CITY OF TUALATIN
Community Development Department-Planning Division
Land Use Application—Type II

PROPOSAL NAME Four-S Corporation Warehouse

PROPOSAL SUMMARY (Brief description)

Construction of distribution warehouse and related site development

PROPERTY INFORMATION

Location (address if available): 12200 SW Myslony Street

Tax Map & Lot #(s): 2S1 22 C TL 1600 Planning District: MG

Total site size: 5.28 acres (3.5 acres subject project area) ☐ Developed ■ Undeveloped

APPLICANT/CONTACT INFORMATION

Applicant or Primary Contact Name: Skip Stanaway, Four-S Corporation

Mailing Address: 16316 SW 72nd Avenue

City/State: Portland, OR Zip: 97224

Phone: 503.905.2245 Email: skipstanaway@gmail.com

Applicant's Signature: Four-S Corp Skip Stanaway Date: 9/18/18

I hereby acknowledge that I have read this application and understand the requirements for approving and denying the application, that the information provided is correct, that I am the owner or authorized agent of the owner, and that plans submitted are in compliance with the City of Tualatin Development (TDC) and Municipal (TMC) Codes.

PROPERTY OWNER/DEED HOLDER INFORMATION (Attach list if more than one)

Name: Four-S Corporation

Mailing Address: 16316 SW 72nd Avenue

City/State: Portland, OR Zip: 97224

Phone: 503.905.2245 Email: skipstanaway@gmail.com

Property Owner Signature: Four-S Corp Skip Stanaway Date: 9/18/18

Power of attorney or letter of authorization required if application not signed by the property owner/deed holder.

LAND USE APPLICATION TYPE

- ■ Architectural Review (AR)
- ☐ Historic Landmark (HIST)
- ☐ Interpretation (INT)
- ☐ Minor Variance (MVAR)
- ☐ Tree Removal (TCP)
- ☐ Other

FOR STAFF USE ONLY

Case No.:
Date Received:
By:
Fee Amount $:
Received by:

GENERAL INFORMATION	
Site Address:	**12200 SW Myslony Street**
Assessor's Map and Tax Lot #:	**2S1 22 C TL 1600**
Planning District:	**MG**
Parcel Size:	**5.28 acres**
Property Owner:	**Four-S Corporation**
Applicant:	**Skip Stanaway**
Proposed Use:	**Warehouse**

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ARCHITECTURAL REVIEW DETAILS	
Residential ☐ Commercial ☐ Industrial	
Number of parking spaces:	**25**
Square footage of building(s):	**57,000 SF**
Square footage of landscaping:	
Square footage of paving:	
Proposed density (for residential):	

For City Personnel to complete:

Staff contact person:

CITY OF TUALATIN FACT SHEET

General

Proposed use: **Warehouse with accessory Office**					
Site area:	**5.28**	acres	Building footprint:	**53,000**	sq. ft.
Development area:	**3.50**	acres	Paved area:	**45,751**	sq. ft.
	152,460	Sq. ft.	Development area coverage:	**98,751**	%

Parking

Spaces required (see TDC 73.400) *(example: warehouse @ 0.3/1000 GFA)* **Warehouse** @ **0.3**/1000 GFA = **15.9** _____@____/1000 GFA = _____ _____@____/1000 GFA = _____ Total parking required: **16** spaces ADA accessible = **2** Van pool = **2** Compact = *(max. 35% allowed)* = Loading berths =	Spaces provided: Total parking: **24** Standard: **18** ADA accessible: **4** Van pool: **2** Compact: **0** Loading berths: **10**

Bicycles

Covered spaces required: **6** (**6 Total Required)**	Covered spaces provided: **6 (within building)**

Landscaping

Landscaping required: **15** % of dvpt. area **22,869** Square feet	Landscaping provided: **35** % of dvpt. area **52,656** Square feet
Landscaped parking island area required: %	Landscaped parking island area provided: %

Trash and recycling facility

Minimum standard method: square feet	
Other method: _____ square feet	

For commercial/industrial projects only

Total building area:	**57,000**	2nd floor:	sq. ft.
Main floor:	**53,000**	3rd floor:	sq. ft.
Mezzanine:	**4000**	4th floor:	sq. ft.

For residential projects only

Number of buildings:	**1**	Total sq. ft. of buildings:	**57,000** sq. ft.
Building stories:	**1**		

City of Tualatin
www.tualatinoregon.gov

Hydraulic Modeling Fee

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

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

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

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

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

☒ Commercial or Industrial Development

- Building floor area **57,000** square feet
- Anticipated water demand (if known) _____ gallons per day
- Described planned building use **Warehouse with accessory office**

☐ Residential Development

- Number of dwelling units or single family home lots _____

☐ Multi-Family Residential Development

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

Permit fee required based on the information provided above $ 300

- If no fee is required, enter $0.

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

ARCHITECTURAL REVIEW CERTIFICATION OF SIGN POSTING

NOTICE

ARCHITECTURAL REVIEW AR-[YY]-__

For more information call 503-691-3026 or visit www.tualatinoregon.gov

18"

24"

The applicant shall provide and post a sign pursuant to Tualatin Development Code (TDC) 31.064(2). Additionally, the 18" x 24" sign must contain the application number, and the block around the word "NOTICE" must remain **primary yellow** composed of the **RGB color values Red 255, Green 255, and Blue 0.** Additionally, the potential applicant must provide a flier (or flyer) box on or near the sign and fill the box with brochures reiterating the meeting info and summarizing info about the potential project, including mention of anticipated land use application(s). Staff has a Microsoft PowerPoint 2007 template of this sign design available through the Planning Division homepage at < www.tualatinoregon.gov/planning/land-use-application-sign-templates>.

NOTE: For larger projects, the Community Development Department may require the posting of additional signs in conspicuous locations.

As the applicant for the **Four-S Warehouse** project, I hereby certify that on this day, _____ sign(s) was/were posted on the subject property in accordance with the requirements of the Tualatin Development Code and the Community Development Department - Planning Division.

Applicant's Name: **Skip Stanaway**

(PLEASE PRINT)

Applicant's Signature: Skip Stanaway

Date: 9/18/18

	LABEL TEMPLATE / EXAMPLE	
	2S123BC02000 PROPERTY OWNER'S NAME ADDRESS CITY STATE ZIP	

Clean Water Services

Clean Water Services File Number
18-002381

Sensitive Area Pre-Screening Site Assessment

1. **Jurisdiction:** Tualatin

2. **Property Information** *(example 1S234AB01400)*
Tax lot ID(s): 2S122C001600
2S1 22C TL 1600
12200 SW MYSLONY STREET
Site Address: No address is available
City, State, Zip: Tualatin, Oregon, 97062
Nearest Cross Street: 124th and SW Myslony

3. **Owner Information**
Name: Ronald Endicott
Company:
Address: PO 261
City, State, Zip: Tualatin, OR, 97062
Phone/Fax: 5034433900
E-Mail: skipstanaway@gmail.com

4. **Development Activity** *(check **all** that apply)*
- ☐ Addition to Single Family Residence (rooms, deck, garage)
- ☐ Lot Line Adjustment
- ☐ Minor Land Partition
- ☐ Residential Condominium
- ☐ Commercial Condominium
- ☐ Residential Subdivision
- ☐ Commercial Subdivision
- ☒ Single Lot Commercial
- ☐ Multi Lot Commercial

Other
Site development and commercial building const.

5. **Applicant Information**
Name: Karl
Company: TM Rippey Consulting Engineers
Address: 7650 SW Beveland Street
City, State, Zip: Tigard, OR, 97213
Phone/Fax: 5034433900
E-Mail: kkoroch@tmrippey.com

6. **Will the project involve any off-site work?** ☐ Yes ☒ No ☐ Unknown
Location and description of off-site work

7. **Additional comments or information that may be needed to understand your project**
Site plan is too large to email, contact me if you'd like it provided directly.

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

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

Print/Type Name Karl **Print/Type Title** Civil Principal

ONLINE SUBMITTAL **Date** 8/1/2018

FOR DISTRICT USE ONLY

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

☒ Based on review of the submitted materials and best available information Sensitive areas do not appear to exist on site or within 200' of the site. This Sensitive Area Pre-Screening Site Assessment does NOT eliminate the need to evaluate and protect water quality sensitive areas if they are subsequently discovered. This document will serve as your Service Provider letter as required by Resolution and Order 17-05, Section 3.02.1. All required permits and approvals must be obtained and completed under applicable local, State, and federal law.

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

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

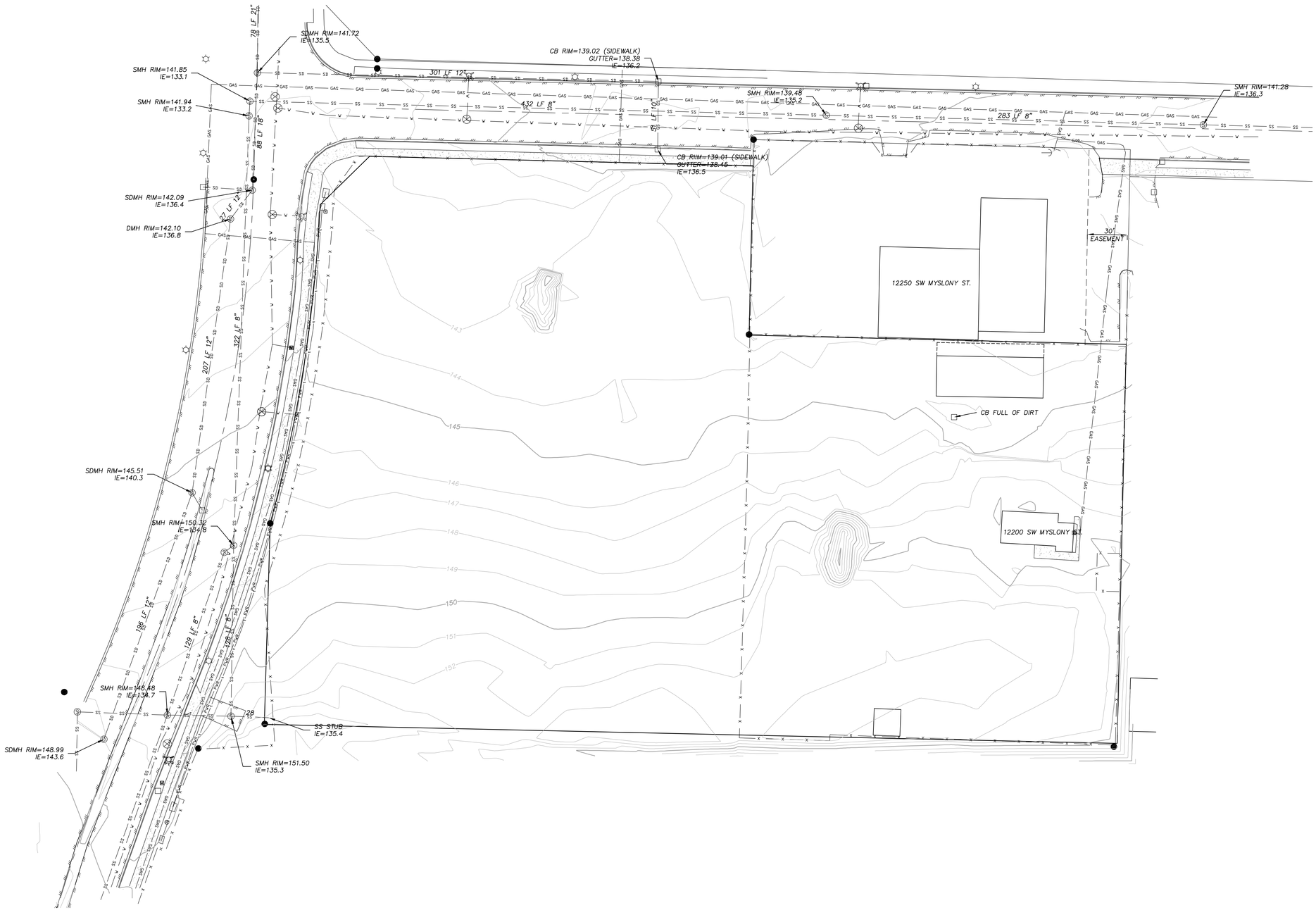
☐ The proposed activity does not meet the definition of development or the lot was platted after 9/9/95 ORS 92.040(2). NO SITE ASSESSMENT OR SERVICE PROVIDER LETTER IS REQUIRED.

Reviewed by Chuck Buckallew Date 8/1/18

TOPOGRAPHIC SURVEY
12200 SW MYSLONY

TUALATIN, OREGON

JUNE 4, 2018



- CURB
- EDGE OF PAVEMENT
- FENCE
- SANITARY SEWER LINE
- SANITARY MANHOLE
- STORM DRAIN LINE
- STORM MANHOLE
- CATCH BASIN
- WATER LINE
- VALVE
- METER
- FIRE HYDRANT
- POWER POLE
- POWER LINE
- GAS LINE
- CONCRETE
- SIGN
- FOUND MONUMENT AS NOTED
- LIGHT POLE

N

0 20 40 80

1 inch = 40 ft.

REGISTERED
PROFESSIONAL
LAND SURVEYOR

OREGON
JULY 19, 1994
FREDERIC C. FORD
2665

12-31-19
RENEWAL DATE

Ford Engineering, Inc.
Civil Engineering & Land Surveying
12205 Ida Way NW
Silverdale, Washington 98383
Phone (360) 588-2124
Fax (503) 296-2374

GENERAL UTILITY NOTES

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE JURISDICTION.
2. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT EDITION OF THE PLUMBING CODE, BUILDING CODE, AND THE FIRE CODE.
3. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
4. THE CONTRACTOR SHALL NOTIFY THE OREGON UTILITY NOTIFICATION CENTER (800 332 2344) THREE BUSINESS DAYS PRIOR TO ANY EXCAVATION.
5. EXISTING CONDITIONS BASED ON TOPOGRAPHIC, BOUNDARY, AND UTILITY SURVEY PREPARED BY FORD ENGINEERING, INC., DATED MAY 2018.
6. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF PRIVATE UTILITIES SUCH AS GAS, TELEPHONE, POWER, CABLE TELEVISION, ETC. CONFIRM VAULT LOCATIONS WITH ARCHITECT.
7. THE CONTRACTOR SHALL KEEP THE ARCHITECT AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 48–HOUR NOTICE IS REQUIRED.
8. THE CONTRACTOR SHALL VERIFY AND CONFIRM EXISTING CONDITIONS. EXISTING UTILITIES AND POINTS OF CONNECTION TO EXISTING UTILITIES AND LOCATIONS WHERE NEW UTILITIES WILL CROSS EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR BY POTHOLING PRIOR TO CONSTRUCTION OR ORDERING MATERIALS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SCHEDULE POTHOLING SUCH THAT IF CONFLICTS ARE ENCOUNTERED, SUFFICIENT TIME EXISTS TO PREPARE MODIFIED DESIGNS AND HAVE THE MODIFICATIONS APPROVED BY THE JURISDICTION WITHOUT IMPACTING THE PROJECT SCHEDULE.
9. THIS PLAN IS GENERALLY DIAGRAMMATIC. IT DOES NOT SHOW EVERY JOINT, BEND, FITTING, OR ACCESSORY REQUIRED FOR CONSTRUCTION.
10. INSTALL CLEANOUTS AT 100' MAX. AND AT ALL LATERALS PER CODE. PROVIDE CLEANOUTS AS REQUIRED BY THE CURRENT OREGON PLUMBING SPECIALTY CODE. NOT ALL REQUIRED CLEANOUTS ARE SHOWN.
11. STORM PIPE FITTINGS ARE TO BE ECCENTRIC.
12. UTILITIES WITHIN TWO FEET OF A BUILDING SHALL BE CONSTRUCTED OF MATERIALS APPROVED FOR INTERIOR USE AS DESCRIBED IN THE CURRENT EDITION OF THE PLUMBING CODE.
13. CHANGES IN DIRECTION OF DRAINAGE AND SEWER PIPING SHALL BE MADE BY THE APPROPRIATE USE OF APPROVED FITTINGS AND SHALL BE OF THE ANGLES PRESENTED BY ONE–SIXTEENTH BEND, ONE–EIGHTH BEND, ONE–SIXTH BEND OR OTHER APPROVED FITTINGS OF EQUIVALENT SWEEP.
14. IF DEWATERING IS REQUIRED DURING CONSTRUCTION, THE CONTRACTOR SHALL PREPARE A DEWATERING PLAN CONSISTENT WITH CITY OF TUALATIN AND CLEAN WATER SERVICES (CWS) REQUIREMENTS, AND OBTAIN APPROVAL OF THE PLAN FROM BOTH JURISDICTIONS PRIOR TO PROCEEDING WITH DEWATERING.
15. THE CONTRACTOR SHALL CLEAN ALL CATCH BASINS AND STORM LINES IMPACTED BY SITE DEVELOPMENT FOLLOWING COMPLETION OF CONSTRUCTION OR AS DIRECTED BY THE CITY OF TUALATIN AND CWS. NO SEDIMENT SHALL BE ALLOWED TO ENTER THE STORM SYSTEM.
16. COORDINATE WITH CITY OF TUALATIN FOR NEW DOMESTIC WATER SERVICE AND METER AT SW MYSLONY STREET FRONTAGE. CONTRACTOR TO INSTALL 2–INCH SERVICE PIPE FROM METER TO CITY OF TUALATIN APPROVED REDUCED PRESSURE DOMESTIC BACKFLOW PREVENTER IN AN ABOVE GRADE HEATED ENCLOSURE ADJACENT TO THE RIGHT OF WAY. EXTEND 2–INCH WATER SERVICE PIPE TO BUILDING. SIZE OF DOMESTIC SERVICE, CAPACITY OF METER, BUILDING DOMESTIC WATER DEMAND AND SIZE OF BACKFLOW PREVENTER AND PIPING TO BUILDING IS ASSUMED AND TO BE CONFIRMED BY BUILDING PLUMBING DESIGNER PRIOR TO CONSTRUCTION OR ORDERING MATERIAL. CONTRACTOR TO PROVIDE 4''–THICK CONCRETE PAD ON 6'' OF 1''–0'' COMPACTED CRUSHED AGGREGATE FOR DOMESTIC BACKFLOW PREVENTER. EXTEND PAD 12'' BEYOND PERIMETER OF BACKFLOW PREVENTER ENCLOSURE. COORDINATE WITH BUILDING PLUMBING DESIGNER. PROVIDE DEDICATED ELECTRICAL CIRCUIT FOR BACKFLOW PREVENTER HEATED ENCLOSURE. CONTRACTOR TO DETERMINE IF REMOTE METER READER IS REQUIRED AND PROVIDE AS DIRECTED BY CITY OF TUALATIN. IRRIGATION CONNECTION IS TO BE DOWNSTREAM OF BUILDING WATER METER AND TO BE OF CITY OF TUALATIN APPROVED TYPE. SEE LANDSCAPE PLANS FOR DISCUSSION OF IRRIGATION BACKFLOW PREVENTER AND CONTINUATION TO IRRIGATION SYSTEM. NO CONNECTIONS MAY OCCUR BETWEEN DOMESTIC METER AND BACKFLOW PREVENTER.
17. COORDINATE WITH CITY OF TUALATIN FOR RETURN OF BLOW OFF REMOVED AT SITE FIRE CONNECTION. FIRE DCDA WILL BE AT RIGHT OF WAY WITH SIZE TO BE CONFIRMED BY CONTRACTOR IN CONSULTATION WITH BUILDING FIRE SYSTEM DESIGNER. FIRE BACKFLOW PREVENTER AND PIPE LINE SIZE IS ASSUMED AND TO BE CONFIRMED BY BUILDING FIRE SYSTEM DESIGNER BASED ON THEIR FLOW TESTING.
18. INSTALL AUTOMATIC DRAIN VALVE IN VAULT AT LOW POINT OF FDC LINE. PROVIDE DRAINAGE FROM VAULT TO CITY OF TUALATIN APPROVED LOCATION. SIZE OF FDC PIPE IS ASSUMED AND TO BE CONFIRMED BY BUILDING FIRE SYSTEM DESIGNER. FDC TO CONFORM TO REQUIREMENTS OF TUALATIN VALLEY FIRE AND RESCUE (TVF&R).
19. WATER LINE, FITTINGS, VALVES, HYDRANTS, AND COMPONENTS TO CONFORM TO THE REQUIREMENTS OF CITY OF TUALATIN. HYDRANTS TO ALSO CONFORM TO REQUIREMENTS OF TVF&R.
20. BUILDING SANITARY PIPE SIZE IS ASSUMED AND TO BE CONFIRMED BY BUILDING PLUMBING DESIGNER BASED ON THEIR CALCULATION OF DESIGN FIXTURE DISCHARGE. SEE BUILDING PLUMBING PLANS FOR SANITARY CONTINUATION WITHIN BUILDING. INVERT ELEVATION OF EXISTING SITE SANITARY SEWER LATERAL IS ASSUMED AND TO BE CONFIRMED BY CONTRACTOR BY POTHOLING BEFORE CONSTRUCTION OR ORDERING MATERIAL. SEPARATE PUBLIC WORKS PERMIT REQUIRED FOR CONNECTION TO THIS LATERAL.

LEGEND

	PROPOSED	EXISTING
PROJECT BOUNDARY		
PROPERTY LINE		
EASEMENT LINE		
FENCE		x x
CURB		
EDGE OF PAVEMENT		/// ///
1' CONTOUR	144	144
5' CONTOUR	145	145
STORM SEWER LINE	SD	STM
WATER LINE	W	WAT
SANITARY SEWER LINE	SS	SAN
GAS LINE		GAS
OVERHEAD UTILITY WIRE		OHW
UNDERGROUND POWER LINE		PWR
COMMUNICATION LINE		COM
EXISTING FEATURE OR CONDITION		(E)
CATCH BASIN	CB	
TOP OF CURB	TC	
GUTTER	G	
BACKFLOW PREVENTER	BFP	
PERFORATED PIPE	PERF	
TOP OF STEP	TS	
BOTTOM OF STEP	BS	
TOP OF WALL	TW	
BOTTOM OF WALL AT FINISHED GRADE	BW	
FINISHED GRADE	FG	
FOOTING	FTG	
BACKFLOW PREVENTER	BFP	
WATER SURFACE ELEVATION	WSE	
GROWING MEDIUM	GM	
BOTTOM	BOT	
GENERAL GRADING NOTES	GGN	
GENERAL UTILITY NOTES	GUN	

GENERAL GRADING NOTES

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE JURISDICTION AND THE PROJECT GEOTECHNICAL INVESTIGATION.
2. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS, INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
3. THE CONTRACTOR SHALL NOTIFY THE OREGON UTILITY NOTIFICATION CENTER (800 332 2344) THREE BUSINESS DAYS PRIOR TO ANY EXCAVATION.
4. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF PRIVATE UTILITIES SUCH AS GAS, TELEPHONE, POWER, DATA, ETC. CONFIRM VAULT LOCATIONS WITH THE ARCHITECT.
5. THE CONTRACTOR SHALL KEEP THE ARCHITECT AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 48–HOUR NOTICE IS REQUIRED.
6. EXISTING CONDITIONS BASED ON TOPOGRAPHIC, BOUNDARY, AND UTILITY SURVEY PREPARED BY FORD ENGINEERING, INC., DATED MAY 2018.
7. FINISHED GRADES ARE TO BE BROUGHT TO WITHIN 0.08 FT. IN 10 FT. OF THE GRADES SHOWN AT SUBGRADE AND TO WITHIN 0.03 FT. IN 10 FT. AT FINISH GRADE. CONTRACTOR TO ALLOW FOR PLACEMENT OF REQUIRED TOPSOIL AND PLANTINGS IN ROUGH GRADING.
8. GRADING ELEVATIONS AS SHOWN ON PLANS ARE FINISHED GRADE, WHICH INCLUDES PAVING, BASE ROCK, AND SUBGRADE SOIL. GENERAL CONTRACTOR IS RESPONSIBLE TO COORDINATE GRADING WITH BOTH EXCAVATOR AND PAVING CONTRACTOR.
9. SEE PROJECT GEOTECHNICAL ANALYSIS FOR PAVING, EXCAVATION, FILL, AND COMPACTION REQUIREMENTS.
10. IF DEWATERING IS REQUIRED DURING CONSTRUCTION, THE CONTRACTOR SHALL PREPARE A DEWATERING PLAN CONSISTENT WITH CITY OF TUALATIN AND CLEAN WATER SERVICES (CWS) REQUIREMENTS, AND OBTAIN APPROVAL OF THE PLAN FROM BOTH JURISDICTIONS PRIOR TO PROCEEDING WITH DEWATERING.
11. THE CONTRACTOR SHALL CLEAN ALL CATCH BASINS AND STORM LINES IMPACTED BY SITE DEVELOPMENT FOLLOWING COMPLETION OF CONSTRUCTION OR AS DIRECTED BY THE CITY OF TUALATIN AND CWS. NO SEDIMENT SHALL BE ALLOWED TO ENTER NEW OR EXISTING INLETS.
12. SITE RETAINING WALLS (OTHER THAN AT TRUCK DOCKS) TO BE CONTRACTOR DESIGN–BUILD MODULAR BLOCK. MATERIAL TO BE AS APPROVED BY ARCHITECT.

