the south of the site is piped underground directly into the existing 15" and 18" storm drain main running in SW Freeman Drive. Runoff and roof downspouts to the north and west of the site outfalls to the existing wetland area to west of the site and into the ravine discussed previously. Refer to the Survey drawing in Appendix A, herein. Per Section 301.1.02.c of the 2015 City of Wilsonville Stormwater and Surface Water Design and Construction Standards, properties or development draining directly to and within 300 feet of the Coffee Lake wetlands are exempt from the flow control standards. These projects are still subject to the water quality, conveyance and erosion

prevention and sediment control provisions of these standards. In discussions with City staff, we understand that while the site is quite close to the Coffee Lake wetlands area, it is greater than 300 feet away, so the exemption does not apply for this project.

A professional geotechnical site investigation was performed with a formal report provided by GeoDesign, Inc., dated September 18, 2020, which is attached in Appendix D, herein. The geotechnical report describes the soils characteristics as stratified silt and clay with minor sand. Groundwater was not encountered in any of the deeper borings, to a depth of 31.5 feet below grade. However, according to the Geotechnical Report, some perched water is present at a depth of approximately 7 to 17 feet below grade, while the regional groundwater level is located at a depth of more than 30 feet. Infiltration testing was performed in 2 borings, using the falling head method. Results were infiltration rates of 0.80 inches per hour at 7.5 feet below grade (near the proposed stormwater planter) and 0.0 inches per hour at 15.0 feet below grade. The BMP facility infiltration rates were set at 0.35 to 0.49 inches per hour for type C1 soils in the City's BMP Sizing Tool.

The total proposed new and/or redeveloped impervious surface area is 14,831 square feet, which exceeds the 5,000 square foot threshold of new/redeveloped impervious area, requiring both water quality treatment and flow control for the runoff, per Section 301.1.02.a of the 2015 City of Wilsonville Stormwater and Surface Water Design and Construction Standards. Proposed is the development of a new stormwater planter to meet these requirements. Due to the existing site topography and as a measure to reduce additional disturbance of existing surfaces, approximately 20,331 square feet of existing roof area will be directed to the new planter in lieu of some of the redeveloped asphalt areas in the parking lot, which slopes to the south and away from the proposed stormwater planter. As such, the total area that is managed on-site is 35,162 square feet.

Refer to the Land Use drawings in Appendix B for the proposed disturbed area redevelopment and proposed planter location. A Site Assessment and Planning Checklist has been attached in Appendix C, herein.

Section B – Methodology

Private on-site development will be required to provide stormwater management in accordance with the current version of the December 2015 City of Wilsonville Stormwater and Surface Water Design and Construction Standards, specifically Section 3 – Public Works Standards. The city has performance standards, with corresponding design storm, for three separate purposes associated with Best Management Practices (BMP). These include:

LID Requirement:

Performance Standard: Retain and infiltrate the runoff volume from the 10-year, 24-hour storm event within 72 hours.

Design Storm: 3.4 inches over a 24-hour period

Water Quality Requirement:

Performance Standard: Capture and treat 80% of the average annual runoff.

Design Storm: 1.0 inch over a 24-hour period

Flow Control Requirement:

Performance Standard: Maintain peak flow rates at their **pre-development** levels from 42% of the 2-year up to the 10-year, 24-hour runoff events.
Design Storm:

2-year, 24-hour: 2.50 inches
10-year, 24-hour: 3.45 inches
25-year, 24-hour: 3.90 inches
100-year, 24-hour: 4.50 inches

General Conveyance Requirement:

Performance Standard: Development shall not cause or increase flooding of adjacent or downstream property. Conveyance systems shall be designed and constructed to carry the 25-year design storm flowing full with no pressure flow.

Infiltration testing revealed a rate of 0.80 inches per hour in the vicinity of the proposed stormwater planter. The BMP Sizing Tool was used to size a Filtration Stormwater Planter. The BMP Sizing Tool is a customized tool selected by the City of Wilsonville that is used to assist developers in designing stormwater management facilities using continuous simulation modeling with long-term rainfall data. The design will include confirmation of an available on-site/downstream storm drain discharge location and proposes to meet the remaining water quality and flow control requirements.

Section C – Analysis

The total proposed new and/or redeveloped impervious surface area is 14,831 square feet, which exceeds the 5,000 square foot threshold of new/redeveloped impervious area, requiring both water quality treatment and flow control for the runoff, per Section 301.1.02.a of the 2015 City of Wilsonville Stormwater and Surface Water Design and Construction Standards. Proposed is the development of a new stormwater planter to meet these requirements. Due to the existing site topography and as a measure to reduce additional disturbance of existing surfaces, approximately 20,331 square feet of existing roof area will be directed to the new planter in lieu of some of the redeveloped asphalt areas in the parking lot, which slopes to the south and away from the proposed stormwater planter. As such, the total area that is managed on-site is 35,162 square feet.

Stormwater quality treatment and flow control were designed using the BMP Sizing Tool method, results of which are attached in Appendix C.

Proposed to meet the water quality and flow control requirements is one filtration stormwater planter. Overflow from the planter will be conveyed via underground piping to the existing storm drain system running in SW Freeman Drive. This BMP facility has been sized to meet both the water quality and flow control requirements. A plan-view layout of the proposed site plan, storm drain plan, and associated details can be found in the Land Use drawings Appendix B, attached herein.

Due to the poor-draining soils, the design includes a perforated underdrain within the drain rock section of the facility. Runoff will enter the planter and be both filtered and detained within the

growing medium and drain rock, with any un-infiltrated water collecting within the perforated pipe, which then discharges and is eventually conveyed to the existing storm drain system.

Section D – Engineering Conclusions

Conveyance of the site stormwater runoff has been designed per the current city of Wilsonville Stormwater and Surface Water Design and Construction Standards, dated December 2015. The storm drain system for the development incorporates a filtration stormwater planter. Construction erosion and sediment control measures are proposed per city of Wilsonville. Refer to Appendix B for the Land Use drawings.

JTE
Janet Turner Engineering, LLC

APPENDIX A

SURVEY DRAWING

LEGAL DESCRIPTION

PARCEL 1, PARTITION PLAT NO. 2001-119, IN THE CITY OF WILSONVILLE, COUNTY OF CLACKAMAS AND STATE OF OREGON;

TOGETHER WITH AN EASEMENT FOR INGRESS AND EGRESS AS SET FORTH IN RECIPROCAL ACCESS EASEMENT RECORDED APRIL 7, 1997 AS NO. 97-028076, RECORDS OF CLACKAMAS COUNTY, OREGON AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

A TRACT OF LAND FOR RECIPROCAL ACCESS EASEMENT PURPOSES LOCATED IN THE NORTHEAST ONE-QUARTER OF SECTION 11, TOWNSHIP 3 SOUTH, RANGE 1 WEST OF THE WILLAMETTE MERIDIAN IN CLACKAMAS COUNTY, OREGON, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE WESTERLY RIGHT OF WAY LINE OF SW 95TH AVENUE, 62.00 FEET WIDE, SAID POINT BEARS SOUTH 01°34'29" WEST, 1501.90 FEET AND SOUTH 88°45'35" EAST, 694.69 FEET FROM THE NORTH ONE-QUARTER CORNER OF SAID SECTION 11; THENCE ALONG SAID WESTERLY RIGHT OF WAY LINE, NORTH 01°16'30" EAST, 28.00 FEET; THENCE LEAVING SAID WESTERLY RIGHT OF WAY LINE, NORTH 88°41'39" WEST, 27.00 FEET TO A POINT ON THE ARC OF A TANGENT 40.00 FOOT RADIUS CURVE LEFT; THENCE ALONG THE ARC OF SAID CURVE 50.73 FEET THROUGH A CENTRAL ANGLE OF 72°39'39" (THE LONG CHORD OF WHICH BEARS SOUTH 54°58'44" WEST, 47.39 FEET) TO A POINT OF NON-TANGENCY; THENCE SOUTH 88°45'35" EAST, 68.18 FEET TO THE POINT OF BEGINNING.

THE LEGAL DESCRIPTION SHOWN ABOVE DESCRIBES ALL THAT PROPERTY IN THE PRELIMINARY TITLE REPORT IDENTIFIED AS "WFG NATIONAL TITLE INSURANCE COMPANY" ORDER NUMBER 19-308675, WITH AN EFFECTIVE DATE OF AUGUST 20, 2020.

NOTES CORRESPONDING TO SCHEDULE B

WFG NATIONAL TITLE INSURANCE COMPANY; ORDER NO: 19-308675; EFFECTIVE DATE: AUGUST 20, 2020;

THE FOLLOWING SURVEY RELATED ITEMS WERE FOUND IN SAID TITLE REPORT AND ARE REFERENCED ON THIS MAP.

6. RIGHTS OF THE GOVERNMENTAL BODIES TO ANY PORTION LYING WITHIN TAPMAN CREEK.
SAID CREEK IS SHOWN IN ITS APPROXIMATE LOCATION HEREON.

7. AN EASEMENT FOR ELECTRIC PURPOSES RECORDED JULY 3, 1967 IN BOOK 692, PAGE 808.
SAID ITEM LIES ON THE SUBJECT PROPERTY AND IS SHOWN HEREON AS DELINEATED ON PARTITION PLAT 2001-119.

8. AN EASEMENT FOR SANITARY SEWER PURPOSES RECORDED FEBRUARY 9, 1978 AS RECORDING NO. 78-5702.
SAID ITEM LIES ON SUBJECT PROPERTY AND IS THEREFORE SHOWN HEREON.

9. RECIPROCAL ACCESS EASEMENT RECORDED APRIL 7, 1997 AS RECORDING NO. 97025076.
SAID ITEM LIES ON SUBJECT PROPERTY AND IS THEREFORE SHOWN HEREON.

10. EASEMENTS FOR PIPELINE PURPOSES DELINEATED ON THE FACE OF PARTITION PLAT NO. 2001-119, RECORDED DECEMBER 6, 2001 AS REC. NO. 2001-102956.
SAID ITEM NOTES THREE 15' PIPELINE EASEMENTS, ALL SHOWN HEREON.

11. MATTERS IN DOCUMENT RECORDED DECEMBER 19, 2013 AS RECORDING NO. 2013-083295; AMENDED OCTOBER 7, 2014 AS RECORDING NO. 2014-051541.
SAID ITEM IS BLANKET IN NATURE OVER THE SUBJECT PROPERTY AND IS THEREFORE NOT SHOWN HEREON.

12. CONDITIONS AND RESTRICTIONS PER CITY OF WILSONVILLE CASE FILE NO. 98 AR 54 AS SHOWN ON THE FACE OF PARTITION PLAT NO. 2001-119, RECORDED DECEMBER 6, 2001 AS REC. NO. 2001-102956.
SAID ITEM IS BLANKET IN NATURE OVER THE SUBJECT PROPERTY AND IS THEREFORE NOT SHOWN HEREON.

13. MATTERS DISCLOSED IN AN ALTA SURVEY BY LEE A. SPURGEON OF TOWNSHIP LAND SURVEYS, LLC DATED NOVEMBER 6, 2019 AS JOB NO. 19-7271.
SAID ITEM WOULD BE REPLACED BY THE CURRENT SURVEY, AND IS THEREFORE NOT SHOWN HEREON.

GENERAL NOTES

1. THE LOCATION OF UTILITIES SERVING THE SUBJECT PROPERTY CAN ONLY BE DETERMINED BY OBSERVED EVIDENCE TOGETHER WITH PLANS AND MARKINGS PROVIDED BY CLIENT, UTILITY COMPANIES, AND OTHER APPROPRIATE SOURCES. THE LOCATION OF UTILITIES EXISTING ON OR SERVING THE SURVEYED PROPERTY FOR THIS SURVEY WAS DETERMINED BY OBSERVATION OF ABOVE GROUND EVIDENCE, FROM MAPS PROVIDED BY THE CLIENT AND THE CITY OF WILSONVILLE, AND BY MARKINGS ON THE GROUND PROVIDED IN RESPONSE TO AN 811 LOCATE REQUEST, TOGETHER WITH MARKINGS MADE BY GPRS. THIS SURVEY WOULD NOT SHOW UTILITIES COVERED BY VEHICLES, OR OVERGROWTH OF FOLIAGE, TREES, BUSH OR SHRUBS.
2. THE BUILDING FOOTINGS WERE NOT EASILY ACCESSIBLE AND THEREFORE THE BUILDING LIMITS SHOWN HEREON, AND THE BUILDING SQUARE FOOT CALCULATIONS, WERE MEASURED ALONG THE BUILDING FASCIA.
3. ITEM NUMBERS SHOWN HEREON ARE STATED AS MATTERS ON REFERENCED COMMITMENT. NO RESPONSIBILITY FOR THE COMPLETENESS, ACCURACY, OR CONTENT OF SAID REPORT IS ASSUMED BY THIS MAP.
4. THERE IS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION OR BLDG. ADDITIONS WITHIN RECENT MONTHS.
5. THERE ARE NO CHANGES IN STREET RIGHT OF WAY LINES EITHER COMPLETED OR PROPOSED TO THE BEST OF OUR KNOWLEDGE, AND AVAILABLE FROM THE CONTROLLING JURISDICTION.
6. THERE IS NO OBSERVABLE EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS.
7. THERE IS NO OBSERVABLE EVIDENCE OF SITE USE AS A CEMETERY.
8. THIS SURVEY MAP CORRECTLY REPRESENTS THE FACTS FOUND AT THE TIME OF THE SURVEY.
9. THERE ARE NO DISCREPANCIES BETWEEN THE BOUNDARY LINES OF THE PROPERTY AS SHOWN ON THIS SURVEY MAP AND AS DESCRIBED IN THE LEGAL DESCRIPTION PRESENTED IN THE TITLE COMMITMENT.
10. THE BOUNDARY LINE DIMENSIONS AS SHOWN ON THIS SURVEY MAP FORM A MATHEMATICALLY CLOSED FIGURE WITHIN +/-0.1'.
11. THE BOUNDARY LINES OF THE PROPERTY ARE CONTIGUOUS WITH THE BOUNDARY LINES OF ALL ADJOINING STREETS, HWYS., RIGHTS OF WAY AND EASEMENTS, PUBLIC OR PRIVATE, AS DESCRIBED IN THEIR MOST RECENT RESPECTIVE LEGAL DESCRIPTIONS OF RECORD.
12. EXCEPT AS OTHERWISE NOTED BELOW, IF THE PROPERTY CONSISTS OF TWO OR MORE PARCELS, THERE ARE NO GAPS OR GORES BETWEEN SAID PARCELS.
13. WETLAND DELINEATION MARKERS AS SET BY A QUALIFIED SPECIALIST WERE OBSERVED DURING THE COURSE OF THE SURVEY, AND THE LOCATION OF SAID WETLAND AREA IS SHOWN HEREON BASED ON SAID MARKERS.
14. THE SUBJECT PROPERTY HAS DIRECT ACCESS TO/FROM SW FREEMAN DRIVE AND SW 95TH AVENUE, BEING PUBLIC RIGHT-OF-WAY WAY, AND ALSO GAINS INDIRECT ACCESS TO/FROM SAID SW 95TH AVENUE BY WAY OF AN EASEMENT RECORDED AS REC. NO. 97-028076.
15. ANY APPURTENANT EASEMENTS NOTED IN DOCUMENTS PROVIDED TO THE SURVEYOR ARE SHOWN OR NOTED HEREON.
16. NO PARTY WALLS EXIST BETWEEN THE SUBJECT PROPERTY AND ANY ADJOINING PROPERTIES.
17. ELEVATIONS SHOWN HEREON ARE BASED ON MONUMENT 7819 AS NOTED IN CLACKAMAS COUNTY SURVEY NO. PS-28942, WHICH BEARS AN ELEVATION OF 194.416 FEET ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929, WHICH WAS CONVERTED TO AN ELEVATION OF 197.623 FEET ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 USING NGVI. CONTOURS ARE SHOWN HEREON ON A ONE FOOT INTERVAL.
18. CONTOURS SHOWN IN THOSE AREAS LISTED AS "OVERGROWN AREAS" ARE APPROXIMATE, ONLY. SUFFICIENT DATA TO CREATE ACCURATE CONTOURS COULD NOT BE GATHERED AT THE TIME OF THE SURVEY DUE TO DENSE BLACKBERRY GROWTH.

SITE RESTRICTIONS

ZONING INFORMATION WAS NOT PROVIDED TO SURVEYOR PURSUANT TO TABLE A ITEM 6.

EXISTING PARKING:

REGULAR PARKING:	185 SPACES
MOTORCYCLE PARKING:	4 SPACES
HANDICAP PARKING:	7 SPACES
TOTAL PARKING:	196 SPACES

LAND AREA

THE LAND AREA OF THE SUBJECT PROPERTY IS 423,144 S.F. (9.76 AC.) AS DESCRIBED IN THE LEGAL DESCRIPTION SHOWN HEREON.

STATEMENT OF POSSIBLE ENCROACHMENTS

(A) — BUS STOP EXTENDS UP TO 3.9' WESTERLY INTO THE SUBJECT PROPERTY.

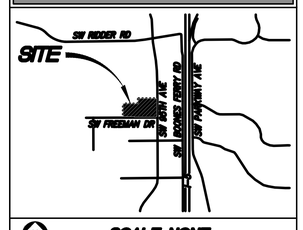
FLOOD NOTE

THE SUBJECT PROPERTY LIES WITHIN ZONE "X" (UNSHADED) OF THE FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 41005C0534D, WHICH BEARS AN EFFECTIVE DATE OF JUNE 17, 2008. ZONE "X" (UNSHADED) IS DEFINED AS AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

BASIS OF BEARINGS

THE BEARINGS SHOWN HEREON ARE BASED ON THE CENTER LINE OF SW 95TH AVENUE AS SHOWN ON PARTITION PLAT NO. 2001-119 FILED IN THE CLACKAMAS COUNTY RECORDER'S OFFICE, BEING NORTH 01°16'29" EAST.

VICINITY MAP



SCALE: NONE

SURVEYOR'S CERTIFICATION

TO: STATE OF OREGON, BY AND THROUGH THE DEPARTMENT OF ADMINISTRATIVE SERVICES; WFG NATIONAL TITLE INSURANCE COMPANY

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 2, 3, 4, 6A, 6B, 7A, 7B1, 7C, 8, 9, 10A, 11, 13, 16, 17, 18, 19, AND 20 OF TABLE A THEREOF.

THE FIELDWORK WAS COMPLETED ON: 8/24/2020
DATE OF LAST REVISION:

TERRAMARK
9105 SW HALL BOULEVARD, SUITE #201
BEAVERTON, OR 97008; PH: 503/590-2205

ALTA/NSPS LAND TITLE SURVEY

NORTH VALLEY COMPLEX ("NVC")

26755 SW 95TH AVENUE
WILSONVILLE, OREGON
CONTRACT # DASPS-1618-20
PCA PROJECT/PHASE 917600/04

DATE : 8/26/2020	DRAWN BY: K.L.M.	JOB NO: 20204302	SHEET: 1 OF 3
SCALE : 1" = 30'	CHKD BY: M.A.H.		

LEGEND

B.SW.	BACK OF SIDEWALK
(C)	CALCULATED DATA
C.L.	CENTER LINE
C.O.	CLEAN OUT
C.T.	CONIFEROUS TREE
CLM.	COLUMN
D.I.	DRAIN INLET
D.T.	DECIDUOUS TREE
E.CAB.	ELECTRIC CABINET
ELEV.	ELEVATION
FD.	FOUND
F.H.	FIRE HYDRANT
G.M.	GAS METER
G.P.	GUARD POST
G.V.T.	GAS VAULT
I.P.	IRON PIPE
I.R.	IRON ROD
L.P.	LIGHT POLE
L.S.	LANDSCAPING
(M)	MEASURED DATA
M.P.S.	MOTORCYCLE PARKING SPACE
MB.	MAILBOX
MON.SN.	MONUMENT SIGN
OH.	OVERHANG
P.L.	PROPERTY LINE
P.S.	PARKING SPACE
(R1)	PARTITION PLAT 2001-119
R.P.C.	RED PLASTIC CAP
S.M.H.	SEWER MAN HOLE
SN.	SIGN
T.PED.	TELEPHONE PEDESTAL
TR.	TRANSFORMER
(TYP)	TYPICAL
W.T.	VAULT
W.M.	WATER METER
W.V.	WATER VALVE
Y.P.C.	YELLOW PLASTIC CAP
	BLOCK/CONCRETE WALL
	CONCRETE
	ASPHALTIC CONCRETE
	BUILDING LINE
	HANDICAP PARKING
	CHAIN LINK FENCE
	LIGHT POLE
OHW	OVERHEAD WIRE

CURVE TABLE				
CURVE	LENGTH	RADIUS	DELTA	CHORD
C1(C,R1)	62.77'	40.00'	89°55'05"	S46°16'02"W 56.53'

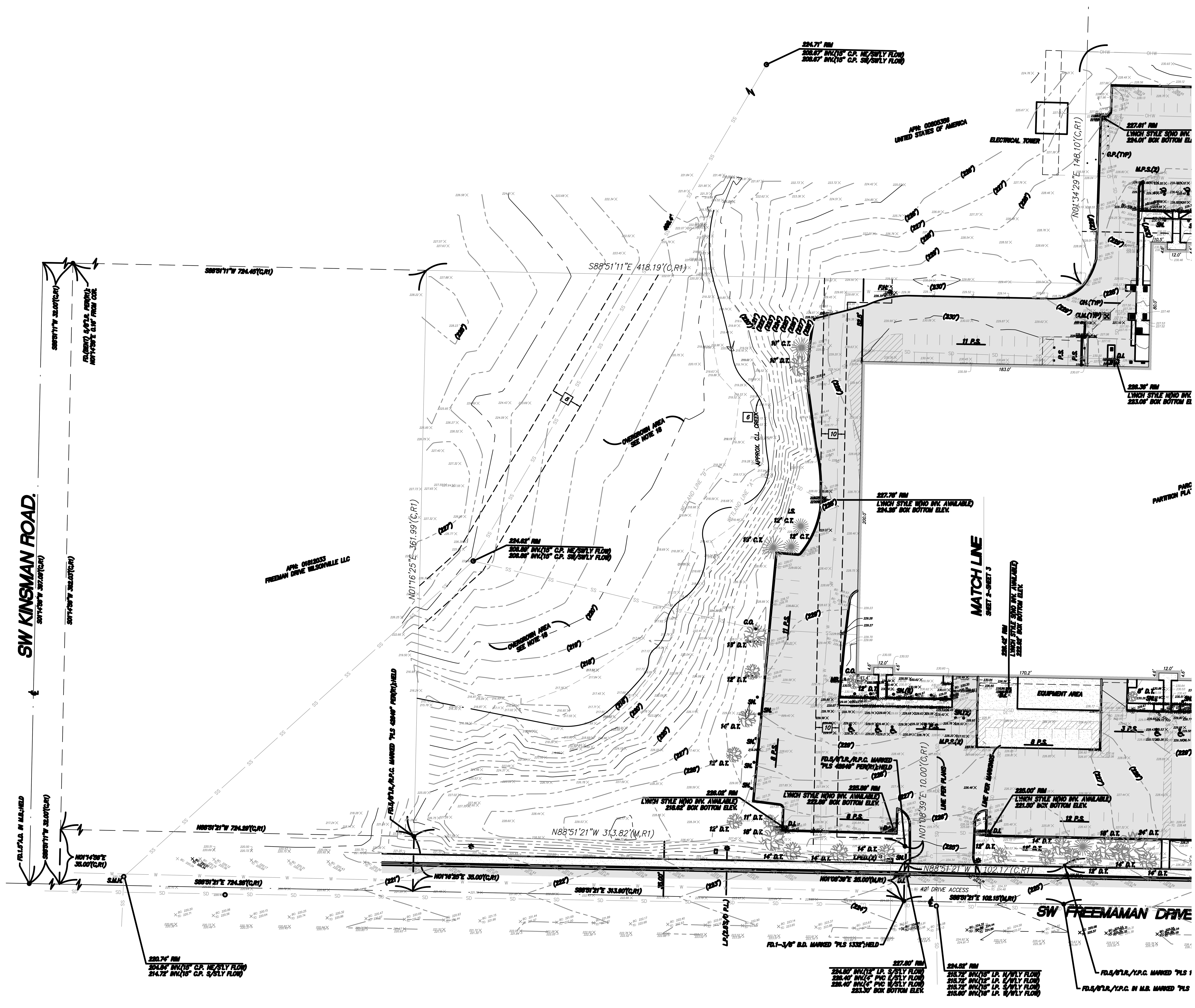
TERRA MARK

30' 15' 0 30' 60'

SCALE 1" = 30'

TERRAMARK

8180 SW HALL BOULEVARD, SUITE 200
BEAVERTON, OR 97008; PH: 503/590-2355



LEGEND

B.SW.	BACK OF SIDEWALK
(C)	CALCULATED DATA
C.L.	CENTER LINE
C.O.	CLEAN OUT
C.T.	CONIFEROUS TREE
CLM.	COLUMN
D.I.	DRAIN INLET
D.T.	DECIDUOUS TREE
E.CAB.	ELECTRIC CABINET
ELEV.	ELEVATION
FD.	FOUND
F.H.	FIRE HYDRANT
G.M.	GAS METER
G.P.	GUARD POST
G.VLT.	GAS VAULT
I.P.	IRON PIPE
I.R.	IRON ROD
L.P.	LIGHT POLE
LS.	LANDSCAPING
(M)	MEASURED DATA
M.P.S.	MOTORCYCLE PARKING SPACE
MB.	MAILBOX
MON.SN.	MONUMENT SIGN
OH.	OVERHANG
P.L.	PROPERTY LINE
P.S.	PARKING SPACE
(R1)	PARTITION PLAT 2001-119
R.P.C.	RED PLASTIC CAP
S.M.H.	SEWER MAN HOLE
SN.	SIGN
T.PED.	TELEPHONE PEDESTAL
TR.	TRANSFORMER
(TYP)	TYPICAL
VLT.	VAULT
W.M.	WATER METER
W.V.	WATER VALVE
Y.P.C.	YELLOW PLASTIC CAP
	BLOCK/CONCRETE WALL
	CONCRETE
	ASPHALTIC CONCRETE
	BUILDING LINE
	HANDICAP PARKING
	CHAIN LINK FENCE
	LIGHT POLE
OHW	OVERHEAD WIRE

TERRA MARK

30' 15' 0 30' 60'

SCALE 1" = 30'

TERRAMARK

8196 SW HALL BOULEVARD, SUITE #201
BEAVERTON, OR 97008; PH: 503/860-2255

JOB NO: 20204302 | SHEET: 3 OF 3

JTE
Janet Turner Engineering, LLC

APPENDIX B

LAND USE DRAWINGS

NORTH VALLEY COMPLEX RESTORATION
WILSONVILLE, OREGON

CIVIL DESIGN REVIEW

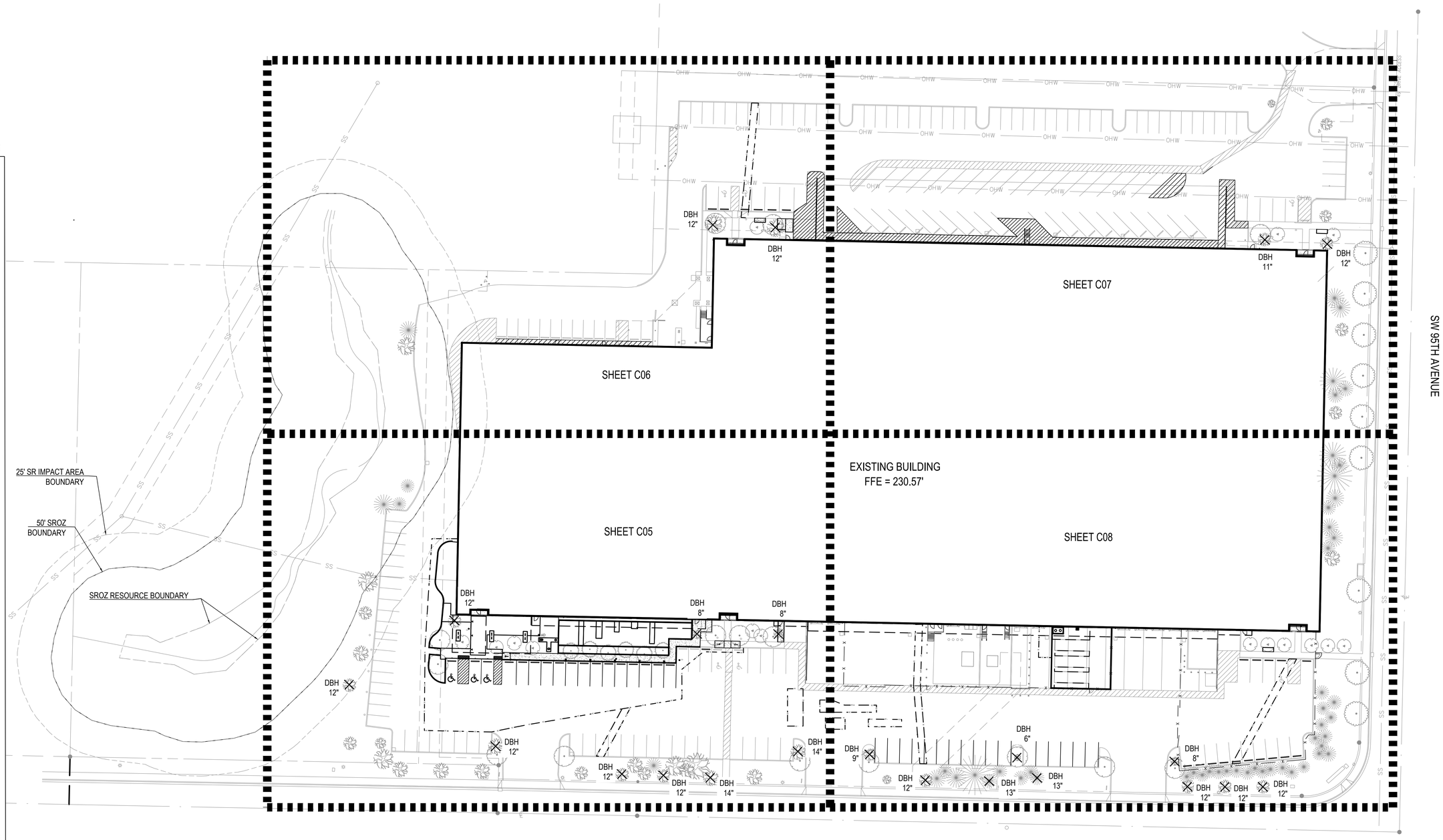
MARCH 2021

SHEET INDEX

PROPOSED / NEW LEGEND AND ABBREVIATIONS

AC	ASPHALT CONCRETE
ADA	AMERICANS WITH DISABILITIES ACT
APPROX	APPROXIMATELY
BC	BOTTOM OF CURB
BPA	BONNEVILLE POWER ADMINISTRATION
BWALL	BOTTOM OF WALL
CONST	CONSTRUCT
CP	CONTROL POINT
DBH	DIAMETER BREAST HEIGHT
DS	DOWNSPOUT
EA	EACH
EG	EXISTING GRADE
EL	ELEVATION
ESMT	EASEMENT
EX	EXISTING
FFE	FINISH FLOOR ELEVATION
FG	FINISH GRADE
FL	FLOWLINE
FT	FOOT/FEET
FS	FINISHED SURFACE
GB	GRADE BREAK
GPS	GLOBAL POSITIONING SYSTEM
L	LENGTH
LF	LINEAR FEET
ME	MATCH EXISTING
MH	MANHOLE
MEP	MECHANICAL ELECTRICAL PLUMBING
MIN	MINIMUM
PERF	PERFORATED
PCC	PORTLAND CEMENT CONCRETE
PL	PROPERTY LINE
PUE	PUBLIC UTILITY EASEMENT
PVMT	PAVEMENT
R	RADIUS
ROW	RIGHT OF WAY
S	SLOPE
SF	SQUARE FEET
SROZ	SIGNIFICANT RESOURCE OVERLAY ZONE
STD	STANDARD
SWP	STORMWATER PLANTER
TC	TOP OF CURB
TP	TOP OF PAVEMENT
TYP	TYPICAL
TW	TOP OF WALK
TWALL	TOP OF WALL

- SAWCUT LINE
- NEW CURB
- 8"SD — STORM DRAIN (SD)
- CO — CLEAN OUT (CO)
- AD — AREA DRAIN (AD)
- VTCO — VERTICAL TRANSITION CLEAN OUT (VCO)
- GB — GRADE BREAK
- TP 32.56' — SPOT ELEVATION
- OVERLAND DRAINAGE DIRECTION
- EXISTING TREE REMOVAL WITH DIAMETER
- x — NEW FENCING



North Valley Complex Renovation
Design Review Package
04 March, 2021

PLAN SCALE
30 0 15 30 60
1 INCH = 30 FT.

N

JTE Janet Turner Engineering, LLC

CIVIL COVER SHEET/KEY PLAN C04

CONSTRUCTION NOTES

1. EXISTING DOWNSPOUT TO BE REVISED TO DISCHARGE ROOF RUNOFF AT THE ELEVATION DEPICTED ON THE PLANS. EXISTING DOWNSPOUT SHALL BE CUT TO THE NEW/HIGHER ELEVATION AND RESTRAINED/STRAPPED TO THE FACE OF THE BUILDING AS PER ARCHITECTURAL/PLUMBING PLANS. EXISTING CLEANOUT AT PAVEMENT ELEVATION SHALL BE PLUGGED/CAPPED.
2. INSTALL CLEANOUT. REFER TO DETAIL 4, SHEET C09.
3. INSTALL AREA DRAIN. REFER TO DETAIL 5, SHEET C09.
4. INSTALL VERTICAL TRANSITION CLEANOUT. REFER TO DETAIL 9, SHEET C09.
5. SAWCUT EXISTING ASPHALT, PER DETAIL 8, SHEET C09.

SHEET NOTES

1. REFER TO SHEET C04 FOR CIVIL LEGEND.
2. USE BUILDING APPROVED MATERIALS FOR ANY AND ALL ELEMENTS OF STORM DRAIN SYSTEM INSTALLED WITHIN 2-FEET OF BUILDINGS OR OTHER STRUCTURES.
3. ALL STORM DRAIN SERVICES SHALL BE SEPARATED FROM WATER MAIN AND LATERALS IN COMPLIANCE WITH OREGON HEALTH AUTHORITY (OAR 333-061-0050 (9)) AND OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY REGULATIONS.
4. SEE LANDSCAPE DRAWINGS FOR PLANTING PLAN, INCLUDING INFORMATION ABOUT PLANT MATERIALS AND DENSITY.
5. A PORTION OF EXISTING CONCRETE PAVEMENT AND WALLS IN THE LOADING DOCK AREA SHALL BE REMOVED AND REPLACED, PER THE DRAWINGS.
6. SEE SHEET C04 FOR LOCATION OF ALL TREES PROPOSED TO BE REMOVED.

PAVING LEGEND

VEHICULAR ASPHALT PAVEMENT

PEDESTRIAN CONCRETE PAVEMENTS

PLAZA CONCRETE PAVEMENTS
REFER TO LANDSCAPE ARCHITECTURAL PLANS FOR LAYOUT, SECTION AND SCORING

SAWCUT EXISTING ASPHALT PER 8/C05

EXISTING STORM DRAIN OUTFALL TO REMAIN
EXISTING CATCH BASIN TO REMAIN
EXISTING WATER MAIN TO REMAIN
15' PIPELINE EASEMENT
EXISTING BUILDING
FFE = 230.57'
EXISTING ROOF DRAIN TO BE RE-ROUTED TO NEW SWP AS SHOWN. EXISTING ROOF AREA APPROXIMATELY 9,921 SF
6" SD FL=229.13'
CONST 6" SD 61.6 LF
S=0.0100 FT/FT
228.66' TP/ME
NEW FULL DEPTH CURB, TYP
INSTALL 6"X4" WYE
6" SD FL=228.51'
CONST 6" SD 11.2 LF
S=0.0100 FT/FT
OUTFALL TO SWP=228.40'
EXISTING ROOF DRAIN TO BE RE-ROUTED TO NEW SWP. EXISTING ROOF AREA APPROXIMATELY 10,410 SF
SWP OVERFLOW
RIM=230.43'
6" SD FL=226.15'
CONST 6" SD 26.7 LF
S=0.0100 FT/FT
CONSTRUCT STORMWATER PLANTER (SWP)- 1,410 SF
TOP OF WALL = 230.76'
TOP OF TOPSOIL = 228.40'
BOTTOM DRAIN ROCK = 225.90'
SEE SHEET NOTE 5
7 C09
50' SROZ BOUNDARY
25' SROZ IMPACT AREA BOUNDARY
INSTALL SD AD
RIM=230.18'
4" SD FL=228.59'
CONST 4" SD 4.4 LF
S=0.0200 FT/FT
REMOVE EXISTING SMOKING SHELTER
NEW WHEEL STOP, TYP OF (1)
EXISTING WHEEL STOPS TO REMAIN TYP OF (4)
TC 230.40'
BC 229.90'
NEW ROOF OVERHANG, TYP.
229.66' TP/ME
1.5%
1.5%
6"SD
AD
5.3'
1.1%
1.5%
0.71%
3.8%
8.5%
7.3%
1.2%
2.8%
229.56' TP/ME
229.87' TP/ME
229.80' TP/ME
CONNECT TO EX 6" SD
6" SD FL=223.87'±
CONST 6" SD 10.1 LF
S=0.0100 FT/FT
CONST CO
RIM=228.50'
6" SD FL=223.77'
CONST 6" SD 46.4 LF
S=0.0100 FT/FT
INTEGRATED PEDESTRIAN LIGHT POLE FOOTINGS IN PLANTER WALL. TYP OF (3)
CONST VCO
RIM=229.37'
6" SD FL (N)=225.88'
6" SD FL (E)=223.31'
6" SD FL (S)=223.03'
CONST 6" SD 6.4 LF
S=0.0100 FT/FT
227.57' TP/ME
INSTALL NEW WHEEL STOP, TYP OF (17)
EXISTING CATCH BASIN TO REMAIN
227.29' TP/ME
CONNECT TO EX 6" SD
6" SD FL=222.71'±
EXISTING STORM DRAIN TO REMAIN
EXISTING STORM DRAIN TO REMAIN
SAWCUT EXISTING ASPHALT PAVEMENT, 78 LF
SW FREEMAN DRIVE
EXISTING CATCH BASIN TO REMAIN
EXISTING CATCH BASIN TO REMAIN
5' WIDE TRENCH PAVEMENT PATCHING FOR ELECTICAL

SERA

North Valley Complex Renovation

Design Review Package

04 March, 2021

PLAN SCALE
1 INCH = 10 FT.

JTE Janet Turner Engineering, LLC

SOUTHWEST CIVIL SITE PLAN

C05

CONSTRUCTION NOTES

1. SAWCUT EXISTING ASPHALT, PER DETAIL 8, SHEET C09.

SHEET NOTES

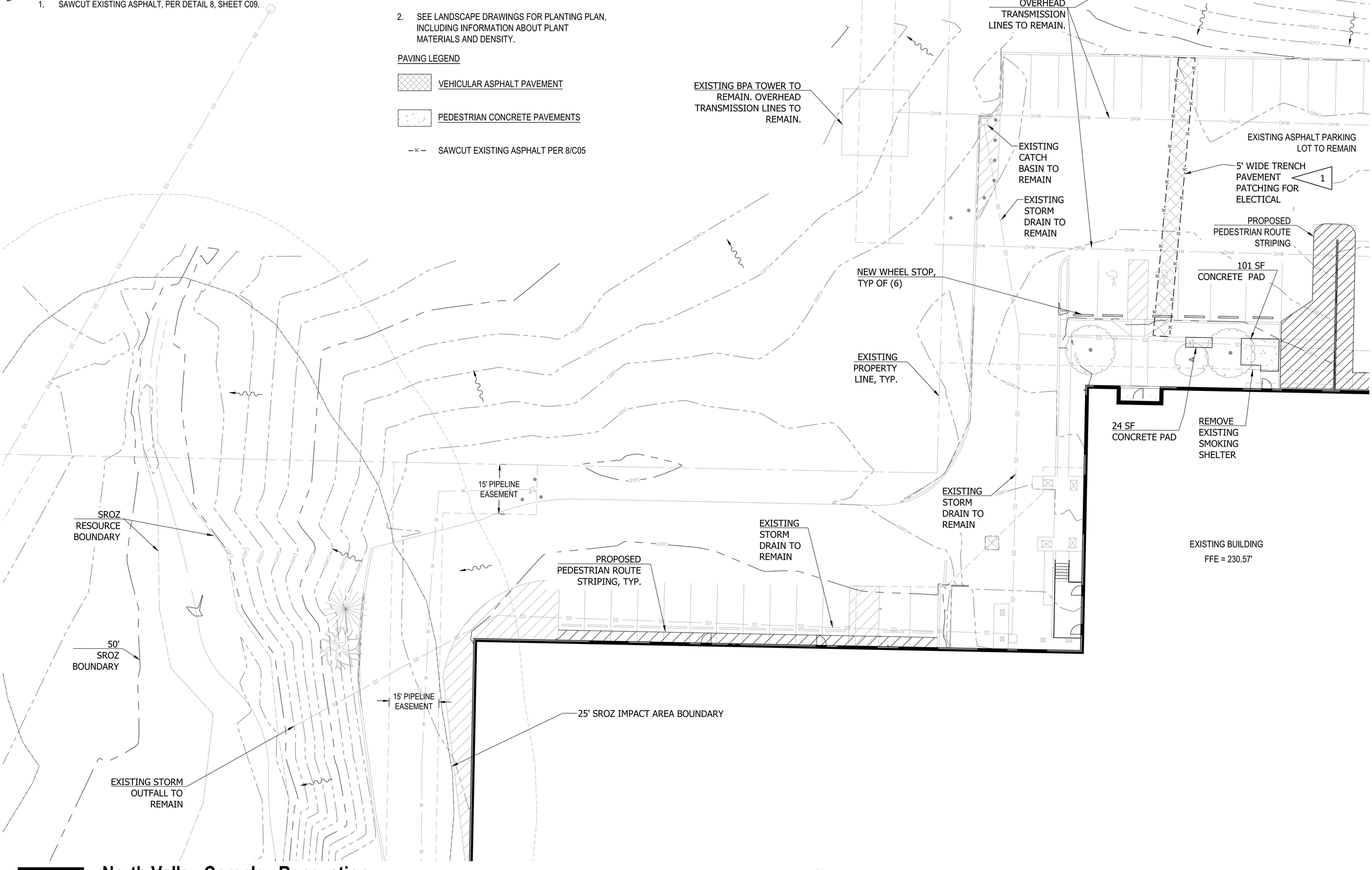
1. REFER TO SHEET C04 FOR CIVIL LEGEND.
2. SEE LANDSCAPE DRAWINGS FOR PLANTING PLAN, INCLUDING INFORMATION ABOUT PLANT MATERIALS AND DENSITY.

PAVING LEGEND

VEHICULAR ASPHALT PAVEMENT

PEDESTRIAN CONCRETE PAVEMENTS

SC SAWCUT EXISTING ASPHALT PER 8/C05



SERA

North Valley Complex Renovation

Design Review Package

04 March, 2021

PLAN SCALE

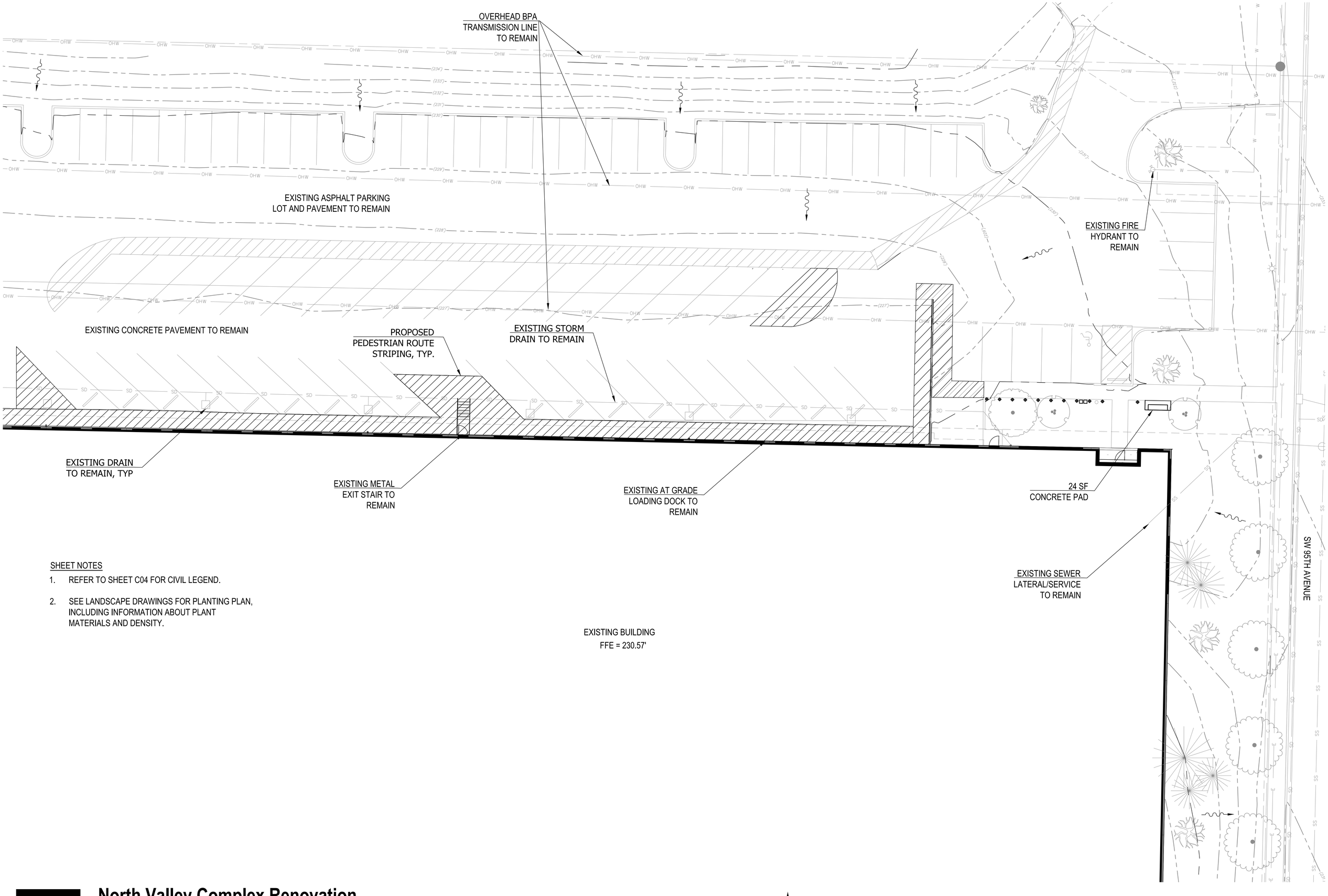
10 0 5 10 20

1 INCH = 10 FT.

N

JTE Janet Turner Engineering, LLC

NORTHWEST CIVIL SITE PLAN **C06**



SHEET NOTES

1. REFER TO SHEET C04 FOR CIVIL LEGEND.
2. SEE LANDSCAPE DRAWINGS FOR PLANTING PLAN, INCLUDING INFORMATION ABOUT PLANT MATERIALS AND DENSITY.

SERA

North Valley Complex Renovation

Design Review Package

04 March, 2021

PLAN SCALE

10 0 5 10 20

1 INCH = 10 FT.

N

JTE
Janet Turner Engineering, LLC

NORTHEAST CIVIL SITE PLAN C07

CONSTRUCTION NOTES

1. SAWCUT EXISTING ASPHALT, PER DETAIL 8, SHEET C09.

SHEET NOTES

1. REFER TO SHEET C04 FOR CIVIL LEGEND.
2. USE BUILDING APPROVED MATERIALS FOR ANY AND ALL ELEMENTS OF STORM DRAIN SYSTEM INSTALLED WITHIN 2-FEET OF BUILDINGS OR OTHER STRUCTURES.
3. ALL STORM DRAIN SERVICES SHALL BE SEPARATED FROM WATER MAIN AND LATERALS IN COMPLIANCE WITH OREGON HEALTH AUTHORITY (OAR 333-061-0050 (9)) AND OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY REGULATIONS.
4. SEE LANDSCAPE DRAWINGS FOR PLANTING PLAN, INCLUDING INFORMATION ABOUT PLANT MATERIALS AND DENSITY.

PAVING LEGEND

VEHICULAR ASPHALT PAVEMENTS

PEDESTRIAN CONCRETE PAVEMENTS

SC SAWCUT EXISTING ASPHALT PER 8/05

EXISTING DOMESTIC WATER SERVICE TO REMAIN

RELOCATED/NEW 7' HIGH CHAIN LINK SECURITY FENCING WITH SLIDING GATE, TYP. EXISTING FENCE TO BE REINSTALLED, AS POSSIBLE.

PROPOSED MECHANICAL AND ELECTRICAL EQUIPMENT. SEE MEP DRAWINGS.

EXISTING BUILDING
FFE = 230.57'

PROPOSED ROOF OVERHANG, TYP

PROPOSED OIL/WATER SEPARATOR. CONNECT TO EXISTING STORM DRAIN AS SHOWN.

PROPOSED LOADING DOCK LOW POINT DRAIN

EXISTING LOADING DOCK DRAIN TO REMAIN AND BE PROTECTED IN PLACE DURING CONSTRUCTION TYP OF (6)

EXISTING STORM DRAIN TO REMAIN AND BE PROTECTED IN PLACE

EX FENCE AND BOLLARDS TO REMAIN, PROTECT DURING DEMOLITION WORK

GUARDRAIL AND CURB TO REMAIN, PROTECT DURING DEMOLITION WORK

EXISTING ROOF DRAIN PIPING TO REMAIN

24 SF CONCRETE PAD

SW 95TH AVENUE

SAWCUT EX AC PVMT, 98 LF (1)

NEW ROLLING GATE

SAWCUT EX AC PVMT, 60 LF (1)

5' WIDE TRENCH PAVEMENT PATCHING FOR ELECTICAL (1)

15' PIPELINE EASEMENT

NEW PARKING STALL STRIPING, TYP OF (17)

NEW ROLLING GATE

EXISTING WATER SERVICE TO REMAIN

EXISTING FIRE HYDRANT TO REMAIN

(3) PROPOSED GENERATORS ON SLABS. SEE MEP DRAWINGS.

PROPOSED PERIMETER CURB WITH INTEGRATED 7' HIGH CHAIN LINK SECURITY FENCING

REGRADE EXISTING CONCRETE PAVEMENT AT EACH NEW GENERATOR PAD TO DIRECT SURFACE DRAINAGE TO LOW POINT DRAIN

PROPOSED FUEL OIL TANK, ON RAISED CURBS. SEE MEP DRAWINGS.

PROPOSED 8' HIGH CHAIN LINK SECURITY FENCING WITH SLIDING GATE, TYP.

NEW WHEEL STOP, TYP OF (10)

REMOVE EXISTING SMOKING SHELTER

PROPOSED SECURE PARKING AREA

5' WIDE TRENCH PAVEMENT PATCHING FOR ELECTICAL (1)

NEW WHEEL STOP, TYP OF (5)

NEW GATE

REMOVE EX WHEEL STOP AT ADA STRIPED SPACE

SW FREEMAN DRIVE

SERA

North Valley Complex Renovation

Design Review Package

04 March, 2021

PLAN SCALE
10 0 5 10 20
1 INCH = 10 FT.

N

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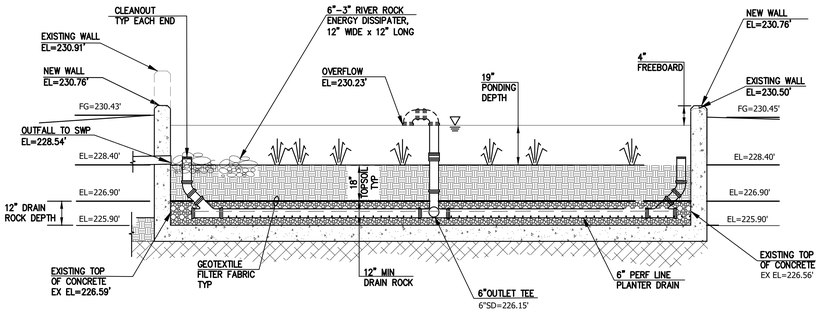
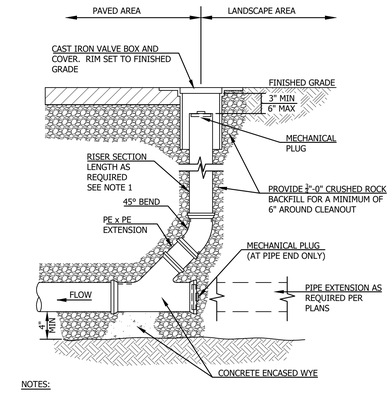
SOUTHEAST CIVIL SITE PLAN C08



STORMWATER PLANTER SECTION A-A

NOT TO SCALE

1 / C09



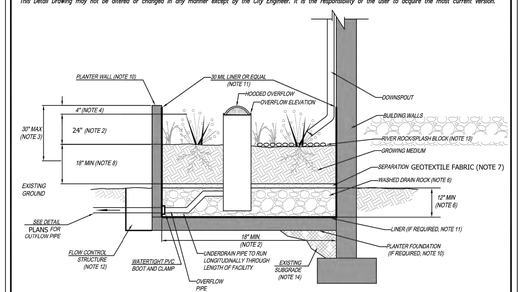
NOTES:

1. RISER PIPE TO BE SAME SIZE AS MAINLINE. RISER NOT TO EXCEED 12"IN DIAMETER. MAINLINES GREATER THAN 12" SHALL HAVE 12" RISER PIPE.
2. WHERE RISER LENGTH EXCEEDS 5', RISER PIPE SHALL BE C900 AND FITTINGS SHALL BE DUCTILE IRON.

STANDARD CLEANOUT

NOT TO SCALE

4 / C09



GENERAL NOTES:

1. **PROVIDE PROTECTION** FROM ALL VEHICLE TRAFFIC, EQUIPMENT STAGING, AND FOOT TRAFFIC IN PROPOSED INFILTRATION AREAS PRIOR TO, DURING AND AFTER CONSTRUCTION. WRAP UNDER-DRAIN IN FILTER FABRIC TO REDUCE TRANSPORT OF FINES.
2. **DIMENSIONS:**
   - WIDTH: 18" MINIMUM
   - DEPTH OF PLANTER (FROM TOP OF GROWING MEDIUM TO OVERFLOW ELEVATION): 24"
   - LONGITUDINAL SLOPE: 0.5% OR LESS
3. **HEIGHT/SETBACK**
   - PLANTER SHALL BE LESS THAN 30" IN HEIGHT ABOVE SURROUNDING AREA
   - PLANTERS SHALL BE MINIMUM OF 5 FEET FROM PROPERTY LINE
4. **OVERFLOW:**
   - INLET ELEVATION SHALL ALLOW FOR 4" OF FREEBOARD, MINIMUM
   - PROTECT FROM DEBRIS AND SEDIMENT WITH STRAINER OR GRATE
5. **PIPING:**
   - PERFORATED UNDER-DRAIN PIPING: SHALL RUN LONGITUDINALLY THROUGH LENGTH OF FACILITY, SHALL BE ABS SCH. 40, CAST IRON, OR PVC SCH.40, 6" MINIMUM DIAMETER. PIPING SHALL HAVE 1% GRADE AND FOLLOW THE UNIFORM PLUMBING CODE. PVC NOT ALLOWED ABOVE GROUND. WRAP UNDER-DRAIN IN FILTER FABRIC TO REDUCE TRANSPORT OF FINES.
   - OVERFLOW PIPING: SHALL BE ABS SCH.40, CAST IRON, OR PVC SCH.40 AND SHALL NOT BE PERFORATED. MINIMUM DIAMETER IS 6". PIPING SHALL HAVE 1% GRADE AND FOLLOW THE UNIFORM PLUMBING CODE. PVC NOT ALLOWED ABOVE GROUND.
6. **DRAIN ROCK:**
   - SIZE FOR FLOW-THROUGH PLANTER: 1 1/2" - 3/4" WASHED
   - DEPTH: 12" MINIMUM
7. **SEPARATION** BETWEEN DRAIN ROCK AND GROWING MEDIUM: SHALL BE GEOTEXTILE SEPARATION FABRIC PER SPECIFICATIONS.
8. **GROWING MEDIUM:**
   - SOIL MEDIUM
   - SEE APPENDIX A FOR SPECIFICATION OR USE SAND/LOAM/COMPOST 3-WAY MIX.
   - FACILITY SURFACE AREA MAY BE REDUCED BY 25% WHEN GROWING MEDIA DEPTH IS INCREASED TO 30" OR MORE.
9. **VEGETATION:** FOLLOW LANDSCAPE PLANS OR REFER TO PLANTING REQUIREMENTS IN APPENDIX A.
10. **PLANTER FOUNDATION AND WALLS:**
    - MATERIALS SHALL BE 4" REINFORCED CONCRETE, STONE, BRICK, OR OTHER DURABLE MATERIAL.
    - CONCRETE, BRICK, OR STONE WALLS SHALL BE INCLUDED ON FOUNDATION PLANS.
    - INSTALL INVERTED CURB AS NEEDED BETWEEN PLANTER AND ROAD SUBGRADE.
    - SUBMIT RETAINING WALL DESIGN IN ACCORDANCE WITH APPLICABLE STRUCTURAL CODES FOR REVIEW AND APPROVAL.
11. **WATERPROOF LINER (IF REQUIRED):**
    - LINER SHALL BE 30 MIL PVC OR EQUIVALENT, FOR FLOW THROUGH FACILITIES.
    - A WATERPROOF LINER IS NOT REQUIRED IF THE FOUNDATION OR WALL MATERIAL IS WATERPROOF REINFORCED CONCRETE OR APPROVED EQUAL.
12. **FLOW CONTROL** STRUCTURE NOT REQUIRED.
13. **INSTALL RIVER ROCK** SPLASH PAD OVER A NON WOVEN GEO TEXTILE FABRIC TO TRANSITION FROM INLETS TO GROWING MEDIUM. SIZE OF ROCK SHALL BE 1" - 3", 4 SQUARE FEET, 4" DEEP.
14. **SEASONAL HIGH GROUNDWATER SEPARATION:**
    - SEPARATION DISTANCE AS REQUIRED BY THE CITY.

Stormwater Planter - Filtration		
DRAWING NUMBER: ST-6005	DRAWN BY: SR	SCALE: N.T.S.
FILE NAME: ST-6005.DWG	APPROVED BY: NK	DATE: 4/16/18

CITY OF WILSONVILLE

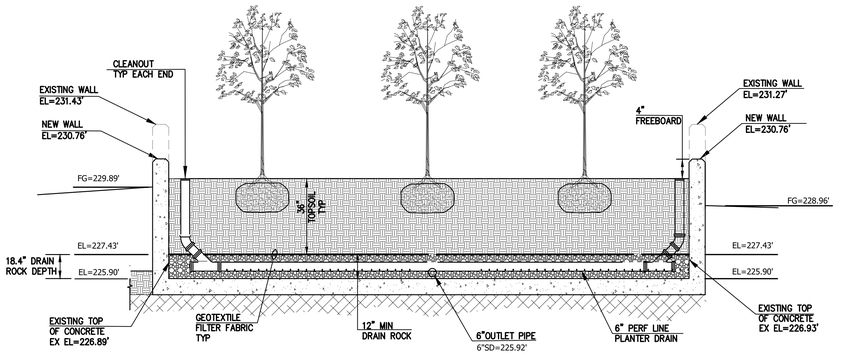
PUBLIC WORKS STANDARDS

FILTRATION STORMWATER PLANTER

NOT TO SCALE

7 / C09

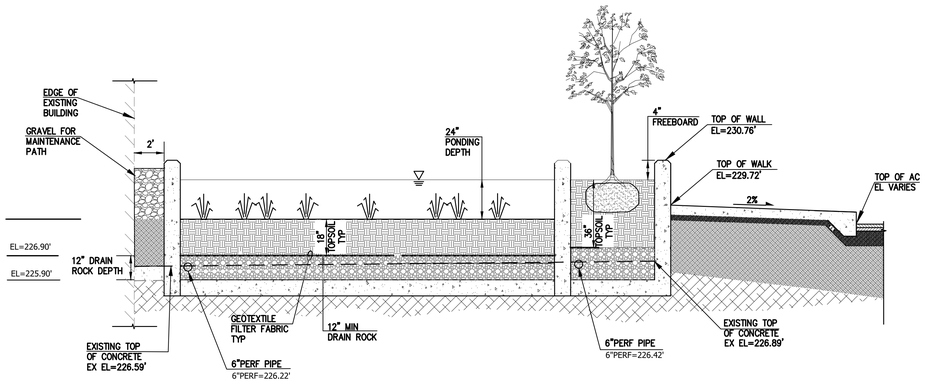
NOTE: THE DETAIL HEREIN IS THE CITY'S STANDARD DETAIL, ALTERED FOR PROJECT SPECIFIC MATERIALS AND DEPTHS. REFER TO SECTIONS ON SHEET C100.1 FOR MORE DETAILED STORMWATER PLANTER DESIGN AND CONSTRUCTION REQUIREMENTS FOR THE PROPOSED PROJECT.



STORMWATER PLANTER SECTION B-B

NOT TO SCALE

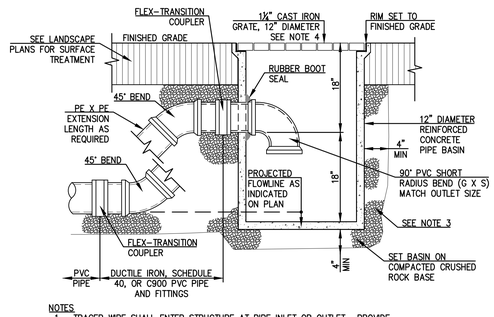
2 / C09



STORMWATER PLANTER SECTION C-C

NOT TO SCALE

3 / C09



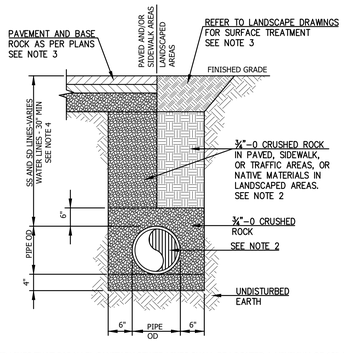
NOTES

1. TRACER WIRE SHALL ENTER STRUCTURE AT PIPE INLET OR OUTLET. PROVIDE ADEQUATE FREE WIRE TO EXTEND 24" ABOVE TOP OF GRATE TO FACILITATE TESTING. COIL WIRE AND SECURE WITH NON-CORROSIVE FASTENER 2" UNDER FRAME.
2. LOCATION SPECIFIED ON PLAN INDICATES CENTER OF GRATED SECTION OF BASIN.
3. BACKFILL AROUND BASIN USING CRUSHED ROCK IN PAVEMENT OR SIDEWALK AREAS OR NATIVE MATERIAL IN LANDSCAPE AREAS.
4. ALL STRUCTURES SHALL BE PROVIDED WITH HEAVY DUTY GRATE WITH SIGNIFICANT BICYCLE BARS

AREA DRAIN

NOT TO SCALE

5 / C09



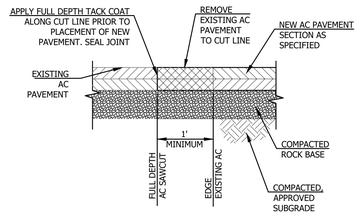
NOTES

1. WATER LINES THAT PARALLEL SANITARY SEWER LINES SHALL BE LOCATED A MINIMUM OF 12" ABOVE SEWER LINES, WHERE SERVICES ARE NOT HORIZONTALLY SEPARATED BY 10'.
2. WITHIN 5' OF A BUILDING STRUCTURE, BUILDING CODE APPROVED PIPE MATERIAL AND ¾"-0 CRUSHED ROCK BACKFILL SHALL BE USED.
3. SAWCUT, REMOVE AND REPAIR EXISTING SURFACES TO MATCH EXISTING ASPHALT, CONCRETE, OR LANDSCAPING IN AREAS WHICH DO NOT RECEIVE NEW IMPROVEMENTS. PROVIDE 4" MIN DEPTH ASPHALT PAVEMENT, 4" MIN DEPTH CONCRETE PAVEMENT, OR MATCH EXISTING PAVEMENT DEPTH, WHICHEVER IS GREATER.
4. 36" MINIMUM FOR FIRE SERVICE PIPES UNDER AREAS TRAFFICKED BY VEHICLES. (NFPA 24, 10-4)
5. INSTALL TRACER WIRE ON ANY PIPELINE(S) CONSTRUCTED OF NON-METALLIC PIPE MATERIAL.

TYPICAL TRENCHING AND BACKFILL SECTION

NOT TO SCALE

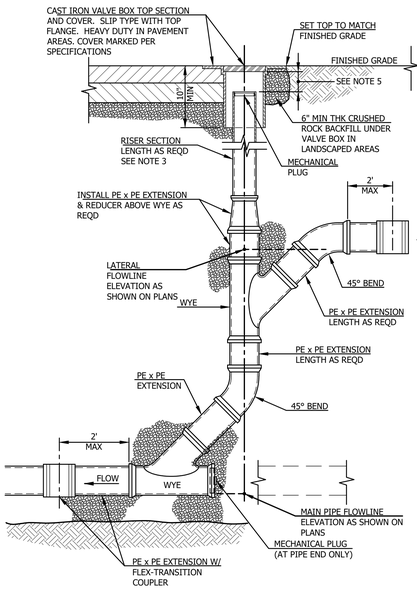
6 / C09



TYPICAL SAWCUT SECTION

NOT TO SCALE

8 / C09



NOTES

1. TRACER WIRE SHALL ENTER STRUCTURE WITH RISER PIPE. PROVIDE ENOUGH FREE WIRE TO EXTEND 24" ABOVE FINISHED GRADE TO FACILITATE TESTING. VERIFY FREE END OF WIRE IS WITHIN EASY REACH OF OPENING IN TOP SECTION.
2. DIAMETER OF ALL PIPE AND FITTINGS TO MATCH LATERAL DIAMETER UNLESS NOTED OTHERWISE.
3. RISER PIPE SIZE:
   4", 6", OR 8" DIA LATERAL - 4" DIA RISER PIPE
   10" DIA & LARGER LATERAL - 6" DIA RISER PIPE
4. WHERE VERTICAL DROP BETWEEN FLOW LINES EXCEEDS 5 FEET, PIPE TO BE C900 PVC AND FITTINGS TO BE DUCTILE IRON.
5. ADJUST END OF RISER PIPE TO MAINTAIN 3" MIN AND 6" MAX CLEARANCE BETWEEN END PIPE AND BOTTOM OF VALVE BOX LID

VERTICAL DROP TRANSITION CLEANOUT

NOT TO SCALE

9 / C09

SERA

North Valley Complex Renovation

Design Review Package

04 March, 2021

JTE
Janet Turner Engineering, LLC

JTE
Janet Turner Engineering, LLC

APPENDIX C

BMP SIZING TOOL & SITE ASSESSMENT CHECKLIST

WES BMP Sizing Software Version 1.6.0.2, May 2018

WES BMP Sizing Report

Project Information

Project Name	DAS NVC
Project Type	PublicFacilities
Location	26755 SW 95th Avenue
Stormwater Management Area	1410
Project Applicant	Oregon DAS
Jurisdiction	CCSD1NCSA

Drainage Management Area

Name	Area (sq-ft)	Pre-Project Cover	Post-Project Cover	DMA Soil Type	BMP
EX Roof West	9,921	Grass	Roofs	C	SWP
EX Roof East	10,410	Grass	Roofs	C	SWP
Concrete	3,411	Grass	ConventionalConcrete	C	SWP
AC	11,430	Grass	ConventionalConcrete	C	SWP

LID Facility Sizing Details

LID ID	Design Criteria	BMP Type	Facility Soil Type	Minimum Area (sq-ft)	Planned Areas (sq-ft)	Orifice Diameter (in)
SWP	FlowControlAndTreatment	Stormwater Planter - Filtration	C1	1,406.9	1,410.0	1.8

Pond Sizing Details

1. FCWQT = Flow control and water quality treatment, WQT = Water quality treatment only

2. Depth is measured from the bottom of the facility and includes the three feet of media (drain rock, separation layer and growing media).

3. Maximum volume of the facility. Includes the volume occupied by the media at the bottom of the facility.

4. Maximum water storage volume of the facility. Includes water storage in the three feet of soil media assuming a 40 percent porosity.

301.2.03 Stormwater Site Assessment

As part of the applicant's development permit application submittal a Stormwater Site Assessment will be completed. The assessment will include the completed checklist, site assessment maps, preliminary site plan, proposed impervious surface area, preliminary stormwater facility sizing documentation, and supporting materials as required.

The following Table 3.1 and sections describe the process for completing the Stormwater Site Assessment and Planning checklist and associated mapping and supporting materials for submittal according to these standards.

TABLE 3.1 SITE ASSESSMENT AND PLANNING CHECKLIST

	Information Needed	Provide information as required; Attach supporting materials as needed
1 Site Information		
	Applicant Contact Information	Applicant name: Janet Turner, P.E. Business name: Janet Turner Engineering, LLC. Contact address, phone number, and e-mail: 16895 65th Avenue, #194 Lake Oswego, OR
	Project Location	Site Address: 26755 SW Freeman Drive Wilsonville, OR Site Description: Parcel 1, Partition Plat No. 2001-119, in the City of Wilsonville, County of Clackamas Major Drainage Basin: Coffee Lake Wetlands Vicinity Map of the site (including location of property in relation to adjacent properties, roads, and pedestrian/bike facilities)
	Project Type	Identify types of development planned for the site such as commercial, industrial, single-family residential, multi-family residential, or other (describe): Office building
	Size of site	Size of site (acres) and number of existing/ proposed tax lots: 9.76 acres 1 Lot
2 Site Assessment (attach engineered scale Site Assessment Map and documentation)		
	Topography Evaluate site and map slopes: Flat (0-10%), Moderate (10-20%), Steep (20%+)	Attach aerial based mapping with 2-foot intervals for slopes 0-20% slope, 10-foot intervals for steeper. Shade or mark areas of flat, moderate and steep slopes. If required, attach geologist/geotechnical report. Slope information may be available from the City. See topographic survey in Appendix A of Storm Drainage Report
	Soils and Groundwater Research and map site soil hydrologic group, depth to groundwater	Natural Resources Conservation Service (NRCS) Hydrologic Soil Type (show on map if more than one type present): Type C/D Attach seasonal groundwater depth evaluation if available or required (site has floodplain and/or wetland). Groundwater depth information is available from the City.
	Infiltration Assessment Determine soil capacity for onsite infiltration	If an infiltration test is performed attach the documentation. Report the test type (Basic/Professional) performed and results. See Appendix B for the approved infiltration testing methods. Test Type: Encased Falling Head (inches/hour): 0.80 in/hr

TABLE 3.1 SITE ASSESSMENT AND PLANNING CHECKLIST		
	Information Needed	**Provide information as required; Attach supporting materials as needed**
	Hydrology - Conditions and Natural Features Map site floodplains, wetlands, streams, and location of outfalls	Clearly label on map all streams, rivers and wetlands, FEMA floodplains, and existing drainage systems (pipes, ditches, outfalls). Check here if present on site: Sensitive Area(s) ____, ☑ Floodplain _____. ☐
	Downstream Conveyance	Prepare and attach Preliminary Drainage Report with analysis of upstream drainage area and downstream conveyance capacity, as required by Section 301.3.02. Check here if analysis indicates adequate downstream capacity is NOT available: ____
	Existing Vegetation Map trees and vegetation	Using aerial photos or survey, map all trees and vegetation. Note all existing trees 6-inch caliper and greater (DBH) on map. Delineate and identify other areas and types of existing vegetation. See topographic survey in Appendix A of the Storm Drainage Report.
	Natural Resource Areas and Setbacks Assess and map buffers	Identify the Significant Resource Overlay Zone and other natural resource areas. A wetland exists to the west of the site. See topographic survey in Appendix A of the Storm Drainage Report.
	Land Use and Zoning	Existing Land Use Zoning designation(s): PD, PDI
	Access and Parking	Delineate proposed access points for all transportation modes on map. Indicate amount and area of required parking onsite if applicable, attach documentation as needed: See Land Use drawings in Appendix B of the Storm Drainage Report.
	Utilities to Site and Surrounding Area	Map existing utilities including stormwater management facilities, storm conveyance, sewer, water, wells, drywells, on-site septic systems, electricity, phone/cable, gas, and any public storm system/facility downstream. See Land Use drawings
3 Site Planning Design Objectives (attach engineered scale Preliminary Site Plan)		
	1. Preserve Existing Natural Resources	**Required:** Show the Significant Resource Overlay Zone and other natural resource areas on the site plan. Show any proposed areas of encroachment and associated mitigation areas.
	2. Minimize Site Disturbance	**Required:** Delineate protection areas on site plan for areas to remain undisturbed during construction.
	3. Minimize Soil Compaction	**Required:** Delineate and note temporary fencing on site plan for proposed infiltration facilities, vegetated stormwater management facilities, and re-vegetation areas.
	4. Minimize Imperviousness	**Required:** Complete and attach *Impervious Area Threshold Determination Form*. Delineate impervious reduction methods on site plan.
4 Proposed Stormwater Management Strategy		
	Proposed Stormwater Management Strategy	☑ LID facilities to the MEP ___ All onsite infiltration including retention of the 10-year storm event. ___ LID facilities and infiltration are limited by the following conditions (include a

TABLE 3.1 SITE ASSESSMENT AND PLANNING CHECKLIST		
	Information Needed	**Provide information as required; Attach supporting materials as needed**
		geotechnical analysis of the site and report): ___ Stormwater management facility to be located on fill ___ Steep slopes ___ High Groundwater ___ Contaminated Soils ___ Conflict with required Source Controls (Section 301.12.00)
	Check Minimum Facility Size Required	A. Calculate surface area of onsite LID facility, as determined by BMP Sizing Tool or Engineered Method: 1,406.9 SF; or B. Calculate MEP surface area of onsite LID facility for sites with limiting conditions: total new/redeveloped impervious area (SF) x 0.10 = 1,483.1 SF C. Required surface area of onsite LID facility: smaller of [A] or [B] 1,406.9 SF D. Proposed LID facility surface area: must be equal to or larger than [C] 1,410 SF
5	**Facility Selection/Sizing**	
	Proposed Facility Type(s)	Check all that apply, attach output from BMP Sizing Tool application, and show proposed facilities on Preliminary Site Plan. LID facilities: ___ Infiltration Stormwater Planter ☑ Filtration Stormwater Planter ___ Infiltration Rain Garden ___ Filtration Rain Garden ___ Vegetated Filter Strip ___ Vegetated Swale ___ Detention Pond Other Stormwater Management Facilities as approved: ___ Infiltration Trench ___ Manufactured Treatment Technology ___ Underground Detention Tank ___ Other: _____

JTE
Janet Turner Engineering, LLC

APPENDIX D

GEOTECHNICAL REPORT

GeoDesign Inc
AN NV5 COMPANY

REPORT OF GEOTECHNICAL ENGINEERING SERVICES

DAS North Valley Complex
26755 SW 95th Avenue
Wilsonville, Oregon

For
DAY CPM
September 18, 2020

GeoDesign Project: ORDAS-7-01

GeoDesign Inc
AN NV5 COMPANY

September 18, 2020

DAY CPM
808 SW 3rd Avenue, Suite 800
Portland, OR 97204

Attention: Dave Lintz

Report of Geotechnical Engineering Services
DAS North Valley Complex
26755 SW 95th Avenue
Wilsonville, Oregon
GeoDesign Project: ORDAS-7-01

GeoDesign, Inc. is pleased to submit this report of geotechnical engineering services for the proposed improvements to the DAS North Valley Complex in Wilsonville, Oregon. This report presents our geotechnical design recommendations and construction guidelines for the proposed improvements. Our services for this project were conducted in general accordance with the professional services contract between GeoDesign and the State of Oregon Department of Administrative Services dated July 27, 2020. We appreciate the opportunity to be of continued service to the Oregon Department of Administrative Services and DAY CPM. Please call if you have questions regarding this report.

Sincerely,

GeoDesign, Inc.

Brett A. Shipton, P.E., G.E.
Principal Engineer

cc: Laura Pedersen, DAY CPM (via email only)

RTL:KDY:BAS:kt
Attachments
One copy submitted (via email only)
Document ID: ORDAS-7-01-091820-geor.docx

EXECUTIVE SUMMARY

Based on our review of the available information and the results of our explorations, it is our opinion that the site can be developed as proposed. Our specific recommendations for site development and design are provided later in this report. The following items will have an impact on design and construction of the proposed project:

- Measured infiltration rates are negligible to low. Stormwater infiltration may not be feasible at this site.
- A high truck traffic area was identified by the design team. Pavement design options in the report are focused on increasing strength in high truck traffic areas and repairing existing moderate to severe fatigue distress.
- The risks of landslides, seismic damage, flooding, and volcanic damage are low at the site.
- Fill was encountered in the borings. Based on SPTs, this fill appears to have been placed as structural fill. This should be verified during construction, particularly beneath footings and other load bearing elements.
- Seismic upgrades may require construction of new footings and enlarging existing footings. All footing subgrade should consist of firm native soil or structural fill.
- The on-site soil is suitable for use as structural fill, provided it is properly moisture conditioned. We do not expect this material to be viable as structural fill during the wet season.

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TABLE OF CONTENTS **PAGE NO.**

ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
AC	asphalt concrete
ACP	asphalt concrete pavement
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
BGS	below ground surface
BSE	Basic Safety Earthquake
CPT	cone penetration test
CRBG	Columbia River Basalt Group
CSZ	Cascadia subduction zone
DAS	State of Oregon Department of Administrative Services
DCP	dynamic cone penetrometer
DOGAMI	Oregon Department of Geology and Mineral Industries
ESAL	equivalent single-axle load
FHWA	Federal Highway Administration
fps	feet per second
FWD	falling weight deflectometer
g	gravitational acceleration (32.2 feet/second^2)
H:V	horizontal to vertical
IBC	International Building Code
I.D.	identification
km	kilometers
LiDAR	light detection and ranging
MCE	maximum considered earthquake
MCE_C	maximum considered earthquake geometric mean
MCE_R	risk-targeted maximum considered earthquake
NA	not applicable
NP	not present
ODOT	Oregon Department of Transportation
OSHA	Occupational Safety and Health Administration
OSHPD	Office of Statewide Health Planning and Development
OSSC	Oregon Standard Specifications for Construction (2018)
PCC	portland cement concrete
pcf	pounds per cubic foot
pci	pounds per cubic inch
PG	performance grade
PGA	peak ground acceleration
PGA_M	maximum considered earthquake geometric mean peak ground acceleration adjusted for site affects
psf	pounds per square foot
psi	pounds per square inch
SEAOC	Structural Engineers Association of California
SOSSC	State of Oregon Structural Specialty Code

SPT	standard penetration test
USGS	U.S. Geological Survey

1.0 INTRODUCTION

GeoDesign, Inc. is pleased to submit this report of geotechnical engineering services for the proposed State of Oregon Department of Administrative Services (DAS) North Valley Complex project located at 26755 SW 95th Avenue in Wilsonville, Oregon. The project includes renovation of an existing manufacturing office/warehouse space that was purchased by DAS. The existing facility is 175,600 square feet and is located on a 9.76-acre site. The existing building is an essential facility and will be renovated for use as an office, a laboratory, a data center, evidence storage, and an emergency operations space. The site relative to surrounding physical features is shown on Figure 1. The site location is shown on Figure 2.

KPFF informs us that maximum column loads will be 100 kips, maximum wall loads will be 12 kips per foot, and maximum floor loads will be 250 psf. KPFF estimates that the building's fundamental period of vibration is approximately 0.3 second. Upgrades include construction of new footings and possibly enlarging existing footings. Micropiles or deep foundations are not being considered at this time. We have assumed that cuts and fills on this project will be less than approximately 2 feet.

Acronyms and abbreviations used herein are defined above, immediately following the Table of Contents. All elevations referred to in this report are relative to Google Earth datum.

2.0 PURPOSE AND SCOPE

The purpose of this evaluation was to provide geotechnical engineering recommendations for use in design and construction of the proposed upgrades. Specifically, we completed the following scope of services:

- Reviewed readily available, published geologic data and our in-house files for existing information on subsurface conditions in the site vicinity.
- Coordinated and managed the field exploration program, including utility locates, coordination with existing tenants, and scheduling subcontractors.
- Conducted a subsurface exploration program that consisted of drilling two borings to a depth of 31.5 feet BGS, drilling six borings to depths between 4 and 6 feet BGS, and advancing one CPT probe to a depth of 30.1 feet BGS. The explorations were located around the existing building in paved areas. We measured shear wave velocities in the CPT exploration to better evaluate the seismic performance of the soil.
- Maintained continuous logs of the explorations and collected samples at representative intervals.
- Conducted a laboratory testing program that consisted of the following:
  - Twenty moisture content determinations in general accordance with ASTM D2216
  - Four particle-size analyses in general accordance with ASTM D1140
  - Two Atterberg limits tests in general accordance with ASTM D4318
- Performed infiltration testing at two locations where stormwater infiltration is being considered.
- Performed non-destructive FWD testing of the existing pavement.
- Provided recommendations for lateral earth pressures and friction coefficients.

- Provided recommendations for site preparation and grading, including fill placement criteria, suitability of on-site soil for fill, subgrade preparation, and wet weather construction.
- Evaluated slope stability.
- Evaluated groundwater conditions and provided drainage recommendations.
- Provided recommendations for rehabilitating or replacing existing pavement.
- Performed a site-specific seismic hazard evaluation in general accordance with the 2019 SOSSC. Provided seismic design parameters in accordance with ASCE 7-16 and ASCE 41-17.
- Provided recommendations for new and modified foundations. Our recommendations include bearing pressures, lateral resistance parameters, and settlement estimates.
- Provided an initial assessment of the feasibility of stormwater infiltration.
- Prepared this geotechnical engineering report that presents our findings, conclusions, and recommendations.

3.0 SITE CONDITIONS

3.1 REGIONAL AND SITE GEOLOGY

The site is located at the north end of the Northern Willamette Basin physiographic province, just south of the interface with the Tualatin Basin physiographic province. The Chehalem Mountains that divide the provinces are located west and north of the site. These mountains were formed by folded and faulted basalt flows of the CRBG (Popowski, 1997).

The soil at the site is mapped as fine-grained Pleistocene Missoula flood deposits (O'Connor et al., 2001). This geologic unit consists of stratified silt and clay with minor sand. This unit underlies much of the Willamette Valley lowland floor. Rhythmic bedding is frequently observed in this unit, with individual beds between 0.1 and 1.0 meter thick. This unit encloses sparse pebbles to boulders of rock types that are not native to the Willamette Basin. The unit is frequently covered by up to 6 feet of late Pleistocene and Holocene alluvium, colluvium, or loess. The Missoula flood deposits resulted from a series of catastrophic late Pleistocene glacial outburst floods. During this time interval, enormous floods would periodically flow across eastern Washington and down the Columbia River Valley caused by failures of a glacial ice dam that impounded a large lake located in southwestern Montana (Lake Missoula). Floodwater would inundate the Willamette Valley and Tualatin Basins, leaving deposits of gravel, sand, and silt to elevations ranging from 250 to 400 feet.

The site is located in a seismically active region. This tectonic activity has contributed to forming the hills and valleys of the Willamette Valley. Subduction of the Juan de Fuca Plate beneath the west margin of the North American Plate presents the potential for great plate-interface earthquakes (magnitude greater than 8). Paleoseismic investigations indicate that plate interface earthquakes have an average recurrence of 500 to 600 years (Atwater and Hemphill-Haley, 1997; Goldfinger et al., 2003) and that the last subduction zone earthquake occurred in the year 1700 (Satake et al., 1996). Moderate intensity and long duration ground shaking would be expected at the site in the event of a large magnitude Cascadia plate-interface earthquake.

Crustal faults have also been mapped in the site vicinity. The closest crustal fault to the site is the Canby-Molalla fault, which is located approximately 4 miles from the site (USGS, 2020).

3.2 SURFACE CONDITIONS

The site is approximately 9.67 acres in size and is bound by SW 95th Avenue on the east, SW Freeman Drive on the south, a ravine and foodservice supply company to the west, and a recreational vehicle parking lot to the north. The site is currently occupied by a 175,600-square-foot building, AC and concrete pavement, and landscaping. The landscaping consists primarily of trees and shrubs around the perimeter of the site. The site is relatively level, with elevations typically ranging from approximately 227 to 230 feet, except for the northeast corner of the site where elevations are up to approximately 233 feet. The ravine west of the site slopes down at an approximately 2H:1V slope or flatter to an elevation of approximately 218 feet.

Most of the pavement is AC; the building loading dock areas are paved with PCC. GeoDesign conducted a visual survey of the AC pavement for pavement distress on August 18, 2020. The survey did not evaluate ride roughness or friction. In general, the pavement is in fair condition. We observed minor raveling and minor fatigue throughout the pavement with 13 isolated areas of moderate to severe fatigue. The approximate size of distress is outlined in Table 1 and approximate locations are shown on Figure 3.

Table 1. Approximate Size of Moderate to Severe Fatigue Distress

Distress I.D.	Length (feet)	Width (feet)
1	14	10
2	18	4
3	22	8
4	5	5
5	5	4
6	12	4
7	13	7
8	26	13
9	11	6
10	17	10
11	6	4
12	20	6
13	5	5

3.3 SUBSURFACE CONDITIONS

We explored subsurface conditions at the site by drilling eight solid-stem auger borings (B-2 through B-9) and conducting one cone penetration test (CPT-1). The CPT was advanced to a depth of 30.1 feet BGS; the CPT was conducted for use in our geotechnical analysis. Borings B-2 and B-3 were drilled to a depth of 31.5 feet BGS. The information collected in the borings was used in our geotechnical analysis. Borings B-4 through B-9 were drilled to provide pavement design recommendations and extend to depths of up to 6 feet BGS. The approximate exploration locations are shown on Figure 2. Descriptions of our field exploration and laboratory testing programs, the exploration logs, and the results of laboratory testing are presented in Appendix A. The CPT results are presented in Appendix B.

We also reviewed a copy of the original geotechnical report that was used to design the existing building at the site (GeoEngineers, 1992). This geotechnical exploration program was conducted in 1992 and consists of eight test pit explorations to depths of up to 17 feet BGS. The site plan and test pit logs from these previous explorations are presented in Appendix C.

A pavement section is present at the ground surface where the borings were drilled. The soil profile generally consists layers of fill, alluvial silt, clay, and gravel. The following sections provide a detailed description of each geologic unit encountered at the site.

3.3.1 Pavement

Borings B-2 through B-9 were drilled through existing AC pavement. The existing pavement thickness and other pertinent information is summarized in Table 2. Photographs of the AC cores and exploration locations are presented in Appendix A.

Table 2. Existing Pavement Thickness

Boring Number	Parking/ Drive Area	Thickness (inches)		AC Crack Depth(s) (inches)
		AC	Aggregate Base	
B-2	South	4	8	NP
B-3	West	3	9	NP
B-4	South	3.5	14.5	1.5
B-5	South	3	10	NP
B-6	West	4.5	14.5	NP
B-7	North	3	10	NP
B-8	North	3.8	8.2	3.8
B-9	North	3	9	3

The AC thickness is between 3 and 4.5 inches and the aggregate base thickness is between 8 and 14.5 inches at the boring locations. We observed cracks in three out of the eight pavement cores, with two of the cracks extending through the AC layer. In general, the AC does not appear to have been overlaid in the recent past and is in fair condition.

3.3.2 Fill

We observed fill in five of the borings (B-2, B-3, B-4, B-6, and B-8). The fill generally appears to be thicker on the west side of the site, where we observed the fill extends to depths between 3.5 and 7.5 feet BGS. The fill consists of silt, clay, and gravel. The silt is generally medium stiff to stiff; brown to gray; moist to wet; has low plasticity; and contains trace to minor sand, gravel, and organics. The clay is generally medium stiff to stiff, gray to brown, moist, has low to medium plasticity, and contains trace sand and organics. The gravel is generally loose, brown to gray, moist, and contains minor sand. Laboratory testing indicates that the moisture contents in this layer ranged from 10 to 25 percent at the time of our exploration. Based on SPTs, it is our

opinion that the fill was placed as structural fill during construction of the original development. Soil of this type and consistency generally exhibits relatively low to moderate strength and moderate compressibility.

3.3.3 Alluvial Silt

Underlying the fill or pavement we observed alluvial silt in borings B-2, B-5, B-7, and B-8. The silt extends to a depth of up to 10 feet BGS. This silt is generally medium stiff to stiff, brown to gray, moist, has low plasticity, and contains trace to minor fine-grained sand. Laboratory testing indicates that the moisture contents in this layer ranged from 24 to 30 percent at the time of our exploration. Soil of this type and consistency generally exhibits relatively low to moderate strength and low to moderate compressibility.

3.3.4 Clay

Underlying the pavement, fill, or alluvial silt we observed clay in borings B-2, B-3, and B-9. The clay extends to a depth of at least 31.5 feet BGS in boring B-2 and B-3, which is the maximum depth explored. It is likely that the clay is also present beneath borings B-4 through B-9, although the borings generally did not extend deep enough to encounter it. CPT-1 generally encountered silt and clay to a depth of approximately 30 feet BGS. The clay is generally stiff to very stiff, brown to orange, moist, has high plasticity, and contains trace sand. We also observed occasional thin gravel lenses within the clay layer. Laboratory testing indicates that the moisture contents in this layer ranged from 23 to 38 percent at the time of our exploration. Soil of this type and consistency generally exhibits relatively moderate strength and low to moderate compressibility.

3.3.5 Gravel

CPT-1 encountered refusal at a depth of approximately 30 feet BGS. We were unable to penetrate into this material, which typically indicates a dense soil such as gravel or weathered rock. Based on our geological knowledge of the site vicinity, we interpret the CPT encountered refusal on basalt that has weathered into gravel-sized particles.

3.3.6 Groundwater

We did not observe groundwater during drilling in the deeper borings (B-2 and B-3). However, we left boring B-2 open after drilling. After several hours water had filled the hole to a depth of approximately 15.4 feet BGS. It appears that water was gradually seeping into the hole from a depth of approximately 7 to 10 feet BGS, near the interface between fill and native soil. One of the test pits that was excavated in 1992 noted water seepage at a depth of 16.8 feet BGS. In our opinion, some perched water is present at a depth of approximately 7 to 17 feet BGS, but that the regional groundwater level is located at a depth of more than 30 feet BGS. We note that the depth to groundwater will also fluctuate in response to seasonal changes, changes in surface topography, and other factors.

3.4 INFILTRATION TESTING

We conducted two falling head infiltration tests in borings B-2 and B-3, which are the locations where stormwater infiltration is being considered. The test in boring B-2 was conducted inside of a 6-inch-diameter pipe that we inserted into the borehole. The test in boring B-3 was conducted in an open borehole drilled with a 4-inch-diameter, solid-stem auger. We saturated the soil prior

to performing the tests. The tests were conducted using the falling head method using an initial head of approximately 2 to 5 feet of water. We collected representative soil samples below the infiltration test depths for particle-size analysis. Table 3 summarizes the infiltration test results and fines content determinations. The boring logs and laboratory test results are presented in Appendix A. Plots of the infiltration data we collected are presented in Appendix D.

Table 3. Measured Infiltration Rates

Location	Depth (feet BGS)	Material	Infiltration Rate[1] (inches per hour)	Fines Content[2] (percent)
B-2	7.5	Silt	0.8	87
B-3	15	Clay	0.0	97

1. Infiltration rates are not factored.
2. Fines content: material passing the U.S. Standard No. 200 sieve

The infiltration rates provided in Table 3 are measured unfactored rates. Factors of safety should be applied to the measured infiltration rates by the civil engineer during design to account for soil variations, the potential for long-term clogging due to siltation and buildup of organic material, maintenance, influent/pre-treatment control, and consequences of failure. We recommend that a factor of safety of at least 2.0 be applied to the field-measured infiltration rates.

Based on the relatively low infiltration rates we measured, it appears that stormwater infiltration may not be feasible.

3.5 FWD TESTING

GeoDesign performed deflection testing of site pavement on August 18,2020. Details of our test program and the deflection data are presented in Appendix E. FWD test locations are presented on Figure 4.

3.6 DCP TESTING

We conducted DCP testing in general accordance with ASTM D6951 to estimate the resilient modulus of the subgrade and base at borings B-7 through B-9. This testing was performed due to overhead high voltage wires that prevented us from being able to perform SPTs. We recorded the penetration depth of the cone for each blow of the hammer and terminated testing when at penetration refusal or end of rod length. We plotted depth of penetration versus blow count and used the slope of the data to estimate the resilient modulus of the subgrade. We used least squares regression to determine the slopes and the equation from the ODOT Pavement Design Guide (ODOT, 2011; herein referred to as the ODOT guide) to estimate the moduli using a correction factor $c_f = 0.35$ for estimating the subgrade resilient moduli. Table 4 lists our estimate of subgrade resilient modulus at each test location. DCP test results are presented in Appendix F.

Table 4. Subgrade Modulus Estimated from DCP Testing

Core Number	Estimated Base Resilient Modulus (psi)	Estimated Subgrade Resilient Modulus (psi)
B-7	14,160	4,660
B-8	14,440	5,600
B-9	19,320	8,270

4.0 GEOLOGIC HAZARDS

We evaluated the presence of geologic hazards in the site vicinity based on a review of published literature and our experience with nearby projects. Individual geologic hazards are summarized in the following sections.

4.1 LANDSLIDES

Hazard mapping for the site does not show any mapped landslides in the site vicinity (DOGAMI, 2018). We note that the site is relatively flat to gently sloping. We also note that the slope of the ravine west of the site is not excessively steep and is located more than 20 feet from the building. In our opinion, the risk of landslides at this site is low.

4.2 SEISMIC

4.2.1 Liquefaction

Liquefaction is a phenomenon caused by a rapid increase in pore water pressure that reduces the effective stress between soil particles to near zero. The excessive buildup of pore water pressure results in the sudden loss of shear strength in a soil. Granular soil, which relies on interparticle friction for strength, is susceptible to liquefaction until the excess pore pressures can dissipate. Sand boils and flows observed at the ground surface after an earthquake are the result of excess pore pressures dissipating upwards, carrying soil particles with the draining water. In general, loose, saturated sand soil with low silt and clay content is the most susceptible to liquefaction. Low plasticity silty sand and silt may be moderately susceptible to liquefaction under relatively higher levels of ground shaking. Liquefaction can densify subsurface soil, which can result in settlement at the ground surface.

In our opinion, the soil at the site is not susceptible to liquefaction. We did not observe saturated soil conditions in our borings. We also measured SPT blow counts that are sufficiently high that liquefaction triggering will not occur. We also measured relatively high plasticity index values in the clay soil, which current research shows will not be susceptible to liquefaction (Boulanger and Idriss, 2006). As a result, it is our opinion that the risk of liquefaction at this site is low.

4.2.2 Lateral Spreading

Lateral spreading is a liquefaction-related seismic hazard and occurs on gently sloping sites or flat sites underlain by liquefiable sediment adjacent to an open face, such as a riverbank. Liquefied soil on a sloping site can flow downhill or a site adjacent to an open face can flow

toward the open face, resulting in lateral ground displacement. Since the risk of liquefaction is low at this site, it is our opinion that the risk of lateral spreading is also low.

4.2.3 Fault Surface Rupture

There are no active faults mapped within 4 miles of the site by USGS (USGS, 2020). Therefore, the risk of fault surface rupture is low at this site.

4.2.4 Seismic-Induced Landslides

Earthquake-induced landslides generally occur in steeper slopes comprised of relatively weak soil deposits. Since there are no significant slopes on or near the site, it is our opinion that the risk of seismic-induced landslides is low.

4.2.5 Ground Motion Amplification

Soil capable of significantly amplifying ground motions beyond the levels determined by our site-specific seismic response analysis was not encountered during our subsurface exploration program. We conclude the level of amplification determined by our site response analysis is appropriate and the proposed building can be designed using the levels of ground shaking prescribed by ASCE 7-16 and ASCE 41-17.

4.2.6 Dry Seismic Settlement

Dry seismic settlement due to earthquakes is most prevalent in relatively deep deposits of dry, clean sand, which are not present at the site. We do not anticipate that significant settlement will occur during design levels of ground shaking.

4.2.7 Subsidence/Uplift

Subduction zone earthquakes can cause vertical tectonic movements. The movements reflect coseismic strain release accumulation associated with interplate coupling in the CSZ. Based on our review of the literature, the locked zone of the CSZ is located in excess of 60 miles from the site. Consequently, we do not anticipate that subsidence or uplift is a significant design concern.

4.2.8 Lurching

Lurching is a phenomenon generally associated with very high levels of ground shaking, which cause localized failures and distortion of the soil. The anticipated ground accelerations from our site response analysis are below the threshold required to induce lurching of the site soil.

4.2.9 Tsunami and Seiche

The site is not in a mapped tsunami inundation zone (DOGAMI, 2018) and is away from large enclosed bodies of water that may develop seiches. In our opinion, tsunamis and seiches are not hazards at the site.

4.3 FLOODING

Hazard mapping for the site does not show flooding as a potential hazard (DOGAMI, 2018). In our opinion, the risk of flooding at this site is low.

4.4 VOLCANIC

Hazard mapping for the site does not show volcanic activity as a potential hazard (DOGAMI, 2018). In our opinion, the risk of damage from volcanic activity is low at this site.

5.0 DESIGN RECOMMENDATIONS

5.1 FOUNDATION SUPPORT

5.1.1 General

KPFF informed us that the seismic upgrades to the existing building may require construction of new footings and possibly enlarging existing footings. Micropiles or other deep foundations are not planned at this time.

All footing subgrade should consist of firm native soil or firm structural fill. In our opinion, the fill encountered in the borings was placed as structural fill, although this should be verified by GeoDesign during construction. If soft subgrade soil is encountered, it should be removed from the influence zone of footings and replaced with structural fill. New and enlarged footings should be sized using an allowable bearing pressure of 3,000 psf. This value may be increased by 50 percent for short-term loads, such as wind and seismic forces. We recommend that an ultimate static and seismic bearing capacity of 9,000 psf be used in design.

We recommend that isolated column and continuous wall footings have minimum widths of 24 and 18 inches, respectively. The bottom of exterior footings should be founded at least 18 inches below the lowest adjacent grade. Interior footings should be founded at least 12 inches below the bottom of the floor slab.

All footing subgrade should be evaluated by the project geotechnical engineer or their representative to evaluate bearing conditions. Observations should determine whether all loose or soft material, organic material, unsuitable fill, prior topsoil zones, and softened subgrades (if present) have been removed. Localized deepening of footing excavations may be required to penetrate unsuitable material.

5.1.2 Lateral Resistance

Lateral loads on footings can be resisted by passive earth pressure on the sides of the footings and by friction along the base of the footings. Our analysis indicates that the available passive earth pressure is 350 pcf, modeled as an equivalent fluid pressure. The upper 12 inches of adjacent, unpaved areas should not be considered when calculating passive resistance. A coefficient of friction value equal to 0.30 may be used when calculating resistance to sliding for footings in direct contact with native soil. Footings in contact with crushed rock should be designed using a coefficient of friction value of 0.50. These passive earth pressure and coefficient of friction values are ultimate values.

5.1.3 Settlement

We anticipate that footings supporting the anticipated design loads and constructed as recommended will experience less than 1 inch of total post-construction settlement and ½ inch of differential settlement between similarly loaded adjacent footings. Placing additional loads on existing footings will result in additional settlement. We can estimate this settlement if the

existing and additional loads are provided. Given the maximum design foundation loads and assuming a load increase of up to 50 percent, we expect the additional settlement will be less than 0.5 inch.

5.2 SLABS ON GRADE

We anticipate that the existing subgrade soil will generally provide adequate support for concrete slabs on grade. We recommend that the slab subgrade be evaluated during construction. If any loose undocumented fill or unsuitable soil is present beneath the floor slabs, the subgrade soil should be scarified and recompacted or over-excavated. A modulus of subgrade reaction of 100 pci can be used for design of the floor slabs, provided the subgrade is prepared in accordance with the recommendations presented in this report. Settlement of slabs supporting the anticipated design loads and constructed as recommended is anticipated to be less than 1 inch of total settlement and ½ inch of differential settlement.

We recommend that floor slabs be supported on at least 6 inches of imported granular material to aid as a capillary break and to provide uniform support. The imported granular material should have a maximum particle size of 1½ inches, should have less than 5 percent by dry weight passing the U.S. Standard No. 200 sieve, and should have at least two mechanically fractured faces. The imported granular material should be placed in one lift and compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557.

Vapor barriers beneath floor slabs are typically required by flooring manufactures to maintain the warranty on their products. In our experience, adequate performance of floor adhesives can be achieved by using a clean base rock (less than 5 percent fines) beneath the floor slab with no vapor barrier. In fact, vapor barriers can frequently cause moisture problems by trapping water beneath the floor slab that is introduced during construction. If a vapor barrier is used, water should not be applied to the base rock prior to pouring the slab and the work should be completed during extended dry weather so that rainfall is not trapped on top of the vapor barrier. Selection and design of an appropriate vapor barrier, if needed, should be based on discussions among members of the design team. If requested, we can provide additional information to assist you with your decision.

5.3 SEISMIC DESIGN PARAMETERS

We performed a site-specific seismic hazard evaluation for this project, which is presented in Appendix G. In Appendix G we present the default seismic design parameters provided by the building codes, as well as the response spectra we obtained from our site-specific seismic hazard evaluation.

5.4 RETAINING WALLS

5.4.1 Assumptions

These retaining wall recommendations apply to permanent above-grade retaining walls. Our retaining wall design recommendations are based on the following assumptions: (1) the walls consist of conventional, cantilevered retaining walls, (2) the walls are up to 10 feet in height, (3) drains are provided to prevent hydrostatic pressure from developing, and (4) the retained soil is level. Re-evaluation of our recommendations will be required if the retaining wall design criteria for the project varies from these assumptions.

5.4.2 Retaining Wall Design Parameters

For unrestrained retaining walls, an active equivalent fluid pressure of 35 pcf should be used for design. Where retaining walls are restrained from rotation prior to being backfilled, an at-rest equivalent fluid pressure of 55 pcf should be used for design. A superimposed seismic lateral force should be calculated based on a dynamic force of $7H^2$ pounds per linear foot of wall (where H is the height of the wall in feet). The load should be applied as a distributed load with the centroid located at a distance of 0.6H above the base of the wall.

If surcharges (e.g., retained slopes, building foundations, vehicles, terraced walls, etc.) are located within a horizontal distance from the back of a wall equal to the height of the wall, additional pressures will need to be accounted for in the wall design. Figure 5 presents additional pressures resulting from some common loading scenarios. Our office should be contacted for additional pressures resulting from alternate loading scenarios. We recommend a vertical live load of 250 psf be applied at the surface of the retained soil where the wall retains roadways.

The base of the wall footing excavations should extend a minimum of 18 inches below the lowest adjacent grade. The wall footings should be designed in accordance with the guidelines in the "Foundation Support" section. At locations where there is a slope in front of the retaining wall, we recommend a minimum 5-foot-wide, horizontal bench be placed between the wall and the top of the slope.

5.4.3 Retaining Wall Drainage and Backfill

The above design parameters have been provided assuming that drains will be installed behind the walls to prevent buildup of hydrostatic pressures. Backfill material placed behind retaining walls and extending a horizontal distance of ½H (where H is the height of the retaining wall) should consist of imported granular material meeting the requirements described in the "Structural Fill" section. Alternatively, the native soil can be used as backfill material, provided a minimum 2-foot-wide column of angular drain rock wrapped in a drainage geotextile is placed against the wall and the native soil can be adequately moisture conditioned for compaction. The rock column should extend from the perforated drainpipe or foundation drains to within approximately 1 foot of the ground surface. The angular drain rock should have a maximum particle size of 2 inches, should have less than 2 percent by dry weight passing the U.S. Standard No. 200 sieve, should have at least two mechanically fractured faces, and should be free of organic material and other unsuitable materials.

Perforated collector pipes should be placed at the base of the granular backfill behind the walls. The pipe should be embedded in a minimum 2-foot-wide zone of angular drain rock wrapped in a drainage geotextile fabric. The collector pipes should discharge at an appropriate location away from the base of the wall. Unless measures are taken to prevent backflow into the drainage system of the wall, the discharge pipe should not be tied directly into stormwater drain systems.

Backfill should be placed and compacted as recommended for structural fill, with the exception of backfill placed immediately adjacent to walls. Backfill adjacent to walls should be compacted to a lesser standard to reduce the potential for compaction-induced earth pressures on the walls.

Backfill located within a horizontal distance of 3 feet from the retaining walls should be compacted to approximately 90 percent of the maximum dry density, as determined by ASTM D1557. Backfill placed within 3 feet of the wall should be compacted in lifts less than 6 inches thick using hand-operated tamping equipment (such as a jumping jack or vibratory plate compactor). If flatwork (such as slabs, sidewalk, or pavement) will be placed adjacent to the wall, we recommend that the upper 2 feet of fill be compacted to 95 percent of the maximum dry density, as determined by ASTM D1557. Settlement of up to 1 percent of the wall height commonly occurs immediately adjacent to the wall as the wall rotates and develops active lateral earth pressures. Consequently, we recommend that construction of flatwork adjacent to retaining walls be postponed at least four weeks after construction, unless survey data indicates that settlement is complete prior to that time.

5.5 PERMANENT SLOPES

Permanent cut or fill slopes should not exceed a gradient of 2H:1V, unless specifically evaluated for stability. Upslope buildings, access roads, and hardscapes should be set back a minimum of 5 feet from the crest of such slopes. Slopes should be planted with appropriate vegetation to provide protection against erosion as soon as possible after grading. Surface water runoff should be collected and directed away from slopes to prevent water from running down the face of the slope.

5.6 DRAINAGE

5.6.1 Surface

The finished ground surface around the building should be sloped away from foundations at a minimum 2 percent gradient for a distance of at least 5 feet. Pavement surfaces and open space areas should be sloped such that surface water runoff is collected and routed to suitable discharge points. Runoff water should not be directed to the top of slopes.

5.6.2 Subsurface

It is not necessary to install footing drains for at-grade structures where floors will be at or above adjacent grades. We recommend that roof downspouts or scuppers discharge to a solid pipe that carries the collected water to an appropriate stormwater system that is designed to prevent backflow. If drywells are used, we recommend that the perforated drywell sections be at least 10 feet below adjacent enclosed spaces such as basements, elevator pits, etc.

5.6.3 Temporary

During grading the contractor should be made responsible for temporary drainage of surface water as necessary to prevent standing water and/or erosion at the working surface. The contractor should keep all footing excavations and building pads free of water during rough and finished grading of the building site.

5.7 PAVEMENT

Descriptions of our input parameters and the recommended pavement designs are summarized below.

5.7.1 Design Standards

The standards used for pavement design are listed below:

- AASHTO Guide for Design of Pavement Structures (AASHTO, 1993; herein referred to as the AASHTO guide)
- ODOT guide

5.7.2 ESAL Calculations

Based on discussions with the design team, exact truck traffic information is not available. However, we understand that heavy truck traffic will be limited to the approximate area shown on Figure 4 and that heavy trucks throughout the rest of the site will be limited to a few vehicles per week. Based on discussions with the design team, we estimate that the heavy truck loading area will have approximately 10 medium trucks (FHWA class 5 and 6) and up to 6 heavy trucks (FHWA class 8 and 9) per day and that the remaining area will have only a few medium and heavy trucks per week. Accordingly, we calculated an ESAL value of 100,000 for the heavy truck area and estimated an ESAL value of 25,000 for the remaining pavement areas.

5.7.3 Back-Calculated Subgrade Resilient Moduli

We used the FWD data and back-calculation analysis to estimate subgrade resilient modulus values at each test location. The AASHTO back-calculation procedure for resilient modulus is based on a factored value. For typical Willamette Valley soil, we used a subgrade correction factor of 0.35 as recommended by the ODOT guide. Accordingly, we calculated an average design resilient modulus value of 7,000 psi based on FWD testing and DCP testing.

5.7.4 Back-Calculated Roadway Structural Capacity

We performed FWD back-calculation to estimate road section structural capacity. We calculated the effective pavement structural number, derived as a function of unit stiffness and pavement depth, in accordance with the method in the AASHTO guide. The effective structural numbers by FWD test location are provided in Table E-1 and on Figure E-1.

5.7.5 Required Structural Number

We used the procedure in the AASHTO guide to determine the required rehabilitation structural number based on our ESAL calculations, resilient modulus, and the other design parameters listed below. Our recommended required structural numbers are 2.29 for the heavy truck loading area and 1.81 for the remaining pavement areas.

The design structural number for a 20-year pavement design is presented on Figure E-1 as a solid gray line and can be compared to the existing structural number for the area.

5.7.6 Other Design Parameters

Other pavement design parameters used in our analysis are as recommended by the ODOT and/or AASHTO guides. These input parameters are summarized as follows:

- Reliability of 80 percent
- Overall standard deviation value of 0.49
- Initial and terminal serviceability values of 4.2 and 2.5, respectively

- Aggregate base drainage coefficient of 1.0
- Structural layer coefficients of 0.42 and 0.10 for new AC and new aggregate base, respectively
- Resilient modulus of 20,000 psi for new aggregate base
- Drainage coefficient of 1.0 for aggregate base

5.7.7 Pavement Recommendations

In general, the pavement is in fair condition and is either near or at required pavement capacity, with the exception of the pavement around the heavy truck loading area identified on Figure 4 and within the areas of moderate to severe fatigue described in Table 1 and identified on Figure 3. Accordingly, we recommend improving the pavement capacity through rehabilitation and repair of the moderate to severe pavement fatigue to increase capacity in the heavy truck loading area. For areas outside of the heavy truck area, we recommend DAS implement a maintenance program consisting of crack sealing and repair as necessary. In addition, we recommend budgeting for a slurry seal within the next 10 years to maintain and extend the life of the pavement.

Typical rehabilitation options include grind, inlay, and overlay. Grind and inlay is the process of removing existing AC and replacing with new AC. Overlay includes raising grades and total pavement structure. Grind and inlay rehabilitation will remove some surface distress and adds some strength to the pavement. The amount of strength added depends on the capacity of the existing pavement and the total depth of grinding. In addition, the depth of grinding is dependent on the available thickness of the AC. Overlay increases the total pavement structure by increasing pavement thickness and pavement grades. However, overlay will reduce curb reveal and may alter site drainage. The following rehabilitation options for the heavy truck area include both grind and inlay and overlay. We recommend selecting an option and reviewing the implications with GeoDesign.

5.7.7.1 Fatigue Pavement Repair

Regardless of which option is selected for site rehabilitation, we recommend repair by removing the fatigued material and replacing with a new pavement structure. Figure 3 and Table 1 provide approximate limits for repair; however, pavement distress areas can change over time. Accordingly, we recommend that site conditions be reviewed and fatigue repair areas be field marked at the time of construction. We estimate approximately 1,650 square feet of repair area with the following:

- Saw cut a minimum of 12 inches outside of distress areas.
- Saw cut lines should be at right angles and should allow for access by excavation and compaction equipment.
- Total depth of excavation should be at least 16 inches and extended to firm subgrade material.
- Adjacent, exposed AC pavement edges should be thoroughly cleaned, and a tack coat should be applied.

- Following excavation and preparation, we recommend the following repair pavement section
  - 2.0 inches of Level 2, ½-inch, dense ACP (surface course)
  - 2.0 inches of Level 2, ½-inch, dense ACP (base course)
  - 12.0 inches of aggregate base
  - Stabilization aggregate (if required)
  - Subgrade geotextile

5.7.7.2 Grind and Inlay Rehabilitation – Option

Grind and inlay rehabilitation is limited by the available depth of AC. Boring B-4 (3.5 inches of AC) is in the heavy truck area and B-5 (3.0 inches of AC) is just to the west. Accordingly, we recommend a maximum grinding depth of 1.5 inches, which will leave 1.5 inches of AC based on the thinner pavement section at B-5. A 1.5-inch grind and inlay combined with pavement repair will result in a pavement life between 15 and 20 years.

1.5-inch grind and inlay

- 1.5-inch cold plane pavement removal
- 1.5 inches of Level 2, dense ACP
- 3/8-inch nominal size ACP
- Tack coat

5.7.7.3 Overlay Rehabilitation – Option

A 1.0-inch overlay will result in a pavement life between 20 and 25 years.

1.0-inch Overlay

- 1.0 inch of Level 2, dense ACP (base course)
- 3/8-inch nominal size ACP
- Tack coat

5.7.8 Pavement Materials

A submittal should be made for each pavement material prior to the start of paving operations. Each submittal should include the test information necessary to evaluate the degree to which the material's properties comply with the properties that were recommended or specified. The geotechnical engineer and other appropriate members of the design team should review each submittal.

5.7.8.1 Aggregate Base Rock

Imported granular material used as aggregate base for new pavement should consist of ¾- or 1½-inch-minus material (depending on the application) and meet the requirements in OSSC 00641 (Aggregate Subbase, Base, and Shoulders). The aggregate base should be compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557.

5.7.8.2 AC

The AC should be Level 2, dense ACP according to the OSSC 00744 (Asphalt Concrete Pavement). Asphalt binder should be performance graded and conform to PG 64-22. For lift thicknesses from 2.0 to 3.0 inches (repair areas), we recommend ½-inch ACP. For lift thicknesses from

1.0 inch to 1.5 inches (grind and inlay or overlay), we recommend 3/8-inch ACP. If lift thicknesses outside this range are requested, we recommend additional consultation and communication between the contractor and the design team. AC paving should only occur when ground temperatures are 40 degrees Fahrenheit or warmer.

5.7.8.3 Subgrade Geotextile Fabric

A subgrade geotextile fabric should be placed as a barrier between fine-grained subgrade (if present) and granular base rock. The geotextile fabric should meet the specifications provided in OSSC 02320 (Geosynthetics) for separation geotextiles (Table 02320-4) and be installed in accordance with OSSC 00350 (Geosynthetic Installation). A minimum initial aggregate base lift of 6 inches is required over geotextiles.

5.7.8.4 Tack Coat

Adequate bonding of pavement layers is important to long pavement life. We recommend tack coats between all pavement layers at rates of 0.25 (milled pavement) and 0.20 (between new ACP layers and overlay) gallons per square yard when diluted 1 to 1 with water.

6.0 CONSTRUCTION RECOMMENDATIONS

6.1 SITE PREPARATION

6.1.1 Demolition

Some demolition will likely be necessary to construct new foundations and floor slabs. Before the construction of new structural elements, we recommend that all previous foundations, walls, slabs, utilities, or other buried elements that will be beneath new foundations and floor slabs be completely removed. Any monitoring wells or underground storage tanks should be abandoned in accordance with state and local regulations prior to site development. Excavations resulting from demolition of existing improvements should be backfilled with compacted structural fill as recommended in this report. The bottom of the excavations should expose firm subgrade. The sides of the temporary excavations should be cut into firm material and sloped no steeper than 1½H:1V.

6.1.2 Subgrade Evaluation

A member of our geotechnical staff should observe all footing, floor slab, and hardscape subgrades after excavation, re-compaction (if applicable), and placement of structural fill have been completed to confirm that there are no areas of unsuitable or unstable soil. The subgrade should be evaluated using moisture-density testing or a hand probe. Soft, loose, or unsuitable soil found at the subgrade level should be over-excavated and replaced with structural fill.

6.2 EXCAVATION

6.2.1 General

Excavations will be required to construct new foundations, utilities, stormwater infiltration facilities, and other improvements. Conventional earthmoving equipment in proper working condition should be capable of making the necessary excavations. Temporary excavation sidewalls could experience raveling, which may result in sloped excavations that are wider than anticipated.

Excavations deeper than 4 feet will require shoring or should be sloped. Sloped excavations may be used to vertical depths of 10 feet BGS and should have side slopes no steeper than 1½H:1V, provided groundwater seepage does not occur. We recommend a minimum horizontal distance of 5 feet from the edge of existing improvements to the top of any temporary slope. All cut slopes should be protected from erosion by covering them during wet weather. If seepage, sloughing, or instability is observed, the slope should be flattened or shored. Shoring will be required where slopes are not possible. The contractor should be responsible for selecting the appropriate shoring system.

Excavations should not be allowed to undermine adjacent improvements. If existing roads or structures are located near a proposed excavation, unsupported excavations can be maintained outside of a 1H:1V downward projection that starts 5 feet from the base of the existing elements. Excavations that must be inside of this zone should be supported by temporary or permanent shoring designed for moment resistance for the full height of the excavation, including kick-out for the full buried depth of the retaining system. If existing footings will be expanded, and over-excavation is required to remove unsuitable subgrade, we should be contacted to provide additional recommendations on how to avoid undermining existing footings on a case-by-case basis.

While we have described certain approaches to performing excavations, it is the contractor's responsibility to select the excavation and dewatering methods, monitor the excavations for safety, and provide any shoring required to protect personnel and adjacent improvements. All excavations should be in accordance with applicable OSHA and state regulations.

6.2.2 Excavation Dewatering

Excavations will be above the groundwater level. However, some perched water could still seep into the site excavations, especially after periods of heavy rain. We anticipate that dewatering methods consisting of pumping water from excavation sumps will generally be adequate. If possible, we recommend that construction be scheduled for the dry season. Water generated during dewatering operations should be treated, if necessary, and pumped to a suitable disposal point.

Where water seepage occurs in excavations, we recommend placing at least 1 foot of stabilization material at the base of the excavations. The stabilization material should consist of 4- or 6-inch-minus pit- or quarry-run rock, crushed rock, or crushed gravel and sand. The material should have a maximum particle size of 6 inches, should have less than 5 percent by dry weight passing the U.S. Standard No. 4 sieve, and should have at least two mechanically fractured faces. The material should be free of organic material and other deleterious materials.

We note that these recommendations are for guidance only. Dewatering of excavations is the sole responsibility of the contractor, as the contractor is in the best position to select the appropriate system based on their means and methods.

6.3 STRUCTURAL FILL

Structural fill includes fill beneath foundations, slabs, hardscapes, and other structures. Structural fill should generally consist of particles no larger than 3 inches in diameter and should be free of organic material and other deleterious materials. Recommendations for suitable fill material are provided in the following sections.

6.3.1 On-Site Soil

The on-site sand and gravel will generally be suitable for use as structural fill. On-site sand or gravel should be placed in lifts with a maximum uncompacted thickness of 12 inches and compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557. It may be necessary to moisture condition the sand and gravel before it can be used as structural fill. We recommend using imported granular material for structural fill if the moisture content of the on-site sand and gravel cannot be reduced.

The on-site fine-grained soil will be suitable for use as structural fill only if it can be moisture conditioned. Based on our experience, fine-grained soil is sensitive to small changes in moisture content and may be difficult, if not impossible, to compact adequately during wet weather or when the moisture content is more than a few percentage points above optimum. Available fine-grained soil may require extensive drying if it is used as structural fill. The material should be placed in lifts with a maximum uncompacted thickness of 8 inches and compacted to not less than 92 percent of the maximum dry density, as determined by ASTM D1557. We recommend using imported granular material for structural fill if the moisture content of the on-site fine-grained soil cannot be reduced.

6.3.2 Imported Granular Material

Imported granular material should be pit- or quarry-run rock, crushed rock, or crushed gravel and sand that is fairly well graded between coarse and fine and has less than 5 percent by dry weight passing the U.S. Standard No. 200 sieve. All granular material must be durable such that there is no degradation of the material during and after installation as structural fill. The material should be placed in lifts with a maximum uncompacted thickness of 12 inches and compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557. During the wet season or when wet subgrade conditions exist, the initial lift should have a maximum thickness of 18 inches and should be compacted by rolling with a smooth-drum, non-vibratory roller.

6.3.3 Recycled Concrete

Recycled concrete can be used for structural fill, provided the concrete is broken to a maximum particle size of 3 inches. This material must be durable such that there is no degradation of the material during and after installation as structural fill. Recycled concrete can be used as trench backfill if it meets the size requirements for that application and the requirements for imported granular material. The material should be placed in lifts with a maximum uncompacted thickness of 12 inches and compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557.

6.3.4 Trench Backfill Material

City of Wilsonville trench backfill requirements should be followed for any public utilities that are installed. Our trench backfill recommendations for private utilities are provided below.

Trench backfill for the utility pipe base and pipe zone should consist of durable, well-graded, granular material that has a maximum particle size of 1 inch, has less than 5 percent by dry weight passing the U.S. Standard No. 200 sieve, and contains no organic material or other deleterious materials. Backfill above the pipe zone should meet the requirements above, except that the maximum particle size may be increased to 1½ inches.

Backfill for the pipe base and within the pipe zone should be placed in maximum 12-inch-thick lifts and compacted to not less than 90 percent of the maximum dry density, as determined by ASTM D1557, or as recommended by the pipe manufacturer. Backfill above the pipe zone should be placed in maximum 12-inch-thick lifts and compacted to not less than 92 percent of the maximum dry density, as determined by ASTM D1557. Trench backfill located within 2 feet of finish subgrade elevation should be placed in maximum 12-inch-thick lifts and compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557. Outside of structural areas, trench backfill material should be compacted to at least 90 percent of the maximum dry density, as determined by ASTM D1557.

6.3.5 Stabilization Material

Stabilization material used in staging or haul road areas or in trenches should consist of 4- or 6-inch-minus pit- or quarry-run rock, crushed rock, or crushed gravel and sand. The material should have a maximum particle size of 6 inches, should have less than 5 percent by dry weight passing the U.S. Standard No. 4 sieve, and should have at least two mechanically fractured faces. The material should be free of organic material and other deleterious materials. Stabilization material should be placed in lifts between 12 and 24 inches thick and compacted to a well-keyed, firm condition.

6.4 EROSION CONTROL

The on-site soil is susceptible to erosion. Consequently, we recommend that slopes be covered with an appropriate erosion control product if construction occurs during periods of wet weather. We recommend that all slope surfaces be planted as soon as practical to minimize erosion. Surface water runoff should be collected and directed away from slopes to prevent water from running down the slope face. Erosion control measures such as straw bales, sediment fences, and temporary detention and settling basins should be used in accordance with local and state ordinances.

6.5 WET WEATHER CONSTRUCTION

Trafficability of soil at the ground surface may be difficult during extended wet periods or when the moisture content of the surface soil is more than a few percentage points above optimum. If not carefully executed, earthwork activities can create extensive soft areas, resulting in significant repair costs.

When the subgrade is wet of optimum, site preparation may need to be accomplished using track-mounted equipment loading into trucks supported on granular haul roads or working blankets. Based on our experience, at least 12 inches of granular material are typically required for light staging areas and at least 18 inches of granular material for haul roads subject to repeated equipment traffic. We typically recommend that imported granular material for haul roads and working blankets consist of durable crushed rock that is well graded and has less than 8 percent by dry weight passing the U.S. Standard No. 200 sieve. Where silt or clay is exposed at the ground surface, the performance of haul roads can typically be improved by placing a geotextile on the subgrade before placing the granular material. The granular material should be placed in a single lift and the surface compacted until well keyed. Although we have presented typical recommendations for haul road and working blankets, the actual thickness and material should be determined by the contractor based on their sequencing of the project and the type and frequency of construction equipment. The base rock thickness for building areas is intended to support post-construction design loads and will not support construction traffic when the subgrade soil is wet. If construction is planned for periods when the subgrade soil is wet, an increased thickness of base rock will be required.

7.0 OBSERVATION OF CONSTRUCTION

Satisfactory foundation and earthwork performance depends to a large degree on the quality of construction. Sufficient observation of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications. Subsurface conditions observed during construction should be compared with those encountered during the subsurface exploration. Recognition of changed conditions often requires experience; therefore, qualified personnel should visit the site with sufficient frequency to determine if subsurface conditions change significantly from those anticipated.

We recommend that GeoDesign be retained to observe earthwork activities. We anticipate this will consist of evaluating footing and floor slab subgrade, proof rolling the pavement subgrade and aggregate base, observing the placement of structural fill, observing the repair of soft subgrade areas, and performing laboratory compaction and field moisture-density tests.

8.0 LIMITATIONS

We have prepared this report for use by DAY CPM, the State of Oregon Department of Administrative Services, and their design and construction teams for the proposed project. The data and report can be used for bidding or estimating purposes, but our report, conclusions, and interpretations should not be construed as warranty of the subsurface conditions and are not applicable to other sites.

Soil explorations indicate soil conditions only at specific locations and only to the depths penetrated. They do not necessarily reflect soil strata or water level variations that may exist between exploration locations. If subsurface conditions differing from those described are noted during the course of excavation and construction, re-evaluation will be necessary.

The site development plans and design details were preliminary at the time this report was prepared. When the design has been finalized and if there are changes in the site grades or location, configuration, design loads, or type of construction, the conclusions and recommendations presented may not be applicable. If design changes are made, we request that we be retained to review our conclusions and recommendations and to provide a written verification or modification.

The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in this report for consideration in design.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with generally accepted practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

♦ ♦ ♦

We appreciate the opportunity to be of continued service to you. Please call if you have questions concerning this report or if we can provide additional services.

Sincerely,

GeoDesign, Inc.

Ryan T. Lawrence, P.E.
Associate Engineer

Krey D. Younger, P.E., G.E.
Senior Associate Engineer

Brett A. Shipton, P.E., G.E.
Principal Engineer

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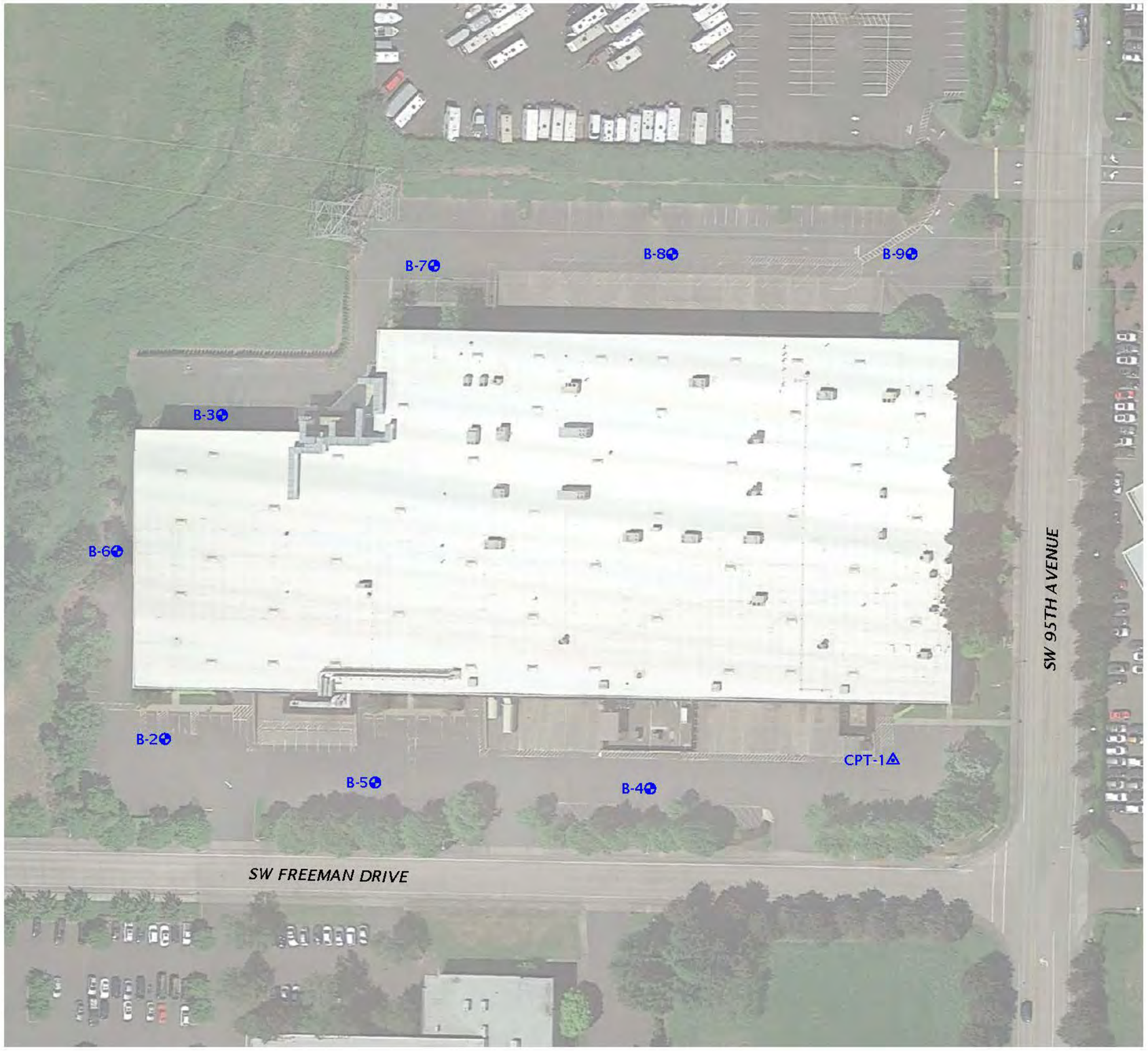
FIGURES

GEODESIGN INC AN NV5 COMPANY	ORDAS-7-01	VICINITY MAP
	SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR — FIGURE 1

Printed By: aday | Print Date: 9/16/2020 4:40:33 PM
File Name: J:\M-R\ORDAS\ORDAS-7\ORDAS-7-01\Figures\CAD\ORDAS-7-01-VM01.dwg | Layout: FIGURE 1



LEGEND:

B-2	BORING
CPT-1	CONE PENETRATION TEST

N

0 80 160

(SCALE IN FEET)

SITE PLAN BASED ON AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO®, AUGUST 8, 2020

SITE PLAN

DAS NORTH VALLEY COMPLEX
WILSONVILLE, OR

FIGURE 2

ORDAS-7-01

SEPTEMBER 2020

GeoDesign NW
An NV5 Company

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File Name: J:\MR\ORDAS\ORDAS-7\ORDAS-7-01\Figures\CAD\ORDAS-7-01-SP01.dwg | Layout: FIGURE 2

LEGEND:

APPROXIMATE LOCATION OF MODERATE TO SEVERE FATIGUE

(1) DISTRESS AREA I.D.

N

0 80 160

(SCALE IN FEET)

SITE PLAN BASED ON AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO®, AUGUST 8, 2020

SITE PLAN - PAVEMENT DISTRESS AREAS

DAS NORTH VALLEY COMPLEX
WILSONVILLE, OR

FIGURE 3

ORDAS-7-01

SEPTEMBER 2020

GEODESIGN INC
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LEGEND:

1 ☑ FALLING WEIGHT DEFLECTOMETER

HEAVY TRUCK LOADING AREA

N

0 80 160

(SCALE IN FEET)

SITE PLAN BASED ON AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO®, AUGUST 8, 2020

SITE PLAN - FWD LOCATIONS

DAS NORTH VALLEY COMPLEX
WILSONVILLE, OR

FIGURE 4

ORDAS-7-01

SEPTEMBER 2020

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AN NV5 COMPANY

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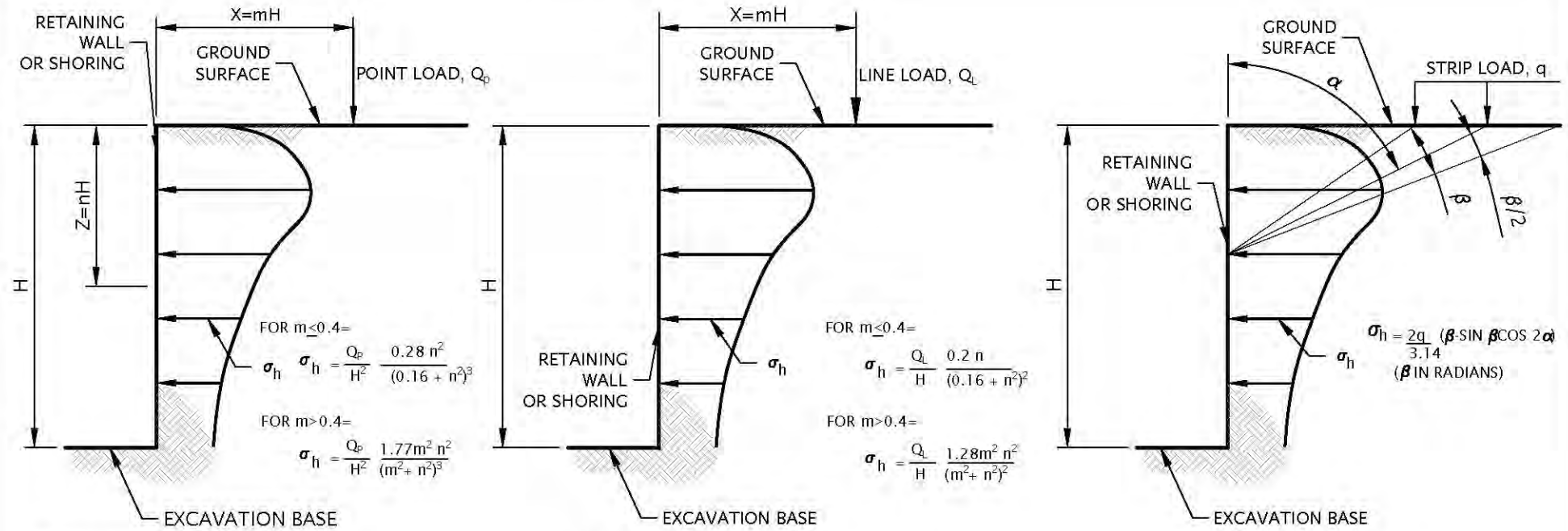
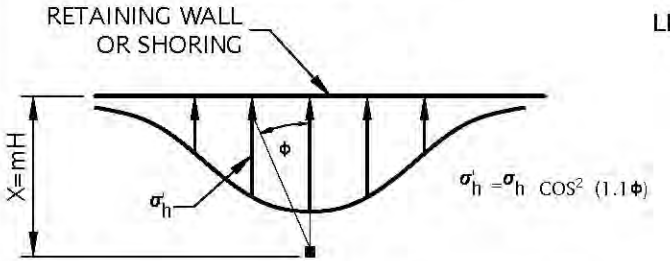
File Name: J:\M-R\ORDAS\ORDAS-7\ORDAS-7-01\Figures\CAD\ORDAS-7-01-DET01.dwg | Layout: FIGURE 5



LINE LOAD PARALLEL TO WALL

STRIP LOAD PARALLEL TO WALL



DISTRIBUTION OF HORIZONTAL PRESSURES

VERTICAL POINT LOAD

NOT TO SCALE

NOTES:

1. FIGURE SHOULD BE USED IN CONJUNCTION WITH REPORT TEXT.
2. THESE GUIDELINES APPLY TO RIGID WALLS WITH POISSON'S RATIO ASSUMED TO BE 0.5 FOR BACKFILL MATERIALS.
3. LATERAL PRESSURES FROM ANY COMBINATION OF ABOVE LOADS MAY BE DETERMINED BY THE PRINCIPLE OF SUPERPOSITION.

GEODESIGN INC AN NV5 COMPANY	ORDAS-7-01	**SURCHARGE-INDUCED LATERAL EARTH PRESSURES**	
	SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR	**FIGURE 5**

APPENDIX A

APPENDIX A

FIELD EXPLORATIONS

GENERAL

We conducted a subsurface exploration program that included drilling eight borings (B-2 through B-9) at the approximate locations shown on Figure 2. The borings were drilled to depths between 4 and 31.5 feet BGS using solid-stem auger drilling methods. Drilling services were provided by Dan J. Fischer Excavating, Inc. of Forest Grove, Oregon, on August 14, 2020. The explorations were observed and logged by a member of our geology staff. We collected representative samples of the various soil encountered in the explorations for visual classification and laboratory testing. The exploration logs are presented in this appendix.

The exploration locations were marked in the field using visual references. The exploration locations should be considered accurate only to the degree implied by the methods used. We estimated ground surface elevations using the computer program Google Earth.

SOIL SAMPLING

We collected soil samples from the borings by taking grab samples of the soil cuttings and by conducting SPTs in general conformance with ASTM D1586. A rope and cathead was used to lift the hammer 30 inches. The number of blows required to drive the sampler 1 foot, or as otherwise indicated, into the soil is shown adjacent to the sample symbols on the exploration logs. Disturbed samples were collected from the split barrel for subsequent classification and index testing. A higher quality, relatively undisturbed sample was collected using a standard Shelby tube in general accordance with ASTM D1587. Sampling methods and intervals are shown on the exploration logs.

The hammer used to conduct the SPTs was lifted using a rope and cathead. The SPTs were conducted using two wraps of the rope around the cathead.

SOIL CLASSIFICATION

The soil samples were classified in accordance with the "Exploration Key" (Table A-1) and "Soil Classification System" (Table A-2), which are presented in this appendix. The exploration logs indicate the depths at which the soils or their characteristics change, although the change could be gradual. A horizontal line between soil types indicates an observed (visual or digging action) change. If the change occurred between sample locations and was not observed or obvious, the depth was interpreted and the change is indicated using a dashed line. Classifications are shown on the exploration logs.

LABORATORY TESTING

We visually examined soil samples collected from the explorations to confirm field classifications. We also performed the following laboratory testing.

MOISTURE CONTENT

We determined the natural moisture content of select soil samples in general accordance with ASTM D2216. The natural moisture content is the ratio of the weight of the water to soil in a test sample and is expressed as a percentage. The test results are presented in this appendix.

PARTICLE-SIZE ANALYSIS

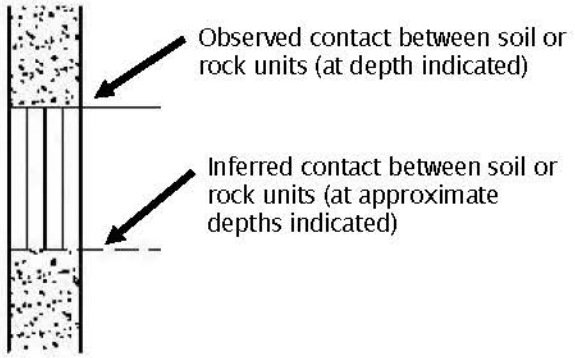
We completed particle-size analysis on select soil samples in general accordance with ASTM D1140. The testing consisted of determining the soil percentages passing various U.S. Standard sieves. The percent fines is the ratio of the dry weight of the material passing the U.S. Standard No. 200 sieve to the dry weight of the overall sample. The test results are presented in this appendix.

ATTERBERG LIMITS TEST

We determined the Atterberg limits of select soil samples in general accordance with ASTM D4318. Atterberg limits include the liquid limit, plastic limit, and the plasticity index of soil. These index properties are used to classify soil and for correlation with other engineering properties of soil. The test results are presented in this appendix.

SYMBOL	SAMPLING DESCRIPTION
	Location of sample collected in general accordance with ASTM D1586 using Standard Penetration Test with recovery
	Location of sample collected using thin-wall Shelby tube or Geoprobe® sampler in general accordance with ASTM D1587 with recovery
	Location of sample collected using Dames & Moore sampler and 300-pound hammer or pushed with recovery
	Location of sample collected using Dames & Moore sampler and 140-pound hammer or pushed with recovery
	Location of sample collected using 3-inch-O.D. California split-spoon sampler and 140-pound hammer with recovery
	Location of grab sample
	Rock coring interval
	Water level during drilling
	Water level taken on date shown

Graphic Log of Soil and Rock Types



GEOTECHNICAL TESTING EXPLANATIONS

ATT	Atterberg Limits	P	Pushed Sample
CBR	California Bearing Ratio	PP	Pocket Penetrometer
CON	Consolidation	P200	Percent Passing U.S. Standard No. 200 Sieve
DD	Dry Density		
DS	Direct Shear	RES	Resilient Modulus
HYD	Hydrometer Gradation	SIEV	Sieve Gradation
MC	Moisture Content	TOR	Torvane
MD	Moisture-Density Relationship	UC	Unconfined Compressive Strength
NP	Non-Plastic	VS	Vane Shear
OC	Organic Content	kPa	Kilopascal

ENVIRONMENTAL TESTING EXPLANATIONS

CA	Sample Submitted for Chemical Analysis	ND	Not Detected
P	Pushed Sample	NS	No Visible Sheen
PID	Photoionization Detector Headspace Analysis	SS	Slight Sheen
		MS	Moderate Sheen
ppm	Parts per Million	HS	Heavy Sheen

RELATIVE DENSITY - COARSE-GRAINED SOIL

Relative Density	Standard Penetration Resistance	Dames & Moore Sampler (140-pound hammer)	Dames & Moore Sampler (300-pound hammer)
Very Loose	0 – 4	0 – 11	0 – 4
Loose	4 – 10	11 – 26	4 – 10
Medium Dense	10 – 30	26 – 74	10 – 30
Dense	30 – 50	74 – 120	30 – 47
Very Dense	More than 50	More than 120	More than 47

CONSISTENCY - FINE-GRAINED SOIL

Consistency	Standard Penetration Resistance	Dames & Moore Sampler (140-pound hammer)	Dames & Moore Sampler (300-pound hammer)	Unconfined Compressive Strength (tsf)
Very Soft	Less than 2	Less than 3	Less than 2	Less than 0.25
Soft	2 – 4	3 – 6	2 – 5	0.25 – 0.50
Medium Stiff	4 – 8	6 – 12	5 – 9	0.50 – 1.0
Stiff	8 – 15	12 – 25	9 – 19	1.0 – 2.0
Very Stiff	15 – 30	25 – 65	19 – 31	2.0 – 4.0
Hard	More than 30	More than 65	More than 31	More than 4.0

PRIMARY SOIL DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE-GRAINED SOIL (more than 50% retained on No. 200 sieve)	GRAVEL (more than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (< 5% fines)	GW or GP	GRAVEL
		GRAVEL WITH FINES (≥ 5% and ≤ 12% fines)	GW-GM or GP-GM	GRAVEL with silt
			GW-GC or GP-GC	GRAVEL with clay
		GRAVEL WITH FINES (> 12% fines)	GM	silty GRAVEL
			GC	clayey GRAVEL
			GC-GM	silty, clayey GRAVEL
	SAND (50% or more of coarse fraction passing No. 4 sieve)	CLEAN SAND (<5% fines)	SW or SP	SAND
		SAND WITH FINES (≥ 5% and ≤ 12% fines)	SW-SM or SP-SM	SAND with silt
			SW-SC or SP-SC	SAND with clay
		SAND WITH FINES (> 12% fines)	SM	silty SAND
			SC	clayey SAND
			SC-SM	silty, clayey SAND
FINE-GRAINED SOIL (50% or more passing No. 200 sieve)	SILT AND CLAY	Liquid limit less than 50	ML	SILT
			CL	CLAY
			CL-ML	silty CLAY
			OL	ORGANIC SILT or ORGANIC CLAY
		Liquid limit 50 or greater	MH	SILT
			CH	CLAY
			OH	ORGANIC SILT or ORGANIC CLAY
HIGHLY ORGANIC SOIL			PT	PEAT

MOISTURE CLASSIFICATION

Term	Field Test
dry	very low moisture, dry to touch
moist	damp, without visible moisture
wet	visible free water, usually saturated

ADDITIONAL CONSTITUENTS

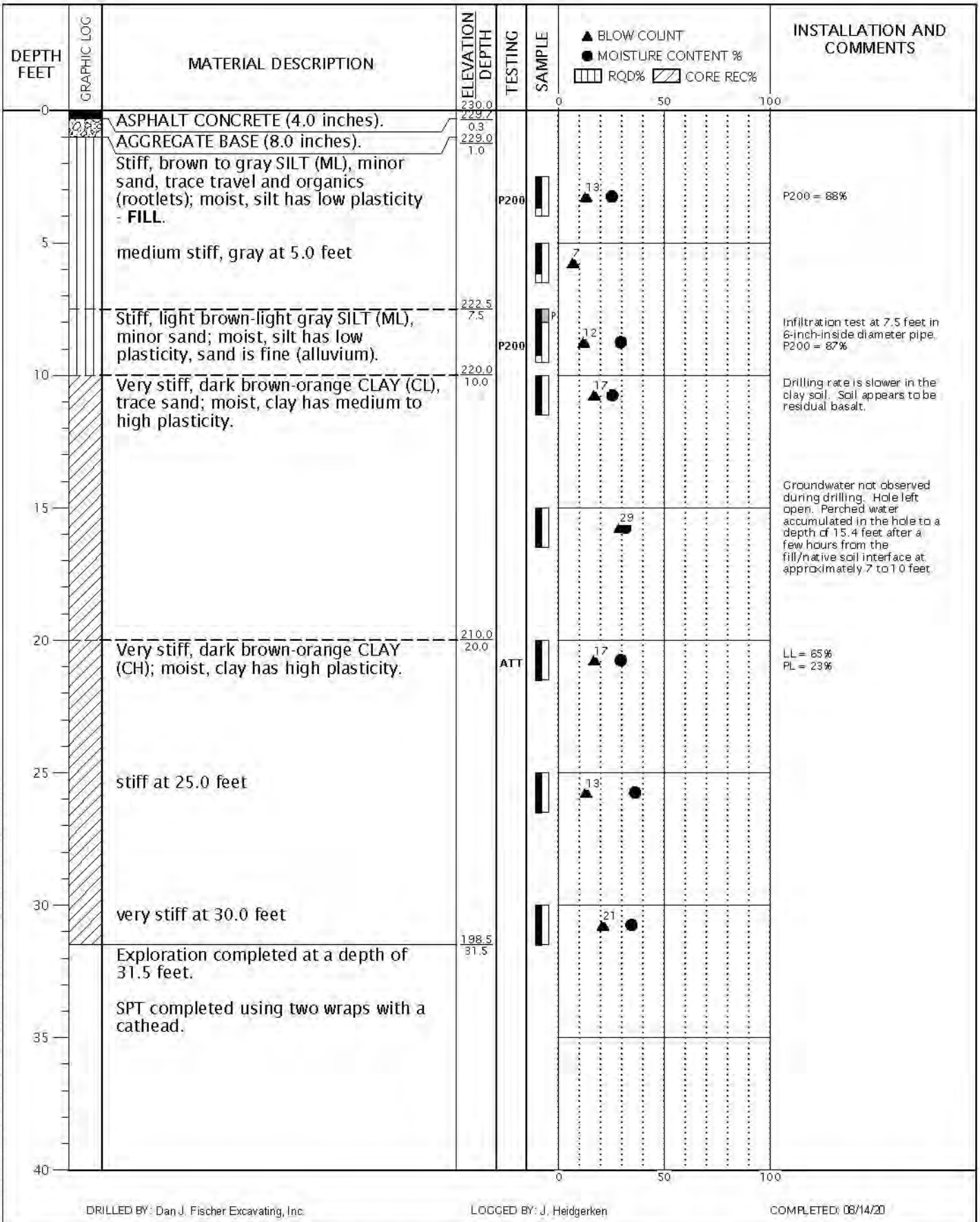
Secondary granular components or other materials such as organics, man-made debris, etc.

Percent	Silt and Clay In: Fine-Grained Soil	Silt and Clay In: Coarse-Grained Soil	Percent	Sand and Gravel In: Fine-Grained Soil	Sand and Gravel In: Coarse-Grained Soil
< 5	trace	trace	< 5	trace	trace
5 – 12	minor	with	5 – 15	minor	minor
> 12	some	silty/clayey	15 – 30	with	with
			> 30	sandy/gravelly	Indicate %

GEODESIGN INC AN NV5 COMPANY

SOIL CLASSIFICATION SYSTEM

TABLE A-2



DRILLED BY: Dan J. Fischer Excavating, Inc.

LOGGED BY: J. Heidgerken

COMPLETED: 08/14/20

BORING METHOD: solid-stem auger (see document text)

BORING BIT DIAMETER: 4 and 6 inches

GEODESIGN INC
AN NV5 COMPANY

ORDAS-7-01

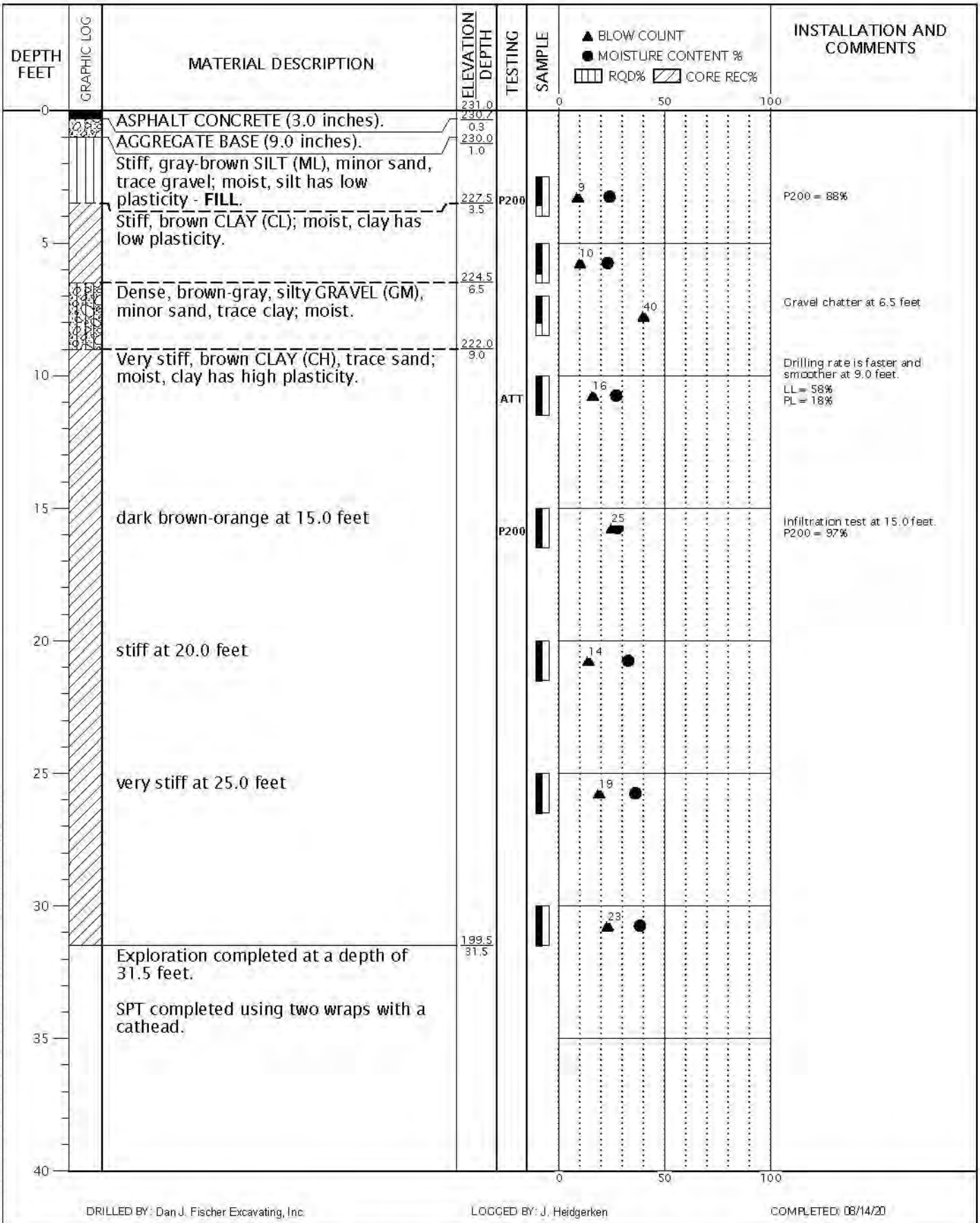
BORING B-2

SEPTEMBER 2020

DAS NORTH VALLEY COMPLEX
WILSONVILLE, OR

FIGURE A-1

BORING LOG - GDI-NV5 - 1 PER PAGE ORDAS-7-01-B2_9.GPJ GDI_NV5.GDT PRINT DATE: 9/18/20:KT



DRILLED BY: Dan J. Fischer Excavating, Inc. LOGGED BY: J. Heidgerken COMPLETED: 08/14/20

BORING METHOD: solid-stem auger (see document text) BORING BIT DIAMETER: 4 inches

GEODESIGN INC AN NV5 COMPANY

ORDAS-7-01	BORING B-3	
SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR	FIGURE A-2

BORING LOG - GDI-NV5 - 1 PER PAGE ORDAS-7-01-B2_9.GPJ GDI_NV5.GDT PRINT DATE: 9/2/20 KT

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION / DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT %	COMMENTS
B-4							
0.0		ASPHALT CONCRETE (3.5 inches).	0.3			0 50 100	
		AGGREGATE BASE (14.5 inches).					
		Loose, brown-gray GRAVEL with silt (GP-GM), minor sand; moist - **FILL**.	1.5				
2.5						9	
		Exploration completed at a depth of 4.0 feet.	4.0				CORE DETAILS: No patch observed. Cored on low fatigue crack.
5.0		SPT completed using two wraps with a cathead.					
7.5						0 50 100	
B-5						0 50 100	
0.0		ASPHALT CONCRETE (3.0 inches).	0.3				
		AGGREGATE BASE (10.0 inches).					
		Medium stiff, light brown SILT (ML), trace sand; moist (alluvium).	1.1				
2.5						5	
		stiff at 4.0 feet				12	
5.0							
		Exploration completed at a depth of 5.5 feet.	5.5				CORE DETAILS: No patch observed. No crack at core.
7.5		SPT completed using two wraps with a cathead.					
						0 50 100	

DRILLED BY: Dan J. Fischer Excavating, Inc. LOGGED BY: J. Heidgerken COMPLETED: 08/14/20

BORING METHOD: core drill/solid-stem auger (see document text) BORING BIT DIAMETER: 5 inches/4 inches

GEODESIGN INC AN NV5 COMPANY

ORDAS-7-01

BORING

SEPTEMBER 2020

DAS NORTH VALLEY COMPLEX
WILSONVILLE, OR

FIGURE A-3

BORING LOG - GDI-NV5 - 2 PER PAGE ORDAS-7-01-B2_9.GPJ GDI_NV5.GDT PRINT DATE: 9/2/20 KT

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION / DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT %	COMMENTS
B-6						0 50 100	
0.0		ASPHALT CONCRETE (4.5 inches).					
		AGGREGATE BASE (14.5 inches).	0.4				
		Medium stiff to stiff, gray-brown CLAY (CL), some silt, trace sand and organics (rootlets); moist - **FILL**.	1.6				
2.5		wet at 3.5 feet				▲8 ●19	
		Stiff, gray SILT (ML), some clay, trace sand and organics (rootlets); moist to wet - **FILL**.	4.5			▲11	
5.0		Exploration completed at a depth of 6.0 feet.	6.0				CORE DETAILS: No patch observed. No crack at core.
7.5		SPT completed using two wraps with a cathead.					
						0 50 100	
B-7						0 50 100	
0.0		ASPHALT CONCRETE (3.0 inches).					
		AGGREGATE BASE (10.0 inches).	0.3				
		Medium stiff, light brown SILT (ML), trace sand; moist (alluvium).	0.8			●19	
2.5							
5.0		Exploration completed at a depth of 5.0 feet.	5.0				CORE DETAILS: No patch observed. No crack at core.
7.5							
						0 50 100	

DRILLED BY: Dan J. Fischer Excavating, Inc. LOGGED BY: J. Heidgerken COMPLETED: 08/14/20

BORING METHOD: core drill/solid-stem auger (see document text) BORING BIT DIAMETER: 5 inches/4 inches

GEODESIGN INC AN NV5 COMPANY

ORDAS-7-01

BORING (continued)

SEPTEMBER 2020

DAS NORTH VALLEY COMPLEX WILSONVILLE, OR

FIGURE A-4

BORING LOG - GDI-NV5 - 2 PER PAGE ORDAS-7-01-B2_9.GPJ GDI_NV5.GDT PRINT DATE: 9/2/20 KT

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION / DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT %	COMMENTS
B-8						0 50 100	
0.0		ASPHALT CONCRETE (3.8 inches).					
		AGGREGATE BASE (8.2 inches).	0.3				
		Medium stiff, gray SILT (ML), trace sand; moist - **FILL**.	1.0				
			1.5				
2.5		Medium stiff, light brown SILT (ML), trace sand; moist (alluvium).					
5.0		Exploration completed at a depth of 5.0 feet.	5.0				CORE DETAILS: No patch observed. Cored on low fatigue crack.
7.5							
						0 50 100	
B-9						0 50 100	
0.0		ASPHALT CONCRETE (3.0 inches).					
		AGGREGATE BASE (9.0 inches).	0.3				
		Medium stiff, dark brown-orange CLAY (CH); moist (alluvium).	1.0				
2.5							
5.0		Exploration completed at a depth of 5.0 feet.	5.0				CORE DETAILS: No patch observed. Cored on low fatigue crack.
7.5							
						0 50 100	

DRILLED BY: Dan J. Fischer Excavating, Inc. LOGGED BY: J. Heidgerken COMPLETED: 08/14/20

BORING METHOD: core drill/solid-stem auger (see document text) BORING BIT DIAMETER: 5 inches/4 inches

GEODESIGN INC AN NV5 COMPANY

ORDAS-7-01

BORING (continued)

SEPTEMBER 2020

DAS NORTH VALLEY COMPLEX WILSONVILLE, OR

FIGURE A-5

BORING LOG - GDI-NV5 - 2 PER PAGE ORDAS-7-01-B2_9.GPJ GDI_NV5.GDT PRINT DATE: 9/2/20 KT

CORE LOCATION B-4.

CORE B-4.

GeoDesign Inc AN NV5 COMPANY	ORDAS-7-01	CORE LOCATION AND CORE PHOTOGRAPHS	
	SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR	FIGURE A-6

CORE LOCATION B-5.

CORE B-5.

GeoDesign Inc AN NV5 COMPANY	ORDAS-7-01	CORE LOCATION AND CORE PHOTOGRAPHS	
	SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR	FIGURE A-7

CORE LOCATION B-6.

CORE B-6.

GeoDesign Inc An NV5 Company	ORDAS-7-01	CORE LOCATION AND CORE PHOTOGRAPHS	
	SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR	FIGURE A-8

CORE LOCATION B-7.

CORE B-7.

GeoDesign Inc AN NV5 COMPANY	ORDAS-7-01	CORE LOCATION AND CORE PHOTOGRAPHS	
	SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR	FIGURE A-9

CORE LOCATION B-8.

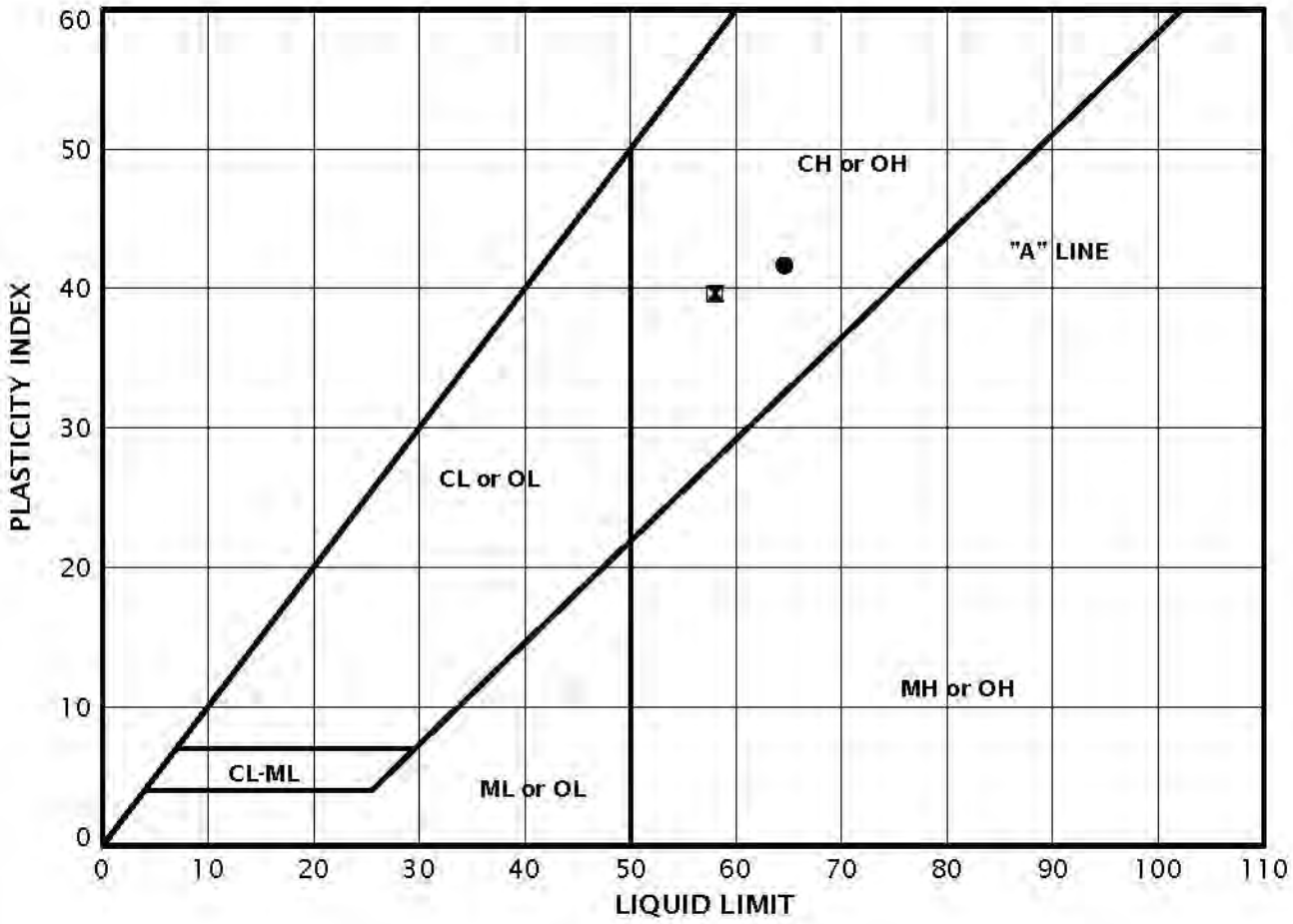
CORE B-8.

GEODESIGN INC AN NV5 COMPANY	ORDAS-7-01	CORE LOCATION AND CORE PHOTOGRAPHS	
	SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR	FIGURE A-10

CORE LOCATION B-9.

CORE B-9.

GeoDesign Inc An NV5 Company	ORDAS-7-01	CORE LOCATION AND CORE PHOTOGRAPHS	
	SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR	FIGURE A-11



KEY	EXPLORATION NUMBER	SAMPLE DEPTH (FEET)	MOISTURE CONTENT (PERCENT)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
●	B-2	20.0	29	65	23	42
⊠	B-3	10.0	27	58	18	40

GEODESIGN INC
AN NV5 COMPANY

ORDAS-7-01	ATTERBERG LIMITS TEST RESULTS	
SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR	FIGURE A-12

SAMPLE INFORMATION			MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	SIEVE			ATTERBERG LIMITS		
EXPLORATION NUMBER	SAMPLE DEPTH (FEET)	ELEVATION (FEET)			GRAVEL (PERCENT)	SAND (PERCENT)	P200 (PERCENT)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
B-2	2.5	227.5	25				88			
B-2	8.0	222.0	30				87			
B-2	10.0	220.0	26							
B-2	15.0	215.0	32							
B-2	20.0	210.0	29					65	23	42
B-2	25.0	205.0	36							
B-2	30.0	200.0	34							
B-3	2.5	228.5	24				88			
B-3	5.0	226.0	23							
B-3	10.0	221.0	27					58	18	40
B-3	15.0	216.0	28				97			
B-3	20.0	211.0	33							
B-3	25.0	206.0	36							
B-3	30.0	201.0	38							
B-4	2.5		10							
B-5	1.5		28							
B-6	2.5		25							
B-7	1.0		24							
B-8	1.0		25							
B-9	1.5		23							

LAB SUMMARY - GDI-NV5 ORDAS-7-01-B2_9.GPJ GDI_NV5.GDT PRINT DATE: 9/1/20 KT

GEODESIGN INC
AN NV5 COMPANY

ORDAS-7-01

SEPTEMBER 2020

SUMMARY OF LABORATORY DATA

DAS NORTH VALLEY COMPLEX
WILSONVILLE, OR

FIGURE A-13

APPENDIX B

APPENDIX B

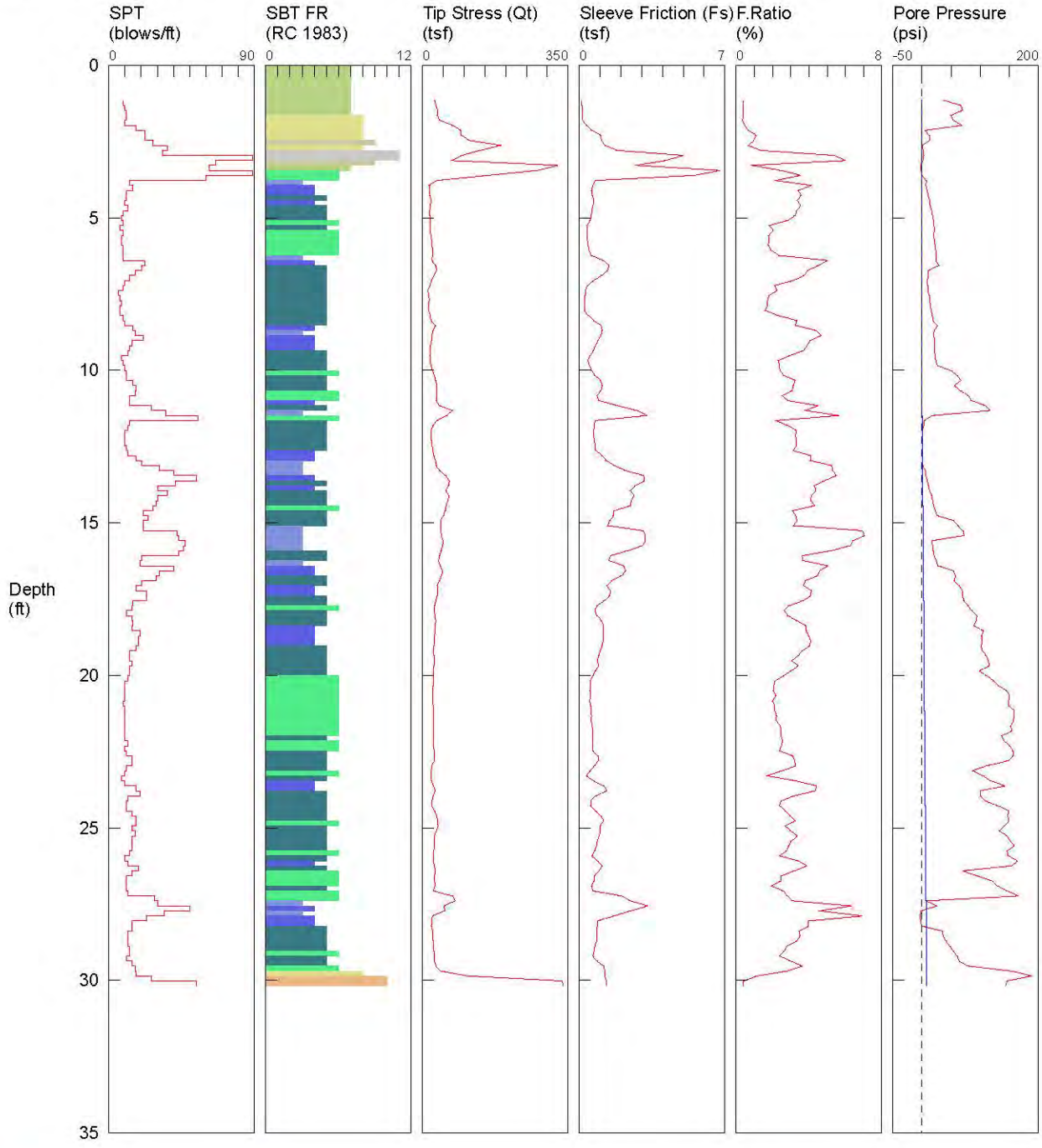
CPT EXPLORATION

Our subsurface exploration program included one CPT (CPT-1) to a depth of 30.1 feet BGS. Figure 2 shows the location of the CPT relative to site improvements. The CPT was performed in general accordance with ASTM D5778 by Oregon Geotechnical Explorations, Inc. of Keizer, Oregon, on August 18, 2020. The results of the CPT are presented in this appendix.

The CPT is an in situ test that characterizes subsurface stratigraphy. The testing includes advancing a 35.6-millimeter-diameter cone equipped with a load cell and a friction sleeve through the soil profile. The cone is advanced at a rate of approximately 2 centimeters per second. Tip resistance, sleeve friction, and pore pressure are typically recorded at 0.1-meter intervals. Shear wave velocities were measured at approximately 1-meter intervals.