AUGUST 2018 - PERMIT SUBMITTAL

7650 SW Beveland, Suite 100
Tigard, Oregon 97223
Phone: (503) 443-3900
Fax: (503) 443-3700

TMR
T.M. RIPPEY
CONSULTING ENGINEERS

REGISTERED PROFESSIONAL ENGINEER
15504
OREGON
JULY 25, 1997
KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

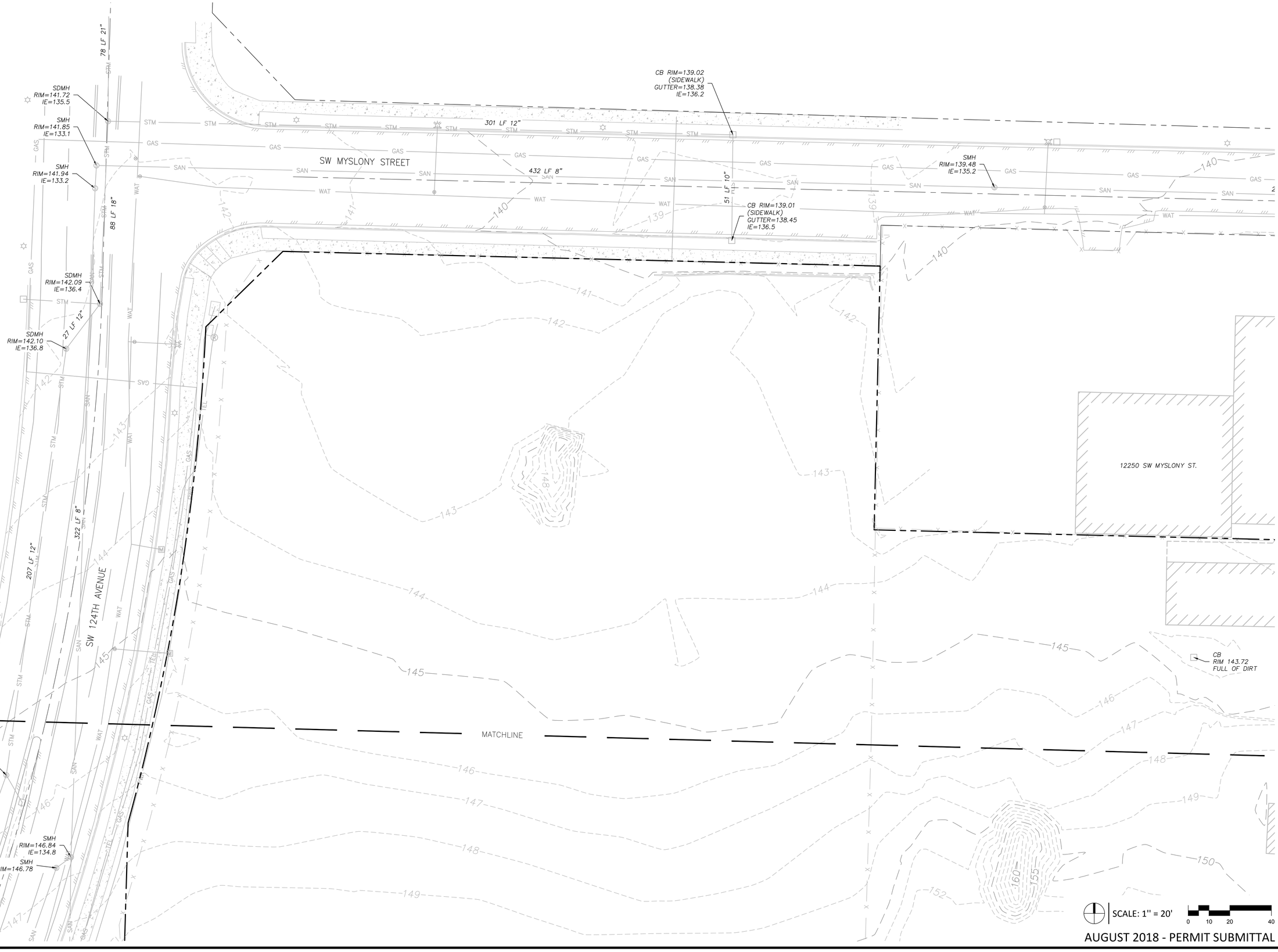
GENERAL NOTES
& LEGEND

REVISIONS:
1. GRADING REVISIONS
2018-08-22

DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET
C0

PROJECT No.
18206



Ford Engineering, Inc.
Civil Engineering & Land Surveying
12236 Main Way NW
Silverdale, Washington 98383
Phone (360) 308-2124
Fax (360) 204-2374

FOUR S CORP. WAREHOUSE BUILDING

12200 MYSLONY STREET
TUALATIN, OR 97062

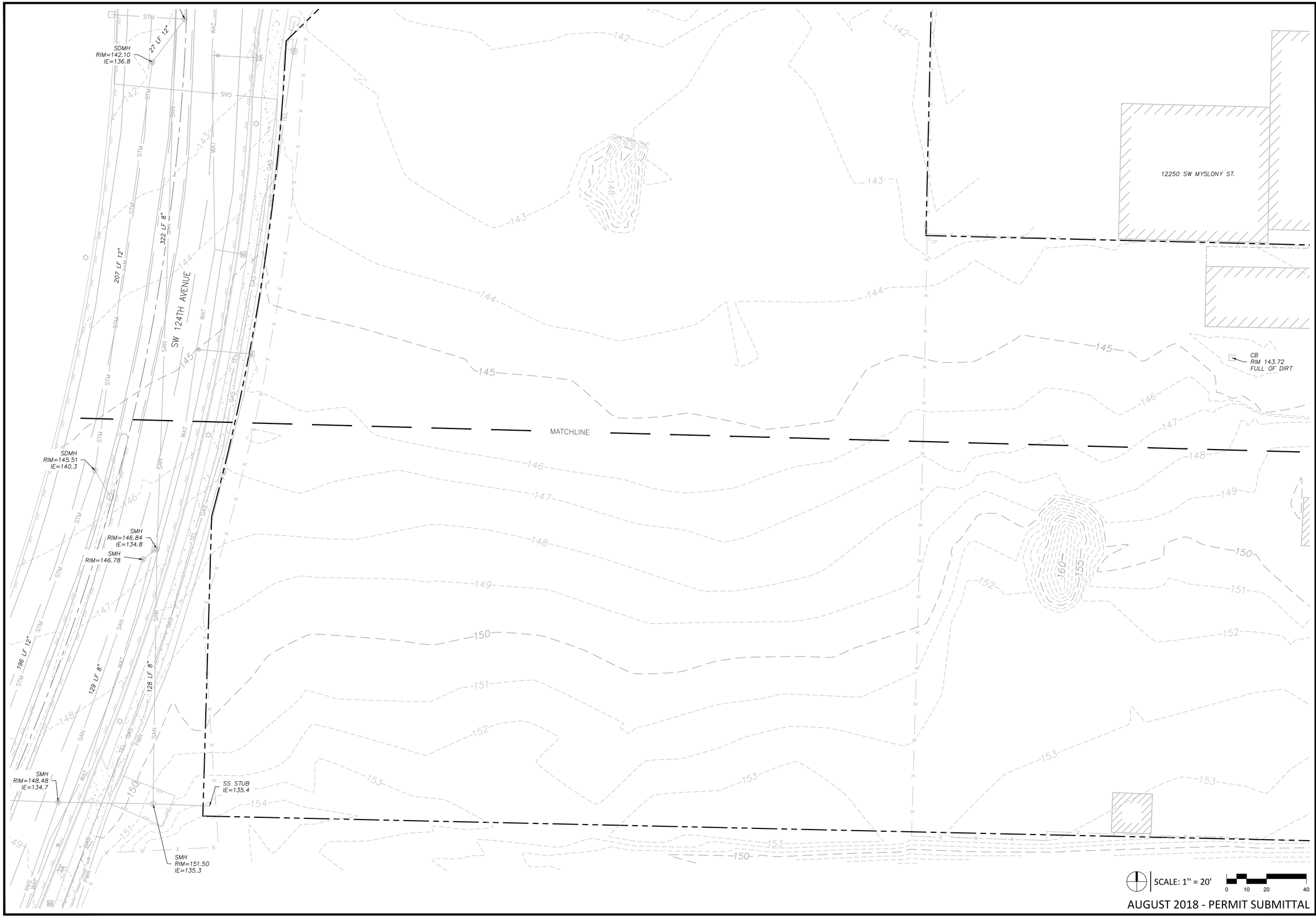
EXISTING CONDITIONS PLAN NORTH

REVISIONS:
1. GRADING REVISIONS 2018-08-22

DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET
C1

PROJECT No.
18206



AUGUST 2018 - PERMIT SUBMITTAL

Ford Engineering, Inc.
Civil Engineering & Land Surveying
12255 Main Way NW
Silverdale, Washington 98383
Phone (360) 308-2124
Fax (360) 204-2374

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

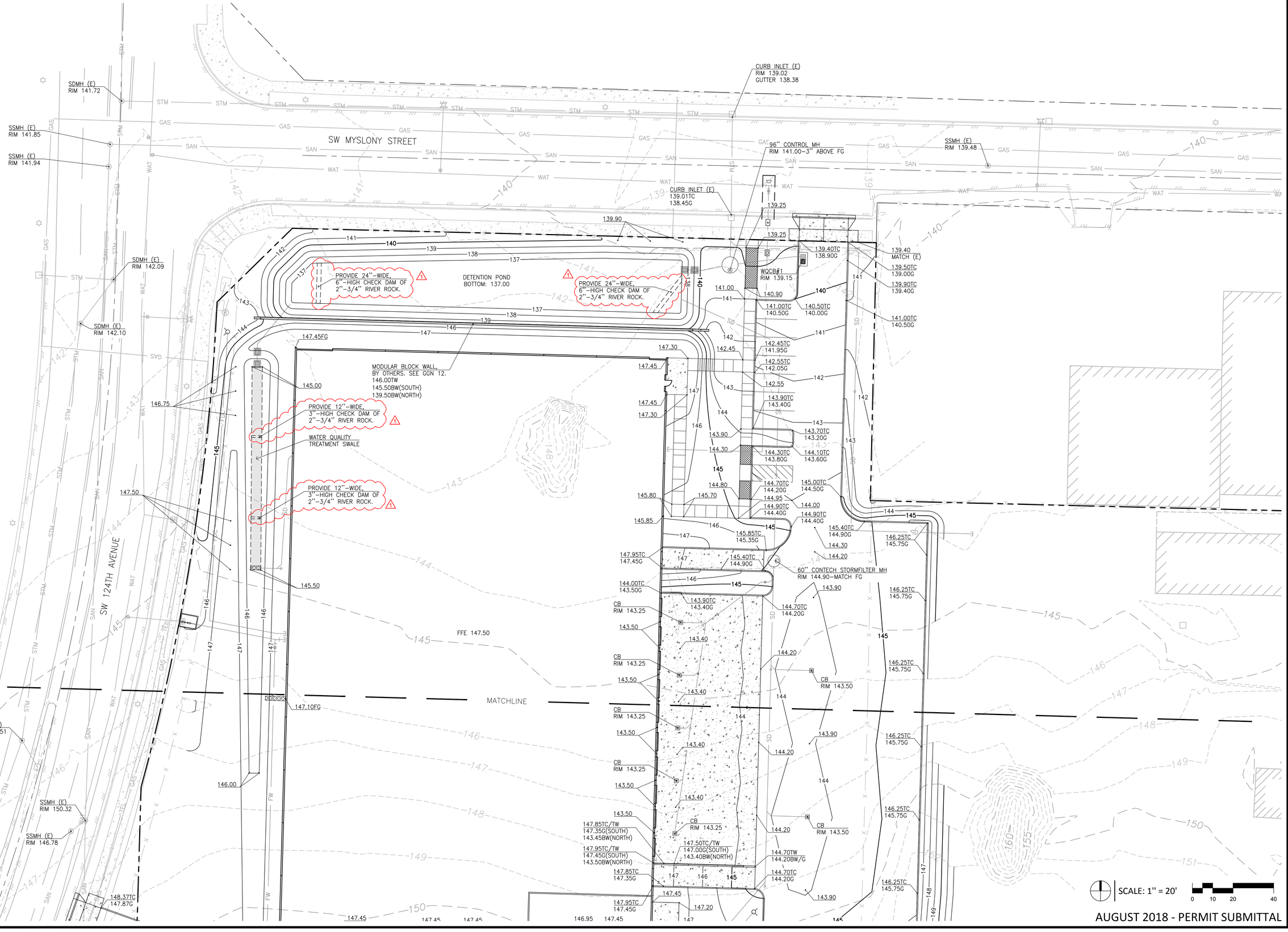
EXISTING
CONDITIONS PLAN
SOUTH

REVISIONS:
1. GRADING REVISIONS
2018-08-22

DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET
C1.1

PROJECT No.
18206



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REGISTERED PROFESSIONAL ENGINEER
15504
OREGON
JULY 25, 1997
KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP. WAREHOUSE BUILDING

12200 MYSLONY STREET
TUALATIN, OR 97062

NORTH GRADING PLAN

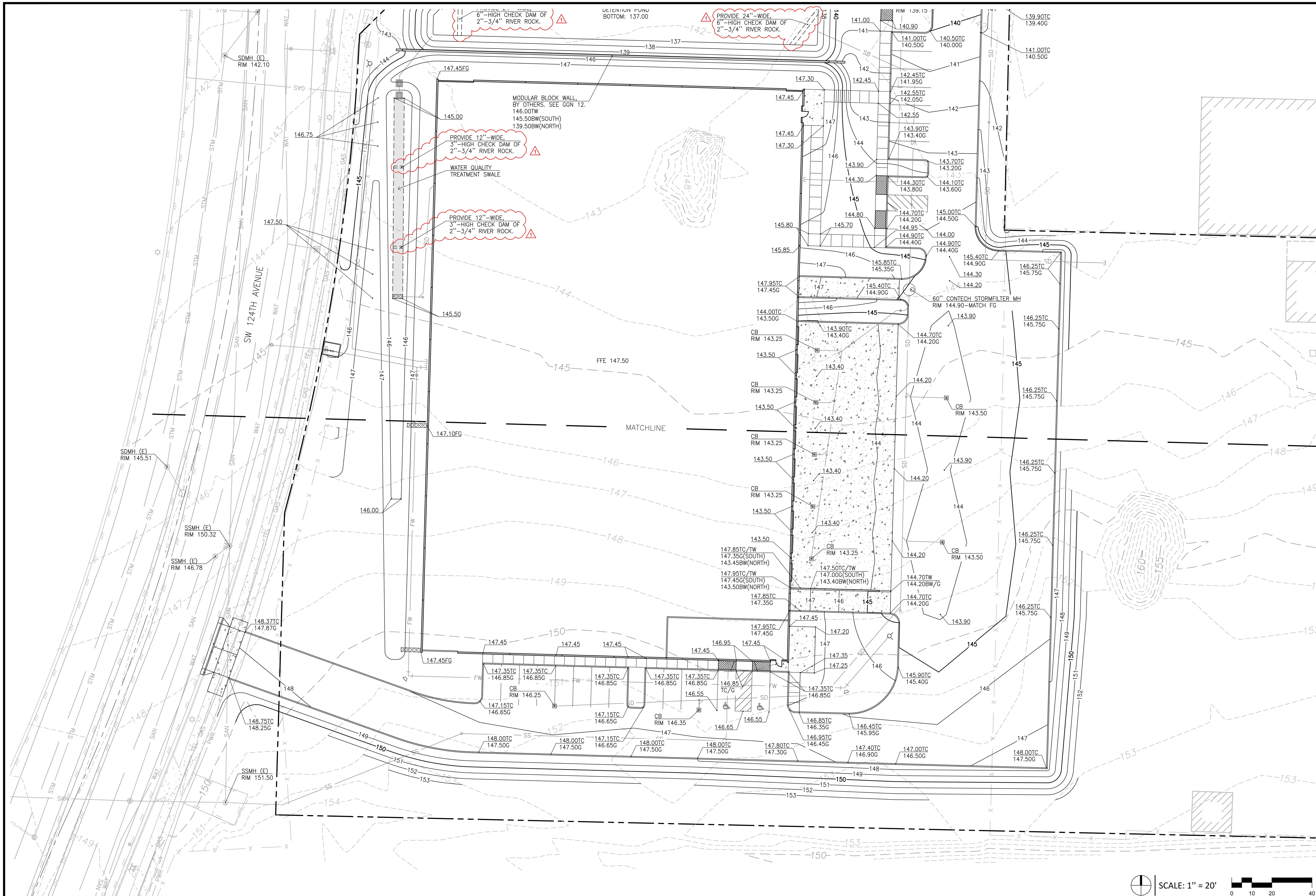
REVISIONS:
1 GRADING REVISIONS 2018-08-22

DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET

C2

PROJECT No.
18206



AUGUST 2018 - PERMIT SUBMITTAL

T.M. RIPPEY
CONSULTING ENGINEERS
7650 SW Beveland, Suite 100
Tigard, Oregon 97223
Phone: (503) 443-3900
Fax: (503) 443-3700

REGISTERED PROFESSIONAL ENGINEER
15504
OREGON
JULY 25, 1991
KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP. WAREHOUSE BUILDING

12200 MYSLONY STREET
TUALATIN, OR 97062

SOUTH GRADING PLAN

REVISIONS:
1 GRADING REVISIONS 2018-08-22

DATE:	AUGUST 3, 2018
FILE NAME:	TMR18206_CIVIL
DRAWN BY:	AS
CHKD BY:	KJK

SHEET
C2.1

PROJECT No.
18206

SW MYSLONY STREET

SW 124TH AVENUE

SDMH (E)
RIM 141.72
IE 135.50

SSMH (E)
RIM 141.85

SSMH (E)
RIM 141.94

SDMH (E)
RIM 142.09
IE 136.40

SDMH (E)
RIM 142.10
IE 136.80

OUTLET STRUCTURE
RIM 145.00
IE OUT 142.50
6" OUTLET @ 1% MIN.

STM OUTFALL
IE 137.50

PROVIDE 24"-WIDE,
6"-HIGH CHECK DAM OF
2"-3/4" RIVER ROCK.

DETENTION POND
BOTTOM: 137.00
WSE: 138.62

OUTLET STRUCTURE
RIM 137.00
IE 136.90
6" OUTLET @ 1% MIN.

PROVIDE 24"-WIDE,
6"-HIGH CHECK DAM OF
2"-3/4" RIVER ROCK.

STM OUTFALL
IE 137.00
10" SD 10 LF

6" SD @ 6%
30 LF

OVERFLOW STRUCTURE
RIM 145.75
IE IN 142.40 (6" SOUTH)
IE OUT 140.60 (6" NORTH)

PROVIDE 12"-WIDE,
3"-HIGH CHECK DAM OF
2"-3/4" RIVER ROCK.

WATER QUALITY
TREATMENT SWALE

DS
IE 146.00

PROVIDE 12"-WIDE,
3"-HIGH CHECK DAM OF
2"-3/4" RIVER ROCK.

6" SD @ 0.70%
60 LF

SDCO
IE 145.60

6" SD @ 1%
10 LF

SD OUTFALL
IE 145.50

2'x5'x12"-THICK
4"-2" RIP RAP
BLANKET

DS-DISCHARGES
ONTO GROUND

2'x10'x12"-THICK
4"-2" RIP RAP
BLANKET

SDMH (E)
RIM 145.51
IE 140.30

SSMH (E)
RIM 150.32

SSMH (E)
RIM 146.78

2'x10'x12"-THICK
4"-2" RIP RAP
BLANKET

DS-DISCHARGES
ONTO GROUND

FFE 147.50

MATCHLINE

CURB INLET (E)
RIM 139.02
GUTTER 138.38
IE 136.20

CURB INLET (E)
139.01TC
IE IN 136.50 (10" SOUTH) NEW
IE OUT 136.50 (10" NORTH) (E)

96" CONTROL MH
RIM 141.00-3" ABOVE FG
IE IN 136.75 (6" EAST)
IE IN 136.75 (10" WEST)
IE OUT 136.75 (10" NORTH)

SSMH (E)
RIM 139.48

10" SD @ 1.4%
10 LF

10" SD @ 0.5%
65 LF

OVERFLOW STRUCTURE
RIM 138.62
IE IN 136.85 (6" WEST)
IE OUT 136.85 (10" EAST)

IE 136.65
10" SD
@ 1.4%
8 LF

SDCO
IE 137.00

WQCB#1
RIM 139.15
IE. 136.85
6" OUTLET @ 0.3%
1 CARTRIDGE, SEE
DETAIL ON SHEET C5.

10" SD @ 1%
55 LF

SDCO
IE 137.45

10" SD @ 0.5%
70 LF

SDCO
IE 137.35

10" SD
@ 1%
65 LF

10" SD @ 0.5%
70 LF

SDCO
IE 138.10

10" SD @ 0.5%
60 LF

10" SD
@ 1%
40 LF

SDCO
IE 137.70

SDCO IE 138.00
CAP END FOR
FUTURE CONNECTION.

10" SD @ 1%
5 LF

60" CONTECH STORMFILTER MH
RIM 144.90-MATCH FG
IE IN 140.30 (10"-SOUTH)
IE OUT 138.50 (10"-NORTH)
4 CARTRIDGES, SEE DETAIL
ON SHEET C5 (SFMH#1).
IE 140.35
EMERGENCY SHUT-OFF VALVE

6" SD @ 0.5%
40 LF

CB
RIM 143.25
IE 140.75
4" SD @
1% MIN.

SDCO
IE 140.55

10" SD
@ 0.3%
45 LF

IE 140.50

CB
RIM 143.50
IE 141.00
6" SD @
1% MIN.

6" SD
@ 0.5%
25 LF

IE 140.65

CB
RIM 143.25
IE. 140.75
4" SD @
1% MIN.

4" SD
@ 0.5%
25 LF

CB
RIM 143.25
IE 140.85
4" SD @
1% MIN.

SDCO
IE 140.80

8" SD
@ 0.5%
70 LF

4" SD
@ 0.5%
25 LF

IE 140.95

CB
RIM 143.25
IE 141.00
4" SD @
1% MIN.

IE 140.85

4" SD
@ 0.8%
25 LF

CB
RIM 143.50
IE 141.00
6" SD
@ 0.7%

CB
RIM 143.25
IE 141.15

6" SD
@ 2.9%
35 LF

SDCO
IE 141.85

SCALE: 1" = 20'

0 10 20 40

AUGUST 2018 - PERMIT SUBMITTAL

7650 SW Beveland, Suite 100
Tigard, Oregon 97223
Phone: (503) 443-3900
Fax: (503) 443-3700

TMR
T.M. RIPPEY
CONSULTING ENGINEERS

REGISTERED PROFESSIONAL ENGINEER
15504
OREGON
JULY 25, 1997
KARL KOROCH

EXPIRES: 6/30/19

FOUR S CORP. WAREHOUSE BUILDING

12200 MYSLONY STREET
TUALATIN, OR 97062

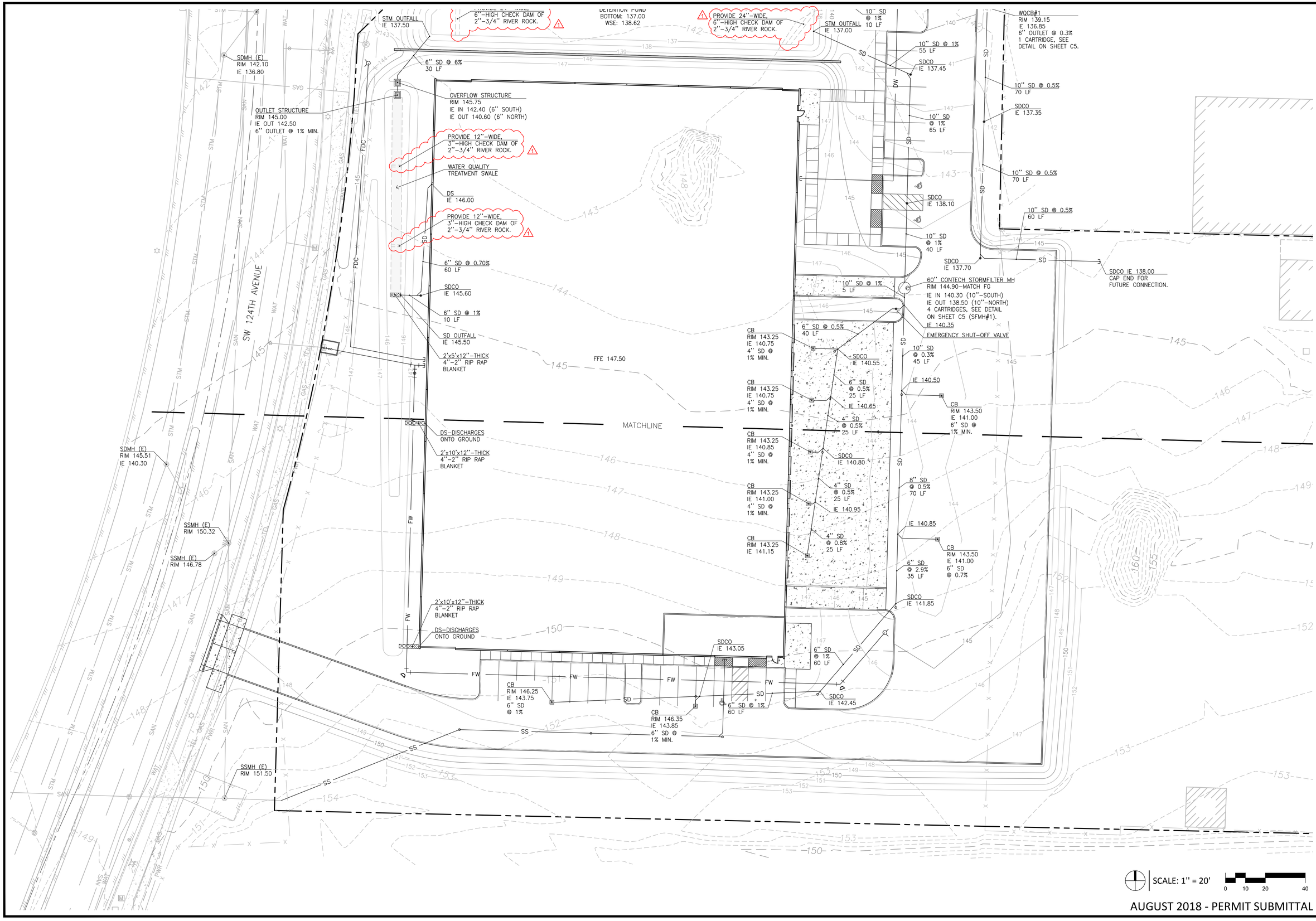
NORTH STORMWATER PLAN

REVISIONS:
1. GRADING REVISIONS
2018-08-22

DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET
C3

PROJECT No.
18206



AUGUST 2018 - PERMIT SUBMITTAL

TMR
T.M. RIPPEY
CONSULTING ENGINEERS
7650 SW Beveland, Suite 100
Tigard, Oregon 97223
Phone: (503) 443-3900
Fax: (503) 443-3700

REGISTERED PROFESSIONAL ENGINEER
15504
OREGON
JULY 25, 1997
KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP. WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

SOUTH STORMWATER PLAN

REVISIONS:
1. GRADING REVISIONS
2018-08-22

DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET
C3.1

PROJECT No.
18206

SW MYSLONY STREET

SW 124TH AVENUE

(E) PUBLIC FH

SDMH (E)
RIM 141.72

SSMH (E)
RIM 141.85
IE 133.10

SSMH (E)
RIM 141.94
IE 133.20

SDMH (E)
RIM 142.09

SDMH (E)
RIM 142.10

(E) PUBLIC FH
INSTALL FDC

4-INCH
FDC LINE

(E) IRRIGATION WATER
METER TO REMAIN.

WATER QUALITY
TREATMENT SWALE

DETENTION POND
BOTTOM: 137.00

2-INCH DOMESTIC WATER
SERVICE. SEE BLDG. PLUMBING
PLANS FOR CONTINUATION.

CONNECT TO (E) 8-INCH SITE FIRE
SERVICE. REMOVE (E) BLOW-OFF.

INSTALL CITY OF TUALATIN APPROVED
6-INCH DCDA IN APPROVED VAULT.
CONTRACTOR'S FIRE SYSTEM DESIGNER TO
CONFIRM SIZE. SET RIM 6" ABOVE FG.

4-INCH FDC LINE. SEE
BLDG. FIRE PROTECTION
PLANS FOR CONTINUATION.

BLDG. FIRE SERVICE. SEE
BLDG. FIRE PROTECTION
PLANS FOR CONTINUATION.

FFE 147.50

MATCHLINE

SDMH (E)
RIM 145.51

SSMH (E)
RIM 150.32
IE 134.80

SSMH (E)
RIM 146.78

6-INCH
FW LINE

BLDG. SS IE 139.50
SEE BLDG. PLUMBING
PLANS FOR CONTINUATION

CURB INLET (E)
RIM 139.02
GUTTER 138.38

INSTALL THRUST BLOCK.
SEE COT STD. DETAIL 620.

INSTALL GATE VALVE. SEE
COT STD. DETAIL 600.

TAP (E) PUBLIC WATER MAIN
& INSTALL 1.5-INCH COPPER
DOMESTIC SERVICE TO METER.

SAWCUT LINE.

2-INCH DOM.
WATER PIPE

1.5-INCH DOM. METER. SEE COT
DETAIL 632 AND GUN 8 & 15.

2-INCH DOM. BFP. IN ABOVE-GROUND
HEATED ENCLOSURE. SEE COT DETAIL
611 AND GUN 8 & 15.

(E) PUBLIC FH

SSMH (E)
RIM 139.48
IE 135.20

CB
RIM 143.25

CB
RIM 143.25

CB
RIM 143.25

CB
RIM 143.25

CB
RIM 143.50

CB
RIM 143.50

INSTALL
PRIVATE FH

SCALE: 1" = 20'

0 10 20 40

AUGUST 2018 - PERMIT SUBMITTAL

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OREGON
JULY 25, 1997
KARL KOROCH

EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

NORTH
SANITARY SEWER
& WATER PLAN

REVISIONS:
1. GRADING REVISIONS
2018-08-22

DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET

C4

PROJECT No.
18206

DETENTION POND
BOTTOM: 137.00

SDMH (E)
RIM 142.10

(E) PUBLIC FH

INSTALL FDC

4-INCH
FDC LINE

WATER QUALITY
TREATMENT SWALE

(E) IRRIGATION WATER
METER TO REMAIN.

SW 124TH AVENUE

CONNECT TO (E) 8-INCH SITE FIRE
SERVICE. REMOVE (E) BLOW-OFF.

INSTALL CITY OF TUALATIN APPROVED
6-INCH DCDA IN APPROVED VAULT.
CONTRACTOR'S FIRE SYSTEM DESIGNER TO
CONFIRM SIZE. SET RIM 6" ABOVE FG.

SDMH (E)
RIM 145.51

SSMH (E)
RIM 150.32
IE 134.80

SSMH (E)
RIM 146.78

4-INCH FDC LINE. SEE
BLDG. FIRE PROTECTION
PLANS FOR CONTINUATION.

BLDG. FIRE SERVICE. SEE
BLDG. FIRE PROTECTION
PLANS FOR CONTINUATION.

FFE 147.50

MATCHLINE

6-INCH
FW LINE

2-INCH DOMESTIC WATER
SERVICE. SEE BLDG. PLUMBING
PLANS FOR CONTINUATION.

2-INCH DOM. BFP. IN ABOVE-GROUND
HEATED ENCLOSURE. SEE COT DETAIL
611 AND GUN 8 & 15.

CB
RIM 143.25

CB
RIM 143.25

CB
RIM 143.25

CB
RIM 143.25

CB
RIM 143.50

CB
RIM 143.50

BLDG. SS IE 139.50
SEE BLDG. PLUMBING
PLANS FOR CONTINUATION.

INSTALL
PRIVATE FH

6-INCH
FW LINE

CB
RIM 146.25

CB
RIM 146.35

IE 142.94 (6" SD)
IE 139.31 (6" SS)

6" SS @ 1%
40 LF

SSCO
IE 139.10

SSCO
IE 137.80

SSCO
IE 138.45

6" SS @ 2.5%
95 LF

6" SS @ 1%
65 LF

6" SS @ 1%
65 LF

SSMH (E)
RIM 151.50
IE 135.30

CONNECT TO
(E) SS LATERAL
IE 135.40
SEE GUN 8.

(E) PUBLIC FH

SCALE: 1" = 20'

0 10 20 40

AUGUST 2018 - PERMIT SUBMITTAL

7650 SW Beveland, Suite 100
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15504
OREGON
JULY 25, 1997
KARL KOROCH

EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

SOUTH
SANITARY SEWER
& WATER PLAN

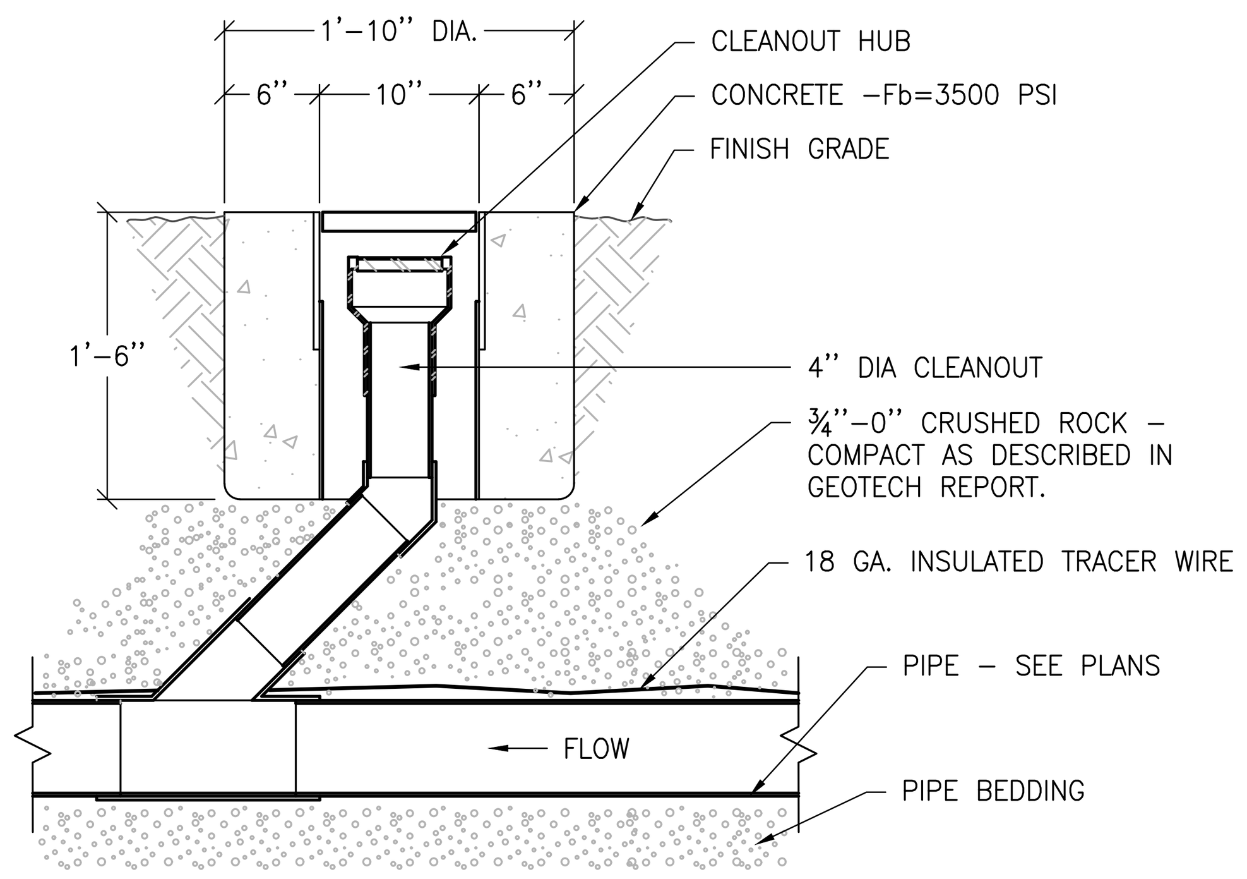
REVISIONS:
1 GRADING REVISIONS
2018-08-22

DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET

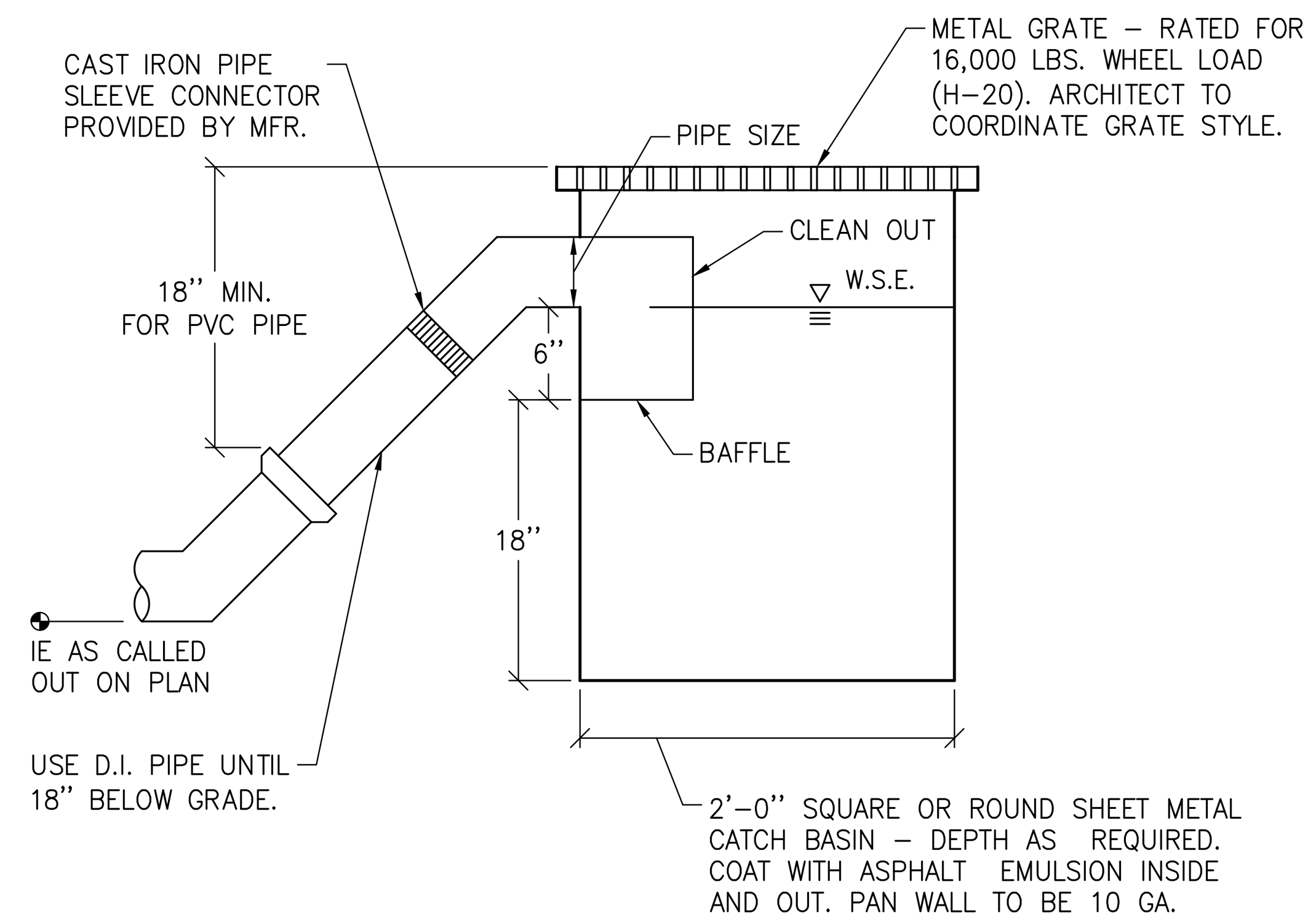
C4.1

PROJECT No.
18206



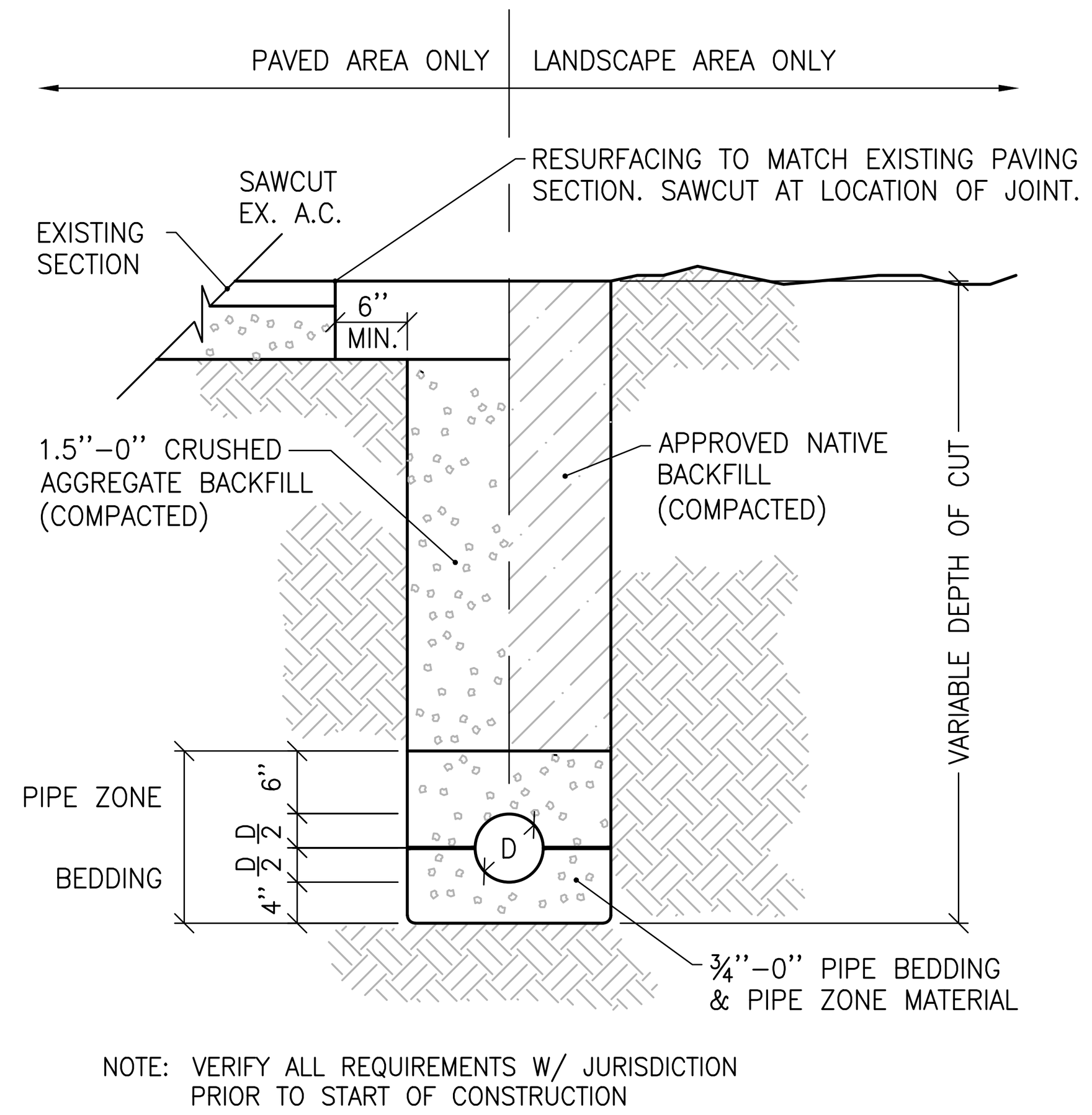
1 TYPICAL CLEANOUT DETAIL

NOT TO SCALE



2 CATCH BASIN DETAIL

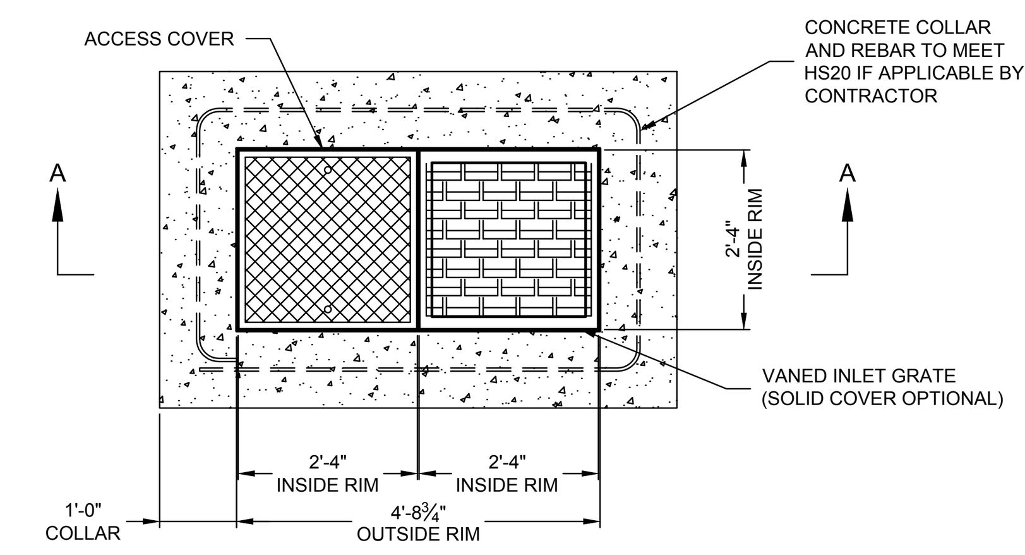
NOT TO SCALE



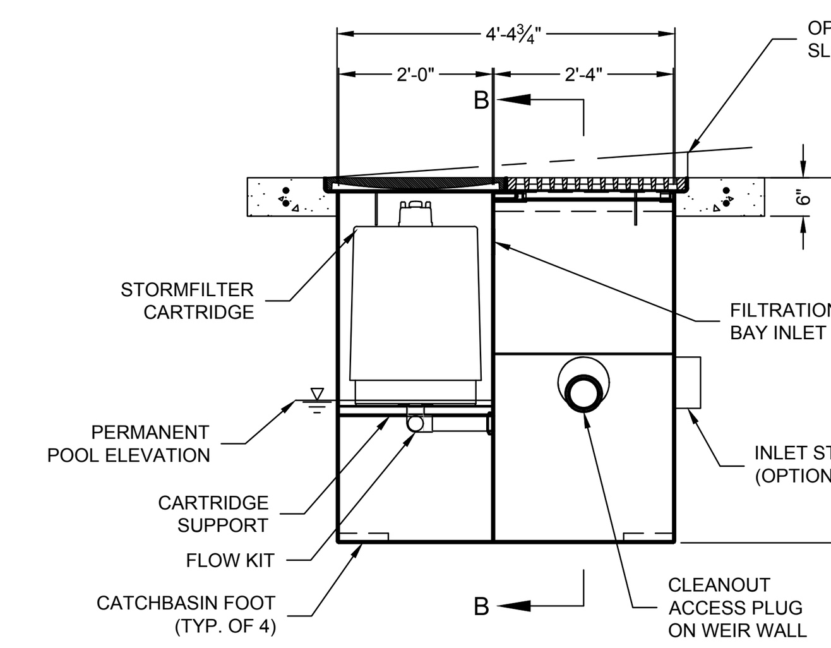
NOTE: VERIFY ALL REQUIREMENTS W/ JURISDICTION PRIOR TO START OF CONSTRUCTION

3 TRENCH BACKFILL DETAIL (PRIVATE SIDE ONLY)

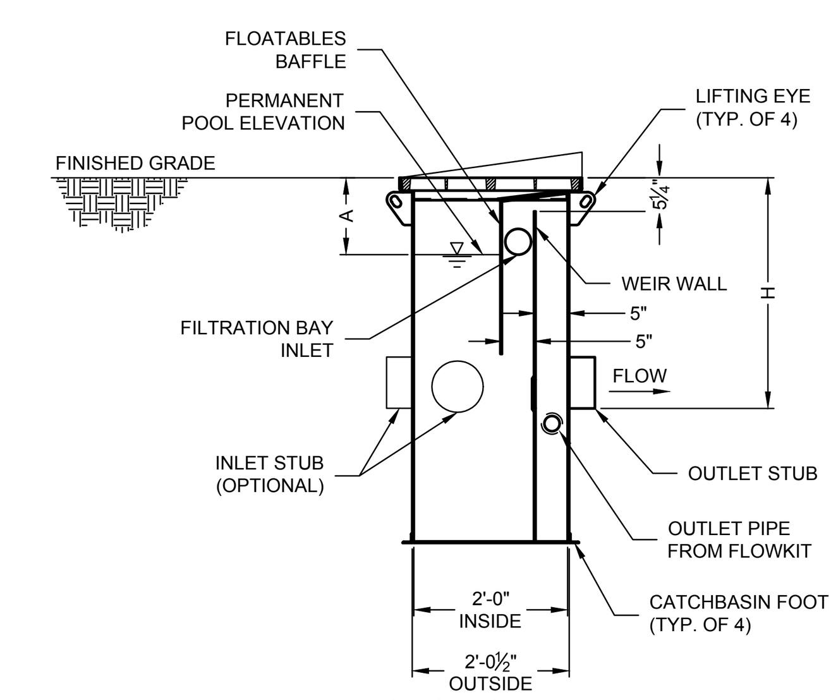
NOT TO SCALE



PLAN VIEW



SECTION A-A



SECTION B-B

STORMFILTER CATCHBASIN DESIGN NOTES

STORMFILTER TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. 1 CARTRIDGE CATCHBASIN HAS A MAXIMUM OF ONE CARTRIDGE. SYSTEM IS SHOWN WITH A 27" CARTRIDGE, AND IS ALSO AVAILABLE WITH AN 18" CARTRIDGE. STORMFILTER CATCHBASIN CONFIGURATIONS ARE AVAILABLE WITH A DRY INLET BAY FOR VECTOR CONTROL.
PEAK HYDRAULIC CAPACITY PER TABLE BELOW. IF THE SITE CONDITIONS EXCEED PEAK HYDRAULIC CAPACITY, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

CARTRIDGE SELECTION

CARTRIDGE HEIGHT	27"		18"		18" DEEP	
MINIMUM HYDRAULIC DROP (H)	3.05'		2.3'		3.3'	
SPECIFIC FLOW RATE (gpm/sf)	2 gpm/ft²	1 gpm/ft²	2 gpm/ft²	1 gpm/ft²	2 gpm/ft²	1 gpm/ft²
CARTRIDGE FLOW RATE (gpm)	22.5	11.25	15	7.5	15	7.5
PEAK HYDRAULIC CAPACITY	1.0		1.0		1.8	
INLET PERMANENT POOL LEVEL (A)	1'-0"		1'-0"		2'-0"	
OVERALL STRUCTURE HEIGHT (B)	4'-9"		3'-9"		4'-9"	

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STORMFILTER CATCHBASIN STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS, LLC REPRESENTATIVE. www.ContechES.com
3. STORMFILTER CATCHBASIN WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
4. INLET SHOULD NOT BE LOWER THAN OUTLET.
5. STORMFILTER CATCHBASIN EQUIPPED WITH 4-INCH (APPROXIMATE) LONG STUBS FOR INLET (IF APPLICABLE) AND OUTLET PIPING. STANDARD OUTLET STUB IS 8 INCHES IN DIAMETER. MAXIMUM OUTLET STUB IS 15 INCHES IN DIAMETER. CONNECTION TO COLLECTION PIPING CAN BE MADE USING FLEXIBLE COUPLING BY CONTRACTOR.
6. STEEL STRUCTURE TO BE MANUFACTURED OF 1/4-INCH STEEL PLATE. CASTINGS SHALL MEET AASHTO M306 LOAD RATING. TO MEET HS20 LOAD RATING ON STRUCTURE, A CONCRETE COLLAR IS REQUIRED. WHEN REQUIRED, CONCRETE COLLAR WITH QUANTITY (2) #4 REINFORCING BARS TO BE PROVIDED BY CONTRACTOR.
7. FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 37 SECONDS.
8. SPECIFIC FLOW RATE IS EQUAL TO THE FILTER TREATMENT CAPACITY (gpm) DIVIDED BY THE FILTER CONTACT SURFACE AREA (sq ft).

INSTALLATION NOTES
A. NOT USED.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CATCHBASIN (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

1-CARTRIDGE CATCHBASIN STORMFILTER DATA

STRUCTURE ID	WQCB#1
WATER QUALITY FLOW RATE (cfs)	0.013
PEAK FLOW RATE (<1 cfs)	0.13
RETURN PERIOD OF PEAK FLOW (yrs)	25
CARTRIDGE FLOW RATE (gpm)	15
MEDIA TYPE (CSF, PERLITE, ZPG, GAC, PHS)	PERLITE
RIM ELEVATION	139.15

PIPE DATA:	I.E.	DIAMETER
INLET STUB		-
OUTLET STUB	136.85	6"

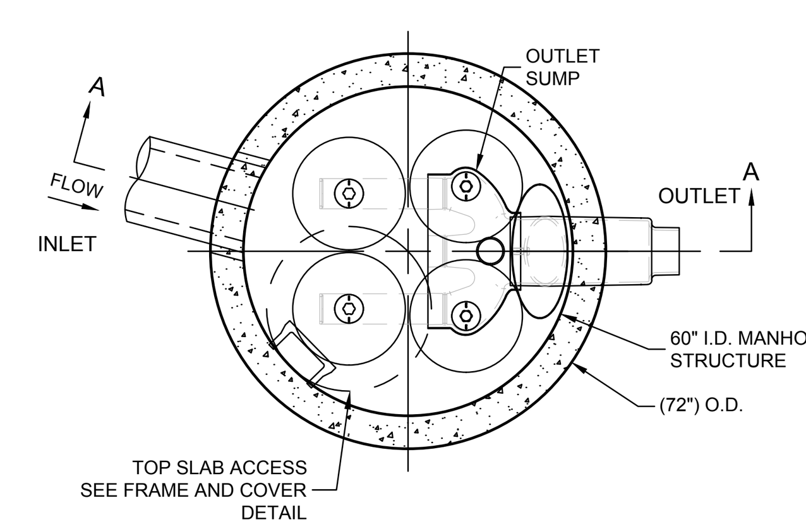
CONFIGURATION
OUTLET INLET INLET
OUTLET INLET INLET

SLOPED LID	YES
SOLID COVER	NO

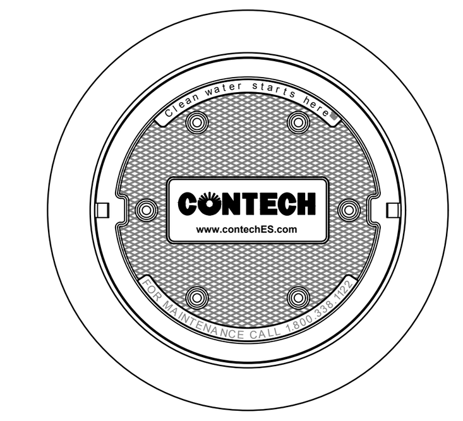
NOTES/SPECIAL REQUIREMENTS:

CONTECH ENGINEERED SOLUTIONS LLC
11815 NE Glenn Widing Drive, Portland, OR 97220
800-548-4667 503-240-3393 800-561-1271 FAX

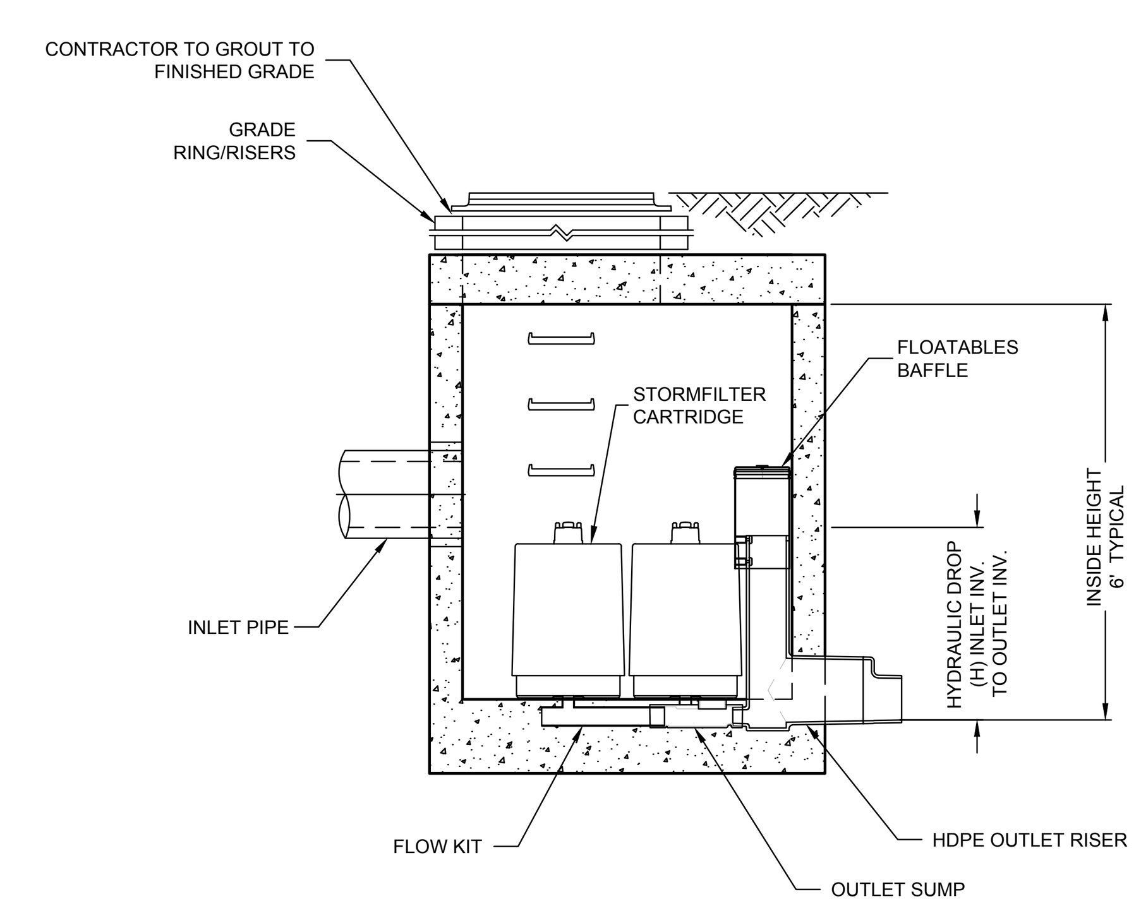
1 CARTRIDGE CATCHBASIN
STORMFILTER
STANDARD DETAIL



PLAN VIEW
STANDARD OUTLET RISER
FLOWKIT: 41A



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.



SECTION A-A

STORMFILTER DESIGN NOTES

STORMFILTER TREATMENTCAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. THE STANDARD MANHOLE STYLE IS SHOWN WITH THE MAXIMUM NUMBER OF CARTRIDGES (4). VOLUME SYSTEM IS ALSO AVAILABLE WITH MAXIMUM 4 CARTRIDGES.
Ø60" MANHOLE STORMFILTER PEAK HYDRAULIC CAPACITY IS 1.0 CFS. IF THE SITE CONDITIONS EXCEED 1.0 CFS AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

CARTRIDGE SELECTION

CARTRIDGE HEIGHT	27"		18"		LOW DROP	
RECOMMENDED HYDRAULIC DROP (H)	3.05'		2.3'		1.8'	
SPECIFIC FLOW RATE (gpm/sf)	2 gpm/ft²	1 gpm/ft²	2 gpm/ft²	1 gpm/ft²	2 gpm/ft²	1 gpm/ft²
CARTRIDGE FLOW RATE (gpm)	22.5	11.25	15	7.5	10	5

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	SFMH 1
WATER QUALITY FLOW RATE (cfs)	0.0824
PEAK FLOW RATE (cfs)	0.83
RETURN PERIOD OF PEAK FLOW (yrs)	25
# OF CARTRIDGES REQUIRED	4
CARTRIDGE FLOW RATE	10
MEDIA TYPE (CSF, PERLITE, ZPG, GAC, PHS)	PERLITE

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE #1	140.30	PVC	10"
INLET PIPE #2	-	-	-
OUTLET PIPE	138.50	PVC	10"

RIM ELEVATION	144.90

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	-	-

NOTES/SPECIAL REQUIREMENTS:

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR SITE SPECIFIC DRAWINGS WITH DETAILED VAULT DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5' AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
6. FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 39 SECONDS.
7. SPECIFIC FLOW RATE IS EQUAL TO THE FILTER TREATMENT CAPACITY (gpm) DIVIDED BY THE FILTER CONTACT SURFACE AREA (sq ft).