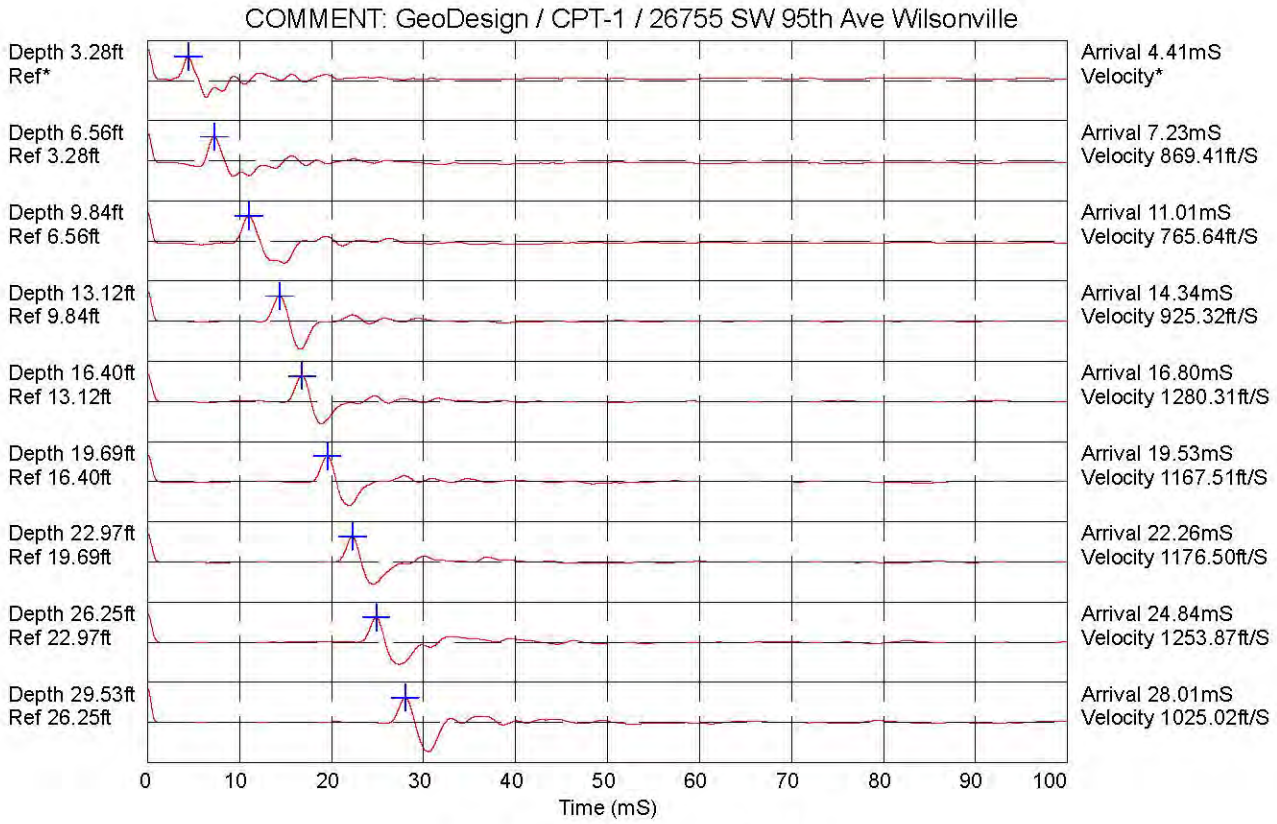
GeoDesign / CPT-1 / 26755 SW 95th Ave Wilsonville

OPERATOR: OGE BAK
CONE ID: DDG1532
HOLE NUMBER: CPT-1
TEST DATE: 8/18/2020 9:41:23 AM
TOTAL DEPTH: 30.184 ft



1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

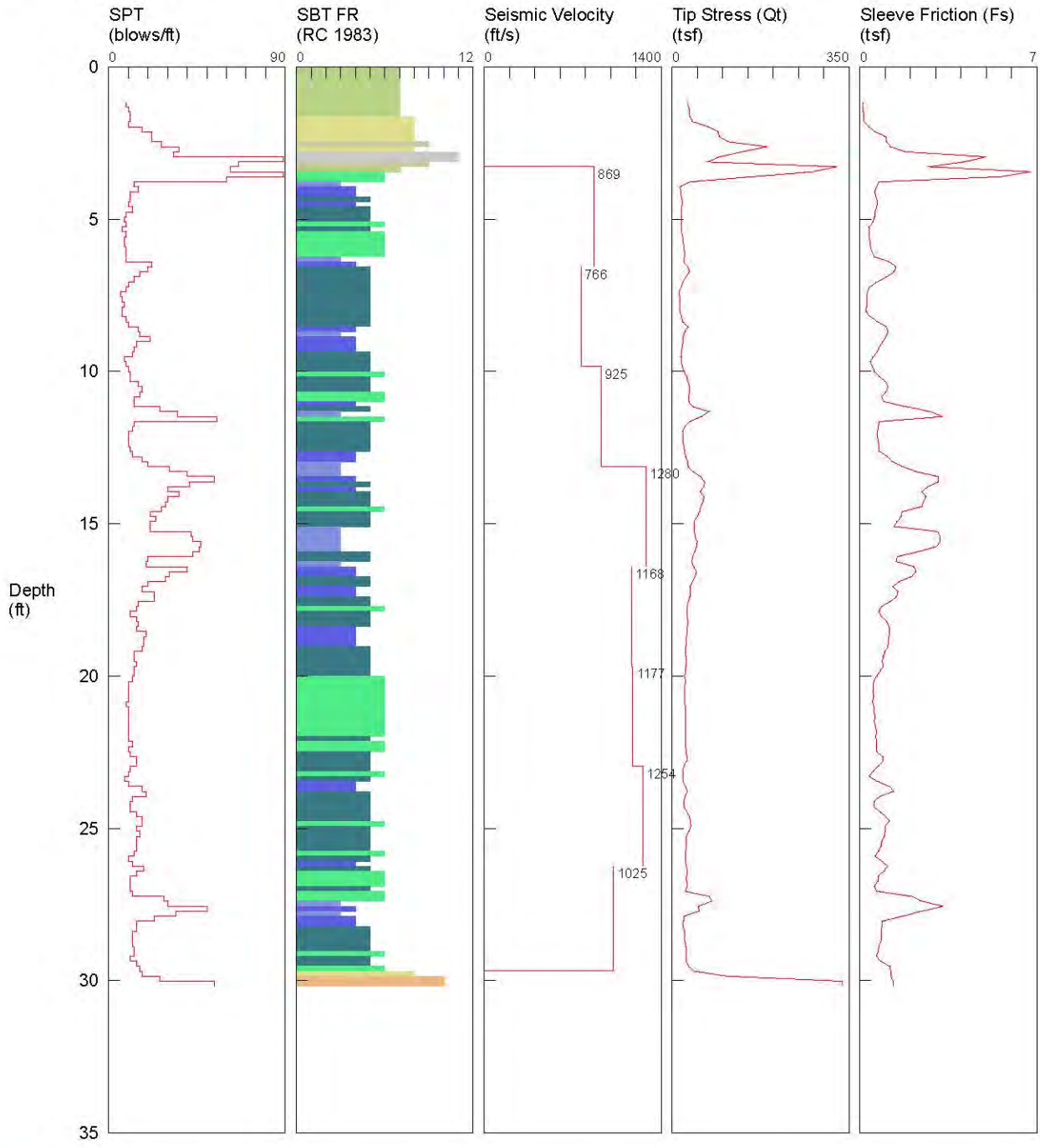
*SBT/SPT CORRELATION: UBC-1983



Hammer to Rod String Distance (ft): 4.27
* = Not Determined

GeoDesign / CPT-1 / 26755 SW 95th Ave Wilsonville

OPERATOR: OGE BAK
CONE ID: DDG1532
HOLE NUMBER: CPT-1
TEST DATE: 8/18/2020 9:41:23 AM
TOTAL DEPTH: 30.184 ft



1 sensitive fine grained
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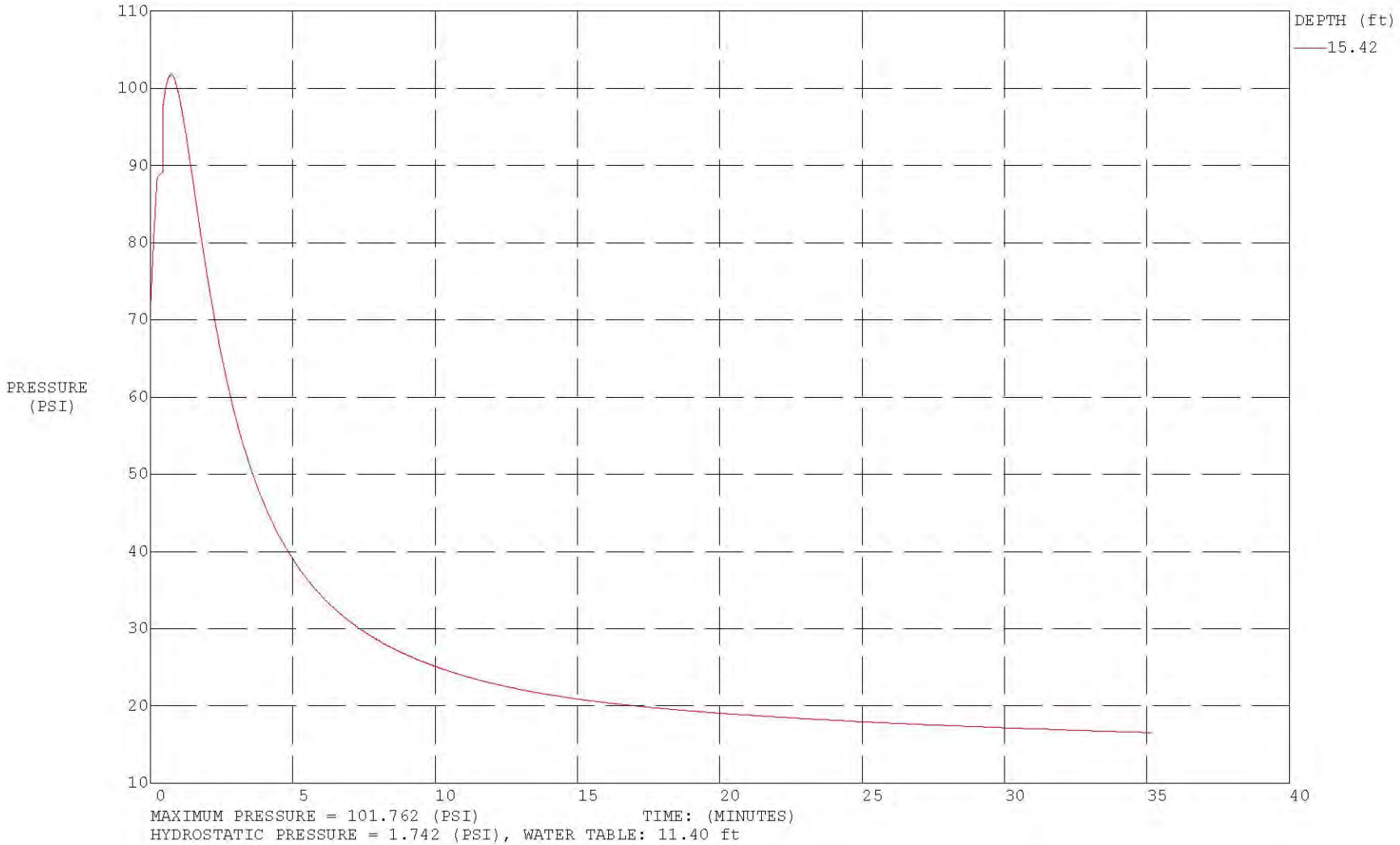
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

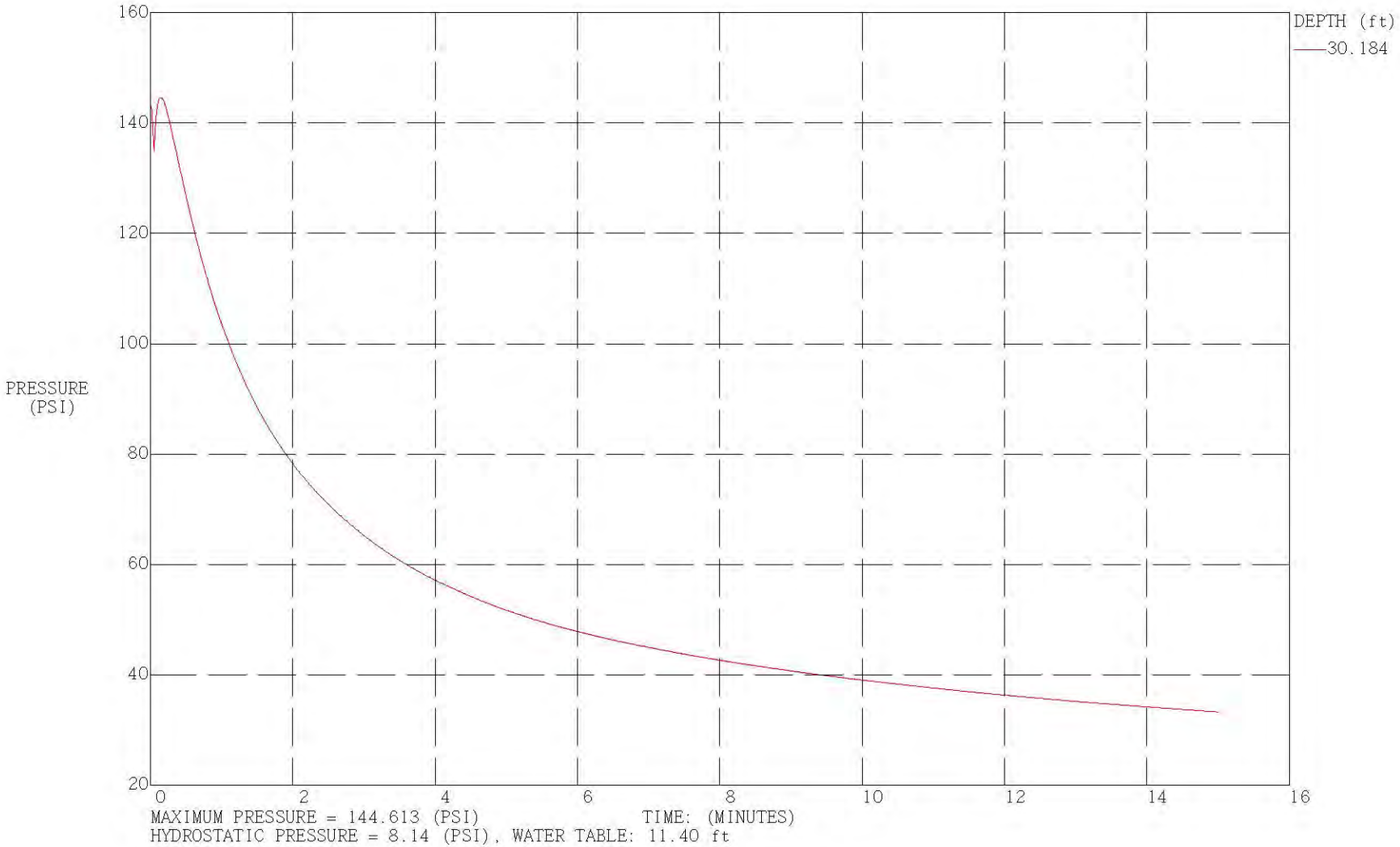
COMMENT: GeoDesign / CPT-1 / 26755 SW 95th Ave Wilsonville

TEST DATE: 8/18/2020 9:41:23 AM



COMMENT: GeoDesign / CPT-1 / 26755 SW 95th Ave Wilsonville

TEST DATE: 8/18/2020 9:41:23 AM



GeoDesign / CPT-1 / 26755 SW 95th Ave Wilsonville

OPERATOR: OGE BAK
CONE ID: DDG1532
HOLE NUMBER: CPT-1
TEST DATE: 8/18/2020 9:41:23 AM
TOTAL DEPTH: 30.184 ft

Depth ft	Tip Stress (Qt) (tsf)	Sleeve Friction (Fs) (tsf)	F.Ratio (%)	Pore Pressure (psi)	SPT (blows/ft)	Zone	Soil Behavior Type UBC-1983
1.148	29.35	0.1100	0.375	36.704	9	7	silty sand to sandy silt
1.312	32.33	0.1201	0.371	66.493	10	7	silty sand to sandy silt
1.476	35.07	0.1300	0.371	68.990	11	7	silty sand to sandy silt
1.640	35.00	0.1400	0.400	48.687	11	7	silty sand to sandy silt
1.804	40.15	0.1390	0.346	52.903	10	8	sand to silty sand
1.969	71.96	0.3314	0.461	67.702	17	8	sand to silty sand
2.133	91.03	0.5886	0.647	5.321	22	8	sand to silty sand
2.297	92.70	1.0148	1.095	12.387	22	8	sand to silty sand
2.461	110.72	1.0500	0.948	13.710	27	8	sand to silty sand
2.625	187.80	1.2105	0.645	0.570	36	9	sand
2.789	136.69	1.8068	1.322	1.323	33	8	sand to silty sand
2.953	93.24	4.9866	5.348	2.824	89	11	very stiff fine grained (*)
3.117	68.49	4.1120	6.004	1.522	66	11	very stiff fine grained (*)
3.281	324.52	2.6951	0.830	-2.555	62	9	sand
3.445	277.30	6.7429	2.432	-1.943	89	7	silty sand to sandy silt
3.609	157.38	5.5368	3.518	0.109	60	6	sandy silt to clayey silt
3.773	34.97	0.7446	2.129	7.139	13	6	sandy silt to clayey silt
3.937	15.52	0.6413	4.131	6.548	15	3	clay
4.101	16.97	0.5761	3.394	8.869	11	4	silty clay to clay
4.265	17.58	0.6246	3.554	10.388	11	4	silty clay to clay
4.429	20.81	0.6947	3.338	13.298	10	5	clayey silt to silty clay
4.593	18.58	0.6571	3.536	13.737	12	4	silty clay to clay
4.757	17.84	0.5924	3.321	16.441	9	5	clayey silt to silty clay
4.921	17.73	0.5742	3.238	18.115	8	5	clayey silt to silty clay
5.085	18.37	0.5162	2.809	19.576	9	5	clayey silt to silty clay
5.249	19.22	0.3477	1.809	20.455	7	6	sandy silt to clayey silt
5.413	18.22	0.3704	2.033	21.541	9	5	clayey silt to silty clay
5.577	20.98	0.3720	1.773	19.523	8	6	sandy silt to clayey silt
5.741	21.62	0.3851	1.781	21.275	8	6	sandy silt to clayey silt
5.906	23.02	0.4065	1.766	22.515	9	6	sandy silt to clayey silt
6.070	24.19	0.4633	1.915	23.446	9	6	sandy silt to clayey silt
6.234	24.05	0.5599	2.328	23.777	9	6	sandy silt to clayey silt
6.398	22.58	1.1291	5.000	24.064	22	3	clay
6.562	31.68	1.4233	4.493	28.898	20	4	silty clay to clay
6.726	34.35	1.3452	3.916	10.953	16	5	clayey silt to silty clay
6.890	28.11	1.0454	3.719	10.293	13	5	clayey silt to silty clay
7.054	21.51	0.6740	3.133	9.273	10	5	clayey silt to silty clay
7.218	18.33	0.3823	2.085	9.377	9	5	clayey silt to silty clay
7.382	13.21	0.2954	2.236	9.795	6	5	clayey silt to silty clay
7.546	15.31	0.2742	1.791	12.534	7	5	clayey silt to silty clay
7.710	15.89	0.2754	1.733	13.409	8	5	clayey silt to silty clay
7.874	14.70	0.2499	1.700	13.968	7	5	clayey silt to silty clay
8.038	15.28	0.2438	1.595	15.730	7	5	clayey silt to silty clay
8.202	18.53	0.4232	2.284	17.551	9	5	clayey silt to silty clay

Depth ft	Tip Stress (Qt) (tsf)	Sleeve Friction (Fs) (tsf)	F.Ratio (%)	Pore Pressure (psi)	SPT (blows/ft)	Zone	Soil Behavior Type UBC-1983
8.366	20.21	0.6730	3.330	18.834	10	5	clayey silt to silty clay
8.530	31.98	1.0355	3.238	27.487	15	5	clayey silt to silty clay
8.694	25.18	1.0961	4.353	20.870	16	4	silty clay to clay
8.858	21.99	1.0227	4.650	19.805	21	3	clay
9.022	21.85	0.8818	4.035	21.988	14	4	silty clay to clay
9.186	19.62	0.7623	3.885	21.469	13	4	silty clay to clay
9.350	18.09	0.6668	3.686	21.381	12	4	silty clay to clay
9.514	17.51	0.5170	2.952	22.249	8	5	clayey silt to silty clay
9.678	18.05	0.4156	2.303	23.361	9	5	clayey silt to silty clay
9.843	20.59	0.4871	2.366	26.529	10	5	clayey silt to silty clay
10.007	24.00	0.5761	2.400	49.717	11	5	clayey silt to silty clay
10.171	28.40	0.7409	2.609	60.545	11	6	sandy silt to clayey silt
10.335	31.16	1.0066	3.230	66.906	15	5	clayey silt to silty clay
10.499	34.87	1.0950	3.140	55.892	17	5	clayey silt to silty clay
10.663	33.74	1.0366	3.073	65.711	16	5	clayey silt to silty clay
10.827	33.23	0.8283	2.492	78.835	13	6	sandy silt to clayey silt
10.991	32.95	0.9309	2.825	84.617	13	6	sandy silt to clayey silt
11.155	40.90	1.8336	4.483	108.225	26	4	silty clay to clay
11.319	73.38	2.7604	3.762	116.977	35	5	clayey silt to silty clay
11.483	57.96	3.2553	5.617	18.099	55	3	clay
11.647	34.84	0.7537	2.164	4.056	13	6	sandy silt to clayey silt
11.811	25.31	0.7139	2.820	2.994	12	5	clayey silt to silty clay
11.975	20.81	0.6911	3.321	0.402	10	5	clayey silt to silty clay
12.139	21.36	0.6925	3.243	0.463	10	5	clayey silt to silty clay
12.303	21.44	0.7090	3.306	0.575	10	5	clayey silt to silty clay
12.467	23.03	0.7599	3.300	0.660	11	5	clayey silt to silty clay
12.631	24.66	0.7651	3.102	0.671	12	5	clayey silt to silty clay
12.795	26.52	1.0800	4.072	0.801	17	4	silty clay to clay
12.959	31.41	1.2777	4.068	1.038	20	4	silty clay to clay
13.123	31.86	1.6711	5.245	1.075	31	3	clay
13.287	41.75	2.2088	5.291	6.231	40	3	clay
13.451	56.22	3.0877	5.492	6.651	54	3	clay
13.615	64.75	3.1169	4.814	9.191	41	4	silty clay to clay
13.780	62.61	2.6763	4.274	10.548	30	5	clayey silt to silty clay
13.944	55.75	2.4370	4.372	13.047	36	4	silty clay to clay
14.108	63.29	2.6138	4.130	16.694	30	5	clayey silt to silty clay
14.272	61.13	2.4935	4.079	18.081	29	5	clayey silt to silty clay
14.436	56.70	2.4468	4.315	20.042	27	5	clayey silt to silty clay
14.600	54.16	1.6616	3.068	22.882	21	6	sandy silt to clayey silt
14.764	50.17	1.6334	3.256	25.515	24	5	clayey silt to silty clay
14.928	43.61	1.4546	3.336	54.958	21	5	clayey silt to silty clay
15.092	43.34	1.3490	3.113	62.014	21	5	clayey silt to silty clay
15.256	44.36	3.0669	6.914	70.861	42	3	clay
15.420	45.08	3.1730	7.038	72.093	43	3	clay
15.584	49.57	3.1720	6.399	17.059	47	3	clay
15.748	48.16	3.0110	6.252	18.062	46	3	clay
15.912	44.51	2.3184	5.208	18.991	43	3	clay
16.076	40.80	1.4756	3.617	20.718	20	5	clayey silt to silty clay
16.240	38.78	1.4172	3.655	24.413	19	5	clayey silt to silty clay
16.404	42.08	2.1176	5.032	27.458	40	3	clay
16.568	48.46	2.2183	4.578	53.795	31	4	silty clay to clay
16.732	45.51	2.0300	4.461	57.492	29	4	silty clay to clay
16.896	40.77	1.5441	3.787	54.992	20	5	clayey silt to silty clay

Depth ft	Tip Stress (Qt) (tsf)	Sleeve Friction (Fs) (tsf)	F.Ratio (%)	Pore Pressure (psi)	SPT (blows/ft)	Zone	Soil Behavior Type UBC-1983
17.060	34.95	1.2852	3.677	64.215	17	5	clayey silt to silty clay
17.224	36.30	1.4965	4.122	69.086	23	4	silty clay to clay
17.388	35.36	1.4449	4.086	69.669	23	4	silty clay to clay
17.552	32.27	1.1799	3.656	71.556	15	5	clayey silt to silty clay
17.717	29.09	0.8387	2.883	79.251	14	5	clayey silt to silty clay
17.881	28.74	0.7533	2.621	85.237	11	6	sandy silt to clayey silt
18.045	29.43	0.8326	2.829	94.371	14	5	clayey silt to silty clay
18.209	31.84	1.0548	3.313	92.759	15	5	clayey silt to silty clay
18.373	30.05	1.1468	3.816	89.144	14	5	clayey silt to silty clay
18.537	30.08	1.1567	3.845	104.954	19	4	silty clay to clay
18.701	28.75	1.1419	3.972	102.128	18	4	silty clay to clay
18.865	27.67	1.1314	4.089	103.240	18	4	silty clay to clay
19.029	27.21	1.0954	4.026	101.513	17	4	silty clay to clay
19.193	27.26	0.9810	3.598	103.115	13	5	clayey silt to silty clay
19.357	27.26	0.9215	3.380	109.825	13	5	clayey silt to silty clay
19.521	28.45	0.8615	3.029	113.780	14	5	clayey silt to silty clay
19.685	27.11	0.9211	3.398	114.853	13	5	clayey silt to silty clay
19.849	26.13	0.7836	2.999	98.438	13	5	clayey silt to silty clay
20.013	25.21	0.6537	2.593	110.512	12	5	clayey silt to silty clay
20.177	25.86	0.5497	2.126	121.776	10	6	sandy silt to clayey silt
20.341	25.25	0.5197	2.058	130.511	10	6	sandy silt to clayey silt
20.505	24.86	0.5063	2.037	144.522	10	6	sandy silt to clayey silt
20.669	24.86	0.5412	2.177	150.083	10	6	sandy silt to clayey silt
20.833	24.73	0.4935	1.996	148.342	9	6	sandy silt to clayey silt
20.997	25.60	0.5412	2.114	147.852	10	6	sandy silt to clayey silt
21.161	26.41	0.5561	2.106	158.171	10	6	sandy silt to clayey silt
21.325	26.70	0.5921	2.218	157.429	10	6	sandy silt to clayey silt
21.490	25.97	0.5672	2.184	157.093	10	6	sandy silt to clayey silt
21.654	25.59	0.6154	2.405	151.682	10	6	sandy silt to clayey silt
21.818	26.22	0.6494	2.477	154.040	10	6	sandy silt to clayey silt
21.982	25.80	0.6308	2.445	136.314	10	6	sandy silt to clayey silt
22.146	25.71	0.6518	2.535	139.561	12	5	clayey silt to silty clay
22.310	26.40	0.6527	2.473	149.798	10	6	sandy silt to clayey silt
22.474	27.98	0.6581	2.353	155.874	11	6	sandy silt to clayey silt
22.638	28.89	0.8918	3.086	156.393	14	5	clayey silt to silty clay
22.802	28.79	0.9224	3.204	147.437	14	5	clayey silt to silty clay
22.966	22.54	0.7384	3.275	110.658	11	5	clayey silt to silty clay
23.130	21.23	0.5310	2.501	86.842	10	5	clayey silt to silty clay
23.294	21.21	0.3563	1.680	104.981	8	6	sandy silt to clayey silt
23.458	21.43	0.6944	3.241	117.746	10	5	clayey silt to silty clay
23.622	26.54	1.1711	4.413	141.967	17	4	silty clay to clay
23.786	30.28	1.3078	4.320	100.198	19	4	silty clay to clay
23.950	25.53	0.8105	3.175	99.679	12	5	clayey silt to silty clay
24.114	22.90	0.5607	2.448	109.373	11	5	clayey silt to silty clay
24.278	23.15	0.5479	2.367	129.782	11	5	clayey silt to silty clay
24.442	28.82	0.7773	2.697	148.733	14	5	clayey silt to silty clay
24.606	34.64	1.0271	2.965	146.814	17	5	clayey silt to silty clay
24.770	35.59	1.1546	3.244	148.869	17	5	clayey silt to silty clay
24.934	37.42	0.9990	2.670	140.125	14	6	sandy silt to clayey silt
25.098	33.22	0.9887	2.976	131.587	16	5	clayey silt to silty clay
25.262	28.81	0.9634	3.344	145.252	14	5	clayey silt to silty clay
25.427	28.38	0.8579	3.023	150.804	14	5	clayey silt to silty clay
25.591	28.74	0.8272	2.878	157.916	14	5	clayey silt to silty clay

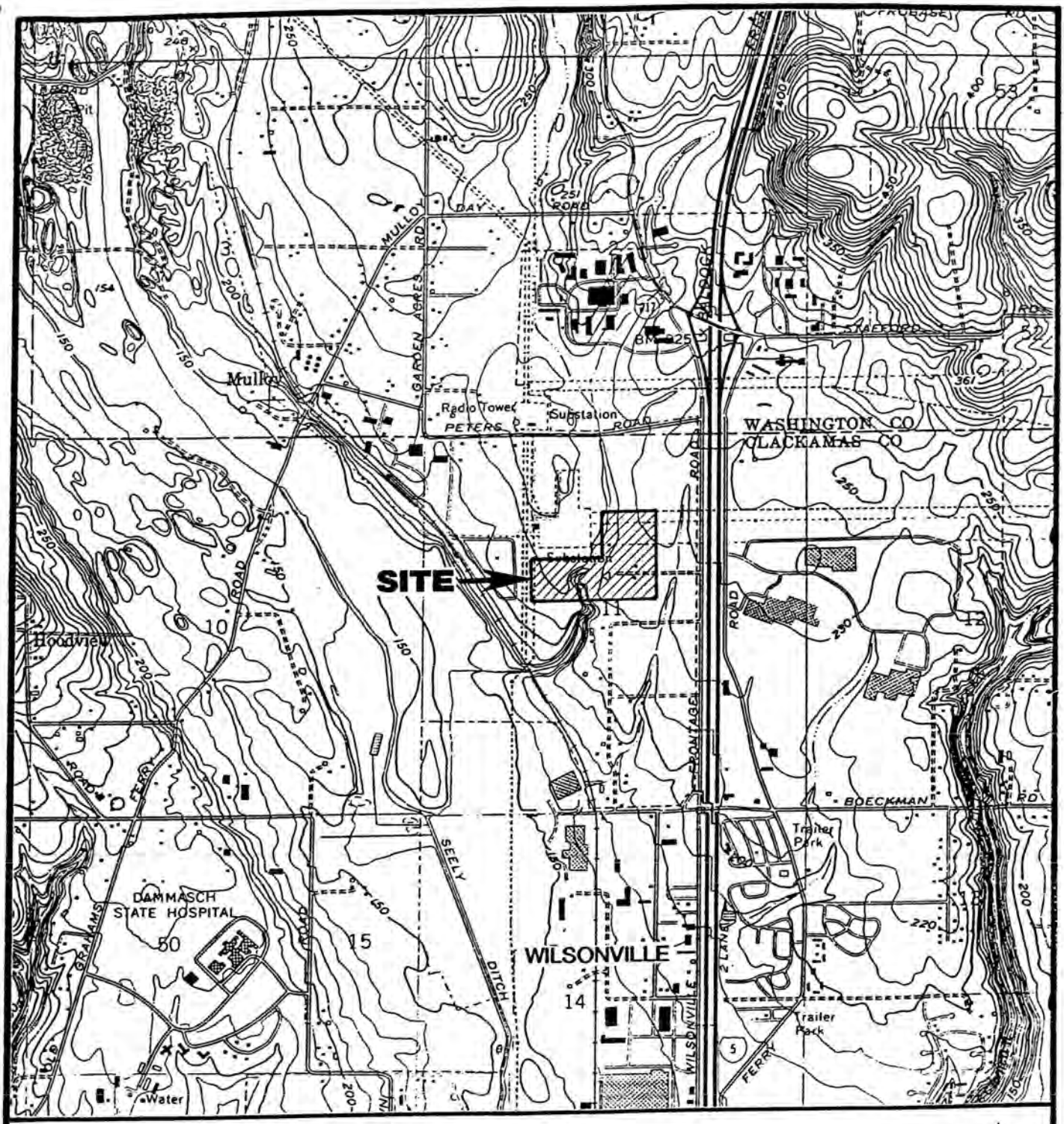
Depth ft	Tip Stress (Qt) (tsf)	Sleeve Friction (Fs) (tsf)	F.Ratio (%)	Pore Pressure (psi)	SPT (blows/ft)	Zone	Soil Behavior Type UBC-1983
25.755	26.72	0.7360	2.755	145.417	13	5	clayey silt to silty clay
25.919	25.70	0.6055	2.356	147.722	10	6	sandy silt to clayey silt
26.083	26.01	0.8821	3.391	162.949	12	5	clayey silt to silty clay
26.247	28.45	1.0987	3.862	153.468	18	4	silty clay to clay
26.411	29.99	0.9532	3.178	70.020	14	5	clayey silt to silty clay
26.575	28.62	0.7022	2.454	94.744	11	6	sandy silt to clayey silt
26.739	28.75	0.7092	2.467	120.831	11	6	sandy silt to clayey silt
26.903	29.95	0.5755	1.921	129.252	11	6	sandy silt to clayey silt
27.067	25.71	0.6603	2.568	145.284	12	5	clayey silt to silty clay
27.231	73.34	2.0366	2.777	165.078	28	6	sandy silt to clayey silt
27.395	79.00	2.4228	3.067	7.208	30	6	sandy silt to clayey silt
27.559	51.86	3.2779	6.321	26.074	50	3	clay
27.723	53.38	2.4298	4.552	-1.251	34	4	silty clay to clay
27.887	23.70	1.6421	6.929	-3.782	23	3	clay
28.051	22.28	0.8833	3.964	-2.236	14	4	silty clay to clay
28.215	21.58	0.8591	3.980	-1.190	14	4	silty clay to clay
28.379	24.22	0.8340	3.443	34.114	12	5	clayey silt to silty clay
28.543	24.25	0.8498	3.505	36.513	12	5	clayey silt to silty clay
28.707	25.18	0.8330	3.308	41.157	12	5	clayey silt to silty clay
28.871	27.00	0.7480	2.771	47.817	13	5	clayey silt to silty clay
29.035	27.33	0.7203	2.636	53.638	13	5	clayey silt to silty clay
29.199	27.65	0.6508	2.353	60.148	11	6	sandy silt to clayey silt
29.364	28.31	0.8402	2.968	63.962	14	5	clayey silt to silty clay
29.528	32.82	1.1836	3.606	79.181	16	5	clayey silt to silty clay
29.692	44.13	1.2253	2.776	152.638	17	6	sandy silt to clayey silt
29.856	109.63	1.2289	1.121	187.779	26	8	sand to silty sand
30.020	335.38	1.3103	0.391	145.600	54	10	gravelly sand to sand
30.184	338.17	1.3204	0.390	142.915	54	10	gravelly sand to sand

APPENDIX C

APPENDIX C

PREVIOUS EXPLORATIONS

A vicinity map, site plan, test pit logs, and laboratory test results for test pits that were excavated on the property in 1992 by GeoEngineers are presented in this appendix.



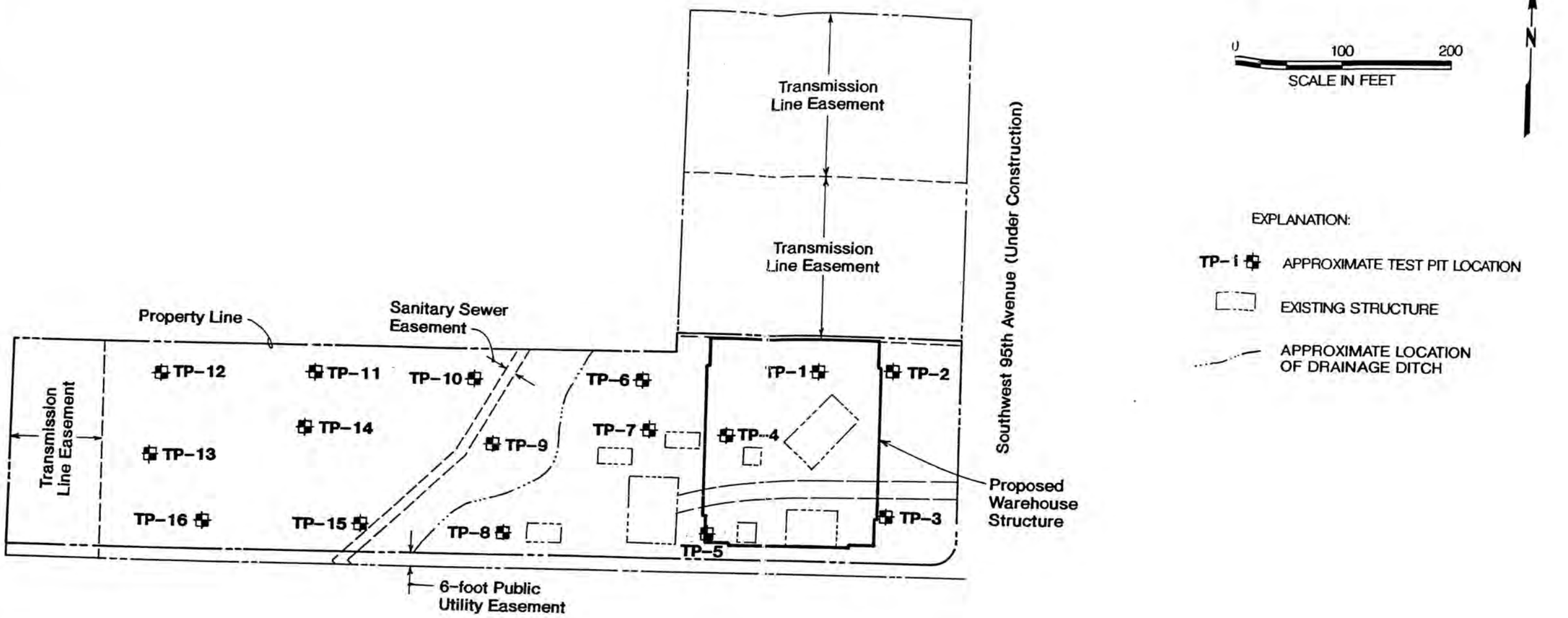
Reference: USGS 7.5' topographic quadrangle map, "Sherwood, OR" photorevised 1985.

2705-001-P36 KDU,CLK 09/17/92

GeoEngineers

VICINITY MAP

FIGURE 1



2705-001-P36 KDU:CLK 08/20/92

Reference: Drawing entitled "Ridder Industrial Park," dated 05/06/90, by OTAK Inc. and drawing entitled "Site Plan," dated 01/05/90, by OMNI Environmental Services, Inc.

GeoEngineers

PROPOSED AND EXISTING DEVELOPMENT

FIGURE 2

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND MORE THAN 50% OF COARSE FRACTION PASSES NO. 4 SIEVE	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE GRAINED SOILS MORE THAN 50% PASSES NO. 200 SIEVE	SILT AND CLAY LIQUID LIMIT LESS THAN 50	INORGANIC	ML	SILT
			CL	CLAY
		ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
	SILT AND CLAY LIQUID LIMIT 50 OR MORE	INORGANIC	MH	SILT OF HIGH PLASTICITY, ELASTIC SILT
			CH	CLAY OF HIGH PLASTICITY, FAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

NOTES:

1. Field classification is based on visual examination of soil in general accordance with ASTM D2488-84.
2. Soil classification using laboratory tests is based on ASTM D2487-85.
3. Descriptions of soil density or consistency are based on interpretation of blowcount data, visual appearance of soils, and/or test data.

SOIL MOISTURE MODIFIERS:

Dry - Absence of moisture, dusty, dry to the touch

Moist - Damp, but no visible water

Wet - Visible free water or saturated, usually soil is obtained from below water table

GEI 85-88

Geo Engineers

SOIL CLASSIFICATION SYSTEM

FIGURE A-1

LOG OF TEST PIT

DEPTH BELOW GROUND SURFACE (feet)[1]	SOIL GROUP CLASSIFICATION SYMBOL	MOISTURE CONTENT (percent)[2]	DESCRIPTION
			TEST PIT TP-1
0.0 - 5.0	ML		BROWN SILT WITH FINE TO COARSE SAND (VERY STIFF, DRY TO MOIST). SOD LAYER TO 0.2 FOOT
1.0		11.9	
3.5		24.2	
5.0 - 13.0	ML		REDDISH BROWN SILT (VERY STIFF, MOIST)
5.0		23.1	
13.0 - 16.5	ML		RED SILT (VERY STIFF, MOIST)
13.0		28.3	
16.5		36.0	
			TEST PIT COMPLETED AT 16.5 FEET ON 08/05/92
			DISTURBED SAMPLES OBTAINED AT 1.0, 3.5, 5.0, 13.0 AND 16.5 FEET
			NO GROUND WATER SEEPAGE OBSERVED
			NO CAVING OBSERVED
			TEST PIT TP-2
0.0 - 12.0	ML		BROWN SILT (VERY STIFF, DRY TO MOIST). SOD LAYER TO 0.2 FOOT
1.0		11.6	
3.5		23.6	
12.0 - 13.0	ML		RED SILT (VERY STIFF, MOIST)
13.0		25.4	
			TEST PIT COMPLETED AT 13.0 FEET ON 08/05/92
			DISTURBED SAMPLES OBTAINED AT 1.0, 3.5 AND 13.0 FEET
			NO GROUND WATER SEEPAGE OBSERVED
			NO CAVING OBSERVED

[1]THE DEPTHS ON THE TEST PIT LOGS, ALTHOUGH SHOWN TO 0.1 FOOT, ARE BASED ON AN AVERAGE OF MEASUREMENTS ACROSS THE TEST PIT AND SHOULD BE CONSIDERED ACCURATE TO 0.5 FOOT.

[2]MOISTURE CONTENT DETERMINED BY ASTM D2216.

LOG OF TEST PIT

DEPTH BELOW GROUND SURFACE (feet)[1]	SOIL GROUP CLASSIFICATION SYMBOL	MOISTURE CONTENT (percent)[2]	DESCRIPTION
			TEST PIT TP-3
0.0 - 14.0	ML		BROWN SILT (VERY STIFF, DRY TO MOIST). SOD LAYER TO 0.3 FOOT
1.0		9.7	
14.0		32.4	
			TEST PIT COMPLETED AT 14.0 FEET ON 08/05/92
			DISTURBED SAMPLES OBTAINED AT 1.0 AND 14.0 FEET
			NO GROUND WATER SEEPAGE OBSERVED
			NO CAVING OBSERVED
			TEST PIT TP-4
0.0 - 5.0	ML		BROWN AND GRAY SILT (VERY STIFF, DRY TO MOIST). SOD LAYER TO 0.2 FOOT. TREE ROOTS TO 2.0 FEET
1.0		11.0	
4.0		18.5	
5.0 - 16.8	ML		REDDISH BROWN SILT (VERY STIFF, MOIST)
5.0		21.0	
16.8		27.4	
			TEST PIT COMPLETED AT 16.8 FEET ON 08/05/92
			DISTURBED SAMPLES OBTAINED AT 1.0, 4.0, 5.0 AND 16.8 FEET
			MINOR GROUND WATER SEEPAGE OBSERVED AT 16.8 FEET AFTER 30 MINUTES
			NO CAVING OBSERVED

[1]THE DEPTHS ON THE TEST PIT LOGS, ALTHOUGH SHOWN TO 0.1 FOOT, ARE BASED ON AN AVERAGE OF MEASUREMENTS ACROSS THE TEST PIT AND SHOULD BE CONSIDERED ACCURATE TO 0.5 FOOT.

[2]MOISTURE CONTENT DETERMINED BY ASTM D2216.

LOG OF TEST PIT

DEPTH BELOW GROUND SURFACE (feet)[1]	SOIL GROUP CLASSIFICATION SYMBOL	MOISTURE CONTENT (percent)[2]	DESCRIPTION
			TEST PIT TP-5
0.0 - 4.5	ML		BROWN SILT (VERY STIFF, DRY TO MOIST)
1.0		11.0	
3.5		17.6	
4.5 - 8.5	ML		REDDISH BROWN SILT (VERY STIFF, MOIST)
8.5 - 16.0	ML		MOTTLED REDDISH BROWN GRAY AND DARK BROWN SILT (VERY STIFF, MOIST)
9.0		23.3	
14.5		19.2	
16.0 - 17.0	ML		RED SILT (VERY STIFF, MOIST)
17.0		38.3	
			TEST PIT COMPLETED AT 17.0 FEET ON 08/05/92
			DISTURBED SAMPLES OBTAINED AT 1.0, 3.5, 9.0, 14.5 AND 17.0 FEET
			NO GROUND WATER SEEPAGE OBSERVED
			NO CAVING OBSERVED
			TEST PIT TP-6
0.0 - 8.0	ML		BROWN SILT (STIFF TO VERY STIFF, DRY TO MOIST). SOD LAYER TO 0.2 FOOT
1.0		11.6	
4.0		18.6	
8.0 - 13.0	ML		REDDISH BROWN SILT (VERY STIFF, MOIST)
8.0		25.0	
13.2		28.2	
			TEST PIT COMPLETED AT 13.2 FEET ON 08/06/92
			DISTURBED SAMPLES OBTAINED AT 1.0, 4.0, 8.0 AND 13.2 FEET
			NO GROUND WATER SEEPAGE OBSERVED
			NO CAVING OBSERVED

[1]THE DEPTHS ON THE TEST PIT LOGS, ALTHOUGH SHOWN TO 0.1 FOOT, ARE BASED ON AN AVERAGE OF MEASUREMENTS ACROSS THE TEST PIT AND SHOULD BE CONSIDERED ACCURATE TO 0.5 FOOT.

[2]MOISTURE CONTENT DETERMINED BY ASTM D2216.

LOG OF TEST PIT

DEPTH BELOW GROUND SURFACE (feet)[1]	SOIL GROUP CLASSIFICATION SYMBOL	MOISTURE CONTENT (percent)[2]	DESCRIPTION
			TEST PIT TP-7
0.0 - 5.0	ML		BROWN SILT (VERY STIFF, DRY TO MOIST)
1.0		16.2	
3.0		14.5	
5.0 - 13.0	ML		RED SILT (VERY STIFF, MOIST)
5.0		22.6	
13.0		26.9	
			TEST PIT COMPLETED AT 13.0 FEET ON 08/06/92
			DISTURBED SAMPLES OBTAINED AT 1.0, 3.0, 5.0 AND 13.0 FEET
			NO GROUND WATER SEEPAGE OBSERVED
			NO CAVING OBSERVED
			TEST PIT TP-8
0.0 - 4.0	ML		BROWN SILT (STIFF TO VERY STIFF, DRY TO MOIST)
1.0		10.6	
3.5		15.9	
4.0 - 8.0	GM		BROWN SILTY GRAVEL WITH COBBLES AND OCCASIONAL BOULDERS (DENSE, DRY TO MOIST)
7.5		19.3	
8.0 - 16.0	ML		REDDISH BROWN SILT (VERY STIFF, MOIST)
8.0		23.7	
16.0		28.9	
			TEST PIT COMPLETED AT 16.0 FEET ON 08/06/92
			DISTURBED SAMPLES OBTAINED AT 1.0, 3.5, 7.5, 8.0 AND 16.0 FEET
			NO GROUND WATER SEEPAGE OBSERVED
			NO CAVING OBSERVED

[1]THE DEPTHS ON THE TEST PIT LOGS, ALTHOUGH SHOWN TO 0.1 FOOT, ARE BASED ON AN AVERAGE OF MEASUREMENTS ACROSS THE TEST PIT AND SHOULD BE CONSIDERED ACCURATE TO 0.5 FOOT.

[2]MOISTURE CONTENT DETERMINED BY ASTM D2216.

LOG OF TEST PIT

DEPTH BELOW GROUND SURFACE (feet)[1]	SOIL GROUP CLASSIFICATION SYMBOL	MOISTURE CONTENT (percent)[2]	DESCRIPTION
			TEST PIT TP-9
0.0 - 10.0	GM		SILTY GRAVEL WITH COBBLES AND BOULDERS (DENSE, DRY TO MOIST)
1.0		8.7	
3.0		10.6	
10.0		21.2	
			TEST PIT COMPLETED AT 10.0 FEET ON 08/06/92
			DISTURBED SAMPLES OBTAINED AT 1.0, 3.0 AND 10.0 FEET
			NO GROUND WATER SEEPAGE OBSERVED
			NO CAVING OBSERVED
			TEST PIT TP-10
0.0 - 1.0	ML		BROWN SILT (VERY STIFF, DRY)
1.0 - 4.0	GM		BROWN SILTY FINE TO COARSE GRAVEL WITH OCCASIONAL COBBLES (DENSE TO VERY DENSE, DRY TO MOIST)
1.0		9.4	
3.0		17.0	
4.0 - 7.0			GRADES WITH COBBLES AND BOULDERS
7.0		20.8	
			TEST PIT COMPLETED AT 7.0 FEET ON 08/06/92
			DISTURBED SAMPLES OBTAINED AT 1.0, 3.0 AND 7.0 FEET
			NO GROUND WATER SEEPAGE OBSERVED
			NO CAVING OBSERVED

[1]THE DEPTHS ON THE TEST PIT LOGS, ALTHOUGH SHOWN TO 0.1 FOOT, ARE BASED ON AN AVERAGE OF MEASUREMENTS ACROSS THE TEST PIT AND SHOULD BE CONSIDERED ACCURATE TO 0.5 FOOT.

[2]MOISTURE CONTENT DETERMINED BY ASTM D2216.

LOG OF TEST PIT

DEPTH BELOW GROUND SURFACE (feet)[1]	SOIL GROUP CLASSIFICATION SYMBOL	MOISTURE CONTENT (percent)[2]	DESCRIPTION
			TEST PIT TP-11
0.0 - 7.0	GM		BROWN SILTY GRAVEL WITH COBBLES AND BOULDERS (DENSE TO VERY DENSE, DRY TO MOIST). SOD LAYER TO 0.2 FOOT
1.5		19.0	
7.0		23.1	
			REFUSAL AT 7.0 FEET ON 08/06/92
			DISTURBED SAMPLES OBTAINED AT 1.5 AND 7.0 FEET
			NO GROUND WATER SEEPAGE OBSERVED
			NO CAVING OBSERVED
			TEST PIT TP-12
0.0 - 4.5	ML		BROWN SILT (VERY STIFF, DRY TO MOIST)
1.0		10.2	
4.0		11.7	
4.5 - 5.5	GM		BROWN SILTY GRAVEL WITH COBBLES AND BOULDERS (VERY DENSE, DRY)
5.5		23.1	
			REFUSAL AT 5.5 FEET ON 08/06/92
			DISTURBED SAMPLES OBTAINED AT 1.0, 4.0 AND 5.5 FEET
			NO GROUND WATER SEEPAGE OBSERVED
			NO CAVING OBSERVED

[1]THE DEPTHS ON THE TEST PIT LOGS, ALTHOUGH SHOWN TO 0.1 FOOT, ARE BASED ON AN AVERAGE OF MEASUREMENTS ACROSS THE TEST PIT AND SHOULD BE CONSIDERED ACCURATE TO 0.5 FOOT.

[2]MOISTURE CONTENT DETERMINED BY ASTM D2216.

LOG OF TEST PIT

DEPTH BELOW GROUND SURFACE (feet)[1]	SOIL GROUP CLASSIFICATION SYMBOL	MOISTURE CONTENT (percent)[2]	DESCRIPTION
			TEST PIT TP-13
0.0 - 3.5	ML		BROWN SILT (VERY STIFF, DRY TO MOIST)
1.0		9.8	
3.5 - 5.5	GM		BROWN SILTY GRAVEL WITH COBBLES AND OCCASIONAL BOULDERS (VERY DENSE, DRY TO MOIST)
4.0		13.6	
5.5		14.3	
			REFUSAL AT 5.5 FEET ON 08/06/92
			DISTURBED SAMPLES OBTAINED AT 1.0, 4.0 AND 5.5 FEET
			NO GROUND WATER SEEPAGE OBSERVED
			NO CAVING OBSERVED
			TEST PIT TP-14
0.0 - 1.0	ML		BROWN SILT WITH TRACE GRAVEL (STIFF, DRY)
1.0 - 5.5	GM		BROWN SILTY GRAVEL WITH COBBLES AND BOULDERS (VERY DENSE, DRY TO MOIST)
1.0		7.6	
3.0		10.1	
4.0		16.1	
			REFUSAL AT 5.5 FEET ON 08/06/92
			DISTURBED SAMPLES OBTAINED AT 1.0, 3.0 AND 4.0 FEET
			NO GROUND WATER SEEPAGE OBSERVED
			NO CAVING OBSERVED

[1]THE DEPTHS ON THE TEST PIT LOGS, ALTHOUGH SHOWN TO 0.1 FOOT, ARE BASED ON AN AVERAGE OF MEASUREMENTS ACROSS THE TEST PIT AND SHOULD BE CONSIDERED ACCURATE TO 0.5 FOOT.

[2]MOISTURE CONTENT DETERMINED BY ASTM D2216.

LOG OF TEST PIT

DEPTH BELOW GROUND SURFACE (feet)[1]	SOIL GROUP CLASSIFICATION SYMBOL	MOISTURE CONTENT (percent)[2]	DESCRIPTION
			TEST PIT TP-15
0.0 - 2.0	ML		BROWN SILT (VERY STIFF, DRY)
1.0		7.1	
2.0 - 5.0	GM		BROWN SILTY GRAVEL WITH COBBLES AND OCCASIONAL BOULDERS (VERY DENSE, DRY)
3.0		13.1	
5.0		13.2	
			REFUSAL AT 5.0 FEET ON 08/06/92
			DISTURBED SAMPLES OBTAINED AT 1.0, 3.0 AND 5.0 FEET
			NO GROUND WATER SEEPAGE OBSERVED
			NO CAVING OBSERVED
			TEST PIT TP-16
0.0 - 4.0	ML		BROWN SILT (VERY STIFF, DRY)
1.0		14.9	
3.0		14.3	
4.0 - 6.0	GM		BROWN SILTY GRAVEL WITH COBBLES AND OCCASIONAL BOULDERS (VERY DENSE, DRY)
6.0		16.6	
			REFUSAL AT 6.0 FEET ON 08/06/92
			DISTURBED SAMPLES OBTAINED AT 1.0, 3.0 AND 6.0 FEET
			NO GROUND WATER SEEPAGE OBSERVED
			NO CAVING OBSERVED

[1]THE DEPTHS ON THE TEST PIT LOGS, ALTHOUGH SHOWN TO 0.1 FOOT, ARE BASED ON AN AVERAGE OF MEASUREMENTS ACROSS THE TEST PIT AND SHOULD BE CONSIDERED ACCURATE TO 0.5 FOOT.

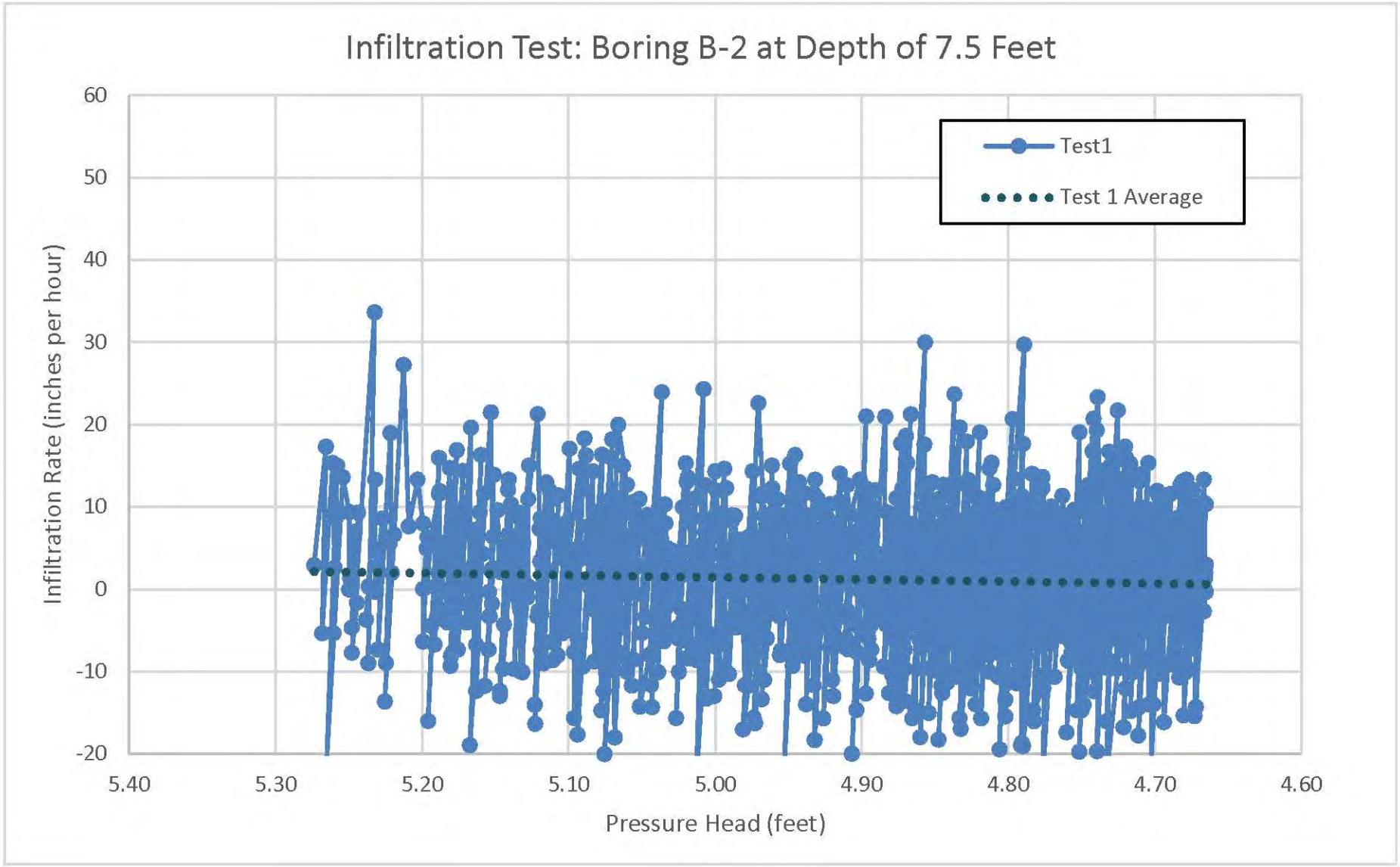
[2]MOISTURE CONTENT DETERMINED BY ASTM D2216.

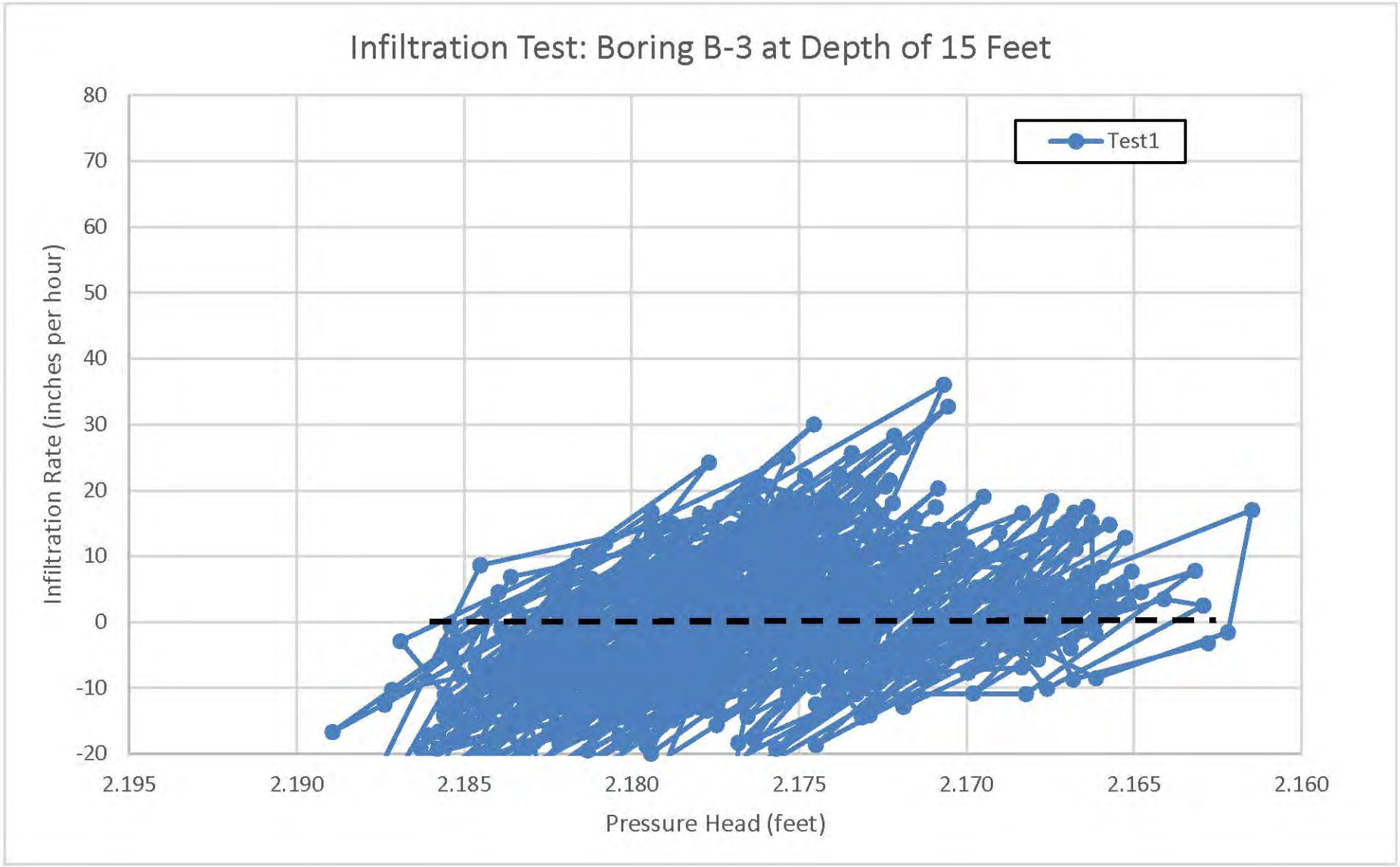
APPENDIX D

APPENDIX D

INFILTRATION TEST DATA

We performed two infiltration tests at locations where stormwater infiltration is being considered. Plots of the infiltration data we collected are presented in this appendix.


Infiltration Test: Boring B-2 at Depth of 7.5 Feet
Infiltration Rate (inches per hour)
60
50
40
30
20
10
0
-10
-20
5.40
5.30
5.20
5.10
5.00
4.90
4.80
4.70
4.60
Pressure Head (feet)
Test1
Test 1 Average


Infiltration Test: Boring B-3 at Depth of 15 Feet
Test1
Infiltration Rate (inches per hour)
80
70
60
50
40
30
20
10
0
-10
-20
2.195
2.190
2.185
2.180
2.175
2.170
2.165
2.160
Pressure Head (feet)

APPENDIX E

APPENDIX E

FWD DATA

GeoDesign performed deflection testing on August 18, 2020. We performed tests using a JILS 20 FWD trailer in accordance with ASTM D4695 using a Level II testing effort, as described by the ASTM method. We conducted tests at approximately 50-foot intervals with loads of approximately 6,000, 9,000, and 12,000 pounds. We measured and recorded deflections 0, 8, 12, 18, 24, 36, 48, 60, and 72 inches from the load impact location. We normalized all results to a 9,000-pound load and adjusted the normalized deflections at the center of the load plate to a standard temperature of 68 degrees Fahrenheit prior to back-calculating subgrade and effective pavement modulus values.

We used the FWD test data to back-calculate values for subgrade resilient modulus at each test location and subsequently adjusted the values using an adjustment factor of 0.35 per ODOT guide recommendations. From these, we computed the design value as the average of the results, as recommended by the AASHTO guide. We then calculated the required structural number and layer thicknesses for new pavement based on the design subgrade resilient modulus value and design traffic level using the method in the AASHTO guide.

We used the FWD data to also back-calculate the effective pavement structural numbers of the existing pavement at each test location in accordance with the method described in the AASHTO guide. We used these values, together with the required structural number for new pavement, to determine rehabilitation structural numbers at each test location and layer thicknesses for rehabilitated pavement.

The FWD test data and back-calculated results are presented in this appendix. Back-calculated subgrade moduli and pavement effective structural numbers at each test station are listed in the following table and displayed graphically on the following figure.

TABLE E-1
FWD Results
DAS North Valley Complex
Wilsonville, Oregon

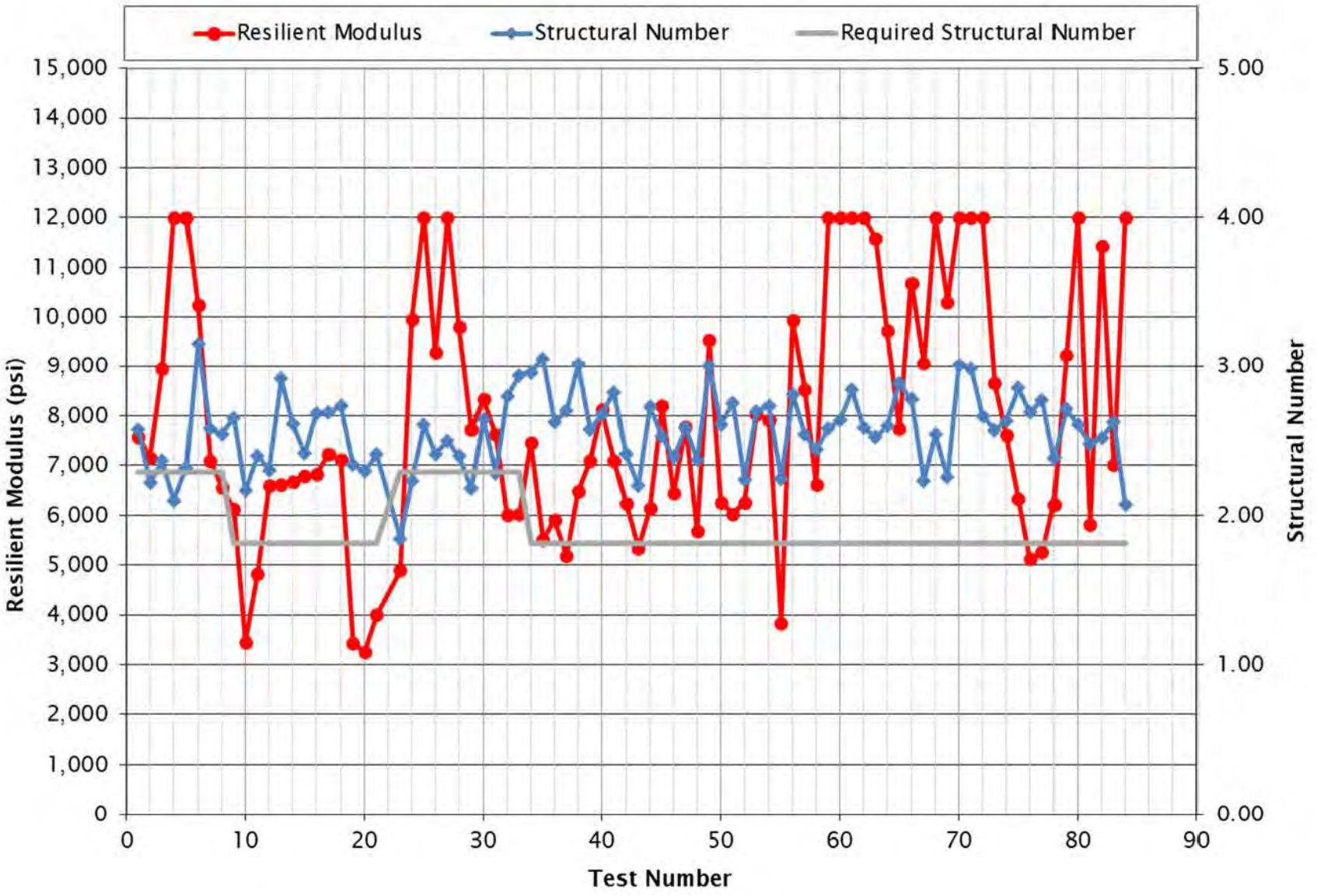
FWD Test Number	Pavement Area	Load (pounds)	Surface Temperature (degrees Fahrenheit)	Normalized Deflections (mils)									Back-Calculated Subgrade Resilient Modulus (psi)	Back-Calculated Effective Pavement Modulus (psi)	Back-Calculated Effective Structural Number
				D0	D8	D12	D18	D24	D36	D48	D60	D72			
1	South	9,000	77.1	14.98	11.50	8.56	5.55	3.69	1.88	1.31	1.04	0.87	7,573	85,073	2.57
2	South	9,000	80.2	20.15	14.12	9.91	5.87	3.49	1.53	1.00	0.75	0.62	7,153	54,437	2.22
3	South	9,000	85.3	16.96	12.08	8.42	4.69	2.33	0.50	0.38	0.40	0.36	8,946	66,032	2.36
4	South	9,000	87.5	19.09	12.30	7.70	3.40	1.23	0.31	0.43	0.43	0.36	12,000	46,126	2.10
5	South	9,000	85.0	15.36	10.43	6.78	3.31	1.37	0.29	0.40	0.40	0.35	12,000	62,048	2.32
6	South	9,000	84.4	9.86	7.50	5.77	4.10	3.00	1.63	0.94	0.58	0.42	10,250	156,214	3.15
7	South	9,000	85.4	16.19	11.98	8.87	5.92	3.90	1.70	0.91	0.59	0.48	7,100	85,849	2.58
8	South	9,000	86.0	17.26	12.68	9.51	6.40	4.39	2.10	1.16	0.75	0.59	6,561	82,149	2.54
9	South	9,000	83.9	16.46	13.06	9.96	6.86	4.90	2.73	1.68	1.10	0.84	6,118	93,212	2.65
10	South	9,000	84.5	29.82	23.07	17.77	12.17	8.47	4.18	2.52	1.71	1.26	3,450	50,835	2.17
11	South	9,000	85.9	21.88	16.95	13.08	8.70	5.74	2.57	1.50	1.07	0.79	4,828	68,844	2.40
12	South	9,000	87.5	20.50	14.44	10.29	6.37	3.94	1.51	0.87	0.69	0.59	6,590	60,958	2.30
13	South	9,000	90.5	14.31	11.05	8.66	6.34	4.70	2.79	1.89	1.34	1.04	6,621	124,010	2.92
14	South	9,000	85.3	16.34	12.05	9.12	6.29	4.47	2.59	1.85	1.43	1.19	6,677	88,885	2.61
15	South	9,000	89.1	18.87	13.07	9.50	6.19	4.35	2.65	1.91	1.50	1.26	6,790	70,387	2.42
16	South	9,000	88.1	15.76	11.80	8.87	6.16	4.46	2.73	2.03	1.61	1.33	6,821	96,691	2.69
17	South	9,000	89.3	15.40	11.10	8.33	5.81	4.23	2.64	1.93	1.45	1.17	7,229	97,313	2.69
18	South	9,000	88.6	15.08	11.16	8.44	5.91	4.20	2.31	1.47	0.99	0.77	7,106	102,032	2.73
19	South	9,000	87.7	27.21	22.93	17.82	12.24	8.03	3.12	1.40	0.98	0.77	3,431	63,720	2.34
20	South	9,000	87.8	28.78	23.88	18.92	13.75	9.68	4.65	2.54	1.62	1.23	3,253	60,174	2.29
21	South	9,000	89.4	24.39	19.19	14.97	10.50	7.30	3.67	2.18	1.45	1.09	3,999	69,630	2.41
23	South	9,000	87.8	34.29	22.81	15.36	8.58	5.34	1.91	0.91	0.59	0.49	4,893	31,347	1.84
24	South	9,000	89.0	18.55	12.00	8.01	4.22	2.03	0.67	0.42	0.37	0.34	9,953	55,261	2.23
25	South	9,000	88.5	12.37	8.26	5.54	3.13	1.75	0.67	0.46	0.39	0.34	12,000	88,293	2.60
26	South	9,000	89.9	16.64	10.96	7.53	4.53	2.80	1.27	0.74	0.52	0.51	9,280	69,953	2.41
27	South	9,000	88.2	13.88	9.17	6.19	3.46	1.78	0.60	0.48	0.44	0.36	12,000	77,598	2.50
28	South	9,000	88.0	16.26	11.22	7.65	4.29	2.28	0.63	0.41	0.41	0.38	9,795	68,609	2.39
29	South	9,000	85.4	20.86	14.49	9.99	5.43	2.43	0.28	0.28	0.39	0.40	7,730	51,549	2.18
30	South	9,000	83.3	14.23	10.35	7.69	5.04	3.28	1.57	1.12	0.90	0.76	8,331	92,712	2.65
31	South	9,000	81.1	18.79	13.53	9.40	5.51	2.86	0.67	0.39	0.39	0.36	7,626	59,240	2.28
32	South	9,000	82.0	15.17	11.93	9.43	7.00	5.03	2.54	1.47	0.97	0.75	5,998	108,972	2.79
33	South	9,000	81.3	13.99	11.08	8.92	6.94	5.24	2.95	1.72	1.07	0.80	6,017	126,627	2.94

TABLE E-1
FWD Results
DAS North Valley Complex
Wilsonville, Oregon

FWD Test Number	Pavement Area	Load (pounds)	Surface Temperature (degrees Fahrenheit)	Normalized Deflections (mils)									Back-Calculated Subgrade Resilient Modulus (psi)	Back-Calculated Effective Pavement Modulus (psi)	Back-Calculated Effective Structural Number
				D0	D8	D12	D18	D24	D36	D48	D60	D72			
34	South	9,000	83.0	12.56	9.61	7.54	5.63	4.29	2.53	1.59	1.02	0.75	7,461	129,405	2.96
35	South	9,000	81.4	13.85	11.31	7.70	7.31	5.71	3.49	2.29	1.58	1.22	5,519	142,222	3.05
36	West	9,000	84.2	17.03	13.23	9.73	7.11	5.08	2.97	2.12	1.71	1.38	5,907	90,603	2.63
37	West	9,000	82.8	17.27	13.47	10.38	8.10	6.06	3.54	2.31	1.65	1.31	5,187	98,197	2.70
38	West	9,000	80.9	12.97	10.47	8.22	6.48	4.86	2.81	1.87	1.37	1.12	6,476	136,280	3.01
39	West	9,000	80.6	15.76	11.06	7.94	5.92	4.47	2.89	2.16	1.70	1.40	7,100	85,189	2.57
40	West	9,000	79.3	13.79	9.78	7.12	5.17	3.75	2.29	1.66	1.30	1.07	8,118	95,879	2.68
41	West	9,000	87.1	14.20	10.28	7.66	5.91	4.58	3.07	2.27	1.72	1.39	7,103	112,388	2.82
42	West	9,000	88.8	19.65	13.72	9.83	6.73	4.75	2.84	1.99	1.46	1.18	6,245	69,753	2.41
43	West	9,000	87.8	24.35	17.05	11.88	7.86	5.20	2.74	1.91	1.43	1.13	5,342	53,053	2.20
44	West	9,000	84.3	15.82	12.61	9.38	6.85	4.95	2.73	1.68	1.08	0.91	6,134	100,995	2.72
45	West	9,000	84.2	15.58	10.62	7.43	5.12	3.59	2.16	1.56	1.17	0.95	8,199	80,604	2.53
46	West	9,000	85.0	19.14	13.34	9.71	6.52	4.47	2.49	1.64	1.21	0.95	6,445	68,080	2.39
47	West	9,000	82.5	15.18	10.83	7.78	5.39	3.84	2.28	1.63	1.22	0.99	7,790	86,302	2.59
48	West	9,000	86.1	20.66	14.96	10.80	7.39	5.19	3.00	2.10	1.58	1.29	5,683	66,625	2.37
49	West	9,000	77.6	10.53	7.46	5.73	4.40	3.49	2.43	1.88	1.51	1.22	9,535	135,343	3.00
50	West	9,000	80.1	16.31	12.08	9.27	6.71	4.88	2.86	2.00	1.55	1.29	6,258	88,717	2.61
51	West	9,000	77.4	15.02	11.72	9.32	6.97	5.16	2.93	1.91	1.39	1.16	6,026	104,340	2.75
52	West	9,000	81.4	21.10	14.13	10.05	6.71	4.72	2.76	1.96	1.47	1.19	6,257	56,190	2.24
53	West	9,000	85.5	14.26	10.03	7.42	5.23	3.88	2.55	1.95	1.54	1.25	8,033	97,844	2.70
54	North	9,000	91.6	14.64	10.53	7.68	5.31	3.77	2.18	1.52	1.14	0.91	7,912	101,834	2.73
55	North	9,000	91.8	28.19	21.46	16.40	10.94	7.17	3.23	1.86	1.32	1.06	3,839	56,354	2.24
56	North	9,000	90.6	12.49	9.01	6.58	4.23	2.73	1.41	1.02	0.81	0.67	9,937	111,080	2.81
57	North	9,000	91.3	15.91	11.30	8.03	4.93	2.91	1.64	1.21	0.91	0.72	8,526	81,867	2.54
58	North	9,000	92.8	19.23	13.85	10.12	6.35	3.91	1.59	0.87	0.73	0.64	6,617	72,653	2.44
59	North	9,000	90.4	13.21	8.92	6.10	3.45	1.82	0.56	0.45	0.48	0.42	12,000	86,148	2.58
60	North	9,000	94.2	11.59	7.03	4.68	2.53	1.33	0.51	0.44	0.41	0.35	12,000	91,410	2.64
61	North	9,000	93.3	9.64	6.28	4.23	2.29	1.19	0.46	0.39	0.36	0.31	12,000	114,483	2.84
62	North	9,000	95.9	11.50	7.07	4.37	2.19	1.18	0.58	0.47	0.40	0.30	12,000	86,577	2.59
63	North	9,000	97.4	14.77	9.72	6.40	3.63	2.01	0.75	0.55	0.49	0.42	11,579	80,188	2.52
64	North	9,000	83.7	13.76	9.73	7.05	4.32	2.56	1.02	0.58	0.46	0.40	9,725	87,583	2.60
65	North	9,000	100.5	14.42	10.81	8.16	5.43	3.59	1.69	1.01	0.71	0.57	7,739	120,415	2.89
66	North	9,000	98.9	13.09	8.78	6.40	3.93	2.33	0.95	0.66	0.52	0.43	10,690	106,788	2.78

TABLE E-1
FWD Results
DAS North Valley Complex
Wilsonville, Oregon

FWD Test Number	Pavement Area	Load (pounds)	Surface Temperature (degrees Fahrenheit)	Normalized Deflections (mils)									Back-Calculated Subgrade Resilient Modulus (psi)	Back-Calculated Effective Pavement Modulus (psi)	Back-Calculated Effective Structural Number
				D0	D8	D12	D18	D24	D36	D48	D60	D72			
67	North	9,000	99.0	20.51	13.35	8.54	4.64	2.84	1.55	1.04	0.74	0.60	9,058	55,704	2.23
68	North	9,000	98.8	13.64	8.80	5.70	2.99	1.51	0.53	0.45	0.41	0.36	12,000	81,926	2.54
69	North	9,000	95.0	18.65	13.14	8.46	4.08	2.37	0.84	0.49	0.42	0.37	10,304	57,300	2.26
70	North	9,000	98.1	9.11	6.05	4.15	2.36	1.32	0.56	0.43	0.36	0.31	12,000	136,235	3.01
71	North	9,000	100.6	9.31	6.09	4.12	2.30	1.30	0.63	0.51	0.42	0.35	12,000	132,769	2.98
72	North	9,000	99.3	13.30	9.37	6.40	3.44	1.93	0.88	0.66	0.55	0.46	12,000	94,423	2.66
73	North	9,000	99.7	16.43	11.40	8.12	4.86	2.87	1.17	0.84	0.70	0.60	8,651	84,922	2.57
74	North	9,000	98.8	16.61	12.08	8.77	5.52	3.37	1.42	1.20	0.92	0.73	7,613	91,336	2.63
75	North	9,000	100.7	16.26	12.56	9.93	7.04	4.98	2.58	1.57	1.10	0.87	6,330	115,931	2.85
76	North	9,000	100.2	19.68	15.17	11.79	8.19	5.56	2.72	1.66	1.18	0.91	5,125	96,962	2.69
77	North	9,000	98.8	18.36	14.97	11.97	8.55	5.99	2.94	1.67	1.16	0.92	5,256	106,545	2.77
78	North	9,000	96.9	21.17	15.20	10.92	6.75	4.10	1.80	1.18	0.93	0.76	6,224	67,576	2.38
79	North	9,000	100.8	14.72	10.41	7.54	4.55	2.63	0.99	0.61	0.51	0.44	9,222	99,802	2.71
80	North	9,000	100.1	12.05	7.33	4.66	2.37	1.24	0.59	0.50	0.41	0.34	12,000	88,303	2.61
81	North	9,000	97.4	20.54	14.72	10.89	7.21	5.00	2.88	2.08	1.60	1.30	5,825	76,111	2.48
82	South	9,000	76.5	12.98	8.36	5.83	3.68	2.52	1.47	1.03	0.73	0.56	11,421	79,776	2.52
83	South	9,000	104.9	18.17	13.22	9.24	5.99	4.11	2.45	1.70	1.24	0.95	7,010	90,182	2.62
84	South	9,000	97.3	19.80	11.85	6.93	2.84	0.97	0.38	0.44	0.38	0.32	12,000	44,329	2.07



GEODESIGN INC AN NV5 COMPANY	ORDAS-7-01	**FWD TEST RESULTS**
	SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR

FIGURE E-1

APPENDIX F

APPENDIX F

DCP TEST CALCULATIONS

Our DCP test calculations are presented in this appendix.

DYNAMIC CONE PENETROMETER RESULTS - BORING B-7

Layer	Layer Type and Location	Slope (mm/blow)	C_f	M_R (psi)
1	Aggregate base or subbase below AC	7.1	0.62	14,160
2	Subgrade below AC and aggregate base	28.2	0.35	4,660
3		---	---	---
Equivalent subgrade modulus based on Odemark's Method of Equivalent Thickness				---

$M_R = C_f \times 49023 \times S^{-0.39}$

M_R = resilient modulus (pounds per square inch)

C_f = conversion coefficient

S = slope (millimeters per blow)

References:

ODOT Pavement Design Guide, Pavement Services Unit, Oregon Department of Transportation, April 2011.

Jianzhou Chen, Mustaque Hossain, and Todd M. LaTorella, "Use of Falling Weight Deflectometer and Dynamic Cone Penetrometer in Pavement Evaluation," *Paper No. 99-1007*, Transportation Research Record 1655, pp 145-151, Transporation Research Board, Washington, D.C., 1999.

Per Ullidtz, *Modelling Flexible Pavement Response and Performance*, Tech Univ. of Denmark Polytekn, 1998.

DYNAMIC CONE PENETROMETER RESULTS - BORING B-8

Layer	Layer Type and Location	Slope (mm/blow)	C_f	M_R (psi)
1	Aggregate base or subbase below AC	6.7	0.62	14,440
2	Subgrade below AC and aggregate base	29.5	0.35	4,580
3	Subgrade below AC and aggregate base	12.8	0.35	6,350
Equivalent subgrade modulus based on Odemark's Method of Equivalent Thickness				5,600

$M_R = C_f \times 49023 \times S^{-0.39}$

M_R = resilient modulus (pounds per square inch)

C_f = conversion coefficient

S = slope (millimeters per blow)

References:

ODOT Pavement Design Guide, Pavement Services Unit, Oregon Department of Transportation, April 2011.

Jianzhou Chen, Mustaque Hossain, and Todd M. LaTorella, "Use of Falling Weight Deflectometer and Dynamic Cone Penetrometer in Pavement Evaluation," *Paper No. 99-1007*, Transportation Research Record 1655, pp 145-151, Transporation Research Board, Washington, D.C., 1999.

Per Ullidtz, *Modelling Flexible Pavement Response and Performance*, Tech Univ. of Denmark Polytekn, 1998.

DYNAMIC CONE PENETROMETER RESULTS - BORING B-9

Layer	Layer Type and Location	Slope (mm/blow)	C_f	M_R (psi)
1	Aggregate base or subbase below AC	3.2	0.62	19,320
2	Subgrade below AC and aggregate base	12.1	0.35	6,490
3	Subgrade below AC and aggregate base	5.5	0.35	8,800
Equivalent subgrade modulus based on Odemark's Method of Equivalent Thickness				8,270

$M_R = C_f \times 49023 \times S^{-0.39}$

M_R = resilient modulus (pounds per square inch)

C_f = conversion coefficient

S = slope (millimeters per blow)

References:

ODOT Pavement Design Guide, Pavement Services Unit, Oregon Department of Transportation, April 2011.

Jianzhou Chen, Mustaque Hossain, and Todd M. LaTorella, "Use of Falling Weight Deflectometer and Dynamic Cone Penetrometer in Pavement Evaluation," *Paper No. 99-1007*, Transportation Research Record 1655, pp 145-151, Transporation Research Board, Washington, D.C., 1999.

Per Ullidtz, *Modelling Flexible Pavement Response and Performance*, Tech Univ. of Denmark Polytekn, 1998.

APPENDIX G

APPENDIX G

SITE-SPECIFIC SEISMIC HAZARD EVALUATION

INTRODUCTION

The information in this appendix summarizes the results of our site-specific seismic hazard study for the proposed DAS North Valley Complex. The project includes renovation of an existing manufacturing office/warehouse space that was purchased by DAS. The existing building will be an essential facility and will be renovated for use as an office, a laboratory, a data center, evidence storage, and an emergency operations space. This seismic hazard evaluation was performed in accordance with the requirements of ASCE 7-16 and also meets the necessary requirements of ASCE 41-17 as they pertain to this project.

SITE CONDITIONS

REGIONAL GEOLOGY

A detailed description of the regional geology is presented in the main report.

GEOLOGIC HAZARDS

A discussion of potential seismic hazards that could affect the proposed project is presented in the main report.

SURFACE AND SUBSURFACE CONDITIONS

Detailed descriptions of the site surface and subsurface conditions are presented in the main report.

SEISMIC SETTING

Earthquake Source Zones

Three earthquake scenarios were considered for this study that are consistent with the local seismic setting. Two of the possible earthquake sources are associated with the CSZ, and the third event is a shallow, local crustal earthquake that could occur in the North American Plate. The three earthquake scenarios are discussed below.

Regional Events

The CSZ is the region where the Juan de Fuca Plate is being subducted beneath the North American Plate. This subduction is occurring in the coastal region between Vancouver Island and northern California. Evidence has accumulated suggesting that this subduction zone has generated eight great earthquakes in the last 4,000 years, with the most recent event occurring approximately 300 years ago (Weaver and Shedlock, 1991). The fault trace is mapped approximately 50 to 120 km off the Oregon Coast. Two types of subduction zone earthquakes are possible and considered in this study:

1. An interface event earthquake on the seismogenic part of the interface between the Juan de Fuca Plate and the North American Plate on the CSZ. This source is reportedly capable of generating earthquakes with a moment magnitude of between 8.5 and 9.0.

2. A deep intraplate earthquake on the seismogenic part of the subducting Juan de Fuca Plate. These events typically occur at depths between 30 and 60 km. This source is capable of generating an event with a moment magnitude of up to 7.5.

Local Events

A significant earthquake could occur on a local fault near the site within the design life of the facility. Such an event would cause ground shaking at the site that could be more intense than the CSZ events, though the duration would be shorter. Figure G-1 shows the locations of faults with potential Quaternary movement within a 35-km radius of the site (USGS, 2020a). Figure G-2 shows the interpreted locations of seismic events that occurred between 1904 and 2020 (USGS, 2020b). The most significant faults in the site vicinity are the Canby-Molalla fault, Oatfield fault, Newberg fault, and Portland Hills fault. A discussion of these faults is provided below.

Canby-Molalla Fault

The north-northwest-striking Canby-Molalla fault is mapped based on a linear series of northwest-trending discontinuous aeromagnetic anomalies that probably represent significant offset of Eocene basement and volcanic rocks of the Miocene Columbia River Basalt beneath Neogene sediments that fill the northern Willamette River Basin. The sense of displacement of the fault is poorly known, but it shows apparent right-lateral separation of several transverse magnetic anomalies, and down-west vertical displacement is also apparent in water well logs. The fault has little geomorphic expression across the gently sloping floor of the Willamette Valley, but a small, laterally restricted berm associated with the fault may suggest young deformation. Deformation of probable Missoula flood deposits suggests possible Holocene deformation (Personius, 2002a).

Oatfield Fault

The northwest-striking Oatfield fault forms northeast-facing escarpments in volcanic rocks of the Miocene CRBG in the Tualatin Mountains and northern Willamette Valley. The fault may be part of the Portland Hills-Clackamas River structural zone. The Oatfield fault is primarily mapped as a very high-angle, reverse fault with apparent down-to-the-southwest displacement, but a few kilometer-long reach of the fault with down-to-the-northeast displacement is mapped in the vicinity of the Willamette River. This apparent change in displacement direction along strike may reflect a discontinuity in the fault trace or could reflect the right-lateral, strike-slip displacement that characterizes other parts of the Portland Hills-Clackamas River structural zone. The fault has also been modeled as a 70-degree, east-dipping reverse fault. Reverse displacement with a right-lateral, strike-slip component is consistent with the tectonic setting, mapped geologic relations, and microseismicity in the area. Fault scarps on surficial deposits have not been described, but exposures in a light rail tunnel showing offset of approximately 1 M_a Boring Lava across the fault indicate Quaternary displacement (Personius, 2002b).