INSTALLATION NOTES
1. NOT USED.
2. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE (LIFTING CLUTCHES PROVIDED).
3. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
4. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET PIPE(S).
5. CONTRACTOR TO PROVIDE AND INSTALL CONNECTOR TO THE OUTLET RISER STUB. STORMFILTER EQUIPPED WITH A DUAL DIAMETER HDPE OUTLET STUB AND SAND COLLAR. IF OUTLET PIPE IS LARGER THAN 8 INCHES, CONTRACTOR TO REMOVE THE 8 INCH OUTLET STUB AT MOLDED IN CUT LINE. COUPLING BY FERNCO OR EQUAL AND PROVIDED BY CONTRACTOR.
6. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

CONTECH ENGINEERED SOLUTIONS LLC
11815 NE Glenn Widing Drive, Portland, OR 97220
800-548-4667 503-240-3393 800-561-1271 FAX

SFMH60
STORMFILTER
STANDARD DETAIL

AUGUST 2018 - PERMIT SUBMITTAL

T.M. RIPPEY
CONSULTING ENGINEERS
7650 SW Beveland, Suite 100
Tigard, Oregon 97223
Phone: (503) 443-3900
Fax: (503) 443-3700

REGISTERED PROFESSIONAL ENGINEER 15504 OREGON JULY 25, 1991 KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

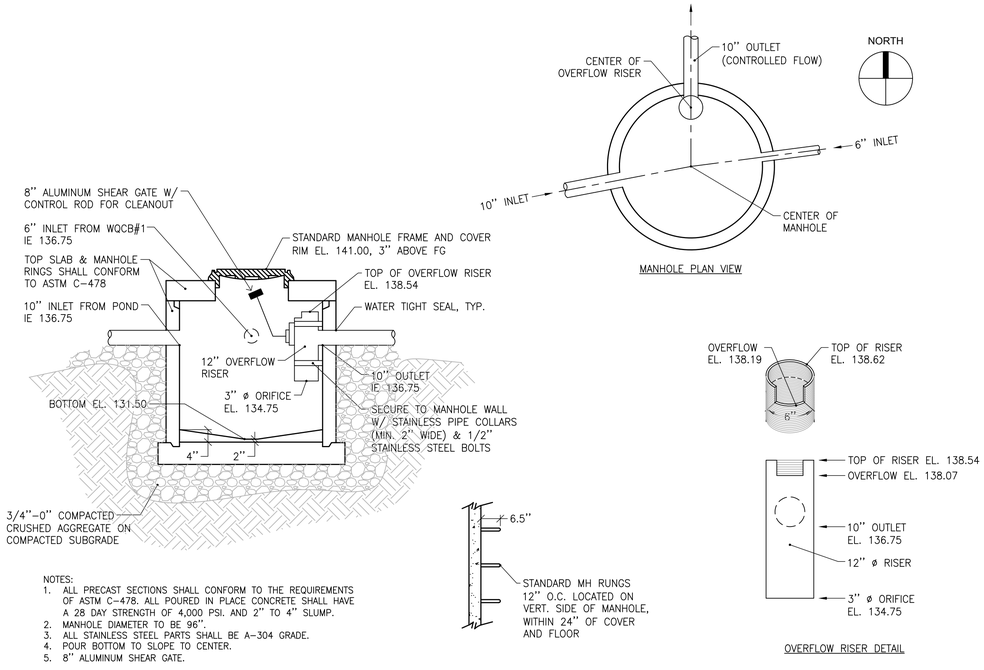
DETAILS

REVISIONS:
1 GRADING REVISIONS
2018-08-22

DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET
C5

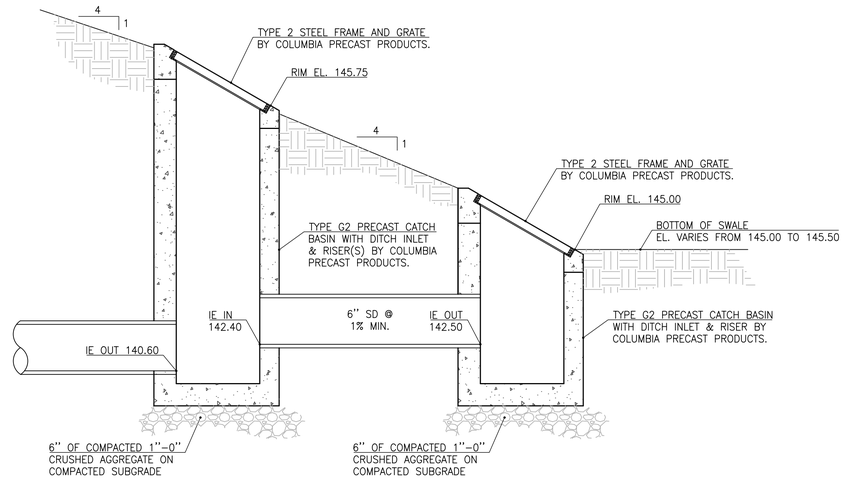
PROJECT No.
18206



NOTES:
1. ALL PRECAST SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478. ALL POURED IN PLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 4,000 PSI. AND 2" TO 4" SLUMP.
2. MANHOLE DIAMETER TO BE 96".
3. ALL STAINLESS STEEL PARTS SHALL BE A-304 GRADE.
4. POUR BOTTOM TO SLOPE TO CENTER.
5. 8" ALUMINUM SHEAR GATE.

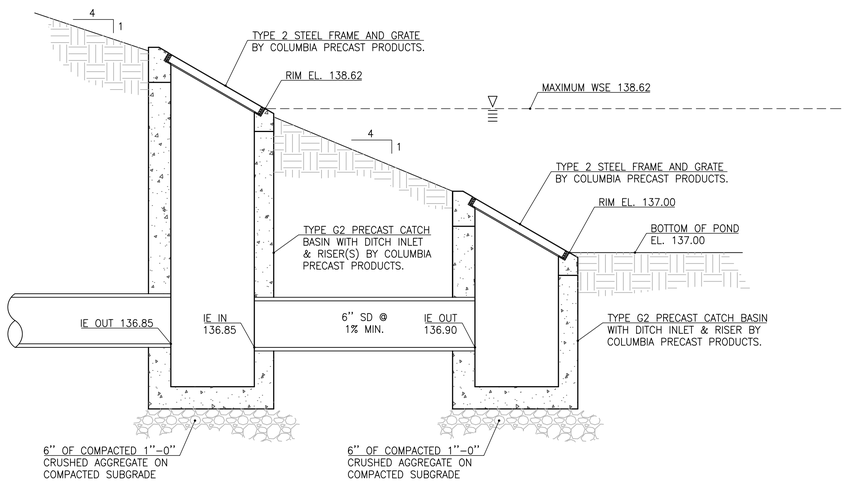
1 96" DIA. STORM OUTLET CONTROL MANHOLE

NOT TO SCALE



2 W.Q. TREATMENT SWALE OUTLET DETAIL

NOT TO SCALE



3 DETENTION POND OUTLET DETAIL

NOT TO SCALE

AUGUST 2018 - PERMIT SUBMITTAL

7650 SW Beveland, Suite 100
Tigard, Oregon 97223
Phone: (503) 443-3900
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TMR
T.M. RIPPEY
CONSULTING ENGINEERS

REGISTERED PROFESSIONAL ENGINEER
15504
OREGON
JULY 25, 1997
KARL KOROH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

DETAILS

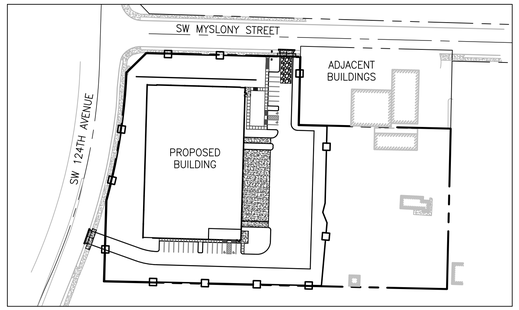
REVISIONS:
1 GRADING REVISIONS 2018-08-22

DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET
C5.1

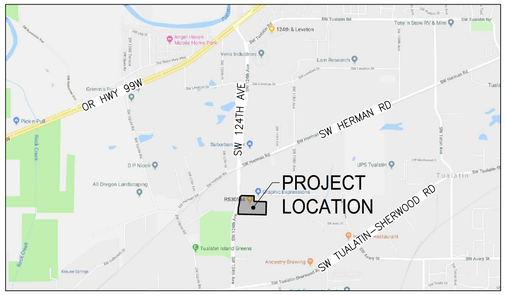
PROJECT No.
18206

ESC PLAN FOR SITES 1 TO 5 ACRES



SITE MAP

NOT TO SCALE



VICINITY MAP

NOT TO SCALE

PROJECT LOCATION

SOUTHEAST CORNER OF THE INTERSECTION OF SW 124th AVENUE AND SW MYSLONY STREET.
TUALATIN, OREGON 97224
LATITUDE = 45° 22' 33"N LONGITUDE = 122° 48' 15"W

PROPERTY DESCRIPTION

TAX LOT 1600 LOCATED IN THE SW 1/4 OF SECTION 22, TOWNSHIP 2 SOUTH, RANGE 1 WEST, WILLAMETTE MERIDIAN, WASHINGTON COUNTY, OREGON

ATTENTION EXCAVATORS

OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THESE RULES FROM THE CENTER BY CALLING 503 232 1987. IF YOU HAVE ANY QUESTIONS ABOUT THE RULES, YOU MAY CONTACT THE CENTER. YOU MUST NOTIFY THE CENTER AT LEAST TWO BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL 503 246 6699.

LOCAL AGENCY-SPECIFIC EROSION CONTROL NOTES

1. IF VEGETATIVE SEED MIXES ARE SPECIFIED, SEEDING MUST TAKE PLACE NO LATER THAT SEPTEMBER 1; THE TYPE AND PERCENTAGES OF SEED IN THE MIX MUST BE IDENTIFIED ON THE PLANS.
2. ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE DISCHARGED OVER AN UNDISTURBED, PREFERABLY VEGETATED AREA, AND THROUGH A SEDIMENT CONTROL BMP I.E. (FILTER BAG).
3. ALL EXPOSED SOILS MUST BE COVERED DURING THE WET WEATHER PERIOD, OCTOBER 01 – MAY 31.

RATIONALE STATEMENT

A COMPREHENSIVE LIST OF AVAILABLE BEST MANAGEMENT PRACTICES (BMP) OPTIONS BASED ON DEQ GUIDANCE MANUAL HAS BEEN REVIEWED TO COMPLETE THIS EROSION AND SEDIMENT CONTROL PLAN. SOME OF THE ABOVE LISTED BMP'S WERE NOT CHOSEN BECAUSE THEY WERE DETERMINED TO NOT EFFECTIVELY MANAGE EROSION PREVENTION AND SEDIMENT CONTROL FOR THIS PROJECT BASED ON SPECIFIC SITE CONDITIONS, INCLUDING SOIL CONDITIONS TOPOGRAPHIC CONSTRAINTS, ACCESSIBILITY TO THE SITE, AND OTHER RELATED CONDITIONS, AS THE PROJECT PROGRESSES AND THERE IS A NEED TO REVISE THE ESC PLAN, AN ACTION PLAN WILL BE SUBMITTED.

KK

THE PERMITTEE IS REQUIRED TO MEET ALL THE CONDITIONS OF THE 1200-CN PERMIT. THIS ESCP AND GENERAL CONDITIONS HAVE BEEN DEVELOPED TO FACILITATE COMPLIANCE WITH THE 1200-CN PERMIT REQUIREMENTS. IN CASES OF DISCREPANCIES OR OMISSIONS, THE 1200-CN PERMIT REQUIREMENTS SUPERCEDE REQUIREMENTS OF THIS PLAN.

PROJECT TEAM

OWNER
FOUR S CORPORATION
CONTACT: SKIP STANAWAY
16316 SW 72ND AVENUE
PORTLAND, OR 97224
PHONE: 503 905 2245

APPLICANT
FOUR S CORPORATION
CONTACT: SKIP STANAWAY
16316 SW 72ND AVENUE
PORTLAND, OR 97224
PHONE: 503 905 2245

CIVIL ENGINEER
TM RIPPEY CONSULTING ENGINEERS
CONTACT: KARL KOROCH, PE
7650 SW BEVELAND ST, SUITE 100
TIGARD, OR 97223
PHONE: 503 443 3900

SURVEYOR
FORD ENGINEERING, INC.
CONTACT: FRED FORD
12205 IOKA WAY NW
SILVERDALE, WA 98383
PHONE: 503 624 2050

STANDARD EROSION AND SEDIMENT CONTROL PLAN DRAWING NOTES

1. ALL PERMIT REGISTRANTS MUST IMPLEMENT THE ESCP. FAILURE TO IMPLEMENT ANY OF THE CONTROL MEASURES OR PRACTICES DESCRIBED IN THE ESCP IS A VIOLATION OF THE PERMIT.
2. THE ESCP MEASURES SHOWN ON THIS PLAN ARE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, UPGRADE THESE MEASURES AS NEEDED TO COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL EROSION AND SEDIMENT CONTROL REGULATIONS.
3. SUBMISSION OF ALL ESCP REVISIONS IS NOT REQUIRED. SUBMITTAL OF THE ESCP REVISIONS IS ONLY UNDER SPECIFIC CONDITIONS. SUBMIT ALL NECESSARY REVISION TO DEQ OR AGENT.
4. PHASE CLEARING AND GRADING TO THE MAXIMUM EXTENT PRACTICAL TO PREVENT EXPOSED INACTIVE AREAS FROM BECOMING A SOURCE OF EROSION.
5. IDENTIFY, MARK, AND PROTECT (BY FENCING OFF OR OTHER MEANS) CRITICAL RIPARIAN AREAS AND VEGETATION INCLUDING IMPORTANT TREES AND ASSOCIATED ROOTING ZONES, AND VEGETATION AREAS TO BE PRESERVED. IDENTIFY VEGETATIVE BUFFER ZONES BETWEEN THE SITE AND SENSITIVE AREAS (E.G., WETLANDS), AND OTHER AREAS TO BE PRESERVED, ESPECIALLY IN PERIMETER AREAS.
6. PRESERVE EXISTING VEGETATION WHEN PRACTICAL AND RE-VEGETATE OPEN AREAS. RE-VEGETATE OPEN AREAS WHEN PRACTICABLE BEFORE AND AFTER GRADING OR CONSTRUCTION. IDENTIFY THE TYPE OF VEGETATIVE SEED MIX USED.
7. EROSION AND SEDIMENT CONTROL MEASURES INCLUDING PERIMETER SEDIMENT CONTROL MUST BE IN PLACE BEFORE VEGETATION IS DISTURBED AND MUST REMAIN IN PLACE AND BE MAINTAINED, REPAIRED, AND PROMPTLY IMPLEMENTED FOLLOWING PROCEDURES ESTABLISHED FOR THE DURATION OF CONSTRUCTION, INCLUDING PROTECTION FOR ACTIVE STORM DRAIN INLETS AND CATCH BASINS AND APPROPRIATE NON-STORMWATER POLLUTION CONTROLS.
8. ESTABLISH CONCRETE TRUCK AND OTHER CONCRETE EQUIPMENT WASHOUT AREAS BEFORE BEGINNING CONCRETE WORK. DIRECT ALL WASH WATER INTO A PIT OR LEAK-PROOF CONTAINER. HANDLE WASH WATER AS WASTE, CONCRETE DISCHARGE TO WATERS OF THE STATE IS PROHIBITED.
9. APPLY TEMPORARY AND/OR PERMANENT SOIL STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS AS GRADING PROGRESSES AND FOR ALL ROADWAYS INCLUDING GRAVEL ROADWAYS.
10. ESTABLISH MATERIAL AND WASTE STORAGE AREAS, AND OTHER NON-STORMWATER CONTROLS.
11. PREVENT TRACKING OF SEDIMENT ONTO PUBLIC OR PRIVATE ROADS USING BMPS SUCH AS: GRAVELED (OR PAVED) EXITS AND PARKING AREAS, GRAVEL ALL UNPAVED ROADS LOCATED ONSITE, OR USE AN EXIT TIRE WASH. THESE BMPS MUST BE IN PLACE PRIOR TO LAND-DISTURBING ACTIVITIES.
12. WHEN TRUCKING SATURATED SOILS FROM THE SITE, EITHER USE WATER-TIGHT TRUCKS OR DRAIN LOADS ON SITE.
13. USE BMPS TO PREVENT OR MINIMIZE STORMWATER EXPOSURE TO POLLUTANTS FROM SPILLS; VEHICLE AND EQUIPMENT FUELING, MAINTENANCE, AND STORAGE; OTHER CLEANING AND MAINTENANCE ACTIVITIES; AND WASTE HANDLING ACTIVITIES. THESE POLLUTANTS INCLUDE FUEL, HYDRAULIC FLUID, AND OTHER OILS FROM VEHICLES AND MACHINERY, AS WELL AS DEBRIS, LEFTOVER PAINTS, SOLVENTS, AND GLUES FROM CONSTRUCTION OPERATIONS.
14. IMPLEMENT THE FOLLOWING BMPS WHEN APPLICABLE: WRITTEN SPILL PREVENTION AND RESPONSE PROCEDURES, EMPLOYEE TRAINING ON SPILL PREVENTION AND PROPER DISPOSAL PROCEDURES, SPILL KITS IN ALL VEHICLES, REGULAR MAINTENANCE SCHEDULE FOR VEHICLES AND MACHINERY, MATERIAL DELIVERY AND STORAGE CONTROLS, TRAINING AND SIGNAGE, AND COVERED STORAGE AREAS FOR WASTE AND SUPPLIES.
15. USE WATER, SOIL-BINDING AGENT OR OTHER DUST CONTROL TECHNIQUE AS NEEDED TO AVOID WIND-BLOWN SOIL.
16. THE APPLICATION RATE OF FERTILIZERS USED TO REESTABLISH VEGETATION MUST FOLLOW MANUFACTURER'S RECOMMENDATIONS TO MINIMIZE NUTRIENT RELEASES TO SURFACE WATERS. EXERCISE CAUTION WHEN USING TIME-RELEASE FERTILIZERS WITHIN ANY WATERWAY RIPARIAN ZONE.
17. IF A STORMWATER TREATMENT SYSTEM (FOR EXAMPLE, ELECTRO-COAGULATION, FLOCCULATION, FILTRATION, ETC.) FOR SEDIMENT OR OTHER POLLUTANT REMOVAL IS EMPLOYED, SUBMIT AN OPERATION AND MAINTENANCE PLAN (INCLUDING SYSTEM SCHEMATIC, LOCATION OF SYSTEM, LOCATION OF INLET, LOCATION OF DISCHARGE, DISCHARGE DISPERSION DEVICE DESIGN, AND A SAMPLING PLAN AND FREQUENCY) BEFORE OPERATING THE TREATMENT SYSTEM. OBTAIN PLAN APPROVAL BEFORE OPERATING THE TREATMENT SYSTEM. OPERATE AND MAINTAIN THE TREATMENT SYSTEM ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
18. AT THE END OF EACH WORKDAY SOIL STOCKPILES MUST BE STABILIZED OR COVERED, OR OTHER BMPS MUST BE IMPLEMENTED TO PREVENT DISCHARGES TO SURFACE WATERS OR CONVEYANCE SYSTEMS LEADING TO SURFACE WATERS.
19. CONSTRUCTION ACTIVITIES MUST AVOID OR MINIMIZE EXCAVATION AND CREATION OF BARE GROUND DURING WET WEATHER OCTOBER 01 – MAY 31.
20. SEDIMENT FENCE: REMOVE TRAPPED SEDIMENT BEFORE IT REACHES 1/3 OF THE ABOVE GROUND FENCE HEIGHT AND BEFORE FENCE REMOVAL.
21. OTHER SEDIMENT BARRIERS (SUCH AS BIOBAGS): REMOVE SEDIMENT BEFORE IT REACHES TWO INCHES IN DEPTH ABOVE GROUND HEIGHT. AND BEFORE BMP REMOVAL.
22. CATCH BASINS: CLEAN BEFORE RETENTION CAPACITY HAS BEEN REDUCED BY 50%. SEDIMENT BASINS AND SEDIMENT TRAPS: REMOVE TRAPPED SEDIMENTS BEFORE DESIGN CAPACITY HAS BEEN REDUCED BY 50% AND AT COMPLETION OF PROJECT.
23. WITHIN 24 HOURS, SIGNIFICANT SEDIMENT THAT HAS LEFT THE CONSTRUCTION SITE, MUST BE REMEDIATED. INVESTIGATE THE CAUSE OF THE SEDIMENT RELEASE AND IMPLEMENT STEPS TO PREVENT A RECURRENCE OF THE DISCHARGE WITHIN THE SAME 24 HOURS. ANY IN-STREAM CLEAN UP OF SEDIMENT SHALL BE PERFORMED ACCORDING TO THE OREGON DIVISION OF STATE LANDS REQUIRED TIMEFRAME.
24. THE INTENTIONAL WASHING OF SEDIMENT INTO STORM SEWERS OR DRAINAGE WAYS MUST NOT OCCUR. VACUUMING OR DRY SWEEPING AND MATERIAL PICKUP MUST BE USED TO CLEANUP RELEASED SEDIMENTS.
25. PROVIDE PERMANENT EROSION CONTROL MEASURES ON ALL EXPOSED AREAS. DO NOT REMOVE TEMPORARY SEDIMENT CONTROL PRACTICES UNTIL PERMANENT VEGETATION OR OTHER COVER OF EXPOSED AREAS IS ESTABLISHED. HOWEVER, DO REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AS EXPOSED AREAS BECOME STABILIZED, UNLESS DOING SO CONFLICTS WITH LOCAL REQUIREMENTS. PROPERLY DISPOSE OF CONSTRUCTION MATERIALS AND WASTE, INCLUDING SEDIMENT RETAINED BY TEMPORARY BMPS.
26. IF VEGETATIVE SEED MIXES ARE SPECIFIED, SEEDING MUST TAKE PLACE NO LATER THAT SEPTEMBER 1; THE TYPE AND PERCENTAGES OF SEED IN THE MIX MUST BE IDENTIFIED ON THE PLANS.
27. ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE DISCHARGED OVER AN UNDISTURBED, PREFERABLY VEGETATED AREA, AND THROUGH A SEDIMENT CONTROL BMP I.E. (FILTER BAG).
28. ALL EXPOSED SOILS MUST BE COVERED DURING THE WET WEATHER PERIOD, OCTOBER 01 – MAY 31.
29. IF WATER OF THE STATE IS WITHIN THE PROJECT SITE OR WITHIN 50 FEET OF THE PROJECT BOUNDARY, MAINTAIN THE EXISTING NATURAL BUFFER WITHIN THE 50-FOOT ZONE FOR THE DURATION OF THE PERMIT COVERAGE, OR MAINTAIN LESS THAN THE ENTIRE EXISTING NATURAL BUFFER AND PROVIDE ADDITIONAL EROSION AND SEDIMENT CONTROL BMPS.

INSPECTION FREQUENCY

SITE CONDITION	MINIMUM FREQUENCY
1. ACTIVE PERIOD	WEEKLY WHEN STORMWATER RUNOFF, INCLUDING RUNOFF FROM SNOW MELT, IS OCCURRING. AT LEAST ONCE EVERY MONTH, REGARDLESS OF WHETHER STORMWATER RUNOFF IS OCCURRING.
2. PRIOR TO THE SITE BECOMING INACTIVE OR IN ANTICIPATION OF SITE INACCESSIBILITY.	ONCE TO ENSURE THAT EROSION AND SEDIMENT CONTROL MEASURES ARE IN WORKING ORDER. ANY NECESSARY MAINTENANCE AND REPAIR MUST BE MADE PRIOR TO LEAVING THE SITE.
3. INACTIVE PERIODS GREATER THAN 14 CONSECUTIVE CALENDAR DAYS.	ONCE EVERY MONTH.
4. PERIODS DURING WHICH THE SITE IS INACCESSIBLE DUE TO INCLEMENT WEATHER.	IF PRACTICAL, INSPECTIONS MUST OCCUR DAILY AT A RELEVANT AND ACCESSIBLE DISCHARGE POINT OR DOWNSTREAM LOCATION.
5. PERIODS DURING WHICH DISCHARGE IS UNLIKELY DUE TO FROZEN CONDITIONS	MONTHLY. RESUME MONITORING IMMEDIATELY UPON MELT, OR WHEN WEATHER CONDITIONS MAKE DISCHARGES LIKELY.

* HOLD A PRE-CONSTRUCTION MEETING OF PROJECT CONSTRUCTION PERSONNEL THAT INCLUDES THE INSPECTOR TO DISCUSS EROSION AND SEDIMENT CONTROL MEASURES AND CONSTRUCTION LIMITS.
* ALL INSPECTIONS MUST BE MADE IN ACCORDANCE WITH DEQ 1200-CN PERMIT REQUIREMENTS.
* INSPECTION LOGS MUST BE KEPT IN ACCORDANCE WITH DEQ'S 1200-CN PERMIT REQUIREMENTS.
* RETAIN A COPY OF THE ESCP AND ALL REVISIONS ON SITE AND MAKE IT AVAILABLE ON REQUEST TO DEQ, AGENT, OR THE LOCAL MUNICIPALITY. DURING INACTIVE PERIODS OF GREATER THAN SEVEN CONSECUTIVE CALENDAR DAYS, RETAIN THE ESCP AT THE CONSTRUCTION SITE OR AT ANOTHER LOCATION.

NARRATIVE DESCRIPTIONS

EXISTING SITE CONDITIONS
TWO RESIDENTIAL BUILDINGS, WITH OPEN AREAS AND VEGETATION.

DEVELOPED CONDITIONS
WESTERN PORTION OF SITE TO BE PROPOSED SINGLE BUILDING WITH ASSOCIATED PAVED PARKING, LANDSCAPING & UTILITIES. EASTERN PORTION OF SITE TO REMAIN.

NATURE OF CONSTRUCTION ACTIVITY AND ESTIMATED TIME TABLE
* MASS GRADING: AUGUST 2018
* TEMP. STABILIZATION: SEPTEMBER 2018
* FINAL STABILIZATION: JULY 2019

TOTAL SITE AREA = 229,881 SF = 5.28 ACRES

TOTAL DISTURBED AREA = 163,304 SF = 3.75 ACRES

SITE SOIL CLASSIFICATION
21B HILLSBORO SILT LOAM (3%-7% SLOPES)

ON-SITE SOILS HAVE A MODERATE EROSION POTENTIAL. FILL MATERIAL SHALL BE GENERATED ON-SITE FROM GRADING EXCAVATION, UTILITY TRENCH SPOILS AND FROM AN APPROVED OFF-SITE APPROVED LOCATION TO BE DETERMINED BY THE GENERAL CONTRACTOR.

RECEIVING WATER BODIES
RUNOFF FROM THE BUILDING IS CONVEYED TO A VEGETATED TREATMENT SWALE WEST OF THE BUILDING. RUNOFF FROM THE PAVED AREAS EAST AND SOUTH OF THE BUILDING IS CONVEYED TO A CONTECH STORMWATER MANAGEMENT CARTRIDGE MANHOLE EAST OF THE BUILDING. RUNOFF FROM THE PAVED AREA NORTHEAST OF THE BUILDING IS CONVEYED TO A CONTECH STORMWATER MANAGEMENT CARTRIDGE CATCH BASIN ADJACENT TO THE NORTH SITE ACCESS. FROM THESE LOCATIONS, RUNOFF IS CONVEYED TO A DETENTION POND LOCATED ALONG THE NORTH SITE BOUNDARY. DISCHARGE FROM THE POND IS CONTROLLED BY A SERIES OF ORIFI IN A CONTROL MANHOLE. DISCHARGE IS ROUTED TO THE EXISTING PUBLIC STORM DRAINAGE SYSTEM IN MYSLONY STREET ADJACENT TO THE SITE'S NORTH BOUNDARY. THE PUBLIC STORM SYSTEM ROUTES FLOW WEST THEN NORTH IN SW 124TH AVE, DISCHARGING INTO THE HEDGES CREEK WATERWAY SYSTEM WEST OF THE SITE, WHICH ULTIMATELY DRAINS TO THE TUALATIN RIVER, WILLAMETTE RIVER, COLUMBIA RIVER, AND PACIFIC OCEAN.

THE PERMITTEE IS REQUIRED TO MEET ALL THE CONDITIONS OF THE 1200-CN PERMIT. THIS ESCP AND GENERAL CONDITIONS HAVE BEEN DEVELOPED TO FACILITATE COMPLIANCE WITH THE 1200-CN PERMIT REQUIREMENTS. IN CASES OF DISCREPANCIES OR OMISSIONS, THE 1200-CN PERMIT REQUIREMENTS SUPERCEDE REQUIREMENTS OF THIS PLAN.

PERMITTEE'S SITE INSPECTOR

PERLO CONSTRUCTION
CONTACT: TIM KOFSTAD
16101 SW 72ND AVE, SUITE 200
TIGARD, OR 97224
PHONE: 503 624 2090
EMAIL: tkofstad@perlo.biz

QUALIFICATION PROGRAM AND NUMBER:
ECO-3-5111804

DESCRIPTION OF EXPERIENCE:
RECEIVED TRAINING IN CERTIFIED EROSION & SEDIMENT CONTROL LEAD.

BMP MATRIX FOR CONSTRUCTION PHASES

REFER TO DEQ GUIDANCE MANUAL FOR A COMPREHENSIVE LIST OF AVAILABLE BMPs.

	CLEARING	MASS GRADING	UTILITY INSTALLATION	STREET CONSTRUCTION	FINAL STABILIZATION	WET WEATHER (OCT. 1 TO MAY 31)
EROSION PREVENTION						
PRESERVE NATURAL VEGETATION	**X	X	X		X	X
GROUND COVER					X	X
HYDRAULIC APPLICATIONS					X	
PLASTIC SHEETING						X
MATTING					X	X
DUST CONTROL	X	X	X		X	X
TEMPORARY/ PERMANENT SEEDING		X	X		X	X
BUFFER ZONE						
SEDIMENT CONTROL						
SEDIMENT FENCE (PERIMETER)	**X	X	X			X
SEDIMENT FENCE (INTERIOR)						
STRAW WATTLES						
FILTER BERM						
INLET PROTECTION	**X	X	X		X	X
DEWATERING						
SEDIMENT TRAP						
NATURAL BUFFER ENCROACHMENT						
RUN OFF CONTROL						
CONSTRUCTION ENTRANCE	**X	X	X			X
PIPE SLOPE DRAIN						
OUTLET PROTECTION	X	X	X		X	
SURFACE ROUGHENING						
CHECK DAMS						
POLLUTION PREVENTION						
PROPER SIGNAGE	X	X	X		X	X
HAZ WASTE MGMT	X	X	X		X	X
SPILL KIT ON-SITE	X	X	X		X	X
CONCRETE WASHOUT AREA	X	X	X		X	X
OTHER:						

* ADDITIONAL BMP'S REQUIRED FOR WORK WITHIN 50' OF WATER OF THE STATE.
** BMP THAT WILL BE INSTALLED PRIOR TO ANY GROUND DISTURBING ACTIVITY.

SHEET INDEX

AUGUST 2018 - PERMIT SUBMITTAL

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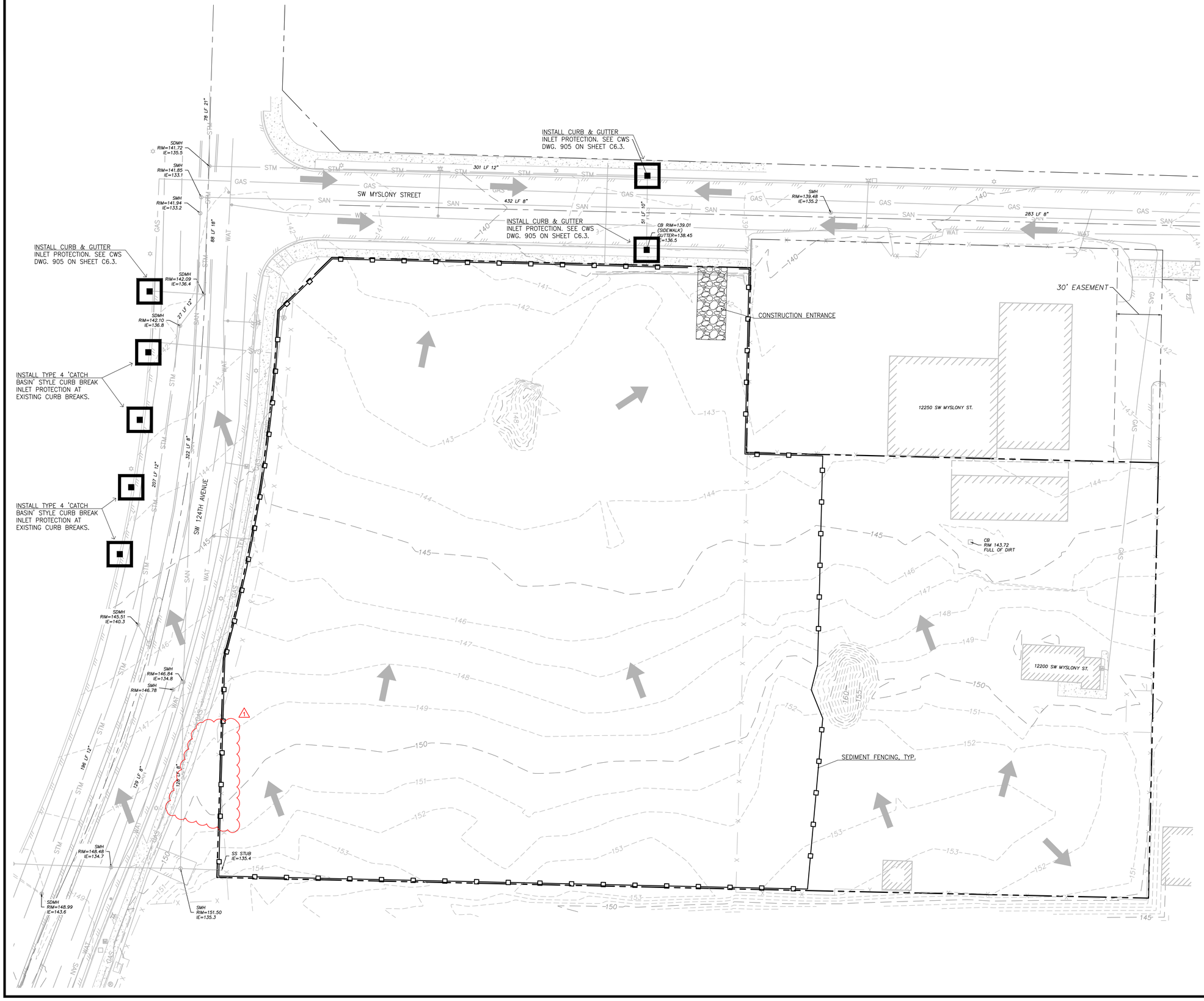
REVISIONS:
1. GRADING REVISIONS 2018-08-22

EROSION & SEDIMENT CONTROL COVER SHEET

DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET
C6

PROJECT No.
18206



LEGEND

PROJECT BOUNDARY	
PROPERTY LINE	
EDGE OF PAVEMENT	
1' CONTOUR	144
5' CONTOUR	145
STORM SEWER LINE	STM
WATER LINE	WATER
SANITARY SEWER LINE	SAN
GAS LINE	GAS
OVERHEAD UTILITY WIRE	OHW
EXISTING FEATURE OR CONDITION	(E)
EROSION CONTROL FENCE SEE DETAIL ON SHEET C6.3	
EXISTING SURFACE DRAINAGE FLOW DIRECTION	
INLET PROTECTION SEE DETAILS ON SHEET C6.3 & C6.4	
CONSTRUCTION ENTRANCE SEE DETAIL ON SHEET C6.3	

PRE-CONSTRUCTION, CLEARING & DEMOLITION NOTES

1. ALL BASE ESC MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, GRAVEL CONSTRUCTION ENTRANCES, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. SEDIMENT BARRIERS APPROVED FOR USE INCLUDE SEDIMENT FENCE, BERMS CONSTRUCTED OUT OF MULCH, CHIPPINGS, OR OTHER SUITABLE MATERIAL, STRAW WATTLES, OR OTHER APPROVED MATERIALS.
3. SENSITIVE RESOURCES INCLUDING, BUT NOT LIMITED TO, TREES, WETLANDS, AND RIPARIAN PROTECTION AREAS SHALL BE CLEARLY DELINEATED WITH ORANGE CONSTRUCTION FENCING OR CHAIN LINK FENCING IN A MANNER THAT IS CLEARLY VISIBLE TO ANYONE IN THE AREA. NO ACTIVITIES ARE PERMITTED TO OCCUR BEYOND THE CONSTRUCTION BARRIER.
4. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES INCLUDING, BUT NOT LIMITED TO, STREET SWEEPING, AND VACUUMING, MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
5. RUN-ON AND RUN-OFF CONTROLS SHALL BE IN PLACE AND FUNCTIONING PRIOR TO BEGINNING SUBSTANTIAL CONSTRUCTION ACTIVITIES. RUN-ON AND RUN-OFF CONTROL MEASURES INCLUDE: SLOPE DRAINS (WITH OUTLET PROTECTION), CHECK DAMS, SURFACE ROUGHENING, AND BANK STABILIZATION.

SCALE: 1" = 30'

0 15 30 60

AUGUST 2018 - PERMIT SUBMITTAL

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JULY 25, 1997
KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP. WAREHOUSE BUILDING

12200 MYSLONY STREET
TUALATIN, OR 97062

CLEARING, DEMOLITION & MASS GRADING EROSION & SEDIMENT CONTROL PLAN

REVISIONS:
1 GRADING REVISIONS 2018-08-22

DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHK'D BY: KJK

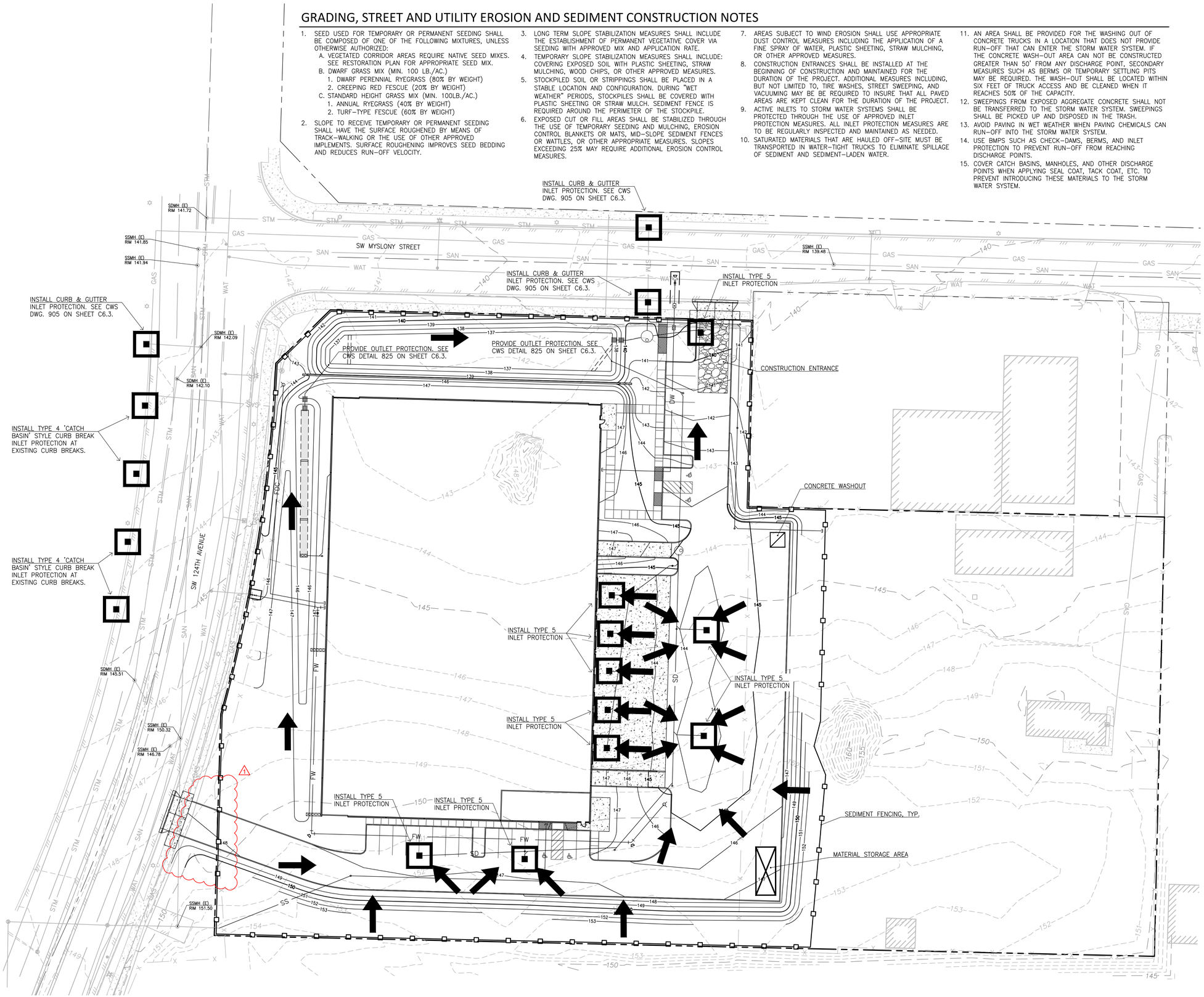
SHEET

C6.1

PROJECT No.
18206

GRADING, STREET AND UTILITY EROSION AND SEDIMENT CONSTRUCTION NOTES

1. SEED USED FOR TEMPORARY OR PERMANENT SEEDING SHALL BE COMPOSED OF ONE OF THE FOLLOWING MIXTURES, UNLESS OTHERWISE AUTHORIZED:
   A. VEGETATED CORRIDOR AREAS REQUIRE NATIVE SEED MIXES. SEE RESTORATION PLAN FOR APPROPRIATE SEED MIX.
   B. DWARF GRASS MIX (MIN. 100 LB./AC.)
      1. DWARF PERENNIAL RYEGRASS (80% BY WEIGHT)
      2. CREEPING RED FESCUE (20% BY WEIGHT)
   C. STANDARD HEIGHT GRASS MIX (MIN. 100LB./AC.)
      1. ANNUAL RYEGRASS (40% BY WEIGHT)
      2. TURF-TYPE FESCUE (60% BY WEIGHT)
2. SLOPE TO RECEIVE TEMPORARY OR PERMANENT SEEDING SHALL HAVE THE SURFACE ROUGHENED BY MEANS OF TRACK-WALKING OR THE USE OF OTHER APPROVED IMPLEMENTS. SURFACE ROUGHENING IMPROVES SEED BEDDING AND REDUCES RUN-OFF VELOCITY.
3. LONG TERM SLOPE STABILIZATION MEASURES SHALL INCLUDE THE ESTABLISHMENT OF PERMANENT VEGETATIVE COVER VIA SEEDING WITH APPROVED MIX AND APPLICATION RATE.
4. TEMPORARY SLOPE STABILIZATION MEASURES SHALL INCLUDE: COVERING EXPOSED SOIL WITH PLASTIC SHEETING, STRAW MULCHING, WOOD CHIPS, OR OTHER APPROVED MEASURES.
5. STOCKPILED SOIL OR STRIPPINGS SHALL BE PLACED IN A STABLE LOCATION AND CONFIGURATION. DURING "WET WEATHER" PERIODS, STOCKPILES SHALL BE COVERED WITH PLASTIC SHEETING OR STRAW MULCH. SEDIMENT FENCE IS REQUIRED AROUND THE PERIMETER OF THE STOCKPILE.
6. EXPOSED CUT OR FILL AREAS SHALL BE STABILIZED THROUGH THE USE OF TEMPORARY SEEDING AND MULCHING, EROSION CONTROL BLANKETS OR MATS, MID-SLOPE SEDIMENT FENCES OR WATTLES, OR OTHER APPROPRIATE MEASURES. SLOPES EXCEEDING 25% MAY REQUIRE ADDITIONAL EROSION CONTROL MEASURES.
7. AREAS SUBJECT TO WIND EROSION SHALL USE APPROPRIATE DUST CONTROL MEASURES INCLUDING THE APPLICATION OF A FINE SPRAY OF WATER, PLASTIC SHEETING, STRAW MULCHING, OR OTHER APPROVED MEASURES.
8. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES INCLUDING, BUT NOT LIMITED TO, TIRE WASHES, STREET SWEEPING, AND VACUUMING MAY BE BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
9. ACTIVE INLETS TO STORM WATER SYSTEMS SHALL BE PROTECTED THROUGH THE USE OF APPROVED INLET PROTECTION MEASURES. ALL INLET PROTECTION MEASURES ARE TO BE REGULARLY INSPECTED AND MAINTAINED AS NEEDED.
10. SATURATED MATERIALS THAT ARE HAULED OFF-SITE MUST BE TRANSPORTED IN WATER-TIGHT TRUCKS TO ELIMINATE SPILLAGE OF SEDIMENT AND SEDIMENT-LADEN WATER.
11. AN AREA SHALL BE PROVIDED FOR THE WASHING OUT OF CONCRETE TRUCKS IN A LOCATION THAT DOES NOT PROVIDE RUN-OFF THAT CAN ENTER THE STORM WATER SYSTEM. IF THE CONCRETE WASH-OUT AREA CAN NOT BE CONSTRUCTED GREATER THAN 50' FROM ANY DISCHARGE POINT, SECONDARY MEASURES SUCH AS BERMS OR TEMPORARY SETTLING PITS MAY BE REQUIRED. THE WASH-OUT SHALL BE LOCATED WITHIN SIX FEET OF TRUCK ACCESS AND BE CLEANED WHEN IT REACHES 50% OF THE CAPACITY.
12. SWEEPINGS FROM EXPOSED AGGREGATE CONCRETE SHALL NOT BE TRANSFERRED TO THE STORM WATER SYSTEM. SWEEPINGS SHALL BE PICKED UP AND DISPOSED IN THE TRASH.
13. AVOID PAVING IN WET WEATHER WHEN PAVING CHEMICALS CAN RUN-OFF INTO THE STORM WATER SYSTEM.
14. USE BMPS SUCH AS CHECK-DAMS, BERMS, AND INLET PROTECTION TO PREVENT RUN-OFF FROM REACHING DISCHARGE POINTS.
15. COVER CATCH BASINS, MANHOLES, AND OTHER DISCHARGE POINTS WHEN APPLYING SEAL COAT, TACK COAT, ETC. TO PREVENT INTRODUCING THESE MATERIALS TO THE STORM WATER SYSTEM.



LEGEND

- PROJECT BOUNDARY
- PROPERTY LINE
- EDGE OF PAVEMENT
- 1' CONTOUR
- 5' CONTOUR
- STORM SEWER LINE (SD)
- WATER LINE (W)
- SANITARY SEWER LINE (SS)
- EXISTING FEATURE OR CONDITION (E)
- EROSION CONTROL FENCE SEE DETAIL ON SHEET C5.3
- PROPOSED SURFACE DRAINAGE FLOW DIRECTION
- INLET PROTECTION SEE DETAILS ON SHEET C5.3 & C5.4
- CONSTRUCTION ENTRANCE SEE DETAIL ON SHEET C5.3
- CONCRETE WASHOUT SEE DETAIL ON SHEET C5.3
- MATERIAL STORAGE AREA

EROSION AND SEDIMENT CONTROL BMP IMPLEMENTATION

1. ALL BASE ESC MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, GRAVEL CONSTRUCTION ENTRANCES, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. ALL 'SEDIMENT BARRIERS (TO BE INSTALLED AFTER GRADING)' SHALL BE INSTALLED IMMEDIATELY FOLLOWING ESTABLISHMENT OF FINISHED GRADE AS SHOWN ON THESE PLANS.
3. LONG TERM SLOPE STABILIZATION MEASURES 'INCLUDING MATTING' SHALL BE IN PLACE OVER ALL EXPOSED SOILS BY OCTOBER 1.
4. THE STORM WATER FACILITY SHALL BE CONSTRUCTED AND LANDSCAPED PRIOR TO THE STORM WATER SYSTEM FUNCTIONING AND SITE PAVING.
5. INLET PROTECTION SHALL BE IN-PLACE IMMEDIATELY FOLLOWING PAVING ACTIVITIES.

TEMPORARY STABILIZATION

FOLLOWING MASS GRADING A MINIMUM OF 6" OF 1"-0" CRUSHED AGGREGATE WILL BE PLACED AT THE BUILDING PAD AND PAVED AREAS. OTHER DISTURBED AREAS WILL BE SEEDED WITH A MIX AS IDENTIFIED IN CONSTRUCTION NOTE 1 ON THIS SHEET. THIS WILL REMAIN IN PLACE UNTIL BUILDING AND SITE UTILITIES PERMITS ARE ISSUED FOR THE PROJECT. FINAL STABILIZATION OF NON-PAVED AREAS WILL INCLUDE THE ADDITION OF LANDSCAPE PLANTINGS AS REQUIRED BY THE CITY OF TUALATIN DEVELOPMENT CODE.

SCALE: 1" = 30'

0 15 30 60

AUGUST 2018 - PERMIT SUBMITTAL

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OREGON
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KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

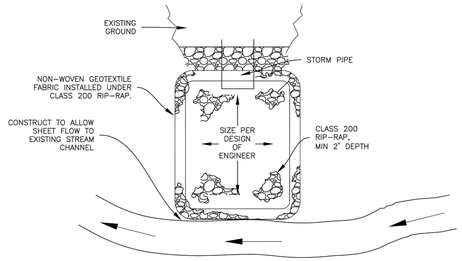
GRADING & UTILITY
CONSTRUCTION EROSION &
SEDIMENT CONTROL PLAN

REVISIONS:
1 GRADING REVISIONS 2018-08-22

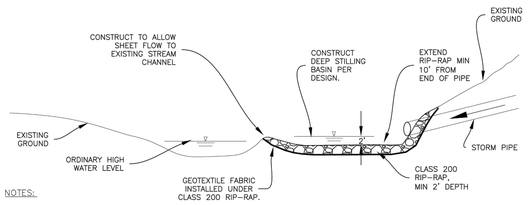
DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET
C6.2

PROJECT No.
18206



PLAN VIEW
NTS



NOTES:

1. CONTRACTOR TO COMPLY WITH CONDITIONS AND REQUIREMENT OF DSL AND CORPS PERMITS.

PROFILE

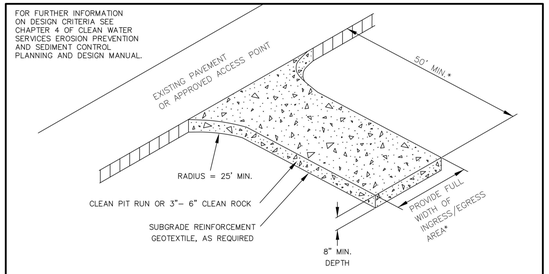
FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

OUTLET PROTECTION STILLING BASIN

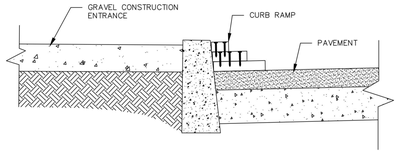
DRAWING NO. 825 REVISED 12-16

CleanWater Services

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.



*20' MIN. FOR SINGLE FAMILY AND DUPLEX RESIDENTIAL



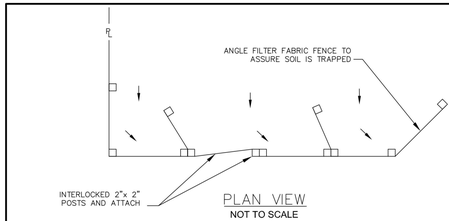
NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF- WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
4. WHERE RUNOFF CONTAINING SEDIMENT LADEN WATER IS LEAVING THE SITE VIA THE CONSTRUCTION ENTRANCE, OTHER MEASURES SHALL BE IMPLEMENTED TO DIVERT RUNOFF THROUGH AN APPROVED FILTERING SYSTEM.
5. DIMENSIONS:
   SINGLE FAMILY
   20' LONG BY 20' WIDE 8" DEEP OF ¾" MINUS CLEAN ROCK.
   COMMERCIAL
   50' LONG BY 20' WIDE 3-6" CLEAN ROCK, GOVERNING AUTHORITY MAY REQUIRE GEOTEXTILE FABRIC TO PREVENT SUB-SOIL PUMPING.

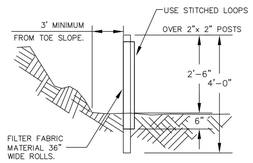
CONSTRUCTION ENTRANCE

DRAWING NO. 855 REVISED 12-16

CleanWater Services



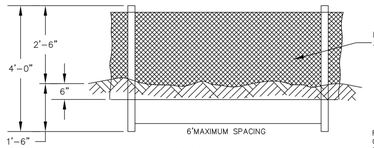
PLAN VIEW
NOT TO SCALE



PROFILE
NOT TO SCALE

NOTES:

1. BURY BOTTOM OF FILTER FABRIC 6" VERTICALLY BELOW FINISHED GRADE.
2. 2"x 2" FIR, PINE OR STEEL FENCE POSTS.
3. POSTS TO BE INSTALLED ON UPHILL SIDE OF SLOPE.
4. COMPACT BOTH SIDES OF FILTER FABRIC TRENCH.
5. PANELS MUST BE PLACED ACCORDING TO SPACING ON DETAIL NO.940



FRONT VIEW
NOT TO SCALE

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

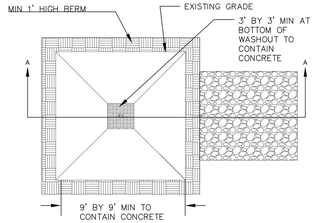
SEDIMENT FENCE

DRAWING NO. 875 REVISED 12-16

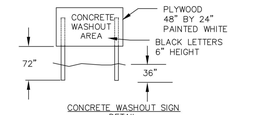
CleanWater Services

NOTES:

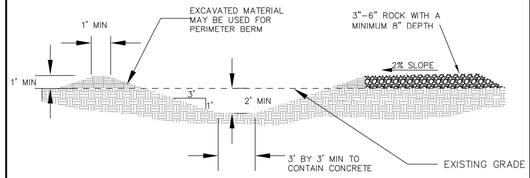
1. WASHOUT FACILITIES SHALL BE MAINTAINED TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM FREEBOARD OF 12 INCHES.
2. WASHOUT FACILITIES MUST BE CLEANED, OR NEW FACILITIES MUST BE CONSTRUCTED AND READY FOR USE ONCE THE WASHOUT IS 75% FULL.
3. IF THE WASHOUT IS NEARING CAPACITY, VACUUM AND DISPOSE OF THE WASTE MATERIAL IN AN APPROVED MANNER.
4. TEMPORARY CONCRETE WASHOUT FACILITIES SHALL BE LOCATED A MINIMUM OF 50 FT FROM SENSITIVE AREAS INCLUDING OPEN DRAINAGE FACILITIES AND WATERSOURSES.
5. CONCRETE WASHOUT FACILITIES SHALL BE CONSTRUCTED AND MAINTAINED IN SUFFICIENT QUANTITY AND SIZE TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS.
6. INSTALL CONCRETE WASHOUT SIGN WITHIN 30 FEET OF TEMPORARY CONCRETE WASHOUT FACILITY.
7. TEMPORARY CONCRETE WASHOUTS MAY BE A PREFABRICATED CONTAINER THAT IS PORTABLE AND REUSABLE.



PLAN
NOT TO SCALE



CONCRETE WASHOUT SIGN DETAIL
(OR EQUIVALENT)
NOT TO SCALE

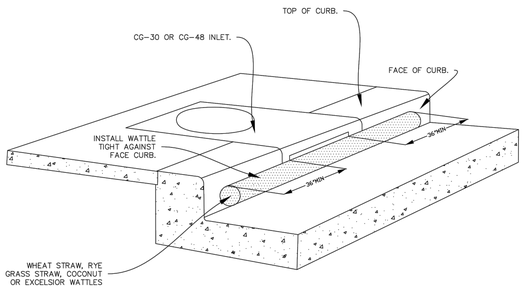


SECTION A-A
NOT TO SCALE

CONCRETE WASHOUT

DRAWING NO. 900 REVISED 12-16

CleanWater Services



PERSPECTIVE VIEW SHOWING WATTLE ALONG GUTTER AT CURB INLET

INSTALLATION NOTES:

1. ONLY ALLOWED USE OF APPLICATION IS ON CG-30 AND CG-48 INLETS UNLESS APPROVED BY CWS.
2. INSTALL WATTLE ALONG INLET WITH WATTLE EXTENDING A MIN OF 36" BEYOND INLET OPENINGS IN EACH DIRECTION.
3. WATTLE MUST BE INSTALLED TIGHTLY AGAINST CURB. MAY REQUIRE ADDITIONAL MEASURES TO ENSURE WATTLE REMAINS TIGHT AGAINST CURB, SUCH AS USING ZIP-TIES TO SECURE WATTLE TO INLET'S TRASH BARS OR USING SANDBAGS TO WEIGHT DOWN WATTLE.

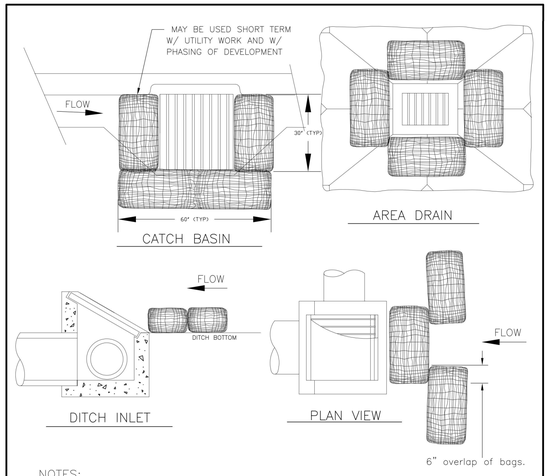
MAINTENANCE NOTES:

1. ANY VISIBLE SIGN OF SEDIMENT ACCUMULATION TO BE CLEANED UP AT THE END OF EACH WORKDAY.
2. REPLACE WATTLE AS NECESSARY TO PREVENT SEDIMENT FROM ENTERING THE STORM SYSTEM.