Newberg Fault

The Newberg fault is part of the Gales Creek-Mount Angel structural zone, a northwest-striking zone of dextral-reverse faults that has been active at least since the Miocene when they controlled the emplacement of Miocene CRBG lava flows in the Northern Willamette Valley. The fault primarily is mapped in the subsurface on the basis of water well, aeromagnetic, and gravity

data. Unequivocal evidence of displacement in Quaternary deposits has not been described, but most of the fault trace is covered by a thick sequence of silty sediment deposited by the Missoula Floods, which may have buried evidence of pre-latest Quaternary displacement (Personius, 2002c).

Portland Hills Fault

The northwest-striking Portland Hills fault forms the prominent linear northeast margin of the Tualatin Mountains (Portland Hills) and the southwest margin of the Portland Basin; this basin may be a right-lateral, pull-apart basin in the forearc of the CSZ or a piggyback synclinal basin formed between antiformal uplifts of the Portland fold belt. The fault is part of the Portland Hills-Clackamas River structural zone, which controlled the deposition of Miocene CRBG lavas in the region. The crest of the Portland Hills is defined by the northwest-striking Portland Hills anticline. The sense of displacement on the Portland Hills fault is poorly known and controversial. The fault was originally mapped as a down-to-the-northeast normal fault. The fault has also been mapped as part of a regional-scale zone of right-lateral, oblique-slip faults and as a steep escarpment caused by asymmetrical folding above a southwest-dipping blind thrust. Reverse displacement with a right-lateral, strike-slip component may be most consistent with the tectonic setting, mapped geologic relations, aeromagnetic data, and microseismicity in the area. Fault scarps on surficial Quaternary deposits have not been described along the fault trace, but some geomorphic (steep, linear escarpment, triangular facets, over-steepened, and knick-pointed tributaries) and geophysical (aeromagnetic, seismic reflection, and ground penetrating radar) evidence suggest Quaternary displacement (Personius and Haller, 2017).

Table G-1. Significant Crustal Faults

Source	Closest Mapped Distance[1] (km)	Mapped Length[1] (km)
Canby-Molalla fault	6.3	50
Oatfield fault	14.5	29
Newberg fault	15.0	5
Portland Hills fault	16.8	49

1. Reported by USGS (USGS, 2020a)

BUILDING CODE SEISMIC DESIGN PARAMETERS

ASCE 7-16 SEISMIC DESIGN PARAMETERS

Based on the SPT and shear wave velocity results from our explorations, it is our opinion that the site should be classified as seismic Site Class D. Seismic design may be performed in accordance with ASCE 7-16, which is prescribed by the 2019 SOSSC and 2018 IBC. ASCE 7-16 requires that seismic design parameters associated with a 2 percent probability of being exceeded in a 50-year period be used in design. Table G-2 presents the default Site Class D design parameters prescribed for the site by ASCE 7-16. These parameters were obtained from the SEAOC/OSHPD seismic design map tool (SEAOC/OSHPD, 2020). These parameters can only be used if Exception 2 in ASCE 7-16 Section 11.4.8 applies. If Exception 2 does not apply, a site response analysis is required. The following sections discuss the site response analysis we performed for

this project. The building code allows a reduction in design levels of ground shaking if it is warranted by a site-specific seismic hazard evaluation. This study shows that a reduction is allowed at most periods. As a result, we anticipate that the structural engineer will elect to use the seismic design parameters from our site response analysis, instead of the default code parameters in Table G-2.

Table G-2. ASCE 7-16 Default Seismic Design Parameters

Parameter	Short Period (T_s = 0.2 second)	1 Second Period (T_1 = 1.0 second)
Spectral Acceleration (MCE)	S_s = 0.823 g	S_1 = 0.384 g
Site Class	D	
Site Coefficient	F_a = 1.171	F_v = 1.916
Spectral Acceleration Parameters	S_{MS} = 0.964 g	S_{M1} = 0.735 g
Design Spectral Acceleration Parameters	S_{DS} = 0.642 g	S_{D1} = 0.490 g
Spectral PGA	0.375 g	
Design Spectral PGA	0.250 g	
MCE_G PGA Adjusted for Site Class Effects[2]	PGA_M = 0.459 g	

1. From ASCE 7-16. Minimum PGA value to use when evaluating liquefaction and soil strength loss, as required by ASCE 7-16 Section 11.8.3.

ASCE 41-17 SEISMIC DESIGN PARAMETERS

Seismic design may also be performed in accordance with ASCE 41-17. Table G-3 presents the default Site Class D seismic design parameters prescribed for the site by ASCE 41-17. These parameters were obtained from the SEAOC/OSHPD seismic design map tool (SEAOC/OSHPD, 2020). The recommended BSE-2N and BSE-1N seismic design parameters from our site response analysis are presented later in this appendix and may be used instead of the default parameters in Table G-3. We did not perform a site response analysis for the BSE-2E and BSE-1E hazard levels, so the default parameters in Table G-3 may be used for these hazard levels.

Table G-3. ASCE 41-17 Default Seismic Design Parameters

Parameter	Hazard Level			
	BSE-2N	BSE-1N	BSE-2E	BSE-1E
Site Class	D			
Spectral Response (0.2 second), S_S	0.823	NA	0.595	0.226
Spectral Response (1.0 second), S_1	0.384	NA	0.272	0.083
Site Amplification Factor (0.2 second), F_a	1.171	NA	1.324	1.6
Site Amplification Factor (1.0 second), F_v	1.916	NA	2.056	2.4
Site-Modified Spectral Response (0.2 second), S_{XS}	0.964	0.642	0.788	0.362
Site-Modified Spectral Response (1.0 second), S_{X1}	0.735	0.490	0.559	0.199

SITE RESPONSE ANALYSIS

RISK-TARGETED BEDROCK SPECTRUM

We obtained a 2,500-year probabilistic bedrock spectrum for the site in accordance with ASCE 7-16 using the computer program EZ-FRISK version 8.06. We determined the spectral accelerations for the outcropping bedrock response spectrum for periods ranging from 0 to 10 seconds. The response spectrum is consistent with a shear wave velocity equal to 760 meters per second in the upper 30 meters of the soil profile. ASCE 7-16 requires that the ground motions be defined in terms of the maximum direction of horizontal response. The maximum direction was adopted as the ground motion intensity parameter for use in lieu of explicit consideration of directional effects. The maximum horizontal response may reasonably be estimated by factoring the average response period by period-dependent factors. ASCE 7-16 Section 21.2 recommends a factor of 1.1 at short periods, 1.3 at a period of 1.0 second, and 1.5 at periods of 5.0 seconds and greater. They recommend using linear interpolation to obtain factors for other periods.

The risk targeted bedrock spectrum, MCE_R, was computed using Method 1 outlined in ASCE 7-16 Section 21.2.1.1. A risk coefficient of $C_{RS} = 0.884$ was applied to the spectrum at periods of 0.2 second or less and a risk coefficient of $C_{R1} = 0.864$ was applied to the spectrum at periods of 1.0 second or greater. Linear interpolation was used to compute risk coefficients between periods of 0.2 and 1.0 second. The intent of this is to achieve a 1 percent collapse of the structure in a 50-year period. Table G-4 presents a summary of values used to compute the MCE_R target bedrock response spectrum.

Table G-4. Risk Targeted Bedrock Spectrum

Period (seconds)	MCE Target Bedrock Spectral Acceleration (g)	Maximum Direction Factor	C_R	MCE_R Target Bedrock Spectral Acceleration (g)
0.0	0.403	1.1	0.884	0.392
0.1	0.856	1.1	0.884	0.833
0.2	0.888	1.1	0.884	0.863
0.3	0.739	1.125	0.882	0.733
0.5	0.538	1.175	0.877	0.554
1.0	0.330	1.3	0.864	0.370
2.0	0.180	1.35	0.864	0.210
3.0	0.119	1.4	0.864	0.144
4.0	0.089	1.45	0.864	0.112
5.0	0.068	1.5	0.864	0.088
7.5	0.041	1.5	0.864	0.053
10.0	0.031	1.5	0.864	0.040

BASE GROUND MOTIONS

Six recorded base ground motions were selected to represent the local seismic setting. We considered faulting mechanism, magnitude, and distance to the recording station. Ground motions at the site are controlled by a crustal event and the CSZ interface event. We selected three acceleration time histories to represent crustal events and three acceleration time histories to represent CSZ events as input for the seismic response analysis. We selected this distribution of CSZ and crustal events to match the hazard contributions from both scenarios. Table G-5 provides the ground motions selected for this study.

Table G-5. Selected Ground Motions

Ground Motion/Recording Station	Magnitude	Distance (km)	Component
Crustal Records			
El Mayor-Cucapah, Mexico 2010/ Cerro Prieto Geothermal	7.2	8.9	000
Darfield, New Zealand 2010/ Papanui High School	7.0	18.7	S33W
Kobe, Japan 1995/Fukushima	6.9	17.9	090
CSZ Records			
Tohoku 2011/Tsukuba City Hall	9.0	106.9	004
Arequipa 2001/MOQ	8.4	60.0	000
Maule 2010/Santiago Puente Alto	8.8	75.0	NS

SITE RESPONSE

We determined acceleration response spectra for the postulated scenarios discussed above by performing a site-specific seismic response analysis. We performed an equivalent linear seismic site response analysis, as described in ASCE 7-16 Section 21.1. In our opinion, an equivalent linear seismic site response analysis is appropriate because the site is not susceptible to liquefaction and we expect total stress and effective stress results to be similar. We performed the site response analysis using the Shake module within the computer program EZ-Frisk 8.06 Build 37.

The input soil models used in our analysis are based on the findings of our subsurface exploration program and our experience in the site vicinity. A detailed description of site subsurface conditions is provided in the main report. Table G-6 provides a summary of the soil models used in our analysis. We estimated the shear wave velocity of the soil based on the shear wave velocity measurements we collected in CPT-1. The acceleration response spectra produced by our equivalent linear seismic response analysis is presented on Figures G-3 through G-6.

Table G-6. Input Soil Profile

Depth Interval (feet)	Subsurface Unit	Shear Wave Velocity (fps)	Modulus Reduction Curve	Damping Curve
0 to 6	Silt (Fill)	850	Vucetic & Dobry (1991) Plasticity index = 0	Vucetic & Dobry (1991) Plasticity index = 0
6 to 10	Silt	870	Vucetic & Dobry (1991) Plasticity index = 0	Vucetic & Dobry (1991) Plasticity index = 0
10 to 30	Clay	925 to 1,200	Vucetic & Dobry (1991) Plasticity index = 30	Vucetic & Dobry (1991) Plasticity index = 30
30 to 40[1]	Dense gravel	1,200	Seed & Idriss (1970) Average	Seed & Idriss (1970) Average

1. Input ground motion applied at base of this layer.

DETERMINISTIC MCE_R RESPONSE SPECTRUM

The deterministic approach considers the maximum ground acceleration that may occur at the site as a result of a characteristic earthquake on all known active faults in the region. ASCE 7-16 Section 21.2.2 requires that the spectral response at each period be calculated as an 84^{th} percentile 5 percent damped spectral response acceleration in the direction of maximum horizontal response. However, the lower limit is computed in accordance with Figure 21.2-1 in ASCE 7-16, where F_a and F_v are taken as 1.0 and 2.5, respectively. Per ASCE 7-16 Supplement 1 Section 21.2.2, a deterministic ground motion response spectrum is not required for this site.

SITE-SPECIFIC MCE_R RESPONSE SPECTRUM

As outlined in ASCE 7-16 Section 21.2.3, the site-specific MCE_R shall be taken as the lesser of the probabilistic MCE_R and the deterministic MCE_R (when required). Figure G-4 shows the site-specific MCE_R response spectrum.

DESIGN RESPONSE SPECTRUM

ASCE 7-16 Section 21.3 states that the site-specific MCE_R response spectrum should be reduced by two-thirds at all periods to obtain the design response spectrum. However, the lower bound for design ground motions is 80 percent of the generalized response spectrum, as outlined in ASCE 7-16 Section 11.4.5.

DESIGN ACCELERATION PARAMETERS

To develop the final design response spectrum, the lesser of the values obtained from the probabilistic MCE_R and the deterministic MCE_R (when required) are taken at each period. The resulting spectrum is then reduced by two-thirds. The parameter S_{DS} is taken as 90 percent of the maximum spectral acceleration obtained from the site-specific spectrum at any period within the range of 0.2 second to 5 seconds. The parameter S_{D1} is taken as the maximum value of the product of period times spectral acceleration for periods from 1 second to 2 seconds. The parameters S_{MS} and S_{M1} shall be taken as 1.5 times S_{DS} and S_{D1}, respectively. The resulting S_{MS}, S_{M1}, S_{DS}, and S_{D1} parameters shall not be less than 80 percent of the values obtained from ASCE 7-16 Sections 11.4.4 and 11.4.5. Figure G-5 shows our recommended design response spectrum that we developed in accordance with ASCE 7-16.

We note that our recommended design response spectrum on Figure G-5 from ASCE 7-16 is equivalent to the ASCE 41-17 BSE-1N hazard level site-specific response spectrum. Figure G-6 shows the ASCE 41-17 BSE-2N hazard level site-specific response spectrum, which is 1.5 times the BSE-1N response spectrum. We did not perform site response analyses for the ASCE 41-17 BSE-2E and BSE-1E hazard levels. The code-based design parameters for the BSE-2E and BSE-1E hazard levels can be obtained from Table G-3.

REFERENCES

ASCE, 2017. *Minimum Design Loads and Associated Criteria for Buildings and Other Structures.* Publication ASCE 7-16.

ASCE, 2017. *Seismic Evaluation and Retrofit of Existing Buildings.* Publication ASCE 41-17.

Personius, S.F., compiler, 2002a. *Fault number 716, Canby-Molalla fault, in Quaternary fault and fold database of the United States*: U.S. Geological Survey website https://earthquakes.usgs.gov/hazards/qfaults, accessed September 9, 2020.

Personius, S.F., compiler, 2002b. *Fault number 875, Oatfield fault, in Quaternary fault and fold database of the United States*: U.S. Geological Survey website https://earthquakes.usgs.gov/hazards/qfaults, accessed September 9, 2020.

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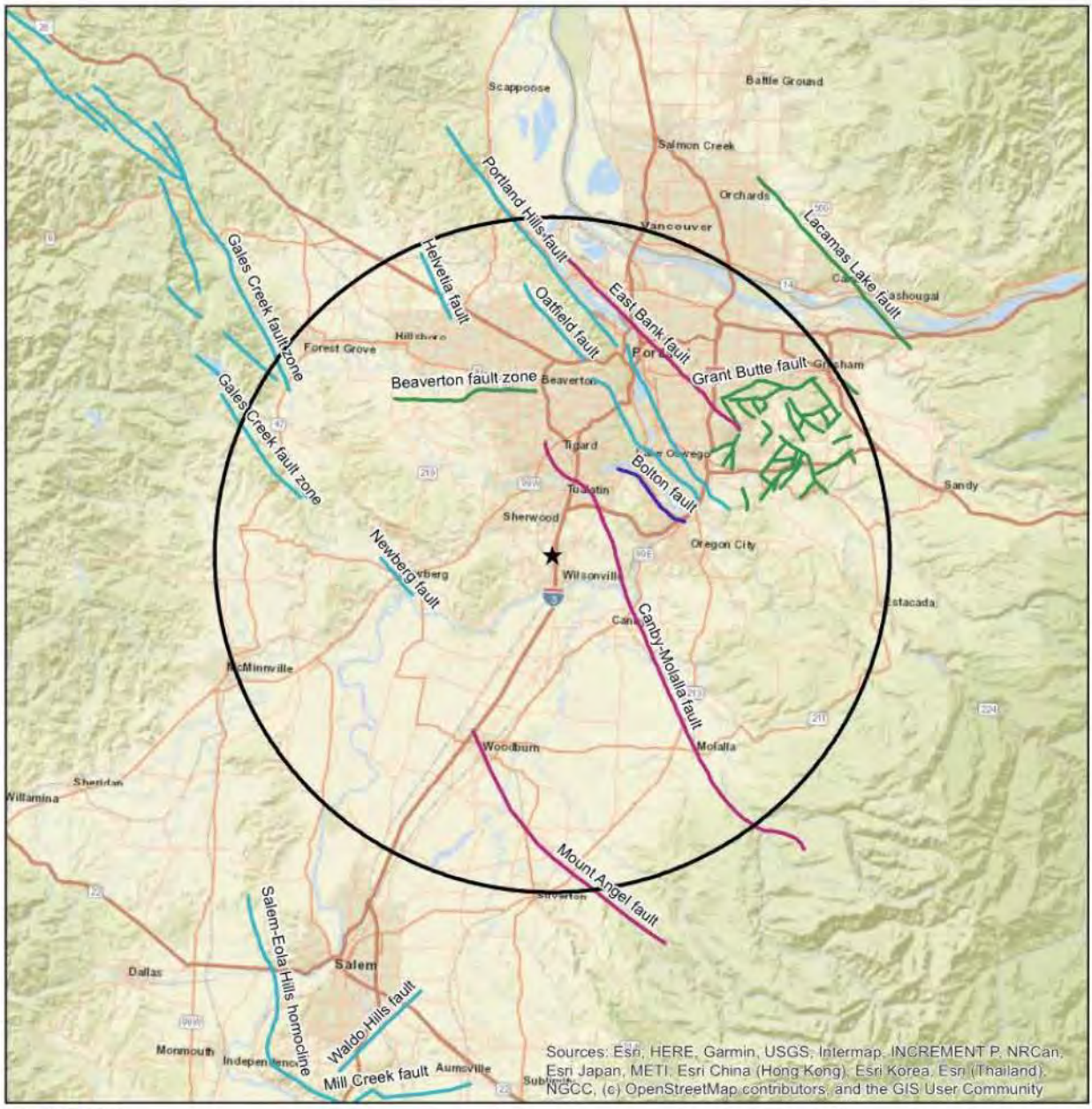
USGS, 2020b. *Earthquake Hazards Program, US Earthquake Information by State*, obtained from website http://earthquake.usgs.gov/earthquakes/search.

Weaver, C.S. and Shedlock, K.M, 1991. *Program for earthquake hazards assessment in the Pacific Northwest: U.S. Geological Survey Circular 1067*, 29 pgs.



LEGEND

RADIUS

★ SITE LOCATION

USGS QUATERNARY FAULTS

AGE

- <150
- <15,000
- <130,000
- <750,000
- <1,600,000
- Class B

N

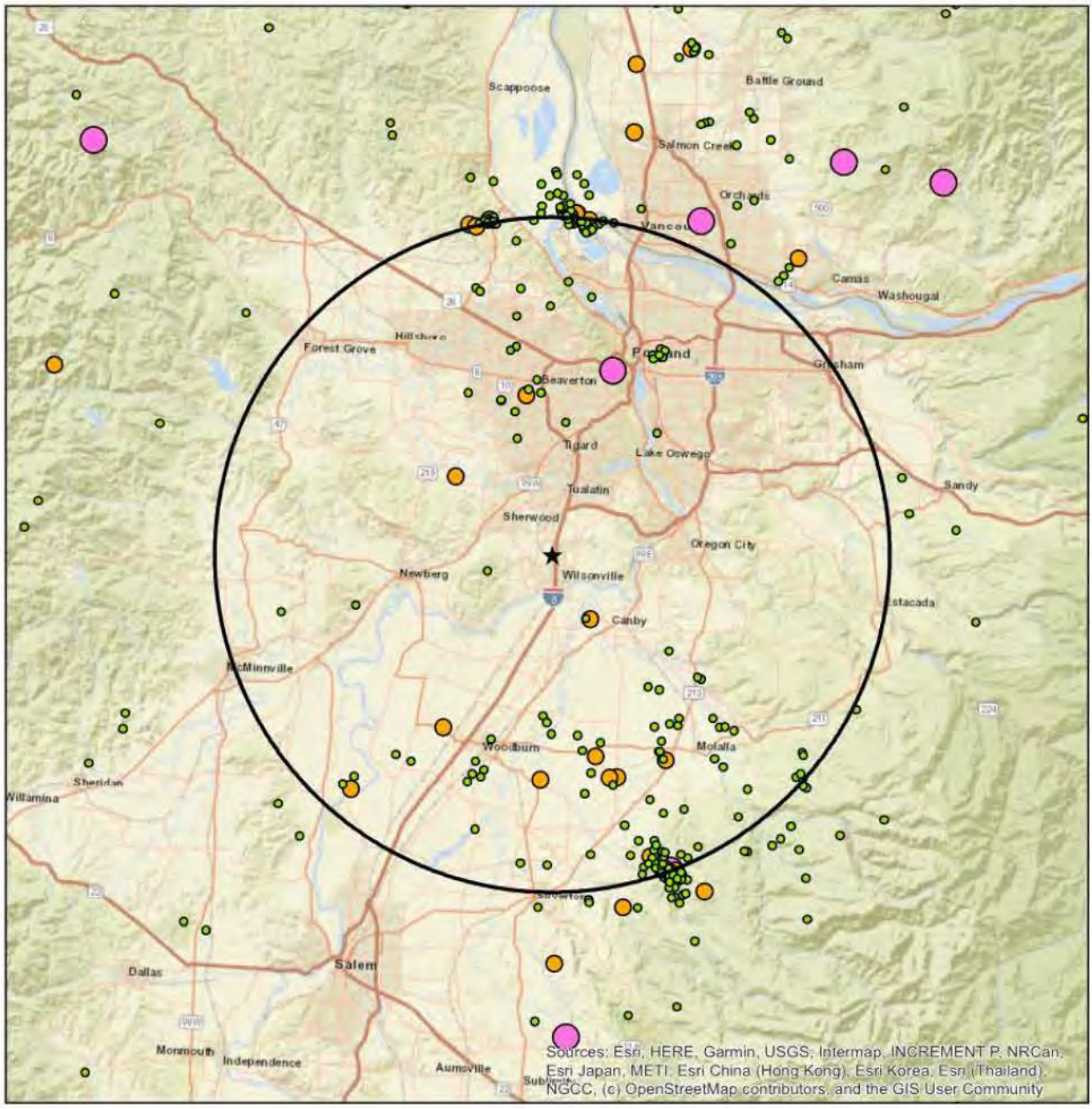
0 20 40

Kilometers

USGS, Quaternary Fault and Fold Database of the United States, U.S. Geological Survey, Available: https://earthquake.usgs.gov/hazards/qfaults

GEODESIGN INC AN NV5 COMPANY	ORDAS-7-01	QUATERNARY FAULT MAP	
	SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR	FIGURE G-1

ORDAS-7-01-FG1_G2.docx Print Date: 9/16/20



LEGEND

RADIUS

★ SITE LOCATION

INSTRUMENTAL EARTHQUAKE MAGNITUDE

- 2.0 - 3.0
- 3.0 - 4.0
- 4.0 - 6.0
- > 6.0

N

0 20 40

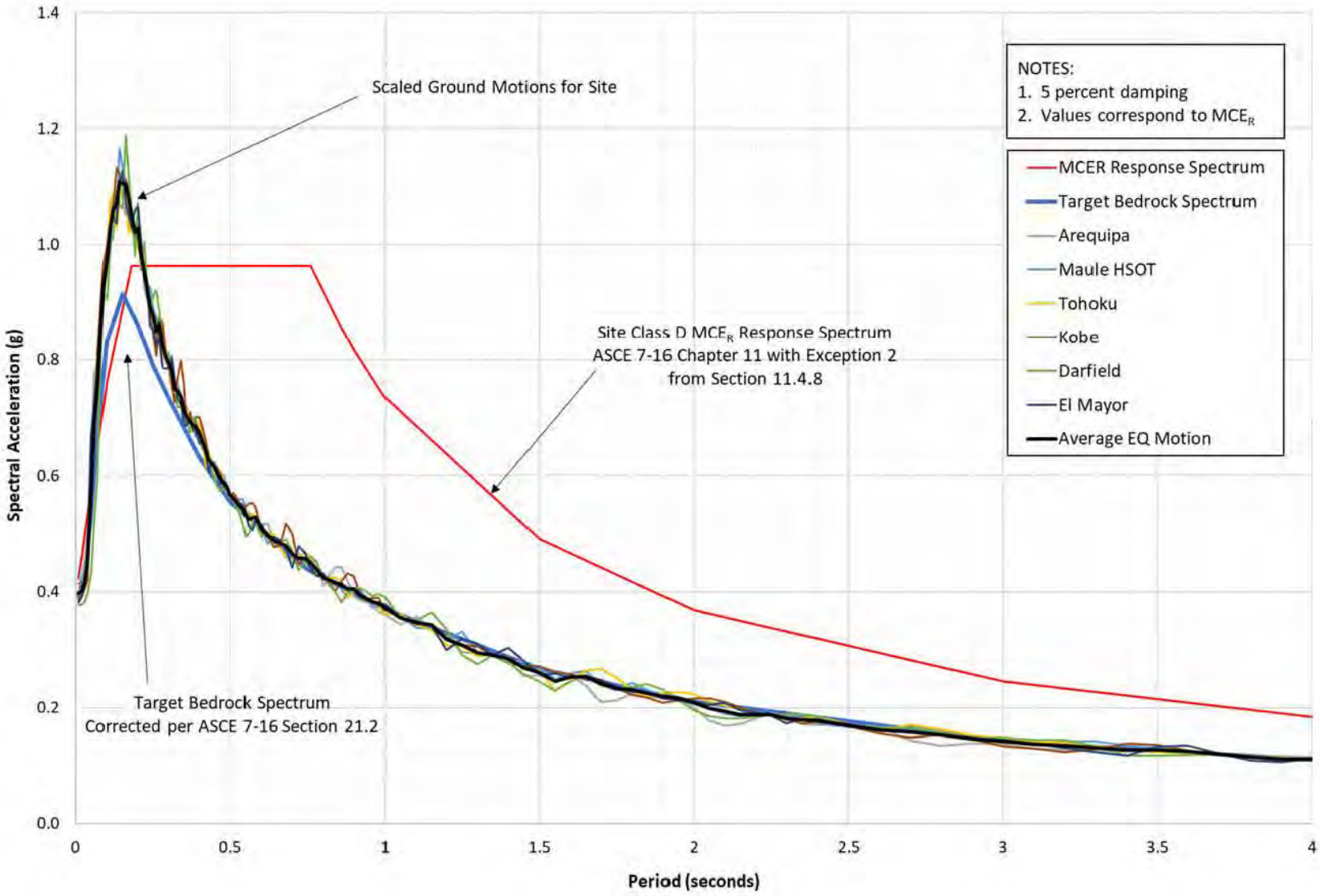
Kilometers

USGS, accessed July 27, 2020, Earthquake Hazards Program, US Earthquake Information by State, U.S. Geological Survey, Available: http://earthquake.usgs.gov/earthquakes/search

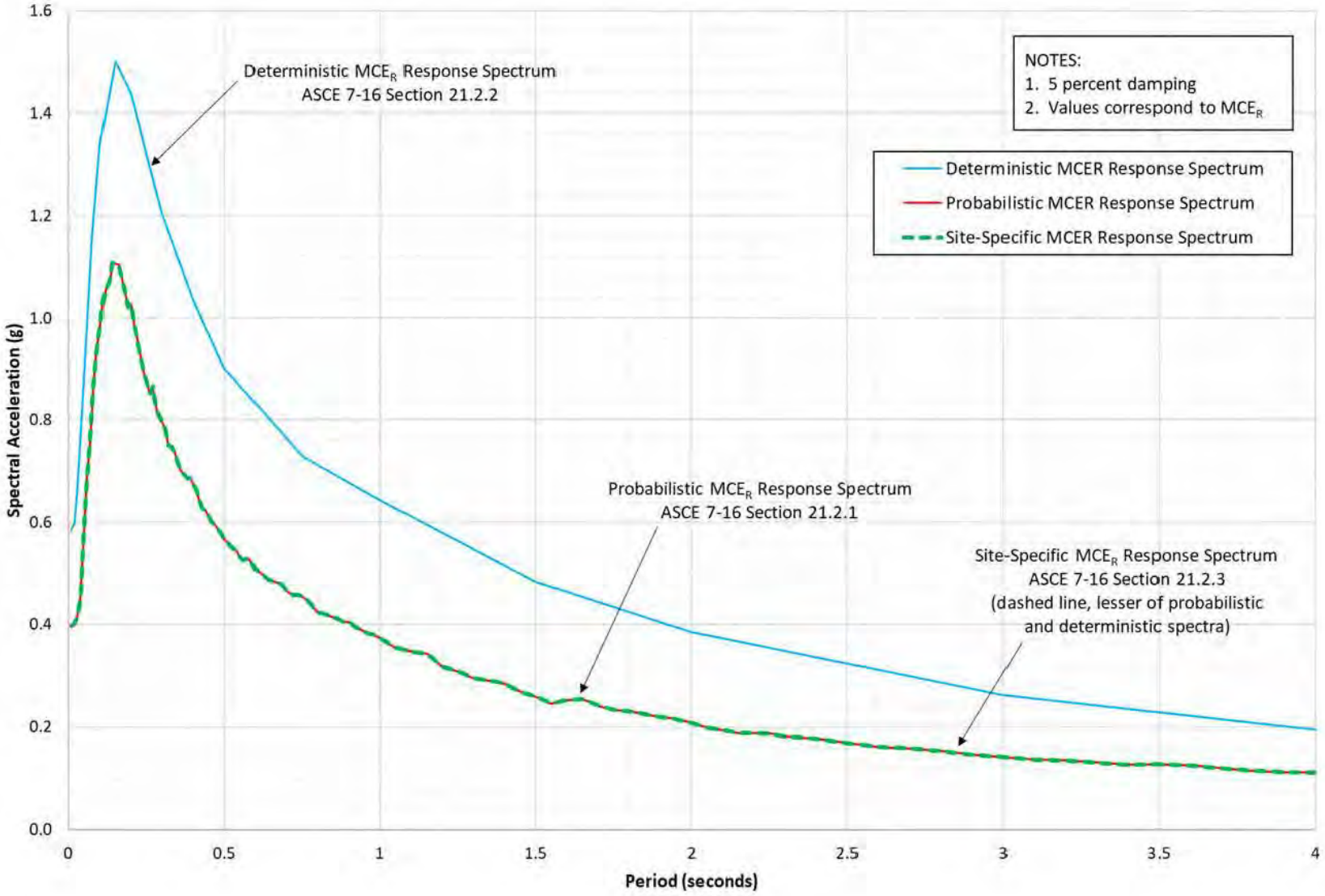
Earthquakes in figure are from 1904-2020.

GEODESIGN INC AN NV5 COMPANY	ORDAS-7-01	HISTORICAL SEISMICITY MAP	
	SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR	FIGURE G-2

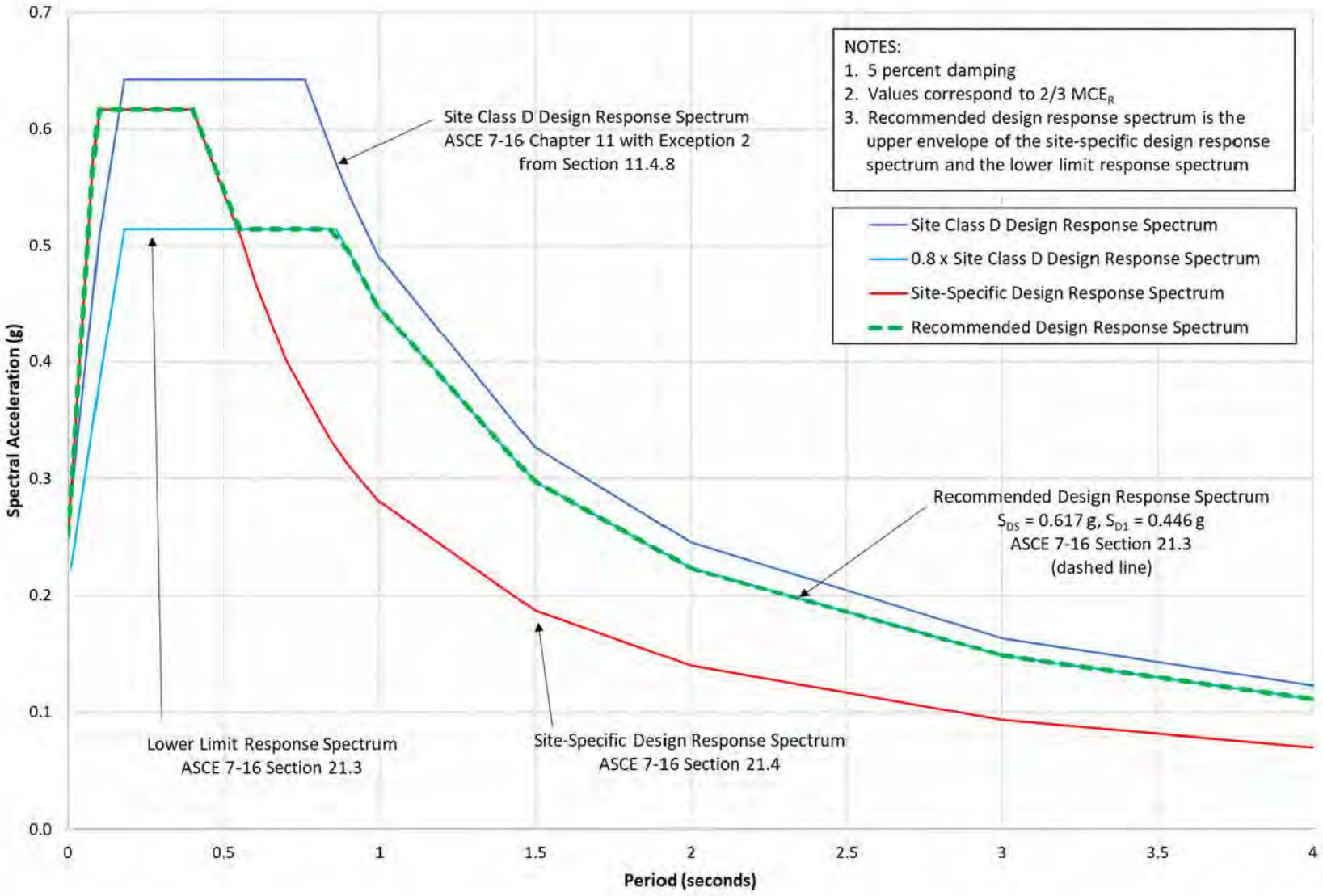
ORDAS-7-01-FG1_G2.docx Print Date: 9/16/20



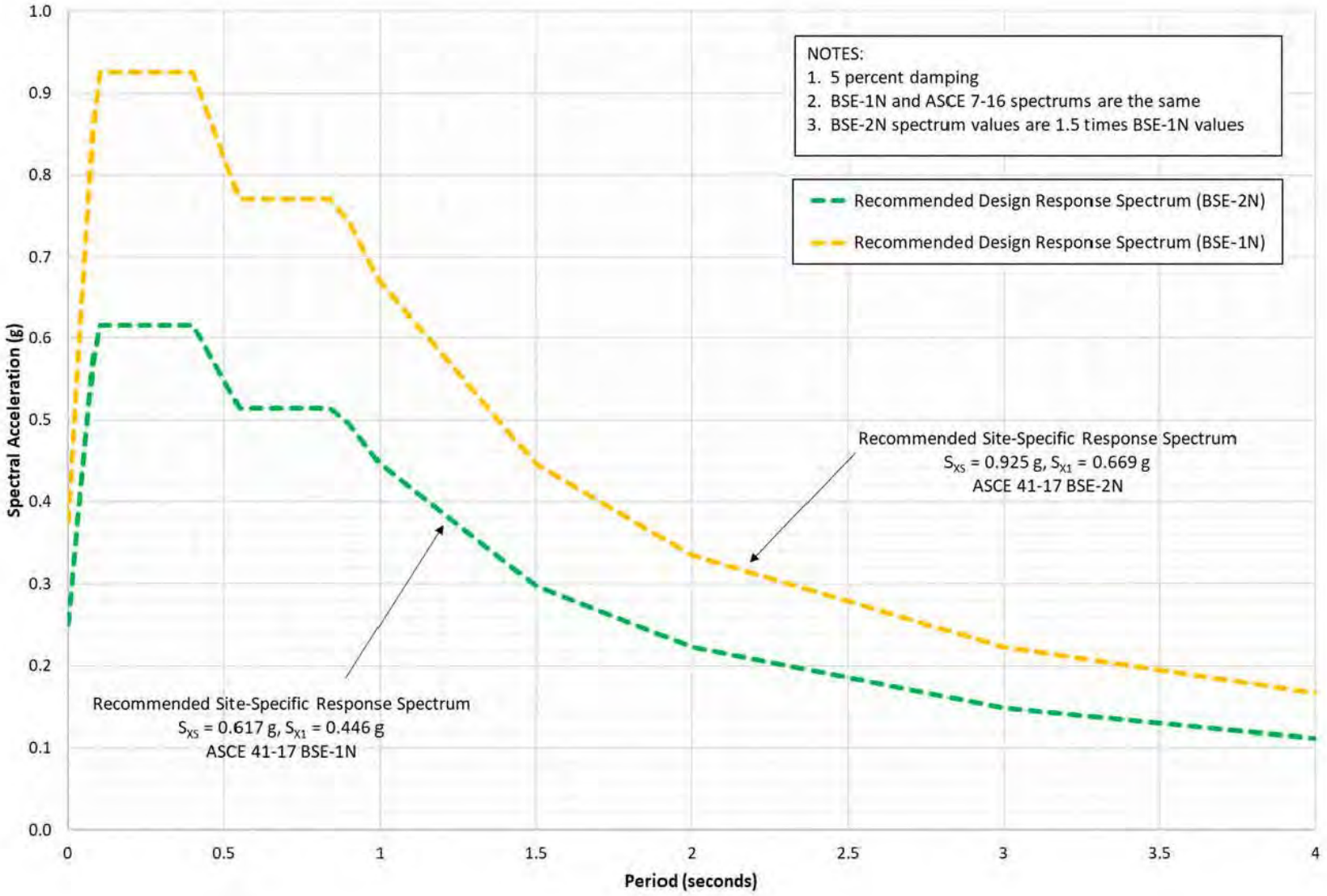
GEODESIGN INC AN NV5 COMPANY	ORDAS-7-01	SITE RESPONSE SPECTRA	
	SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR	FIGURE G-3



GeoDesign Inc. AN NV5 COMPANY	ORDAS-7-01	SITE-SPECIFIC MCE$_R$ RESPONSE SPECTRUM	
	SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR	FIGURE G-4



GEODESIGN INC AN NV5 COMPANY	ORDAS-7-01	RECOMMENDED DESIGN RESPONSE SPECTRUM FOR ASCE 7-16	
	SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR	FIGURE G-5



GEODESIGN INC AN NV5 COMPANY	ORDAS-7-01	RECOMMENDED DESIGN RESPONSE SPECTRA FOR ASCE 41-17	
	SEPTEMBER 2020	DAS NORTH VALLEY COMPLEX WILSONVILLE, OR	FIGURE G-6

INTERFACE ENGINEERING

Flow Test 2

100 SW Main Street, Suite 1600
Portland, OR 97204
TEL 503.382.2266
FAX 503.382.2262
www.interfaceengineering.com

Project Number	2020-0253	**Date**	June 16, 2020
Project Name	City of Wilsonville Hydrant Flow Testing		
To	Dan Carlson	**Phone**	503-570-1557
	City of Wilsonville 29799 SW Town Center Loop E Wilsonville, OR 97070		
From	Jarod Myrick, CET	**@**	Interface Engineering, Inc.
Distribution	Dan Carlson, City of Wilsonville, Ian Eglitis, City of Wilsonville		

Applies To **Fire/Life Safety**

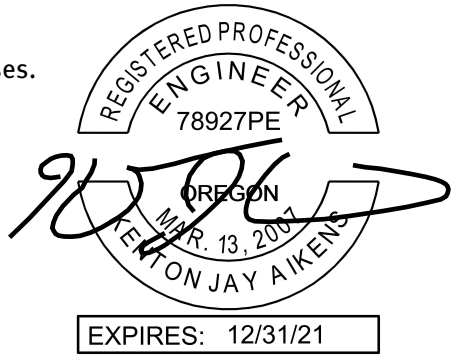
Comments: Flow Test

A hydrant flow test was conducted for the subject project at your request. Test Results are:

Test Date and Time =	06/16/2020 @ 9:10 ☒ AM ☐ PM
Tester Names =	Jarod Myrick, Interface Engineering Sam Kinnaman, City of Wilsonville
Witnesses =	Jerry Anderson, City of Wilsonville.
Test Conducted Per	☒ National Fire Protection Association (NFPA), Recommended Practice #291.
Gauges Calibrations	Certified through February 24, 2021
Pressure Hydrant Location =	SW 95th Ave, #2425
Pressure Hydrant is on a	☒ Circulating Main ☐ Dead-End Main
Flow Hydrant Location =	SW 95th Ave, #2441
Flow Hydrant is on a	☒ Circulating Main ☐ Dead-End Main
Test Static Pressure =	70 psig
Test Residual Pressure =	66 psig
UL Certified Orifice Plate Pressure:	39 psig (Hose Monster)
Test Nozzle =	☒ 1 ea. 4 ½" Hose Monster, C=1.0
Corrected Flow =	2068 gpm
Calculated Available Fire Flow =	Theoretical: 8089 gpm at 20 psi. Contact City of Wilsonville Water Services for system limitations.

National Fire Protection Association (NFPA) Recommended Practice #291: "To obtain satisfactory test results of theoretical calculation of expected flows or rated capacities, sufficient discharge should be achieved to cause a drop in pressure at the residual hydrant of at least 25 percent, or to flow the total demand necessary for fire-fighting purposes."
This test achieved:

☒ Flow of the total demand necessary for fire-fighting purposes.



FIRE PROTECTION WATER SUPPLY CALCULATION

Interface Engineering, Inc.

Project Information

Project No.:	2020-0253 - Test 2
Project Name:	City of Wilsonville Hydrant Flow
Date and Time of Test:	6/16/20 @ 9:10am

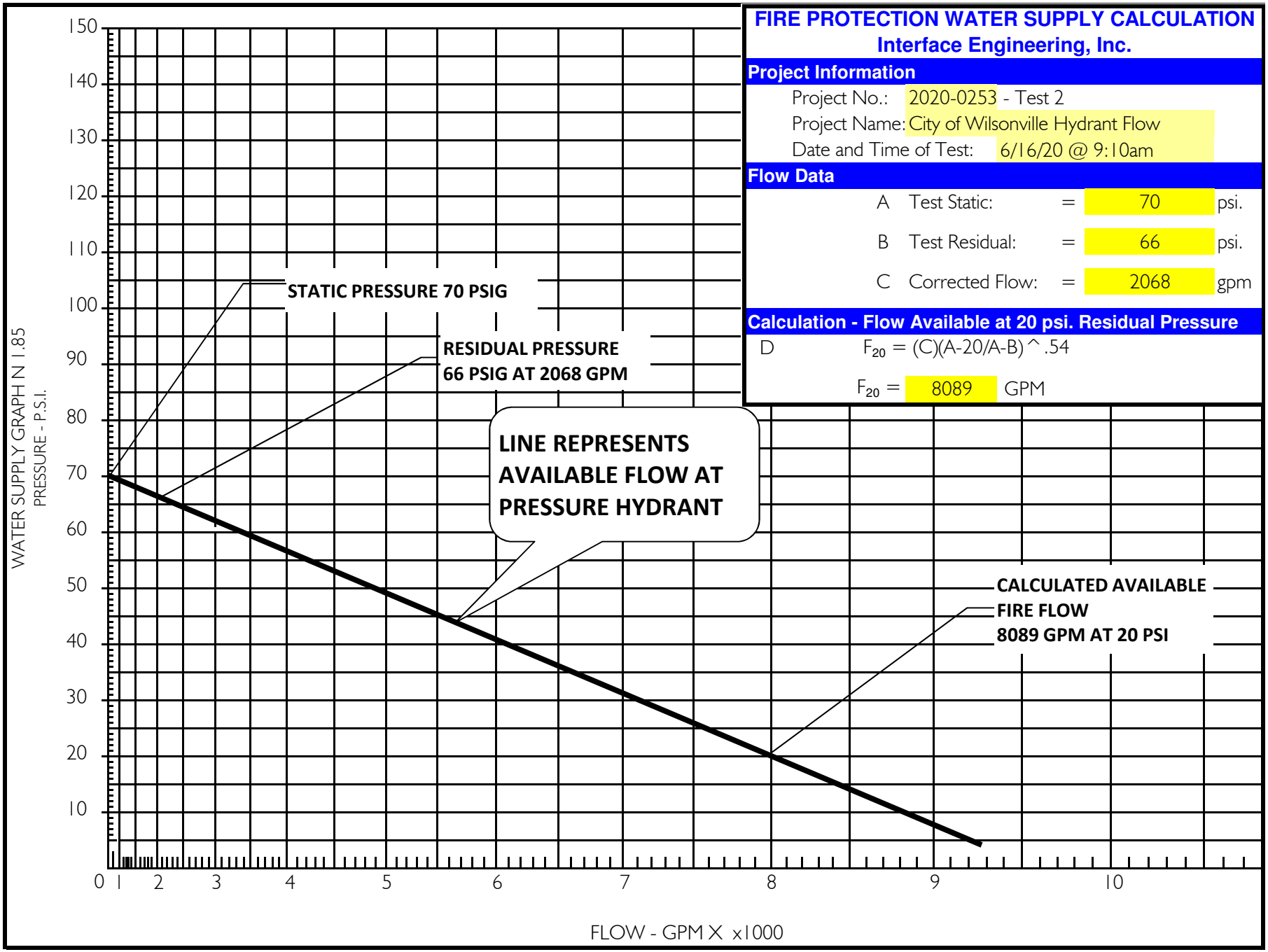
Flow Data

A	Test Static:	=	70	psi.
B	Test Residual:	=	66	psi.
C	Corrected Flow:	=	2068	gpm

Calculation - Flow Available at 20 psi. Residual Pressure

D $F_{20} = (C)(A-20/A-B)^{.54}$

F_{20} = 8089 GPM



Public Pipe | Private Pipe | Valve | Fire Hydrant | XXXX Hydrant Number | 1/3/20

Flow Hydrant:
Flow: 39psi

Pressure Hydrant:
Static: 70
Residual: 66

Rec 21
Hyd 1726
77 Static
74 Residual
2032 GPM
9964 F/20
7/12/00

Rec 70
Hyd 2402
74 Static
72 Residual
1987 GPM
11,780 F/20 (+/-10%)
July 30, 2013

Rec 68
Hyd 2717
72 Static
70 Residual
1250 GPM
7308 F/20
May 2, 2013

Rec 32
Hyd ?
75 Static
65 Residual
1957 GPM
4918 F/20
2/19/03

Rec 84
Hyd 2108
74 Static
68 Residual
1959 GPM
6417 F/20
5/24/17

Rec 46
Hyd 4013
88 Static

Rec 47

Rec 69
Hyd 2732
99 Static
97 Residual
2341 GPM
17,044 F/20 (+/-10%)
July 30, 2013

Parkway Ave
95th Ave
Interstate 5
Nike Access Rd
Freeman Dr
Hillman Ct
Ridder Rd
Kinsman Rd
Boeckman Rd

HOSE MONSTER™

4" & 4 ½" CONNECTION

FLOW CHART

PSI	4" GPM	4 ½" GPM
10		1047
11		1098
12		1147
13		1194
14		1239
15		1282
16		1324
17		1365
18		1405
19		1443
20		1481
21		1517
22		1553
23		1588
24		1622
25		1655
26		1688
27		1720
28		1752
29		1783
30		1813
31		1843
32		1873
33		1902
34		1930
35		1959
36		1986
37		2014
38		2041
39		2068
40		2094
41		2120
42		2146

PSI	4" GPM	4 ½" GPM
43		2171
44		2196
45		2221
46		2245
47		2270
48		2294
49		2317
50		2341
51		2364
52		2387
53		2410
54		2433
55		2455
56		2478
57		2500
58		2521
59		2543
60		2564
61		2586
62		2607
63		2628
64		2649
65		2669
66		2690
67		2710
68		2730
69		2750
70		2770
71		2790
72		2809
73		2829
74		2848
75		2867

The readings on this chart are based on the orifice plate diameter.
It is the user's responsibility to verify that the correct chart and column is being used.

- **4"** Use this column if the connection to the Hose Monster is 4".

- **4 ½"** Use this column if the connection to the Hose Monster is 4 ½".

This chart is FM Approved for flow rate accuracy. Please call us or instruct the Authority Having Jurisdiction to call us if there are any questions. Additional copies of flow charts are available at: www.hosemonster.com

FLOW TEST

HOSE MONSTER COMPANY™

MANUFACTURED BY:
The Hose Monster Company
(888) 202-9987 Toll Free
(847) 434-0073 Fax
Service@FlowTest.com
www.HoseMonster.com

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TERAGAN & ASSOCIATES, INC.
ARBORICULTURAL CONSULTANTS

April 19, 2021

Christopher L. Aston
State of Oregon, O&M Landscape
1240 Ferry St. SE
Salem, OR 97301

RE: Tree Protection Plan for the North Valley Complex Renovation Project

Summary

The State of Oregon is renovating the North Valley Complex at 26755 SW 95th Avenue, Wilsonville, OR 97070. The exterior renovation includes the addition of a fenced-in parking, improved lighting, and improvements to the southwest entrance. A tree inventory resulted in 144 trees on the property, many of which are away from the impacts of development. A total of 26 trees are proposed for removal and 127 trees are proposed to be retained and protected.

Assignment

Assist the State of the Oregon in meeting the tree protection and preservation requirements of the City of Wilsonville tree code: Section 4.610.40, Type C Permit and Section 4.620.00, Tree Relocation, Mitigation or Replacement. This report does not discuss the number or species of new trees proposed for planting, rather it only presents what is required.

Background

A Significant Resource Overlay Zone (SROZ) is located west of the building. The proposed renovations to the building will not impact the SROZ.

Observations

The tree survey was conducted on March 3, 2021. The following information was collected for each tree over 6-inches in diameter at 4.5 above ground level: tree number, common name, botanical, name, DBH, height, canopy spread, health, condition, and pertinent comments. Tree locations were recorded on a survey provided by the State of Oregon. All trees were tagged with aluminum tags that correspond with the tree survey included in this report.

Discussion

Section 4.610.40- Type C Permit

Section 4.610.10.H.1 – Necessary for Construction (3 trees

Trees 80 – 82 are three ornamental cherry trees that are proposed for removal to facilitate exterior improvements to the southwest entrance.

Section 4.610.10.H.2 Damaged, Dead, and Failed Trees (10 trees)

Trees 57, 67 and 94 failed in the February 2021 ice storm. Tree 96 is dead. Trees 6, 49, 68, 87, 93, and 99 were heavily damaged in the February 2021 ice storm.

An additional five (5) trees are recommended for removal due to declining health. Trees 1, 2, 7, 66, and 84 are either outgrowing the soil volume needed for tree growth or are otherwise showing poor incremental growth.

Section 4.610.10.H.3 - Interference of Trees in the ROW (8 trees)
Trees 50-52, 66, 70, 74, 78, 84 are all trees in or adjacent to the right-of-way that was overplanted. The removal of these eight (8) trees is proposed to facilitate the growth of nearby trees in and adjacent to the right-of-way.

Table 1 Summary of Trees proposed for removal.

Code	Trees	Count
Section 4.610.10.H.1 – Necessary for Construction	80-82	3
Section 4.610.10.H.2 Damaged, Dead, and Failed Trees	6, 49, 57, 67, 68, 87, 93, 94, 96, 99	10
Section 4.610.10.H.3 - Interference of Trees in the ROW	50-52, 54, 60, 70, 74, 78	8
Remove for declining health	1, 2, 7, 66, 84	5
	Total:	**26**

Section 4.620.00 Tree Relocation, Mitigation or Replacement
Twenty-six (26) trees are proposed for removal. Of these, 24 are deciduous trees and 2 are evergreen trees. Trees shall be selected and established per the replacement requirements outlined in Section 4.620.00.

Section 4.620.10 Tree Protection During Construction (requirement of a Tree Maintenance and Protection Plan)
No development of new structures or renovations of existing structures is occurring on the north or east sides of the property, hence no tree protection fencing is necessary.

New trees are proposed to be planted west of the sidewalk along SW 95th Ave. These trees are a minimum of 15 feet from the existing trees located between the building and sidewalk. No tree protection fencing should be necessary. No heavy equipment is to sit or track across the east landscape bed and turf area when installing the new trees.

The proposed renovation includes restricting access to several parking spaces in the southeast corner of the existing parking lot. The fence is to be installed inside the curb and over the existing asphalt and will not impact tree roots. Existing trees in the southeast landscape strip shall be protected with tree protection fencing.

The storage of equipment and vehicles will be in the south parking lot. Tree protection fencing is proposed on the south side of the parking lot. Tree protection fencing extends from the southwest corner north along the west perimeter of the parking lot.

Recommendations

Based on the proposed exterior improvements and trees inventoried, I recommend the following:

1. **Removal of 26 trees due to health, construction, or**
2. **Protection of 127 trees.** Trees in the southeast landscape bed, south landscape beds, southwest landscape bed, and west of the parking lot are to be protected with tree protection fencing. See Appendices 3-6 for specifications.

Conclusion

The proposed renovation project is compatible with tree protection measures.

Sincerely,

Christine Johnson

Christine Johnson, MS
ISA Certified Arborist, PN-8730A

Enclosures:

Appendix 1: Certification of Performance
Appendix 2: Assumptions and Limiting Conditions
Appendix 3: Tree Protection Specifications
Appendix 4: Tree Inventory
Appendix 5: Tree Protection Plan
Appendix 6: Tree Protection Signage

Appendix 1: Certification of Performance

I, Christine Johnson, certify:

- That a representative of Teragan & Associates, Inc., has inspected the tree(s) and/or the property referred to in this report. The extent of the evaluation is stated in the attached report.
- That Teragan & Associates, Inc. has no current or prospective interest in the vegetation of the property that is the subject of this report, and Teragan & Associates, Inc. has no personal interest or bias with respect to the parties involved.
- That Teragan & Associates, Inc.'s compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client or any other party, or upon the results of the assessment, the attainment of stipulated results, or the occurrence of any subsequent events.
- That the analysis, opinions, and conclusions that were developed as part of this report have been prepared according to commonly accepted arboricultural practices.
- That a Board-Certified Master Arborist has overseen the gathering of data.

Appendix 2: Assumptions and Limiting Conditions

1. Any legal description provided to the consultant is assumed to be correct. Teragan and Associates, Inc. checked the species identification and tree diameters in the field.
2. It is assumed that this property is not in violation of any codes, statutes, ordinances, or other governmental regulations.
3. The consultant is not responsible for information gathered from others involved in various activities pertaining to this project. Care has been taken to obtain information from reliable sources.
4. Loss or alteration of any part of this delivered report invalidates the entire report.
5. Drawings and information contained in this report may not be to scale and are intended to be used as display points of reference only.
6. The consultants' role is only to make recommendations. Inaction on the part of those receiving the report is not the responsibility of the consultant.
7. This report is to certify the trees that are on site, their size and condition and create a tree plan. Tree plan to include the measures necessary to protect trees that are to be retained during the construction.

Appendix 3: Tree Protection Specifications

It is critical that the following steps be taken to ensure that trees slated for retention are protected.

Before Construction Begins

1. **Notify all contractors of the tree protection procedures.** For successful tree protection on a construction site, all contractors must know and understand the goals of tree protection. It can only take one mistake with a misplaced trench or other action to destroy the future of a tree.
    a. Hold a Tree Protection meeting with all contractors to fully explain goals of tree protection.
    b. Have all sub-contractors sign memoranda of understanding regarding the goals of tree protection. Memoranda to include penalty for violating tree protection plan. Penalty to equal appraised value of tree(s) within the violated tree protection zone per the current Trunk Formula Method as outline by the Council of Tree & Landscape Appraisers current edition of the *Guide for Plant Appraisal*.

2. **Fencing (City of Wilsonville Public Works Standard Drawing R-1155).**
    a. Tree protection fencing is to be put in place before construction begins in order to protect the trees and the soil around the trees from any disturbance. Exception is if trees are to be removed that are located within the tree protection areas (TPA), they should be removed prior to installing the tree protection fencing without the use of mechanized wheeled or tracked equipment.
    b. Fencing is to be placed at the edge of the TPA as shown on the Tree Protection Plan (Appendix 4). TPAs are initially established by the project arborist based on the needs of the site and the tree(s) to be protected and approved by the City's Urban Forester.
    c. Tree protection fencing shall be 6' in height and set at the edge of the dripline, hardscape, or as shown on the Tree Protection Plan.
    d. Fence materials shall consist of a 2" mesh chain links secured to a minimum of 1 ½ diameter steel or aluminum line posts.
    e. Posts shall be set to a depth of no less than 2' in native soil.
    f. Tree protection fencing is to remain in place until the completion of adjacent construction activities. Tree protection fencing is not to be moved without written permission from the project arborist until the end of the project unless otherwise approved by the City's authorized representative.
    g. No equipment shall operate inside the tree protective fencing including during fence installation and removal unless otherwise approved by the project aborist.

3. **Signage.**
    a. All tree protection fencing should have tree protection so that all contractors understand the purpose of the tree protection fencing. See Appendix 6 for signage.
    b. The sign shall be a minimum size of 8.5" x 11".
    c. Signage shall be secured to tree protection fencing with wire ties or plastic zip ties.
    d. Signage shall be placed 42 inches (3.5 ft) above ground and spaced 50 feet apart. Signage mist be clearly visible to contractors and the public.
    e. Signage shall be weather resistant, either laminated in plastic or placed on aluminum sheeting.

During Construction

1. **Protection guidelines within the TPA.**
    a. No traffic shall be allowed within the TPA. No vehicle, heavy equipment, or even repeated foot traffic.
    b. No storage of materials including but not limiting to soil, construction material, or waste from the site.
        i. Waste includes but is not limited to concrete wash out, gasoline, diesel, paint, cleaner, thinners, etc.
    c. Construction trailers are not to be parked / placed within the TPA without written clearance from project arborist.
    d. No vehicles shall be allowed to park within the TPA.
    e. No activity shall be allowed that will cause soil compaction within the TPA.
2. **Tree protection.** Retained trees shall be protected from any cutting, skinning or breaking of branches, trunks or roots.
3. **Root pruning.** Any roots that are to be cut from existing trees that are to be retained, the project consulting arborist shall be notified to evaluate, document, and oversee the proper cutting of roots with sharp cutting tools. Cut roots are to be immediately covered with soil or mulch to prevent them from drying out.
4. **Grade changes**. No grade change should be allowed within the TPA.
5. **Tree protection area changes.** Any necessary deviation of the TPA shall be cleared by the project arborist and approved by the City's Urban Forester.
6. **Watering**. Provide water to trees during the summer months as needed. Tree(s) that will have had root system(s) cut back will need supplemental water to overcome the loss of ability to absorb necessary moisture during the summer months.
7. **Utilities**. Any necessary passage of utilities through the TPA shall be by means of tunneling under roots by hand digging or boring under the supervision of the project arborist.
8. **Reinspection of fencing.** Tree protection fencing is subject to inspection by the City. The project arborist highly recommends monthly inspections of tree protection fencing to ensure compliance with the permit and protection of the trees.

After Construction

1. Fences are to remain standing until the completion of the project.
2. Carefully landscape in the area of the tree. Do not allow trenching or soil rototilling within the TPA. Carefully plant new plants within the TPA. Avoid cutting roots.
3. Do not plan for irrigation within the TPA of existing trees unless it is drip irrigation for a specific planting or cleared by the project arborist.
4. Provide for or ensure that adequate drainage will occur around the retained trees.
5. Pruning of the trees should be completed as one of the last steps of the landscaping process before the final placement of trees, shrubs, ground covers, mulch or turf.
6. Provide for inspection and treatment of insect and disease populations that are capable of damaging the retained trees and plants.
7. Trees that are retained may need to be fertilized as called for by project arborist after final inspection.

TERAGAN & ASSOCIATES, INC.
ARBORICULTURAL CONSULTANTS

Appendix 4: Tree Inventory for North Valley Complex
26755 SW 95th Avenue, Wilsonville, OR 97070

Tree No.	Common Name	Botanical Name	DBH* (in)	Height (ft)	Spread (ft)	Condition**	Structure**	Remove or Retain	Comments
1	Cherry	*Prunus serrulata*	12	20	15	Fair	Fair	Remove - Declining health	Diameter measured at 3.75' AGL; dead and crossing branches; decay on SW side of trunk; water sprouts.
2	Cherry	*Prunus sertulata*	15	25	20	Fair	Fair	Remove - Declining health	Diameter at 3' AGL; water sprouts; crossing branches; touching building.
3	Hawthorn	*Crataegus sp.*	7	10	10	Good	Fair	Retain	Diameter at 3.5' AGL; topped; weak branch attachments; unbalanced canopy to the W.
4	Hawthorn	*Crataegus sp.*	12	10	15	Good	Fair	Retain	Topped; crossing branches.
5	Hawthorn	*Crataegus sp.*	11	10	15	Good	Fair	Retain	Topped; crossing branches.
6	Japanese maple	*Acer palmatum*	16	20	30	Poor	Poor	Remove - Damaged	Multistem: 7,6,6,3,4,5,6; storm damage; four leaders have decay present; unbalanced canopy with storm damage.
7	Japanese maple	*Acer palmatum*	12	15	15	Fair	Poor	Remove - Declining health	Multistem: 6,6,5,5,5; inclusion; decay or wound on every leader; some storm damage in upper canopy.
8	Western redcedar	*Thuja plicata*	20	50	30	Good	Good	Retain	Codominant leaders: 16,13.
9	Western redcedar	*Thuja plicata*	18	50	30	Good	Good	Retain	
10	Japanese maple	*Acer palmatum*	12	30	25	Good	Good	Retain	Multistem: 6,8,6,3; some storm damage in upper canopy.
11	Western redcedar	*Thuja plicata*	21	50	25	Good	Good	Retain	Codominant leaders:17,13.
12	Western redcedar	*Thuja plicata*	18	50	25	Good	Good	Retain	
13	Western redcedar	*Thuja plicata*	16	50	25	Good	Good	Retain	
14	Japanese maple	*Acer palmatum*	11	25	15	Good	Fair	Retain	Multistem: 7,7,4,4; inclusions; unbalanced to the E.
15	Western redcedar	*Thuja plicata*	22	50	20	Good	Good	Retain	Codominant leaders: 16,15.
16	Western redcedar	*Thuja plicata*	15	50	20	Good	Good	Retain	
17	Western redcedar	*Thuja plicata*	17	50	20	Good	Good	Retain	Multistem: 13,8,8.
18	Western redcedar	*Thuja plicata*	17	50	25	Good	Good	Retain	
19	Western redcedar	*Thuja plicata*	16	50	15	Good	Good	Retain	
20	Western redcedar	*Thuja plicata*	15	45	15	Good	Good	Retain	Fused leaders; diameter measured at 1.25' AGL.
21	Western redcedar	*Thuja plicata*	14	50	20	Good	Good	Retain	Two leaders: 13,6.
22	Western redcedar	*Thuja plicata*	16	50	15	Good	Good	Retain	Codominant leaders:12,11.
23	Japanese maple	*Acer palmatum*	14	30	20	Good	Good	Retain	Multistem: 8,7,6,5,4,3; unbalanced to the SE.
24	Colorado blue spruce	*Picea pungens*	13	40	15	Good	Good	Retain	
25	Colorado blue spruce	*Picea pungens*	14	40	15	Good	Good	Retain	
26	Colorado blue spruce	*Picea pungens*	12	40	15	Good	Good	Retain	
27	Western redcedar	*Thuja plicata*	8	35	15	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
28	Western redcedar	*Thuja plicata*	11	40	20	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
29	Western redcedar	*Thuja plicata*	12	40	20	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
30	Western redcedar	*Thuja plicata*	11	40	20	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
31	Western redcedar	*Thuja plicata*	10	35	15	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
32	Western redcedar	*Thuja plicata*	15	45	25	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
33	Western redcedar	*Thuja plicata*	12	40	20	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
34	Western redcedar	*Thuja plicata*	15	45	20	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
35	Colorado blue spruce	*Picea pungens*	10	30	10	Good	Good	Retain	
36	Colorado blue spruce	*Picea pungens*	12	35	20	Good	Good	Retain	
37	Western redcedar	*Thuja plicata*	12	35	15	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
38	Western redcedar	*Thuja plicata*	12	35	15	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
39	Western redcedar	*Thuja plicata*	10	35	15	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
40	Western redcedar	*Thuja plicata*	13	35	15	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
41	Western redcedar	*Thuja plicata*	13	35	20	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
42	Colorado blue spruce	*Picea pungens*	11	35	20	Good	Good	Retain	
43	Western redcedar	*Thuja plicata*	8	25	15	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
44	Western redcedar	*Thuja plicata*	14	35	20	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
45	Western redcedar	*Thuja plicata*	10	30	15	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
46	Western redcedar	*Thuja plicata*	12	35	20	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
47	Western redcedar	*Thuja plicata*	11	35	20	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
48	Western redcedar	*Thuja plicata*	14	35	25	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
49	Red maple	*Acer rubrum*	8	15	10	Poor	Poor	Remove - Damaged	Diameter measured at 3.5' AGL; storm damage; heavily unbalanced to NW; lean to NW.
50	Maple	*Acer saccharum*	10	25	20	Good	Good	Client Request for Removal - Interference	
51	Maple	*Acer saccharum*	12	25	20	Good	Good	Client Request for Removal - Interference	Surface root damage; pruned away from lamp to W.
52	Maple	*Acer saccharum*	12	25	25	Good	Good	Client Request for Removal - Interference	6' N of sidewalk; 3.5' W of electric; diameter measured at 4' AGL.
53	Maple	*Acer saccharum*	14	25	15	Good	Fair	Retain	Three leaders at 7'; active decay; wood borer holes.
54	Western redcedar	*Thuja plicata*	12	25	20	Good	Good	Client Request for Removal - Interference	Some discoloration/yellowing foliage in upper canopy.
55	Western redcedar	*Thuja plicata*	10	25	20	Good	Good	Retain	Some discoloration/yellowing foliage in upper canopy.
56	Western redcedar	*Thuja plicata*	13	35	20	Fair	Good	Retain	Some discoloration/yellowing foliage in upper canopy, more so than others in the planted stand.
57	Unknown	Unknown	0	n/a	n/a	Dead	Dead	Remove - Dead	Failed; uprooted.
58	Maple	*Acer saccharum*	6	20	15	Good	Fair	Retain	Codominant leaders at 6.
59	Western redcedar	*Thuja plicata*	11	35	20	Fair	Good	Retain	Some discoloration/yellowing foliage in upper canopy, more so than others in the planted stand.
60	Western redcedar	*Thuja plicata*	13	35	20	Poor	Good	Client Request for Removal - Interference	Declining health; brown and yellowing foliage.

Appendix 4: Tree Inventory for North Valley Complex
26755 SW 95th Avenue, Wilsonville, OR 97070

Tree No.	Common Name	Botanical Name	DBH* (in)	Height (ft)	Spread (ft)	Condition**	Structure**	Remove or Retain	Comments
61	Western redcedar	*Thuja plicata*	17	35	20	Good	Good	Retain	Three leaders:11,8,11; some discoloration and yellowing foliage in upper canopy.
62	Western redcedar	*Thuja plicata*	15	35	20	Good	Good	Retain	Two leaders:13,8; some discoloration and yellowing foliage in upper canopy.
63	Western redcedar	*Thuja plicata*	13	30	20	Good	Good	Retain	Some discoloration and yellowing foliage in upper canopy.
64	Western redcedar	*Thuja plicata*	16	35	20	Good	Good	Retain	Some discoloration and yellowing foliage in upper canopy.
65	Maple	*Acer saccharum*	11	25	15	Good	Good	Retain	
66	Maple	*Acer saccharum*	10	20	10	Very poor	Poor	Remove - Declining health	Blackened and missing bark on lower trunk; boring holes; little to no new growth.
67	Unknown	Unknown	0	n/a	n/a	Dead	Dead	Remove - Dead	Failed; uprooted.
68	Maple	*Acer saccharum*	14	20	25	Poor	Poor	Remove - Damaged	Storm damage, unbalanced canopy.
69	Maple	*Acer saccharum*	17	25	25	Good	Fair	Retain	Diameter at 3.75'; Four leaders at 5'; crossing branches; blackened bark on lower trunk; borer holes.
70	Maple	*Acer saccharum*	13	25	25	Good	Fair	Client Request for Removal - Interference	Blackened bark on lower trunk; borer holes; surface root damage.
71	Western redcedar	*Thuja plicata*	17	35	20	Good	Good	Retain	Three leaders:12,9,8.
72	Western redcedar	*Thuja plicata*	14	35	20	Good	Good	Retain	Two leaders:13,6.
73	Western redcedar	*Thuja plicata*	21	35	20	Good	Good	Retain	Diameter measured at 0.5' AGL; three fused leaders.
74	Maple	*Acer saccharum*	15	25	20	Fair	Fair	Client Request for Removal - Interference	Diameter at 3.5' AGL; large inclusion on S side; wound wood and cracked bark.
75	Western redcedar	*Thuja plicata*	16	35	15	Good	Good	Retain	Two leaders: 14,8; sapsuckers.
76	Western redcedar	*Thuja plicata*	16	35	20	Good	Good	Retain	
77	Western redcedar	*Thuja plicata*	16	35	20	Good	Good	Retain	
78	Maple	*Acer saccharum*	16	30	20	Good	Good	Client Request for Removal - Interference	Slight unbalance to NW.
79	Maple	*Acer saccharum*	13	25	20	Good	Fair	Retain	Inclusions; crossing branches; burls.
80	Cherry	*Prunus serrulata*	8	10	10	Poor	Very poor	Client Request for Removal - Development - Structure	Two leaders: 6,5; decayed leaders; lean to the E.
81	Cherry	*Prunus serrulata*	10	15	10	Good	Fair	Client Request for Removal - Development - Structure	Two leaders:8,6; dead branches; unbalanced to the E; water sprouts.
82	Cherry	*Prunus serrulata*	12	25	20	Good	Good	Client Request for Removal - Development - Structure	
83	Maple	*Acer saccharum*	15	20	20	Good	Good	Retain	Diameter at 4' AGL, branch inclusions; cable and telecommunications nearby.
84	Maple	*Acer saccharum*	16	20	20	Poor	Very poor	Remove - Declining health	Missing bark on S side; will decline; inclusions; cracked bark; dead leaders
85	Maple	*Acer saccharum*	15	25	25	Fair	Fair	Retain	Diameter at 4' AGL; wound on south side of trunk; inclusions.
86	Western redcedar	*Thuja plicata*	12	35	20	Good	Good	Retain	Three leaders: 8,8,4.
87	Green ash	*Fraxinus pennsylvanica*	10	30	25	Poor	Poor	Remove - Damaged	Lost 75% of canopy on storm.
88	Western redcedar	*Thuja plicata*	15	35	30	Good	Good	Retain	Multistem: 9,8,7,6,3.
89	Western redcedar	*Thuja plicata*	13	35	25	Good	Good	Retain	Two leaders: 12,6.
90	Red maple	*Acer rubrum*	9	25	20	Good	Good	Retain	
91	Western redcedar	*Thuja plicata*	12	25	15	Poor	Good	Retain	Brown foliage; in decline.
92	Green ash	*Fraxinus pennsylvanica*	14	30	25	Good	Good	Retain	
93	Green ash	*Fraxinus pennsylvanica*	15	30	20	Poor	Poor	Remove - Damaged	Lost over 50% of canopy in storm.
94	Unknown	Unknown	0	n/a	n/a	Dead	Dead	Remove - Dead	Failed; uprooted.
95	Green ash	*Fraxinus pennsylvanica*	19	30	30	Good	Good	Retain	
96	Green ash	*Fraxinus pennsylvanica*	7	n/a	n/a	Dead	Dead	Remove - Dead	
97	Western redcedar	*Thuja plicata*	17	35	25	Fair	Good	Retain	Codominant leaders: 13,11; browning and thinning foliage.
98	Western redcedar	*Thuja plicata*	12	35	25	Poor	Good	Retain	Browning and thinning foliage.
99	Green ash	*Fraxinus pennsylvanica*	12	25	25	Poor	Poor	Remove - Damaged	Lost over 50% of canopy to storm.
100	Douglas fir	*Pseudotsuga menziesii*	12	30	25	Good	Good	Retain	
101	Green ash	*Fraxinus pennsylvanica*	20	35	30	Good	Good	Retain	
102	Western redcedar	*Thuja plicata*	17	35	25	Fair	Good	Retain	Slight browning of foliage in upper canopy.
103	Douglas fir	*Pseudotsuga menziesii*	7	15	10	Good	Good	Retain	
104	Western redcedar	*Thuja plicata*	9	20	10	Good	Good	Retain	
105	Western redcedar	*Thuja plicata*	14	30	25	Fair	Good	Retain	Slight browning of foliage.
106	Western redcedar	*Thuja plicata*	19	30	25	Fair	Good	Retain	Three leaders: 14,10,8; slight browning of foliage.
107	Western redcedar	*Thuja plicata*	8	25	30	Good	Good	Retain	Three leaders: 6,5,3.
108	Red maple	*Acer rubrum*	12	25	25	Good	Good	Retain	
109	Red maple	*Acer rubrum*	11	20	20	Fair	Fair	Retain	Cracked bark at tree base.
110	Red maple	*Acer rubrum*	11	20	20	Fair	Fair	Retain	Cracked bark at trunk base and up trunk.
111	Red maple	*Acer rubrum*	13	25	20	Good	Good	Retain	
112	Red maple	*Acer rubrum*	14	25	25	Good	Good	Retain	Heavy sapsuckers at 6'.
113	Red maple	*Acer rubrum*	14	25	25	Good	Good	Retain	
114	Red maple	*Acer rubrum*	13	25	25	Good	Good	Retain	
115	Western redcedar	*Thuja plicata*	~15	30	30	Good	Good	Retain	
116	Northern red oak	*Quercus rubra*	22	40	35	Good	Good	Retain	
117	Northern red oak	*Quercus rubra*	19	40	35	Good	Good	Retain	
118	Western redcedar	*Thuja plicata*	13	35	25	Good	Good	Retain	Two leaders: 12,6.

Appendix 4: Tree Inventory for North Valley Complex
26755 SW 95th Avenue, Wilsonville, OR 97070

Tree No.	Common Name	Botanical Name	DBH* (in)	Height (ft)	Spread (ft)	Condition**	Structure**	Remove or Retain	Comments
119	Western redcedar	*Thuja plicata*	20	35	25	Good	Good	Retain	Two leaders: 8,~18
120	Northern red oak	*Quercus rubra*	19	40	30	Good	Good	Retain	
121	Western redcedar	*Thuja plicata*	~13	40	25	Good	Good	Retain	
122	Douglas fir	*Pseudotsuga menziesii*	~28	70	40	Poor	Poor	Retain	Dead branches; thinning foliage.
123	Douglas fir	*Pseudotsuga menziesii*	~30	65	40	Good	Good	Retain	
124	Douglas fir	*Pseudotsuga menziesii*	~36	80	50	Good	Good	Retain	
125	Giant Seqouia	*Sequoiadendron giganteum*	~28	45	25	Good	Good	Retain	
126	Douglas fir	*Pseudotsuga menziesii*	16	45	30	Good	Good	Retain	
127	Douglas fir	*Pseudotsuga menziesii*	20	40	30	Good	Good	Retain	
128	Giant Seqouia	*Sequoiadendron giganteum*	9	20	15	Good	Good	Retain	
129	Douglas fir	*Pseudotsuga menziesii*	17	45	30	Good	Good	Retain	
130	Giant Seqouia	*Sequoiadendron giganteum*	30	50	30	Good	Good	Retain	
131	Douglas fir	*Pseudotsuga menziesii*	45	80	40	Good	Good	Retain	
132	Douglas fir	*Pseudotsuga menziesii*	44	80	40	Good	Good	Retain	
133	Willow	*Salix sp.*	18	30	25	Good	Good	Retain	
134	Willow	*Salix sp.*	13	25	20	Fair	Poor	Retain	Two leaders: 7,11; unbalanced to the E.
135	Douglas fir	*Pseudotsuga menziesii*	44	80	40	Good	Good	Retain	
136	Bigleaf maple	*Acer macrophyllum*	23	30	30	Fair	Fair	Retain	Lean to NE; deadwood.
137	Incense cedar	*Calocedrus decurrens*	26	60	40	Good	Fair	Retain	Multiple leaders at 20'.
138	Bigleaf maple	*Acer macrophyllum*	34	50	40	Good	Fair	Retain	
139	Incense cedar	*Calocedrus decurrens*	27	60	30	Good	Good	Retain	Craggy and burled growth.
140	Incense cedar	*Calocedrus decurrens*	9	20	15	Good	Poor	Retain	Failed tree leaning on upper canopy.
141	Incense cedar	*Calocedrus decurrens*	25	50	30	Good	Good	Retain	
142	Bigleaf maple	*Acer macrophyllum*	27	45	25	Good	Fair	Retain	Unbalanced to the N.
143	Incense cedar	*Calocedrus decurrens*	10	25	10	Poor	Fair	Retain	Suppressed.
144	Incense cedar	*Calocedrus decurrens*	23	60	25	Good	Good	Retain	
145	Incense cedar	*Calocedrus decurrens*	19	65	30	Good	Good	Retain	
146	Incense cedar	*Calocedrus decurrens*	30	70	40	Good	Good	Retain	NW corner tree.
147	Incense cedar	*Calocedrus decurrens*	40	70	50	Good	Good	Retain	S of 146; codominant leaders: 28,28.
148	Incense cedar	*Calocedrus decurrens*	27	75	45	Good	Good	Retain	
149	Bigleaf maple	*Acer macrophyllum*	39	60	50	Good	Fair	Retain	Codininant leaders; diameter measured at 1' AGL; burls at trunk base; deadwood.
150	Bigleaf maple	*Acer macrophyllum*	25	55	35	Good	Good	Retain	
151	Bigleaf maple	*Acer macrophyllum*	~30	55	45	Fair	Fair	Retain	Odd growth at trunk base; deadwood.
152	Douglas fir	*Pseudotsuga menziesii*	43	60	50	Fair	Poor	Retain	Conks at ~20; hard lean S; failed and regrown.
153	Western redcedar	*Thuja plicata*	8	n/a	n/a	Dead	Dead	Retain	This tree is in a natural area and does not need to be removed.

*** DBH** is diameter measured at the industry standard of 4.5-feet above ground level.
** Tree health condition and structure ratings are **Good**, **Fair**, **Poor**, **Very poor**, and **Dead**.
AGL, Above Ground Level

NORTH VALLEY COMPLEX RESTORATION
WILSONVILLE, OREGON

CIVIL DESIGN REVIEW

MARCH 2021

Appendix 5: Tree Protection Plan

Tree Protection Plan Prepared by: Teragan & Associates, Inc.;
Christine Johnson, ISA Certified Arborist, PN-8730A
Date Prepared: 04/19/2020
Plan Provided By: Christopher Aston, DAS Enterprise Asset Management
NOTE: TERAGAN & ASSOCIATES, INC. ADDED TREES THAT WERE NOT SHOWN.

TREE LEGEND

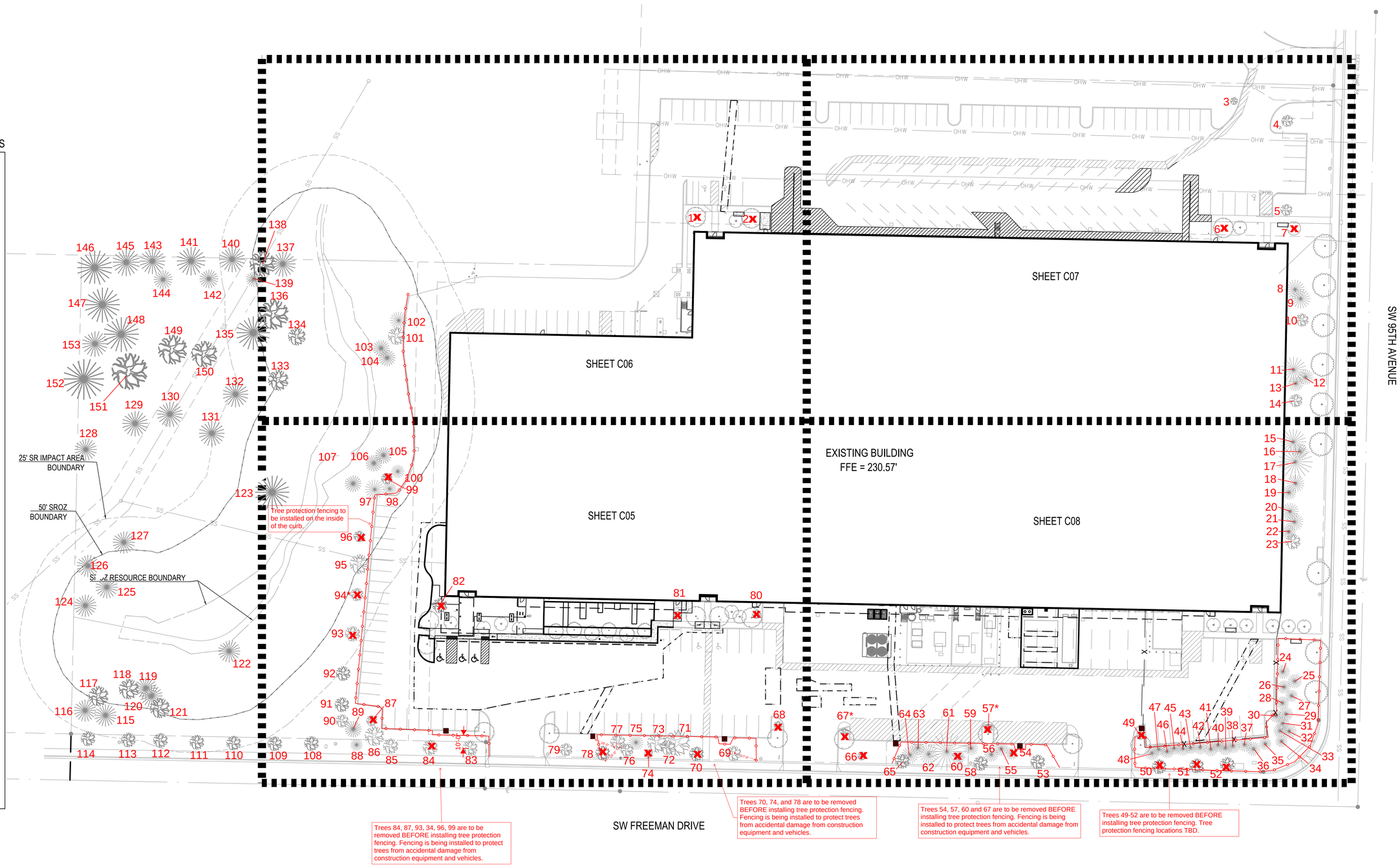
- # TREE NO.
- X TREE PROPOSED FOR REMOVAL
- TREE PROTECTION FENCING
- PROPOSED LAMP POSTS

SHEET INDEX

PROPOSED / NEW LEGEND AND ABBREVIATIONS

AC	ASPHALT CONCRETE
ADA	AMERICANS WITH DISABILITIES ACT
APPROX	APPROXIMATELY
BC	BOTTOM OF CURB
BPA	BONNEVILLE POWER ADMINISTRATION
BWALL	BOTTOM OF WALL
CONST	CONSTRUCT
CP	CONTROL POINT
DS	DOWNSPOUT
EA	EACH
EG	EXISTING GRADE
EL	ELEVATION
ESMT	EASEMENT
EX	EXISTING
FFE	FINISH FLOOR ELEVATION
FG	FINISH GRADE
FL	FLOWLINE
FT	FOOT/FEET
FS	FINISHED SURFACE
GB	GRADE BREAK
GPS	GLOBAL POSITIONING SYSTEM
L	LENGTH
LF	LINEAR FEET
ME	MATCH EXISTING
MH	MANHOLE
MEP	MECHANICAL ELECTRICAL PLUMBING
MIN	MINIMUM
PERF	PERFORATED
PCC	PORTLAND CEMENT CONCRETE
PL	PROPERTY LINE
PUE	PUBLIC UTILITY EASEMENT
PVMT	PAVEMENT
R	RADIUS
ROW	RIGHT OF WAY
S	SLOPE
SF	SQUARE FEET
SROZ	SIGNIFICANT RESOURCE OVERLAY ZONE
STD	STANDARD
SWP	STORMWATER PLANTER
TC	TOP OF CURB
TP	TOP OF PAVEMENT
TYP	TYPICAL
TW	TOP OF WALK
TWALL	TOP OF WALL

- SAWCUT LINE
- NEW CURB
- 8"SD STORM DRAIN (SD)
- CO CLEAN OUT (CO)
- AD AREA DRAIN (AD)
- VTCO VERTICAL TRANSITION CLEAN OUT (VCO)
- GB GRADE BREAK
- TP 32.56' SPOT ELEVATION
- OVERLAND DRAINAGE DIRECTION



SERA

North Valley Complex Renovation
Design Review Package
04 March, 2021

PLAN SCALE
30 0 15 30 60
1 INCH = 30 FT.

N

JTE
Janet Turner Engineering, LLC

REGISTERED PROFESSIONAL ENGINEER
OREGON
JANET L. TURNER
EXPIRATION DATE: 06/30/22
PRELIMINARY

CIVIL COVER SHEET/KEY PLAN **C04**

VEGETATION/TREE PROTECTION ZONE

DO NOT REMOVE OR ADJUST THIS FENCING.
THE FENCE LOCATIONS ARE APPROVED TO PROTECT VEGETATION AND TREES.

Please contact the Code Enforcement Specialist and project arborist, if alterations to the approved location of the protection fencing are needed.

TERAGAN & ASSOCIATES, INC.
ARBORICULTURAL CONSULTANTS

Project Arborist: TERAGAN & ASSOCIATES, INC 503-697-1975
Date of Tree Protection Plan: 04/19/2021

City of Wilsonville
Industrial Pretreatment Program
29799 SW Town Center Loop E,
Wilsonville, OR 97070

Industrial & Commercial Environmental Survey

The City of Wilsonville (the City) is required by the federally mandated Pretreatment Program (40 CFR 403.8(f)(2)), to develop and implement procedures that:

1. Identify and locate all possible industrial and commercial users which might be subject to federal pretreatment categorical regulations.
2. Characterize the type and volume of pollutants contributed to the POTW by the industrial and commercial users as identified under (1) above.