CURB AND GUTTER INLET PROTECTION

DRAWING NO. 905 REVISED 2-17

CleanWater Services



NOTES:

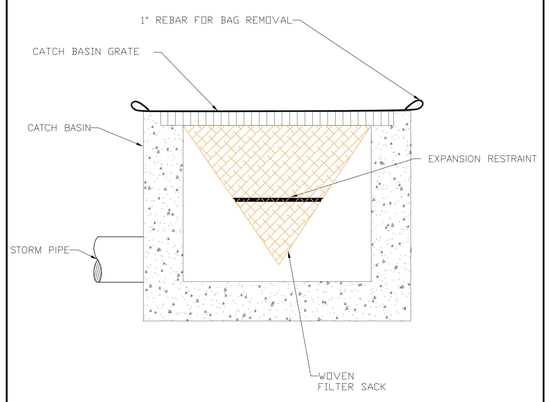
1. ADDITIONAL MEASURES MUST BE CONSIDERED DEPENDING ON SOIL TYPES.
2. BIO-FILTER BAGS SHOULD BE STAKED WHERE APPLICABLE USING (2) 1"x2" WOODEN STAKES OR APPROVED EQUAL PER BAG.
3. WHEN USING 30" BIO-BAGS TO PROTECT A CATCH BASIN YOU MUST HAVE 4 BAGS AND THEY SHALL BE OVERLAPPED BY 6".

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

INLET PROTECTION TYPE 4

DRAWING NO. 915 REVISED 12-16

CleanWater Services



CATCH BASIN INSERT

NOTE:

1. RECESSED CURB INLET CATCH BASINS MUST BE BLOCKED WHEN USING FILTER FABRIC INLET SACKS. SIZE OF FILTER FABRIC INLET SACKS TO BE DETERMINED BY MANUFACTURER.

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

INLET PROTECTION TYPE 5

DRAWING NO. 920 REVISED 12-16

CleanWater Services

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OREGON
JULY 25, 1997
KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
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TUALATIN, OR 97062

EROSION & SEDIMENT CONTROL DETAILS

REVISIONS:
1 GRADING REVISIONS 2018-08-22

DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET
C6.3

PROJECT No.
18206

AUGUST 2018 - PERMIT SUBMITTAL

PLANTS


WESTERN REDBUD


SWEDISH COLUMNAR ASPEN


LITTLE LEAF LINDEN


AUSTRIAN PINE


PRINCETON SENTRY GINKGO


VINE MAPLE


RED TWID DOGWOOD


ST JOHN'S WORT


ST JOHN'S WORT


PORTUGUESE LAUREL


BLUE OAT GRASS


DWARF FOUNTAIN GRASS


BIG BLUE LIRIOPE

MATERIALS


GABION


ROCK BORDER

PLANT SCHEDULE

TREES

1 LITTLE LEAF LINDEN
2 PRINCETON SENTRY GINGKO
3 SWEDISH COLUMNAR MAPLE
4 VINE MAPLE
5 AUSTRIAN PINE
6 WESTERN REDBUD

SHRUBS

7 RED TWIG DOGWOOD
8 EVERGREEN HUCKLEBERRY
9 PORTUGUESE LAUREL

GROUNDCOVERS

10 DWARF FOUNTAIN GRASS
11 ST JOHN'S WORT
12 BLUE OAT GRASS
13 BIG BLUE LIRIOPE

MATERIALS SCHEDULE

14 GABION
15 ROCK BORDER
TO MATCH GABION
16 LOW MAINTENANCE/ EROSION CONTROL GRASS MIX
17 ULTRA BLOCK

LIGHTING

18 LIGHT POLE
SEE ELECTRICAL

NOTE:
TREE PROTECTION MEASURES WILL BE PUT IN PLACE TO ENSURE THE HEALTH AND SAFETY OF GROVE OF TREES THAT BORBER ADJEACENT SOUTH PROPERTY LINE.

simp.L
a land design workshop

0 10' 20' 40'

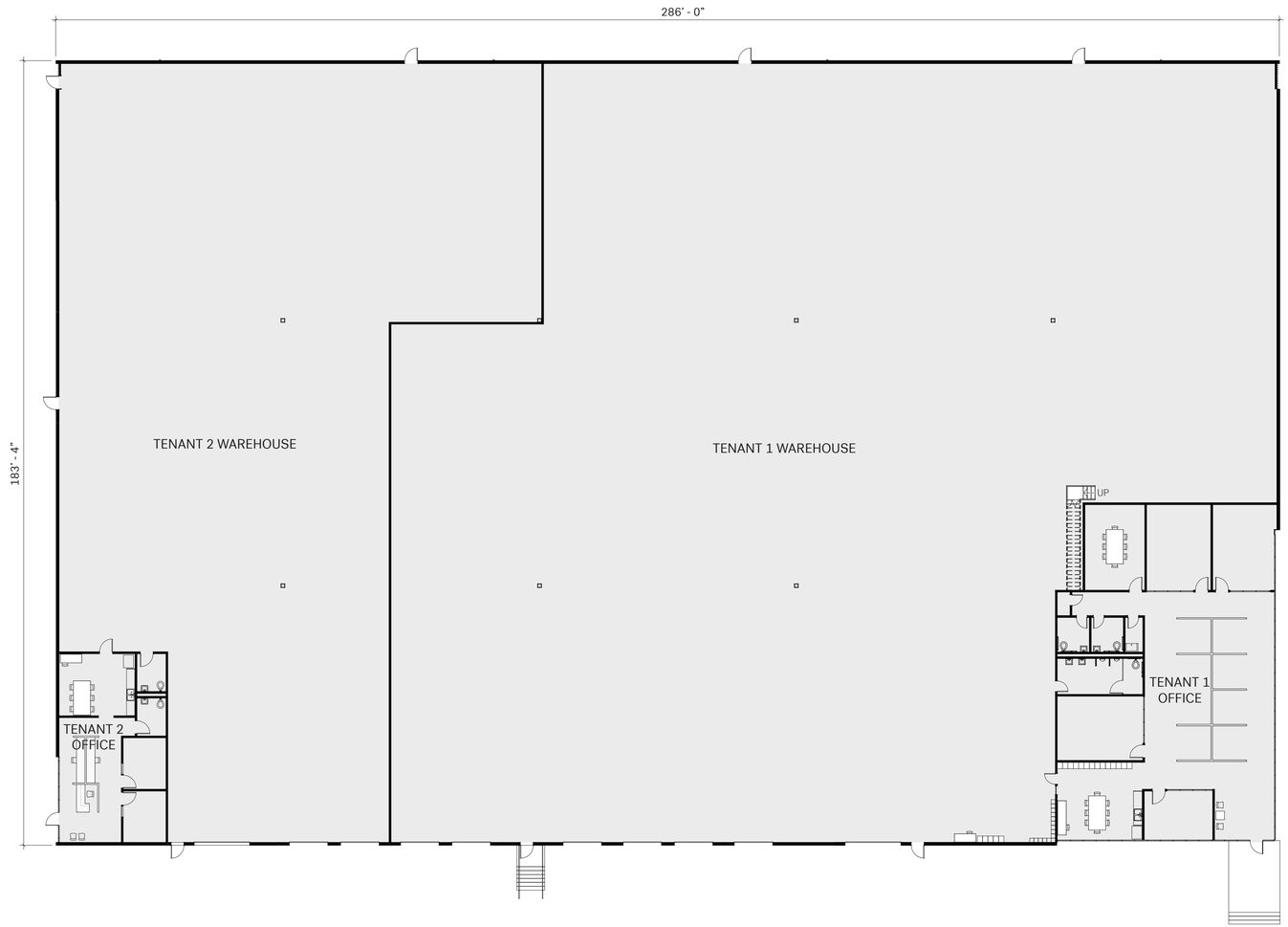
LANDSCAPE PLAN | SCALE 1:20

SRG PARTNERSHIP INC

FOUR - S CORPORATION WAREHOUSE

CITY OF TUALATIN - ARCHITECTURAL REVIEW

SEPTEMBER 17, 2018



NORTH

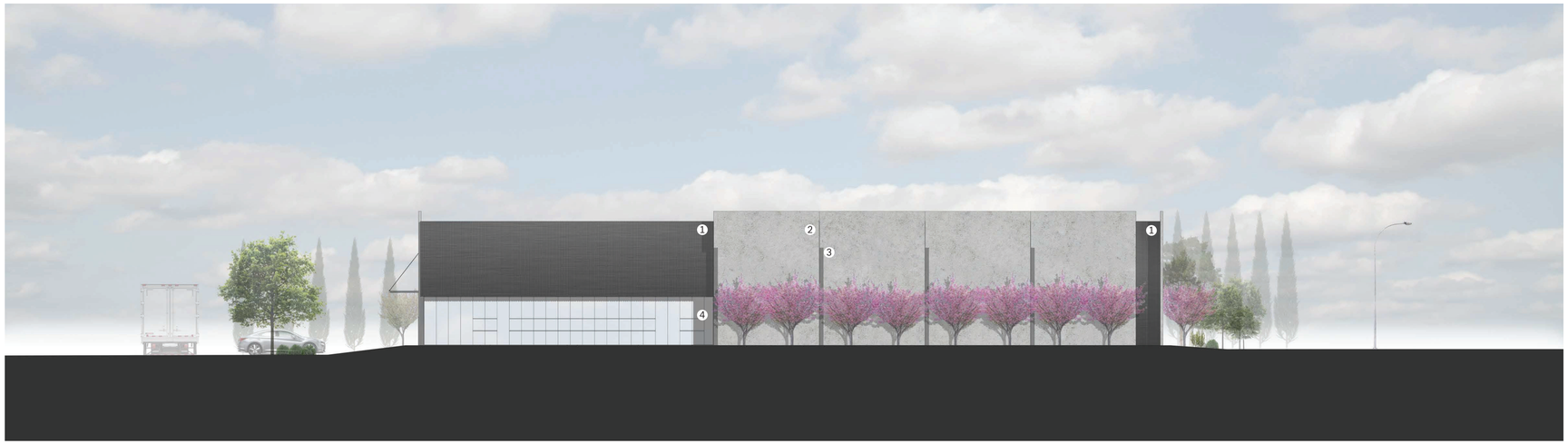
BUILDING PLAN | 1/16" = 1' - 0"

SRG PARTNERSHIP INC

FOUR - S CORPORATION WAREHOUSE

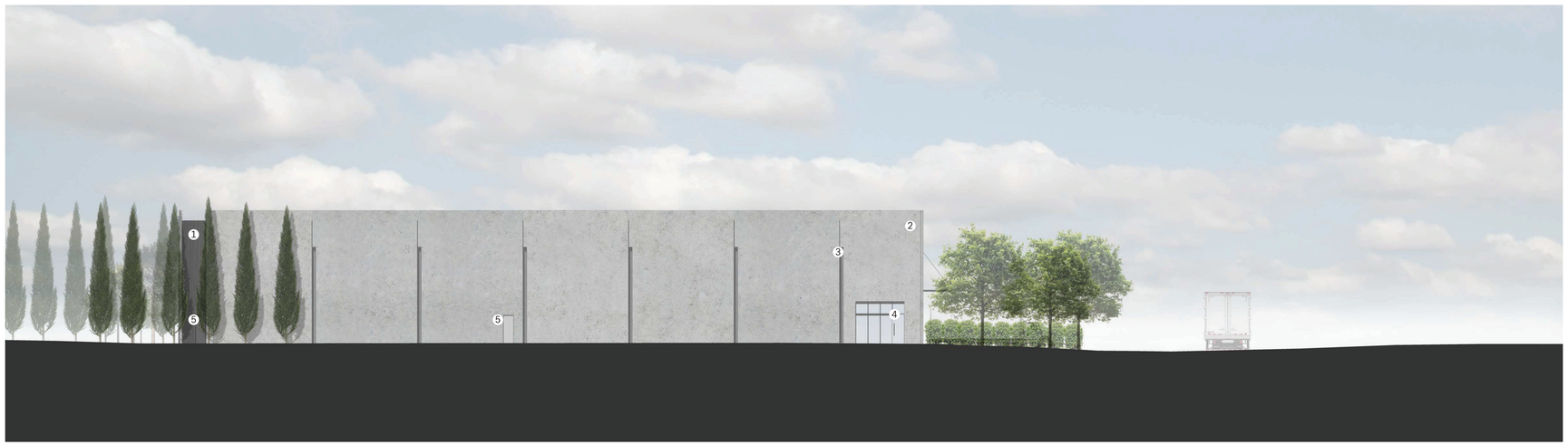
CITY OF TUALATIN - ARCHITECTURAL REVIEW

SEPTEMBER 17, 2018



NORTH ELEVATION

1. FORMED STEEL PANELS WITH VERTICAL BOX RIB; DARK GRAY COLOR
2. TILT-UP CONCRETE PANELS WITH ELASTOMERIC PAINT COATING; SMOOTH FINISH; NEUTRAL COLOR
3. 12” WIDE BY 1.5” DEEP REVEALS IN TILT-UP CONCRETE PANEL
4. ALUMINUM & GLASS EXTERIOR STOREFRONT; DARK GRAY COLOR TO MATCH FORMED STEEL PANELS
5. EXTERIOR HOLLOW METAL ACCESS DOOR & FRAMES; PAINT FINISH TO MATCH ADJACENT TILT-UP CONCRETE PANEL AND/OR DARK GREY METAL PANEL



SOUTH ELEVATION

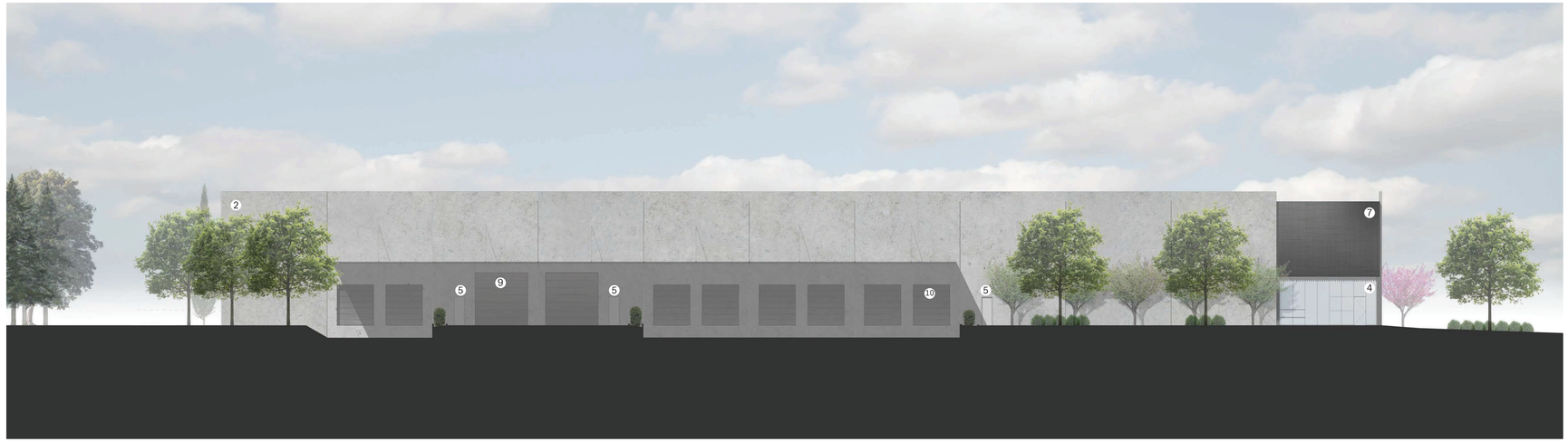
ELEVATIONS | 1/16” = 1’ - 0”

SRG PARTNERSHIP INC

FOUR - S CORPORATION WAREHOUSE

CITY OF TUALATIN - ARCHITECTURAL REVIEW

OCTOBER 22, 2018



EAST ELEVATION

WEST ELEVATION

1. FORMED STEEL PANELS WITH VERTICAL BOX RIB; DARK GRAY COLOR; SUPPORTED BY PAINTED STEEL GIRTS FROM TILT-UP CONCRETE PANELS
2. TILT-UP CONCRETE PANELS WITH ELASTOMERIC PAINT COATING; SMOOTH FINISH; NEUTRAL COLOR
3. 12” WIDE BY 1.5” DEEP REVEALS IN TILT-UP CONCRETE PANEL
4. ALUMINUM & GLASS EXTERIOR STOREFRONT; DARK GRAY COLOR TO MATCH FORMED STEEL PANELS
5. EXTERIOR HOLLOW METAL ACCESS DOOR & FRAMES; PAINT FINISH TO MATCH ADJACENT TILT-UP CONCRETE PANEL
6. 12” DEEP PAINTED STEEL PLATE FIN AT EDGE OF FORMED STEEL PANELS; LIGHT GRAY COLOR
7. FORMED STEEL PANELS WITH VERTICAL BOX RIB; DARK GRAY COLOR
8. RAIN WATER SCUPPER AND LEADER; PAINT FINISH
9. 12’0”W X 13’0”H SECTIONAL LOADING DOOR WITH PAINT FINISH; NEUTRAL GRAY COLOR
10. 9’0”W X 10’0”H SECTIONAL LOADING DOORS WITH PAINT FINISH; NEUTRAL GRAY COLOR

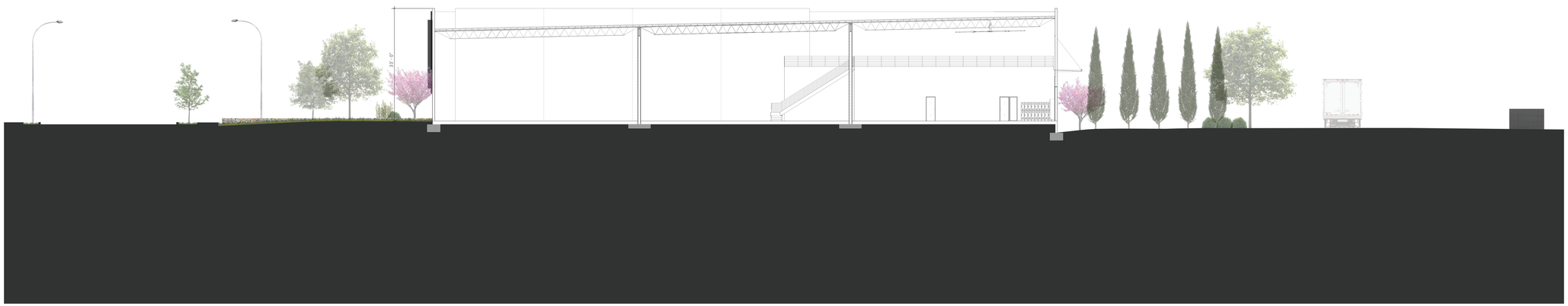
ELEVATIONS | 1/16” = 1’ - 0”

SRG PARTNERSHIP INC

FOUR - S CORPORATION WAREHOUSE

CITY OF TUALATIN - ARCHITECTURAL REVIEW

OCTOBER 22, 2018



EAST/ WEST BUILDING SECTION | 1/16" = 1' - 0"

NORTHEAST CORNER PERSPECTIVE

NORTHWEST CORNER PERSPECTIVE

ADDITIONAL DRAWINGS

SRG PARTNERSHIP INC

FOUR - S CORPORATION WAREHOUSE

CITY OF TUALATIN - ARCHITECTURAL REVIEW

SEPTEMBER 17, 2018

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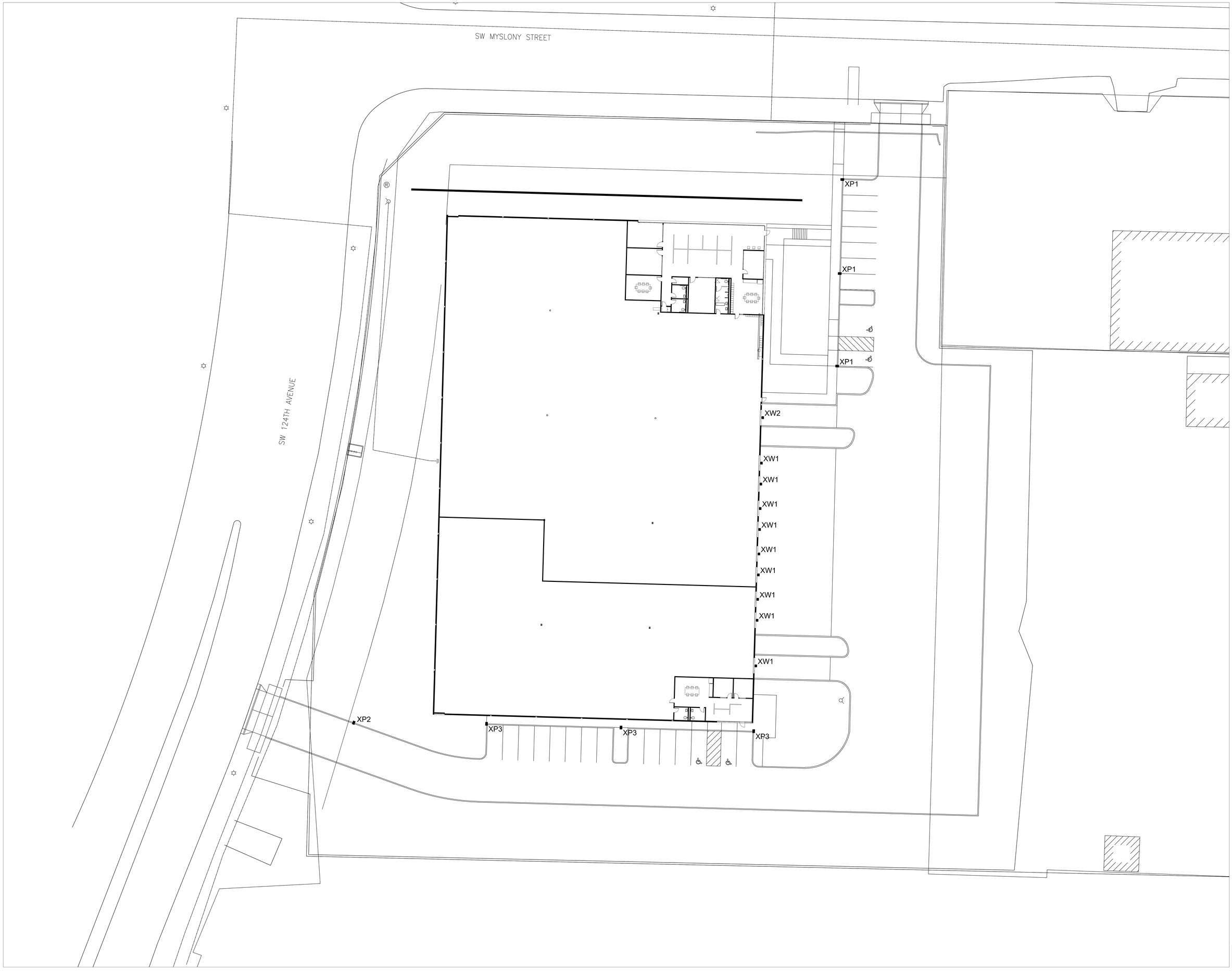

Preliminary Exterior Lighting
Not for Construction

Project Name
Four-S Warehouse
Tualatin, Oregon

Date: 9/12/18

Revision: 0

Scale: 1/16" = 1'

Drawing No.
SL-1

CODE REVIEW BY SECTION

CODE SECTION	REQUIREMENT	CODE REVIEW NARRATIVE
61.010 Purpose	Limits retail sales area Industrial Business Park Overlay Special Commercial Setback	No retail sales area provided TDC Chapter 69 not applicable Not applicable; not a commercial use
61.020 Permitted Uses	(1) All uses permitted by TDC 60.020 and 60.037	Warehousing per TDC 60.020, (34)
61.021 Restrictions on Permitted Uses	"(1) The use must be conducted wholly within a completely enclosed building, except off–street parking and loading, utility facilities, wireless communication facilities, outdoor storage of materials and products directly related to the permitted use"	The primary use will occur within the building. No outdoor storage of materials and products will occur. No retail sales area or other restricted uses apply.
61.040 Prohibited Uses		Permitted use per TDC 61.020, (34)
Section 61.050 Lot Size.	(1) The minimum lot area shall be 20,000 square feet. (2) The minimum lot width shall be 100 feet. (3) The minimum average lot width at the building line shall be 100 feet. (4) The minimum lot width at the street shall be 100 feet.	(1) Lot area = 229,997 SF (2) Minimum lot width = 286 feet (3) Complies (4) Complies
61.060 Setback Requirements	(1) Front yard, 30'min. (2) Side yard, 0–50' (3) Rear yard, 0–50' min (5) Min. parking and circulation area setback is 10' at R.O.W.; no setback required from lot lines within ingress and egress areas shared by abutting properties in accordance with *TDC 73.400(2).* (8) No fence shall be constructed within 10' of R.O.W.	(1) Actual = 39.69' (2) Actual = 58.74 north, 82.9' south (3) Actual = 100.79' (5) Minimum parking and circulation area setback is 10' at east side access drive (8) No fencing proposed
61.080 Structure Height	(1) Maximum height of 60'	(1) Actual height is 33'-0" per building elevations

CODE REVIEW BY SECTION

CODE SECTION	REQUIREMENT	CODE REVIEW NARRATIVE
73.050 Criteria and Standards	(a) The proposed site development, including the site plan, architecture, landscaping, parking and graphic design, is in conformance (b) The proposed design of the development is compatible with the design of other developments in the vicinity (c) The location, design, size, color and materials of the exterior of all structures are compatible with the proposed development and appropriate to the design character of other developments in the vicinity	(a) The proposed development is a one-story warehouse structure consistent with Nortek Air Solutions to the NW, Tufcoat Powder Coating Services to the north, and Tualatin Sleep Products to the NE (b) The vicinity development is mainly comprised of simple, orthogonal structures with flat roofs – new development is consistent with this massing and the use of simple forms (c) The use of tilt-up concrete panels and industrial metal siding is consistent with vicinity construction materials. Tilt-up panel color will be light-colored and neutral, and metal panel color will be gray.
73.150 Objectives	(1)Provide convenient walkways and crosswalks which separate pedestrians from vehicles and link primary building entries to parking areas, other on−site buildings and the public right− of−way (2) Avoid barriers to disabled individuals (3) Locate and design drive− through facilities in a manner which does not conflict with pedestrian routes (4)"Break up parking areas with landscaping…" (5) "Utilize landscaping in parking areas to direct and	(1) Concrete walkways are provided connecting parking areas to building entries at the NE and SE corners. A concrete walkway adjacent to the NE (primary) entrance and parking area extends north to the public sidewalk along Myslony Street (2) ADA-required parking is provided near building entrances and does not require crossing a vehicle area. A 5% max. slope ramp connects the ADA parking at the NE corner to the building entrance as a result of the grade elevation relative to the building floor elevation (3) Not applicable (4) Parking areas comply with TDC landscape requirements, using shade trees, shrubs and groundcover

CODE SECTION	REQUIREMENT	CODE REVIEW NARRATIVE
	control vehicular movement patterns, screen headlights from adjacent properties and streets, and lessen the visual dominance of pavement coverage (6) Provide vehicular connections to adjoining sites (9) Encourage outdoor seating areas (12) Provide safe pathways for pedestrians to move from parking areas to building entrances (17) Provide preferential parking for carpool and vanpools to encourage employees to participate in carpools and vanpools (18) Screen elements such as mechanical and electrical equipment	5) All parking faces building; primary vehicle circulation ingress at south end faces an internal area of the property and existing tree line along south property line; primary vehicle circulation ingress along the east side faces existing tree line. Vehicle circulation egress faces existing public streets 6) Corner lot; development preserves the possibility of vehicular connection to the east 12) See (1) and (2) above 17) Two (2) carpool/vanpool vehicle parking spots provided 18) HVAC package units for office spaces will be located at the roof and set back from parapet for concealment. Trash and recycling dumpsters will be screened with architecturally compatible construction
73.160 Standards	(1) (b)"For Industrial Uses i. a walkway shall be provided from the main entrance to sidewalks in the public right-of-way (c) Curb ramps shall be provided wherever a walkway or accessway crosses a curb	(1) ,(b), 1. A concrete walkway is provided from the NE building entrance (primary) to the public sidewalk along Myslony Street (1), (c) Curb ramps provided opposite accessible parking at the NE and SE corners of the building

CODE SECTION	REQUIREMENT	CODE REVIEW NARRATIVE
	(3) Safety and Security (b) Locate windows and provide lighting in a manner which enables surveillance of interior activity from the public right−of−way (c) Locate, orient and select on−site lighting to facilitate surveillance of on−site activities from the public right−of−way without shining into public rights−of−way or fish and wildlife habitat areas	(3) (b) Parking lots, pedestrian access walkways, and loading apron provided with electric lighting for security purposes (3), (c) On-site lighting will comply with dark-sky requirements and not shine into public right-of-way
73.210 Objectives	(1) Minimize disruption of natural site features such as topography, trees and water features (8) Select colors in consideration of lighting conditions and the context under which the structure is viewed, the ability of the material to absorb, reflect or transmit light and the color's functional role (e.g., to identify and attract business, aesthetic reasons, image−building)	(1) There are no existing water features on-site. Grading at existing trees along south property line has been avoided. Site grading has been minimized to balance cut and fill but maintain a single floor elevation (8) Exterior building colors will be neutral, consistent with other buildings in the vicinity; tilt-up concrete panels will be provided with an elastomeric paint coating for maintainability and a light color consistent with the appearance of concrete
73.220 Standards	(1) Safety and Security (a) Locate, orient and select on−site lighting to facilitate…" (b) Provide an identification system which clearly identifies and locates buildings and their entries (c) Shrubs in parking areas shall not exceed 30 inches in height, and tree canopies must not extend below 8 feet measured from grade	(1) (a) See previous commentary for TDC 73.160(c) regarding on−site lighting (b) Street address signage will be provided per Code through monument signage in site areas; see Landscape Plan for locations (c) See landscape plan for plant material description; trees shall be maintained in compliance

CODE SECTION	REQUIREMENT	CODE REVIEW NARRATIVE
73.227 Standards-for solid waste		
73.240 Landscaping General Provisions	(3) The minimum area requirement for landscaping … MG Planning Districts shall be fifteen (15) percent of the total land area to be developed"	(3) Area to be developed = 3.5 acres = 152,460 SF x .15 = 22,869 SF Proposed: 52,656 SF
	(11) Any required landscaped area shall be designed, constructed, installed and maintained so that within three years the ground shall be covered by living grass or other plant materials…A maximum of 10% of the landscaped area may be covered with un-vegetated areas of bark chips, rock, or stone	(11) See Landscape Plan – configuration and plant materials selected will comply with this subsection; gabion wall features cover approximately 820 SF or 1.6% of the landscaped area
73.250 Tree Preservation	(1) Tree and other plant materials to be retained shall be identified on the landscaping and grading plan	(1) No existing trees in the area to be developed
73.260 Tree and Plant Specifications	(1) Minimum standards for trees and plants, (a) through (e)	(1) Trees include both deciduous and coniferous species (see Landscape Plan) and will comply with this subsection. Evergreen and deciduous shrubs, ground cover, and grass seed mix to also comply. No English Ivy proposed.

CODE SECTION	REQUIREMENT	CODE REVIEW NARRATIVE
73.290 Re-vegetation in Un-landscaped Areas	The purpose of this section is to ensure erosion protection, and in appropriate areas to encourage soil amendment, for those areas not included within the landscape percentage requirements	The entirety of the 3.5 acres of development area will be improved, with either pavement or landscaping at all non-building areas. The remaining portions of the property at the eastern side is preserved for future development
73.310 Landscape Standards - Commercial, Industrial, Public and Semi-Public Uses.	(1) A minimum 5−foot−wide landscaped area must be located along all building perimeters which are viewable by the general public from parking lots or the public right−of−way (3) All areas not occupied by buildings, parking spaces, driveways, drive aisles, pedestrian areas or undisturbed natural areas shall be landscaped	(1) See Landscape Plan; all areas comply (3) See Landscape Plan; proposed development complies
73.340 Off-Street Parking Lot Landscaping Standards	(1) The goals of the off-street parking lot standards are to create shaded areas in parking lots, to reduce glare and heat build-up, provide visual relief within parking areas…	(1) The proposed development incorporates trees, shrubs, and groundcover at parking lot islands and adjoining landscape spaces
73.340 Off-Street Parking Lot and Loading Area	(1) A clear zone shall be provided for the driver at ends of on−site drive aisles and at driveway entrances, vertically between a maximum of 30" and a minimum of 8'−0" measured at ground level (2) Perimeter site landscaping at least 5'−0" in width…	(1) SW ingress/egress is in a grass seed mix area and will be unobstructed; NE ingress/egress location will have low shrubs and groundcover below 30" in height (2) Project complies; see Landscape Plan

CODE SECTION	REQUIREMENT	CODE REVIEW NARRATIVE
73.360 Off-Street Parking Lot Landscape Islands-Industrial	(1) A minimum of 25 square feet per parking stall shall be improved with landscape island areas (2) Landscaped island areas with… trees shall be a minimum of 5 feet in width (3) A minimum of one deciduous shade tree shall be provided for every four (4) parking spaces to lessen the adverse impacts of glare, reduce heat from paved surfaces, and to emphasize circulation patterns. Required shade trees shall be uniformly distributed throughout the parking lot (see TDC 73.380(3)) (4) Landscape islands shall be utilized at aisle ends to protect parked vehicles (5) Required plant material in landscape islands shall achieve 90 percent coverage within three years. Native shrubs and trees are encouraged."	(1) Project complies; see Landscape Plan (2) All landscaped islands comply (3) Project complies; see Landscape Plan – 8 trees provide for 24 stalls (4) Project complies; see Landscape Plan (5) Proposed landscape materials include ground cover and grasses for compliance
	(7) (a) through (g) Deciduous shade trees shall meet the following criteria	See Landscape Plan – all deciduous trees comply with all requirements

CODE SECTION	REQUIREMENT	CODE REVIEW NARRATIVE
73.370 Off-Street Parking and Loading	(1) General Provisions (a) At the time of establishment of a new structure…off-street parking, off-street vanpool and carpool parking spaces…off-street bicycle parking, and off=street loading berths shall be provided… (n) Bicycle parking facilities… long term and short term (o) Bike parking space shall be 6'–0" long, 2'–0" wide with 7'–0" min. overhead clear (p) 5–foot–wide bicycle maneuvering area shall be provided beside (q) Access to bicycle parking shall be provided by an area at least 3 feet in width (u) Bicycle parking areas and facilities shall be identified with appropriate signing as specified in the Manual on Uniform Traffic Control Devices (MUTCD) (v) "Required vanpool and carpool parking shall meet the 9–foot parking stall standards in Figure 73–1 and be identified with appropriate signage	(1) (a) New construction; project complies in all respects (n) Bicycle parking is entirely contained within interior of building (o), (p), (q), (u), (v) - project complies

CODE SECTION	REQUIREMENT	CODE REVIEW NARRATIVE
	(2) Off-Street Parking Provisions (ii) Warehousing Min. Vehicle Parking: 0.3/1,000 Max. Vehicle Parking: 0.5/1,000 Bicycle Parking Requirement: 0.10/1,000 Covered Bicycle Requirement: First 5 (3) Off-Street Vanpool and Carpool Parking Spaces Required: 2	(2) Parking Counts: Min. Vehicle Parking: 24 spaces proposed (16 required) Max. Vehicle Parking: 24 spaces proposed (27 allowed) Bicycle Parking: 6 total Covered Bicycle Parking: 6 (all spaces covered inside building) Proposed Vanpool and Carpool Spaces: 2
73.380 Off Street Parking Lots	(1) Off-street parking lot design shall comply with the dimensional standards set forth in figure 73-1 (2) Parking stalls for sub–compact vehicles shall not exceed 35 percent o parking stalls (3) Parking stalls shall not exceed eight continuous spaces in a row without a landscape separation (4) All parking lot drive aisles shall be constructed of asphalt or concrete (9) Parking bumpers or wheel stops or curbing shall be provided (10) Disability parking spaces and accessibility shall be provided in accordance with applicable federal and state requirements.”	(1) See Landscape Plan; project complies (2) No sub-compact parking spaces are proposed (3) See Landscape Plan; project complies (4) All parking lot drive aisles are constructed of asphalt paving (9) 6” concrete curbs are provided at all parking areas, interrupted only by ADA-required curb ramps (10) Per OSSC, parking lots with 26 to 50 spaces must provide 2 accessible parking spaces, one of which must be van-accessible. One of each proposed – project complies

CODE SECTION	REQUIREMENT	CODE REVIEW NARRATIVE
73.390 Off-Street Loading Facilities	(1) Minimum number of loading berths for 25,000 to 60,000 SF is 2 berths (2) Min. size for Industrial = 12' x 60' and an unobstructed height of 14'	(1) 8 loading docks and 2 loading ramps proposed consistent with warehouse use (2) All loading berths comply with these requirements
Section 73.400 Access	(6) Except as provided in TDC 53.100, all ingress and egress shall connect directly with public streets (8) to afford safe pedestrian access and egress…a sidewalk shall be constructed along all street frontage (12) Min. Access Requirements for 1−250 spaces= 1 access required: 36 feet wide for first 50' from ROW, 24' wide thereafter; no curbs or walkway required	(6) Project complies; ingress/egress along 124th Avenue will be right-in/right-out only due to existing median and safety considerations (8) Existing sidewalks parallel both 124th Avenue and Myslony Street. The sidewalk along 124th Avenue will be repaired in concert with construction of the access, including curb ramps on each side, constructed to match existing adjacent. Similarly, the sidewalk along Myslony Street will be repaired and completed to its intersection with the east property line (12)

CODE REVIEW BY SECTION

CODE SECTION	REQUIREMENT	CODE REVIEW NARRATIVE
Section 73.410 Street Tree Plan	Street trees shall comply with TDC 74.765	Existing street trees are already provided along both 124th Avenue and Myslony Street – no modifications anticipated
Section 74.420 Street Improvements	When an applicant proposes to develop land adjacent to an existing street… the applicant should be responsible for the improvements to the adjacent existing or proposed street that will bring the improvement of the street into conformance with the Transportation Plan (TDC Chapter 11)	124th Avenue is already improved in conformance with the Transportation Plan. The portion of Myslony Street along the subject property frontage conforms with the exception that the width of the paved area and ROW is slightly less than that required under the reclassification of Myslony Street in the Transportation Plan
Section 74.440 Streets, Traffic Study Required	(1) The City Engineer may require a traffic study…	See attached Traffic Study

End of Code Review Narrative

City of Tualatin

www.tualatinoregon.gov

October 19, 2018

CITY ENGINEER'S REVIEW FINDING AND DECISION FOR AR18-04

Contents

I. RECOMMENDATION

Based on the findings presented, the City Engineer approves AR18- with the following conditions:

A. PRIOR TO ISSUANCE OF EROSION CONTROL, PUBLIC WORKS, AND WATER QUALITY PERMITS:

PFR-1 Submit final sanitary sewer plans that show location of the lines, grade, materials, and other details including a clean out at the right-of-way.
PFR-2 Submit final water system plans that show location of the water lines, grade, materials, and other details that include a separate lateral with a valve at the main for domestic and fire water services.
PFR-3 Show a public utility easement surrounding the exterior of the DCVA by 5 feet.
PFR-4 City of Tualatin erosion control permit (EC 1218 1511) has been issued in accordance with code section TMC 3-5-060.
PFR-5 1200CN NPDES Erosion Control Permit has been issued.
PFR-6 Submit final storm drainage calculations.
PFR-7 Submit final plans showing runoff from the site treatment and flow control facilities directed to the existing public storm drainage system in Myslony Street, with a clean out at the right-of-way.
PFR-8 Not used.
PFR-9 Submit plans that meet the requirements of TVF&R.
PFR-10 Submit plans that show the full access driveway onto Myslony to be 36 feet wide at right of way and right in-right out driveway to 124th to be 36 ft. wide at the right of way.
PFR-11 Prove that any existing street light illumination is adequate or construct street lights in accordance with Public Works Construction Code.
PFR-12 Submit plans that are sufficient to obtain a Stormwater Connection Permit Authorization Letter that complies with the submitted Service Provider Letter conditions.
PFR-13 Submit plans that minimize the impact of stormwater from the development to adjacent properties.
PFR-14 Submit plans that show overhead utilities underground.
PFR-15 Submit a plan sheet that includes all City Engineer and Planning Division conditions of approval. Include Clean Water Services' Service Provider Letter.
PFR-16 Submit PDFs of final site and permit plans.

B. PRIOR TO ISSUANCE OF A BUILDING PERMIT:

PFR-17 Obtain an Erosion Control, Public Works, and Water Quality Permit from the City of Tualatin.
PFR-18 Complete all the public improvements, shown on submitted plans and corrected by conditions of approval, and have them accepted by the City or provide financial assurance.

C. PRIOR TO ISSUANCE OF A CERTIFICATE OF OCCUPANCY:

PFR-19 Construct all private and public improvements shown on submitted plans and corrected by conditions of approval.

PFR-20 Record the public utility easement including surrounding the exterior of the DCVA by 5 feet.

II. APPEAL

Requests for review of this decision must be received by the Engineering Division within the 14-day appeal period ending on **xx, 2018 at 5 PM**. Issues must have been described with adequate clarity and detail with identification of the associated Tualatin Municipal or Development Code section to afford a decision maker an opportunity to respond to the issue. A request for review must be submitted on the form provided by the City, as detailed in TDC 36.161, and signed by the appellant.

III. STANDARDS AND APPLICABLE CRITERIA

Tualatin Municipal Code (TMC)
Title 03: Utilities and Water Quality
Title 04: Building

Tualatin Development Code (TDC)
Chapter 73: Community Design Standards
Chapter 74: Public Improvement Requirements
Chapter 75: Access Management

IV. CONCLUSIONS

A. TMC TITLE 03: UTILITIES AND WATER QUALITY

I. TMC CHAPTER 03-02: SEWER REGULATIONS; RATES

1. TMC 3-2-020 APPLICATION, PERMIT AND INSPECTION PROCEDURE.

(1) No person shall connect to any part of the sanitary sewer system without first making an application and securing a permit from the City for such connection, nor may any person substantially increase the flow, or alter the character of sewage, without first obtaining an additional permit and paying such charges therefore as may be fixed by the City, including such charges as inspection charges, connection charges and monthly service charges.

FINDINGS:
As shown on Sheet C4.1, this project is proposing a six-inch sanitary sewer connection to an existing public sanitary lateral at SW 124th, near the southwest corner of the site. A clean out will be installed at the right of way. Sanitary sewer line designs will be in conformance with the Public Works Construction Code and the current international plumbing code.

This criterion is satisfied with conditions of approval PFR-1, PFR-17, and PFR-19.

2. TMC 3-2-030 MATERIALS AND MANNER OF CONSTRUCTION.

(1) All building sewers, side sewers and connections to the main sewer shall be so constructed as to conform to the requirements of the Oregon State Plumbing Laws and rules and regulations and specifications for sewerage construction of the City.

FINDINGS:
As shown on Sheet C4.1, this project is proposing a six-inch sanitary sewer connection to an existing public sanitary lateral at SW 124th, near the southwest corner of the site. A clean out will be installed at the right of way. Sanitary sewer line designs will be in conformance with the Public Works Construction Code and the current international plumbing code.

This criterion is satisfied with conditions of approval PFR-1, PFR-17, and PFR-19.

(3) A public works permit must be secured from the City and other agency having jurisdiction by owners or contractors intending to excavate in a public street for the purpose of installing sewers or making sewer connections.

FINDINGS:
As shown on Sheet C4.1, this project is proposing a six-inch sanitary sewer connection to an existing public sanitary lateral at SW 124th, near the southwest corner of the site. A clean out will be installed at the right of way. Sanitary sewer line designs will be in conformance with the Public Works Construction Code and the current international plumbing code.

This criterion is satisfied with conditions of approval PFR-1, PFR-17, and PFR-19.

II. TMC CHAPTER 03-03: WATER SERVICE

1. TMC 3-3-040 SEPARATE SERVICES REQUIRED.

(1) Except as authorized by the City Engineer, a separate service and meter to supply regular water service or fire protection service shall be required for each building, residential unit or structure served. For the purposes of this section, trailer parks and multi-family residences of more than four dwelling units shall constitute a single unit unless the City Engineer determines that separate services are required.

FINDING:
As shown on Sheet C4, this application is proposing a fire service connection to an existing 8-inch public fire service lateral at the SW 124th frontage and a domestic water connection at the existing public water main in SW Myslony Street. Water line designs will be in conformance with the Public Works Construction Code.

The plans include a valve at the connection to the public main for domestic service. A valve already exists for the fire service.

The applicant will submit water system plans that show location and other details prior to obtaining a Building Permit. A public works construction permit for the domestic and fire connections will be obtained. The applicant has not applied for a public works permit for these improvements. The applicant will need to submit water system plans that show

location of the water lines, grade, materials, and other details prior to obtaining a public works permit.

This criterion is satisfied with conditions of approval PFR-2, PFR-3, PFR-15, and PFR-16.

2. TMC 3-3-110 CONSTRUCTION STANDARDS.

All water line construction and installation of services and equipment shall be in conformance with the City of Tualatin Public Works Construction Code. In addition, whenever a property owner extends a water line, which upon completion, is intended to be dedicated to the City as part of the public water system, said extension shall be carried to the opposite property line or to such other point as determined by the City Engineer. Water line size shall be determined by the City Engineer in accordance with the City's Development Code or implementing ordinances and the Public Works Construction Code.

FINDING:
As shown on Sheet C4, this application is proposing a fire service connection to an existing 8-inch public fire service lateral at the SW 124th frontage and a domestic water connection at the existing public water main in SW Myslony Street. Water line designs will be in conformance with the Public Works Construction Code.

The plans include a valve at the connection to the public main for domestic service. A valve already exists for the fire service.

The applicant will submit water system plans that show location and other details prior to obtaining a Building Permit. A public works construction permit for the domestic and fire connections will be obtained. The applicant has not applied for a public works permit for these improvements. The applicant will need to submit water system plans that show location of the water lines, grade, materials, and other details prior to obtaining a public works permit.

This criterion is satisfied with conditions of approval PFR-2, PFR-3, PFR-15, and PFR-16.

3. TMC 3-3-120 BACKFLOW PREVENTION DEVICES AND CROSS CONNECTIONS.

(1) Except where this ordinance provides more stringent requirements, the definitions, standards, requirements and regulations set forth in the Oregon Administrative Rules pertaining to public water supply systems and specifically OAR 333 Division 61 in effect on the date this ordinance becomes effective are hereby adopted and incorporated by reference.

(2) The owner of property to which City water is furnished for human consumption shall install in accordance with City standards an appropriate backflow prevention device on the premises where any of the following circumstances exist:

(a) Those circumstances identified in regulations adopted under subsection (1) of this section;
(b) Where there is a fire protection service, an irrigation service or a nonresidential service connection which is two inches (2") or larger in size;
(c) Where the potable water supply provided inside a structure is 32 feet or more, higher than the elevation of the water main at the point of service connection;

FINDING:
The proposed water laterals will connect to the City's existing public water mains within SW 124th and SW Myslony. Sheet C4 shows a fire service backflow prevention DCDV and vault within a public utility easement adjacent to the SW 124th right-of-way. The domestic service includes a reduced pressure backflow preventer after the water meter at the right-of-way. The applicant will provide final plans and install these backflow preventers. The public utility easement will surround the DCDV by 5 feet.

This criterion is satisfied with conditions of approval PFR-2, PFR-3, PFR-15, and PFR-16.

(4) Except as otherwise provided in this subsection, all irrigation systems shall be installed with a double check valve assembly. Irrigation system backflow prevention device assemblies installed before the effective date of this ordinance, which were approved at the time they were installed but are not on the current list of approved device assemblies maintained by the Oregon State Health Division, shall be permitted to remain in service provided they are properly maintained, are commensurate with the degree of hazard, are tested at least annually, and perform satisfactorily. When devices of this type are moved, or require more than minimum maintenance, they shall be replaced by device assemblies which are on the Health Division list of approved device assemblies.

FINDING:
The proposed water laterals will connect to the City's existing public water mains within SW 124th and SW Myslony. Sheet C4 shows a fire service backflow prevention DCDV and vault within a public utility easement adjacent to the SW 124th right-of-way. The domestic service includes a reduced pressure backflow preventer after the water meter at the right-of-way. The applicant will provide final plans and install these backflow preventers. The public utility easement will surround the DCDV by 5 feet.

This criterion is satisfied with conditions of approval PFR-2, PFR-3, PFR-15, and PFR-16.

4. TMC 3-3-130 CONTROL VALVES.

The customer shall install a suitable valve, as close to the meter location as practical, the operation of which will control the entire water supply from the service. The operation by the customer of the curb stop in the meter box is prohibited.

FINDING:
As shown on Sheet C4, this application is proposing a fire service connection and a domestic water service that will connect with the existing public water mains in SW 124th (fire) and SW Myslony (domestic water). Water line designs will be in conformance with the Public Works Construction Code.

The applicant will submit water system plans that show location and other details prior to obtaining a Building Permit. A public works construction permit for the domestic and fire connections will be obtained. The applicant has not applied for a public works permit for these improvements. The applicant will need to submit water system plans that show location of the water lines, grade, materials, and other details prior to obtaining a public works permit.

This criterion is satisfied with conditions of approval PFR-2, PFR-3, PFR-15, and PFR-16.

III. TMC 3-5 ADDITIONAL SURFACE WATER MANAGEMENT STANDARDS

1. TMC 3-5-010 POLICY.

It is the policy of the City to require temporary and permanent measures for all construction projects to lessen the adverse effects of construction on the environment. The contractor shall properly install, operate and maintain both temporary and permanent works as provided in this chapter or in an approved plan, to protect the environment during the term of the project. In addition, these erosion control rules apply to all properties within the City, regardless of whether that property is involved in a construction or development activity. Nothing in this chapter shall relieve any person from the obligation to comply with the regulations or permits of any federal, state, or local authority…

2. TMC 3-5-050 EROSION CONTROL PERMITS.

(1) Except as noted in subsection (3) of this section, no person shall cause any change to improved or unimproved real property that causes, will cause, or is likely to cause a temporary or permanent increase in the rate of soil erosion from the site without first obtaining a permit from the City and paying prescribed fees…

3. TMC 3-5-060 PERMIT PROCESS.

(1) Applications for an Erosion Control Permit. Application for an Erosion Control Permit shall include an Erosion Control Plan which contains methods and interim facilities to be constructed or used concurrently and to be operated during construction to control erosion. The plan shall include either:

(a) A site specific plan outlining the protection techniques to control soil erosion and sediment transport from the site to less than one ton per acre per year as calculated using the Soil Conservation Service Universal Soil Loss Equation or other equivalent method approved by the City Engineer, or

(b) Techniques and methods contained and prescribed in the Soil Erosion Control Matrix and Methods, outlined in TMC 3-5.190 or the Erosion Control Plans - Technical Guidance Handbook, City of Portland and Unified Sewerage Agency, January, 1991.

(2) Site Plan. A site specific plan, pre-pared by an Oregon registered professional engineer, shall be required when the site meets any of the following criteria:

(a) greater than five acres;

(b) greater than one acre and has slopes greater than 20 percent;

(c) contains or is within 100 feet of a City-identified wetland or a waterway identified on FEMA floodplain maps; or

(d) greater than one acre and contains highly erodible soils.

FINDING:
The application materials indicate disturbance area of 3.75 acres. The applicant has obtained a 1200CN Construction Erosion Control permit from Clean Water Services as agent for Oregon DEQ and has obtained a grading (EXGR 18 1508) and erosion control permit (EC 1218 1511) from the City of Tualatin as required prior to issuance of permits allowing construction activities.

This criterion is satisfied with conditions of approval PFR-4 and PFR-5.

4. TMC 3-5-200 DOWNSTREAM PROTECTION REQUIREMENT.

Each new development is responsible for mitigating the impacts of that development upon the public storm water quantity system. The development may satisfy this requirement through the use of any of the following techniques, subject to the limitations and requirements in TMC 3-5-210: Construction of permanent on-site stormwater quantity detention facilities designed in accordance with this title;…

5. TMC 3-5-210 REVIEW OF DOWNSTREAM SYSTEM.

For new development other than the construction of a single family house or duplex, plans shall document review by the design engineer of the downstream capacity of any existing storm drainage facilities impacted by the proposed development. That review shall extend downstream to a point where the impacts to the water surface elevation from the development will be insignificant, or to a point where the conveyance system has adequate capacity, as determined by the City Engineer. To determine the point at which the downstream impacts are insignificant or the drainage system has adequate capacity, the design engineer shall submit an analysis using the following guidelines:

(1) evaluate the downstream drainage system for at least ¼ mile;
(2) evaluate the downstream drainage system to a point at which the runoff from the development in a build out condition is less than 10 percent of the total runoff of the basin in its current development status. Developments in the basin that have been approved may be considered in place and their conditions of approval to exist if the work has started on those projects;
(3) evaluate the downstream drainage system throughout the following range of storms: 2, 5, 10, 25 year;
(4) The City Engineer may modify items 1, 2, 3 to require additional information to determine the impacts of the development or to delete the provision of unnecessary information.

FINDING:
The drainage analysis provided by TM Rippey Consulting Engineers, determined that there is not a downstream drainage capacity deficiency. Plans show provision for on-site detention using a pond with outflow limited by a series of orifi installed within a control manhole. Sizing is detailed in the submitted drainage analysis, which conforms to current Clean Water Services Resolution and Order 17-05.

This criterion is satisfied.

6. TMC 3-5-220 CRITERIA FOR REQUIRING ON-SITE DETENTION TO BE CONSTRUCTED.

The City shall determine whether the onsite facility shall be constructed. If the onsite facility is constructed, the development shall be eligible for a credit against Storm and Surface Water System Development Charges, as provided in City ordinance. On-site facilities shall be constructed when any of the following conditions exist:
(1) There is an identified downstream deficiency, as defined in TMC 3-5-210, and detention rather than conveyance system enlargement is determined to be the more effective solution…

FINDING:
The drainage analysis provided by TM Rippey Consulting Engineers, determined that there is not a downstream drainage capacity deficiency. Plans show provision for on-site detention using a pond with outflow limited by a series of orifi installed within a control manhole. Sizing is detailed in the submitted drainage analysis, which conforms to current Clean Water Services Resolution and Order 17-05.

This criterion is satisfied.

IV. TMC 3-5 PERMANENT ON-SITE WATER QUALITY FACILITIES

1. TMC 3-5-280 PLACEMENT OF WATER QUALITY FACILITIES.

Title III specifies that certain properties shall install water quality facilities for the purpose of removing phosphorous. No such water quality facilities shall be constructed within the defined area of existing or created wetlands unless a mitigation action, approved by the City, is constructed to replace the area used for the water quality facility.

FINDING:
The site's proposed water quality facilities are not located in wetlands or associated buffers.

This criterion is met.

2. TMC 3-5-290 PURPOSE OF TITLE.

The purpose of this title is to require new development and other activities which create impervious surfaces to construct or fund on-site or off-site permanent water quality facilities to reduce the amount of phosphorous entering the storm and surface water system.

FINDING:
The site's proposed water quality facility is designed in conformance with Clean Water Services Resolution and Order 17-05.

This criterion is met.

3. TMC 3-5-300 APPLICATION OF TITLE.

Title III of this Chapter shall apply to all activities which create new or additional impervious surfaces, except as provided in TMC 3-5.310.

FINDING:
The site's proposed water quality facilities, shown on sheet C 3, are designed in conformance with Clean Water Services Resolution and Order 17-05.

This criterion is met.

4. TMC 3-5-310 EXCEPTIONS.

(1) Those developments with application dates prior to July 1, 1990, are exempt from the requirements of Title III.
The application date shall be defined as the date on which a complete application for development approval is accepted by the City in accordance with City regulations.

(2) Construction of one and two family (duplex) dwellings are exempt from the requirements of Title III.

(3) Sewer lines, water lines, utilities or other land development that will not directly increase the amount of storm water run-off or pollution leaving the site once construction has been completed and the site is either restored to or not altered from its approximate original condition are exempt from the requirements of Title III.

FINDING:
No exceptions are requested.

This criterion is met.

5. TMC 3-5-320 DEFINITIONS.

(1) "Stormwater Quality Control Facility" refers to any structure or drainage way that is designed, constructed and maintained to collect and filter, retain, or detain surface water run-off during and after a storm event for the purpose of water quality improvement. It may also include, but is not limited to, existing features such as constructed wetlands, water quality swales, low impact development approaches ("LIDA"), and ponds which are maintained as stormwater quality control facilities.

(2) "Low impact development approaches" or "LIDA: means stormwater facilities constructed utilizing low impact development approaches used to temporarily store, route or filter run-off for the purpose of improving water quality. Examples include; but are not limited to, Porous Pavement, Green Roofs, Infiltration Planters/Rain Gardens, Flow-Through Planters, LIDA Swales, Vegetated Filter Strips, Vegetated Swales, Extended Dry Basins, Constructed Water Quality Wetland, Conveyance and Stormwater Art, and Planting Design and Habitats.

(3) "Water Quality Swale" means a vegetated natural depression, wide shallow ditch, or constructed facility used to temporarily store, route or filter run-off for the purpose of improving water quality.

(4) "Existing Wetlands" means those areas identified and delineated as set forth in the Federal Manual for Identifying the Delineating Jurisdictional Wetlands, January, 1989, or as amended, by a qualified wetlands specialist.

(5) "Created Wetlands" means those wetlands developed in an area previously identified as a non-wetland to replace, or mitigate wetland destruction or displacement.

(6) "Constructed Wetlands" means those wetlands developed as a water quality or quantity facility, subject to change and maintenance as such. These areas must be clearly defined and/or separated from existing or created wetlands. This separation shall preclude a free and open connection to such other wetlands.

6. TMC 3-5-330 PERMIT REQUIRED.

Except as provided in TMC 3-5-310, no person shall cause any change to improved or unimproved real property that will, or is likely to, increase the rate or quantity of run-off or pollution from the site without first obtaining a permit from the City and following the conditions of the permit.

FINDING:
The applicant is required to obtain a permit from the City of Tualatin to install an approved runoff flow control and treatment facility on the subject site.

This criterion is met.