By completing this survey, you are helping the City complete its requirements.

Confidential Information

As outlined in 40 CFR 403.14 (a)-(c) and ORS 192.430, any information submitted to the City under the Pretreatment Program requirements may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission in the matter prescribed on the application form or instructions, or, in the case of other submissions, by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of the submission, the City may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with the procedures in 40 CFR part 2 (public information) and ORSE 192.440(2).

Hazardous Materials

40 CFR 403.-12(p)(1) specifies that an Industrial User (IU) shall notify the POTW of any discharge into the POTW of a substance, which, if otherwise disposed of, would be a hazardous waste under 40 CFR 261. If the IU discharges more than 100 kilograms of such waste per calendar month to the POTW, the notification shall also contain information to the extent such information is known and readily available to the IU.

For information about Resource Conservation and Recovery Act (RCRA) hazardous waste, contact the Oregon Department of Environmental Quality at (503)229-5615 or (503)229-5165.

Contact:

If at any time you require additional assistance, please contact the City's Pretreatment Program:

Mia Pan, Industrial Pretreatment Coordinator
30000 SW Town Center Loop E.
Wilsonville, OR 97070
503-570-1551
mpan@ci.wilsonville.or.us

Instructions

Section A

- Enter the legal name of the company—i.e., the name of the company legally responsible for this facility.
- Enter the name of the facility, such as the name used on letterhead, correspondence or advertising brochures.
- Enter the street address where the facility is located.
- Enter the mailing address of the facility, if different from the facility street address above.
- Enter the name, title, telephone number and email address of the person who is most familiar with the facts reported on this form and who can be contacted by City staff.
- Check the appropriate box indicating type of facility. If facility type is strictly business office or retail, or combination, proceed to Section G. If facility type is strictly distribution, or combination of distribution, business office or retail, proceed to Section E. If the facility type is manufacturing/production, continue with Section B.

Section B

1. Check the appropriate box. If you are uncertain whether this facility is connected to the City of Wilsonville's sanitary sewer system, check your water billing statement for sewer charges, or contact the City's Building Department at 503-682-4960 for sewer connection information.
    a. Check the appropriate box.
    b. Enter the approximate month and year for sewer connection.
2. Check the appropriate box. If you are uncertain whether this facility is connected to the City of Wilsonville's water system, check your water billing statement or contact the City's Building Department at 503-682-4960 for information.
    a. Check the appropriate box. List three of your account number(s) in order of total volume used, with the largest first.
3. Check the appropriate box. If other, please specify.

Section C

1. Check the box for each day of the week the facility conducts business.
2. Indicate the number of hours per day that the facility conducts business.
3. Supply the requested information for all industrial or commercial activity done at the facility.
4. Enter the approximate month and year that operations began, or are proposed to begin.
5. Check the appropriate box.
    a. Check the appropriate box.
    b. Check the appropriate box. A continuous discharge is described as an uninterrupted flow, while a batch discharge is the controlled discharge of a discrete volume of wastewater for a limited duration.
    c. Check the appropriate box.
    d. Estimate the amount of wastewater discharged per day (gallons).

Instructions continued

e. Check the appropriate box.
f. If wastewater is treated before discharge, describe pretreatment processes.

Section D

1. Check the appropriate box. (For questions 1 through 5).

6. Check the appropriate box. If you discharge a listed or a characteristic hazardous waste that is subject to the provisions of the RCRA into the City's sewer collection system, you must complete the RCRA Hazardous Waste Information questionnaire.

Section E

1. Check the appropriate box(es). Parking lot run-off includes paved and concreted areas, but excludes graveled areas. If Other, list all flows other than stormwater that flows to a storm sewer. A storm sewer is any sewer pipe conveyance not draining to a sewage treatment plant but draining to a creek, stream, river, pond or other surface water.
2. Check the appropriate box(es). On-site infiltration systems may include, but are not limited to, dry wells, soakage trenches, water quality ponds, etc.
3. Check the appropriate box.
    a. If applicable, describe activities.
4. Check the applicable box(es).
    a. Check the applicable box(es), indicating the number of each type in use on site. If Other, provide the information as requested.
    b. Check the applicable box(es).
    c. Check the appropriate box(es). If Other, describe how wash water is discharged.
5. Check the appropriate box.
    a. If applicable, check appropriate box.
6. Check all that apply.
    a. Check the applicable box(es), indicating the number of each type serviced on site. If Other, please indicate type of equipment and amount.
    b. Check appropriate box.
    c. Check appropriate box.
    d. If applicable, describe disposal methods.
7. Check appropriate box.
    a. If applicable, check appropriate box. If Other, explain.

Section F

1. Check appropriate box.
    a. If applicable, check appropriate box.

Section G

Sign and date survey, then return either via enclosed paid postage envelope or by email to mpan@ci.wilsonville.or.us

Section A. General Information

Legal Name: Department of Administrative Services

Facility Name: North Valley Complex Business Registry No.:_____

Facility Address: 26755 SW 95th Ave., Wilsonville, OR 97070

Mailing Address: 26755 SW 95th Ave., Wilsonville, OR 97070

Questionnaire Resource:

Contact Person: Nicole Holt

Contact Title: Project Architect Phone: 503.444.7384

Email: nicoleh@seradesign.com

Contact Affiliation:

Company Representative

Consultant, Name of Firm: SERA Architects

Facility Type:

- [x] Business Office
- [ ] Retail
- [ ] Distribution
- [x] Manufacturing/Production (Laboratory)

If facility type is strictly business office or retail, or combination, proceed to **Section G.** If facility type is strictly distribution, or combination of distribution, business office or retail, proceed to **Section E.** If the facility type is not applicable to the above, continue with **Section B.** If the facility type is manufacturing/production, continue with full survey.

Section B. Water Use & Service

1. Is this facility connected to the City of Wilsonville's sanitary sewer system? [x] Y [ ] N
   a. If No, are there plans to connect? [ ] Y [ ] N
   b. If Yes, to 1a, above, indicate when: (Month/Year)

      _____
2. Does this facility receive water or sewer billing statements from the City? [x] Y [ ] N
   a. If Yes, list the water account number(s) with the largest water use volume:

      Account No.:_____

      Account No.:_____

      Account No.:_____

(NO) 3. Does this facility have any non-City sources of water? ☐ Well ☐ Rain Harvest

a. If other, please specify:_____

Section C. Business Activity

1. Days per week of operation:

☑ Mon ☑ Tue ☑ Wed ☑ Thur ☑ Fri ☐ Sat ☐ Sun

2. Hours per day of operation:

☑ 8 ☐ 10 ☐ 12 ☐ 16 ☐ 24 ☐ Other:_____

3. Please check off category of business activities or processes conducted at this facility:

☐ Food or Beverage Production
☐ Medical, Dental, Veterinary, or Chiropractic
☐ Organic Chemical Manufacturing
☐ Inorganic Chemical Manufacturing
☐ Battery Manufacturing
☐ Cement Manufacturing/Paving & Roofing Materials
☐ Electrical & Electrical Component Manufacturing
☐ Glass Manufacturing
☐ Metal Manufacturing/Metal Forming/Metal Finishing (Eletroplating, Eletroless Plating, Anodizing, Coating, Chemical Etching or Milling, or Printed Circuit Board Manufacturing) If unsure, please see https://www.epa.gov/eg/industrial-effluent-guidelines
☐ Industrial Laundry
☐ Pain or Ink Formulating
☐ Plastics Molding & Forming
☐ Rubber Manufacturing or Extrusion
☐ Soap & Detergent Manufacturing
☐ Transportation Equipment Cleaning
☐ Hauled Waste Treatment
☐ Petroleum or Chemical Storage
☑ Other (explain): Chemical & Microbiological Analytical Testing

List SIC or NAICS Code(s) that apply:

_____

4. Enter date production began or will begin at this facility (Month/Day/Year:

11/23/2023

5. Does your facility generate any process wastewater, excluding domestic wastewater?

☑ Yes ☐ No

a) If Yes, is this wastewater discharged to the City's sewer system? ☑ Yes ☐ No

b) If wastewater is discharged is it continuous or batch?

☐ Continuous ☑ Batch

c) If Yes to 5a, please check off all types of wastewater generated at this facility.

☐ Non-Contact Cooling Water
☐ Contact Cooling Water
☐ Recycled Washwater
☑ ~~Boiler/~~Cooling Tower Blowdown
☐ Air Pollution Control Equipment
☐ Stormwater to Sanitary Sewer
☐ Equipment/Facility Washdown, describe:

_____

☐ Process Water, describe processes that generate wastewater:

_____

_____

d) Estimated Volume (gallons per day): TBD

e) Is this wastewater treated prior to discharge? ☐ Yes ☑ No

f) If Yes to 5e, above, briefly describe treatment process/equipment:

_____

Section D. Material Storage

1. Do you use or store liquid chemicals? ☑ Yes ☐ No
2. Do you use or store dry chemicals? ☑ Yes ☐ No
3. Do you have floor drains in manufacturing or storage areas? ☐ Yes ☑ No
4. Do you use or store materials, chemicals, products, equipment, or waste materials outside? ☐ Yes ☑ No
5. Does this facility have a current, written spill contingency plan? ☐ Yes ☑ No
6. Do you discharge hazardous waste to the sanitary sewer as defined by EPA? ☐ Yes ☑ No

   a) If Yes, complete the following:

Hazardous Waste Information Questionnaire

Facility EPA Identification Number: _____

Name of Waste:	EPA Hazardous Waste Number:	Disposal Method:

_____

_____

_____

_____

Section E. Stormwater Management

1. Indicate which of the following drains to a storm sewer system:

☑ Parking Lot Run-off ☐ Floor Drains ☑ Roof Drains ☐ Other:_____

2. If stormwater from this facility does not drain to a City sewer system, does the stormwater drain:

☑ Directly to a Drainage Way ☐ To an on-site infiltration system ☐ Other:_____

3. Does stormwater come in contact with any material handling activities or equipment, raw materials, intermediate products, by-products, waste materials, or industrial machinery at this facility? ☑ Yes ☐ No

   a. If Yes, briefly describe the activities:

   utility yard contains a generator surrounded by containment curb with oil/water separator

4. Check all that apply:

   a. Equipment or vehicles used on site. Indicate the number in use:

   ☑ Fork Lifts____ ☑ Trucks____ ☐ Tractors____ ☐ Cranes____ ☐ Other (specify):

   _____

   b. Equipment or vehicle cleaning:

   ☐ Onsite ☑ Offsite ☐ Cleaned by Facility ☐ Mobile Cleaning Service

   c. Wash water discharge:

   ☐ Sanitary Sewer ☐ Storm Sewer ☑ Taken offsite ☐ 100% recycle

   ☐ Other (specify): _____

5. Does this facility have an oi/water separator or a grease trap on the drainage line? ☑ Yes ☐ No

   a. If Yes, does the oil/water separator or grease trap discharge to:

   ☐ Sanitary Sewer ☑ Storm Sewer ☐ Do Not Know

6. Check all that apply:

   a. Equipment or vehicles serviced on site. Indicate the number serviced:

   ☐ Fork Lifts____ ☐ Trucks____ ☐ Tractors____ ☐ Cranes____ ☑ Other (specify):

   no vehicles serviced on site

   b. Mobile services used? ☐ Yes ☑ No

c. Where are services performed? ☐ Inside ☐ Outside

d. Describe how you dispose of used oil, steam cleaning waste, antifreeze, or other wastes:
N/A

7. Do you have ongoing groundwater remediation on site? ☐ Yes ☑ No

a. If Yes, remediated groundwater is discharged to:

☐ Sanitary Sewer ☐ Storm Sewer ☐ Do Not Know ☐ Other (specify): _____

Section F. Miscellaneous Information

1. Are expansion plans scheduled within the next three years? ☐ Yes ☑ No

a. If Yes, check the appropriate box(es) concerning expansion plans:

☐ Add new Product(s) ☐ Same Product, Add Capacity ☐ Expand Current Facility

☐ New Facility

Section G. Sign and Date Survey

You have completed the *Industrial and Commercial Environmental Survey*

Sign and return this survey to the Public Works Department, Industrial Pretreatment Program

Hand deliver:

City of Wilsonville
Public Works
ATTN: Mia Pan
30000 SW Town Center Loop E,
Wilsonville, OR 97070

Mail:

City of Wilsonville
Public Works
ATTN: Mia Pan
29799 SW Town Center Loop E,
Wilsonville, OR 97070

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information, the information submitted, is to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. [40 CFR 403.6(a)(2)(ii)] This certification is to be signed by on the Responsible Corporate Official, Business Owner, or Production Manager as per 40 CFR 403.12(l)(1) (e.g. the president, treasurer, vice president, general partner, or sole proprietor of the facility).

_____ _____
Print Name & Job Title Telephone Number

_____ _____
Signature Date Signed

LABORATORIES SUMMARY

Q. What type of laboratory operations are conducted (medical, research, analytical)?

This facility is for analytical testing.

Q. Which areas have water and/or chemical discharges?

All lab areas have water. Chemical discharges will be limited to acid solutions as all solvents should be collected and not enter the drain system. For acids we have a point-of-use neutralizers at designated sinks within each lab to provide treatment prior to entering the sanitary sewer system.

Q. What are operations generating waste stream?

ODA

- Sample processing - ethanol or ethanol denatured with isopropyl alcohol
- Performing PCR - ethanol
- Laboratory testing - spent/used media, sharps containers with biohazardous sharp materials and samples
- Microbiological analyses – autoclaved liquids and solids
- Pesticide analyses (HPLCs) – solvents
- Inorganic analyses – acids and bases

OSHA

- High Performance Liquid Chromatography (HPLCs) - solvents
- Gas Chromatography (GCs) – solvent waste
- Silica sample preparation – solvent waste
- Chemical inventory – a wide variety of expired chemicals
- Microscopic analysis of asbestos – bulk asbestos containing material
- Atomic Absorption Spectrometry (AA) – Inorganic acids diluted in water – neutralized
- Ion Chromatography (IC) – primarily potassium hydroxide and ammonium sulfate/ammonium hydroxide buffers in water

Q. Is any wet chemistry performed?

Yes

Q. Which areas use solvents in their processes?

Primarily OSHA and ODA Regulatory Lab Services (RLS) and Animal Health Lab (AHL). The Plant Health Lab (PHL) and Insect Pest Prevention and Management (IPPM) have minimal solvent use.

Q. Is routine glassware washed or disposed.

Yes, it is washed.

Q. Any glassware acid washed?

Yes.

Q. Discharge to sanitary sewer?

The discharge enters the lab waste system and will be treated at a point-of-use neutralizer prior to entering the sanitary sewer.

Q. How are spent or contaminated chemicals handled?

Liquid acids and bases are diluted and neutralized prior to going down designated sinks with water. Any chemical with cradle to grave documentation requirements is collected and consolidated for pickup by a waste contractor for proper disposal.

ODA

- Solvent waste (Halogenated and Non-Halogenated) - Clean Earth, 1701 E Alexander Ave., Tacoma, WA 98421
- Expired chemicals, reagents, inorganic fertilizers, and some samples - Metro Central Hazardous Waste Facility, 6161 NM 61st Ave., Portland, OR 97210
- Biological waste (not autoclaved) - Stericycle, 1032 NE Dunbar Ave., Troutdale, OR 97060

OSHA

- Clean Harbors Environmental Services - 16540 SE 130th Avenue, Clackamas, OR

Q. Routine washdown of work area?

A routine wipe down occurs to maintain a clean environment. Depending on the activities, cleaning would range from daily to weekly. Floors and common areas will be cleaned at least weekly by DAS custodial staff. Shared spaces will be cleaned after each use using 5% bleach or 70% ETOH depending on the area. Household cleaners will also used.

Specialty Areas:

- Perchloric acid fume hood – built in wash down system rinses hood with water every 2 months
- PCR work area – wiped down with ELIMINase
- Micro counters – wiped down with 70% ethanol solution or 300 ppm bleach solution
- Chemistry counters – wiped down with acetone, isoproplyalcohol or methanol

Q. Are there radioactive materials present?

Analysis is not performed on radioactive materials, but OSHA's labs do have radioactive sources in some of their instruments which require licensing. These instruments are the 2 electron capture detectors (ECDs) in their gas chromatography systems as well as a license for the x-ray in our X-ray Diffractometer (XRD).

TVF&R COMPLIANCE LETTER

Tualatin Valley Fire & Rescue

www.tvfr.com

June 15, 2021

Cindy Luxhoj
AICP, Associate Planner
City of Wilsonville
29799 SW Town Center Loop East
Wilsonville, OR 97070

Re: FD Land Use Review- North Valley Complex Renovation
Tax Lot I.D: 31W11 01903

Cindy,

Thank you for the opportunity to review the proposed land use application for the North Valley Complex renovation. After reviewing the proposed application, the Fire District has no conditions to add. Fire access and water supplies remain unchanged.

If you have questions or need further clarification, please feel free to contact me at **503-519-1057.**

Sincerely,

Jason Arn

Jason Arn
Deputy Fire Marshal II

Email jason.arn@tvfr.com

Cc: File

A full copy of the New Construction Fire Code Applications Guide for Commercial and Multi-Family Development is available at http://www.tvfr.com/DocumentCenter/View/1296

Command & Business Operations Center and North Operating Center
11945 SW 70th Avenue
Tigard, Oregon 97223-9196
503-649-8577

South Operating Center
8445 SW Elligsen Road
Wilsonville, Oregon
97070-9641
503-259-1500

Training Center
12400 SW Tonquin Road
Sherwood, Oregon
97140-9734
503-259-1600

REPUBLIC SERVICES COMPLIANCE LETTER

REPUBLIC SERVICES

10295 Southwest Ridder Road Wilsonville, OR 97070
o 503.570.0626 f 503.582.9307 republicservices.com

July 9, 2021

Nicole Holt

Re: North Valley Complex
26755 SW 95th Ave.
Wilsonville, OR 97070

Dear Nicole,

Thank you, for sending us the preliminary site plans for this proposed Renovation in Wilsonville OR.

My Company: Republic Services of Clackamas and Washington Counties has the franchise agreement to service this area with the City of Wilsonville. We will provide complete commercial waste removal and recycling services as needed on a weekly basis for this location

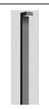
We have completed a site visit to determine Solid waste and Recycling serviceability of the existing 40-yard and 30-yard compactors that you have proposed to move from loading bays 2,3 and position at loading bays 4,5. This position shift will reduce the alignment footage for our trucks to service the compactor that will be placed at loading bay 5, due to the landscape curbing that is immediately South of the loading bay. To remedy this alignment issue, we will require the 40-yard compactor be placed at door 4, and the 30-yard compactor placed at door 5, as it is considerably shorter and will allow our trucks to access the unit for service as communicated via email on 7/7/2021. We determined there are no other Solid waste and Recycling serviceability issues at this location.

Thank you, Nicole, for your help and concerns for our services prior to this project being developed.

Sincerely,

Kelly Herrod
Operations Supervisor
Republic Services Inc.

EXTERIOR LUMINAIRE SCHEDULE

FIXTURE TYPE	IMAGE	PRODUCT DESCRIPTION	BASIS OF DESIGN MANUFACTURER	SIZE	INPUT WATTS	LAMP SOURCE	POWER SUPPLY	INPUT VOLTAGE	FINISH	MOUNTING	NOTES	ALTERNATE MANUFACTURER(S)
S1A		LED AREA LUMINAIRE, TYPE 3 MEDIUM DISTRIBUTION. MOUNT TO SSS POLE. *Parking*	LITHONIA DSX0	26" L X 13" W X 3" H - 25' OVERALL MH	71W	LED 8,559 LUMENS 5000K	INTEGRAL ELECTRONIC 0-10V DIMMING TO 1%	MVOLT	STANDARD PER ARCHITECTURAL	25' POLE	SEE STRUCTURAL FOR POLE BASE DETAILS	OR PRE APPROVED
S1B		LED AREA LUMINAIRE, TYPE 4 DISTRIBUTION, HOUSE-SIDE SHIELD, EXTERNAL GLARE SHIELD. MOUNT TO SSS POLE. *Parking, Area of Safe Dispersal*	LITHONIA DSX0	26" L X 13" W X 3" H - 25' OVERALL MH	71W	LED 7,013 LUMENS 5000K	INTEGRAL ELECTRONIC 0-10V DIMMING TO 1%	MVOLT	STANDARD PER ARCHITECTURAL	25' POLE	SEE STRUCTURAL FOR POLE BASE DETAILS	OR PRE APPROVED
S1C		LED AREA LUMINAIRE, TYPE 5 DISTRIBUTION. MOUNT TO SSS POLE. *Service Yard*	LITHONIA DSX0	26" L X 13" W X 3" H - 14' OVERALL MH	38W	LED 4,953 LUMENS 5000K	INTEGRAL ELECTRONIC 0-10V DIMMING TO 1%	MVOLT	STANDARD PER ARCHITECTURAL	14' POLE	SEE STRUCTURAL FOR POLE BASE DETAILS	OR PRE APPROVED
S2A		LED WALL AREA SCONCE, FORWARD THROW DISTRIBUTION *Building Exterior*	LITHONIA WDGE4 LED	25" W X 10" D X 9" H	123W	LED 18,327 LUMENS 5000K	INTEGRAL ELECTRONIC 0-10V DIMMING	MVOLT	STANDARD PER ARCHITECTURAL	WALL SURFACE - ~25' SEE NOTE	MOUNT FIXTURE AT LOCATION OF DEMOLISHED WALL PACK, WHERE POSSIBLE.	OR PRE APPROVED
S2B		LED WALL AREA SCONCE, TYPE 2 DISTRIBUTION *Building Exterior*	LITHONIA WDGE4 LED	25" W X 10" D X 9" H	77W	LED 12,125 LUMENS 5000K	INTEGRAL ELECTRONIC 0-10V DIMMING	MVOLT	STANDARD PER ARCHITECTURAL	WALL SURFACE - ~25' SEE NOTE	MOUNT FIXTURE AT LOCATION OF DEMOLISHED WALL PACK, WHERE POSSIBLE.	OR PRE APPROVED
S3		NOT USED										
S4		SURFACE MOUNT TAPE LIGHT, ALUMINUM EXTRUSION, CONTINUOUS FROSTED LENS. UL LISTED WET LOCATION. *Main Entry*	KELVIX ZACH 409 WITH PERFORMANCE 400 DIRECT VIEW RUBBER COATED TAPE	18MM W X 13 MM D X LENGTH AS SHOWN	5.2W/FT	LED 400 LUMENS/FT 5000K	REMOTE ELECTRONIC 0-10V DIMMING	24VDC TAPE/MVOLT DRIVER	STANDARD	SURFACE MOUNT AT BOTTOM OF CANOPY STRUCTURE - ~22'-6"	AIMED STRAIGHT DOWN	OR PRE APPROVED
S5		SURFACE MOUNT TAPE LIGHT, ALUMINUM EXTRUSION, CONTINUOUS FROSTED LENS. UL LISTED WET LOCATION. *Awnings*	KELVIX ZACH 409 WITH PERFORMANCE 200 DIRECT VIEW RUBBER COATED TAPE	18MM W X 13 MM D X LENGTH AS SHOWN	2.6W/FT	LED 200 LUMENS/FT 5000K	REMOTE ELECTRONIC 0-10V DIMMING	24VDC TAPE/MVOLT DRIVER	STANDARD	SURFACE MOUNT AT UNDERSIDE OF AWNING - ~10'-0"	AIMED STRAIGHT DOWN	OR PRE APPROVED
S6		8" LED RETROFIT DOWNLIGHT *Secondary Entries*	COOPER HALO LCR8	9" DIA X 4.23" D	34W	LED 3000 LUMENS 5000K	INTEGRAL ELECTRONIC 0-10V DIMMING	MVOLT	STANDARD	RECESSED AT EXISTING DOWNLIGHT LOCATIONS - ~8'-0"		OR PRE APPROVED
S7		SURFACE MOUNT ADJUSTABLE LANDSCAPE LIGHT WITH 10 DEGREE DISTRIBUTION AND FULL SNOOT. *Main Entry*	ECOSENSE RISE	2.6" SQ X 4.7" L	12W	LED 744 LUMENS 5000K	INTEGRAL ELECTRONIC 0-10V DIMMING	MVOLT	STANDARD PER ARCHITECTURAL	SURFACE MOUNT TO COLUMN - ~22'-6"	AIMED 20 DEGREES ABOVE NADIR (STRAIGHT DOWN)	OR PRE APPROVED
S8		SURFACE MOUNT PARKING GARAGE/AREA LIGHT *Loading Canopy*	LITHONIA VCPG	19" D X 3.75" H	27W	LED 3,917 LUMENS 5000K	INTEGRAL ELECTRONIC 0-10V DIMMING	MVOLT	STANDARD PER ARCHITECTURAL	SURFACE MOUNT TO UNDERSIDE OF CANOPY ~13'-7"		OR PRE APPROVED
S9		ADJUSTABLE INGRADE WITH INTERIOR HEXCELL LOUVER, ANTI-SLIP GLASS AND DOUBLE LENS *Flagpole*	HYDREL M9400C	10" DIA	10W	LED 1,200 LUMENS 5000K	INTEGRAL ELECTRONIC 0-10V DIMMING	MVOLT	STANDARD PER ARCHITECTURAL	INGRADE	AIMED STRAIGHT UP	OR PRE APPROVED
S10		SURFACE MOUNT FLEXIBLE LED STRIP LIGHT WITH 15X40 DEGREE OPTICS. UL LISTED WET LOCATION. *Entry Awing Washer*	ECOSENSE TROV FLEX	.72" W X .374" H X LENGTH AS SHOWN	5W/FT	LED 441 LUMENS/FT 5000K	REMOTE ELECTRONIC 0-10V DIMMING	MVOLT	STANDARD PER ARCHITECTURAL	SURFACE MOUNT BELOW ENTRY CANOPY ~9'-6"	AIMED 90 DEGREES ABOVE NADIR. FULLY SHIELDED BY ENTRY CANOPY.	OR PRE APPROVED
S11		LED WALL AREA SCONCE, TYPE 2 DISTRIBUTION *Building Exterior*	LITHONIA WDGE2 LED	11.5" X 7" X 9"H	10W	LED 2,000 LUMENS 5000K	INTEGRAL ELECTRONIC 0-10V DIMMING	MVOLT	STANDARD PER ARCHITECTURAL	WALL SURFACE ~10'-0"	MOUNT FIXTURE AT LOCATION OF DEMOLISHED WALL PACK, WHERE POSSIBLE.	OR PRE APPROVED
S12		LED AREA LUMINAIRE, SINGLE HEAD ASYMETRIC, WIDE BEAM *Main Entry*	BEGA 99072	9-1/2" W X 12-1/2" D X 14' TO TOP	30W	LED 851 LUMENS 5000K	INTEGRAL ELECTRONIC 0-10V DIMMING	MVOLT	STANDARD PER ARCHITECTURAL	14' POLE		OR PRE APPROVED

D-Series Size 0
LED Area Luminaire

Catalog Number

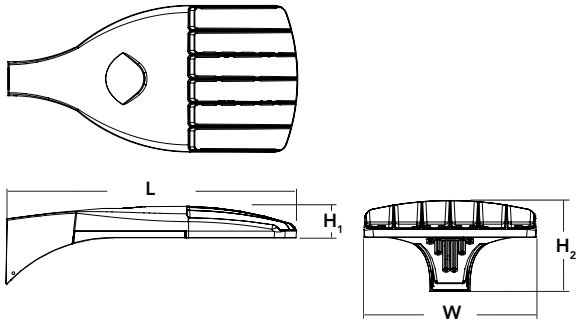
Notes

Type

Hit the Tab key or mouse over the page to see all interactive elements.

Specifications

EPA:	0.95 ft² (.09 m²)
Length:	26" (66.0 cm)
Width:	13" (33.0 cm)
Height$_1$:	3" (7.62 cm)
Height$_2$:	7" (17.8 cm)
Weight (max):	16 lbs (7.25 kg)



Introduction

The modern styling of the D-Series is striking yet unobtrusive - making a bold, progressive statement even as it blends seamlessly with its environment. The D-Series distills the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire.

The outstanding photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. It is ideal for replacing up to 400W metal halide with typical energy savings of 70% and expected service life of over 100,000 hours.

Ordering Information

EXAMPLE: DSX0 LED P6 40K T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

DSX0 LED

Series
DSX0 LED

LEDs
Forward optics
P1 P5
P2 P6
P3 P7[1]
P4[1]
Rotated optics
P10[2] P12[2]
P11[2] P13[1,2]

Color temperature
30K 3000 K
40K 4000 K
50K 5000 K

Distribution
T1S Type I short (Automotive)
T2S Type II short
T2M Type II medium
T3S Type III short
T3M Type III medium
T4M Type IV medium
TFTM Forward throw medium
T5VS Type V very short[3]
T5S Type V short[3]
T5M Type V medium[3]
T5W Type V wide[3]
BLC Backlight control[4]
LCCO Left corner cutoff[4]
RCCO Right corner cutoff[4]

Voltage
MVOLT (120V-277V)[5,6]
XVOLT (277V-480V)[7,8,9]
120[6]
208[6]
240[6]
277[6]
347[6]
480[6]

Mounting
Shipped included
SPA Square pole mounting
RPA Round pole mounting[10]
WBA Wall bracket[3]
SPUMBA Square pole universal mounting adaptor[11]
RPUMBA Round pole universal mounting adaptor[11]
Shipped separately
KMA8 DDBXD U Mast arm mounting bracket adaptor (specify finish)[12]

Control options
Shipped installed
NLTAIR2 nLight AIR generation 2 enabled[13,14]
PIRHN Network, high/low motion/ambient sensor[15]
PER NEMA twist-lock receptacle only (control ordered separate)[16]
PER5 Five-pin receptacle only (control ordered separate)[16,17]
PER7 Seven-pin receptacle only (leads exit fixture) (control ordered separate)[16,17]
DMG 0-10V dimming extend out back of housing for external control (control ordered separate)[18]
PIR High/low, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 5fc[19,20]
PIRH High/low, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 5fc[19,20]
PIR1FC3V High/low, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 1fc[19,20]
PIRH1FC3V High/low, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 1fc[19,20]
FAO Field adjustable output[21]

Other options
Shipped installed
HS House-side shield[22]
SF Single fuse (120, 277, 347V)[6]
DF Double fuse (208, 240, 480V)[6]
L90 Left rotated optics[2]
R90 Right rotated optics[2]
DDL Diffused drop lens[22]
HA 50°C ambient operations[1]
Shipped separately
BS Bird spikes[23]
EGS External glare shield

Finish *(required)*
DDBXD Dark bronze
DBLXD Black
DNAXD Natural aluminum
DWHXD White
DDBTXD Textured dark bronze
DBLBXD Textured black
DNATXD Textured natural aluminum
DWHGXD Textured white

Ordering Information

Accessories

Ordered and shipped separately.

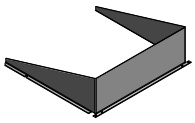
DLL127F 1.5 JU	Photocell - SSL twist-lock (120-277V) [24]
DLL347F 1.5 CUL JU	Photocell - SSL twist-lock (347V) [24]
DLL480F 1.5 CUL JU	Photocell - SSL twist-lock (480V) [24]
DSHORT SBK U	Shorting cap [24]
DSX0HS 20C U	House-side shield for P1,P2,P3 and P4 [22]
DSX0HS 30C U	House-side shield for P10,P11,P12 and P13 [22]
DSX0HS 40C U	House-side shield for P5,P6 and P7 [22]
DSX0DDL U	Diffused drop lens (polycarbonate) [22]
PUMBA DDBXD U*	Square and round pole universal mounting bracket adaptor (specify finish) [25]
KMA8 DDBXD U	Mast arm mounting bracket adaptor (specify finish) [12]
DSX0EGS (FINISH) U	External glare shield

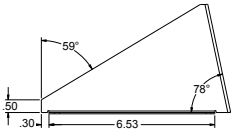
For more control options, visit DTL and ROAM online. Link to nLight Air 2

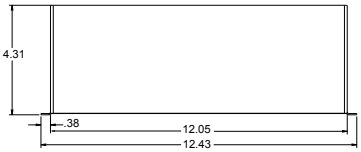
NOTES

1 HA not available with P4, P7, and P13.
2 P10, P11, P12 and P13 and rotated options (L90 or R90) only available together.
3 Any Type 5 distribution with photocell, is not available with WBA.
4 Not available with HS or DDL.
5 MVOLT driver operates on any line voltage from 120-277V (50/60 Hz).
6 Single fuse (SF) requires 120V, 277V or 347V. Double fuse (DF) requires 208V, 240V or 480V. XVOLT not available with fusing (SF or DF).
7 XVOLT only suitable for use with P4, P7 and P13.
8 XVOLT operates with any voltage between 277V and 480V.
9 XVOLT not available with fusing (SF or DF) and not available with PIR, PIRH, PIR1FC3V, PIRH1FC3V.
10 Suitable for mounting to round poles between 3.5" and 12" diameter.
11 Universal mounting brackets intended for retrofit on existing pre-drilled poles only. 1.5 G vibration load rating per ANCI C136.31. Only usable when pole's drill pattern is NOT Lithonia template #8.
12 Must order fixture with SPA mounting. Must be ordered as a separate accessory; see Accessories information. For use with 2-3/8" diameter mast arm (not included).
13 Must be ordered with PIRHN.
14 Sensor cover available only in dark bronze, black, white and natural aluminum colors.
15 Must be ordered with NLTAIR2. For more information on nLight Air 2 visit this link.
16 Photocell ordered and shipped as a separate line item from Acuity Brands Controls. See accessories. Shorting Cap included.
17 If ROAM® node required, it must be ordered and shipped as a separate line item from Acuity Brands Controls. Shorting Cap included.
18 DMG not available with PIRHN, PER5, PER7, PIR, PIRH, PIR1FC3V or PIRH1FC3V, FAO.
19 Reference Controls Options table on page 4.
20 Reference Motion Sensor Default Table on page 4 to see functionality.
21 Not available with other dimming controls options.
22 Not available with BLC, LCCO and RCCO distribution.
23 Must be ordered with fixture for factory pre-drilling.
24 Requires luminaire to be specified with PER, PER5 or PER7 option. See Controls Table on page 4.
25 For retrofit use only. Only usable when pole's drill pattern is NOT Lithonia template #8

EGS – External Glare Shield

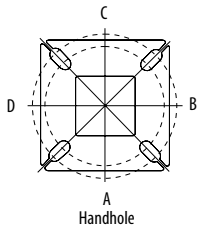


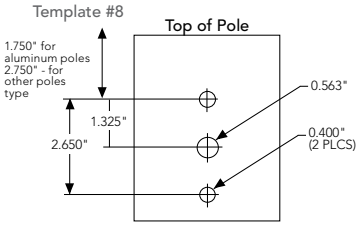




Drilling

HANDHOLE ORIENTATION
(from top of pole)





Tenon Mounting Slipfitter

Tenon O.D.	Mounting	Single Unit	2 @ 180	2 @ 90	3 @ 90	3 @120	4 @ 90
2-3/8"	RPA	AS3-5 190	AS3-5 280	AS3-5 290	AS3-5 390	AS3-5 320	AS3-5 490
2-7/8"	RPA	AST25-190	AST25-280	AST25-290	AST25-390	AST25-320	AST25-490
4"	RPA	AST35-190	AST35-280	AST35-290	AST35-390	AST35-320	AST35-490

Mounting Option	**Drilling Template**	**Single**	**2 @ 180**	**2 @ 90**	**3 @ 90**	**3 @ 120**	**4 @ 90**
Head Location		Side B	Side B & D	Side B & C	Side B, C & D	Round Pole Only	Side A, B, C & D
Drill Nomenclature	#8	DM19AS	DM28AS	DM29AS	DM39AS	DM32AS	DM49AS
		Minimum Acceptable Outside Pole Dimension					
SPA	#8	2-7/8"	2-7/8"	3.5"	3.5"		3.5"
RPA	#8	2-7/8"	2-7/8"	3.5"	3.5"	3"	3.5"
SPUMBA	#5	2-7/8"	3"	4"	4"		4"
RPUMBA	#5	2-7/8"	3.5"	5"	5"	3.5"	5"

DSX0 Area Luminaire - EPA

*Includes luminaire and integral mounting arm. Other tenons, arms, brackets or other accessories are not included in this EPA data.

Fixture Quantity & Mounting Configuration	Single DM19	2 @ 180 DM28	2 @ 90 DM29	3 @ 90 DM39	3 @ 120 DM32	4 @ 90 DM49
Mounting Type						
DSX0 LED	0.950	1.900	1.830	2.850	2.850	3.544

D-Series Size 0
LED Area Luminaire

Catalog Number

Notes

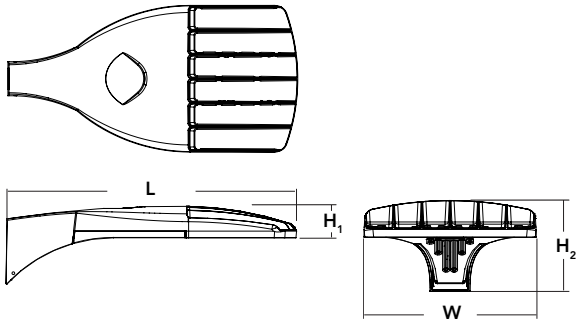
Type

Hit the Tab key or mouse over the page to see all interactive elements.

d#series

Specifications

EPA:	0.95 ft² (.09 m²)
Length:	26" (66.0 cm)
Width:	13" (33.0 cm)
Height$_1$:	3" (7.62 cm)
Height$_2$:	7" (17.8 cm)
Weight (max):	16 lbs (7.25 kg)



Introduction

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The outstanding photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. It is ideal for replacing up to 400W metal halide with typical energy savings of 70% and expected service life of over 100,000 hours.

Ordering Information

EXAMPLE: DSX0 LED P6 40K T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

DSX0 LED

Series
DSX0 LED

LEDs
Forward optics
P1 P5
P2 P6
P3 P7[1]
P4[1]
Rotated optics
P10[2] P12[2]
P11[2] P13[1,2]

Color temperature
30K 3000 K
40K 4000 K
50K 5000 K

Distribution
T1S Type I short (Automotive)
T2S Type II short
T2M Type II medium
T3S Type III short
T3M Type III medium
T4M Type IV medium
TFTM Forward throw medium
T5VS Type V very short[3]
T5S Type V short[3]
T5M Type V medium[3]
T5W Type V wide[3]
BLC Backlight control[4]
LCCO Left corner cutoff[4]
RCCO Right corner cutoff[4]

Voltage
MVOLT (120V-277V)[5,6]
XVOLT (277V-480V)[7,8,9]
120[6]
208[6]
240[6]
277[6]
347[6]
480[6]

Mounting
Shipped included
SPA Square pole mounting
RPA Round pole mounting[10]
WBA Wall bracket[3]
SPUMBA Square pole universal mounting adaptor[11]
RPUMBA Round pole universal mounting adaptor[11]
Shipped separately
KMA8 DDBXD U Mast arm mounting bracket adaptor (specify finish)[12]

Control options
Shipped installed
NLTAIR2 nLight AIR generation 2 enabled[13,14]
PIRHN Network, high/low motion/ambient sensor[15]
PER NEMA twist-lock receptacle only (control ordered separate)[16]
PER5 Five-pin receptacle only (control ordered separate)[16,17]
PER7 Seven-pin receptacle only (leads exit fixture) (control ordered separate)[16,17]
DMG 0-10V dimming extend out back of housing for external control (control ordered separate)[18]
PIR High/low, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 5fc[19,20]
PIRH High/low, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 5fc[19,20]
PIR1FC3V High/low, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 1fc[19,20]
PIRH1FC3V High/low, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 1fc[19,20]
FAO Field adjustable output[21]

Other options
Shipped installed
HS House-side shield[22]
SF Single fuse (120, 277, 347V)[6]
DF Double fuse (208, 240, 480V)[6]
L90 Left rotated optics[2]
R90 Right rotated optics[2]
DDL Diffused drop lens[22]
HA 50°C ambient operations[1]
Shipped separately
BS Bird spikes[23]
EGS External glare shield

Finish *(required)*
DDBXD Dark bronze
DBLXD Black
DNAXD Natural aluminum
DWHXD White
DDBTXD Textured dark bronze
DBLBXD Textured black
DNATXD Textured natural aluminum
DWHGXD Textured white

Ordering Information

Accessories

Ordered and shipped separately.

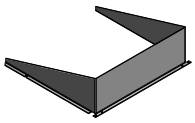
DLL127F 1.5 JU	Photocell - SSL twist-lock (120-277V) [24]
DLL347F 1.5 CUL JU	Photocell - SSL twist-lock (347V) [24]
DLL480F 1.5 CUL JU	Photocell - SSL twist-lock (480V) [24]
DSHORT SBK U	Shorting cap [24]
DSX0HS 20C U	House-side shield for P1,P2,P3 and P4 [22]
DSX0HS 30C U	House-side shield for P10,P11,P12 and P13 [22]
DSX0HS 40C U	House-side shield for P5,P6 and P7 [22]
DSX0DDL U	Diffused drop lens (polycarbonate) [22]
PUMBA DDBXD U*	Square and round pole universal mounting bracket adaptor (specify finish) [25]
KMA8 DDBXD U	Mast arm mounting bracket adaptor (specify finish) [12]
DSX0EGS (FINISH) U	External glare shield

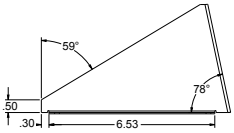
For more control options, visit DTL and ROAM online. Link to nLight Air 2

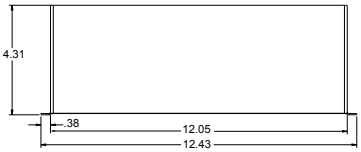
NOTES

1 HA not available with P4, P7, and P13.
2 P10, P11, P12 and P13 and rotated options (L90 or R90) only available together.
3 Any Type 5 distribution with photocell, is not available with WBA.
4 Not available with HS or DDL.
5 MVOLT driver operates on any line voltage from 120-277V (50/60 Hz).
6 Single fuse (SF) requires 120V, 277V or 347V. Double fuse (DF) requires 208V, 240V or 480V. XVOLT not available with fusing (SF or DF).
7 XVOLT only suitable for use with P4, P7 and P13.
8 XVOLT operates with any voltage between 277V and 480V.
9 XVOLT not available with fusing (SF or DF) and not available with PIR, PIRH, PIR1FC3V, PIRH1FC3V.
10 Suitable for mounting to round poles between 3.5" and 12" diameter.
11 Universal mounting brackets intended for retrofit on existing pre-drilled poles only. 1.5 G vibration load rating per ANCI C136.31. Only usable when pole's drill pattern is NOT Lithonia template #8.
12 Must order fixture with SPA mounting. Must be ordered as a separate accessory; see Accessories information. For use with 2-3/8" diameter mast arm (not included).
13 Must be ordered with PIRHN.
14 Sensor cover available only in dark bronze, black, white and natural aluminum colors.
15 Must be ordered with NLTAIR2. For more information on nLight Air 2 visit this link.
16 Photocell ordered and shipped as a separate line item from Acuity Brands Controls. See accessories. Shorting Cap included.
17 If ROAM® node required, it must be ordered and shipped as a separate line item from Acuity Brands Controls. Shorting Cap included.
18 DMG not available with PIRHN, PER5, PER7, PIR, PIRH, PIR1FC3V or PIRH1FC3V, FAO.
19 Reference Controls Options table on page 4.
20 Reference Motion Sensor Default Table on page 4 to see functionality.
21 Not available with other dimming controls options.
22 Not available with BLC, LCCO and RCCO distribution.
23 Must be ordered with fixture for factory pre-drilling.
24 Requires luminaire to be specified with PER, PER5 or PER7 option. See Controls Table on page 4.
25 For retrofit use only. Only usable when pole's drill pattern is NOT Lithonia template #8

EGS – External Glare Shield

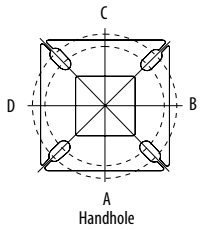


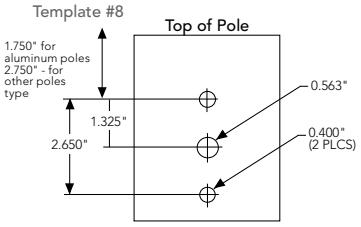




Drilling

HANDHOLE ORIENTATION
(from top of pole)





Tenon Mounting Slipfitter

Tenon O.D.	Mounting	Single Unit	2 @ 180	2 @ 90	3 @ 90	3 @120	4 @ 90
2-3/8"	RPA	AS3-5 190	AS3-5 280	AS3-5 290	AS3-5 390	AS3-5 320	AS3-5 490
2-7/8"	RPA	AST25-190	AST25-280	AST25-290	AST25-390	AST25-320	AST25-490
4"	RPA	AST35-190	AST35-280	AST35-290	AST35-390	AST35-320	AST35-490

Mounting Option	**Drilling Template**	**Single**	**2 @ 180**	**2 @ 90**	**3 @ 90**	**3 @ 120**	**4 @ 90**
Head Location		Side B	Side B & D	Side B & C	Side B, C & D	Round Pole Only	Side A, B, C & D
Drill Nomenclature	#8	DM19AS	DM28AS	DM29AS	DM39AS	DM32AS	DM49AS
		Minimum Acceptable Outside Pole Dimension					
SPA	#8	2-7/8"	2-7/8"	3.5"	3.5"		3.5"
RPA	#8	2-7/8"	2-7/8"	3.5"	3.5"	3"	3.5"
SPUMBA	#5	2-7/8"	3"	4"	4"		4"
RPUMBA	#5	2-7/8"	3.5"	5"	5"	3.5"	5"

DSX0 Area Luminaire - EPA

*Includes luminaire and integral mounting arm. Other tenons, arms, brackets or other accessories are not included in this EPA data.

Fixture Quantity & Mounting Configuration	Single DM19	2 @ 180 DM28	2 @ 90 DM29	3 @ 90 DM39	3 @ 120 DM32	4 @ 90 DM49
Mounting Type						
DSX0 LED	0.950	1.900	1.830	2.850	2.850	3.544

D-Series Size 0
LED Area Luminaire

Catalog Number

Notes

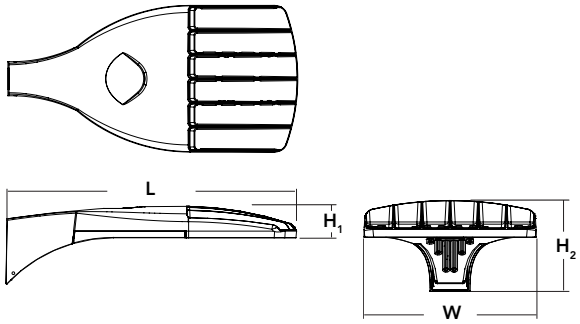
Type

Hit the Tab key or mouse over the page to see all interactive elements.

d#series

Specifications

EPA:	0.95 ft² (.09 m²)
Length:	26" (66.0 cm)
Width:	13" (33.0 cm)
Height$_1$:	3" (7.62 cm)
Height$_2$:	7" (17.8 cm)
Weight (max):	16 lbs (7.25 kg)



Introduction

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The outstanding photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. It is ideal for replacing up to 400W metal halide with typical energy savings of 70% and expected service life of over 100,000 hours.

Ordering Information

EXAMPLE: DSX0 LED P6 40K T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

DSX0 LED

Series	LEDs	Color temperature	Distribution	Voltage	Mounting
DSX0 LED	**Forward optics** P1 P5 P2 P6 P3 P7[1] P4[1] **Rotated optics** P10[2] P12[2] P11[2] P13[1,2]	30K 3000 K 40K 4000 K 50K 5000 K	T1S Type I short (Automotive) T2S Type II short T2M Type II medium T3S Type III short T3M Type III medium T4M Type IV medium TFTM Forward throw medium T5VS Type V very short[3] T5S Type V short[3] T5M Type V medium[3] T5W Type V wide[3] BLC Backlight control[4] LCCO Left corner cutoff[4] RCCO Right corner cutoff[4]	MVOLT (120V-277V)[5,6] XVOLT (277V-480V)[7,8,9] 120[6] 208[6] 240[6] 277[6] 347[6] 480[6]	**Shipped included** SPA Square pole mounting RPA Round pole mounting[10] WBA Wall bracket[3] SPUMBA Square pole universal mounting adaptor[11] RPUMBA Round pole universal mounting adaptor[11] **Shipped separately** KMA8 DDBXD U Mast arm mounting bracket adaptor (specify finish)[12]

Control options		Other options	Finish *(required)*
Shipped installed NLTAIR2 nLight AIR generation 2 enabled[13,14] PIRHN Network, high/low motion/ambient sensor[15] PER NEMA twist-lock receptacle only (control ordered separate)[16] PER5 Five-pin receptacle only (control ordered separate)[16,17] PER7 Seven-pin receptacle only (leads exit fixture) (control ordered separate)[16,17] DMG 0-10V dimming extend out back of housing for external control (control ordered separate)[18]	PIR High/low, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 5fc[19,20] PIRH High/low, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 5fc[19,20] PIR1FC3V High/low, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 1fc[19,20] PIRH1FC3V High/low, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 1fc[19,20] FAO Field adjustable output[21]	**Shipped installed** HS House-side shield[22] SF Single fuse (120, 277, 347V)[6] DF Double fuse (208, 240, 480V)[6] L90 Left rotated optics[2] R90 Right rotated optics[2] DDL Diffused drop lens[22] HA 50°C ambient operations[1] **Shipped separately** BS Bird spikes[23] EGS External glare shield	DDBXD Dark bronze DBLXD Black DNAXD Natural aluminum DWHXD White DDBTXD Textured dark bronze DBLBXD Textured black DNATXD Textured natural aluminum DWHGXD Textured white

Ordering Information

Accessories

Ordered and shipped separately.

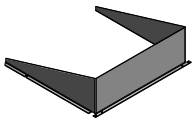
DLL127F 1.5 JU	Photocell - SSL twist-lock (120-277V) [24]
DLL347F 1.5 CUL JU	Photocell - SSL twist-lock (347V) [24]
DLL480F 1.5 CUL JU	Photocell - SSL twist-lock (480V) [24]
DSHORT SBK U	Shorting cap [24]
DSX0HS 20C U	House-side shield for P1,P2,P3 and P4 [22]
DSX0HS 30C U	House-side shield for P10,P11,P12 and P13 [22]
DSX0HS 40C U	House-side shield for P5,P6 and P7 [22]
DSX0DDL U	Diffused drop lens (polycarbonate) [22]
PUMBA DDBXD U*	Square and round pole universal mounting bracket adaptor (specify finish) [25]
KMA8 DDBXD U	Mast arm mounting bracket adaptor (specify finish) [12]
DSX0EGS (FINISH) U	External glare shield

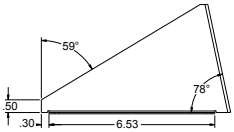
For more control options, visit DTL and ROAM online. Link to nLight Air 2

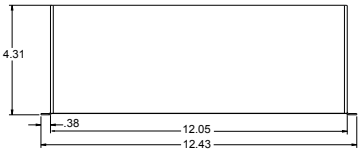
NOTES

1 HA not available with P4, P7, and P13.
2 P10, P11, P12 and P13 and rotated options (L90 or R90) only available together.
3 Any Type 5 distribution with photocell, is not available with WBA.
4 Not available with HS or DDL.
5 MVOLT driver operates on any line voltage from 120-277V (50/60 Hz).
6 Single fuse (SF) requires 120V, 277V or 347V. Double fuse (DF) requires 208V, 240V or 480V. XVOLT not available with fusing (SF or DF).
7 XVOLT only suitable for use with P4, P7 and P13.
8 XVOLT operates with any voltage between 277V and 480V.
9 XVOLT not available with fusing (SF or DF) and not available with PIR, PIRH, PIR1FC3V, PIRH1FC3V.
10 Suitable for mounting to round poles between 3.5" and 12" diameter.
11 Universal mounting brackets intended for retrofit on existing pre-drilled poles only. 1.5 G vibration load rating per ANCI C136.31. Only usable when pole's drill pattern is NOT Lithonia template #8.
12 Must order fixture with SPA mounting. Must be ordered as a separate accessory; see Accessories information. For use with 2-3/8" diameter mast arm (not included).
13 Must be ordered with PIRHN.
14 Sensor cover available only in dark bronze, black, white and natural aluminum colors.
15 Must be ordered with NLTAIR2. For more information on nLight Air 2 visit this link.
16 Photocell ordered and shipped as a separate line item from Acuity Brands Controls. See accessories. Shorting Cap included.
17 If ROAM® node required, it must be ordered and shipped as a separate line item from Acuity Brands Controls. Shorting Cap included.
18 DMG not available with PIRHN, PER5, PER7, PIR, PIRH, PIR1FC3V or PIRH1FC3V, FAO.
19 Reference Controls Options table on page 4.
20 Reference Motion Sensor Default Table on page 4 to see functionality.
21 Not available with other dimming controls options.
22 Not available with BLC, LCCO and RCCO distribution.
23 Must be ordered with fixture for factory pre-drilling.
24 Requires luminaire to be specified with PER, PER5 or PER7 option. See Controls Table on page 4.
25 For retrofit use only. Only usable when pole's drill pattern is NOT Lithonia template #8

EGS – External Glare Shield

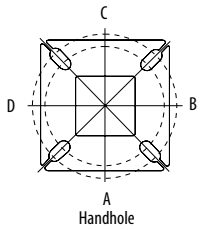


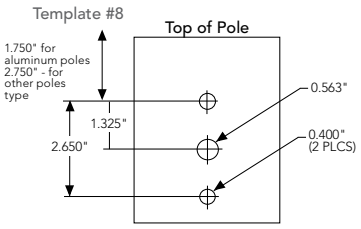




Drilling

HANDHOLE ORIENTATION
(from top of pole)





Tenon Mounting Slipfitter

Tenon O.D.	Mounting	Single Unit	2 @ 180	2 @ 90	3 @ 90	3 @120	4 @ 90
2-3/8"	RPA	AS3-5 190	AS3-5 280	AS3-5 290	AS3-5 390	AS3-5 320	AS3-5 490
2-7/8"	RPA	AST25-190	AST25-280	AST25-290	AST25-390	AST25-320	AST25-490
4"	RPA	AST35-190	AST35-280	AST35-290	AST35-390	AST35-320	AST35-490

Mounting Option	**Drilling Template**	**Single**	**2 @ 180**	**2 @ 90**	**3 @ 90**	**3 @ 120**	**4 @ 90**
Head Location		Side B	Side B & D	Side B & C	Side B, C & D	Round Pole Only	Side A, B, C & D
Drill Nomenclature	#8	DM19AS	DM28AS	DM29AS	DM39AS	DM32AS	DM49AS
		Minimum Acceptable Outside Pole Dimension					
SPA	#8	2-7/8"	2-7/8"	3.5"	3.5"		3.5"
RPA	#8	2-7/8"	2-7/8"	3.5"	3.5"	3"	3.5"
SPUMBA	#5	2-7/8"	3"	4"	4"		4"
RPUMBA	#5	2-7/8"	3.5"	5"	5"	3.5"	5"

DSX0 Area Luminaire - EPA

*Includes luminaire and integral mounting arm. Other tenons, arms, brackets or other accessories are not included in this EPA data.

Fixture Quantity & Mounting Configuration	Single DM19	2 @ 180 DM28	2 @ 90 DM29	3 @ 90 DM39	3 @ 120 DM32	4 @ 90 DM49
Mounting Type						
DSX0 LED	0.950	1.900	1.830	2.850	2.850	3.544

LITHONIA LIGHTING®

Catalog Number	
Notes	
Type	

FEATURES & SPECIFICATIONS

INTENDED USE — These specifications are for USA standards only. Check with factory for Canadian specifications. Square Straight Steel is a general purpose light pole for up to 39-foot mounting heights. This pole provides a robust yet cost effective option for mounting area lights and floodlights.

CONSTRUCTION — Pole Shaft: The pole shaft is of uniform dimension and wall thickness and is made of a weldable-grade, hot-rolled, commercial-quality steel tubing with a minimum yield of 55 KSI (11-gauge, .1196"), or 50 KSI (7-gauge, .1793"). Shaft is one-piece with a full-length longitudinal high-frequency electric resistance weld. Uniformly square in cross-section with flat sides, small corner radii and excellent torsional qualities. Available shaft widths are 4", 5" and 6".

Pole Top: A flush non-metalic black top cap is provided for all poles that will receive drilling patterns for side-mount luminaire arm assemblies or when ordered with PT option.

Handhole: A reinforced handhole with grounding provision is provided at 18" from the base on side A. Positioning the handhole lower may not be possible and requires engineering review; consult Tech Support-Outdoor for further information. Every handhole includes a cover and cover attachment hardware. The handhole has a nominal dimension of 2.5" x 5".

Base Cover: A durable ABS plastic two-piece full base cover, finished to match the pole, is provided with each pole assembly. Additional base cover options are available upon request.

Anchor Base/ Bolts: Anchor base is fabricated from steel that meets ASTM A36 standards and can be altered to match existing foundations; consult factory for modifications. Anchor bolts are manufactured to ASTM F1554 Standards grade 55, (55 KSI minimum yield strength and tensile strength of 75-95 KSI). Top threaded portion (nominal 12") is hot-dipped galvanized per ASTM A-153.

HARDWARE – All structural fasteners are high-strength galvanized carbon steel. All non-structural fasteners are galvanized or zinc-plated carbon steel or stainless steel.

FINISH – Extra durable standard powder-coat finishes include Dark Bronze, White, Black, Medium Bronze and Natural Aluminum colors. Classic finishes include Sandstone, Charcoal Gray, Tennis Green, Bright Red and Steel Blue colors. Architectural Colors and Special Finishes are available by quote and include, but are not limited to Hot-dipped Galvanized, Paint over Hot-dipped Galvanized, RAL Colors, Custom Colors and Extended Warranty Finishes. Factory-applied primer paint finish is available for customer field-paint applications.

WARRANTY — 1-year limited warranty. Complete warranty terms located at:
www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

NOTE: Actual performance may differ as a result of end-user environment and application.
Specifications subject to change without notice.

Anchor Base Poles

SSS

SQUARE STRAIGHT STEEL

See footnotes next page.

SSS Square Straight Steel Poles

ORDERING INFORMATION Lead times will vary depending on options selected. Consult with your sales representative. **Example:** SSS 20 5C DM19 DDB

SSS						
Series	**Nominal fixture mounting height**	**Nominal shaft base size/wall thickness[1]**	**Mounting[2]**		**Options**	**Finish[10]**
SSS	10'-39' (for 1/2 ft increments, add -6 to the pole height. Ex: 20-6 equals 20ft 6in.) See technical information table for complete ordering information.)	4C 4" 11g (.1196") 4G 4" 7g (.1793") 5C 5" 11g (.1196") 5G 5" 7g (.1793") 6G 6" 7g (.1793") See technical information table for complete ordering information.)	Tenon mounting PT Open top (includes top cap) T20 2-3/8" O.D. (2" NPS) T25 2-7/8" O.D. (2-1/2" NPS) T30 3-1/2" O.D. (3" NPS) T35 4" O.D. (3-1/2" NPS) KAC/KAD/KSE/KSF/KVR/KVF Drill mounting[3] DM19 1 at 90° DM28 2 at 180° DM28 PL 2 at 180° with one side plugged DM29 2 at 90° DM39 3 at 90° DM49 4 at 90° CSX/DSX/RSX/AERIS™/OMERO™/ HLA/KAX Drill mounting[3] DM19AS 1 at 90° DM28AS 2 at 180° DM29AS 2 at 90° DM39AS 3 at 90° DM49AS 4 at 90° RAD drill mounting[3] DM19RAD 1 at 90° DM28RAD 2 at 180° DM29RAD 2 at 90° DM32RAD 3 at 120° DM39RAD 3 at 90° DM49RAD 4 at 90°	AERIS™ Suspend drill mounting[3,4] DM19AST_ 1 at 90° DM28AST_ 2 at 180° DM29AST_ 2 at 90° DM39AST_ 3 at 90° DM49AST_ 4 at 90° OMERO™ Suspend drill mounting[3,4] DM19MRT_ 1 at 90° DM28MRT_ 2 at 180° DM29MRT_ 2 at 90° DM39MRT_ 3 at 90° DM49MRT_ 4 at 90°	Shipped installed L/AB Less anchor bolts (Include when anchor bolts are not needed) VD Vibration damper TP Tamper resistant handhole cover fasteners HAxy Horizontal arm bracket (1 fixture)[5,6] FDLxy Festoon outlet less electrical[5] CPL12/xy 1/2" coupling[5] CPL34/xy 3/4" coupling[5] CPL1/xy 1" coupling[5] NPL12/xy 1/2" threaded nipple[5] NPL34/xy 3/4" threaded nipple[5] NPL1/xy 1" threaded nipple[5] EHHxy Extra handhole[5,7] MAEX Match existing[8] USPOM United States point of manufacture[9] IC Interior coating[10] UL UL listed with label (Includes NEC compliant cover) NEC NEC 410.30 compliant gasketed handhole (Not UL Labeled) Shipped separately (replacement kit available) (blank) FBC Full base cover (plastic) (blank) TC Top cap (blank) HHC Handhole cover	Standard colors DDBXD Dark bronze DWHXD White DBLXD Black DMBXD Medium bronze DNAXD Natural aluminum Classic colors DSS Sandstone DGC Charcoal gray DTG Tennis green DBR Bright red DSB Steel blue Architectural Colors and Special Finishes[11] Galvanized, Paint over Galvanized, RAL Colors, Custom Colors and Extended Warranty Finishes available.

NOTES:

1. Wall thickness will be signified with a "C" (11 Gauge) or a "G" (7-Gauge) in nomenclature. "C" - 0.1196" | "G" - 0.1793".
2. PT open top poles include top cap. When ordering tenon mounting and drill mounting for the same pole, follow this example: DM28/T20. The combination includes a required extra handhole.
3. Refer to the fixture spec sheet for the correct drilling template pattern and orientation compatibility.
4. Insert "1" or "2" to designate fixture size; e.g. DM19AST**2**.
5. Specify location and orientation when ordering option.
   For "x": Specify the height above the base of pole in feet or feet and inches; separate feet and inches with a "-".
   Example: 5ft = 5 and 20ft 3in = 20-3
   For "y": Specify orientation from handhole (A,B,C,D)
   Refer to the Handhole Orientation diagram below.
   Example: 1/2" coupling at 5' 8", orientation C = CPL12/5-8C
6. Horizontal arm is 18" x 2-3/8" O.D. tenon standard, with radius curve providing 12" rise and 2-3/8" O.D. If ordering two horizontal arm at the same height, specify with HAxyy. Example: HA20BD.
7. Combination of tenon-top and drill mount includes extra handhole.
8. Must add original order number of existing pole(s).
9. Use when mill certifications are required.
10. Provides enhanced corrosion resistance.
11. Additional colors available; see www.lithonia.com/archcolors or Architectural Colors brochure (Form No. 794.3). Available by formal quote only, consult factory for details.

OUTDOOR: One Lithonia Way Conyers, GA 30012 Phone: 800-705-SERV (7378) www.lithonia.com

S2A

WDGE4 LED
Architectural Wall Sconce

Catalog Number

Notes

Type

Hit the Tab key or mouse over the page to see all interactive elements.

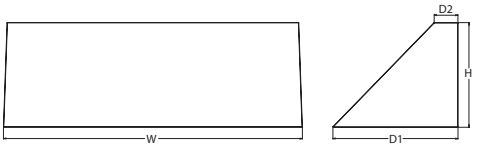
Introduction

The WDGE LED family is designed to meet specifier's every wall-mounted lighting need in a widely accepted shape that blends with any architecture. The clean rectilinear design comes in four sizes with lumen packages ranging from 1,200 to 25,000 lumens, providing a true site-wide solution. Embedded with nLight® AIR wireless controls, the WDGE family provides additional energy savings and code compliance.

WDGE4 has been designed to deliver up to 25,000 lumens through a precision refractive lens with wide distribution, perfect for augmenting the lighting from pole mounted luminaires.

Specifications

Depth (D1): 10"
Depth (D2): 2"
Height: 9"
Width: 25"
Weight: (without options) 30.5 lbs



WDGE LED Family Overview

Luminaire	Standard EM, 0°C	Cold EM, -20°C	Sensor	Lumens (4000K)					
				P1	P2	P3	P4	P5	P6
WDGE1 LED	4W	--	--	1,200	2,000	--	--	--	--
WDGE2 LED	10W	18W	Standalone / nLight	1,200	2,000	3,000	4,500	6,000	--
WDGE3 LED	15W	18W	Standalone / nLight	7,500	8,500	10,000	12,000	--	--
WDGE4 LED	--	--	Standalone / nLight	12,000	16,000	18,000	20,000	22,000	25,000

Ordering Information

EXAMPLE: WDGE4 LED P3 40K 70CRI R3 MVOLT SRM DDBXD

Series	Package		Color Temperature		CRI	Distribution		Voltage	Mounting		Shipped separately	
WDGE4 LED	P1	P4	30K	3000K	70CRI	R2	Type 2	MVOLT	**Shipped included**		AWS	3/8inch Architectural wall spacer
	P2	P5	40K	4000K	80CRI	R3	Type 3	347[1]	SRM	Surface mounting bracket	PBBW	Surface-mounted back box (top, left, right conduit entry)
	P3	P6	50K	5000K		R4	Type 4	480[1]	ICW	Indirect Canopy/Ceiling Washer bracket (dry/damp locations only)[4]		
						RFT	Forward Throw					

Options

PE[2]	Photocell, Button Type
DS[3]	Dual switching (comes with 2 drivers and 2 light engines)
DMG[3]	0-10V dimming wires pulled outside fixture (for use with an external control, ordered separately)
BCE	Bottom conduit entry for back box (PBBW). Total of 4 entry points.
SPD10KV	10kV Surge pack

Standalone Sensors/Controls

PIR	Bi-level (100/35%) motion sensor for 8-15' mounting heights. Intended for use on switched circuits with external dusk to dawn switching.
PIRH	Bi-level (100/35%) motion sensor for 15-30' mounting heights. Intended for use on switched circuits with external dusk to dawn switching
PIR1FC3V	Bi-level (100/35%) motion sensor for 8-15' mounting heights with photocell pre-programmed for dusk to dawn operation.
PIRH1FC3V	Bi-level (100/35%) motion sensor for 15-30' mounting heights with photocell pre-programmed for dusk to dawn operation.

Networked Sensors/Controls

NLTAIR2 PIR	nLightAIR Wireless enabled bi-level motion/ambient sensor for 8-15' mounting heights.
NLTAIR2 PIRH	nLightAIR Wireless enabled bi-level motion/ambient sensor for 15-30' mounting heights.

See page 3 for out of box functionality

Finish

DDBXD	Dark bronze
DBLXD	Black
DNAXD	Natural aluminum
DWHXD	White
DSSXD	Sandstone
DDBTXD	Textured dark bronze
DBLBXD	Textured black
DNATXD	Textured natural aluminum
DWHGXD	Textured white
DSSTXD	Textured sandstone

Accessories

Ordered and shipped separately.

WDGEAWS DDBXD U	WDGE 3/8inch Architectural Wall Spacer (specify finish)
WDGE4PBBW DDBXD U	WDGE4 surface-mounted back box (specify finish)

NOTES

1 347V and 480V not available with DS.
2 PE not available in 480V and with sensors/controls.
3 DS and DMG not available with sensors/controls.
4 Not qualified for DLC. Not available with emergency battery backup.

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Performance Package	System Watts	Dist. Type	30K (3000K, 70 CRI)					40K (4000K, 70 CRI)					50K (5000K, 70 CRI)				
			Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G
P1	77W	R2	11,173	146	2	0	1	12,125	158	2	0	1	12,125	158	2	0	1
		R3	10,951	143	2	0	2	11,884	155	2	0	2	11,884	155	2	0	2
		R4	11,224	147	2	0	2	12,180	159	2	0	2	12,180	159	2	0	2
		RFT	11,104	145	2	0	2	12,050	157	2	0	2	12,050	157	2	0	2
P2	106W	R2	14,960	141	3	0	2	16,235	153	3	0	2	16,235	153	3	0	2
		R3	14,663	138	2	0	2	15,912	150	2	0	3	15,912	150	2	0	3
		R4	15,028	141	2	0	2	16,308	153	2	0	3	16,308	153	2	0	3
		RFT	14,868	140	2	0	2	16,134	152	2	0	2	16,134	152	2	0	2
P3	123W	R2	16,993	138	3	0	2	18,441	150	3	0	2	18,441	150	3	0	2
		R3	16,655	136	2	0	3	18,074	147	3	0	3	18,074	147	3	0	3
		R4	17,070	139	2	0	3	18,524	151	3	0	3	18,524	151	3	0	3
		RFT	16,888	138	2	0	3	18,327	149	2	0	3	18,327	149	2	0	3
P4	140W	R2	18,958	136	3	0	2	20,573	147	3	0	2	20,573	147	3	0	2
		R3	18,581	133	3	0	3	20,164	144	3	0	3	20,164	144	3	0	3
		R4	19,044	136	3	0	3	20,667	148	3	0	3	20,667	148	3	0	3
		RFT	18,841	135	2	0	3	20,446	146	3	0	3	20,446	146	3	0	3
P5	156W	R2	20,919	134	3	0	2	22,702	146	3	0	2	22,702	146	3	0	2
		R3	20,503	132	3	0	3	22,250	143	3	0	3	22,250	143	3	0	3
		R4	21,014	135	3	0	3	22,804	147	3	0	4	22,804	147	3	0	4
		RFT	20,790	134	3	0	3	22,561	145	3	0	3	22,561	145	3	0	3
P6	185W	R2	23,725	128	3	0	2	25,746	139	3	0	2	25,746	139	3	0	2
		R3	23,253	126	3	0	4	25,234	136	3	0	4	25,234	136	3	0	4
		R4	23,832	129	3	0	4	25,863	140	3	0	4	25,863	140	3	0	4
		RFT	23,578	127	3	0	3	25,587	138	3	0	4	25,587	138	3	0	4

Electrical Load

Performance Package	System Watts	Current (A)					
		120V	208V	240V	277V	347V	480V
P1	77W	0.635	0.366	0.319	0.280	0.223	0.161
P2	106W	0.889	0.514	0.449	0.395	0.309	0.228
P3	123W	1.014	0.585	0.510	0.447	0.356	0.258
P4	140W	1.159	0.668	0.582	0.509	0.403	0.294
P5	156W	1.296	0.743	0.647	0.564	0.451	0.326
P6	185W	1.512	0.864	0.751	0.655	0.526	0.378

Lumen Multiplier for 80CRI

CCT	Multiplier
30K	0.891
40K	0.906
50K	0.906

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

Ambient		Lumen Multiplier
0°C	32°F	1.05
10°C	50°F	1.03
20°C	68°F	1.01
25°C	77°F	1.00
30°C	86°F	0.99
40°C	104°F	0.97

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in a 25°C ambient, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).
To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	1.0	>0.98	>0.96	>0.92

S2B

WDGE4 LED

Architectural Wall Sconce

Catalog Number

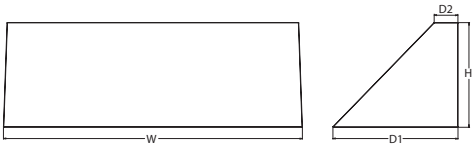
Notes

Type

Hit the Tab key or mouse over the page to see all interactive elements.

Specifications

Depth (D1): 10"
Depth (D2): 2"
Height: 9"
Width: 25"
Weight: (without options) 30.5 lbs



Introduction

The WDGE LED family is designed to meet specifier's every wall-mounted lighting need in a widely accepted shape that blends with any architecture. The clean rectilinear design comes in four sizes with lumen packages ranging from 1,200 to 25,000 lumens, providing a true site-wide solution. Embedded with nLight® AIR wireless controls, the WDGE family provides additional energy savings and code compliance.

WDGE4 has been designed to deliver up to 25,000 lumens through a precision refractive lens with wide distribution, perfect for augmenting the lighting from pole mounted luminaires.

WDGE LED Family Overview

Luminaire	Standard EM, 0°C	Cold EM, -20°C	Sensor	Lumens (4000K)					
				P1	P2	P3	P4	P5	P6
WDGE1 LED	4W	--	--	1,200	2,000	--	--	--	--
WDGE2 LED	10W	18W	Standalone / nLight	1,200	2,000	3,000	4,500	6,000	--
WDGE3 LED	15W	18W	Standalone / nLight	7,500	8,500	10,000	12,000	--	--
WDGE4 LED	--	--	Standalone / nLight	12,000	16,000	18,000	20,000	22,000	25,000

Ordering Information

EXAMPLE: WDGE4 LED P3 40K 70CRI R3 MVOLT SRM DDBXD

Series	Package		Color Temperature		CRI	Distribution		Voltage	Mounting		Shipped separately	
WDGE4 LED	P1	P4	30K	3000K	70CRI	R2	Type 2	MVOLT	**Shipped included**		AWS	3/8inch Architectural wall spacer
	P2	P5	40K	4000K	80CRI	R3	Type 3	347[1]	SRM	Surface mounting bracket	PBBW	Surface-mounted back box (top, left, right conduit entry)
	P3	P6	50K	5000K		R4	Type 4	480[1]	ICW	Indirect Canopy/Ceiling Washer bracket (dry/damp locations only)[4]		
						RFT	Forward Throw					

Options

PE[2]	Photocell, Button Type
DS[3]	Dual switching (comes with 2 drivers and 2 light engines)
DMG[3]	0-10V dimming wires pulled outside fixture (for use with an external control, ordered separately)
BCE	Bottom conduit entry for back box (PBBW). Total of 4 entry points.
SPD10KV	10kV Surge pack

Standalone Sensors/Controls

PIR	Bi-level (100/35%) motion sensor for 8-15' mounting heights. Intended for use on switched circuits with external dusk to dawn switching.
PIRH	Bi-level (100/35%) motion sensor for 15-30' mounting heights. Intended for use on switched circuits with external dusk to dawn switching
PIR1FC3V	Bi-level (100/35%) motion sensor for 8-15' mounting heights with photocell pre-programmed for dusk to dawn operation.
PIRH1FC3V	Bi-level (100/35%) motion sensor for 15-30' mounting heights with photocell pre-programmed for dusk to dawn operation.

Networked Sensors/Controls

NLTAIR2 PIR	nLightAIR Wireless enabled bi-level motion/ambient sensor for 8-15' mounting heights.
NLTAIR2 PIRH	nLightAIR Wireless enabled bi-level motion/ambient sensor for 15-30' mounting heights.

See page 3 for out of box functionality

Finish

DDBXD	Dark bronze
DBLXD	Black
DNAXD	Natural aluminum
DWHXD	White
DSSXD	Sandstone
DDBTXD	Textured dark bronze
DBLBXD	Textured black
DNATXD	Textured natural aluminum
DWHGXD	Textured white
DSSTXD	Textured sandstone

Accessories

Ordered and shipped separately.

WDGEAWS DDBXD U	WDGE 3/8inch Architectural Wall Spacer (specify finish)
WDGE4PBBW DDBXD U	WDGE4 surface-mounted back box (specify finish)

NOTES

1. 347V and 480V not available with DS.
2. PE not available in 480V and with sensors/controls.
3. DS and DMG not available with sensors/controls.
4. Not qualified for DLC. Not available with emergency battery backup.

One Lithonia Way • Conyers, Georgia 30012 • Phone: 1-800-705-SERV (7378) • www.lithonia.com

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Performance Package	System Watts	Dist. Type	30K (3000K, 70 CRI)					40K (4000K, 70 CRI)					50K (5000K, 70 CRI)				
			Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G
P1	77W	R2	11,173	146	2	0	1	12,125	158	2	0	1	12,125	158	2	0	1
		R3	10,951	143	2	0	2	11,884	155	2	0	2	11,884	155	2	0	2
		R4	11,224	147	2	0	2	12,180	159	2	0	2	12,180	159	2	0	2
		RFT	11,104	145	2	0	2	12,050	157	2	0	2	12,050	157	2	0	2
P2	106W	R2	14,960	141	3	0	2	16,235	153	3	0	2	16,235	153	3	0	2
		R3	14,663	138	2	0	2	15,912	150	2	0	3	15,912	150	2	0	3
		R4	15,028	141	2	0	2	16,308	153	2	0	3	16,308	153	2	0	3
		RFT	14,868	140	2	0	2	16,134	152	2	0	2	16,134	152	2	0	2
P3	123W	R2	16,993	138	3	0	2	18,441	150	3	0	2	18,441	150	3	0	2
		R3	16,655	136	2	0	3	18,074	147	3	0	3	18,074	147	3	0	3
		R4	17,070	139	2	0	3	18,524	151	3	0	3	18,524	151	3	0	3
		RFT	16,888	138	2	0	3	18,327	149	2	0	3	18,327	149	2	0	3
P4	140W	R2	18,958	136	3	0	2	20,573	147	3	0	2	20,573	147	3	0	2
		R3	18,581	133	3	0	3	20,164	144	3	0	3	20,164	144	3	0	3
		R4	19,044	136	3	0	3	20,667	148	3	0	3	20,667	148	3	0	3
		RFT	18,841	135	2	0	3	20,446	146	3	0	3	20,446	146	3	0	3
P5	156W	R2	20,919	134	3	0	2	22,702	146	3	0	2	22,702	146	3	0	2
		R3	20,503	132	3	0	3	22,250	143	3	0	3	22,250	143	3	0	3
		R4	21,014	135	3	0	3	22,804	147	3	0	4	22,804	147	3	0	4
		RFT	20,790	134	3	0	3	22,561	145	3	0	3	22,561	145	3	0	3
P6	185W	R2	23,725	128	3	0	2	25,746	139	3	0	2	25,746	139	3	0	2
		R3	23,253	126	3	0	4	25,234	136	3	0	4	25,234	136	3	0	4
		R4	23,832	129	3	0	4	25,863	140	3	0	4	25,863	140	3	0	4
		RFT	23,578	127	3	0	3	25,587	138	3	0	4	25,587	138	3	0	4

Electrical Load

Performance Package	System Watts	Current (A)					
		120V	208V	240V	277V	347V	480V
P1	77W	0.635	0.366	0.319	0.280	0.223	0.161
P2	106W	0.889	0.514	0.449	0.395	0.309	0.228
P3	123W	1.014	0.585	0.510	0.447	0.356	0.258
P4	140W	1.159	0.668	0.582	0.509	0.403	0.294
P5	156W	1.296	0.743	0.647	0.564	0.451	0.326
P6	185W	1.512	0.864	0.751	0.655	0.526	0.378

Lumen Multiplier for 80CRI

CCT	Multiplier
30K	0.891
40K	0.906
50K	0.906

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

Ambient		Lumen Multiplier
0°C	32°F	1.05
10°C	50°F	1.03
20°C	68°F	1.01
25°C	77°F	1.00
30°C	86°F	0.99
40°C	104°F	0.97

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in a 25°C ambient, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).
To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	1.0	>0.98	>0.96	>0.92

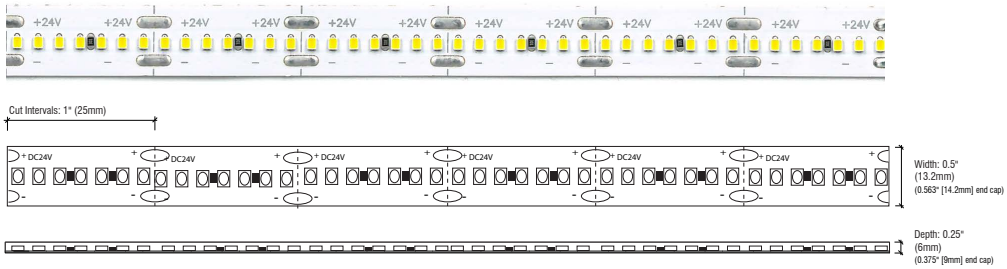
DIRECT VIEW 200 (OUTDOOR)

DL-SERIES | RUBBER COATED | LINEAR LED LIGHTING

Fixture Type: _____

Project: _____

Location: _____



MODEL:	DL27K-WR-24V	DL30K-WR-24V	DL35K-WR-24V	DL40K-WR-24V	DL50K-WR-24V
Kelvin	2700K	3000K	3500K	4100K	5000K
Lumens	189 lm/ft	195 lm/ft	205 lm/ft	220 lm/ft	237 lm/ft
Rating	IP67	IP67	IP67	IP67	IP67

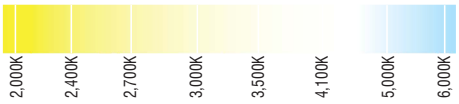
PRODUCT FEATURES

- Suitable for most direct view applications
- 90+ CRI
- Dimmable
- 50,000 hour life
- 5-year warranty
- UL-listed for indoor and outdoor use
- 3M™ Industrial adhesive backing
- For use with 24V power supplies

SPECIFICATIONS

Series	DL - Direct View 200 (Outdoor)
Input Voltage	24VDC / Constant Voltage
Watts per Foot	2.6W/ft @ Maximum Run Length
Beam Spread	120°
Max Run Length	Unlimited, power every 20ft
Cut Intervals	1" (25mm)
End Cap Dimensions	0.563" (14.2mm) × 0.375" (9mm)
Tape Dimensions	0.5" (13.2mm) × 0.25" (6mm)
CRI	90+
Diode	2016
Dimming Options	PWM, Triac, 0-10V, DMX, Hi-lume
Temp Range	-40°F (-40°C) to 149°F (65°C)

KELVIN COLOR TEMPERATURE SCALE



TOTAL WATTAGE USED AT EACH LENGTH

1ft	2ft	3ft	4ft	5ft	6ft	7ft	8ft	9ft	10ft	11ft	12ft	13ft	14ft	15ft	16ft	17ft	18ft	19ft	20ft
3	6.6	10.2	13.6	17	20.3	23.5	26.6	29.5	32.4	35.1	37.7	40.2	42.6	44.8	46.9	48.6	49.2	51	52.8

Conforms to ANSI/UL Standard 2108
Certified to CAN/CSA Standard C22.2 No. 250.0

Supports TITLE 24 JA8-2016 Compliance | RoHS COMPLIANT | c UL us LISTED | 24V DC | WET LOCATION RATED

ZACH 409

LINEAR EASY-SPEC™

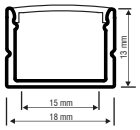
Fixture Type: _____

Project: _____

Location: _____


White Lens (WH)


Mounting Clips (PC)



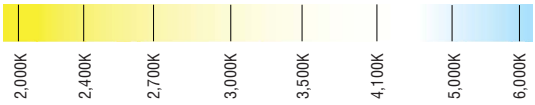
FEATURES

- 100 to 1000 Lumens per Foot
- Field Replaceable Light Source
- 50,000 Hour Lamp Life
- Dimmable to 1%
- Anodized Finish
- Adjustable-Length Power Feed Included

SPECIFICATIONS

Input Voltage	24V DC / Constant Voltage
CRI	90+
Dimming Options	PWM, Triac, 0-10V
Temp Range	-40°F to 149°F
Channel Height	13mm (1/2")
Channel Width	18mm (11/16")

KELVIN COLOR TEMPERATURE SCALE



PART NUMBER BUILDER

Example:

409-I-36-DV-35K-WH-CP-SV-ULV

Model	Setting	Length (Unlimited)[1]	Output	CCT	Lens	Mounting Method	Finish	Power Supply
409	I					CP	SV	ULV
409	**I** - Indoor	**Inches**	**DL** - 200+lm/ft **DK** - 400+lm/ft **DV** - 700+lm/ft **VT** - 1000+lm/ft **RGBW-2** **RGBW-3**	**24K** - 2400 Kelvin **27K** - 2700 Kelvin **30K** - 3000 Kelvin **35K** - 3500 Kelvin **40K** - 4000 Kelvin **50K** - 5000 Kelvin	**NA** - None **WH** - White **SWH** - Seamless White *(SWH for direct view applications only)*	**CP** - Mounting Clips	**SV** - Silver *(Custom Finishes Available)*	**ULV** - Universal Power Supply[2]

[1] Light Source is installed in field allowing for unlimited run lengths

[2] 120V = Forward Phase Dimming | 120/277 = 0-10V Dimming

For use with c UL us Light Source

Certified to CAN/CSA Standard C22.2 No. 250.0

RoHS COMPLIANT | 24V DC | DRY LOCATION RATED

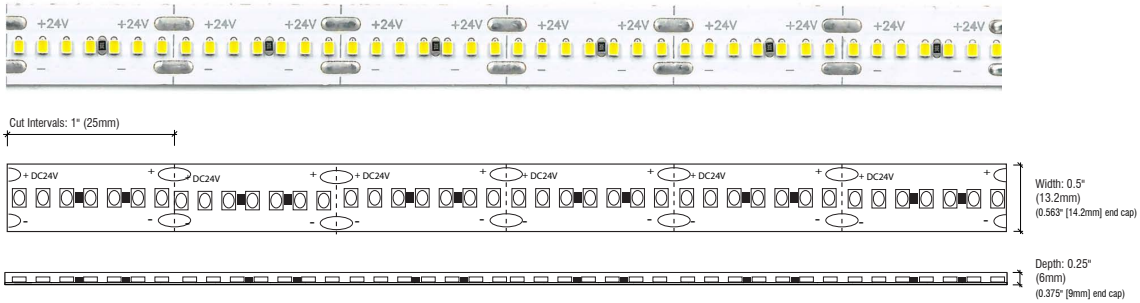
DIRECT VIEW 200 (OUTDOOR)

DL-SERIES | RUBBER COATED | LINEAR LED LIGHTING

Fixture Type: _____

Project: _____

Location: _____



MODEL:	DL27K-WR-24V	DL30K-WR-24V	DL35K-WR-24V	DL40K-WR-24V	DL50K-WR-24V
Kelvin	2700K	3000K	3500K	4100K	5000K
Lumens	189 lm/ft	195 lm/ft	205 lm/ft	220 lm/ft	237 lm/ft
Rating	IP67	IP67	IP67	IP67	IP67

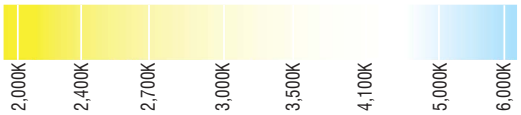
PRODUCT FEATURES

- Suitable for most direct view applications
- 90+ CRI
- Dimmable
- 50,000 hour life
- 5-year warranty
- UL-listed for indoor and outdoor use
- 3M™ Industrial adhesive backing
- For use with 24V power supplies

SPECIFICATIONS

Series	DL - Direct View 200 (Outdoor)
Input Voltage	24VDC / Constant Voltage
Watts per Foot	2.6W/ft @ Maximum Run Length
Beam Spread	120°
Max Run Length	Unlimited, power every 20ft
Cut Intervals	1" (25mm)
End Cap Dimensions	0.563" (14.2mm) × 0.375" (9mm)
Tape Dimensions	0.5" (13.2mm) × 0.25" (6mm)
CRI	90+
Diode	2016
Dimming Options	PWM, Triac, 0-10V, DMX, Hi-lume
Temp Range	-40°F (-40°C) to 149°F (65°C)

KELVIN COLOR TEMPERATURE SCALE



TOTAL WATTAGE USED AT EACH LENGTH

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3	6.6	10.2	13.6	17	20.3	23.5	26.6	29.5	32.4	35.1	37.7	40.2	42.6	44.8	46.9	48.6	49.2	51	52.8

Conforms to ANSI/UL Standard 2108
Certified to CAN/CSA Standard C22.2 No. 250.0

Supports TITLE 24 JA8-2016 Compliance | RoHS COMPLIANT | c UL us LISTED | 24V DC | WET LOCATION RATED

ZACH 409

LINEAR EASY-SPEC™

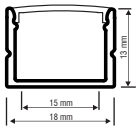
Fixture Type: _____

Project: _____

Location: _____


White Lens (WH)


Mounting Clips (PC)



FEATURES

- 100 to 1000 Lumens per Foot
- Field Replaceable Light Source
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- Dimmable to 1%
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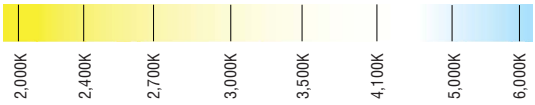


PART NUMBER BUILDER

Example:

409-I-36-DV-35K-WH-CP-SV-ULV

Model	Setting	Length (Unlimited)[1]	Output	CCT	Lens	Mounting Method	Finish	Power Supply
409	I					CP	SV	ULV
409	**I** - Indoor	**Inches**	**DL** - 200+lm/ft **DK** - 400+lm/ft **DV** - 700+lm/ft **VT** - 1000+lm/ft **RGBW-2** **RGBW-3**	**24K** - 2400 Kelvin **27K** - 2700 Kelvin **30K** - 3000 Kelvin **35K** - 3500 Kelvin **40K** - 4000 Kelvin **50K** - 5000 Kelvin	**NA** - None **WH** - White **SWH** - Seamless White *(SWH for direct view applications only)*	**CP** - Mounting Clips	**SV** - Silver *(Custom Finishes Available)*	**ULV** - Universal Power Supply[2]

[1] Light Source is installed in field allowing for unlimited run lengths

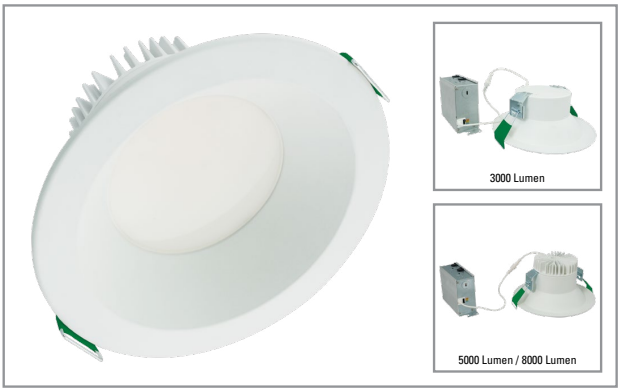
[2] 120V = Forward Phase Dimming | 120/277 = 0-10V Dimming

For use with c UL us Light Source

Certified to CAN/CSA Standard C22.2 No. 250.0

RoHS COMPLIANT | 24V DC | DRY LOCATION RATED

Project		Catalog #		Type	
Prepared by		Notes		Date	



HALO

LCR8

8-Inch Round All-Purpose LED Retrofit Module

Typical Applications

Residential • Multi-family • Mixed-Use

Interactive Menu

Product Certification

Refer to ENERGY STAR® Certified Products List.
Can be used to comply with California Title 24 High Efficacy requirements.
Certified to California Appliance Efficiency Database under JA8.

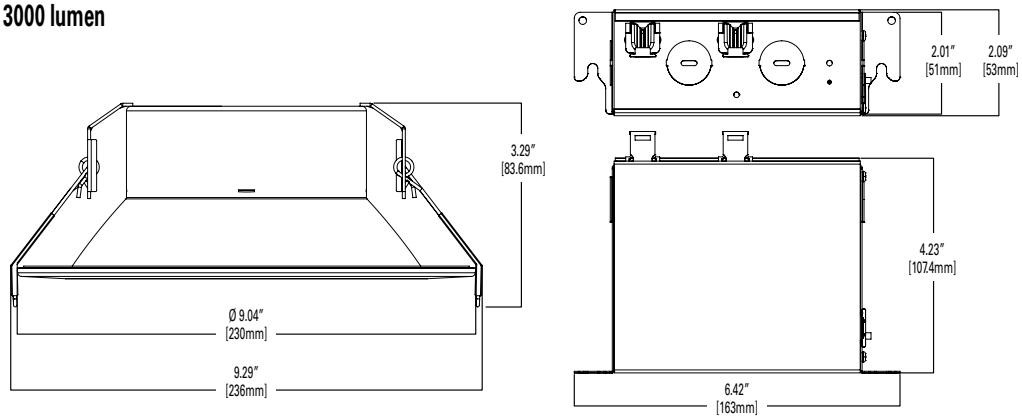
Product Features

Top Product Features

- Select from 5 CCTs via switch; 2700K, 3000K, 3500K, 4000K, 5000K CCT; 90 CRI
- Up to 8000 Lumens IC
- Direct mount - does not require recessed housing or junction box
- Dimmable down to 5%, 0-10V
- Wet location listed for showers and protected ceilings

Dimensional and Mounting Details

3000 lumen



additional product diagrams

HALO LCR8

Order Information*

Icon Key: Δ Configurable Product

SAMPLE ORDER NUMBER: **LCR8309FSE010MW**

Models	Lumens	CRI/CCT	Driver	Finish
LCR8 = 8" all- purpose round LED module	**30** = 3000 lumens (nominal) **50** = 5000 lumens (nominal) **80** = 8000 lumens (nominal)	**9FS** = 90 CRI minimum, field selectable CCT, choose 2700K, 3000K, 3500K, 4000K or 5000K CCT	**E010** = UNV 120-277V, 50/60Hz, 0-10V analog 100% to 5% dimming	**MW** = Matte white
Notes	**Notes**	**Notes**	**Notes**	**Notes**

Accessories

Accessories	
Overized Trim Ring **OT810P** = Oversize trim ring for 8" housings **Designer Trims** **LCR8TRMAH** = 8" Haze, white flange **LCR8TRMSC** = 8" Specular, white flange **LCR8TRMTBZ** = 8" Tuscan bronze **LCR8TRMWH** = 8" Paintable white	**Mounting Frame** **HL8RSMF** = 8" new construction mounting frame **Extension Cable | seleCCTable Driver/Jbox** **HLB06FSEC** – 6 ft. extension cable **HLB12FSEC** – 12 ft. extension cable **HLB20FSEC** – 20 ft. extension cable

Product Specifications

Module

- Module construction includes LED Array, reflector, lens, housing and heat sink where applicable
- Integral aluminum heat sink provides passive thermal cooling achieving L70 at 50,000 hours in IC and non-IC applications

LED Array

- Mid power LED array provides a uniform source with high efficiency and no pixilation.
- 90 CRI minimum, R9 greater than 50
- Color accuracy within 3 SDCM at the CCT endpoints and 4 SDCM in between endpoints, provide color accuracy and uniformity.
- Correlated Color Temperature (CCT) has a selectable range from 2700K to 5000K (factory default 3000K)
- Use the switch to choose between 2700K, 3000K, 3500K, 4000K, and 5000K CCT

Optical Assembly

- Regressed flat lens provides uniformity, UGR ≤ 10
- Exceeds ENERGY STAR® color angular uniformity requirements

Remote Driver/Junction Box

- Metal driver/junction box with captive hinged junction box cover. Listed for (6) #12 AWG 90˚C splice conductors, 2-in, 2-out plus (2) ground
- (4) 1/2" conduit pry-outs
- (2) Slide-N-Side™ non-metallic (NM) wire traps all accepts 14-2, 14-3, 12-2, 12-3 U.S and 14-2, 14-3, 12-2 Canadian NM cable
- (3) 4-port push wire nuts with clear caps for quick and reliable mains voltage connections
- Integral keyhole mounting slots facilitate direct mounting to building structure or new construction mounting frame

Driver

- Integral 120-277V, 50/60Hz constant current driver provides noise free operation
- Continuous, flicker-free dimmer from 100% to 5%
- Plenum rated inline electrical quick connect provides low voltage connection to fixture fitting

Installation

- Can be installed in 3/8" to 1-1/4" thick ceilings
- Cutout can utilize standard round hole saw sizes, cutout template provided
- Mousetrap springs hold fixture fitting securely in the ceiling eliminating light leaks
- Can be removed from below the ceiling for service or replacement

Mounting / Retention

- The LCR8 requires no housing or third party junction box
- The remote enclosure may be used in direct contact with insulation.
- Installer must cut template out of drywall and install into aperture with the clips compressed.
- When released, the mousetrap springs will rest on to the back side of the drywall
- Not for installation in recessed cans

Compliance

- UL certified US and Canada
- Wet location listed and IP64 ingress protection rated, covered ceiling only
- Airtight per ASTM-E283-04
- Suitable for use in clothes closets when installed in accordance with the NEC 410.16 spacing requirements
- EMI/RFI emissions per FCC 47CFR Part 15 consumer limits, CAN ICES-005(B)/NMB-005 (B)
- Contains no mercury or lead and RoHS compliant
- Photometric testing in accordance with IES LM-79-08
- Lumen maintenance projections in accordance with IES LM-80-08 and TM-21-11
- Can be used for State of California Title 24 high efficacy LED compliance under JA8, reference Modernized Appliance Efficiency Database System (MAEDBS) for 2019 JA8 High Efficacy Lighting
- ENERGY STAR® certified, reference "Certified Light Fixtures" database

Warranty

- Five year limited warranty, consult website for details. www.cooperlighting.com

ECOSENSE®

RISE™

OVERVIEW • SPECIFICATIONS • ORDERING

INTERIOR + EXTERIOR | **F080 SINGLE**

DATE	PROJECT	FIRM	TYPE

RISE IS A SYSTEM OF BEAUTIFULLY DESIGNED OUTDOOR RATED LUMINAIRES THAT PROVIDE EFFICIENT AND POWERFUL LIGHT USING THE LATEST IN LED TECHNOLOGY. RISE F080 SINGLE IS A POWERFUL AND COMPACT LED LIGHT FIXTURE, DELIVERING UP TO 1170 LUMENS, THAT CAN BE USED IN SPOT, ACCENT, LANDSCAPE AND FLOODLIGHT APPLICATIONS. ITS UNIQUE MACRO™ LOCK FEATURE ALLOWS FOR FULL 180 DEGREE TILT AND 360 DEGREE PAN AIMABILITY USING ONLY ONE TWIST.

FEATURES :

- POWERFUL CBCP
- EXTREMELY COMPACT
- POWERFUL OUTPUT UP TO 1170 LUMENS
- MACRO™ LOCK - 180° TILT AND 360° PAN
- 12 UNIQUE BEAM ANGLES
- MULTIVOLT (110V-277V)
- 8 CCTS: 2200K THROUGH 6500K
- 80+ AND 90+ CRI
- DIMMABLE TO 5%
- IP66 RATED

FIXTURE MODEL	**FIXTURE CONFIG.**	**POWER/ LUMEN OUTPUT***	**CCT/ COLOR**	**CRI**	**BEAM ANGLE**	**FINISHES**	**ACCESSORIES**	**WIRING AND MOUNTING**
F080	1S							
F080	1S - Single Head	LO - Low Output MO - Medium Output HO - High Output	22 - 2200K 25 - 2500K 27 - 2700K 30 - 3000K 35 - 3500K 40 - 4000K 50 - 5000K 65 - 6500K RD - Red GR - Green BL - Blue AM - Amber *2200K and 2500K not available in 40°, 60°, 70° and 90°	8 - 80 9 - 90* X - For RD, GR, BL, AM *90 CRI not available in 2500K, 5000K, and 6500K	05 - Laser Spot (5°) 10 - Very Narrow Spot (10°) 15 - Narrow Spot (15°) 20 - Spot (20°) 40 - Flood (40°) 60 - Medium Flood (60°) 70 - Wide Flood (70°) 90 - Very Wide Flood (90°) E1 - Elliptical 1 (15°x60°) E2 - Elliptical 2 (30°x60°) E3 - Elliptical 3 (60°x15°) E4 - Elliptical 4 (60°x30°)	K - Black Z - Bronze S - Silver W - White C - Custom* *Provide RAL #	X - No Accessory H - Half Snoot F - Full Snoot Will ship as X if not specified	A - 19" Flying Leads - Internal Cable IC; Bottom Exit; 1/2" NPT ; UL/CE Listed B* - 10' External Cable Side Exit; Surface Mount ; UL Listed C* - 10' External Cable Bottom Exit; Surface Mount - 1/2" NPT ; UL Listed D* - 10' External Cable Side Exit; Surface Mount ; CE Listed E* - 10' External Cable Bottom Exit; Surface Mount - 1/2" NPT; CE Listed *Will ship as A if not specified

EXAMPLE: F080-1S-LO-22-8-05-S-X-A

*SEE PHOTOMETARY CHART FOR LUMEN DATA

PERFORMANCE	WATTS	POWER	LUMEN OUTPUT 5°	LUMEN OUTPUT 40°	EFFICACY 5°	EFFICACY 40°	CBCP 5°	CBCP 40°
	4	Low Output	309	429	76	107	21,991	705
	7.5	Medium Output	531	761	71	101	37,824	1,251
	11.5	High Output	744	1,120	65	99	53,048	1,874

ALL LUMEN DATA IS FROM 4000K 80CRI FIXTURES. PLEASE SEE PHOTOMETRY SPEC SHEET FOR ADDITIONAL LUMEN DATA.

COLOR RENDERING INDEX 80+, 90+

COLOR CONSISTENCY 3-STEP MACADAM ELLIPSE

LUMEN DEPRECIATION

WATTS	L70 @ 25C	L70 @ 50C	L90 @ 25C	L90 @ 50C
LOW	>60,500* >(109,000)**	>60,500* >(109,000)**	>60,500* >(109,000)**	>60,500* >(109,000)**
MEDIUM	>60,500* >(109,000)**	>60,500* >(109,000)**	>60,500* >(109,000)**	>60,500* >(109,000)**
HIGH	>60,500* >(181,000)**	>36,300*	>60,500* >(69,800)**	>33,200*

* ENERGY STAR REPORTED TESTING HOURS TO DATE. CALCULATIONS FOR LED FIXTURES ARE BASED ON MEASUREMENTS THAT COMPLY WITH IES LM-80 TESTING PROCEDURES AND IES TM-21 CALCULATOR

** ESTIMATED HOURS

NOTE: Information on this Spec Sheet is subject to change, please visit ecosenselighting.com/downloads/rise for the most updated information.

ECOSENSE LIGHTING INC.
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855.6.ECOSEN

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RISE™

OVERVIEW • SPECIFICATIONS • ORDERING

INTERIOR + EXTERIOR | **F080 SINGLE**

DATE	PROJECT	FIRM	TYPE

ELECTRICAL	**WATTAGE**	LOW OUTPUT = 4W; MEDIUM OUTPUT = 7.5W; HIGH OUTPUT = 11.5W
	POWER FACTOR	>0.9 for 120V (HO, MO, LO), 230V (HO, MO), 277V (HO)
	THD	<0.2 for 120V (HO, MO, LO), 230V (HO, MO), 277V (HO)
	OPERATING VOLTAGE	MULTIVOLT: 110-277VAC, 50/60 Hz
	DRIVER	INTEGRAL TO FIXTURE; DE-RATED POWER AND SYNCHRONOUS START-UP AT FULL BRIGHTNESS
	STARTUP TEMPERATURE	-40˚F TO 122˚F (-40˚C TO 50˚C)
	OPERATING TEMPERATURE	-40˚F TO 122˚F (-40˚C TO 50˚C)
	STORAGE TEMPERATURE	-40˚F TO 176˚F (-40˚C TO 80˚C)
	SURGE PROTECTION	SURGE PROTECTION DEVICES WITH A MINIMUM DISCHARGE CURRENT RATING OF 20kA, THAT MEET UL1449, CSA C22.2 No. 269.1, AND IEC TR 62066, SHOULD BE INSTALLED ON EACH BRANCH CIRCUIT.
CONTROL	**DIMMING**	110-277VAC, ELV TYPE, REVERSE PHASE, TRAILING EDGE
PHYSICAL	**DIMENSIONS**	W 2.49" x H 8.13" x L 6.97" ; (63.33mm x 206.45mm x 177.05mm)
	HOUSING/LENS	EXTRUDED ALUMINUM; UV STABILIZED POLYCARBONATE; STAINLESS STEEL FASTENERS
	WEIGHT	1.25LBS / 0.56KG
	ENVIRONMENT	OUTDOOR • UL CERTIFIED FOR WET LOCATIONS IP66 IMPACT RATED TO IK10 MEETS 3G ANSI C136.31 VIBRATION STANDARD FOR BRIDGE APPLICATIONS
	MOUNTING OPTIONS	A - FLYING LEADS - INTERNAL CABLE IC; BOTTOM EXIT; 1/2" NPT ; UL/ CE RATED B - EXTERNAL CABLE SIDE EXIT; SURFACE MOUNT ; UL LISTED SURFACE MOUNT PLATE INCLUDED C - EXTERNAL CABLE BOTTOM EXIT; 1/2" NPT ; UL LISTED SURFACE MOUNT PLATE INCLUDED D - EXTERNAL CABLE SIDE EXIT; SURFACE MOUNT ; CE LISTED SURFACE MOUNT PLATE INCLUDED E - EXTERNAL CABLE BOTTOM EXIT; SURFACE MOUNT ; CE LISTED SURFACE MOUNT PLATE INCLUDED
	WIRING	LENGTH OF FLYING LEADS 19" (482.6mm) LENGTH OF EXTERNAL CABLE 10' (3.05m)
	TOOLS	2.5mm HEX KEY AND PHILLIPS #0 SCREWDRIVER FOR INTERCHANGEABLE LENS + SNOOTS 4mm HEX KEY FOR AIMING 5mm HEX KEY FOR MAIN TILT ARM
	WIND LOAD (EPA)	EFFECTIVE PROJECTED AREA 0.14ft²
	CORROSION RESISTANT	RISE HAS A HIGH-PERFORMING, CORROSION-RESISTANT FINISH THAT USES HIGH DURABILITY TRIGLYCIDYL ISOCYANURATE (TGIC) POWDER COATINGS SPECIFICALLY DESIGNED FOR NATATORIUMS AND EXTERIOR WEATHER EXPOSURE. THIS FINISH HAS BEEN TESTED AND APPROVED TO **MARINE GRADE** CORROSION RESISTANCE STANDARD IN UL1598A, ASTM B117 SALT FOG TEST FOR 200 HOURS.
FIXTURE RATING & CERTIFICATIONS	**CE, UL CERTIFIED** **RoHS COMPLIANT, IK10**	CE · c UL us LISTED · RoHS COMPLIANT · IK10
LIMITED WARRANTY	**5 YEARS**	

0-10V CONTROL OPTIONS

100-120VAC / 277VAC Linear Dimming Control Module 0-10V - Plenum Rated **LDCM-PL-120-277-010V-GR**

All products come standard with ELV dimming capabilities. 0-10V Control options required for operation at 0-10V.

OPTIONAL ACCESSORIES

Snoots

Half Snoot, Color Finish (K=Black, Z=Bronze, S=Silver, W=White, C=Custom) ..... **F080-H-(K,Z,S,W,C)**

Full Snoot, Color Finish (K=Black, Z=Bronze, S=Silver, W=White, C=Custom) ..... **F080-F-(K,Z,S,W,C)**

Interchangeable Lens

If inner optic = 5°, Desired angle	**Order the following spread lens**
5 Degree	**F080-LENS-05**
10 Degree	**F080-LENS-10**
15 Degree	**F080-LENS-15**
20 Degree	**F080-LENS-20**
40 Degree	**F080-LENS-40**
60 Degree	**F080-LENS-60**
80 Degree	**F080-LENS-80**

NOTE: Information on this Spec Sheet is subject to change, please visit ecosenselighting.com/downloads/rise for the most updated information.

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VCPG LED
Parking Garage

Catalog Number

Notes

Type

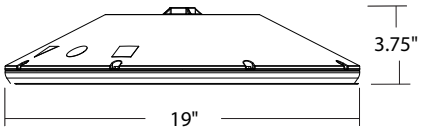
Hit the Tab key or mouse over the page to see all interactive elements.

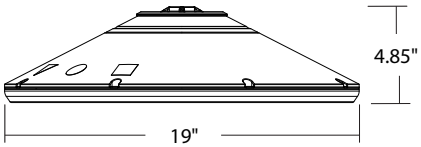
Specifications

Diameter: 19"

Height: 3.75" (4.85" with Up-Light)

Weight (max, with no options): 18 lbs





A+ Capable options indicated by this color background.

Introduction

The all new VCPG LED (Visually Comfortable Parking Garage) luminaire is designed to bring glare control, optical performance and energy savings into one package. The recessed lens design of VCPG LED minimizes high angle glare, while its precision molded acrylic lens eliminates LED pixilation and delivers the required minimums, verticals and uniformity. The dedicated up-light module option reduces the contrast between the luminaire and the ceiling creating a more visually comfortable environment.

The VCPG LED delivers up to 87% in energy savings when replacing 175W metal halide luminaires. With over 100,000 hour life expectancy (12+ years of 24/7 continuous operation), the VCPG LED luminaire provides significant maintenance savings over traditional luminaires.

Ordering Information

EXAMPLE: VCPG LED V4 P4 40K 70CRI T5M MVOLT SRM DNAXD

VCPG LED

Series	LED Light Engines	Package	Color temperature	Color Rendering Index	Distribution	Voltage		Mounting
VCPG LED	V4[1] 4 Light Engines V8[1] 8 Light Engines	P1[1] P2[1] P3[1] P4[1] P5[1] P6[1] P7[1]	30K 3000 K 35K 3500 K 40K 4000 K 50K 5000 K	70CRI 80CRI	T5M Type V, medium T5R[2] Type V, rectangular T5W Type V, wide T5E Type V entry LANE[2] Drive lane	MVOLT 347 480	For ordering with fuse 120 208 240 277 347 480	**Shipped included** PM Pendant mount standard (24-inch length supply leads) SRM Surface mount (24-inch length supply leads) ARM Arm mount (use RSXWBA accessory to mount to a wall) **Shipped separately** YK Yoke/trunnion mount[3]

Options

Shipped installed

UPL1	Up-Light: 500 lumens
UPL2	Up-Light: 700 lumens
E8WC	Emergency battery backup, Certified in CA Title 20 MAEDBS (8W, -20°C min)[4,5,6]
E10WH	Emergency battery backup, Certified in CA Title 20 MAEDBS (10W, 5°C min)[4,5,6]
HA	High ambient (50°C, only P1-P4)
SF	Single fuse (120V, 277V, 347V)
DF	Double fuse (208V, 240V, 480V)
SPD10KV	10KV Surge Pack
LDS36	36in (3ft) lead length
LDS72	72in (6ft) lead length
LDS108	108in (9ft) lead length
DMG	External 0-10V leads (no controls)[7]

Shipped Separately

WG	Wire Guard
BDS	Bird Shroud
HS	House Side Shield

Standalone Sensors/Controls[2]

PIR	Motion/ambient sensor for 8-15' mounting heights
PIRH	Motion/ambient sensor for 15-30' mounting heights
PIR3FC3V	Motion/ambient sensor for 8-15' mounting heights, pre programmed to 3fc and 35% light output
PIRH3FC3V	Motion/ambient sensor for 15-30' mounting heights, pre programmed to 3fc and 35% light output
PIR3FC3V924	UL924 Listed motion/ambient sensor for emergency circuit for 8-15' mounting heights, pre programmed to 3fc and 35% light output[8]
PIRH3FC3V924	UL924 Listed motion/ambient sensor for emergency circuit for 15-30' mounting heights, pre programmed to 3fc and 35% light output[8]

Networked Sensors/Controls[2]

NLTAIR2 PIR	nLIGHT AIR Wireless enabled motion/ambient sensor for 8-15' mounting heights
NLTAIR2 PIRH	nLIGHT AIR Wireless enabled motion/ambient sensor for 15'-30' mounting heights
NLTAIR2 PIR924	nLIGHT AIR Wireless enabled, UL 924 Listed motion/ambient sensor for emergency circuits for 8-15' mounting heights[9]
NLTAIR2 PIRH924	nLIGHT AIR Wireless enabled, UL 924 Listed motion/ambient sensor for emergency circuits for 15-30' mounting heights[9]
XAD	XPoint™ Wireless enabled[10]
XAD924	XPoint™ Wireless enabled, UL 924 Listed for emergency circuit[8,10]
XAD PIR	XPoint™ Wireless enabled motion/ambient sensor for 8-15' mounting heights
XAD PIRH	XPoint™ Wireless enabled motion/ambient sensor for 15-30' mounting heights
XAD924 PIR	XPoint™ Wireless enabled, UL 924 Listed motion/ambient sensor for emergency circuits for 8-15' mounting heights[8]
XAD924 PIRH	XPoint™ Wireless enabled, UL 924 Listed motion/ambient sensor for emergency circuits for 15-30' mounting heights[8]

Finish *(required)*

DWHXD	White
DNAXD	Natural aluminum
DDBXD	Dark bronze
DBLXD	Black

Ordering Information Cont.

Accessories

Ordered and shipped separately.

VCPGBDS DWHXD U	Bird shroud for PM (specify finish)
VCPGBDS YK DWHXD U	Bird shroud for YK (specify finish)
VCPGUBDS DWHXD U	Bird shroud for PM with Up-Light (specify finish)
VCPGUBDS YK DWHXD U	Bird shroud for YK with Up-Light (specify finish)
VCPGSRM U	Surface mount kit, with no Up-Light
VCPGUSRM U	Surface mount kit, with Up-Light
VCPGWG U	Wire guard
SLVSQ	Quick mount pendant swivel kit, square
SLVRD	Quick mount pendant swivel kit, round
VCPG YK DWHXD U	Yoke mount kit (specify finish)
RSXWBA DWHXD U	RSX WBA wall bracket (specify finish)

NOTES

1 P1-P6 not available with V8. P7 not available with V4.
2 Not available with P7.
3 Only vertical height adjustment. No angle adjustment. Use PM and SLVSQ or SLVRD for mounting to angled ceiling or canopies.
4 Not available with 347V or 480V.
5 E8WC and E10WH only rated up to 35°C ambient.
6 E8WC & E10WH only available with P1-P4 packages.
7 DMG option not available with standalone or networked sensors/controls.
8 Power interruption delay >30 milliseconds required for operation. Refer sequence of operations on page 4 for more details. BDS not available with UPL1 or UPL2.
9 Not available with P6 & P7. Power interruption delay >200 milliseconds required for operation. Refer sequence of operations on page 4 for more details.
10 XAD & XAD924 not available with PIR3FC3V924 and PIRH3FC3V924.

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Performance Package	Watts	Distribution Type	30K (3000K, 70 CRI)		35K (3500K, 70 CRI)		40K (4000K, 70 CRI)		50K (5000K, 70 CRI)	
			Lumens	LPW	Lumens	LPW	Lumens	LPW	Lumens	LPW
P1	27W	T5E	3,581	135	3,670	138	3,815	144	3,876	146
		T5M	3,620	136	3,710	140	3,856	145	3,917	147
		T5W	3,592	135	3,681	139	3,827	144	3,888	146
		T5R	3,464	130	3,550	134	3,690	139	3,749	141
		LANE	3,507	132	3,594	135	3,736	141	3,796	143
P2	34W	T5E	4,577	135	4,691	138	4,876	144	4,954	146
		T5M	4,626	136	4,741	140	4,928	145	5,007	147
		T5W	4,591	135	4,705	139	4,891	144	4,968	146
		T5R	4,427	130	4,537	134	4,716	139	4,791	141
		LANE	4,482	132	4,594	135	4,775	141	4,851	143
P3	43W	T5E	5,808	134	5,952	137	6,187	143	6,286	145
		T5M	5,870	135	6,015	139	6,253	144	6,353	146
		T5W	5,825	134	5,970	138	6,205	143	6,304	145
		T5R	5,617	130	5,757	133	5,984	138	6,079	140
		LANE	5,688	131	5,829	134	6,059	140	6,155	142
P4	56W	T5E	7,391	131	7,575	135	7,874	140	7,999	142
		T5M	7,470	133	7,656	136	7,958	141	8,085	144
		T5W	7,414	132	7,597	135	7,898	140	8,023	143
		T5R	7,149	127	7,326	130	7,615	135	7,737	137
		LANE	7,238	129	7,418	132	7,711	137	7,834	139
P5	82W	T5E	10,189	124	10,442	127	10,854	132	11,027	134
		T5M	10,298	125	10,553	128	10,970	134	11,145	136
		T5W	10,220	124	10,473	128	10,887	133	11,060	135
		T5R	9,855	120	10,099	123	10,498	128	10,665	130
		LANE	9,978	121	10,226	124	10,629	129	10,799	131
P6	108W	T5E	12,878	120	13,197	123	13,719	127	13,937	129
		T5M	13,015	121	13,338	124	13,865	129	14,086	131
		T5W	12,917	120	13,237	123	13,760	128	13,979	130
		T5R	12,455	116	12,764	119	13,268	123	13,480	125
		LANE	12,611	117	12,924	120	13,435	125	13,649	127
P7	122W	T5E	15,503	125	15,887	128	16,515	133	16,778	135
		T5M	15,668	126	16,057	129	16,691	135	16,957	137
		T5W	15,549	125	15,935	129	16,564	134	16,828	136

Up-light Lumen Output

Up-light Option	Watts	Lumens
UPL1	6.5W	519
UPL2	8.5W	715

Lumen Multiplier for 80CRI

CCT	Multiplier
30K	0.926
35K	0.945
40K	0.967
50K	0.965

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

Ambient		Lumen Multiplier
0°C	32°F	1.03
10°C	50°F	1.02
20°C	68°F	1.01
25°C	77°F	1
30°C	86°F	0.99
40°C	104°F	0.98

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in a 25°C ambient, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	1.0	0.97	0.94	0.89

Electrical Load

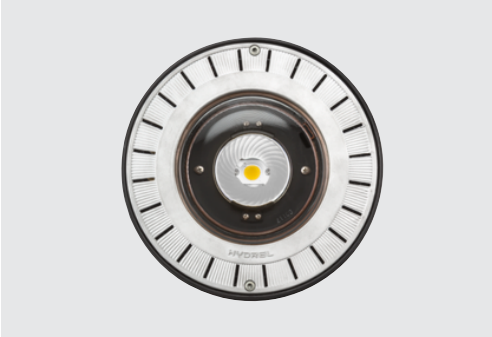
Power Package	System Watts	Current (A)					
		120V	208V	240V	277V	347V	480V
P1	27W	0.22	0.13	0.12	0.10	0.08	0.06
P2	34W	0.28	0.16	0.14	0.13	0.10	0.08
P3	43W	0.37	0.21	0.18	0.16	0.13	0.09
P4	56W	0.48	0.28	0.24	0.21	0.16	0.12
P5	82W	0.68	0.40	0.35	0.30	0.24	0.18
P6	108W	0.91	0.52	0.45	0.39	0.32	0.23
P7	124W	1.03	0.59	0.51	0.44	0.37	0.27

HYDREL

CATALOG NUMBER

NOTES

TYPE



M9400C

In-Grade Luminaire

Specifications	SINGLE LENS	DOUBLE LENS
Length:	9"	9"
	229 mm	229 mm
Width:	9"	9"
	229 mm	229 mm
Height:	16"	16"
	407 mm	407 mm
Weight:	21lbs	23lbs

Weight is based on aluminum material.
For B and SS material add 2lbs.

HIGHLIGHTS

- Factory-sealed LED lamp module and encapsulated power module
- Optical and mechanical aiming with an optional double lens
- Optimal efficiency through photometric improvements
- Color temperature: 27K - 50K
- In-line & 0-10V Dimming
- Seven distributions including very narrow spot & wall wash
- Flow-through technology

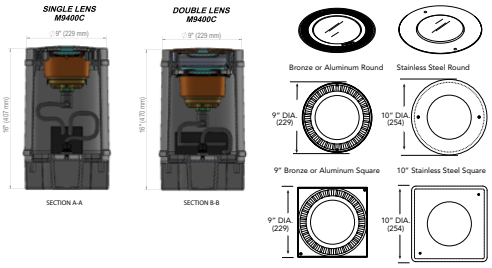
5 YEAR warranty

LED

IP68

DLC

DIMENSIONS

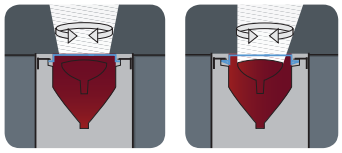


LUMEN PACKAGES

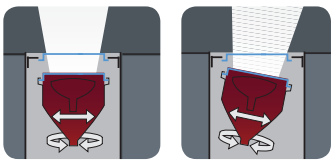
	VNSP	NSP	NFL	MFL	FL	WFL	WWD
Delivered Lumens	2,425	2,527	2,426	2,154	2,254	1,955	1,550
Watts	20	20	20	20	20	20	20
LPW	119	128	123	109	114	99	78
Peak Candela	22,634	15,940	14,728	3,364	2,097	1,423	1,729

Note: Information based on 4000K @ P2 Performance Package -
Single lens (M9410C and M9430C)

AIMING DETAILS

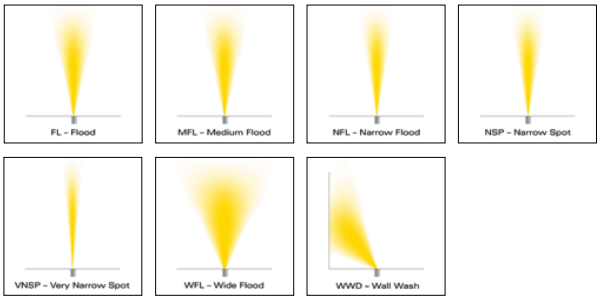


Single lensed fixture can be aimed using
10° and 20° optical tilt lenses only.



Double lens, mechanically and optically aimed.

STANDARD DISTRIBUTION



ORDERING INFORMATION

EXAMPLE: M9420C SS LED P3 40K MVOLT NSP FLC 34S

Model		Door Material		Source	Performance Package		LED Color		Voltage	Distribution		Lens[5]	
M9410C	Round Door, Single Lens	A	Aluminum	LED	P1	10W	27K	2700K	MVOLT (120 - 277 volt 50/60HZ)	NSP	Narrow Spot	FLC	Flat Lens Clear
M9420C	Round Door, Double Lens	B	Bronze		P2	20W	30K	3000K		NFL	Narrow Flood	FLC5	Flat Lens Clear, 5° Axial Spread
M9430C	Square Door, Single Lens	SS	Stainless Steel		P3	28W	35K	3500K		MFL	Medium Flood	FLC10	Flat Lens Clear, 10° optical tilt
M9440C	Square Door, Double Lens				P4[1]	31W	40K	4000K		FL	Flood	FLC20	Flat Lens Clear, 20° optical tilt
					P5[2]		50K	5000K		WFL	Wide Flood	FLF	Flat Lens Frosted
							AMBLW[3]	Amber Limited Wavelength		WWD[4]	Wall Wash	FLCAS	Flat Lens Clear, Anti-Slip
							Note: For 50K consult factory for lead times			VNSP	Very Narrow Spot	FLC5AS	Flat Lens Clear, 5° Axial Spread, Anti-Slip

Lens (cont.)		Conduit Entries		Accessories		Options		Finish[13]		Listing	
FLCSR[6]	Flat Lens Clear Slip Resistant	12B	1/2" NPT Bottom	Internal[8,9]		LDIM	0-10V Dimming (Dims to Dark)	BL	Black	IEC[7,15]	Built to International Electro-technical Commission Standards. (50HZ applications only)
FLC5SR[6]	Flat Lens Clear, 5° Axial Spread, Slip Resistant	12S	1/2" NPT Side	IHL	Internal Honeycomb Louver	IDIM[12]	Inline Dimming (Dims to Dark)	BZ	Bronze		
FLC10SR[6]	Flat Lens Clear, 10° optical tilt, Slip Resistant	34B	3/4" NPT Bottom	LSF	Linear Spread Filter			DDB	Dark Bronze		
FLC20SR[6]	Flat Lens Clear, 20° optical tilt, Slip Resistant	34S	3/4" NPT Side	External[8,10]				DNA	Natural Alum.		
CLC	Convex Lens, Clear	25S[7]	25mm Side	GS	Glare Shield			GN	Green		
CLF	Convex Lens, Frosted	25B	25mm bottom	LC[10]	Lexan Cover			GR	Gray		
		1B	1" bottom	RG[11]	Rock Guard			SND	Sand		
		20B	20mm bottom	Trim Ring[8,10]				STG	Steel Gray		
		20S	20mm side	BTR	Brass Round			TVG	Terra Verde Green		
		16B	PG16 bottom	BTS	Brass Square			WH	White		
		16S	PG16 side	STR	Stainless Round			__Z[14]	Zinc Undercoat (i.e. BLZ)		
				STS	Stainless Square						

ELECTRICAL LOAD

			Current (A)			
Light Engines	**Drive Current (mA)**	**System Watts**	120	208	240	277
P1	250mA	10	0.083	0.048	0.042	0.036
P2	500mA	20	0.167	0.096	0.083	0.072
P3	700mA	28	0.233	0.135	0.117	0.101
P4	850mA	31	0.258	0.149	0.129	0.112
P5	1050mA	14	0.117	0.067	0.058	0.051

PROJECTED LED LUMEN MAINTENANCE

Data references the extrapolated performance projections for the **Fixture** platform in a **25°C ambient**, based on 13,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Based on 2700K-5000K LED color

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	1.00	0.91	0.85	0.75
Lumen Maintenance Factor*	1.00	0.94	0.94	0.93

*For VNSP only

LUMEN AMBIENT TEMPERATURE (LAT) MULTIPLIERS

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

Based on 2700K-5000K LED color

Ambient		**Lumen Multiplier**	**Lumen Multiplier***
0°C	32°F	1.05	1.06
10°C	50°F	1.03	1.04
20°C	68°F	1.01	1.01
25°C	77°F	1	1
30°C	86°F	0.99	0.99
40°C	104°F	0.96	0.96

*For VNSP only

SLIP RESISTANCE AND LOAD RATING

M9400C LED
MAXIMUM LOAD RATING
Peak compression force of 7,700 lbs. (single lens), 2,550 lbs. (double lens).
LENS STATIC COEFFICIENT OF FRICTION
M9400C Anti-Slip Lens (FLCAS): Dry = 0.76; Wet = 0.10
M9400C Slip Resistant Lens (FLCR): Dry = 0.66; Wet = 0.67

M9400C LED Series Assembly consists of the following individual components parts	MRISC94 Rough-In Housing
	MFSC94 Finishing Section
	MACSC LED Module
	MHSLC94Power Module

Notes:
1 P3 with VNSP and P4 not available with double lens.
2 P5 only available with AMBLW.
3 AMBLW not available with VNSP or NSP distribution.
4 Recommeded to use the FLF or FLCSR lens with the WWD. WWD distribution is not avaialble with double lens.
5 Specify top lens. Bottom lens is FLC standard on M9420C and M9440C.
6 Meets ADA requirements for coefficient of friction.
7 Only for use in 50HZ applications.
8 Accessories are mutually exclusive, choose one only.
9 Not available with FLC10, FLC20, FLC10SR or FLC20SR.
10 External accessory not available with SS door material.
11 Not available with CLC or CLF convex lens.
12 IDIM option should be run at 120 volt.
13 Finish only available on "A" door material.
14 Add Zinc undercoat for harsh environments.
15 Product is built to IEC standards but not listed.

TROV® Flex

OVERVIEW • SPECIFICATIONS • ORDERING

EXTERIOR | **L09 FLEX**

DATE	PROJECT	FIRM	TYPE

THE ALL-SILICONE, FLEXIBLE LUMINAIRE WITH OPTICS, TROV FLEX L09 PACKS 2-STEP COLOR CONSISTENCY INTO A DURABLE PACKAGE SUITABLE FOR BOTH EXTERIOR AND INTERIOR USE. ITS ULTRA-DISCREET PROFILE MAKES IT AN IDEAL FIT FOR APPLICATIONS WHERE SPACE IS A PREMIUM.

FEATURES:

- DIMMABLE TO 0%
- 3 BEAM ANGLES
- FIELD CUTTABLE EVERY 6 INCHES
- 24 VDC CLASS 2
- 90+ CRI
- IP67 RATED FOR OUTDOOR AND INDOOR APPLICATIONS

MODEL SIZE	INTERIOR/ EXTERIOR	LENGTH	POWER	CCT	CRI	VOLTAGE	OPTICS
	E	120			90	CV24 - 24VDC	
L09	E	120 - 120"	05 - 5W/ft 09 - 9W/ft	27 - 2700K 30 - 3000K 35 - 3500K 40 - 4000K	90 - 90CRI 80 CRI is available as Build to Order. Longer lead times apply. Consult your Ecosense Sales Rep for more information.	CV24 - 24VDC	10x10 15x40 ASYM

EXAMPLE: L09-E-120-05-27-90-CV24-15x40

PERFORMANCE	WATTS	OPTIC	LUMEN OUTPUT	EFFICACY	CBCP
	05	10x10	440 lm/FT (1,443 lm/m)	92 lm/W	4,345
		15x40	441 lm/FT (1,447 lm/m)	92 lm/W	700
		ASYM	428 lm/FT (1,405 lm/m)	89 lm/W	385
	09	10x10	714 lm/FT (2,344 lm/m)	84 lm/W	7,056
		15x40	716 lm/FT (2,350 lm/m)	84 lm/W	1,137
		ASYM	696 lm/FT (2,282 lm/m)	82 lm/W	626

ALL LUMEN DATA IS FROM 4000K 90CRI FIXTURES. PLEASE SEE PHOTOMETRY SPEC SHEET FOR ADDITIONAL LUMEN DATA.

COLOR RENDERING INDEX	90+
COLOR CONSISTENCY	2-STEP MACADAM ELLIPSE

LUMEN DEPRECIATION / RATED LIFE	WATTS	L70 @ 25C
	5W-9W	>50,000

*CALCULATIONS FOR LED FIXTURES ARE BASED ON MEASUREMENTS THAT COMPLY WITH IES LM-80 TESTING PROCEDURES AND IES TM-21 CALCULATOR.

ELECTRICAL	**MAX POWER CONSUMPTION**	5W/ft = 4.8W (15.7W/m) ; 9W/ft = 8.7W/ft (28.5W/m)
	MAX FIXTURE RUN LENGTH	5W/ft = 20ft (Interior) 10ft (Exterior), 9W/ft = 10ft
	OPERATING VOLTAGE	24VDC
	DRIVER	REMOTE DRIVER SOLD SEPARATELY
	STARTUP TEMPERATURE	-4˚F TO 122˚F (-20˚C TO 50˚C)
	OPERATING TEMPERATURE	-4˚F TO 122˚F (-20˚C TO 50˚C)
	STORAGE TEMPERATURE	-40˚F TO 176˚F (-40˚C TO 80˚C)
PHYSICAL	**HOUSING/LENS**	SILICONE HOUSING AND LENS
	WEIGHT	2.22oz/ft ; (206.5g/m)
	CONNECTORS	INTEGRAL MALE AND FEMALE CONNECTORS
	ENVIRONMENT	OUTDOOR WET LOCATION IP67 FOR OUTDOOR, MARINE, AND NATATORIUM APPLICATIONS
	MOUNTING OPTIONS	STAINLESS STEEL MOUNTING BRACKET NEEDED EVERY 6 INCHES. **SOLD SEPERATELY.**
	CUT LENGTH	CUTTABLE EVERY 6 INCHES (152.4MM)
	BEND RADIUS	3IN (75MM) VERTICAL, 0IN (0MM) HORIZONTAL
CONTROL	**DIMMING**	0%-100%
FIXTURE RATING & CERTIFICATIONS	**UL AND CE LISTED** **RoHS COMPLIANT** **TITLE 24 JA8**	
LIMITED WARRANTY	**5 YEARS**	

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855.6.ECOSEN

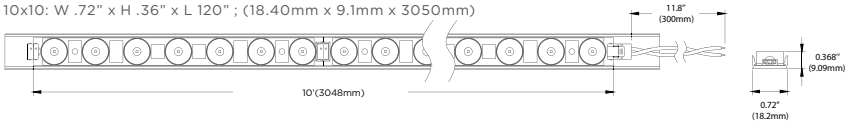
TROV® Flex

DATE | PROJECT | FIRM | TYPE

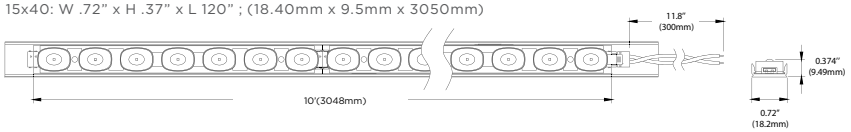
PHYSICAL

DIMENSIONS

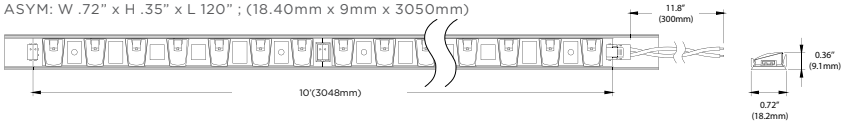
10x10: W .72" x H .36" x L 120" ; (18.40mm x 9.1mm x 3050mm)



15x40: W .72" x H .37" x L 120" ; (18.40mm x 9.5mm x 3050mm)



ASYM: W .72" x H .35" x L 120" ; (18.40mm x 9mm x 3050mm)



WIRING OPTIONS (Interior Use Only)

Cable Assembly, AVX Connector, Leader, 6 feet CBL-AVX-LDR-6ft
Cable Assembly, AVX Connector, Jumper, 4 inches CBL-AVX-JMP-4in
Cable Assembly, AVX Connector, Jumper, 12 inches CBL-AVX-JMP-12in
Cable Assembly, AVX Connector, Jumper, 6 feet CBL-AVX-JMP-6ft

L09 120 inch spools come with 12" wired leads. Leader and jumper cables are only needed when cutting to shorter lengths.

REMOTE DRIVER OPTIONS

MAGNETIC NORTH AMERICA
Driver, Magnetic, Exterior, MLV & TRIAC, 96W, 120/277V Dual Tap DRV-M-E-96W-120/277-SBC
Driver, Magnetic, Exterior, MLV & TRIAC, 60W, 120/277V Dual Tap DRV-M-E-60W-120/277-SBC
Driver, Magnetic, Exterior, MLV & TRIAC, 40W, 120/277V Dual Tap DRV-M-E-40W-120/277-SBC
ELECTRONIC NORTH AMERICA
Driver, Electronic, Exterior, 0-10V & TRIAC & ELV, 96W, 120-277V Multi-Volt DRV-E10-E-96W-120-277-LTF
Driver, Electronic, Exterior, 0-10V & TRIAC & ELV, 60W, 120-277V Multi-Volt DRV-E10-E-60W-120-277-LTF
Driver, Electronic, Exterior, 0-10V & TRIAC & ELV, 40W, 120-277V Multi-Volt DRV-E10-E-40W-120-277-LTF
ELECTRONIC INTERNATIONAL
Driver, Electronic, Exterior, 0-10V, 100W, 100-305V Multi-Volt, CE Only DRV-E10-E-100W-100-305-ELG
Driver, Electronic, Exterior, DALI, 100W, 100-305V, Multi-Volt, CE Only DRV-DALI-E-100W-100-305-ELG
Driver, Electronic, Exterior, 0-10V, 120W, 90-305V Multi-Volt, CE Only..... DRV-E10-E-120W-90-305-PWM
Driver, Electronic, Exterior, DALI, 120W, 90-305V Multi-Volt, CE Only DRV-DALI-E-120W-90-305-PWM

See Remote Driver Spec Sheet for more details.
Drivers can be fully loaded.

MAXIMUM DRIVER TO FIXTURE WIRE LENGTH CHART

	Total Wattage per Run									
Wire Gauge	**10W .42 A**	**20W .83 A**	**30W 1.3 A**	**40W 1.7 A**	**50W 2.1 A**	**60W 2.5 A**	**70W 2.9 A**	**80W 3.3 A**	**90W 3.75 A**	**100W 4.2 A**
20 AWG	85 ft.	43 ft.	27 ft.	21 ft.	17 ft.	14 ft.	12 ft.	11 ft.	9 ft.	8 ft.
18 AWG	134 ft.	68 ft.	45 ft.	33 ft.	27 ft.	22 ft.	19 ft.	17 ft.	15 ft.	14 ft.
16 AWG	215 ft.	109 ft.	72 ft.	54 ft.	43 ft.	36 ft.	31 ft.	27 ft.	24 ft.	22 ft.
14 AWG	345 ft.	174 ft.	115 ft.	86 ft.	69 ft.	57 ft.	49 ft.	43 ft.	39 ft.	36 ft.
12 AWG	539 ft.	272 ft.	181 ft.	135 ft.	108 ft.	90 ft.	77 ft	68 ft.	61 ft.	56 ft.
10 AWG	784 ft.	397 ft.	263 ft.	197 ft.	158 ft.	131 ft.	112 ft.	98 ft.	97 ft.	82 ft.

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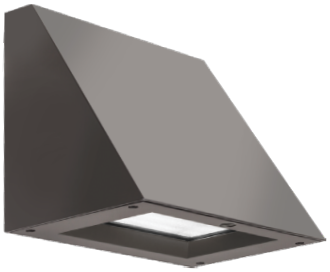


WDGE2 LED
Architectural Wall Sconce

Catalog Number

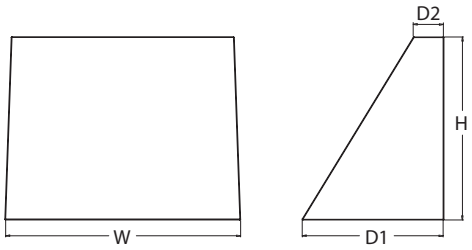
Notes

Type

Hit the Tab key or mouse over the page to see all interactive elements.

Specifications

Depth (D1):	7"
Depth (D2):	1.5"
Height:	9"
Width:	11.5"
Weight: (without options)	13.5 lbs



Introduction

The WDGE LED family is designed to meet specifier's every wall-mounted lighting need in a widely accepted shape that blends with any architecture. The clean rectilinear design comes in four sizes with lumen packages ranging from 1,200 to 25,000 lumens, providing a true site-wide solution. Embedded with nLight® AIR wireless controls, the WDGE family provides additional energy savings and code compliance.

WDGE2 delivers up to 6,000 lumens with a soft, non-pixelated light source, creating a visually comfortable environment. When combined with multiple integrated emergency battery backup options, including an 18W cold temperature option, the WDGE2 becomes the ideal wall-mounted lighting solution for pedestrian scale applications in any environment.

WDGE LED Family Overview

Luminaire	Standard EM, 0°C	Cold EM, -20°C	Sensor	Lumens (4000K)					
				P1	P2	P3	P4	P5	P6
WDGE1 LED	4W	--	--	1,200	2,000	--	--	--	--
WDGE2 LED	10W	18W	Standalone / nLight	1,200	2,000	3,000	4,500	6,000	--
WDGE3 LED	15W	18W	Standalone / nLight	7,500	8,500	10,000	12,000	--	--
WDGE4 LED	--	--	Standalone / nLight	12,000	16,000	18,000	20,000	22,000	25,000

Ordering Information

EXAMPLE: WDGE2 LED P3 40K 80CRI VF MVOLT SRM DDBXD

Series	Package		Color Temperature		CRI	Distribution		Voltage	Mounting	
WDGE2 LED	P1[1]	P1SW	27K	2700K	80CRI	VF	Visual comfort forward throw	MVOLT	**Shipped included**	**Shipped separately**
	P2[1]	P2SW	30K	3000K	90CRI	VW	Visual comfort wide	347[3]	SRM Surface mounting bracket	AWS 3/8inch Architectural wall spacer
	P3[1]	P3SW	35K	3500K				480[3]	ICW Indirect Canopy/Ceiling Washer bracket (dry/damp locations only)[7]	PBBW Surface-mounted back box (top, left, right conduit entry). Use when there is no junction box available.
	P4[1]	Door with small window (SW) is required to accommodate sensors. See page 2 for more details.	40K	4000K						
	P5[1]		50K[2]	5000K						

Options

E4WH	Emergency battery backup, Certified in CA Title 20 MAEDBS (4W, 0°C min)
E10WH	Emergency battery backup, Certified in CA Title 20 MAEDBS (10W, 5°C min)
E20WC	Emergency battery backup, Certified in CA Title 20 MAEDBS (18W, -20°C min)
PE[4]	Photocell, Button Type
DS[5]	Dual switching (comes with 2 drivers and 2 light engines; see page 3 for details)
DMG[6]	0-10V dimming wires pulled outside fixture (for use with an external control, ordered separately)
BCE	Bottom conduit entry for back box (PBBW). Total of 4 entry points.

Standalone Sensors/Controls (only available with P1SW, P2SW & P3SW)

PIR	Bi-level (100/35%) motion sensor for 8-15' mounting heights. Intended for use on switched circuits with external dusk to dawn switching.
PIRH	Bi-level (100/35%) motion sensor for 15-30' mounting heights. Intended for use on switched circuits with external dusk to dawn switching
PIR1FC3V	Bi-level (100/35%) motion sensor for 8-15' mounting heights with photocell pre-programmed for dusk to dawn operation.
PIRH1FC3V	Bi-level (100/35%) motion sensor for 15-30' mounting heights with photocell pre-programmed for dusk to dawn operation.

Networked Sensors/Controls (only available with P1SW, P2SW & P3SW)

NLTAIR2 PIR	nLightAIR Wireless enabled bi-level motion/ambient sensor for 8-15' mounting heights.
NLTAIR2 PIRH	nLightAIR Wireless enabled bi-level motion/ambient sensor for 15-30' mounting heights.

See page 4 for out of box functionality

Finish

DDBXD	Dark bronze
DBLXD	Black
DNAXD	Natural aluminum
DWHXD	White
DSSXD	Sandstone
DDBTXD	Textured dark bronze
DBLBXD	Textured black
DNATXD	Textured natural aluminum
DWHGXD	Textured white
DSSTXD	Textured sandstone

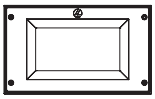
Accessories

Ordered and shipped separately.

WDGEAWS DDBXD U	WDGE 3/8inch Architectural Wall Spacer (specify finish)
WDGE2PBBW DDBXD U	WDGE2 surface-mounted back box (specify finish)

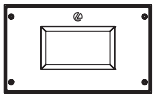
NOTES

1 P1-P5 not available with sensors/controls. Sensors/controls only available with P1SW, P2SW and P3SW.
2 50K not available in 90CRI
3 347V and 480V not available with E4WH, E10WH, E20WC or DS.
4 PE not available in 480V or with sensors/controls
5 DS option not available with E4WH, E10WH, E20WC or sensors/controls.
6 DMG option not available with sensors/controls
7 Not qualified for DLC. Not available with emergency battery backup or sensors/controls



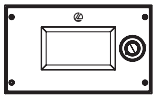
Default configuration with no sensors/controls.

Power Packages: P1, P2, P3, P4, P5



Small Window (SW) configuration

Power Packages: P1SW, P2SW, P3SW



Configuration with sensors/controls

Power Packages: P1SW, P2SW, P3SW

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Performance Package	System Watts	Dist. Type	27K (2700K, 80 CRI)					30K (3000K, 80 CRI)					35K (3500K, 80 CRI)					40K (4000K, 80 CRI)					50K (5000K, 80 CRI)				
			Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G
P1 / P1SW	10W	VF	1,166	119	0	0	0	1,209	123	0	0	0	1,251	128	0	0	0	1,256	128	0	0	0	1,254	128	0	0	0
		VW	1,197	122	0	0	0	1,241	126	0	0	0	1,284	131	0	0	0	1,289	131	0	0	0	1,286	131	0	0	0
P2 / P2SW	15W	VF	1,878	129	1	0	0	1,947	134	1	0	0	2,015	139	1	0	0	2,023	139	1	0	0	2,019	139	1	0	0
		VW	1,927	133	1	0	0	1,997	137	1	0	0	2,067	142	1	0	0	2,075	143	1	0	0	2,071	143	1	0	0
P3 / P3SW	23W	VF	2,908	129	1	0	0	3,015	134	1	0	0	3,119	138	1	0	0	3,132	139	1	0	0	3,126	139	1	0	0
		VW	2,983	132	1	0	0	3,093	137	1	0	0	3,200	142	1	0	0	3,213	143	1	0	0	3,206	142	1	0	0
P4	35W	VF	4,096	117	1	0	1	4,247	121	1	0	1	4,394	126	1	0	1	4,412	126	1	0	1	4,403	126	1	0	1
		VW	4,202	120	1	0	0	4,357	125	1	0	1	4,508	129	1	0	1	4,526	129	1	0	1	4,517	129	1	0	1
P5	48W	VF	5,567	115	1	0	1	5,772	119	1	0	1	5,972	123	1	0	1	5,996	124	1	0	1	5,984	124	1	0	1
		VW	5,711	118	1	0	1	5,921	122	1	0	1	6,127	126	1	0	1	6,151	127	1	0	1	6,139	127	1	0	1

Electrical Load

Performance Package	System Watts	Current (A)					
		120V	208V	240V	277V	347V	480V
P1 / P1SW	10W	0.082	0.049	0.043	0.038	--	--
	13W	--	--	--	--	0.046	0.033
P2 / P2SW	15W	0.132	0.081	0.072	0.064	--	--
	18W	--	--	--	--	0.056	0.041
P3 / P3SW	23W	0.195	0.114	0.100	0.088	--	--
	26W	--	--	--	--	0.079	0.058
P4	35W	0.302	0.175	0.152	0.134	--	--
	38W	--	--	--	--	0.115	0.086
P5	48W	0.434	0.241	0.211	0.184	--	--
	52W	--	--	--	--	0.157	0.119

Lumen Multiplier for 90CRI

CCT	Multiplier
27K	0.845
30K	0.867
35K	0.845
40K	0.885
50K	0.898

Lumen Output in Emergency Mode (4000K, 80 CRI)

Option	Dist. Type	Lumens
E4WH	VF	646
	VW	647
E10WH	VF	1,658
	VW	1,701
E20WC	VF	2,840
	VW	2,913

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

Ambient		Lumen Multiplier
0°C	32°F	1.03
10°C	50°F	1.02
20°C	68°F	1.01
25°C	77°F	1.00
30°C	86°F	0.99
40°C	104°F	0.98

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in a 25°C ambient, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	1.0	>0.96	>0.95	>0.91

Light building element - asymmetric wide beam distribution

BEGA

Type:
BEGA Product:
Project:
Modified:

Application
Light building element with asymmetric wide beam light distribution. Light building elements are luminous design features for public areas. They are usually suited for delineating and structuring interior and exterior spaces such as landscape areas, plazas, building entrances and atria.

Materials
Luminaire housing and post constructed of extruded and die-cast marine grade, copper free (≤ 0.3% copper content) A360.0 aluminum alloy
Clear safety glass
Reflector made of pure anodized aluminum
Silicone applied robotically to casting, plasma treated for increased adhesion
High temperature silicone gasket
Mechanically captive stainless steel fasteners
Stainless steel helicoils
Heavy gauge galvanized steel mounting base

NRTL listed to North American Standards, suitable for wet locations
Protection class IP 65
Effective projection area: 12.81 sq. ft.
Weight: 124.3 lbs

Electrical

Operating voltage	120-277V AC
Minimum start temperature	-30° C
LED module wattage	15.8 W
System wattage	20.0 W
Controllability	0-10V dimmable
Color rendering index	Ra > 80
Luminaire lumens	2,088 lumens (4000K)
LED service life (L70)	60,000 hours

LED color temperature

4000K - Product number + **K4**
3500K - Product number + **K35**
3000K - Product number + **K3**
2700K - Product number + **K27**
Amber - Product number + **AMB**

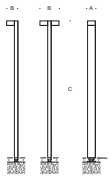
Wildlife friendly amber LED - Optional
Luminaire is optionally available with a narrow bandwidth, amber LED source (585-600nm) approved by the FWC. This light output is suggested for use within close proximity to sea turtle nesting and hatching habitats. Electrical and control information may vary from standard luminaire.

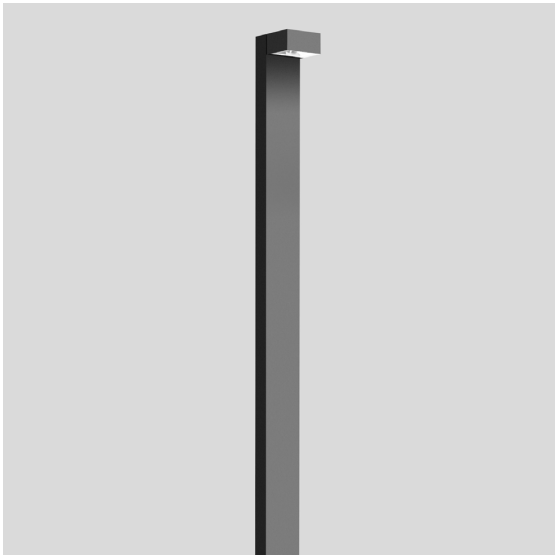
LED module wattage	29.4 W (Amber)
System wattage	34.6 W (Amber)
Luminaire lumens	851 lumens (Amber)

BEGA can supply you with suitable LED replacement modules for up to 20 years after the purchase of LED luminaires - see website for details

Finish
All BEGA standard finishes are matte, textured polyester powder coat with minimum 3 mil thickness.

Available colors	Black (BLK)	White (WHT)	RAL:
	Bronze (BRZ)	Silver (SLV)	CUS:





Light building element · asymmetric wide beam light distribution

	LED	A	B	C	Anchorage
99072	15.8 W	9 ½	12 ½	177	**79802**

BEGA 1000 BEGA Way, Carpinteria, CA 93013 (805) 684-0533 info@bega-us.com

Updated 08/13/19

COMcheck Software Version 4.1.5.1

Exterior Lighting Compliance Certificate

Project Information

Energy Code:	90.1 (2016) Standard
Project Title:	North Valley Complex Renovation
Project Type:	Alteration
Exterior Lighting Zone	2 (Light industrial area with limited nighttime use)

Construction Site:
26755 SW 95th Avenue
Wilsonville, OR 97070

Owner/Agent:
Department of Administrative Services
Wilonville, OR

Designer/Contractor:
PAE Engineers/Luma Lighting Design
Portland, OR 97204

Allowed Exterior Lighting Power

A Area/Surface Category	B Quantity	C Allowed Watts / Unit	D Tradable Wattage	E Allowed Watts (B X C)
North Parking Lot (Parking area)	43366 ft2	0.04	Yes	1735
Northwest Parking Lot (Parking area)	4827 ft2	0.04	Yes	193
South/Southwest Parking Lot (Parking area)	50906 ft2	0.04	Yes	2036
West Drive (Driveway)	4731 ft2	0.04	Yes	189
West Drive Mechanical Yard (Driveway)	4457 ft2	0.04	Yes	178
East Landscape (Landscaping)	8920 ft2	0.04	Yes	357
NW Walkway (Walkway < 10 feet wide)	156 ft of	0.5	Yes	78
North Facade (Illuminated length of facade wall or surface)	302 ft	2.5	No	755
South Facade (Illuminated length of facade wall or surface)	299 ft	2.5	No	748
South Loading Dock/Mechanical Yard (Loading dock)	11103 ft2	0.35	Yes	3886
Entry Plaza Area (Plaza area)	2871 ft2	0.1	Yes	287
South Entry Walk (Walkway < 10 feet wide)	170 ft of	0.5	Yes	85
NE Walkway (Walkway < 10 feet wide)	106 ft of	0.5	Yes	53
SE Walkway (Walkway < 10 feet wide)	89 ft of	0.5	Yes	44
			Total Tradable Watts (a) =	9122
			Total Allowed Watts =	10624
			Total Allowed Supplemental Watts (b) =	400

(a) Wattage tradeoffs are only allowed between tradable areas/surfaces.
(b) A supplemental allowance equal to 400 watts may be applied toward compliance of both non-tradable and tradable areas/surfaces.

Proposed Exterior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
North Parking Lot (Parking area 43366 ft2): Tradable Wattage				
S1B: S1B: Lithonia DSX0: Other:	1	4	71	284
S2A: S2A: Lithonia WDGE4: Other:	1	5	123	615
Northwest Parking Lot (Parking area 4827 ft2): Tradable Wattage				
S2B: S2B: Lighonia WDGE4: Other:	1	1	77	77
South/Southwest Parking Lot (Parking area 50906 ft2): Tradable Wattage				
S1A: S1A: Lithonia DSX0: Other:	1	7	71	497
S2B: S2B: Lighonia WDGE4: Other:	1	1	77	77
S2A: S2A: Lithonia WDGE4: Other:	1	2	123	246

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
S11: S11: Lithonia WDGE2: Other:	1	1	10	10
West Drive (Driveway 4731 ft2): Tradable Wattage				
S2B: S2B: Lighonia WDGE4: Other:	1	1	77	77
West Drive Mechanical Yard (Driveway 4457 ft2): Tradable Wattage				
S8: S8: Lithonia VCPG: Other:	1	1	27	27
S11: S11: Lithonia WDGE2: Other:	1	6	10	60
East Landscape (Landscaping 8920 ft2): Tradable Wattage				
S2B: S2B: Lighonia WDGE4: Other:	1	3	77	231
NW Walkway (Walkway < 10 feet wide 156 ft of walkway length): Tradable Wattage				
S11: S11: Lithonia WDGE2: Other:	1	2	10	20
S6: S6: Halo LCR8: Other:	1	1	34	34
North Facade (Illuminated length of facade wall or surface 302 ft): Non-tradable Wattage				
S5: S5: Kelvix Zach: Other:	1	302	3	906
South Facade (Illuminated length of facade wall or surface 299 ft): Non-tradable Wattage				
S5: S5: Kelvix Zach: Other:	1	299	3	897
South Loading Dock/Mechanical Yard (Loading dock 11103 ft2): Tradable Wattage				
S1C: S1C: Lithonia DSX0: Other:	1	6	38	228
Entry Plaza Area (Plaza area 2871 ft2): Tradable Wattage				
S7: S7: Ecosense Rise: Other:	1	12	12	144
S9: S9: Hydrel M9400C: Other: Exemption:Highlighting public monuments	1	9	10	Exempt
S4: S4: Kelvix Zach: Other:	1	57	5	285
S10: S10: Ecosense Trov: Other:	1	30	5	150
S6: S6: Halo LCR8: Other:	1	1	34	34
South Entry Walk (Walkway < 10 feet wide 170 ft of walkway length): Tradable Wattage				
S12: S12: Bega 99072: Other:	1	3	30	90
NE Walkway (Walkway < 10 feet wide 106 ft of walkway length): Tradable Wattage				
S6: S6: Halo LCR8: Other:	1	1	34	34
SE Walkway (Walkway < 10 feet wide 89 ft of walkway length): Tradable Wattage				
S6: S6: Halo LCR8: Other:	1	1	34	34
			Total Tradable Proposed Watts =	3254

Exterior Lighting PASSES

Exterior Lighting Compliance Statement

Compliance Statement: The proposed exterior lighting alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed exterior lighting systems have been designed to meet the 90.1 (2016) Standard requirements in COM*check* Version 4.1.5.1 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Daren Vandeberg, Lighting Designer LC — Name - Title

Signature

02/17/2021 — Date

E.01 GENSET

Sound-attenuated and weather-protective enclosures

> For generator sets from 10 to 1000 kW

Our energy working for you.™

Power Generation

- **Diesel generator set enclosures**
  10 to 1000 kW
  Weather-protective
  Level I, Level II, Level III
- **Spark-ignited generator set enclosures**
  20 to 150 kW
  Weather-protective
  Level I, Level II

Sound-attenuated and weather-protective enclosures from Cummins Power Generation Inc. meet even the strictest sound requirements and provide optimum protection from inclement weather.

Cummins Power Generation diesel and spark-ignited generator sets are available with sound-attenuated and weather-protective enclosures. Pre-assembled, pre-integrated and delivered as part of the entire power system, these enclosures are designed to speed installation time and reduce costs.

Choose from three levels of sound-attenuation, depending on model size, to comply with even the strictest noise requirements. Enclosures are constructed of steel or aluminum, which is preferred in coastal regions or other environments where corrosion is a concern.

Features:

■ **Cambered roof**
Prevents water accumulation

■ **Stainless steel hardware**
Resists rust

■ **12 and 14 gauge steel construction**

■ **Emergency stop button (standard on 600-1000 kW)**

■ **Enclosed exhaust system**
Ensures safety

■ **Fixed air inlet and outlet louvers**

■ **Choice of vertical or horizontal discharge**

■ **Non-hydroscopic sound insulation**

■ **Recessed, lockable doors**
Provides easy service access and protects internal equipment

■ **Flexible oil and coolant drain lines with interior valves**

■ **Rodent barriers on inlet and outlet**

■ **Ships assembled on fuel tank or lifting base**

> Three levels of sound attenuation
  Level I: 70 to 89 d(B)A*
  Level II: 63 to 78 d(B)A*
  Level III: 68 to 70 d(B)A*
> Compact footprint, low profile design
> Easy access to all major generator and engine control components for servicing
> Fully-house, enclosed exhaust silencer ensures safety and protects against rust
> Enclosure, generator set, exhaust system and tank are pre-assembled, pre-integrated and shipped as one package, saving time and labor costs
> All-steel construction with stainless steel hardware offers durability
> Upgrade kits
> Enclosures mounted directly to a sub-base fuel tank or lifting base
> UL2200-listed
> Customer options available to meet your application needs

Enclosure options

> Aluminum enclosure is wind-rated to 150 mph (per ASCE 7-05 exposure D, category 1 importance factor)
> Kits available to up-fit existing generator sets or to upgrade existing enclosures with additional sound attenuation
> Exterior oil and coolant drains with interior valves for ease of service
> Overhead 2-point lifting brackets (some models)

* Full load at 7 meters, steel enclosures

Choose from weather protective enclosure or three levels of sound attenuation:

Sound levels (dB(A))*				
kW	Model	Weather-protective	Level I	Level II
Diesel				
10	DSKAA	78	68	65
15	DSKAB	81	69	66
20	DSKBA	80	70	67
25	DSKFA	82	72	69
35	DGBB	82	71	63
35	DGGD	81	72	66
40	DGBC	82	72	63
40	DGHD	79	71	64
50	DGCA	83	72	66
50	DGHE	79	70	65
60	DGCB	84	73	67
60	DSFAD	87	79	71
80	DGCG	84	76	67
80	DSFAE	87	82	72
100	DGDB	86	77	70
100	DSGAA*	87	-	73
100	DSHAF	95	88	78
125	DGDK	86	80	71
125	DSGAB*	87	-	74
125	DSHAE	95	88	78
150	DGFA	89	77	72
150	DSGAC*	88	-	75
150	DSHAA	95	88	78
175	DGFB	90	78	72
175	DSHAB	95	88	78
200	DGFC	91	80	74
200	DSHAC	95	88	78
230	DGFS	91	81	75
230	DSHAD	96	89	78
250	DQDAA	90	86	71
275	DQDAB	89	86	71
275	DQHAA	86	85	74
300	DFCB	86	84	71
300	DQDAC	89	86	71
300	DQHAB	89	88	76
350	DFCC	87	85	72
350	DFEG	85	83	72
400	DFCE	89	85	73
400	DFEG	89	85	73
450	DFEJ	87	84	73
500	DFEK	88	85	76
600	DFGB	85	78	74
600	DQCA	87	79	74
750	DFGE	87	80	75
750	DFHA	91	81	77
750	DQCB	87	79	74
750	DQFAA	89	79	75
800	DFHB	91	81	77
800	DQCC	87	79	74
800	DQFAB	89	79	75
900	DFHC	93	83	78
900	DQFAC	88	80	76
1000	DFHD	90	80	76
1000	DQFAD	90	80	76

Sound levels (dB(A))*				
kW	Model	Weather-protective	Level I	Level II
Spark-ignited				
20	GGMA	77	N/A	66
25	GGMB	78	N/A	66
30	GGMC	79	N/A	67
35	GGFD	80	73	65
42/47	GGFE	83	73	66
60	GGHE	86	77	68
70/75	GGHF	87	77	69
85	GGHG	85	79	75
100	GGHH	86	80	76
125	GGLA	85	79	75
150	GGLB	85	79	75

***Also available Level III**

100 kW	DSGAA	68 dB(A)
125 kW	DSGAB	69 dB(A)
150 kW	DSGAC	70 dB(A)

Diesel generator sets from 100 to 150 kW (models **DSGAA, DSGAB, DSGAC**) are available in **Level III** sound attenuation.

Shown: 100 kW Tier 3 diesel generator set (model DSGAA).

* Full load at 7 meters, steel enclosures

Diesel package dimensions (in.)

Tank capacity (gal.)	Weather-protective			Level I			Level II, III		
	Length	Width	Height	Length	Width	Height	Length	Width	Height
35-80 kW									
70	83	40	63	83	40	81	102	40	81
140	83	40	71	83	40	89	102	40	89
100-230 kW									
109	105	40	67	108	40	85	142	40	87
173	105	40	72	108	40	90	142	40	92
309	105	44	87	N/A	N/A	N/A	145	43	97
336	105	40	86	108	40	104	142	40	106
230-500 kW									
Lifting base	188	82	100	188	82	100	222	82	100
300	188	82	104	188	82	104	222	82	104
400	188	82	106	188	82	106	222	82	106
500	188	82	108	188	82	108	222	82	108
600	188	82	111	188	82	111	222	82	111
660	188	82	113	188	82	113	222	82	113
720	188	82	114	188	82	114	222	82	114
850	188	82	118	188	82	118	222	82	118
1470	200	82	128	200	82	128	200	82	128
1700	234	82	128	234	82	128	234	82	128
600-1000 kW									
200	260	98	133	303	98	133	315	98	133
660	260	98	133	303	98	133	315	98	133
1000	260	98	137	303	98	137	315	98	137
1500	260	98	142	303	98	142	315	98	142
2000	280	98	142	320	98	142	320	98	142
2400	332	98	142	330	98	142	332	98	142

Spark-ignited package dimensions (in.)

Model number	Weather-protective			Level I			Level II		
	Length	Width	Height	Length	Width	Height	Length	Width	Height
20 kW									
GGMA	65	30	46	N/A	N/A	N/A	85	30	47
25 kW									
GGMB	65	30	46	N/A	N/A	N/A	85	30	47
30 kW									
GGMC	65	30	46	N/A	N/A	N/A	85	30	47
35 kW									
GGFD	83	40	54	83	40	72	83	40	72
45 kW									
GGFE	83	40	54	83	40	72	83	40	72
60 kW									
GGHE	83	40	54	83	40	72	83	40	72
70 kW									
GGHF	83	40	54	83	40	72	83	40	72
85 kW									
GGHG	105	40	70	105	60	70	142	60	70
100 kW									
GGHH	105	40	70	105	60	70	142	60	70
125 kW									
GGLA	105	40	70	105	60	70	142	60	70
150 kW									
GGLB	105	40	70	105	60	70	142	60	70

Cummins Power Generation
1400 73rd Avenue N.E.
Minneapolis, MN 55432
Phone: 763 574 5000
Fax: 763 574 5298

Latin America
3350 Southwest 148th Ave., Suite 205
Miramar, FL 33027
USA
Phone 1 954 431 5511
Fax 1 954 433 5797

Package listed to UL2200

Our energy working for you.™
www.cumminspower.com

Power Generation

Specification sheet

Diesel generator set QST30 series engine

680 kW - 1000 kW 60 Hz

Description

Cummins® commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary Standby and Prime power applications.

Features

Cummins heavy-duty engine - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

Permanent Magnet Generator (PMG) - Offers enhanced motor starting and fault clearing short circuit capability.

Circuit breakers - Option for manually-and/or electrically-operated circuit breakers.

Control system - The PowerCommand® electronic control is standard equipment and provides total generator set system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

Masterless Paralleling - An optional electrically operated circuit breaker can be added for a simple masterless paralleling solution.

Cooling system - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

NFPA - The generator set accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

Warranty and service - Backed by a comprehensive warranty and worldwide distributor network.

	Standby rating	Prime rating	Continuous rating	Data sheets
Model	60 Hz kW (kVA)	60 Hz kW (kVA)	60 Hz kW (kVA)	60 Hz
DQFAA	750 (938)	680 (850)		D-3329
DQFAB	800 (1000)	725 (907)		D-3330
DQFAC	900 (1125)	818 (1023)		D-3331
DQFAD	1000 (1250)	900 (1125)		D-3332

Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	IEC 61000-4-2: Level 4 Electrostatic discharge IEC 61000-4-3: Level 3 Radiated susceptibility

Engine specifications

Bore	140 mm (5.51 in.)
Stroke	165.0 mm (6.5 in.)
Displacement	30.5 L (1860 in^3)
Cylinder block	Cast iron, V 12 cylinder
Battery capacity	1800 amps minimum at ambient temperature of -18 ℃ to 0 ℃ (0 ℉ to 32 ℉)
Battery charging alternator	35 amps
Starting voltage	24 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel, fuel filter, automatic electric fuel shutoff
Fuel filter	Triple element, 10 micron filtration, spin-on fuel filters with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Four spin-on, combination full flow filter and bypass filters
Standard cooling system	High ambient radiator

Alternator specifications

Design	Brushless, 4 pole, drip-proof, revolving field
Stator	2/3 pitch
Rotor	Single bearing flexible discs
Insulation system	Class H on low and medium voltage, Class F on high voltage
Standard temperature rise	150 ℃ Standby at 40 ℃ ambient
Exciter type	PMG (Permanent Magnet Generator)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform Total Harmonic Distortion (THDV)	< 5% no load to full linear load, < 3% for any single harmonic
Telephone Influence Factor (TIF)	< 50 per NEMA MG1-22.43
Telephone Harmonic Factor (THF)	< 3

Available voltages

60 Hz Line – Neutral/Line - Line

• 120/208	• 220/380	• 240/416	• 347/600
• 139/240	• 230/400	• 277/480	

Note: Consult factory for other voltages.

Generator set options

Engine

- 208/240/480 V coolant heater for ambient above 4.5 ℃ (40 ℉)
- 208/240/480 V coolant heater for ambient below 4.5 ℃ (40 ℉)

Control panel

- PowerCommand 3.3 with Masterless Load Demand (MLD)
- Run relay package
- Ground fault indication
- Paralleling configuration
- Remote fault signal package
- Exhaust gas temperature sensor
- 120/240 V 100 W control anti-condensation heater

Alternator

- 80 ℃ rise
- 105 ℃ rise
- 150 ℃ rise
- 120/240 V 300 W anti-condensation heater
- Temperature sensor - RTDs, 2-phase
- Temperature sensor – alternator bearing RTD
- Differential current transformers

Exhaust system

- Critical grade exhaust silencer
- Exhaust packages
- Industrial grade exhaust silencer
- Residential grade exhaust silencer

Cooling system

- High ambient 50 ℃ radiator

Generator set

- AC entrance box
- Battery
- Battery rack with hold-down - floor standing
- Circuit breaker - set mounted
- Disconnect switch - set mounted
- PowerCommand network
- Remote annunciator panel
- Spring isolators
- 2 year warranty
- 5 year warranty
- 10 year major components warranty

Note: Some options may not be available on all models - consult factory for availability.

PowerCommand 3.3 Control System

An integrated microprocessor based generator set control system providing voltage regulation, engine protection, alternator protection, operator interface and isochronous governing. Refer to document S-1570 for more detailed information on the control.

AmpSentry – Includes integral AmpSentry protection, which provides a full range of alternator protection functions that are matched to the alternator provided.

Power management – Control function provides battery monitoring and testing features and smart starting control system.

Advanced control methodology – Three phase sensing, full wave rectified voltage regulation, with a PWM output for stable operation with all load types.

Communications interface – Control comes standard with PCCNet and Modbus® interface.

Regulation compliant – Prototype tested: UL, CSA and CE compliant.

Service - InPower™ PC-based service tool available for detailed diagnostics, setup, data logging and fault simulation.

Easily upgradeable – PowerCommand controls are designed with common control interfaces.

Reliable design – The control system is designed for reliable operation in harsh environment.

Multi-language support

Operator panel features

Operator/display functions

- Displays paralleling breaker status
- Provides direct control of the paralleling breaker
- 320 x 240 pixels graphic LED backlight LCD
- Auto, manual, start, stop, fault reset and lamp test/panel lamp switches
- Alpha-numeric display with pushbuttons
- LED lamps indicating generator set running, remote start, not in auto, common shutdown, common warning, manual run mode, auto mode and stop

Paralleling control functions

- First Start Sensor System selects first generator set to close to bus
- Phase Lock Loop Synchronizer with voltage matching
- Sync check relay
- Isochronous kW and kVar load sharing
- Load govern control for utility paralleling
- Extended Paralleling (Base Load/Peak Shave) Mode
- Digital power transfer control, for use with a breaker pair to provide open transition, closed transition, ramping closed transition, peaking and base load functions,
- Alternator data
- Line-to-Neutral and Line-to-Line AC volts
- 3-phase AC current
- Frequency
- kW, kVar, power factor kVA (three phase and total)
- Engine data
- DC voltage
- Engine speed
- Lube oil pressure and temperature
- Coolant temperature
- Comprehensive FAE data (where applicable)
- Other data
- Genset model data
- Start attempts, starts, running hours, kW hours
- Load profile (operating hours at % load in 5% increments)
- Fault history
- Data logging and fault simulation (requires InPower)

Standard control functions

Digital governing

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

Digital voltage regulation

- Integrated digital electronic voltage regulator
- 3-phase, 4-wire Line-to-Line sensing
- Configurable torque matching

AmpSentry AC protection

- AmpSentry protective relay
- Over current and short circuit shutdown
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shutdown
- Over and under frequency shutdown
- Overload warning with alarm contact
- Reverse power and reverse Var shutdown
- Field overload shutdown

Engine protection

- Battery voltage monitoring, protection and testing
- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown
- Fuel-in-rupture-basin warning or shutdown
- Full authority electronic engine protection

Control functions

- Time delay start and cool down
- Real time clock for fault and event time stamping
- Exerciser clock and time of day start/stop
- Data logging
- Cycle cranking
- Load shed
- Configurable inputs and outputs (4)
- Remote emergency stop

Options

- Auxiliary output relays (2)

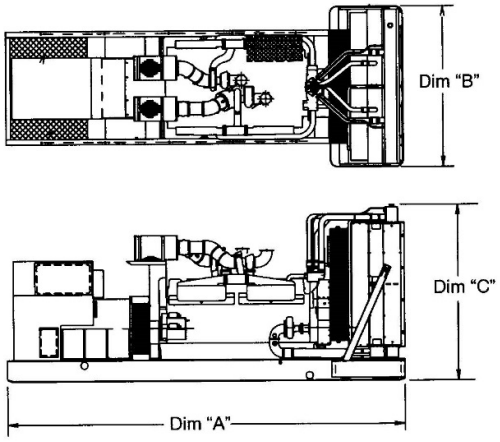
Ratings definitions

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time Running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



- This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

Model	Dim 'A' mm (in.)	Dim 'B' mm (in.)	Dim 'C' mm (in.)	Set Weight dry* (kg)	Set Weight wet* (kg)
DQFAA	4287 (168.8)	1990 (78.3)	2355 (92.7)	6633 (14625)	6896 (15205)
DQFAB	4287 (168.8)	1990 (78.3)	2355 (92.7)	6857 (15117)	7120 (15697)
DQFAC	4287 (168.8)	1990 (78.3)	2355 (92.7)	7335 (16172)	7598 (16752)
DQFAD	4287 (168.8)	1990 (78.3)	2355 (92.7)	7594 (16742)	7857 (17322)

* Weights represent a set with standard features. See outline drawings for weights of other configurations.

Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

	This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.		The generator set is available listed to UL 2200, Stationary Engine Generator Assemblies for all 60 Hz low voltage models. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% Continuous operation and also UL 869A Listed Service Equipment.
	The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.	**U.S. EPA**	Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation.
	All low voltage models are CSA certified to product class 4215-01.	**International Building Code**	The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006, IBC2009 and IBC2012.

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

For more information contact your local Cummins distributor or visit power.cummins.com

Our energy working for you.™

S-1508 (08/17)

M.01 CT-1,2,3

Cooling Tower Technical Data Sheet

Rudy Caffall
735 SW 20th Place suite 230

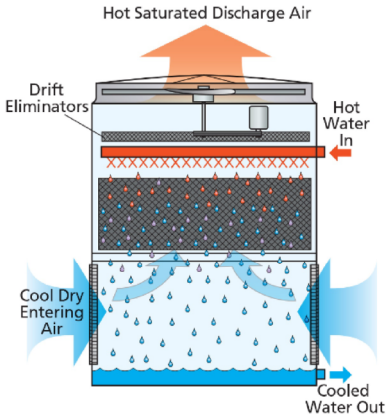
Portland, Oregon 97205
5032600439
rudyc@jbarrow.com

(1) AT 312-2J36

Project Details

Project Name : DAS Wilsonville
Location: TBD UNK

Date: 3/19/2021
Customer:
Contact:
Contact Email:



Product Description

The original Advanced Technology cooling tower provides an induced-draft, axial fan solution for a wide array of outdoor cooling capacities.

Selection Criteria

	Total	Each Unit
Flow:	2,940.0 GPM	2,940.0 GPM
Fluid:	Water	Water
Entering Fluid Temp:	90.0°F	90.0°F
Leaving Fluid Temp:	80.0°F	80.0°F
Entering Wet Bulb:	70.0°F	70.0°F

Required Capacity

14,700.00 MBH
980.00 Tons

Unit Selected

3% derate with custom footprint

One(1) EVAPCO AT 312-2J36 at 109.3% capacity (16,067.10 MBH)

Product Line is CTI/ECC Certified. Selection is rated in accordance with CTI Standard 201 RS.

Physical Data Per Unit

Overall Dimensions (WxLxH):	11'-10" x 36'-4 1/4" x 15'-6 1/4"
Operating Weight:	41,670 lbs
Shipping Weight:	23,040 lbs
Heaviest Section:	5,000 lbs

*weights and dimensions could vary depending on options selected

IBC Design Capability

IBC Standard Structural Design
1.0 Importance Factor Specified

Seismic(Sᴅs):	up to 1.34 g, z/h = 0
Wind Load(P):	up to 119 psf

Fan Motor Data per Unit

Number of Fans:	3
# of Fan Motors:	3
Nameplate Power (460/3/60):	15.00 HP Per Motor
Total Connected Nameplate Power:	45.00 HP
Typical Nameplate FLA:	18 Amps Per Motor

*Nameplate FLA could vary

Additional Details Per Unit

Air Flow:	246,400 CFM

Hydraulic Data

Inlet Pressure Drop:	2.3 psi
Evaporated Water Rate:	23.52 GPM

Layout Criteria

From FACE B/D to wall:	3.00ft
From FACE A/C to wall:	4.00ft
Between FACE B/D ends:	3.50ft
Between FACE A/C sides:	7.00ft

Sound Data(dB(A) @ 5'/50')

Face A (Opp Mtr. Side):	82/68	Face C (Motor Side):	82/68
Face B (End):	81/65	Face D (Opp End):	81/65
Top:	81/71		

Notes: Sound Pressure Levels are according to CTI Standard ATC-128 and verified by an independent CTI-licensed sound test agency. Sound data is shown for 3 cells operating at full speed. The use of frequency inverters (Variable Frequency Drives) can increase sound levels. Sound Options: None

Accessories

(1) ASHRAE 90.1-2019 Energy Compliant	(1) IBC Standard Structural Design	(1) 1.0 Importance Factor Specified
(1) 304 Welded Stainless Steel Cold Water Basin	(1) Bottom Suction Connections	(1) EVAPAK Fill
(1) Equalizer Connection; A; 4"; BFW/GRVD	(1) 3-Probe Electronic Water Level Control Package	(1) Vibration Switch
(1) Louver Access Door	(1) Additional Louver Access Door	(1) External Service Platform with Ladder
(1) Ladder Extension; 2 Feet	(1) El. Heaters (0F / -18C ambient) (6) 6 kW; 460/3/60	(1) Sump Sweeper Piping (High Flow Eductors)
(3) Field Mounted Pulse~Pure	(3) Fan Motor: Inverter Capable, Premium Efficient	(3) Fan Motor: Space Heaters

UNIT	COOLING TOWER		EVAPCO, INC.	DWG. #	T3123C24-DRF-ST	REV.	-
MODEL #	AT 312-2J36	SCALE	NTS	SERIAL #		DATE	3/19/2021

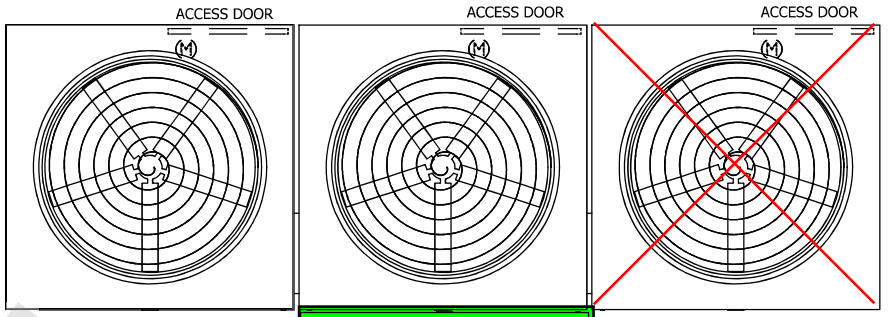
NOTES:
1. (M)- FAN MOTOR LOCATION
2. HEAVIEST SECTION IS UPPER SECTION
3. MPT DENOTES MALE PIPE THREAD
   FPT DENOTES FEMALE PIPE THREAD
   BFW DENOTES BEVELED FOR WELDING
   GVD DENOTES GROOVED
   FLG DENOTES FLANGE
4. +UNIT WEIGHT DOES NOT INCLUDE
   ACCESSORIES (SEE ACCESSORY DRAWINGS)
5. MAKE-UP WATER PRESSURE
   20 psi MIN [137 kPa], 50 psi MAX [344 kPa]
6. 3/4" [19MM] DIA. MOUNTING HOLES. REFER TO
   RECOMENDED STEEL SUPPORT DRAWING.
7. DIMENSIONS LISTED AS FOLLOWS:
   ENGLISH FT-IN
   [METRIC] mm

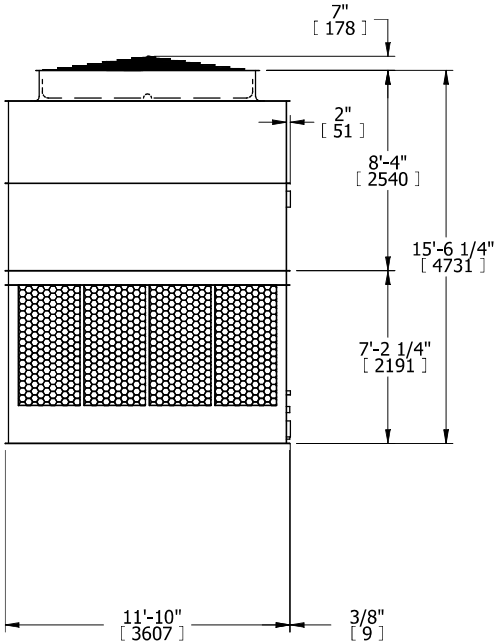
FACE C

FACE B

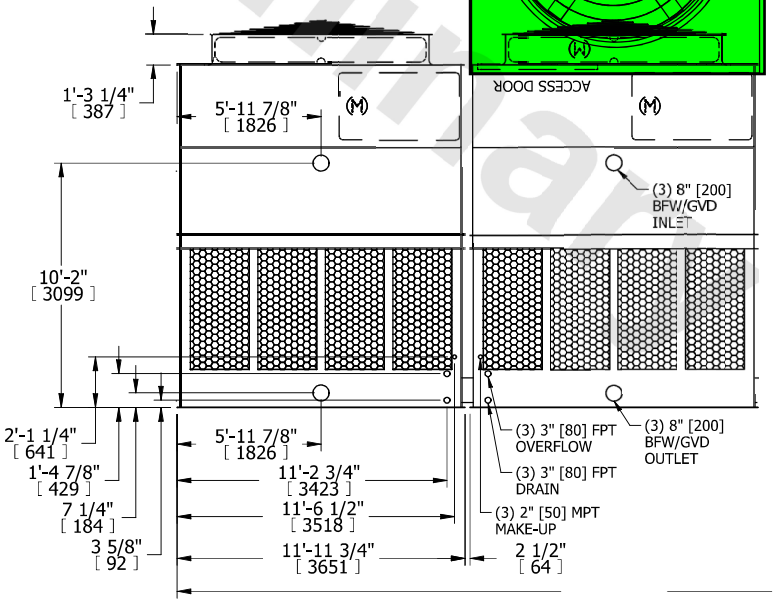
PLAN VIEW

FACE D





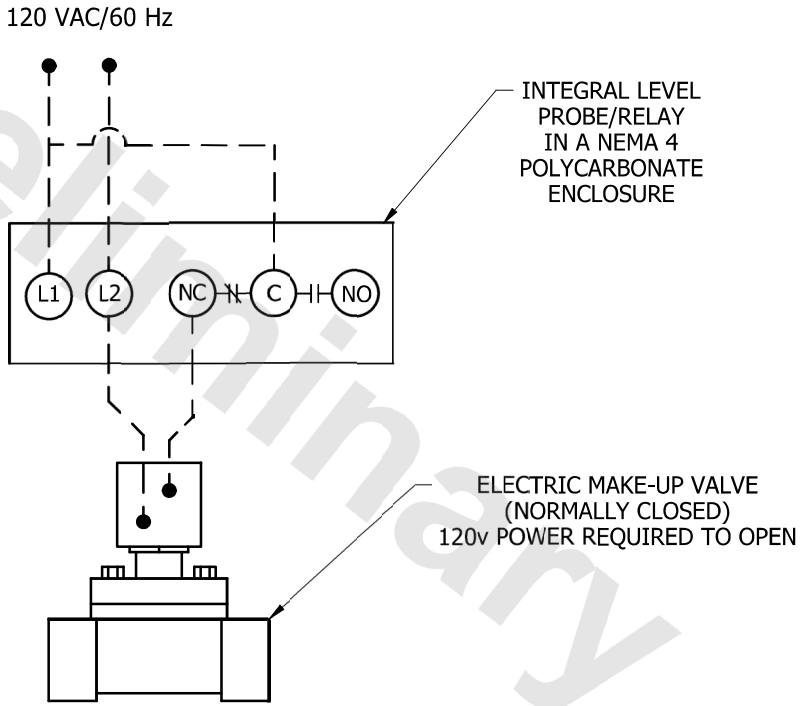
FACE B



FACE A

SHIPPING WEIGHT	23040 lbs+ [10455] kg+	OPERATING WEIGHT	41670 lbs+ [18905] kg+	HEAVIEST SECTION WEIGHT	5000 lbs+ [2270] kg+	NO. OF SHIPPING SECTIONS	6	DRAWN BY:	BLL

UNIT		DWG. #	
AT 312-2J36	**EVAPCO, INC.**	C1AU0000-A	
TITLE		SCALE	DRAWN BY
ELECTRIC WATER LEVEL CONTROL WIRING		N.T.S.	MWR



3 PROBE

NOTES:
1. DASHED LINES INDICATE WIRING BY OTHERS.
2. TYPICAL WIRING PER PROBE.

UNIT		DWG. #	
AT 312-2J36	**EVAPCO, INC.**	ELT4MT3C-DA	
TITLE: ELECTRIC WATER LEVEL CONTROL LOCATION		SCALE: N.T.S.	DRAWN BY: MWR

VALVE

QUANTITY: 3

SIZE: 1 1/2" [40]

PART NUMBER: 017-00154P

Y-STRAINER

QUANTITY: 3

SIZE: 1 1/2" [40]

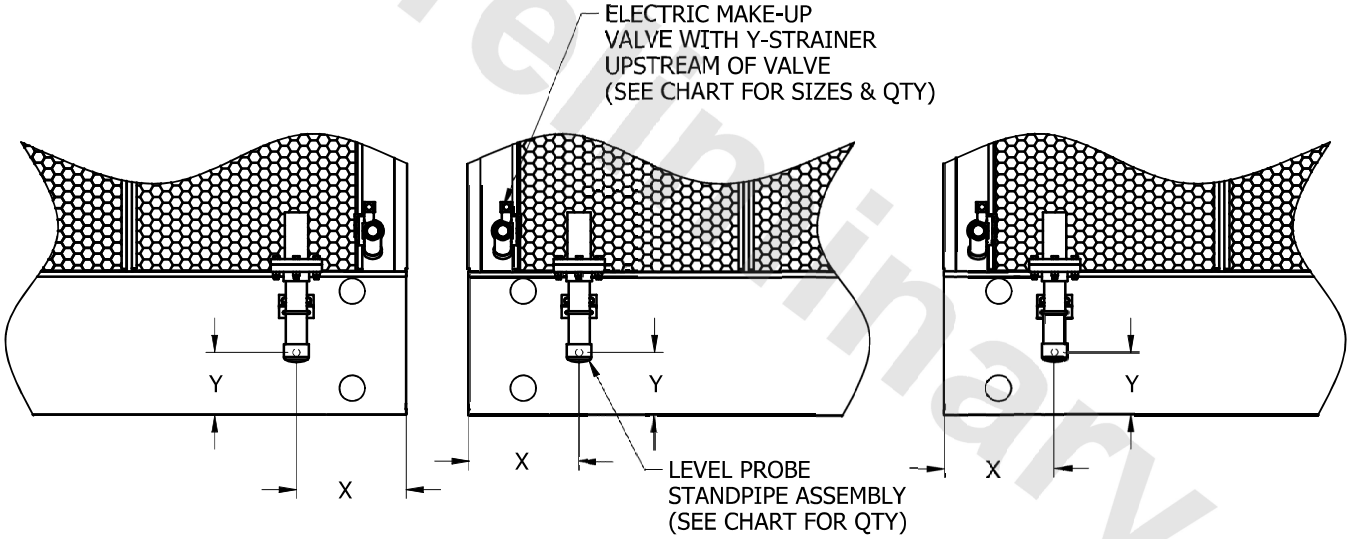
PART NUMBER: 017-00281P

STAND PIPE

QUANTITY: 3

X: 4'-2" [1270]

Y: 9" [229]

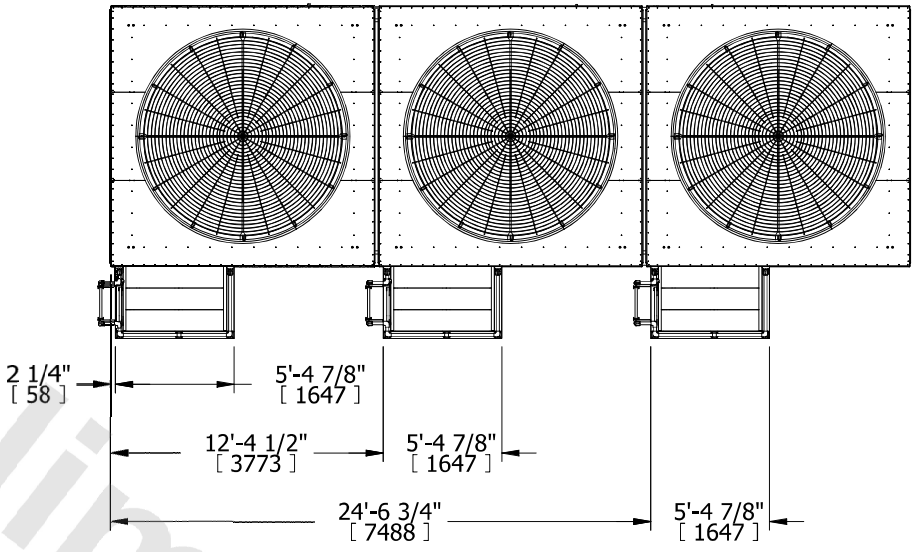


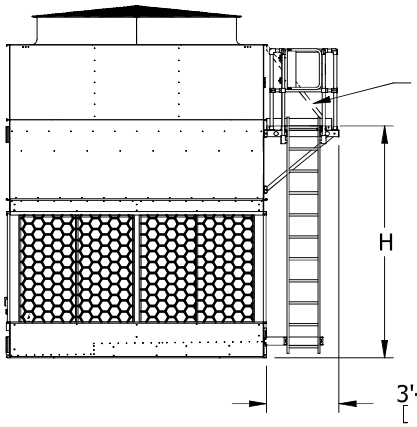
FACE A

NOTES:
1. PIPING BY OTHERS.
2. LEVEL PROBE STANDPIPE ASSEMBLY, MAKE-UP VALVE AND Y-STRAINER TO SHIP LOOSE FOR FIELD MOUNTING BY OTHERS.
3. SEE CERTIFIED PRINT FOR MAKE-UP LOCATION.
4. STANDPIPE TO BE HEAT TRACED AND INSULATED FOR WINTER OPERATION (BY OTHERS).
5. THE ELECTRONIC WATER LEVEL CONTROL ON THIS UNIT WILL MAINTAIN THE PROPER OPERATING WATER LEVEL. HOWEVER, BEFORE INITIAL START-UP THE UNIT MUST BE MANUALLY FILLED TO WITHIN 1" OF THE OVERFLOW.
6. FOR EASE OF MAINTENANCE, A SHUT-OFF VALVE IS RECOMMENDED UPSTREAM OF Y-STRAINER.
7. DIMENSIONS LISTED AS FOLLOWS: ENGLISH FT-IN
   [METRIC] [mm]

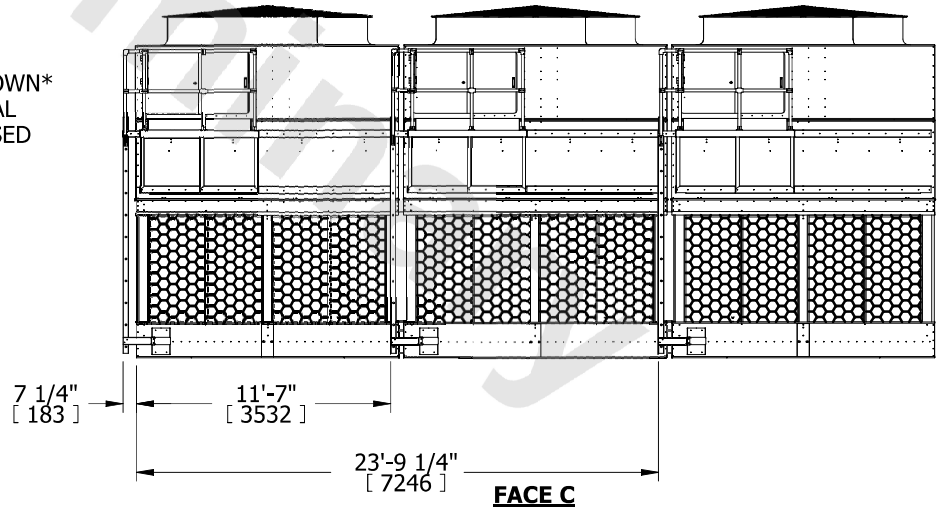
UNIT	AT 312-2J36	EVAPCO, INC.	DWG. #	PLT4MT37-DA
TITLE	EXTERNAL SERVICE PLATFORM		SCALE N.T.S.	DRAWN BY AMG

MODEL #	H DIM	
	FT-IN	[mm]
AT-312-2I36, 2J36, 2K36, 2L36, 2M36	10'-6 7/8 "	3223
AT-312-3I36, 3J36, 3K36, 3L36, 3M36	11'-6 7/8 "	3527
AT-312-4I36, 4J36, 4K36, 4L36, 4M36, 4N36	12'-6 7/8 "	3832
AT-310-2I36, 2J36, 2K36, 2L36, 2M36	10'-5 7/8 "	3197
AT-310-3I36, 3J36, 3K36, 3L36, 3M36	11'-5 7/8 "	3502
AT-310-4I36, 4J36, 4K36, 4L36, 4M36, 4N36	12'-5 7/8 "	3807





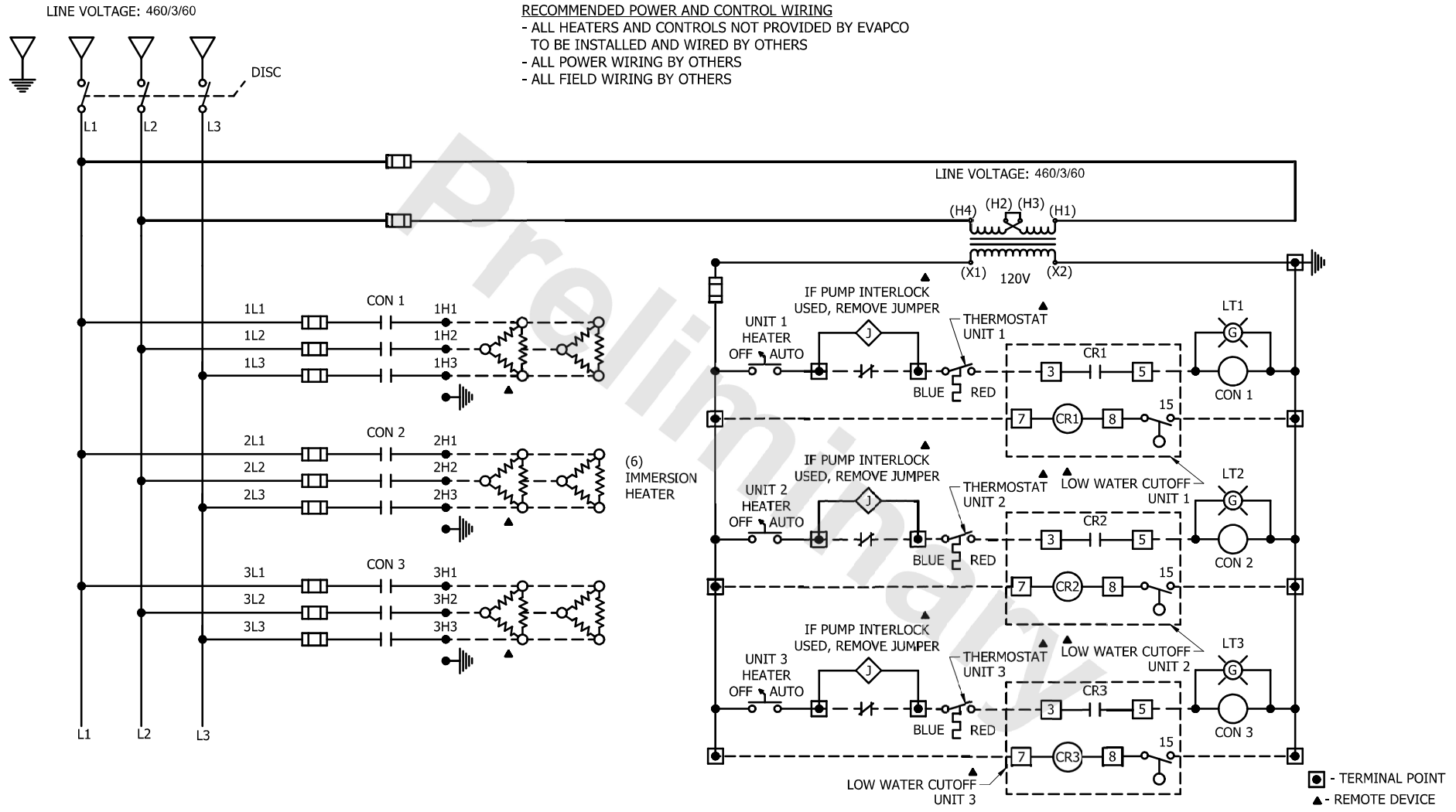
FACE D



FACE C

NOTES:
1. LADDER AND PLATFORM SHIP LOOSE. FIELD INSTALLATION BY OTHERS IS REQUIRED.
2. THE BOTTOM OF THE LADDER DOES NOT EXTEND PAST THE BASE OF THE UNIT. IF THE UNIT IS ELEVATED THEN AN OPTIONAL EXTENDED LADDER PACKAGE SHOULD BE CONSIDERED. (CONSULT FACTORY)
3. REFER TO RIGGING PACK FOR LADDER AND PLATFORM MOUNTING INSTRUCTIONS.
4. EACH PLATFORM AND LADDER ASSY. WEIGHS 560 LBS. [254KG]
5. DIMENSIONS LISTED AS FOLLOWS: ENGLISH FT-IN
   [METRIC] [mm]

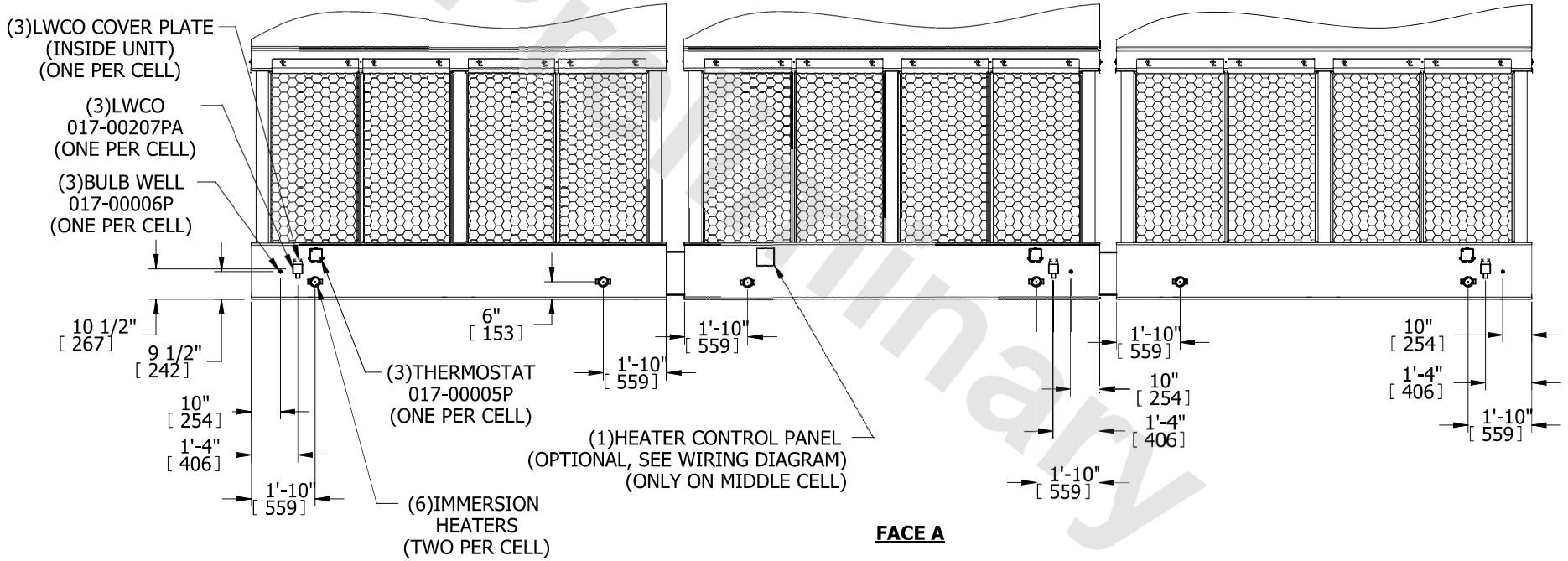
UNIT	AT 312-2J36	EVAPCO, INC.	DWG. #	B6AU0000-DC
TITLE	3Ø HEATER WIRING DIAGRAM 6 HEATERS		SCALE N.T.S.	DRAWN BY SLR



NOTES:
1. DASHED LINES INDICATE FIELD WIRING.
2. THE HEATERS HAVE BEEN SIZED TO MAINTAIN 40° F PAN WATER AT AN AMBIENT TEMPERATURE OF 0° F
3. ALL COMPONENTS BY EVAPCO HAVE TYPE 4 ENCLOSURES.
4. AUXILIARY N.C. CONTACT INTERLOCKS IMMERSION HEATERS WITH SPRAY WATER CIRCULATING PUMP TO DE-ENERGIZE HEATERS WHEN SPRAY PUMP IS RUNNING.
5. (1) CONTACTOR IS SUPPLIED FOR EVERY (2) HEATERS
   - CONTACTOR SHOULD BE WIRED WITH SEPARATE SUPPLY TERMINALS FOR EACH HEATER.
6. (1) CONTACTOR IS SUPPLIED PER CELL OF A MULTICELL UNIT
   - PROVIDES FOR INDIVIDUAL CELL OPERATION.

IMMERSION HEATER BY:	EVAPCO
LOW WATER CUTOFF/THERMOSTAT CONTROL BY:	EVAPCO
AUXILIARY N.C. PUMP INTERLOCK BY:	OTHERS
HEATER CONTROL PANEL BY:	OTHERS
TRANSFORMER BY:	OTHERS
HEATER CONTACTOR BY:	OTHERS
FUSED DISCONNECT BY:	OTHERS

UNIT	AT 312-2J36	EVAPCO, INC.	DWG. #	HLT3MT37-DC
TITLE	HEATER LOCATION		SCALE N.T.S.	DRAWN BY JLG



FACE A

NOTES:

1. A MINIMUM OF CLEARANCE IS REQUIRED BETWEEN THE HEATER OUTLET BOX AND THE NEAREST OBSTRUCTION FOR REMOVAL OF THE HEATER.
2. ALL NIPPLES ON UNIT ARE NOT SHOWN IN ORDER TO CLARIFY HEATER COMPONENT LOCATIONS.
3. ALL HEATER COMPONENTS BY EVAPCO ARE FACTORY MOUNTED WHEN POSSIBLE.
4. DIMENSIONS LISTED AS FOLLOWS: ENGLISH FT- IN
   [METRIC] [mm]

M.02 CWP-1,2,3

Bell & Gossett
a xylem brand

Submittal

Job/Project:	**Representative:** Columbia Hydronics Corporation	
ESP-Systemwize: WIZE-AD3EA8 **Created On:** 03/14/2021	**Phone:** 360-883-2600	
Location/Tag:	**Email:** sales@columbiahydronics.com	
Engineer:	**Submitted By:**	**Date:**
Contractor:	**Approved By:**	**Date:**

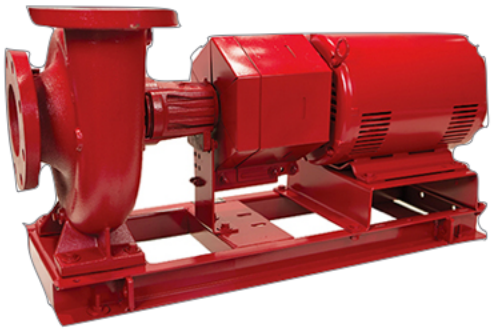
Base Mounted End Suction Pump

Series: e-1510

Model: 5EB

Features & Design

- ANSI/OSHA Coupling Guard
- Center Drop Out Spacer Coupling
- Fabricated Heavy Duty Baseplate
- Internally Self-Flushing Mechanical Seal



*The Bell & Gossett Series e-1510 is available in 26 sizes and a variety of configuration options that enable customization and flexibility to fit a broad range of operating conditions.

http://bellgossett.com/pumps-circulators/end-suction-pumps/e-1510/

Pump Selection Summary

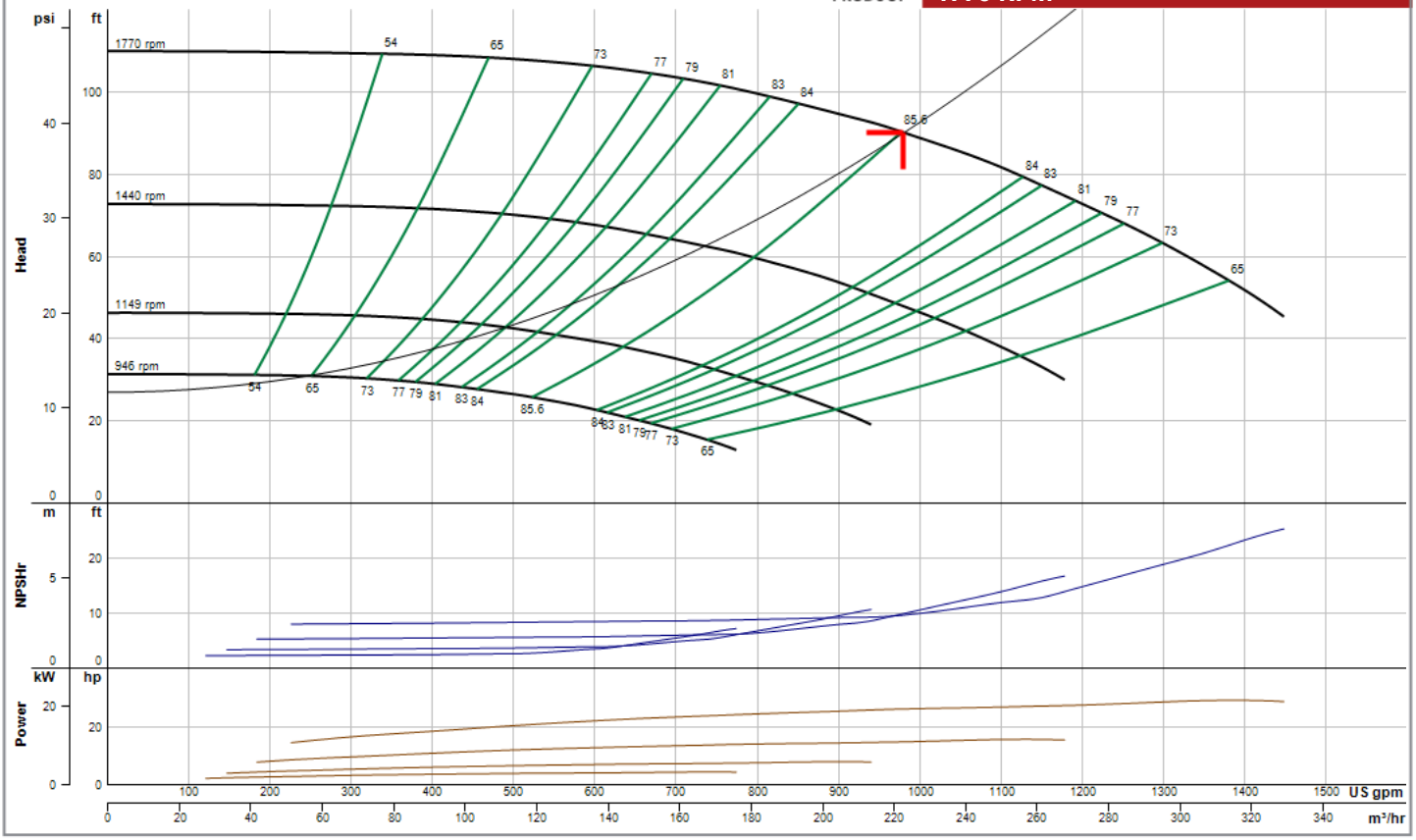
Duty Point Flow	980 US gpm
Duty Point Head	90 ft
Control Head	27 ft
Duty Point Pump Efficiency	85.6 %
Part Load Efficiency Value (PLEV)	80.1 %
Impeller Diameter	10.5 in
Motor Power	30 hp
Duty Point Power	26 bhp
Motor Speed	1800 rpm
RPM @ Duty Point	1770 rpm
NPSHr	9.7 ft
Minimum Shutoff Head	110 ft
Minimum Flow at RPM	225 US gpm
Flow @ BEP	978 US gpm
Fluid Temperature	68 °F
Fluid Type	Water
Weight *(approx. - consult rep for exact)*	811 lbs
Pump Floor Space Calculation	7.68 ft²

Performance Curve

Energy Efficiency Ratings:
Pump & Motor PEIcl: 0.94 ERcl: 6
Pump, Motor & Drive: PEIvl: 0.46 ERvl: 54

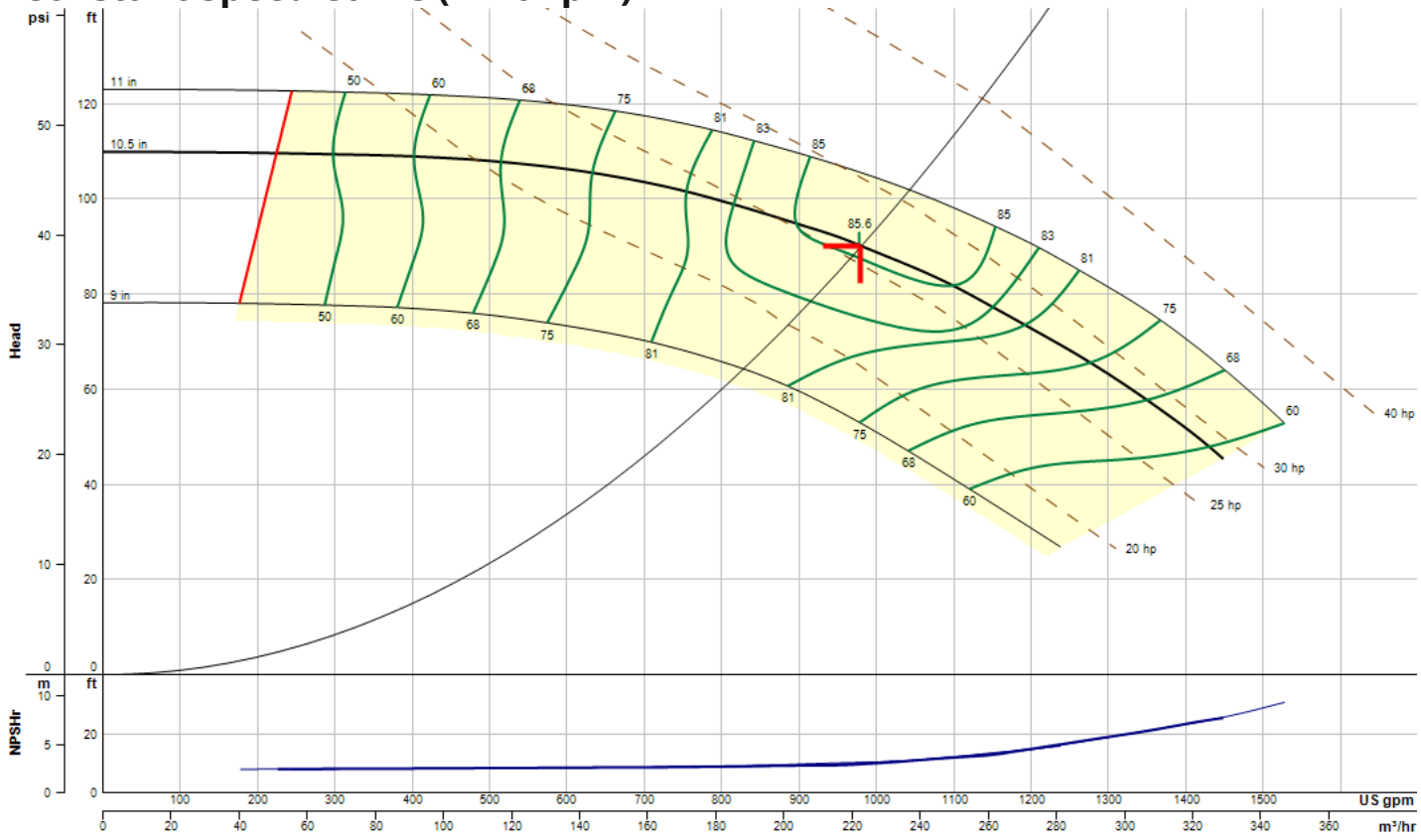
PREMIUM EFFICIENCY PRODUCT

e-1510
5EB
1770 RPM



Performance curve meets 14.6 / ISO 9906 acceptance criteria

Constant Speed Curve (1770 rpm)

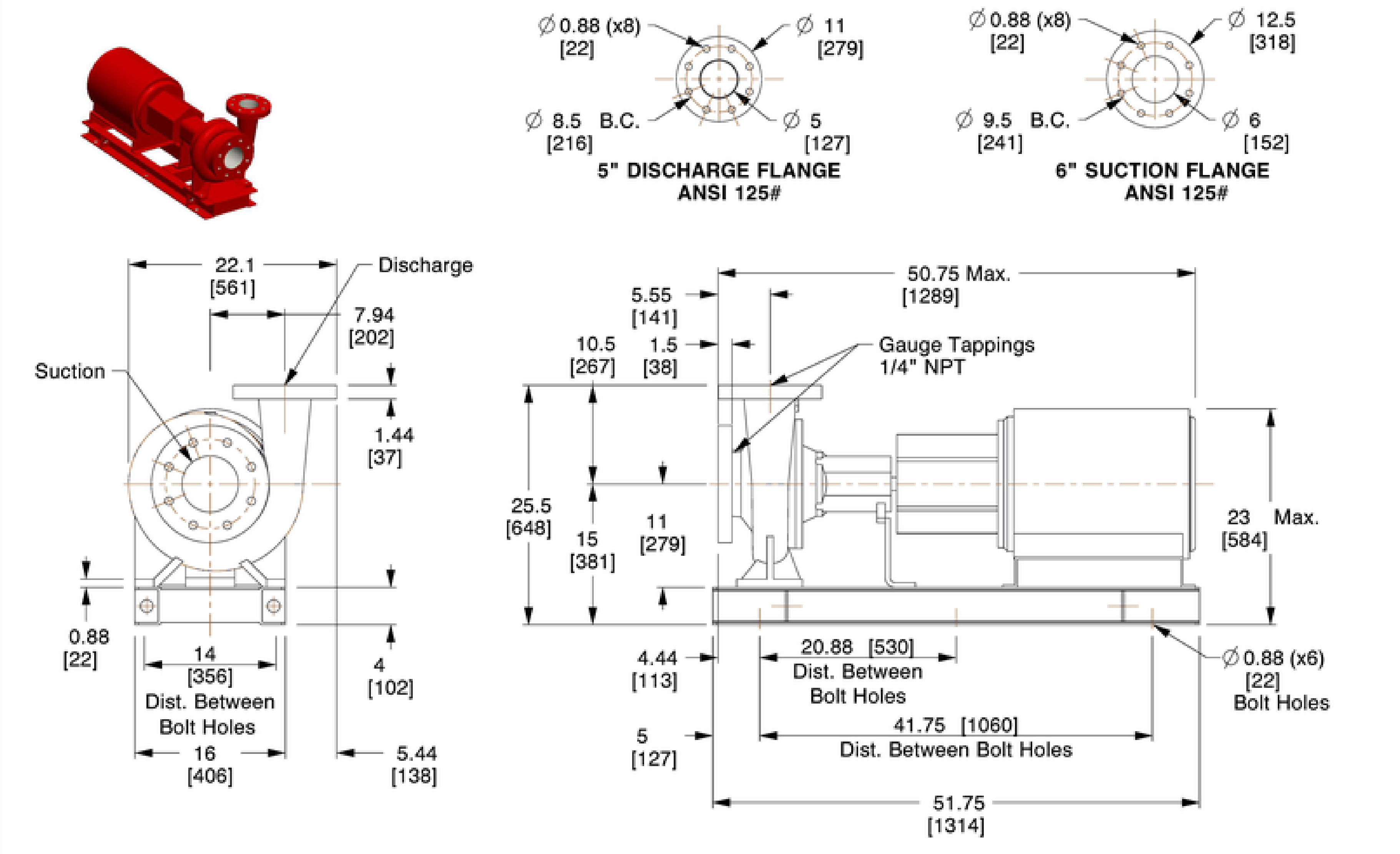


Operating Point

Flow: 981 US gpm **Head:** 90.1 ft **Speed:** 1770 **Efficiency:** 85.6% **Point BHP:** 26 **End Of Curve:** 67.7%

Maximum Duty Point (at rated motor speed)

Flow: 981 US gpm **Head:** 90.1 ft **Speed:** 1770 **Efficiency:** 85.6% **Point BHP:** 26 **NOL Flow:** 1350 US gpm **Runout Flow:** 1449 US gpm **NOL (BHP):** 28.9



Bell & Gossett
a xylem brand

8200 N. Austin Ave.
Morton Grove, IL 60053, USA

Dimensions are subject to change

Not to be used for construction unless certified

BG-E1510-5EB-SS-286T-L

Series e-1510 Centrifugal Pumps - Base Mounted

Seal Type: Standard Seal | Motor Frame: 286T | Frame Type: L | Flange: ANSI 125#

Dimensions : IN (mm)	Scale : N.T.S.	Submittal # : B-880.36C

Standard Mechanical Configuration

Standard Mechanical Seal	SM, LG, & XL Bearing Frames	ES Bearing Frame
Temperature Range	-20 to 225°F	-20 to 225°F
Maximum Pressure	175 PSI	175 PSI
pH Limitations	7.0 - 9.0	7.0 - 9.0
Elastomer	Buna	Buna
Rotating Face	Carbon	Carbon
Stationary Face	Ceramic	Silicon Carbide
Hardware	Stainless Steel / Brass	Stainless Steel

Mechanical Seal Options	SM, LG, & XL Bearing Frames		
Temperature Range	-20 to 250°F	-10 to 225°F	-20 to 250°F
Maximum Pressure	175 PSI	175 PSI	175 PSI
pH Limitations	7.0 - 11.0	7.0 - 9.0	7.0 - 12.5.0
Elastomer	EPR (Ethylene Propylene Rubber)	FKM (Viton™ or Fluoroelastomer)	EPR (Ethylene Propylene Rubber)
Rotating Face	Carbon	Carbon	Silicon Carbide
Stationary Face	Tungsten Carbide	Ceramic	Silicon Carbide
Hardware	Stainless Steel / Brass	Stainless Steel	Stainless Steel

Mechanical Seal Options	ES Bearing Frame		
Temperature Range	-20 to 250°F	-10 to 225°F	-20 to 250°F
Maximum Pressure	175 PSI	175 PSI	175 PSI
pH Limitations	7.0 - 11.0	7.0 - 9.0	7.0 - 12.5.0
Elastomer	EPR (Ethylene Propylene Rubber)	FKM (Viton™ or Fluoroelastomer)	EPR (Ethylene Propylene Rubber)
Rotating Face	Silicon Carbide	Carbon	Silicon Carbide
Stationary Face	Tungsten Carbide	Silicon Carbide	Silicon Carbide
Hardware	Stainless Steel / Brass	Stainless Steel	Stainless Steel

Stuffing Box Configuration

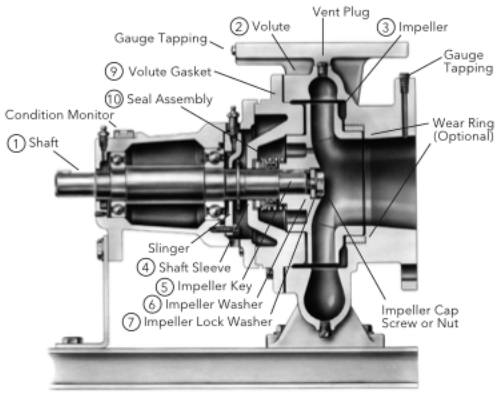
Mechanical Seal	SM, LG, & XL Bearing Frames
Temperature Range	-20 to 250°F*
Maximum Pressure	175 PSI (Optional 250 PSI)
pH Limitations	7.0 - 11.0
Elastomer	EPR (Ethylene Propylene Rubber)
Rotating Face	Tungsten Carbide
Stationary Face	Carbon
Hardware	Stainless Steel

Packing Option	
Temperature Range	0 to 250°F
Maximum Pressure	175 PSI
pH Limitations	7.0 - 9.0
Material	Braided Graphite Impregnated PTFE

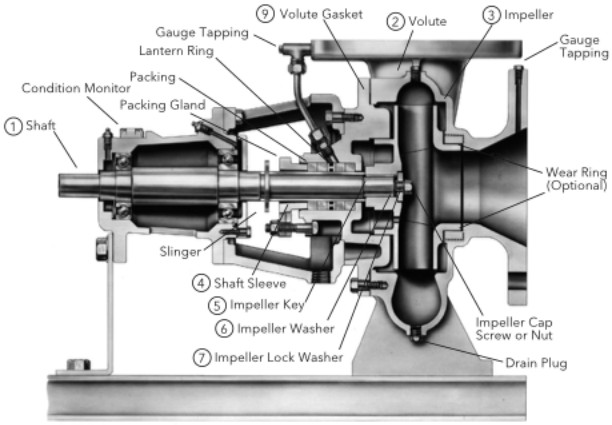
* For operating temperatures above 250°F a cooled flush is required and is recommended for temperatures above 225°F for optimum seal life. On closed systems cooling is accomplished by inserting a small heat exchanger in the flush line to cool the seal flushing fluid.

Flush-line Filters and Sediment Separators are available on special request.

Materials of Construction



Standard Configuration



Optional - S Configuration

Description	SM, LG, & XL Bearing Frames	ES Bearing Frame
1 Shaft	ASTM 108 Grade 1144	ASTM 108 Grade 1144
2 Volute	Cast Iron ASTM A48 Class 30B	Cast Iron ASTM A48 Class 30B
3 Impeller	ASTM A743 Grade CF8 - 304 Stainless Steel	ASTM A743 Grade CF8 - 304 Stainless Steel
4 Shaft Sleeve	ASTM 312 Grade TP304 - 304 Stainless Steel	ASTM 312 Grade TP304 - 304 Stainless Steel
5 Impeller Key	#304 Stainless Steel	NA
6 Impeller Washer	Steel	NA
7 Impeller Lock Washer	#304 Stainless Steel (18-8 XL FRM)	NA
8 Impeller Cap Screw	#304 Stainless Steel	NA
8 Impeller Nut	NA	316 Stainless Steel
9 Volute Gasket	Cellulose Fiber	Cellulose Fiber
10 Seal Assembly	Reference Seal Data Tables	Reference Seal Data Tables

Pump Options

- Stainless Steel Volute Wear Ring
- Galvanized Steel Drip Pan
- Stainless Steel Shaft
- Rexnord Omega Spacer Coupling
- Falk T31 Spacer Coupling
- External Flush Line
- Stuffing Box Configuration
- Epoxy Coated Internal Cast Iron Components
- Special Impeller Balancing (ISO 1940 G2.5 or G1.0)
- Certified Performance Tests (Per HI Standard 14.6)
- 250 PSI Working Pressure

xylem
Let's Solve Water

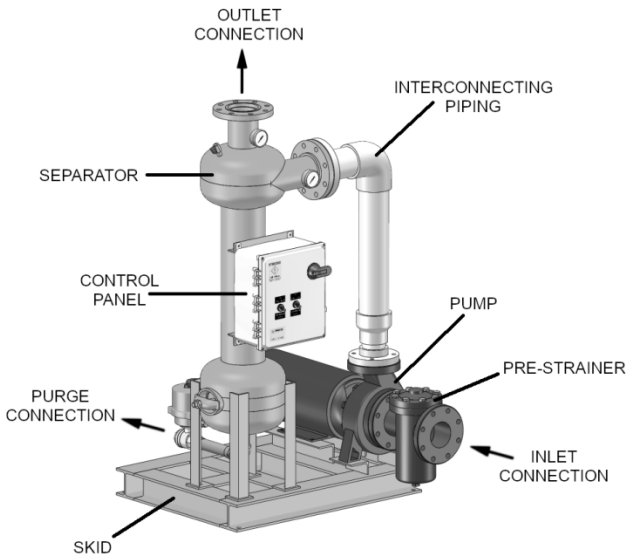
Xylem Inc.
8200 N. Austin Avenue, Morton Grove, IL 60053
Phone: (847)966-3700 Fax: (847)965-8379
www.bellgossett.com

M.03 SSF-1

PUROFLUX CORPORATION

ENGINEERING • MANUFACTURING • SERVICE

PF-64-050-AP SPECIFICATION SHEET
PUMP PACKAGE SYSTEM



SPECIFICATIONS	PF-64-050-AP
Flow Rate	600 GPM
System Inlet Connection	6” flng
System Outlet Connection	5” flng
Purge Connection	1-1/2” fpt
Separator Model	PF-61-050
Separator Purge	Automatic
Pump Motor	15 HP
Volume	24 GAL
Est. Weight, Dry	1045 lbs
Est. Weight, Operating	1245 lbs

Features:

- Removes particulate as low as 45 microns
- 150 psi working pressure
- Fully assembled skid package
- One year limited warranty

Options:

- Manual purge
- Removable dome separator
- 22-1/2º Profile separator
- Coated carbon steel piping
- Isolation valve kit

SYSTEM COMPONENTS

Separator :

- PF-61 Series separator
- Fusion-bond polyester coated vessel
- Manual air bleed valve
- Inlet/Outlet pressure gauges

Pump :

- Centrifugal pump
- TEFC motor
- Cast iron pre-strainer

Skid :

- Fusion-bond polyester coated carbon steel

Electrical Controls :

- UL labeled control panel
- Door disconnect switch
- Motor starter with Short-circuit overload protection
- Local/Off/Remote Switch
- Pump Status/Trip Dry Contact Signals

Automatic Purge :

- Electrically actuated ball valve
- Adjustable purge timer

Interconnecting Pipe :

- Sch.80 PVC piping

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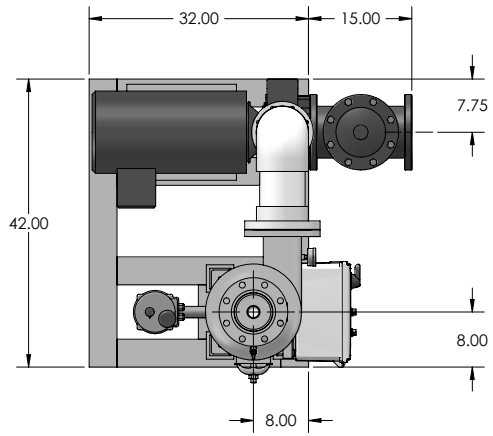
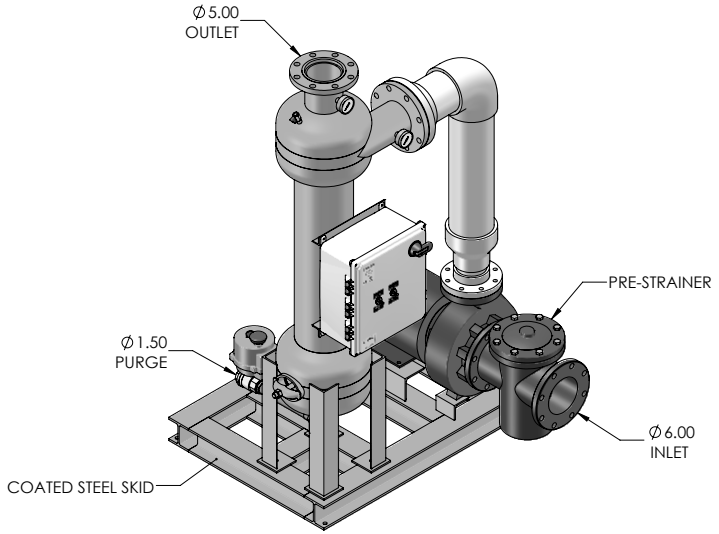
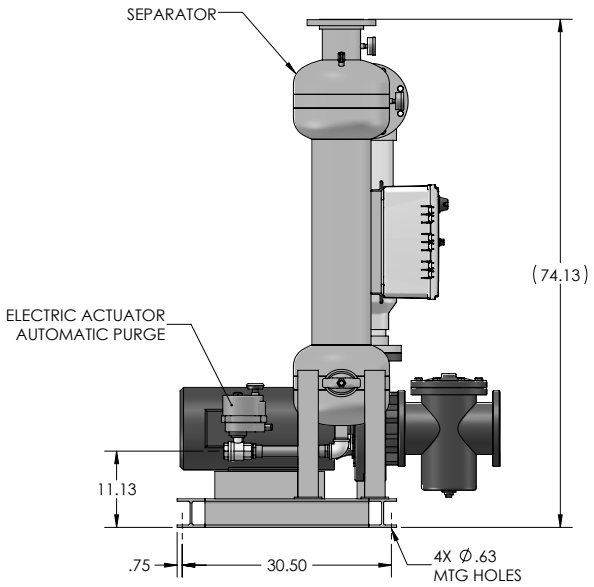
NOTES: UNLESS OTHERWISE SPECIFIED

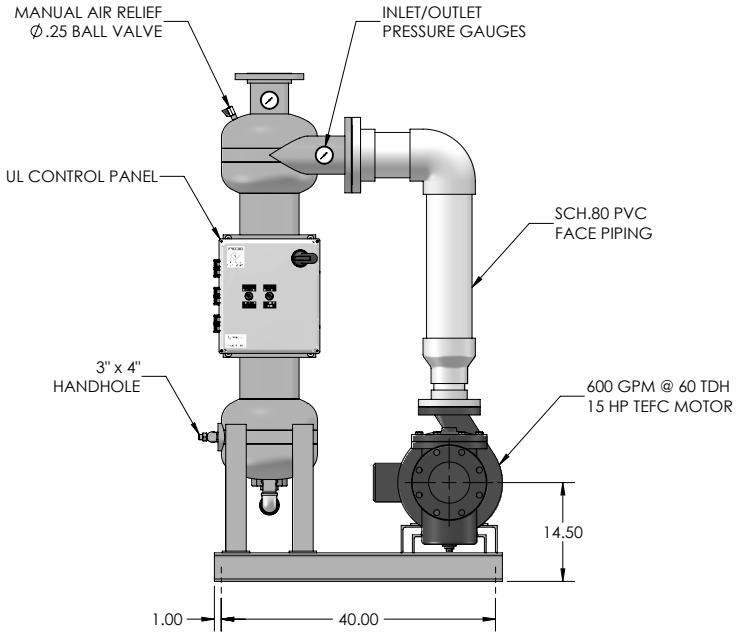
1. DIMENSIONS ARE IN INCHES
2. DIMENSIONS MAY VARY SLIGHTLY - DO NOT USE FOR CONSTRUCTION
3. SEPARATOR SYSTEM IS RATED FOR 150 PSI WORKING PRESSURE

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
B	REVISED PUMP AND BRACKETS	1-8-16	D.L.









PF-64-050-AP SEPARATOR PACKAGE
600 GPM - WITH SKID MOUNTED PUMP

SIZE	DWG NO.	REV
C	641-0544	B

DRAWN	RELEASE DATE	SCALE
D. LUNA	6-14-12	NONE

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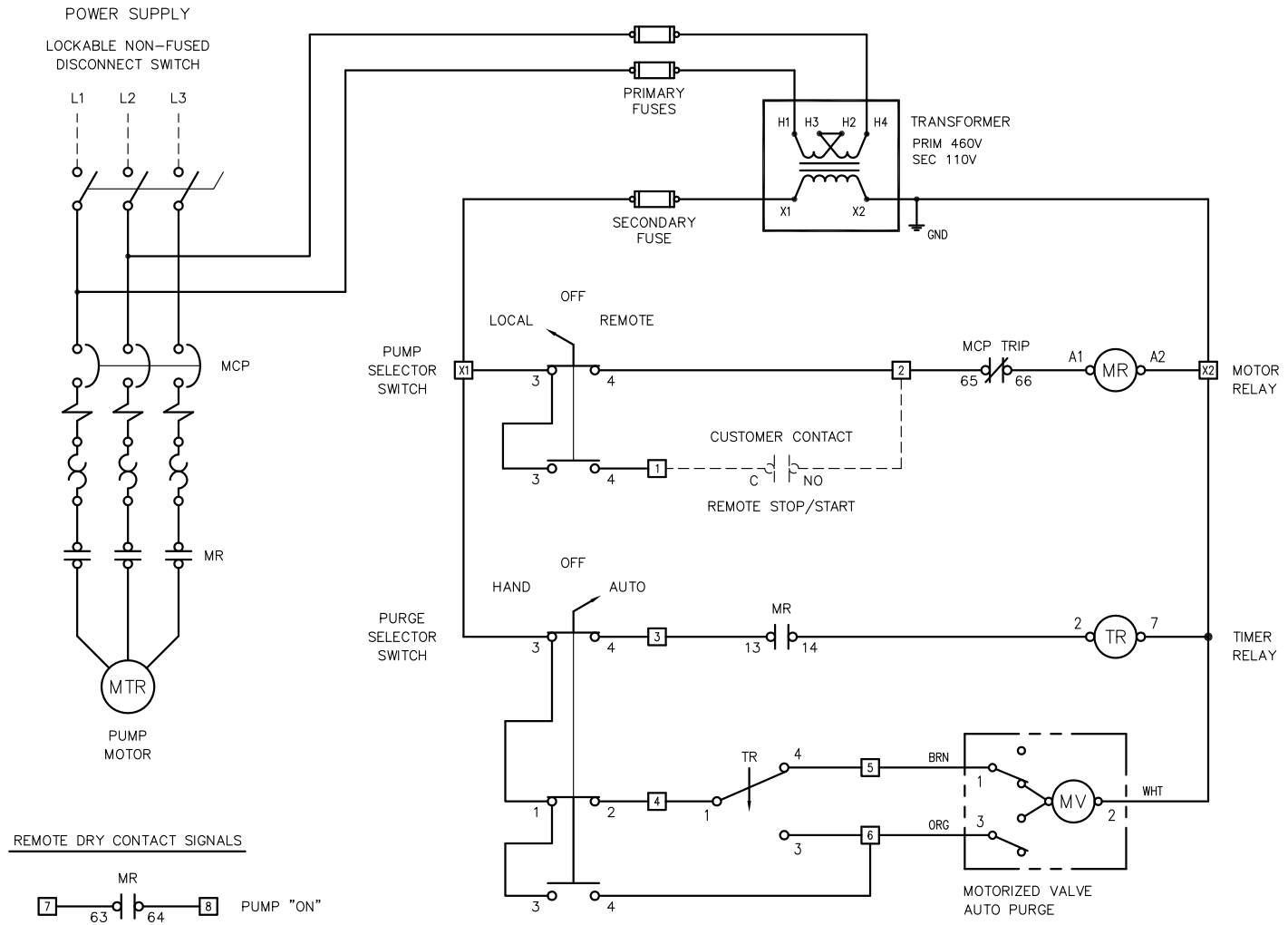
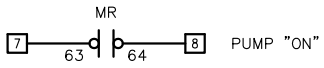
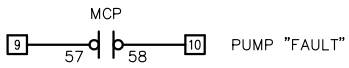
SHEET 1 OF 1

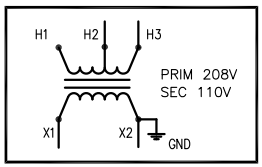


REMOTE DRY CONTACT SIGNALS

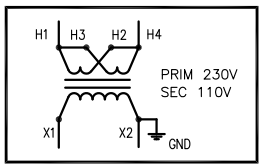




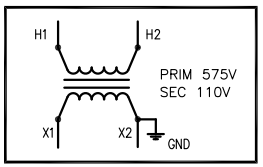
ALTERNATE – 208V



ALTERNATE – 230V



ALTERNATE – 575V



REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

PUMP MOTOR FULL LOAD AMPS (3Ø, 60Hz)				
MOTOR HP	208 VOLTS	230 VOLTS	460 VOLTS	575 VOLTS
10	29.2	25.4	12.7	10.1
15	45.1	39.2	19.6	15.7
20	58.9	51.2	25.6	20.5
25	74.5	64.8	32.4	25.9
30	86.9	75.6	37.8	30.2
40	116.0	101.0	50.4	40.3

FULL LOAD CURRENTS LISTED ABOVE ARE "AVERAGE VALUES" FOR HORSEPOWER RATED MOTORS OF SEVERAL MANUFACTURERS.

THE RATED FULL LOAD CURRENT SHOWN ON THE MOTOR NAMEPLATE MAY VARY BY MANUFACTURER.

NOTES

NOTES: UNLESS OTHERWISE SPECIFIED

1. BRANCH CIRCUIT PROTECTION SUPPLIED BY OTHERS
2. PANEL U.L. LISTED AND LABELED
3. DASHED LINES INDICATE FIELD WIRING
4. SWITCH OPERATION
   "LOCAL" – REMOTE STOP/START OVERRIDE
   "OFF" – FILTER "OFF"
   "AUTO" – FILTER ON/OFF VIA REMOTE STOP/STOP

ACTUATOR WARNING !!!!

The emergency "MAN" switch and external hand wheel located on the filter actuator are only to be used when there is no power to the actuator. Disconnect power to the control panel before using this feature or DAMAGE MAY OCCUR to the actuator.

THIS FEATURE IS FOR EMERGENCIES ONLY!

If the valve does not open or close fully adjust cams to correct problem.

WARNING

If an overload or fault current interruption occurs, circuits must be checked to determine the cause of the interruption. If a fault condition exists, the current carrying components should be examined and replaced if damaged, and the integral current sensors must be replaced to reduce the risk of fire or electric shock.

CAUTION – RISK OF ELECTRICAL SHOCK

More than one disconnect switch may be required to de-energize the equipment before servicing.

WARNING – RISK OF FIRE OR ELECTRIC SHOCK

The opening of the branch circuit protective device may be an indication that a fault current has been interrupted. All current carrying parts and other components protected by this device should be examined and replaced if damaged. If burnout of a current element of an overload relay occurs, the complete overload relay must be replaced.

U.L. CONTROL PANEL : PF-64 SERIES
AUTO PURGE PANEL WITH PUMP HOA

SIZE	DWG NO.	REV
C	UL2-1913	A

DRAWN	RELEASE DATE	SCALE
K. CARTER	6-03-16	NONE

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SHEET 1 OF 1

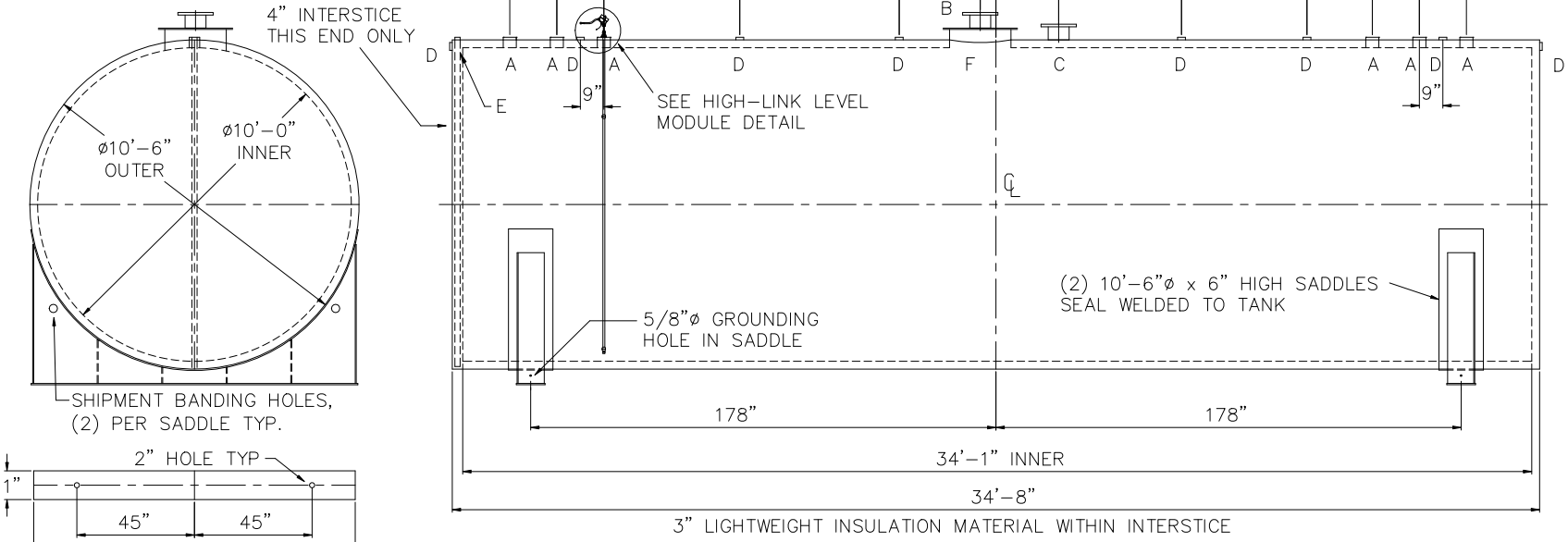
TOUCH UP OF FINISHED PAINT IS REQUIRED BY INSTALLATION CONTRACTOR. TOUCH UP PAINT SHIPPED WITH TANK.

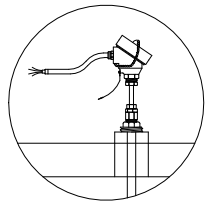
SHIP LOOSE

(2) 8" FLANGED EMERGENCY VENTS

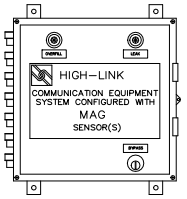
(1) HIGH-LINK LEVEL SHIELD MODEL# LS_XEXD_3500 138" LONG & BUSHING WITH LS_LINK_GPRS COMMUNICATION BOX.

SHIPPING LUGS AS NEEDED





HIGH-LINK LEVEL SHIELD DETAIL



COMMUNICATION BOX DETAIL

DESIGN DATA

CAPACITY : 20,000 GALLONS
TYPE: FIREGUARD® CYLINDRICAL
FIREGUARD® IS A TRADEMARK OF THE STEEL TANK INSTITUTE
NO. REQ. – –
OPERATING PRESSURE – ATMOSPHERIC
SPECIFIC GRAVITY = 1.0
TANK MATERIAL – MILD CARBON STEEL
THICKNESS – INNER – HEADS: 5/16", SHELL: 1/4"
THICKNESS – OUTER – HEADS: 5/16", SHELL: 1/4" MIN. GAUGE OR THICKNESS (PER U.L. 2085)
CONSTRUCTION – INNER – LAP WELD OUTSIDE ONLY
CONSTRUCTION – OUTER – LAP WELD OUTSIDE ONLY
TANK TEST – PER UL 2085
INT. FINISH – NONE
EXT. FINISH – SP-6 BLAST, FINISH PAINT WHITE –
LABEL– UL 2085 AND FIREGUARD® PER sti

LEGEND

A	4" FEMALE FIREGUARD COUPLING
B	8" FFSO 150# FLANGE – FOR PRIMARY EMERGENCY VENT USE ONLY
C	8" FFSO 150# FLANGE THROUGH OUTER SHELL ONLY, MARK WITH SPECIAL WARNING LABEL INTERSTITIAL EMERGENCY VENT USE ONLY
D	2" FITTING THROUGH OUTER SHELL ONLY WITH CAST IRON PLUG– MFG USE ONLY
E	2" INTERSTITIAL MONITOR PIPE – MALE NPT END
F	24" x 1/4" PLATE TIGHT BOLT MANWAY WITH 1/8" THICK NEO-CORK GASKET AND "B" IN COVER ON CL

NOTES:

STRIKER PLATES ARE NOT SUPPLIED ON FIREGUARDS® UNLESS SPECIFIED

Highland Tank

UNLESS NOTED, TOLERANCES ARE +/- 1"

20,000 GAL 120"ø CYL. FIREGUARD®

PATENT: 5,695,089 PATENT: 5,809,650

CUSTOMER:

PROJECT:

QUOTE NO: CHK'D BY:

SCALE:	DATE:	DWG. BY:	DWG. NO.:
1/4"=1'-0"			20000FGCYL120

20000FGCYL120

20000-Gallon Capacity Aboveground Horizontal Cylindrical Fireguard®
UL-2085 Thermally Insulated, Double-Wall Steel Storage Tank

Quantity: ____

Nominal Capacity: 20000-gallons, as indicated on drawing.

Nominal Tank Dimensions:	Diameter	Length
Primary Tank:	10-feet, 0-inches	34-feet, 1-inches
Secondary Tank:	10-feet, 6-inches	34-feet, 8-inches

Minimum Steel Thickness:	Head	Shell
Primary Tank:	5/16-inch	1/4-inch
Secondary Tank:	5/16-inch	1/4-inch

Tank shall be manufactured, tested and labeled in conformance with Underwriters Laboratories' UL-2085 Standard for Protected Aboveground Tanks for Flammable and Combustible Liquids, Double-wall Construction. Tank shall be manufactured and labeled in strict accordance with Steel Tank Institute (STI) Fireguard® Thermally Insulated, Double-wall Steel Aboveground Storage Tank standards as applied by a licensee of the STI. Tank shall be subject to the STI's Quality Assurance program and shall be backed by the STI 30-year limited warranty.

The tank shall be a cylindrical, horizontal, steel tank intended for the storage of flammable and combustible liquids at atmospheric pressure. Tank shall include integral steel secondary containment and thermal insulation that provides a minimum two-hour fire rating. The tank design shall comply with UL 2085 "Protected" Tank standard having been tested for Ballistics, Impact, Hose Stream, and Pool Fire performance standards. Tank shall be designed for possible relocation at a future date. Concrete encased tank designs are not equal and will NOT be permitted.

Inner (primary) and outer (secondary) tanks shall be fabricated from mild carbon steel with flat-flanged heads, and lap-welds at all seams and joints. Primary and secondary tanks are air tested at the factory. (Primary tank may need to be retested for tightness at the jobsite prior to commissioning. Consult AHJ for requirements.) Tank shall be supplied with emergency vents for the primary and the secondary containment tanks. Emergency venting by "form of construction" is not equal and will NOT be permitted.

Tank shall comply with the latest edition of National Fire Protection Association NFPA 30 Flammable and Combustible Liquids Code. The tank system shall also meet or exceed the requirements of:

- National Fire Protection Association NFPA 30A Automobile And Marine Service Station Code
- 1997 Uniform Fire Code (UFC) "Protected" AST criteria as per Appendix II-F, including ballistics protection
- California Air Resources Board (CARB) testing requirements for air emissions
- International Fire Code

Construction

Tank shall be of double-wall construction and provide complete secondary containment of the primary storage tank's contents by an impervious steel outer wall. Inner and outer tanks shall be manufactured in accordance

with UL-142 Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids as referenced in UL-2085. Tank shall be fabricated of mild carbon steel with shell seams of continuous lap weld construction.

A minimum of 3" of porous, lightweight monolithic thermal insulation material shall be installed at the factory within the interstitial space between the inner and outer wall. Thermal insulating material:

- Shall be in accordance with American Society of Testing Materials (ASTM) Standards C-332 and C-495.
- Shall allow liquid to migrate through it to the monitoring point.
- Shall not be exposed to weathering and shall be protected by the steel secondary containment outer wall (an exterior concrete wall or vault exposed to the elements will NOT be permitted).

Each tank shall be delivered as a complete UL-listed assembly including the following fittings and components: (All fittings NPT or flanged, shall be supplied with plastic protectors for shipment)

Standard tanks shall include, at a minimum, fittings for normal vent, interstitial monitoring, emergency vent for primary tank, emergency vent for secondary tank, product fill, product pump/supply and liquid level gauge. See standard drawings at www.highlandtank.com for quantity, size and location of fittings on standard tanks. All fittings must be located above the maximum fluid level per UL-2085 / STI Fireguard requirements. Normal vent sizes are equal to, or larger than largest fitting to be used for fill or withdraw from the tank. Emergency vent size is based on the wetted surface area of the tank.

- Two (2) Welded-on Saddles - Design, size and location determined per STI specifications

- Lifting lugs shall be provided at balancing points to facilitate handling and installation.

Exterior Protective Coating:

- Surface Preparation: Grit blast - SSPC-SP-6 White Blast
- Finish: White urethane paint system 5-7 DFT on the shell and heads

Tank shall be supplied with a High-LINK® LevelShield Series P, Level Management System that includes:

1. One (1) Magnetostrictive probe for continuous monitoring of product and water levels, and product temperature (provides temperature-compensated volume monitoring).
   Probe Specs:
   - Probe length: 59″ - Additional probe length required _____″ (Available in 10″ increments)
   - Communication cable 78″ (included) - Additional cable length required _____″
   - RS-485 Communication
   - 2 floats – (1) for product level, (1) for water level
   - Thermocouple for product temperature measurement
   - Measuring accuracy up to +/- 0.02″
   - Resolution +/- .004″
   - 316 Stainless Steel Shaft
   - Polypropylene float material
   - Explosion-proof head
   - ¾" compression fitting
   - ¾" x 2” NPT reducer bushing supplied (minimum 2″ opening required)
   - Compatible with gasoline and diesel (Contact Highland Tank for other chemical/product compatibility)

2. CommBox transmits data from connected sensors/probes to cloud-based High-LINK® software platform.
   - CommBox specs: Note: Maximum of two (2) probes per CommBox.
   - **NEMA 4 Enclosure**
   - 120VAC with terminals for electrical landing
   - 5A 120VAC breaker
   - Active barrier
   - 12VDC power converter
   - Terminal blocks for probe wire landing
   - 4G cellular technology
   - Two (2) Integrated LED/Horn combinations with dry contacts for audible/visual alarms.

3. High-LINK® Cloud-Based Software Platform

Optional Equipment

_____ Bulkhead(s) for Split Tank – Single or Double (Double bulkhead required if storing dissimilar products)
Tank splits: _____-gallons and _____-gallons (Contact Highland Tank for 3 or more compartments)
_____ Manway(s) Qty: _____, _____-inch diameter with gasket, bolts, nuts, washers and lid
_____ 7 or _____ 10-gallon Spill/Overfill Container
_____ Pump mount(s): _____ Top Mount, _____ Side Mount, or _____ for Free Standing Pumps and Dispensers on Standard or Split Tanks
_____ Remote fill cabinet (_____ Post-mounted or _____ Tank-mounted: _____ head or _____ shell)
External Access component(s) please specify:
_____ Ladder(s), _____ Stairs, _____ Platform(s), _____ Walkway(s) with Handrails
_____ Internal Ladder(s) per drawing
_____ HTLP 1.5” Interstitial Float Switch Sensor for leak detection (Requires HTSC 2″ Pipe Cap)
_____ HTF-1 Float Switch Interface Stem Sensor for overfill detection
_____ Electronic Alarm Panel. Channel quantity: _____
_____ High-LINK **Fuel**Shield®, Fuel Management System
_____ Additional High-LINK Magnetostrictive probe for **Level**Shield Inventory System (2 Maximum)

_____ Equipment Packages available:
_____ Gasoline Dispensing _____ Diesel Dispensing
_____ Emergency Generator _____ Waste Oil Handling
- Consult Factory for Aviation Fuel (Avgas, Jet-A, or Jet A-1) Dispensing

Additional threaded fittings with thread protectors shall be supplied as follows. Add as needed.

a. ____-inch diameter, intended for _____ use, location indicated on drawing(s)
b. ____-inch diameter, intended for _____ use, location indicated on drawing(s)

Flanged fittings Class 150#, (RF-Raised-Face, FF-Flat-Face, SO-Slip-On, WN-Weld-Neck) with flange protectors shall be supplied as follows. . Add as needed.

a. ____-inch diameter, Type: _____, intended for _____ use, location indicated on drawing(s)
b. ____-inch diameter, Type: _____, intended for _____ use, location indicated on drawing(s)

Optional Interior & Exterior Coatings & Linings:

____ Interior Commercial grit blast (SSPC-6)
____ Internal coating _____ Minimum size 500 gallon
(Must include interior weld and minimum (1) 18-inch diameter manway)
____ Exterior polyurethane paint color: _____
____ Other exterior coating _____, Color: _____

Execution

Tank to be set level on a solid foundation of reinforced concrete constructed by owner of installer. Installation and testing shall be in strict accordance with STI's Fireguard® Installation Instructions and performed by a licensed installer.

Warranty

The tank is warranted by Highland Tank & Mfg. Co. to be free from defects in manufacturing, workmanship and materials. Highland Tank will repair or replace, at its sole discretion F.O.B. factory, within a period of one year after date of shipment, any item of our manufacture. All other items shall be warranted by their respective manufacturers. Liability hereunder is limited, as stated above, and does not include labor, installation costs, indirect or consequential damages of any kind. Tanks must be returned to the factory and if found to be defective upon examination, will be repaired, replaced or credit will be issued at our option.

Tank to be manufactured by Highland Tank at one of the following locations: Stoystown, PA; Manheim, PA; Watervliet, NY; Greensboro, NC; Friedens, PA; Clarkston, MI or Mancelona, MI.

A Veteran Owned Business

FUEL TECHNOLOGIES INTERNATIONAL

FTI-10A: 48” W x 48” H x 16.5” D

FM approved and NFPA compliant diesel fuel maintenance equipment
NEMA 3R compliant 2-door cabinet with zinc primer and powder coat finish
Affordable system for diesel fuel tank maintenance
Designed for rack or wall mount 48.0”W x 48.0”H x 16.5”D
Priming Tee, Sight Glass, UL Listed Controller
99% fuel sediment removal for best diesel fuel quality (1 Micron)
Nearly 100% water removal
Automatic Fuel Filtration runs on an optimum schedule, with automatic Shut-Off & Alarms for: Water Detection, Filter Saturation, Leak Detection, Flow Loss, High Pressure, and Motor Overload
Optional Modbus RTU Communications (contact your local authorized representative)
Optional Multi-Tank Submersible Pump Controller (contact your local authorized representative)

Perfect for MISSION CRITICAL facilities including:

Hospitals
Data processing centers
Prisons
Banks

P.O. Box 6863 | Santa Maria, CA 93456 USA | Phone: 805.459.1733 | Fax: 805.456.2944

Model FTI-10A Single Tank

FM APPROVED

Engineering Specifications
Automated Diesel Fuel Maintenance System
Single Diesel Fuel Tank Up To 30,000 Gallons

1. Description

A. Diesel fuel storage tank shall be equipped with an **FM APPROVED**, and **NFPA EQUIPMENT COMPLIANT** automated fuel maintenance system.
B. Filtration system shall remove particulates to 1 micron and water to 99.5% from stored diesel fuel.
C. Fuel stabilizer shall be added to the diesel fuel in storage.
D. Fuel biocide shall be added to the diesel fuel in storage annually.
E. Includes: Modbus RTU, RS485 Serial Communications.

2. Pump / Motor Ratings

A. Pump: 10 GPM, Rotary gear, mechanical seal, positive displacement, pressure relief valve.
B. Motor: 3/4 HP, 1725 RPM, 115/208-230V AC @ 8.4 / 4.2 Amps, 1 phase, 60Hz, TEFC.

3. Filtration Shall Consist of:

A. Stage 1: Strainer,100 mesh (spin on filter)
B. Stage 2: 10 micron, particulate removal (spin on filter)
C. Stage 3: 3 Micron particulate removal (spin on filter)
D. Stage 4: Water Coalescer and separator to 5 PPM. (element type)
E. Stage 5: Final filter, 1 micron particulate removal. (element type)

4. Filter Replacement Kit: FRK-10A (Kit includes filters listed below.)

A. FL-70-10N – 10 Micron, Spin On, 1 ea.
B. FL-FBO-60327 – One Micron / Water Separator, 1 ea.
C. FL-50-100M – Strainer, 100 Mesh, Spin On, 1 ea.
D. FL-70-03N – 3 Micron, Spin On, 1 ea.

5. Controller Specifications:

A. Control panel shall be UL 508.
B. Siemens 1200 Series PLC, UL/CSA/CE/FM approvals.
C. Siemens CB1241 RS485 Module **(Modbus Module included)**
D. Motor contactor: UL/SA/CE approvals.
E. Motor overload: UL/SA/CE approvals.
F. Terminal block: 26 Amps, 18-12 AWG
G. Lockable disconnect switch: UL/CE Approvals.
H. Dry contact general alarms: One set of dry contacts provided. (Normally open for all alarms)
I. Siemens Basic touch screen display.
J. PLC shall monitor items 1-9
K. Alarm conditions 1-9 shall be indicated by an audible horn.
L. Visual alarm descriptions for items 1-9 shall be shown on the touch screen.
   1. Strainer plugged (Vacuum switch gauge)
   2. 3 Micron Filter Plugged (Differential pressure switch gauge)
   3. 10 Micron Filter Plugged (Differential pressure switch gauge)

4. Water level in separator bowl at maximum. (Water Detected)
5. Leak in Cabinet. (Leak Detected)
6. Motor overload. (Motor / Pump Issue)
7. System Pressure (Pressure switch gauge)
8. 1 Micron Filter Plugged (Differential pressure switch gauge)
9. Loss of Prime (Low set point on pressure switch gauge)

M. Signal device (audible alarms)**:** 120/230V AC, Slow pulse, 80 to 95 Db.

N. Controller shall be programmable to time delay the following 6 operations:

1. Vacuum / Strainer plugged (Vacuum switch gauge)
2. 1, 3 and 10 Micron Filter Plugged (Differential pressure switch gauge)(one alarm delay for 1, 3 and 10 Micron)
3. Water level in bowl at maximum. (Water Detected)
4. Leak in Cabinet. (Leak Detected)
5. Low Flow. (Loss of prime)
6. System Pressure (Pressure switch gauge)

O. One dry contact to turn off FTI system when generator starts.

P. One dry contact to stop FTI system for any reason.

6. Enclosure

A. Cabinet shall have 2 lift off removable doors.
B. Cabinet shall be treated with **"Zinc Primer"** for corrosion resistance and **"Powder Coat"** finish.
C. Cabinet shall be manufactured to "NEMA 3R" standards and designed for rack or wall mounting.
D. Cabinet size: 48" W x 48 H x 16.5" D.
E. Leak detection: Provided in cabinet.
F. System weight: 500 Lbs.

7. Voltage Options

A. Choose one:(115V AC, 1 Phase, 50/60 Hz) (208-230V AC, 1 Phase, 50/60 Hz)

8. Leak Detector

A. 24V DC, N.O. (closes with liquid present)

9. Plumbing

A. Supply line shall be installed at the sump, or low end of the fuel tank.
B. Supply line shall be installed 1" from the bottom of the fuel tank, with a foot valve.
C. Return line to be installed at the opposite end of the fuel tank.
D. Caution should be taken not to exceed the 15 feet lift capability of the fuel circulation pump.
E. Inlet Connection = 1 1/2" NPT.
F. Outlet Connection = 1 1/2" NPT.

10. Installation Precautions:

MODEL FTI-10A SINGLE TANK HAS NO PROTECTION AGAINST THERMAL EXPANSION OF THE FUEL LINES. IF THE FUEL LINES ARE INSTALLED WITHOUT PRESSURE RELIEF, DAMAGE MAY OCCUR TO THE PUMP, MOTOR OR FILTERS.

INSTALLER SHOULD PREVENT ANY CLOSED LOOP WITH THE FTI-10A SYSTEM IN THE MIDDLE.

FTI WILL NOT BE RESPONSIBLE FOR ANY DAMAGE DUE TO EXCESSIVE LINE PRESSURE CAUSED BY THERMAL EXPANSION

Model FTI-10A Single Tank System as Manufactured by

Fuel Technologies International

P O Box 6863, Santa Maria, CA 93456

Compact Automatic FuelPort
for Petroleum Products

The Simplex Automatic FuelPort is a factory packaged system for control of filling operations of aboveground tanks that are filled from pumper trucks. The Automatic FuelPort provides a ready means of ground level connection of the fill hose, and captures spills that may occur at the fill point during filling operations. The Automatic FuelPort alerts the operator at Tank Full with filling operations locked out at High Level. A leak detection circuit prevents filling of leaking tanks. Visual and audible level and leak alarms are provided.

The Simplex Automatic Fuel-Port is available for use with fuel oil (Class-II liquids) multi-tank units and units for use with gasoline (Class-I liquids) available through Simplex.

Contact Simplex or your Simplex representative for information on the full line of Simplex Tank Filling Systems.

Top outlet shown (bottom outlet available)

How It Works:

1. Delivery truck arrives and driver proceeds to Automatic FuelPort to make fuel delivery.
2. Connect ground cable
3. Unlock fill box and control box
4. Turn on controller
5. Connect delivery hose to hose coupling
6. Open valve on truck
7. Start delivery pump on truck
8. Press Valve Open pushbutton on controller
9. Automatic FuelPort valve opens
10. Fuel is delivered to tank
11. At Tank Full level, audible and visual alarm activates and alerts driver
12. Driver may stop delivery by pressing the Valve Close pushbutton and proceed to step #16
13. Driver tops off to Tank Full
14. At High Level, audible and visual alarm activates and Automatic FuelPort valve closes (valve may not be reopened)
15. Stop fill pump
16. Drain delivery hose
17. Close truck valve
18. Disconnect delivery hose from Automatic FuelPort
19. Turn controller off
20. Close and lock Automatic FuelPort doors
21. Proceed to next delivery, where, hopefully, the owner has had the foresight to install a Simplex Automatic FuelPort

Includes:

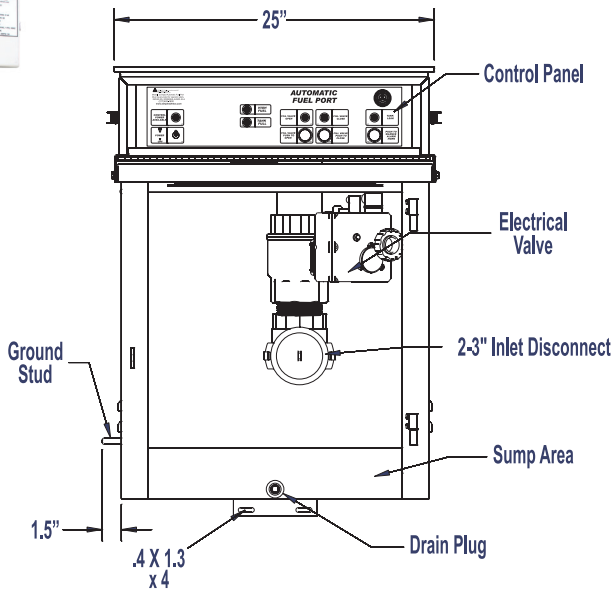
- Freestanding, pad or tank mountable, weatherproof and lockable enclosure
- Quick disconnect hose coupling with dust plug
- Check valve
- Electrically operated shutoff valve
- Automatic controller
- Ground stud
- Optional post assembly available
- Available with top or bottom outlet

Float Set

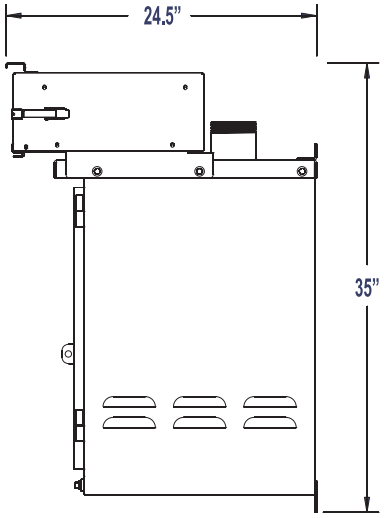
Compact Automatic FuelPort

for Petroleum Products • Page 2

SIMPLEX®



FRONT VIEW
SHOWN WITHOUT DOOR



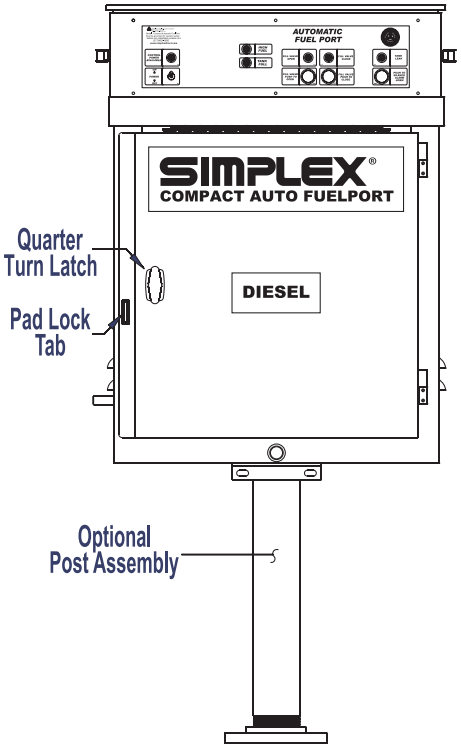
RIGHT VIEW

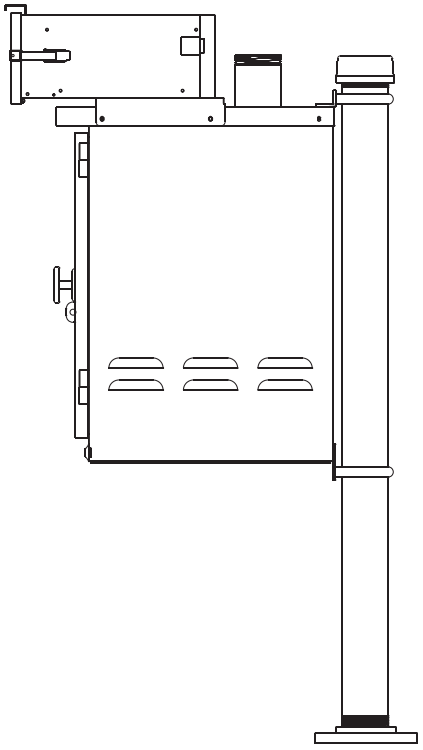
Controller Includes:

- Level sensors for installation in a 2” tank fitting (minimum)
- Tank Full visual alarm
- High Level visual alarm
- Tank Leak alarm
- Audible alarm horn activated by alarms above
- Power available indicator
- Control power On-Off switch
- Valve Open/Close push-buttons
- Type 3R enclosure

Specifications:

Fitting size: 2” or 3”
Spill containment: 7 gallons
Paint: white with blue doors
Net Weight: 313 lbs.
Control power: 115-1-60v
Level transmitter fitting: 2” min.





Order Checklist

- ☐ How many tanks to fill?
- ☐ Tank leak sensing required?
- ☐ Size fill fittings: 2" or 3"?
- ☐ Accurate tank dimensions required, 2" or 4" fitting required for transmitter (specify)
- ☐ Specify options

Printed in the USA • 1503-01.02

SPECIFICATIONS

1. 4" Plain End inlet/outlet, 3" Plain End vents.
2. Max flow rate: 100 GPM
3. Capacities: Liquid: 110 gal. (14.7 cu. ft.); Oil: 93 gal.; Sand: 11 gal.
4. Unit weight with composite cover: 130 lbs.; with cast iron cover: 188 lbs.
5. Maximum operating temperature 140˚F continuous.
6. Highway rated covers: 16,000 lb. capacity.

NOTES

1. Snap-in Flow control (ships with unit).
2. Seamless medium density polyethylene tank.
3. Unit supplied with built-in adapter for up to 5" of adjustability. Additional riser(s) available for deeper burial depth.
4. Cover placement allows full access to tank for proper maintenance.
5. Narrow footprint allows clearance through doorways and down stairs.
6. Engineered inlet and outlet diffusers are removable to inspect/clean piping.
7. For on the-floor or buried applications.

DIFFUSION FLOW TECHNOLOGY

The inlet diffuser splits influent into three paths, creating laminar flow and utilizing the entire liquid volume of the tank for efficient oil separation. The calibrated openings greatly reduce influent turbulence. The influent enters the main chamber without disturbing the existing oil or sand layers. The bottom of the outlet diffuser allows only effluent that is free of oil to exit the tank.

ENGINEER SPECIFICATION GUIDE

Striem Oil Reserve™ oil/sand separator model OS-75 shall be lifetime guaranteed and made in USA of seamless, rotationally-molded polyethylene. Separator shall be furnished for above or below grade installation, with field adjustable riser system, snap-in flow control and (2) vent connections. Separator flow rate shall be 75 GPM. Separator oil capacity shall be 93 gallons. Sand capacity shall be 11 gallons. Covers shall provide water/gas-tight seal and have a maximum 16,000 lbs load capacity.

THIRD PARTY STRUCTURAL ANALYSIS

The OS-75 has been structurally analyzed in accordance with the requirements of IBC 2012 and ASCE/SEI 7 for direct burial. The maximum burial depth and backfill material are specified in our installation instructions. The structural design has been reviewed and sealed by a professional engineer registered in the state of California. A sealed structural analysis report is available upon request.

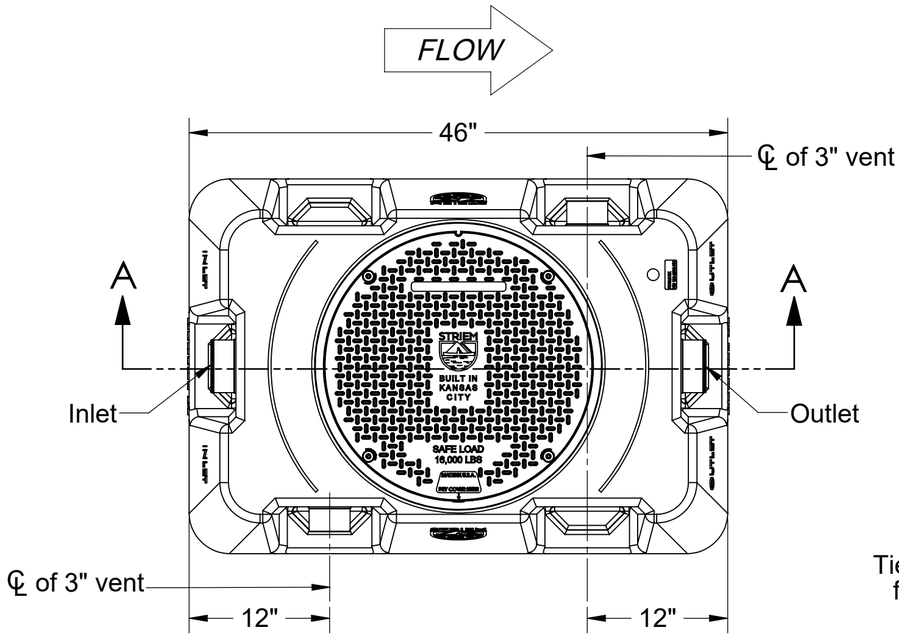
OPTIONS

- ☐ **4M** - 4" Male Thread Inlet / Outlet
- ☐ **6P** - 6" Plain End SCH.40 Inlet / Outlet
- ☐ **6M** - 6" Male Thread Inlet / Outlet
- ☐ **C24-HP** - H20 Rated Pickable Cast Iron Cover
- ☐ **CC24** - Integral Membrane Clamping Collar Kit
- ☐ **CS2** - Clean Sweep Coalescing Media (single)*
- ☐ **HDK-2** - High Water Anchor Kit

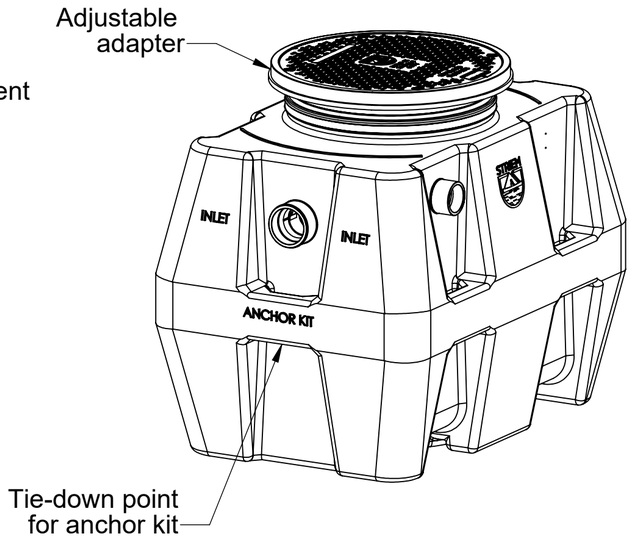
*Clean Sweep Coalescing Media not compatible with CPRK

RISER OPTIONS

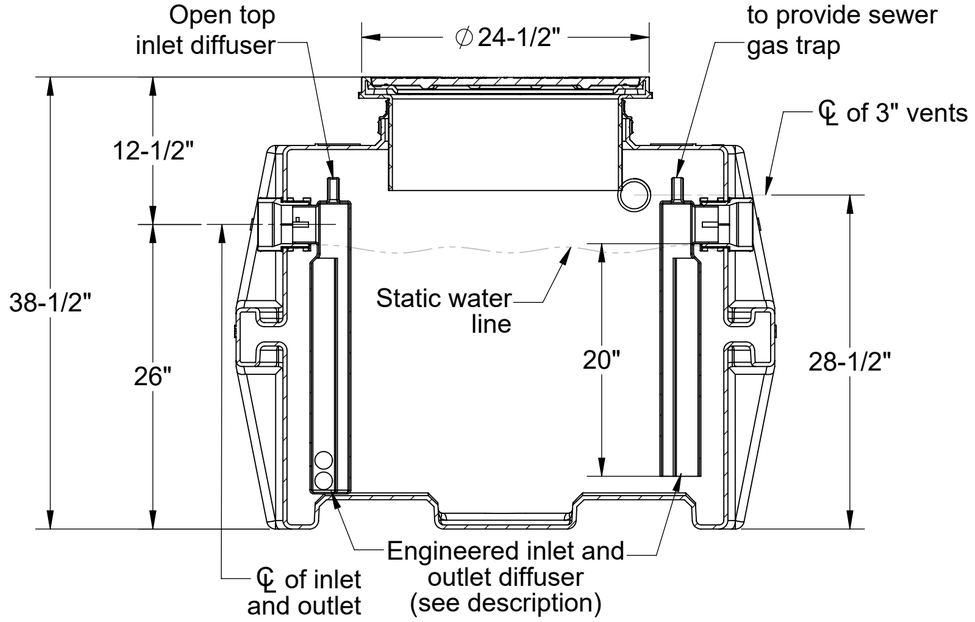
- ☐ **SR24** - >6"-24"
- ☐ **LR24** - >24"-39"
- ☐ **SR24** (2) - >39"-43"
- ☐ **SR24** + **LR24** - >43"-58"
- ☐ **LR24** (2) - >58"-72"
- ☐ **CPRK** : >11" - 72"
  - Corrugated Pipe Riser Kit.
  - 18" diameter corrugated pipe by others.
  - Used in substitute of SR/LR riser options
  - See CPRK specification for more detail.



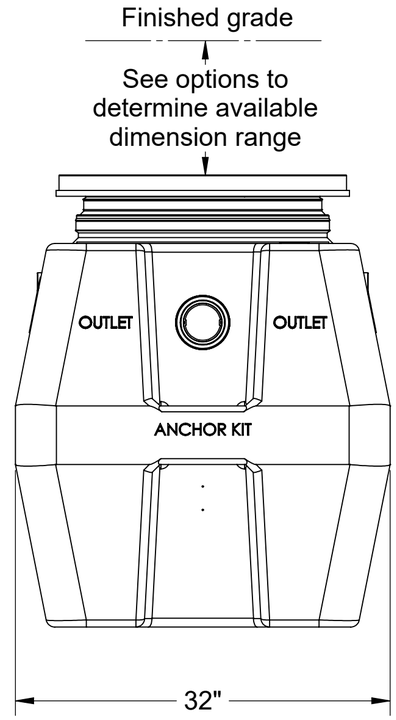
TOP VIEW



ISOMETRIC VIEW



SECTION "A-A"



OUTLET END VIEW

MODEL NUMBER:	OS-75
DESCRIPTION:	75 GPM POLYETHYLENE OIL/SAND SEPARATOR

DWG BY: MJ	**DATE:** 12/09/2020	**REV:** 0	**ECO:**

SPECIFICATION SHEET

Striem
3100 Brinkerhoff
Kansas City, KS 66115
Tel: 913-222-1500
orders@striemco.com
www.striemco.com

Made in the U.S.A

SMITH® JAY R. SMITH MFG. CO.®
MEMBER OF MORRIS GROUP INTERNATIONAL
POST OFFICE BOX 3237
MONTGOMERY, ALABAMA 36109-0237 (USA)
TEL: 334-277-8520 FAX: 334-272-7396 www.jrsmith.com
CUSTOMER DRIVEN SINCE 1926
MEMBER OF:

LOCATION

ROOF-CEPTOR® INDIRECT WASTE DRAINS

12 1/2"(320) TOP - MEDIUM DEPTH RECEPTORS

FUNCTION: Recommended for use in roof areas to receive waste water from air conditioning units, cooling towers and other mechanical equipment installed on the roof. The solid water dam prevents storm water from entering the waste line. The large vandal proof dome bottom strainer provides ample drainage and prevents entry of debris.

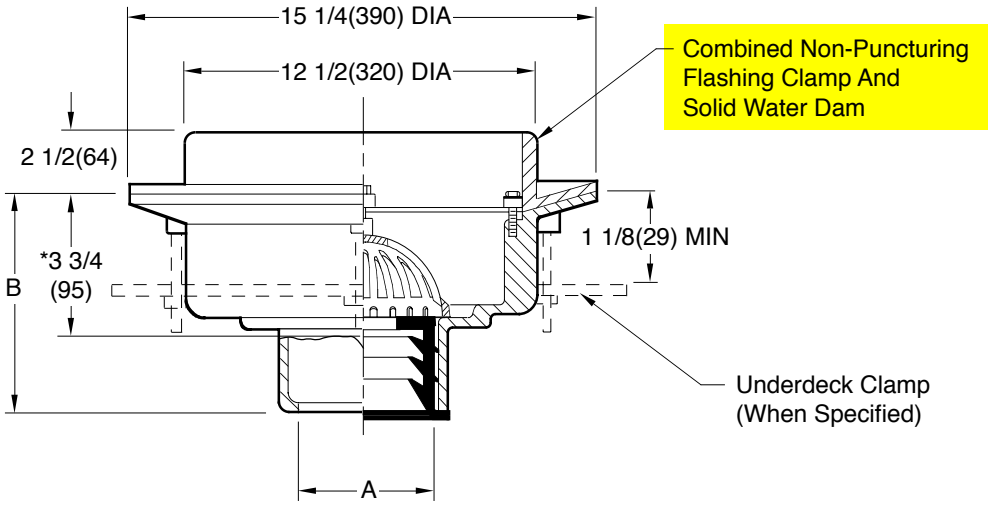


Fig. 3980C . . . CAULK OUTLET
Fig. 3980Y . . . NO-HUB OUTLET

*This Dimension to Internal Stop of Speedi-Set Gasket

recommended deck openings:
with suffix -R - 17"(430)
less suffix -R - 14"(355)

A SIZE	02 (50)	03 (80)	04 (100)	05 (125)	06 (150)
B	5(125) for Caulk, NO-HUB and Speedi-Set. 3 3/4(95) for Threaded				

REGULARLY FURNISHED:
Duco Cast Iron Receptor with Solid Water Dam and Cast Iron Dome Bottom Strainer Secured with Stainless Steel Vandal Proof Screws.

VARIATIONS:
- Extension -E
- L Speedi-Set Service Weight 02(50), 03(80) & 04"(100) sizes only
- LXH Speedi-Set Extra Heavy 02(50), 03(80) & 04"(100) sizes only
- Roof Sump Receiver -R
- Underdeck Clamp -UDC
- T Threaded Outlet

OPTIONAL MATERIALS:
- All Galvanized -G

NOTE: Dimensions shown in parentheses are in millimeters.

REV.	DATE	DESCRIPTION	BY	CKD. BY
C	04/22/04	Added UDC to Variations	JJ	CL
B	8-27-96	Added Millimeters	EMB	BS
A	7-26-94	Submittal Update	EMB	BS

WEIGHT POUNDS | VOLUME CUBIC FEET | FIGURE NUMBER 3980

FIGURE NUMBER 3980 | DRAWN BY: PJ | CHECKED BY: JD | APPROVED BY: SJM | DATE: 9-19-85 | SCALE: NONE | SIZE A | DRAWING NUMBER S3980 | C

WEIL 2-Inch Submersible Wastewater Pump 2554

Submersible Wastewater Pump Association SWPA

Heavy duty pump for commercial and industrial applications.
Pump clear water, gray water, effluent and wastewater with solids up to 2-inch diameter.

Disch. Size	2 Inch
Disch. Type	ANSI
Solids Max.	2 Inch
Mounting Style	2613 Removal

P.06 SP-102

Pump

Case - Cast Iron
Impeller - Cast Iron
Stainless Steel Hardware

Motor

Double Seal - Tandem
- Upper - Carbon against Ceramic
- Lower - Silicon Carbide against Silicon Carbide

Air-Filled Hermetically Sealed
Shaft - Stainless Steel Series 300
Motor Shell - Cast Iron
Insulation - Class F
Ball Bearings - 2 - Double Sealed
Power Cable Length - 25 ft

Three-phase motor
- 1750 RPM
- 60 Hz, 208-230 or 460 volts

Single-phase capacitor start motor
- 1750 RPM
- 60 Hz, 115 or 208-230 volts
- Automatic reset thermal and overload protection

Options

Bronze Impeller
UL Explosion Proof Motor
Moisture Sensor and Temperature Limiter
Additional Power Cable Lengths
Stainless Steel Lifting Cable

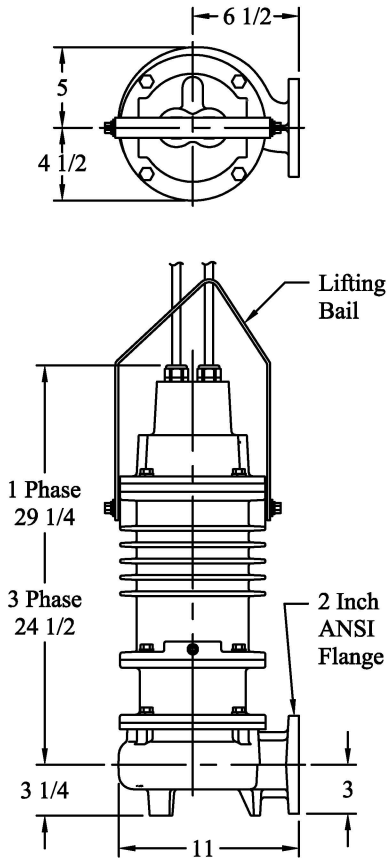
Flow - To prevent solids from settling out

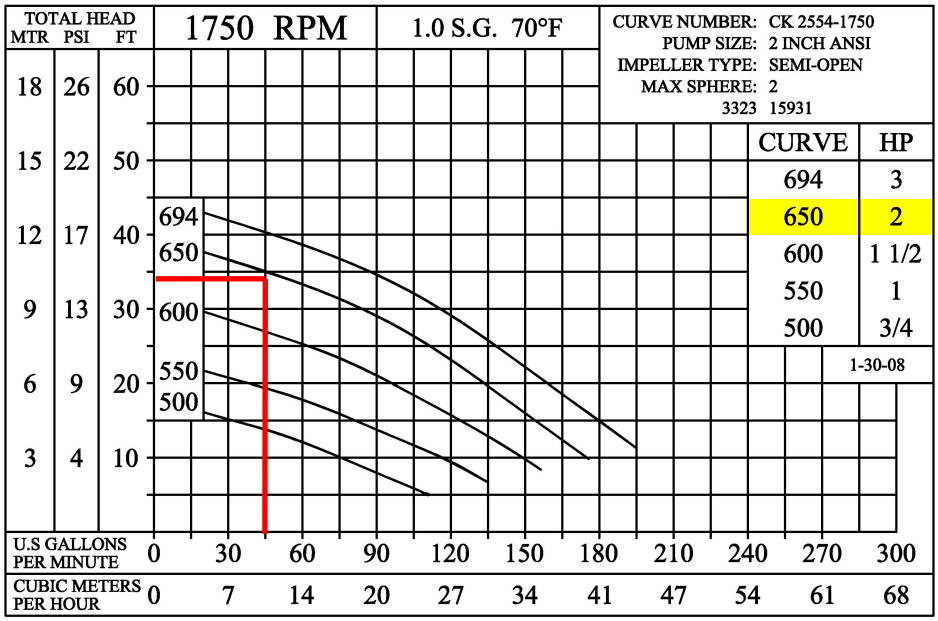
Discharge Pipe Size Dia Inches	Minimum Flow GPM
1 1/2	15
2	25
3	50

Capacities - Wet Wells

Dia or Side Inches	Gallons per Foot of Depth	
	Round	Square
24	24	30
30	37	47
36	53	67
48	94	120
60	147	187
72	212	269

Good wet well design
Maximum 10 starts per hour.
Minimum run time - 1 1/2 minutes.

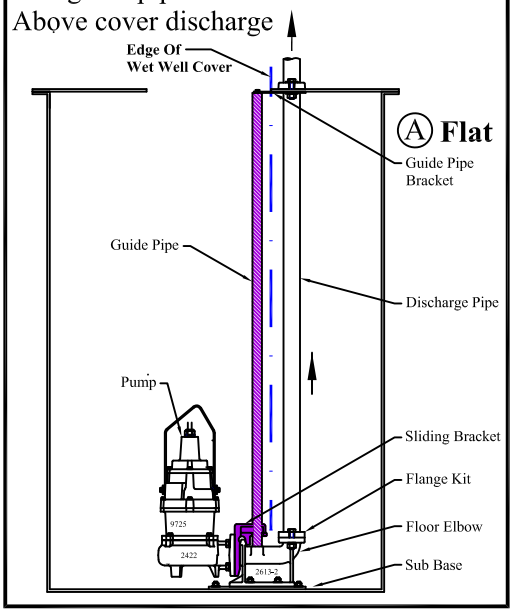




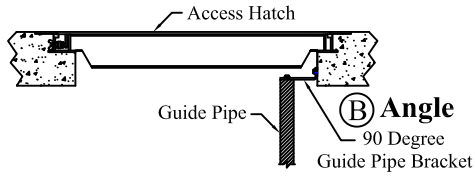
WEIL 2 Inch Removal System 2613-2

April 9, 2018

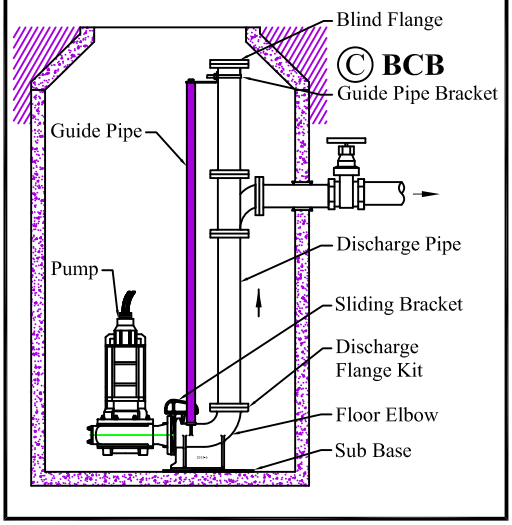
Flat guide pipe bracket
Above cover discharge



Angle guide pipe bracket



BCB guide pipe bracket



System Includes:

- Discharge Floor Elbow - one
- Sliding Bracket - one
  - Iron or
  - Bronze for use with Explosion Proof Motors
    - 316 Stainless Steel
- Guide Pipe Bracket - one
  - Ⓐ- Flat (cover mount) - bolts to wet well cover or
  - Ⓑ- Angle 90° (side mount) bolts to vertical side wall or
  - Ⓒ- BCB Bracket - mounts to discharge pipe

Not Included:

- Discharge Pipe - (2 inch schedule 40), Guide Pipe - (1 inch schedule 40)

Options:

- Discharge Flange Kit for Floor Elbow
- Intermediate Guide Pipe Bracket
- Sub Base for Floor Elbow
- Level Control Lifting Assembly for BCB Duplex Bracket

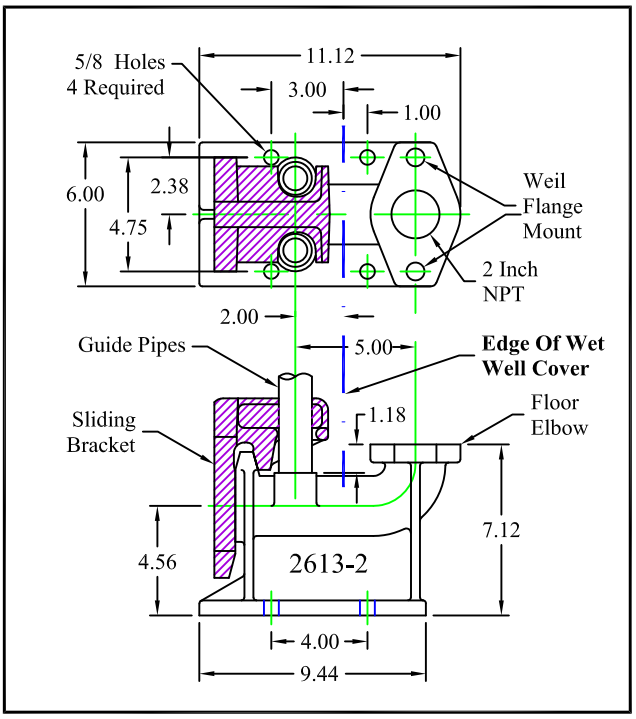
Removal System:

Simplex

Order Number	Floor Elbow	Sliding Bracket	Guide Pipe Bracket	Mount Type	Weight Lbs.
2613K1021	Iron	Iron	Flat	Cover	42
2613K2021	Iron	Bronze	Flat	Cover	42
2613K9102	316 SS	316 SS	Flat	Cover	42
2613K5013	Iron	Iron	Angle	Side	42
2613K6032	Iron	Bronze	Angle	Side	42
2613K9122	316 SS	316 SS	Angle	Side	42
2613K3021	Iron	Iron	BCB	Pipe	42
2613K4021	Iron	Bronze	BCB	Pipe	42
2613K9132	316 SS	316 SS	BCB	Pipe	42

Duplex - BCB System

Order Number	Floor Elbow	Sliding Bracket	Guide Pipe Bracket	Mount Type	Weight Lbs.
2613K7021	Iron	Iron	Pipe	BCB	84
2613K7031	Iron	Bronze	Pipe	BCB	84
2613K9722	316 SS	316 SS	Pipe	BCB	84



Discharge Flange Kit - For Floor Elbow

Includes - Flange, Gasket and Hardware
Weil = 2 bolt oval configuration

Order Number	Material	Pipe Type	Flange Type
2613K102	Cast Iron	Threaded	Weil
2613K202	Cast Iron	Plain End	Weil
2613K942	316 SS	Plain End	Weil

Intermediate Guide Pipe Bracket:

205.666.002	Intermediate Guide Pipe Bracket

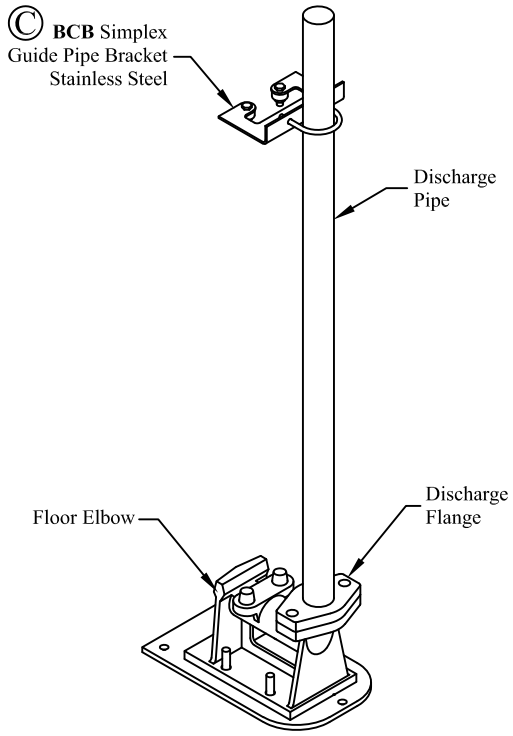
WEIL

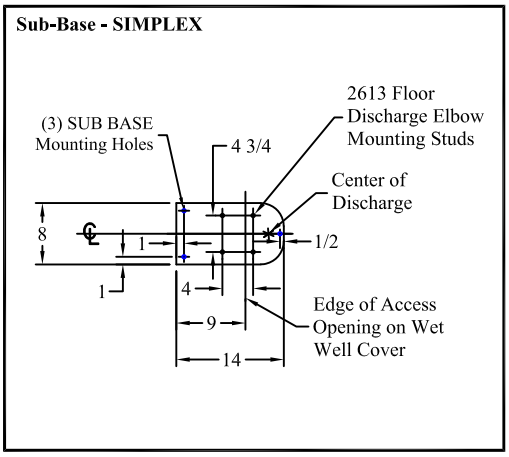
2 Inch Removal System

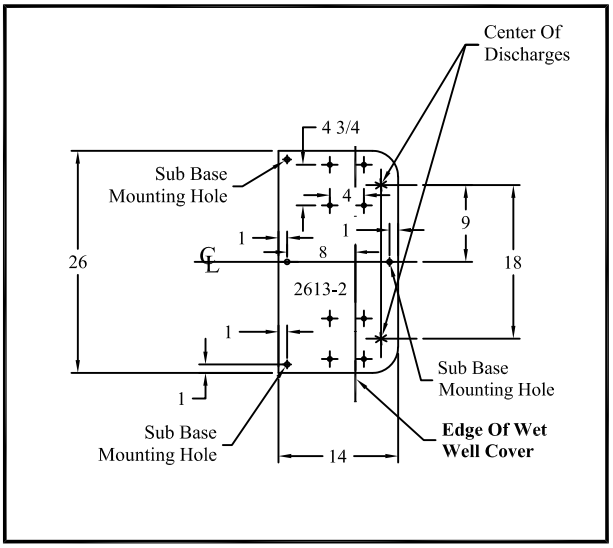
2613-2

April 9, 2018

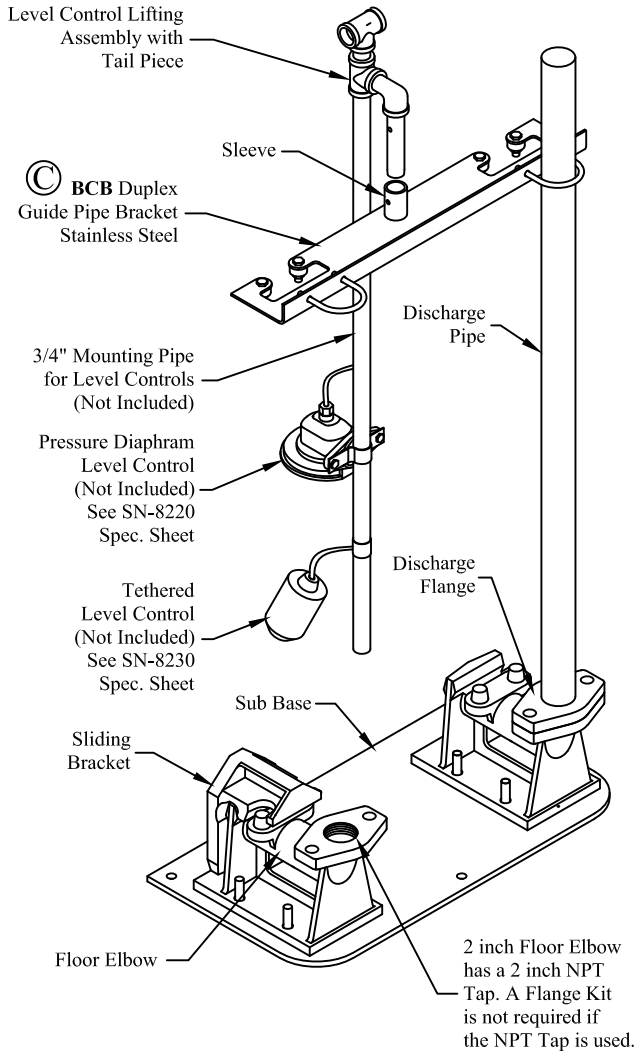
BCB - Simplex







BCB - Duplex



Sub Base for Duplex Installations

Steel Galvanized or Stainless Steel sub base with stainless steel studs is used to locate and install the 2613 discharge floor elbows in a wet well. Mounting locations match standard Weil 8804/8815 wet well covers and 2616 valves. Three 9/16 holes for bolting to the wet well floor. Waterproof adhesive 3M Marine 5200 could be used instead of bolting.

Order Number	Style	Material	Stud Size	Min. Wet Well Diameter
2613K602	Simplex	Galvanized	1/2"	24"
2613K922	Simplex	304 SS	1/2"	24"
2613K501	Duplex	Galvanized	1/2"	36"
2613K902	Duplex	304 SS	1/2"	36"

Level Control Lifting Assembly

(Duplex BCB systems only)

Does not include level control switches or mounting pipe.
See SN-8220 and SN-8230

Order Number	
2613K801	Level Control Lifting Assembly with Tailpiece

WEIL

Tethered Level Controls
Float Switch

8230

8230 Float Switch
The 8230 level controls utilize pole mounted tethered switches. The pole may be suspended from either a wet swell cover or a bracket fastened to the wall of the wet well.

Each tethered switch includes a cord grip and strap mount for mounting to a 3/4 inch or 1 inch pole.

The 8230 tethered switch is normally open, closing on liquid rise. Use with Weil 8100 control panels. The switch is not rated for motor loads.

Duplex System
Lead pump starts when the liquid level activates Switch FS2. The lead pump will run until the liquid level deactivates Switch FS1.

The Lag pump will start if the liquid level activates Switch FS3. Both Pumps continue to run until the liquid level deactivates Switch FS1.

If the liquid level activates Switch FSA the high water alarm circuit will turn on.

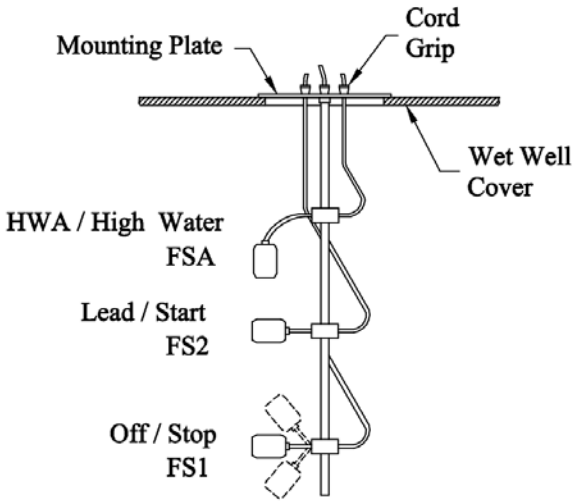
Contractor Verification Required

8230 Tethered Float Switch

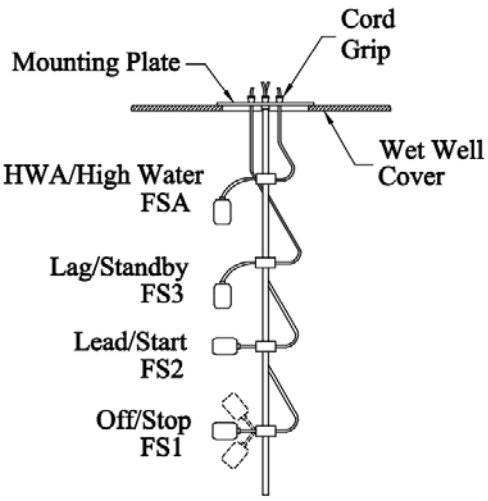
Order Number	Cord Length (Ft.)	Approx Wt. (Lbs.)
8233K1006AS	20	4
8233K1014AS	40	6
8233K1016AS	60	8
8233K1018AS	80	10
8233K1020AS	100	12

Note: The 8230 control assembly is a switch only with cord grip

Simplex Configuration



Duplex Configuration



Configuration	Switches Required
Simplex	2
Simplex with Alarm	3
Duplex	3
Duplex with Alarm	4

How To Order: Specify Order Number, Wet Well Depthand Options

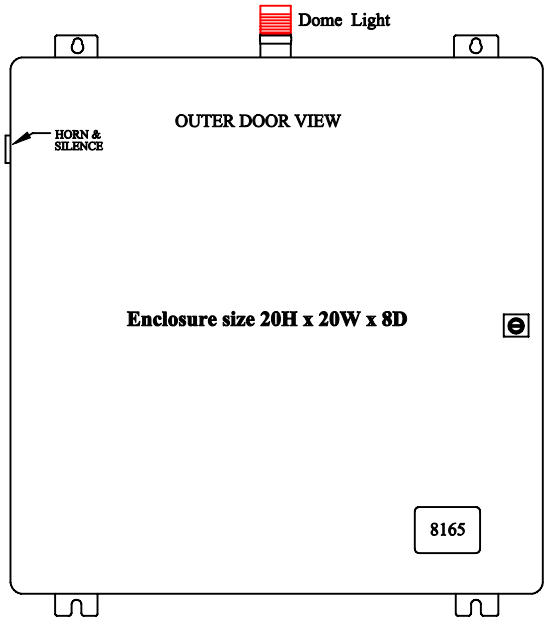
F.O.B. Cedarburg (Milwaukee), Wisconsin

WEIL Duplex Alternating Pump Control Panel 8162

Duplex

Type 4 Double Door Dead Front Enclosure
Moisture Sensor and Temperature Limiter

- The 8162 Duplex Panel controls two pumps and includes moisture sensor and overtemp indicator lights. It is a deluxe full featured panel that includes a high water alarm system, alternator, and a lockable through-the-door disconnect on inner door.
- Type 4 enclosure for indoor or outdoor use. Provides a degree of protection against falling rain, splashing water, and hose-directed water; undamaged by the formation of ice on the enclosure.
- Exceeds Type 1, 3R and 12 requirements.
- Panel can be operate on 50 or 60 Hertz power.
- Select level controls
  - 8213 Lever
  - 8220 Pressure Diaphragm
  - 8230 Tethered
- Requires one 8213 lever or four 8220 or 8230 level switches- three switched for level control and one switch for the high water alarm.



Control Panel Selection Guide
- Determine Phase and Voltage
- Determine maximum run current in amps required by the pump motor.

Panel Includes
- U/L Listed Label
- LED Lights, hour meter, switches, and test buttons are mounted on inner door.
- One lockable panel disconnect; through-the-door with door interlock on inner door. The mechanical interlock prevents the door from being opened when the disconnect is in the ON position. Lock is not provided.
- Padlocking hasp - on outer door, padlock not included.
- Two lockable pump disconnects, on motor overload protectors. Lock is not provided.
- Two Industrial duty contactors.
- Electric Alternator has a 3 position selector switch; that locks the Pumps in Auto, Pump 1-2 or Pump 2-1 sequencing.
- Two Overloads - one per pump. Ambient compensated bi metallic (Class 10) motor overload circuit protector. Instantaneous magnetic trip for short circuit protection. Single-phase protection for three-phase motors. Field adjustable within the amp range.
- Control transformer with fused primary and secondary secondary for three-phase and single-phase 208-230 volt. Single-phase 115-volt has a fused control circuit.
- Pump run switches - one per pump. Three position TOA (test-off-automatic) with spring return to off from test.
- Green lights (2) indicates power to pump motors.
- White light indicates control power on.
- Red overload lights (2) indicates motor overload condition and pump is off. Light remains on and pump remains off until reset.
- Hour meters (2). Non resetting meters indicates total pump run time.
- Moisture sensor relay and test button mounted inside enclosure. Two Yellow lights indicate moisture in pump motor.
- Temperature limiter circuit shuts down pump motor when motor over temperature is sensed. The temperature limiter circuit automatically resets when the motor temperature falls to a normal operating range. Blue light indicates there is a motor over temperature.
- General Alarm Fault and Pump run status isolated contacts.
- High Water Alarm System Type 4x. Hold finger over hole of horn for 1-2 seconds and remove to silence horn (95 dB).
  - Red HWA light and alarm test button on inner door.
  - Two isolated contacts for remote monitoring and/or to use as a connection to a phone dialer.
- Alarm LED Dome Light - Lexan, red flashing on top of enclosure. Light indicates a general fault condition; overload, high water, moisture sensor or over temp condition. Light remains on until condition is corrected.
- Control Terminal board, numbered and wired.
- Layout and schematic CAD diagrams are provided. Installer connections at terminal board are clearly marked.

Motor Protrector Amp Range	Order Number			Approx. Weight Lbs.
	Single-Phase 115 Volts	Single-phase 208 or 230 Volts	Three-Phase 208, 230,460 Volts	
1.0 - 1.6	8162-L-016	8162-D-016	8162-T-016	75
1.6 - 2.5	8162-L-025	8162-D-025	8162-T-025	75
2.5 - 4.0	8162-L-040	8162-D-040	8162-T-040	75
4.0 - 6.3	8162-L-063	8162-D-063	8162-T-063	75
6.3 - 10.0	8162-L-100	8162-D-100	8162-T-100	75
10.0 - 16.0	8162-L-160	8162-D-160	8162-T-160	76
16.0 - 20.0	8162-L-200	8162-D-200	8162-T-200	78
20.0 - 25.0	8162-L-250	8162-D-250	8162-T-250	78
*25.0 - 32.0	8162-L-320	8162-D-320	8162-T-320	91
*32.0 - 40.0	8162-L-400	8162-D-400	8162-T-400	91
*40.0 - 50.0	8162-L-500	8162-D-500	8162-T-500	101

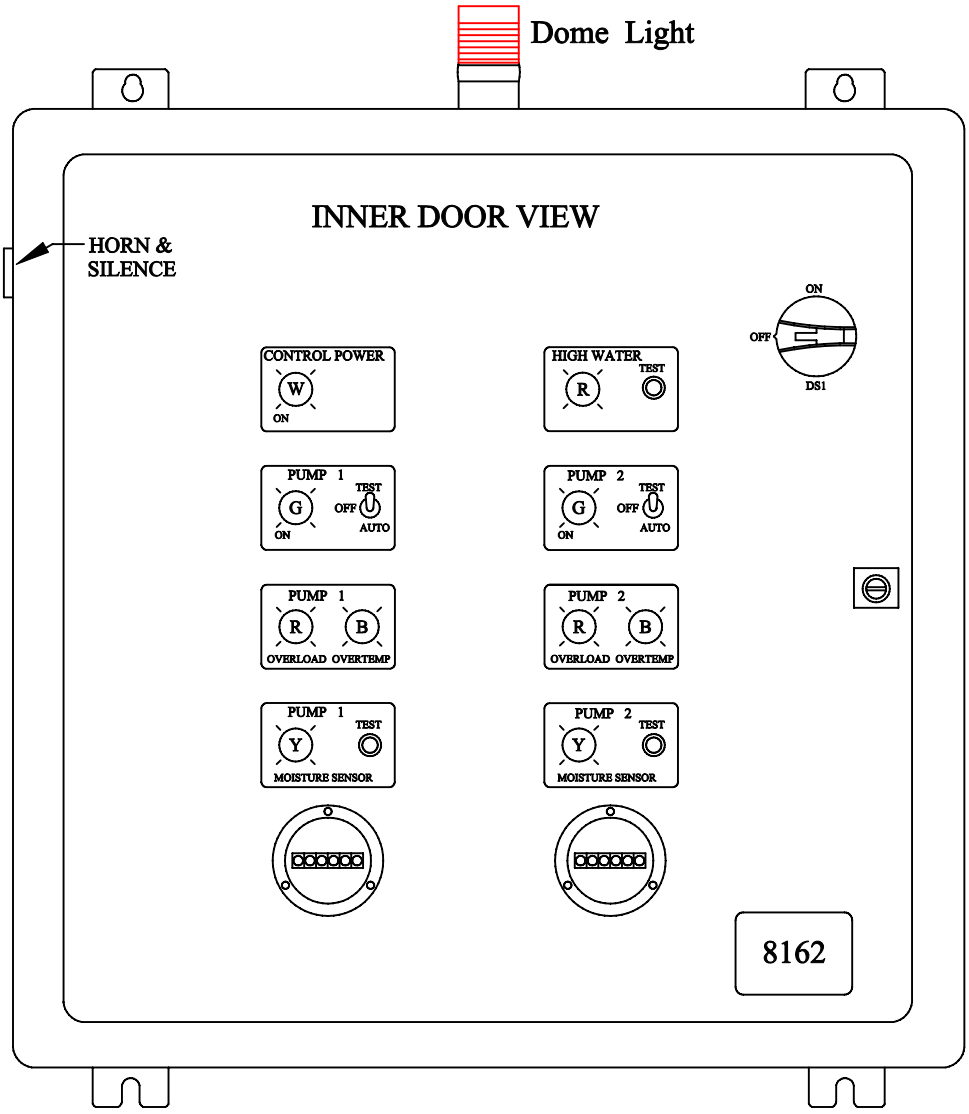
***Includes 2nd disconnect switch and larger enclosure**

How to Order: Specify the Order Number, System Phase and Voltage, and Pump Motor HP.
F.O.B. Cedarburg (Milwaukee), Wisconsin

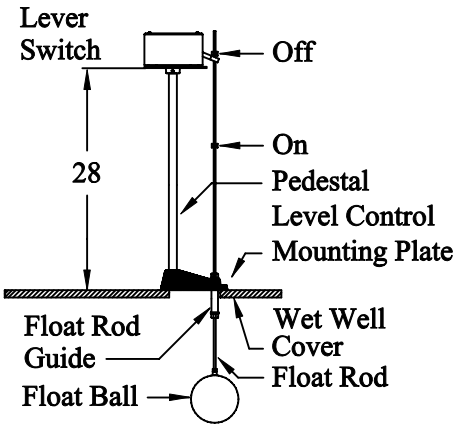
WEIL Duplex Alternating Pump Control Panel

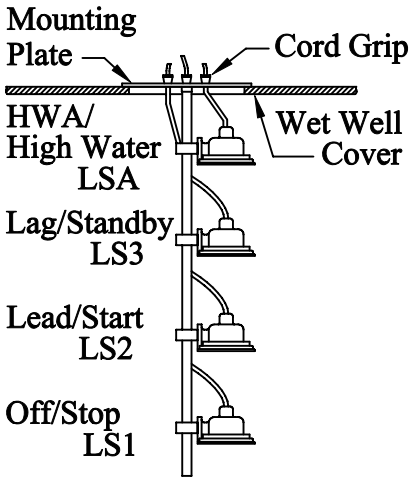
8162
Duplex

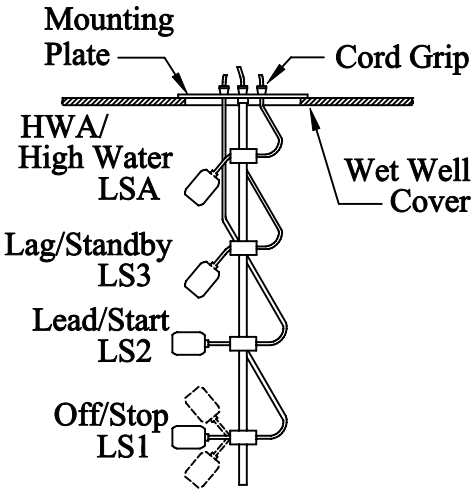
Type 4 Double Door Dead Front Enclosure
Moisture Sensor and Temperature Limiter



Use any of the three level controls with duplex control panel.



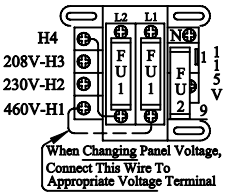




SN-8162-P2-4

PANEL NAME PLATE INCLUDES:
- -System Voltage
- -Motor Amp Range
- -MAX Panel Amps
- -Phase & HZ
- -Enclosure Type

Control Transformer Is Connected For Proper Line Voltage At Factory



Installer to Supply Branch Circuit Protection in accordance with NEC and local codes.
Fuses (LP-J or Equivalent) for Branch Circuit Protection 1.2 5 X full load amps of both motors, Plus 1 Amp for C.P..

Dotted lines (– – – – – –) represent Field Connections.
Wire Colors: Black = Power Green = Ground
Red = Control White = Common (Neutral)
Yellow = Alarm Circuit and Isolated Contacts

Pump should rotate in the direction of the Arrow on the Pump Case. Change rotation of the pump at the control panel. Interchange wires: T1 & T2 on M1, for Pump 1. T1 & T2 on M2, for Pump 2

Wires are Individually Numbered.
M1 & M2 = Motor Contactors
MP1 & MP2 = Motor Circuit Protectors
PBA = Alarm Test
SS1 & SS2 = Spring Return Test To Off

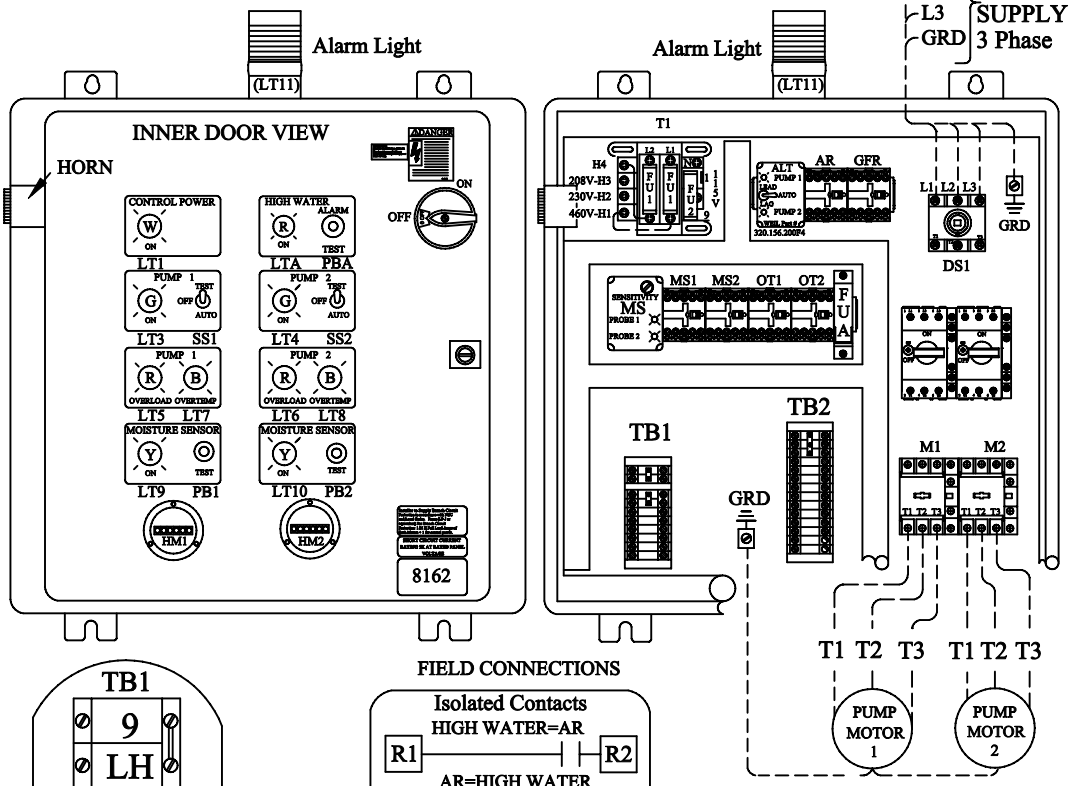
= Component Coil
□ = Numbers on Terminal Blocks (TB1 or TB2).
○ = Numbers on Components.
| | = Normally Open Contact on Components.
|/| = Normally Closed Contact on Components.

Caution: Connection of any other device to the Control Power Source of this Panel will cause improper operation and Void the Warranty.

Moisture Sensor: If water enters the motor the Sensor Indicator Light will illuminate. The light will remain illuminated until the leakage condition is is corrected. Test the sensor circuit by depressing the test push-button. The light will illuminate. When the push-button is released the indicator light will go off.

Temp Limiter (Over Temperature):
If The Internal Temperature Of The Motor Rises To 130 Degrees Celsius (266 Degrees Fahrenheit) the motor circuit will open and the motor control circuit will remain off until the temperature drops below 82 degrees Celsius (179 Degrees Fahrenheit) at which point the motor control circuit will close.

INTERIOR LAYOUT



L1 L2 L3 GRD — SYSTEM POWER SUPPLY 3 Phase

TB1
9
LH
LN
20
R1
R2
R3
R4
R5
R6
R7

FIELD CONNECTIONS

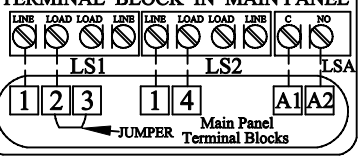
Isolated Contacts
HIGH WATER=AR — R1 R2
AR=HIGH WATER — R3 R4
PUMP 1 OFF/ON=M1 — R5
M2=PUMP 2 OFF/ON — R6
Genaral Fault=GFR — R7
Customer To Supply Power for Operation Of External Device's

9706 Mtr. SENSOR Connections:
Add Jumpers to TB2: #21 to 22 & 25; #23 to 24 and #26 to 27
Pump 1: Red wire to #21 Orange to #23 Black wire to #10 White wire to #37
Pump 2: Red wire to #21 Orange to #26 Black wire to #10 White wire to #47
Connect ALL Green Wires to Ground.

CONNECT EACH WIRE TO MATCHING NUMBER ON TERMINAL BLOCK

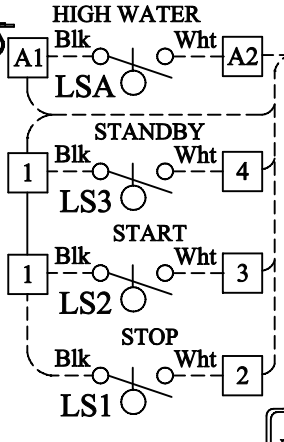
LEVEL SWITCH CONNECTIONS

CONNECTIONS FROM 8213 Non Alternating Mechanical Level Switch To TERMINAL BLOCK IN MAIN PANEL



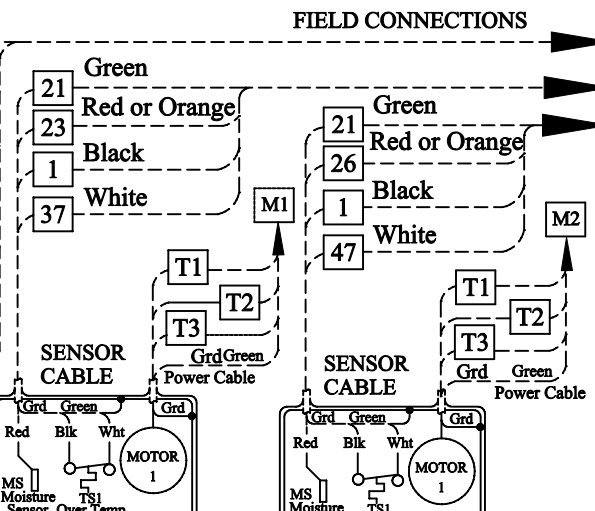
8220 8230

4 Level Switch System



OR MOTOR CONTACTORS (M1 & M2)

FIELD CONNECTIONS



TB2
1
1
1
2
3
4
A1
A2
21
23
26
37
47

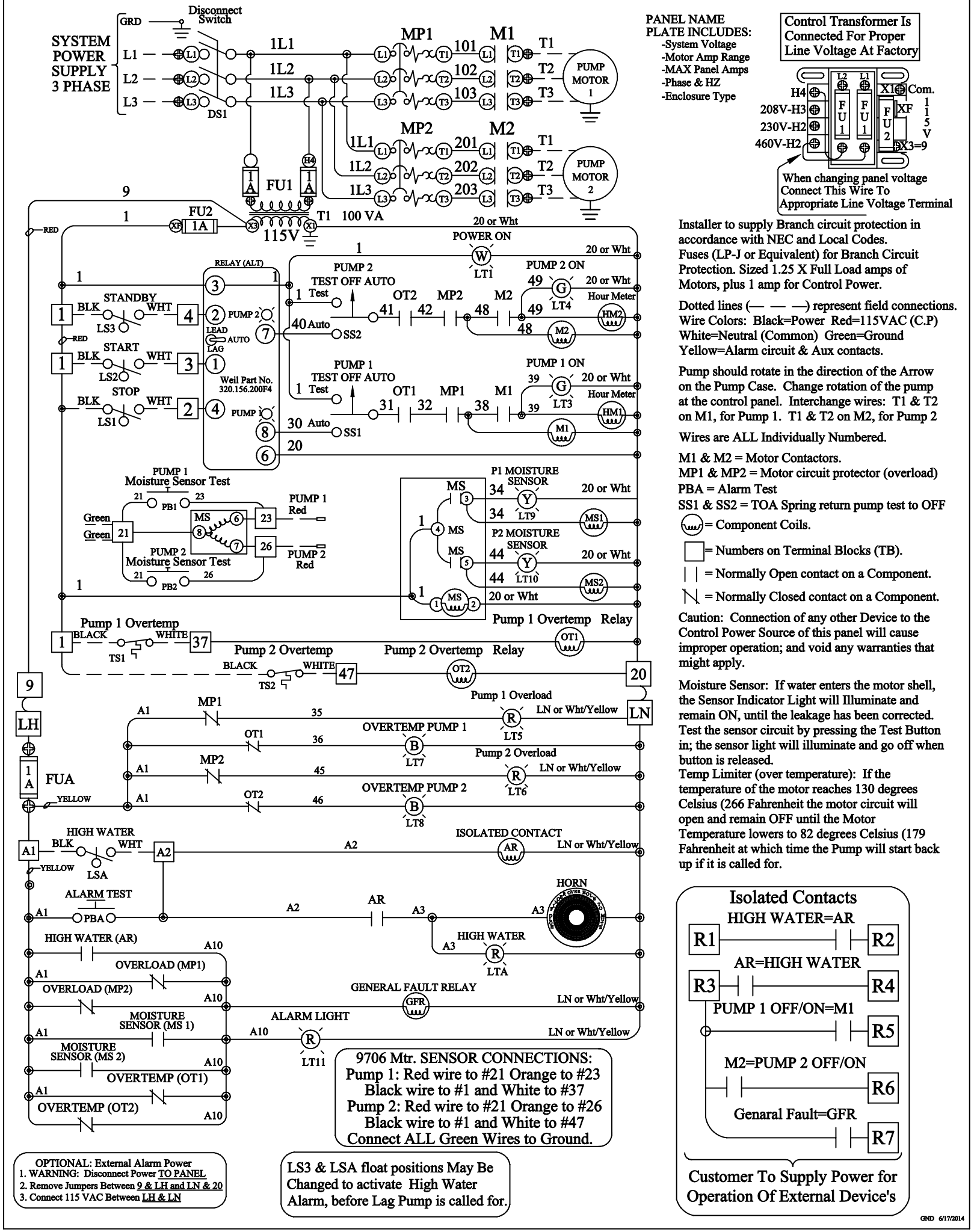
OPTIONAL External Alarm Panel
1. WARNING: Disconnect Power TO PANEL
2. Remove Jumpers Between 9 & LH and LN & 20
3. Connect 115 VAC Between LH & LN

LS3 & LSA float positions May Be Changed to activate High Water Alarm, before Lag Pump is called for.

GND 7/8/2016

WEIL CEDA 4/13/2017 12:44 PM H8162-T11 Schematic 3-Phase Duplex Control Panel .dwg

SP-102



PANEL NAME PLATE INCLUDES:
- -System Voltage
- -Motor Amp Range
- -MAX Panel Amps
- -Phase & HZ
- -Enclosure Type

Control Transformer Is Connected For Proper Line Voltage At Factory

When changing panel voltage Connect This Wire To Appropriate Line Voltage Terminal

Installer to supply Branch circuit protection in accordance with NEC and Local Codes.
Fuses (LP-J or Equivalent) for Branch Circuit Protection. Sized 1.25 X Full Load amps of Motors, plus 1 amp for Control Power.

Dotted lines (— — —) represent field connections.
Wire Colors: Black=Power Red=115VAC (C.P) White=Neutral (Common) Green=Ground Yellow=Alarm circuit & Aux contacts.

Pump should rotate in the direction of the Arrow on the Pump Case. Change rotation of the pump at the control panel. Interchange wires: T1 & T2 on M1, for Pump 1. T1 & T2 on M2, for Pump 2

Wires are ALL Individually Numbered.

M1 & M2 = Motor Contactors.
MP1 & MP2 = Motor circuit protector (overload)
PBA = Alarm Test
SS1 & SS2 = TOA Spring return pump test to OFF
= Component Coils.
= Numbers on Terminal Blocks (TB).
= Normally Open contact on a Component.
= Normally Closed contact on a Component.

Caution: Connection of any other Device to the Control Power Source of this panel will cause improper operation; and void any warranties that might apply.

Moisture Sensor: If water enters the motor shell, the Sensor Indicator Light will Illuminate and remain ON, until the leakage has been corrected. Test the sensor circuit by pressing the Test Button in; the sensor light will illuminate and go off when button is released.
Temp Limiter (over temperature): If the temperature of the motor reaches 130 degrees Celsius (266 Fahrenheit the motor circuit will open and remain OFF until the Motor Temperature lowers to 82 degrees Celsius (179 Fahrenheit at which time the Pump will start back up if it is called for.

9706 Mtr. SENSOR CONNECTIONS:
Pump 1: Red wire to #21 Orange to #23
Black wire to #1 and White to #37
Pump 2: Red wire to #21 Orange to #26
Black wire to #1 and White to #47
Connect ALL Green Wires to Ground.

OPTIONAL: External Alarm Power
1. WARNING: Disconnect Power TO PANEL
2. Remove Jumpers Between 9 & LH and LN & 20
3. Connect 115 VAC Between LH & LN

LS3 & LSA float positions May Be Changed to activate High Water Alarm, before Lag Pump is called for.

Isolated Contacts

HIGH WATER=AR
R1 — R2
AR=HIGH WATER
R3 — R4
PUMP 1 OFF/ON=M1
R5
M2=PUMP 2 OFF/ON
R6
Genaral Fault=GFR
R7

Customer To Supply Power for Operation Of External Device's

GND 6/17/2014

WEIL Duplex Wastewater Valve Assembly 2616-2

2-Inch ANSI - 2-Inch Solids

The 2616-2 Valve Assembly has the check valve and isolation valve requirements for a duplex pumping system combined into one unit.

The 2616-2 cast iron assembly consists of two check valves and one four-way isolation valve.

The check valve ball is ground to close spherical tolerances which assures positive sealing at low back pressures.

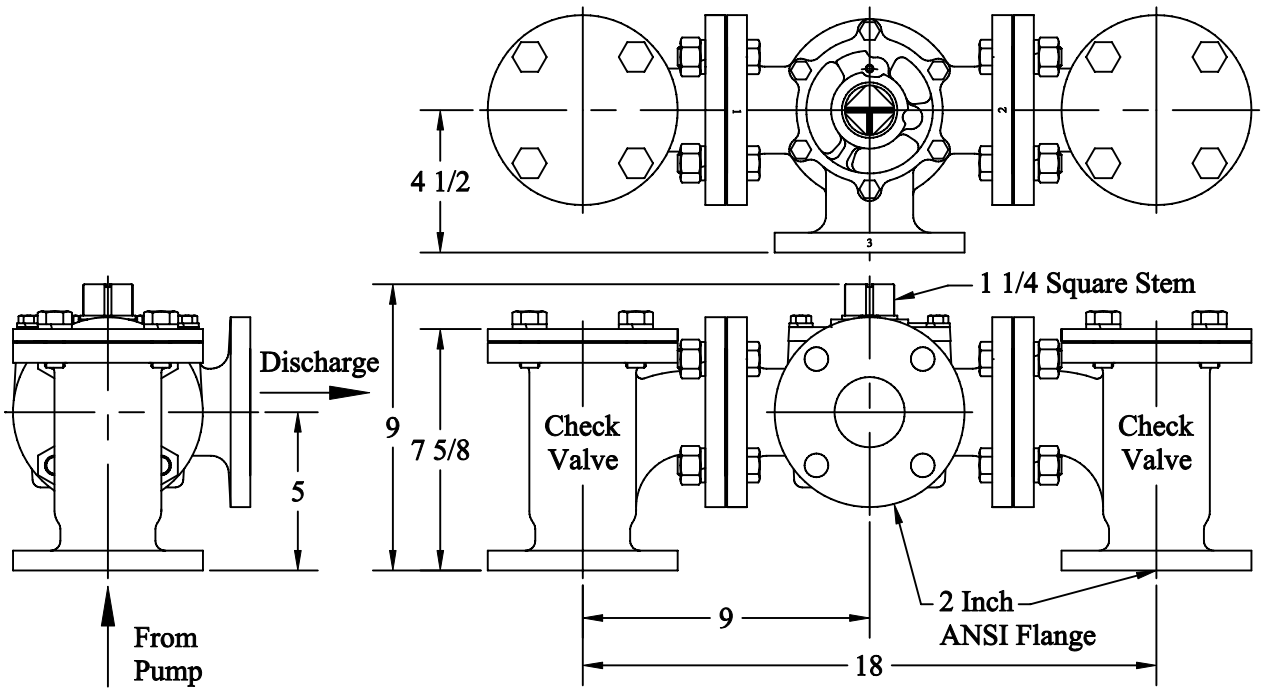
The low friction, easy to operate four-way valve is marked to locate each of the four positions. The valve is lockable in any of the four positions.

The assembly has standard ANSI B61 iron 125 PSI flanges and standard 18-inch spacing.

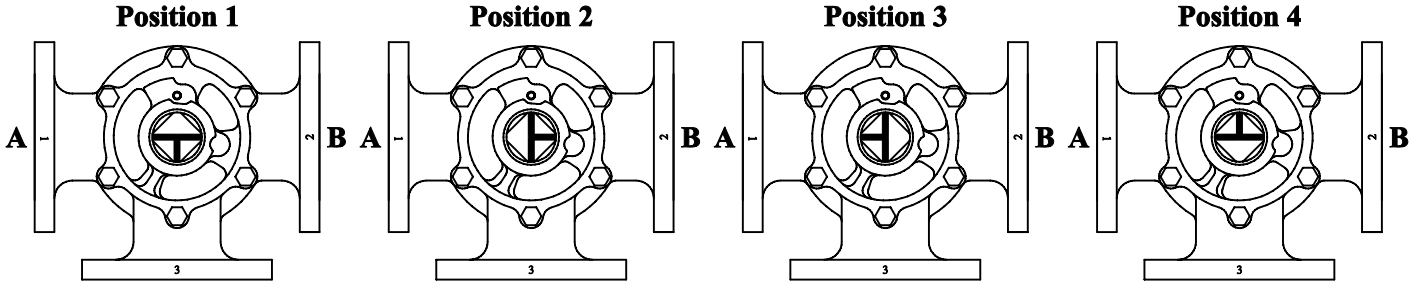
Use with submersible pumps and 2613 Removal System.

2616-2 Includes

2 - 90 degree Ball Check Valves
1 - 4-way Isolation Valve
1 - Lockable Handle



The 2616-2 Isolation Valve has four positions:



Position 1 — Discharge
Normal Operation
Pump A And Pump B
Open To Discharge Line

Position 2 — Discharge
Pump A Isolated
Pump B Open To
Discharge Line

Position 3 — Discharge
Pump B Isolated
Pump A Open To
Discharge Line

Position 4 — Discharge
Discharge Line
Blocked To Both
Pump A And Pump B

Model	Disch.	Disch. Mount	Wt. Lbs.
2616K1043	2-Inch	90 degrees	90

WEIL Duplex Wastewater Valve Assembly 2616-2

2-Inch ANSI - 2-Inch Solids

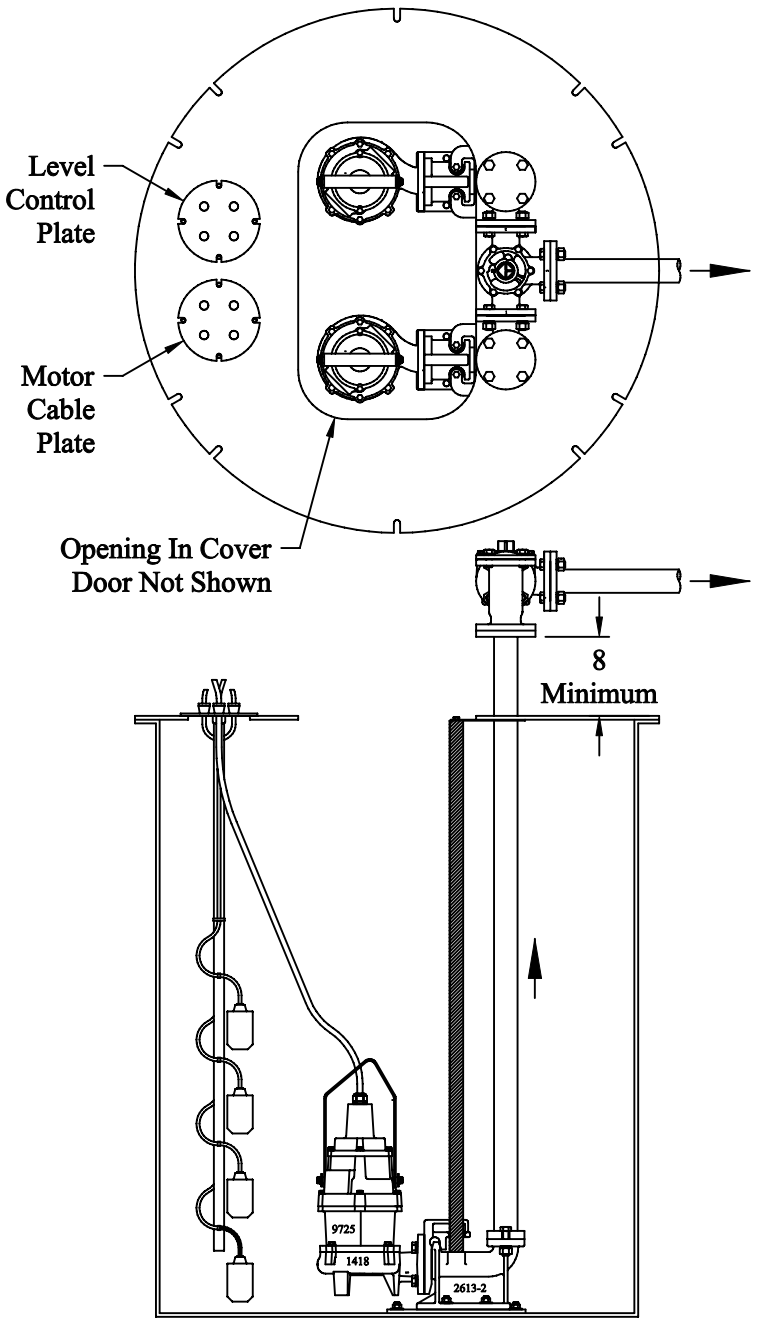
In a typical duplex wastewater discharge piping arrangement the 2616 assembly replaces the following components:

* 4 Elbows
* 1 Tee
* 2 Check Valves
* 2 or 3 Isolation Valves

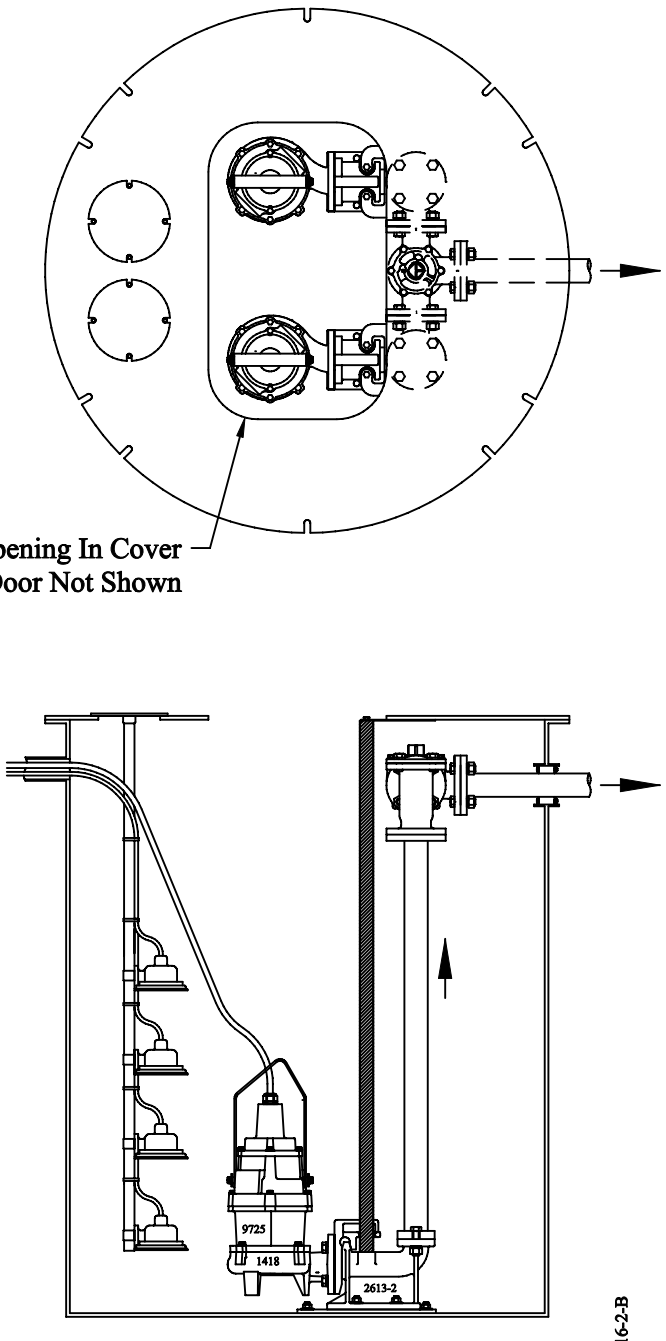
A valve box compartment could be eliminated when the discharge is below cover.

Field installation cost is greatly reduced. Space requirements are the same as two elbows and one tee.

Above Cover Discharge



Below Cover Discharge

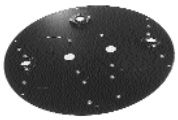


SN-2616-2-B

Fiberglass Basins & Covers

36" Inside Diameter Fiberglass Basin

Part No.	Capacity in U.S. Gallons	Fiberglass Basin Only	Weight U.S. Lbs	Fiberglass Basin w/Fiberglass Anti-Float add "F" to Part No.	Weight U.S. Lbs.	Fiberglass Basin w/Steel Anti Float add "S" to Part No.	Weight U.S. Lbs.
FB36X036	159		64		103		195
FB36X042	185		71		110		202
FB36X048	211		78		118		210
FB36X054	238		86		125		217
FB36X060	264		93		132		224
FB36X066	291		159		198		290
FB36X072	317		168		207		299
FB36X078	344		177		216		308
FB36X084	370		186		226		318
FB36X090	397		196		235		327
FB36X096	423		205		244		336
FB36X102 F	449		214		253		345
FB36X108 F	476		223		262		354
FB36X114 F	502		232		271		364
FB36X120 F	529		241		281		373
FB36X126 F	555		251		290		382
FB36X132 F	582		260		299		391
FB36X138 F	608		269		308		400
FB36X144 F	634		281		320		412
FB36X150 F	661		293		332		424
FB36X156 F	687		304		344		436
FB36X162 F	714		316		355		448
FB36X168 F	740		328		367		459
FB36X174 F	767		340		379		471
FB36X180 F	793		352		391		483
FB36X186 F	820		364		403		495
FB36X192 F	846		376		415		507
FB36X198 F	872		387		426		519
FB36X204 F	899		399		438		530
FB36X210 F	925		411		450		542
FB36X216 F	952		423		462		554
FB36X222 F	978		440		479		571
FB36X228 F	1,005		457		496		588
FB36X234 F	1,031		474		514		606
FB36X240 F	1,057		492		531		623



Standard Round Covers For 36" ID Basins

Description	Part No.	Price
36" Inside Diameter Standard Round Covers		
1/2" thick Solid Green Fiberglass Cover - 27 lbs.	C36WF	
12 gauge Simplex Black Epoxy Steel Cover with (1) Access Plate and (1) Blank Inspection Plate - 70 lbs.	C36-12SSA	
12 gauge Duplex Black Epoxy Steel Cover with (2) Access Plate and (1) Blank Inspection Plate - 75 lbs.	C36-12DSA	
1/4" thick Solid Steel Cover - 90 lbs.	C36WS	
1/4" thick Simplex Black Epoxy Steel Cover with (1) Access Plate and (1) Blank Inspection Plate - 95 lbs.	C36SSA	
1/4" thick Duplex Black Epoxy Steel Cover with (2) Access Plate and (1) Blank Inspection Plate - 100 lbs.	C36DSA	
Steel Single Hatch Door - 110 lbs.	C36HSS	
Aluminum Single Hatch Door - 45 lbs.	C36HSA	

F *Fiberglass Basins Over 8 Feet Deep, Poly Skid Packaging Adder - $60.00*

Finalize Basin Depth

1. Top of Basin to Bottom of the Inlet = 0 inches
   Codes may specify minimum

2. Inlet to "Alarm" Float = 6 inches
   3 to 6 inches, Codes may specify

3. "Alarm" to "Lag" Float = 6 inches
   3 to 6 inches

4. "Lag" to "On" Float = 6 inches
   3 to 6 inches

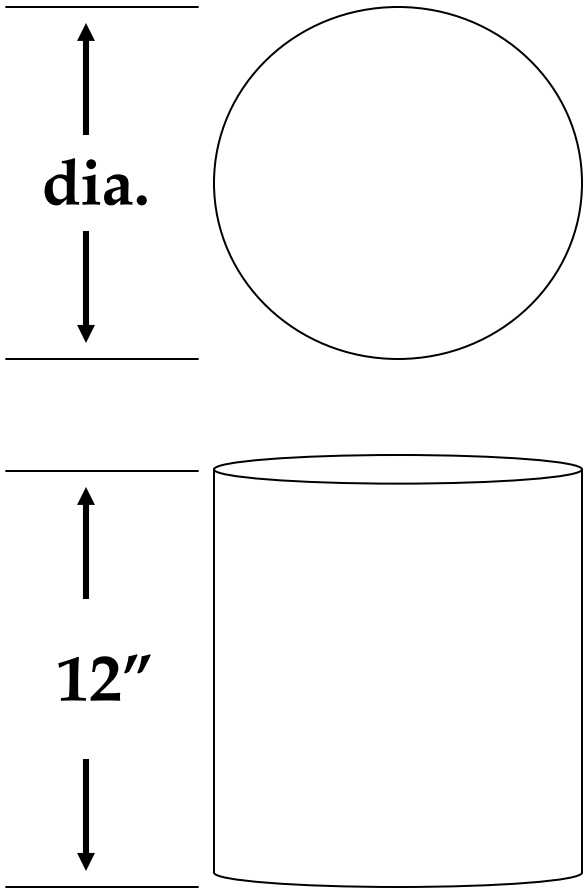
5. Pump Down = 11 inches
   (V/GPF of Basin Selected) x 12)

6. Floor of Basin to Top of Pump Case = 8 inches
   2" Removal Pumps - 10 inches
   3" Removal Pumps - 12 inches
   4" Removal Pumps - 15 inches
   6" Removal Pumps - 19 inches
   Small to Medium Sized Floor Mounted Pumps - 10 inches
   Large Floor Mounted Pumps - 16 inches
   (**Note:** Required to prevent vortexing)

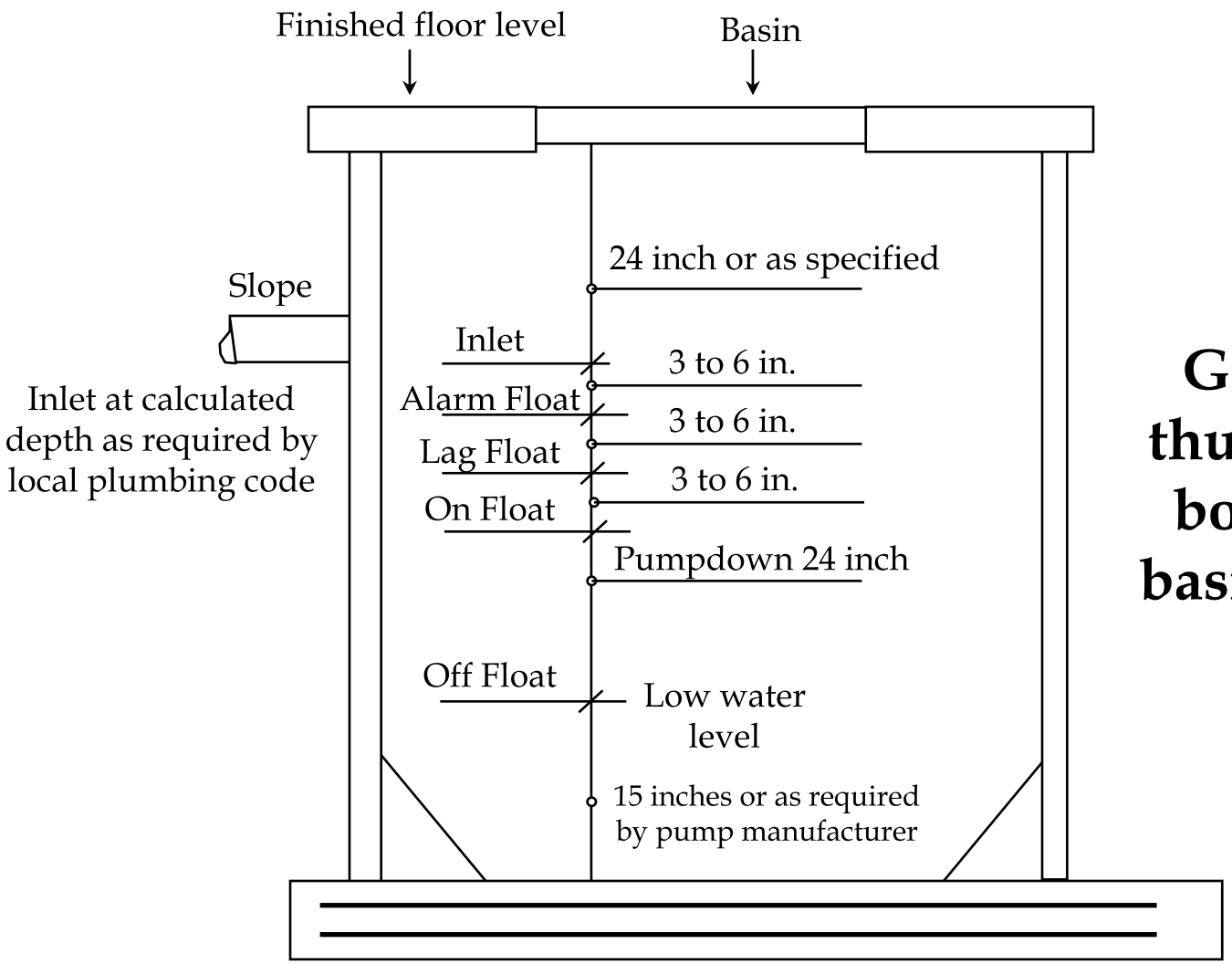
Total Basin Depth 37 inches

Cylindrical Basin Capacities

Diameter, in.	Capacity per Ft depth, gal
18	14
24	24
30	38
36	53
42	77
48	95
60	150
72	212
84	290
96	375



Rule of Thumb Elevations



Good rule of thumb puts the bottom of the basin 48″ below the inlet.