7. TMC 3-5-340 FACILITIES REQUIRED.

For new development, subject to the exemptions of TMC 3-5-310, no permit for construction, or land development, or plat or site plan shall be approved unless the conditions of the plat, plan or permit approval require permanent stormwater quality control facilities in accordance with this Title III.

FINDING:
The applicant is required to obtain a permit from the City of Tualatin to install an approved runoff flow control and treatment facility on the subject site.

This criterion is met.

8. TMC 3-5-345 INSPECTION REPORTS.

The property owner or person in control of the property shall submit inspection reports annually to the City for the purpose of ensuring maintenance activities occur according to the operation and maintenance plan submitted for an approved permit or architectural review.

FINDING:
The submitted drainage analysis includes a maintenance and operation section outlining the maintenance requirements in conformance with Clean Water Services Resolution and Order 17-05.

This criterion is met.

9. TMC 3-5-350 PHOSPHOROUS REMOVAL STANDARD.

The stormwater quality control facilities shall be designed to remove 65 percent of the phosphorous from the runoff from 100 percent of the newly constructed impervious surfaces. Impervious surfaces shall include pavement, buildings, public and private roadways, and all other surfaces with similar runoff characteristics.

FINDING:
The site's proposed water quality facilities, shown on sheet C 3, are designed in conformance with Clean Water Services Resolution and Order 17-05.

This criterion is met.

10. TMC 3-5-360 DESIGN STORM.

The stormwater quality control facilities shall be designed to meet the removal efficiency of TMC 3-5-350 for a mean summertime storm event totaling 0.36 inches of precipitation falling in four hours with an average return period of 96 hours.

FINDING:
The site's proposed water quality facilities, shown on sheet C 3, are designed in conformance with Clean Water Services Resolution and Order 17-05, which includes the listed summer rainfall event.

This criterion is met.

11. TMC 3-5-370 DESIGN REQUIREMENTS.

The removal efficiency in TDC Chapter 35 specifies only the design requirements and are not intended as a basis for performance evaluation or compliance determination of the stormwater quality control facility installed or constructed pursuant to this Title III.

FINDING:
This is information.

This criterion is met.

12. TMC 3-5-390 FACILITY PERMIT APPROVAL.

A stormwater quality control facility permit shall be approved only if the following are met:

(1) The plat, site plan, or permit application includes plans and a certification prepared by an Oregon registered, professional engineer that the proposed stormwater quality control facilities have been designed in accordance with criteria expected to achieve removal efficiencies for total phosphorous required by this Title III. Clean Water Services Design and Construction Standards shall be used in preparing the plan for the water quality facility; and

(2) The plat, site plan, or permit application shall be consistent with the areas used to determine the removal required in TMC 3-5-350; and

(3) A financial assurance, or equivalent security acceptable to the City, is provided by the applicant which assures that the stormwater quality control facilities are constructed according to the plans established in the plat, site plan, or permit approval. The financial assurance may be combined with our financial assurance requirements imposed by the City; and

(4) A stormwater facility agreement identifies who will be responsible for assuring the long term compliance with the operation and maintenance plan.

FINDING:
Plans and storm drainage analysis prepared by TM Rippey Consulting Engineers and submitted with the application have been prepared and sealed by a registered professional civil engineer, licensed in the State of Oregon. Plans and analysis conform to Clean Water Services Resolution and Order 17-05.

The applicant is required to obtain a permit from the City of Tualatin to install the approved runoff flow control and treatment facilities on the subject site, provide a maintenance assurance and agreement, and provide a maintenance and operation plan.

This criterion is satisfied with conditions of approval PFR-6 and PFR-7.

B. CHAPTER 04-02: FIRE HYDRANT LOCATIONS AND RATES OF FLOW

I. TMC 4-2-010 HYDRANTS AND WATER SUPPLY FOR FIRE PROTECTION.

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

(2) If adequate provisions for such facilities are not made, the Fire and Life Safety Reviewer shall either recommend against approval of the plans or indicate to

the applicant in writing where the plans are deficient or recommend approval of plans subject to conditions.

FINDING:
Sheets C 4 and 4.1 show existing public fire hydrants at both the Myslony and 124th frontages. The plans also a new private fire hydrant SE of the proposed building.

Plans shall be provided to TVF&R for review and comment. The applicant is required to comply with their requirements.

This criterion is satisfied with conditions of approval PFR-9.

C. TDC CHAPTER 73: COMMUNITY DESIGN STANDARDS

I. TDC SECTION 73.270 GRADING.

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

FINDING:
All areas receiving landscape plant material will be provided with soil amendments according to final specifications.

This criterion is satisfied with conditions of approval PFR-4 and PFR-5.

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

FINDING:
Plan sheets C 2 and 2.1 shows proposed planting areas sloping away from the building and direct runoff to the proposed storm drainage systems.

This criterion is satisfied with conditions of approval PFR-4 and PFR-5.

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

FINDING:
Proposed landscaping will be bounded by curbs or the paved on-site pedestrian network so as to ensure that landscape materials will not wash across roadways or walkways.

This criterion is satisfied with conditions of approval PFR-4 and PFR-5.

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

FINDING:
As shown on sheets C3 and 3.1, storm sewer catch basins are proposed at strategic locations to capture and redirect surface drainage from parking, maneuvering, and walk areas.

This criterion is satisfied with conditions of approval PFR-4 and PFR-5.

II. TDC SECTION 73.400 ACCESS.

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

FINDINGS:
This project is proposing a public driveway that will connect to SW Myslony Street and a second driveway connecting to SW 124th Street. The driveway to SW Myslony Street will be full movement and the driveway to SW 124th will be right in-right out movements only.

Lancaster Engineering Transportation Impact Study, dated 8.28.18, pages 12 to 13 states that the minimum required site distance criteria is met at the proposed SW Myslony Street site access relative to the intersection of SW Myslony Street with SW 124th Avenue. Lancaster Engineering's findings regarding the right-in, right-out access along SW 124th Avenue is "Given that the measured intersection sight distance is greater than the minimum required stopping sight distance, the access is expected to operate safely, granted occasional delays may occur along the northbound approach of SW 124th Avenue".

This criterion is met.

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

FINDINGS:
This project is proposing a public driveway that will connect to SW Myslony Street and a second driveway connecting to SW 124th Street. The driveway to SW Myslony Street will be full movement and the driveway to SW 124th will be right in-right out movements only.

This criterion is met.

(8) To afford safe pedestrian access and egress for properties within the City, a sidewalk shall be constructed along all street frontage, prior to use or occupancy of the building or structure proposed for said property. The sidewalks required by this section shall be constructed to City standards, except in the case of streets with inadequate right-of-way width or where the final street design and grade have not been established, in which case the sidewalks shall be constructed to a design and in a manner approved by the City Engineer. Sidewalks approved by the City Engineer may include temporary sidewalks and sidewalks constructed on private property; provided, however, that such sidewalks shall provide continuity with sidewalks of adjoining commercial developments existing or proposed. When a sidewalk is to adjoin a future street improvement, the sidewalk construction shall include construction of the curb and gutter section to grades and alignment established by the City Engineer.

FINDINGS:
Public sidewalks exist at both project frontages and will remain.

This criterion is met.

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

FINDINGS:
Lancaster Engineering Transportation Impact Study, dated 8.28.18, page 1 states:

- Trip generation of the proposed facility is 37 in morning peak hour and 33 in evening peak hour, both very small increases
- No significant trends or crash patterns were identified at the intersection of SW Myslony Street with SW 124th Avenue
- Upon removal or proper maintenance of any obstructing onsite foliage, adequate sight distance can be made available at the proposed site access intersections to ensure safe operation along SW Myslony Street and SW 124th Avenue
- The intersection of SW Myslony Street at SW 124th Avenue, under two-way stop control, is projected to operate at LOS F during the evening peak hour under year 2020 buildout conditions. However, upon installation of a planned traffic signal, the intersection is projected to operate at LOS B for all future year analysis scenarios. All other study intersections are currently operating acceptably per City of Tualatin standards and are projected to continue operating acceptably upon buildout of the proposed development through year 2020. No other operational mitigation is necessary or recommended.

This criterion is met.

Is section 12 needed for Industrial rather than 11?

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

In the Central Design District, when driveway access is on local streets, not collectors or arterials and the building(s) on the property is(are) less than 5,000 square feet in gross floor area, or parking is the only use on the property, ingress and egress shall not be less than 24 feet. In all other cases, ingress and egress for commercial uses shall not be less than the following:

Required Parking Spaces	Minimum Number Required	Minimum Pavement Width	Minimum Pavement Walkways, Etc.
1-99	1	32 feet for first 50 feet from ROW, 24' thereafter	Curbs required; walkway 1 side only
100-249	2	32 feet for first 50 feet from ROW, 24' thereafter	Curbs required; walkway 1 side only
Over 250	As required by City Engineer	As required by City Engineer	As required by City Engineer

FINDINGS:

The project does not meet the criteria for 24-foot wide access drives; 36 feet in width is used instead. A walkway is provided on the west side of the NE access drive.

This criterion is satisfied with conditions of approval PFR-10.

(14) Maximum Driveway Widths and Other Requirements.

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

FINDINGS:

This project is proposing a 36 ft. wide public driveway that will connect to SW Myslony Street and a second 36 ft. wide public driveway connecting to SW 124th Street. The driveway to SW Myslony Street will be full movement and the driveway to SW 124th will be right in-right out movements only.

This criterion is met.

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

FINDINGS:

As shown on the site plan, the driveway to Myslony Street is 5 ft. west of the east property line. The driveway to 124th is 45 ft. north of the south property line.

This criterion is met.

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

FINDINGS:
The two proposed driveways are on separate streets.

This criterion is met.

(15) Distance between Driveways and Intersections
Except for single-family dwellings, the minimum distance between driveways and intersections shall be as provided below. Distances listed shall be measured from the stop bar at the intersection.
(a) At the intersection of collector or arterial streets, driveways shall be located a minimum of 150 feet from the intersection.

FINDINGS:
Per Lancaster Engineering Transportation Impact Study, page 12 to 13, proposed separations of 286 feet along SW Myslony Street and 382 feet along SW 124th both exceed the 150-foot requirement.

This criterion is met.
This section isn't needed as there are no nearby classified local streets Figure 11-1: Functional Classification and Traffic Signal Plan.
~~**(b) At the intersection of two local streets, driveways shall be located a minimum of 30 feet from the intersection.**~~

~~**FINDINGS:**~~
~~Both driveways are located more than 30 ft. from the intersection of SW Myslony and 124th. No other intersections are proximate to the site.~~

~~This criterion is met.~~

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

FINDINGS:

This project is not requesting approval of a driveway located within 150 feet from the intersection of a collector or arterial street; therefore, this standard does not apply.

This criterion is met.

(16) Vision Clearance Area.

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

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

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

FINDINGS:

Landscape plant material or any other visual obstructions will be avoided and maintained in compliance with this statute.

This criterion is satisfied with conditions of approval PFR-17, PFR-18, and PFR-19.

D. TDC CHAPTER 74: PUBLIC IMPROVEMENT REQUIREMENTS

I. TDC SECTION 74.120 PUBLIC IMPROVEMENTS.

(1) Except as specially provided, all public improvements shall be installed at the expense of the applicant. All public improvements installed by the applicant shall be constructed and guaranteed as to workmanship and material as required by the Public Works Construction Code prior to acceptance by the City. No work shall be undertaken on any public improvement until after the construction plans have been approved by the City Engineer and a Public Works Permit issued and the required fees paid.

FINDINGS:

All public improvements proposed as part of this project (driveways, water, storm, and sanitary sewer connections) will be installed by the applicant in accordance with the Public Works Construction Code.

This criterion is satisfied with conditions of approval PFR-17, PFR-18, and PFR-19.

II. TDC SECTION 74.130 PRIVATE IMPROVEMENTS.

All private improvements shall be installed at the expense of the applicant. The property owner shall retain maintenance responsibilities over all private improvements.

FINDINGS:
The applicant will be responsible for proposed utility facilities located within the subject property.

This criterion is satisfied with conditions of approval PFR-19.

III. TDC SECTION 74.140 CONSTRUCTION TIMING.

(1) All the public improvements required under this chapter shall be completed and accepted by the City prior to the issuance of a Certificate of Occupancy; or, for subdivision and partition applications, in accordance with the requirements of the Subdivision regulations.

(2) All private improvements required under this chapter shall be approved by the City prior to the issuance of a Certificate of Occupancy; or for subdivision and partition applications, in accordance with the requirements of the Subdivision regulations.

FINDINGS:
All public and private improvements required under TDC Chapter 74 will be complete prior to receiving a Certificate of Occupancy.

This criterion is satisfied with conditions of approval PFR-19.

IV. TDC SECTION 74.210 MINIMUM STREET RIGHT-OF-WAY WIDTHS.

The width of streets in feet shall not be less than the width required to accommodate a street improvement needed to mitigate the impact of a proposed development. In cases where a street is required to be improved according to the standards of the TDC, the width of the right-of-way shall not be less than the minimums indicated in TDC Chapter 74, Public Improvement Requirements, Figures 74-2A through 74-2G.

(2) For development applications other than subdivisions and partitions, wherever existing or future streets adjacent to property proposed for development are of inadequate right-of-way width, the additional right-of-way necessary to comply with TDC Chapter 74, Public Improvement Requirements, Figures 74-2A through 74-2G of the Tualatin Community Plan shall be dedicated to the City for use by the public prior to issuance of any building permit for the proposed development. This right-of-way dedication shall be for the full width of the property abutting the roadway and, if required by the City Engineer, additional dedications shall be provided for slope and utility easements if deemed necessary.

FINDINGS:
Per agreement with the City Engineer, SW Myslony Street R.O.W. and pavement section will not be modified and the existing R.O.W. and 72-foot width shall remain.

This criterion is satisfied.

(3) For development applications that will impact existing streets not adjacent to the applicant's property, and to construct necessary street improvements to mitigate those impacts would require additional right-of-way, the applicant shall be responsible for obtaining the necessary right-of-way from the property owner. A right-of-way dedication deed form shall be obtained from the City Engineer and upon completion returned to the City Engineer for acceptance by the City. On subdivision and partition plats the right-of-way dedication shall be accepted by the City prior to acceptance of the final plat by the City. On other development applications the right-of-way dedication shall be accepted by the City prior to issuance of building permits. The City may elect to exercise eminent domain and condemn necessary off-site right-of-way at the applicant's request and expense. The City Council shall determine when condemnation proceedings are to be used.

FINDINGS:
This section does not apply to the subject development.

This criterion is satisfied.

V. TDC SECTION 74.330 UTILITY EASEMENTS.

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

FINDINGS:
This project is proposing a public utility easement along the frontages and to surround the DCVA by 5 feet.

This criterion is satisfied with conditions of approval PFR-3 and PFR-20.

(4) For development applications other than subdivisions and partitions, and for both on-site and off-site easement areas, a utility easement shall be granted to the City; building permits shall not be issued for the development prior to acceptance of the easement by the City. The City may elect to exercise eminent domain and condemn necessary off-site public utility easements at the applicant's request and expense. The City Council shall determine when condemnation proceedings are to be used.

FINDINGS:
This project is proposing a public utility easement along the frontages and to surround the DCVA by 5 feet.

This criterion is satisfied with conditions of approval PFR-3 and PFR-20.

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

FINDINGS:
This project is proposing a public utility easement along the frontages and to surround the DCVA by 5 feet.

This criterion is satisfied with conditions of approval PFR-3 and PFR-20.

VI. TDC SECTION 74.420 STREET IMPROVEMENTS.

When an applicant proposes to develop land adjacent to an existing or proposed street, including land which has been excluded under TDC 74.220, the applicant should be responsible for the improvements to the adjacent existing or proposed street that will bring the improvement of the street into conformance with the Transportation Plan (TDC Chapter 11), TDC 74.425 (Street Design Standards), and the City's Public Works Construction Code, subject to the following provisions:

(1) For any development proposed within the City, roadway facilities within the right-of-way described in TDC 74.210 shall be improved to standards as set out in the Public Works Construction Code.

FINDINGS:
The only modifications within the right-of-way are vehicular access points as indicated in the civil drawings and landscape improvements. These modifications will be constructed in accordance with TDC 74.425. The curbside planting strip along SW Myslony Street will be refurbished to match City standards.

Pole lighting along SW 124th Avenue and SW Myslony Street meets TDC requirements; no modification of the street and sidewalk lighting is proposed under this development.

(2) The required improvements may include the rebuilding or the reconstruction of any existing facilities located within the right-of-way adjacent to the proposed development to bring the facilities into compliance with the Public Works Construction Code.

No modifications to the existing street and sidewalk construction is necessary for compliance. Reconstruction work is limited to the areas covered in 74.420 (1) above.

FINDINGS:
I recently saw a sidewalk survey of Tualatin that indicated that the sidewalks on Myslony may not meet ADA slope requirements. Please take a look so your team is prepared as we will require sidewalks that are out of compliance to be improved.

Perlo Construction has cleared the existing sidewalk along SW Myslony Street of blackberries and other impediments and determined that cross-slopes do not exceed the 2% mandated by the American with Disabilities Act. See attached letter from Perlo Construction.

(3) The required improvements may include the construction or rebuilding of off-site improvements which are identified to mitigate the impact of the development.

FINDINGS:

Lancaster Engineering Transportation Impact Study, dated 8.28.18, page 1 notes the existing condition at the intersection of SW 124th Avenue and SW Myslony Street, which is to be mitigated by the City's improvement of the intersection:

- The intersection of SW Myslony Street at SW 124th Avenue, under two-way stop control, is projected to operate at LOS F during the evening peak hour under year 2020 buildout conditions. However, upon installation of a planned traffic signal, the intersection is projected to operate at LOS B for all future year analysis scenarios. All other study intersections are currently operating acceptably per City of Tualatin standards and are projected to continue operating acceptably upon buildout of the proposed development through year 2020. No other operational mitigation is necessary or recommended.

This criterion is satisfied.

(4) Where development abuts an existing street, the improvement required shall apply only to that portion of the street right-of-way located between the property line of the parcel proposed for development and the centerline of the right-of-way, plus any additional pavement beyond the centerline deemed necessary by the City Engineer to ensure a smooth transition between a new improvement and the existing roadway (half-street improvement). Additional right-of-way and street improvements and off-site right-of-way and street improvements may be required by the City to mitigate the impact of the development. The new pavement shall

connect to the existing pavement at the ends of the section being improved by tapering in accordance with the Public Works Construction Code.

FINDINGS:

The access point connections to the existing roadway pavement and sidewalk construction require localized modifications only as the existing construction is sound and meets City standards.

(6) All required street improvements shall include curbs, sidewalks with appropriate buffering, storm drainage, street lights, street signs, street trees, and, where designated, bikeways and transit facilities.

FINDINGS:
I recently saw a sidewalk survey of Tualatin that indicated that the sidewalks on Myslony may not meet ADA slope requirements. Please take a look so your team is prepared as we will require sidewalks that are out of compliance to be improved.

Both site frontages are improved to current City of Tualatin standards, including curbs, walks, street trees, storm drainage, public water and public sewer. Other than the two new driveways and utility connections described above, no additional public improvements are proposed.

This criterion is with conditions of approval PFR-17 and PFR-19.

(8) For development applications other than subdivisions and partitions, all street improvements required by this section shall be completed and accepted by the City prior to the issuance of a Certificate of Occupancy.

FINDINGS:
The applicant understands that all driveway construction and utility connections within the rights of way of the project frontages must be completed prior to the issuance of a Certificate of Occupancy.

This criterion is with conditions of approval PFR-17.

(11) Existing streets which abut the proposed development site shall be graded, constructed, reconstructed, surfaced or repaired as necessary in accordance with the Public Works Construction Code and TDC Chapter 11, Transportation Plan, and TDC 74.425 (Street Design Standards).

FINDINGS:
Both site frontages are improved to current City of Tualatin standards, including curbs, walks, street trees, storm drainage, public water and public sewer. Other than the two new driveways and utility connections described above, no additional public improvements are proposed.

This criterion is with conditions of approval PFR-17 and PFR-19.

(12) Sidewalks with appropriate buffering shall be constructed along both sides of each internal street and at a minimum along the development side of each external street in accordance with the Public Works Construction Code.

FINDINGS:

Both site frontages are improved to current City of Tualatin standards, including curbs, walks, street trees, storm drainage, public water and public sewer. Other than the two new driveways and utility connections described above, no additional public improvements are proposed.

This criterion is with conditions of approval PFR-17 and PFR-19.

(17) Intersections should be improved to operate at a level of service of at least D and E for signalized and unsignalized intersections, respectively.

FINDINGS:
Lancaster Engineering Transportation Impact Study, dated 8.28.18, page 1 notes the existing condition at the intersection of SW 124th Avenue and SW Myslony Street, which is to be mitigated by the City's improvement of the intersection:

- The intersection of SW Myslony Street at SW 124th Avenue, under two-way stop control, is projected to operate at LOS F during the evening peak hour under year 2020 buildout conditions. However, upon installation of a planned traffic signal, the intersection is projected to operate at LOS B for all future year analysis scenarios. All other study intersections are currently operating acceptably per City of Tualatin standards and are projected to continue operating acceptably upon buildout of the proposed development through year 2020. No other operational mitigation is necessary or recommended.

VII. TDC SECTION 74.425 STREET DESIGN STANDARDS.

(1) Street design standards are based on the functional and operational characteristics of streets such as travel volume, capacity, operating speed, and safety. They are necessary to ensure that the system of streets, as it develops, will be capable of safely and efficiently serving the traveling public while also accommodating the orderly development of adjacent lands.
(2) The proposed street design standards are shown in Figures 72A through 72G. The typical roadway cross sections comprise the following elements: right-of-way, number of travel lanes, bicycle and pedestrian facilities, and other amenities such as landscape strips. These figures are intended for planning purposes for new road construction, as well as for those locations where it is physically and economically feasible to improve existing streets

FINDINGS:
No new streets are proposed in this development.

This criterion is met.

(4) All streets shall be designed and constructed according to the preferred standard. The City Engineer may reduce the requirements of the preferred standard based on specific site conditions, but in no event will the requirement be less than the minimum standard. The City Engineer shall take into consideration the following factors when deciding whether the site conditions warrant a reduction of the preferred standard:

(a) Arterials:
(i) Whether adequate right-of-way exists
(ii) Impacts to properties adjacent to right-of-way
(iii) Current and future vehicle traffic at the location
(iv) Amount of heavy vehicles (buses and trucks).

(b) Collectors:
(i) Whether adequate right-of-way exists
(ii) Impacts to properties adjacent to right-of-way
(iii) Amount of heavy vehicles (buses and trucks)
(iv) Proximity to property zoned manufacturing or industrial.

(c) Local Streets:
(i) Local streets proposed within areas which have environmental constraints and/or sensitive areas and will not have direct residential access may utilize the minimum design standard. When the minimum design standard is allowed, the City Engineer may determine that no parking signs are required on one or both sides of the street.

FINDINGS:
SW Myslony Streetwas built to previous City standards consistent with its prior street classification. The existing 72-foot dimension doesn't meet the current preferred cross-section width of 74 feet Figures 74-2A-G: Street Design Standards, but is consistent with the surrounding area and the traffic study proves 72 feet and its current design is adequate with appropriate striping.

Both site frontages are improved to current City of Tualatin standards, including curbs, walks, street trees, storm drainage, public water and public sewer. Other than the two new driveways and utility connections described above, no additional public improvements are proposed.

This criterion is satisfied with conditions of approval PFR-15, and PFR-19.

VIII. TDC SECTION 74.430 STREETS, MODIFICATIONS OF REQUIREMENTS IN CASES OF UNUSUAL CONDITIONS.

(1) When, in the opinion of the City Engineer, the construction of street improvements in accordance with TDC 74.420 would result in the creation of a hazard, or would be impractical, or would be detrimental to the City, the City

Engineer may modify the scope of the required improvement to eliminate such hazardous, impractical, or detrimental results. Examples of conditions requiring modifications to improvement requirements include but are not limited to horizontal alignment, vertical alignment, significant stands of trees, fish and wildlife habitat areas, the amount of traffic generated by the proposed development, timing of the development or other conditions creating hazards for pedestrian, bicycle or motor vehicle traffic. The City Engineer may determine that, although an improvement may be impractical at the time of development, it will be necessary at some future date. In such cases, a written agreement guaranteeing future performance by the applicant in installing the required improvements must be signed by the applicant and approved by the City.

(2) When the City Engineer determines that modification of the street improvement requirements in TDC 74.420 is warranted pursuant to subsection (1) of this section, the City Engineer shall prepare written findings of modification. The City Engineer shall forward a copy of said findings and description of modification to the applicant, or his authorized agent, as part of the Utility Facilities Review for the proposed development, as provided by TDC 31.072. The decision of the City Engineer may be appealed to the City Council in accordance with TDC 31.076 and 31.077.

(3) To accommodate bicyclists on streets prior to those streets being upgraded to the full standards, an interim standard may be implemented by the City. These interim standards include reduction in motor vehicle lane width to 10 feet [the minimum specified in AASHTO's A Policy on Geo-metric Design of Highways and Streets (1990)], a reduction of bike lane width to 4-feet (as measured from the longitudinal gutter joint to the centerline of the bike lane stripe), and a paint-striped separation 2 to 4 feet wide in lieu of a center turn lane. Where available roadway width does not provide for these minimums, the roadway can be signed for shared use by bicycle and motor vehicle travel. When width constraints occur at an intersection, bike lanes should terminate 50 feet from the intersection with appropriate signing.

FINDINGS:
Both site frontages are improved to current City of Tualatin standards, including curbs, walks, street trees, storm drainage, public water and public sewer. Other than the two new driveways and utility connections described above, no additional public improvements are proposed.

This criterion is satisfied with conditions of approval PFR-13, PFR-15, and PFR-19.

IX. TDC 74.440 STREETS, TRAFFIC STUDY REQUIRED

(1) The City Engineer may require a traffic study to be provided by the applicant and furnished to the City as part of the development approval process as provided by this Code, when the City Engineer determines that such a study is necessary in connection with a proposed development project in order to:

(a) Assure that the existing or proposed transportation facilities in the vicinity of the proposed development are capable of accommodating the amount of traffic that is expected to be generated by the proposed development, and/or
(b) Assure that the internal traffic circulation of the proposed development will not result in conflicts between on-site parking movements and/or on-site loading movements and/or on-site traffic movements, or impact traffic on the adjacent streets.

FINDINGS:
Traffic volumes and movements on SW 124th Avenue and SW Myslony Street were studies by Lancaster Engineering. The Site access along 124th Avenue will perform at at Level of Service (LOS) of A or B depending on time of day. The site access from SW Myslony Street will operate at a LOS of A. The intersection of SW 124th Avenue and Myslony Street already experiences LOS E periods (min. acceptable by City standards), but is anticipated would experience LOS F periods by 2020 under the present 2-way stop control. The City's plan to signalize this intersection as part of the approved and funded 2018 Bond Issue will result in a LOS of B otr better for all future year analysis scenarios. Please see Lancaster Engineering Traffic Impact Study for additional information.

(2) The required traffic study shall be completed prior to the approval of the development application.

FINDINGS:
Lancaster Engineering Transportation Impact Study, dated 8.28.18.

This criterion is met.

(3) The traffic study shall include, at a minimum:
(a) an analysis of the existing situation, including the level of service on adjacent and impacted facilities.
(b) an analysis of any existing safety deficiencies.
(c) proposed trip generation and distribution for the proposed development.
(d) projected levels of service on adjacent and impacted facilities.
(e) recommendation of necessary improvements to ensure an acceptable level of service for roadways and a level of service of at least D and E for signalized and unsignalized intersections respectively, after the future traffic impacts are considered.
(f) The City Engineer will determine which facilities are impacted and need to be included in the study.
(g) The study shall be conducted by a registered engineer.

FINDINGS:
Please see Lancaster Engineering Transportation Impact Study, dated 8.28.18.

(4) The applicant shall implement all or a portion of the improvements called for in the traffic study as determined by the City Engineer.

FINDINGS:
Please see Lancaster Engineering Transportation Impact Study, dated 8.28.18

This criterion is met.

X. TDC SECTION 74.470 STREET LIGHTS.

(1) Street light poles and luminaries shall be installed in accordance with the Public Works Construction Code.
(2) The applicant shall submit a street lighting plan for all interior and exterior streets on the proposed development site prior to issuance of a Public Works Permit.

FINDINGS:
This project is not proposing to install street lights as part of this application. Street illumination will be shown to be adequate to current Public Works Construction Code or street lights will be constructed to meet illumination standards.

Existing illumination levels along SW 124th Avenue and SW Myslony Street via pole lights installed as part of the City street improvements meet IES guidelines for roadway lighting. An existing roadway light adjacent to the SW 124th access adequately lights the access point. An existing pole light on the north side of SW Myslony Street adequately lights the NE site access.

This criterion is satisfied with conditions of approval PFR-11, PFR-17, and PFR-20.

XI. TDC SECTION 74.485 STREET TREES.

(2) In nonresidential subdivisions and partitions street trees shall be planted by the owners of the individual lots as development occurs.
(3) The Street Tree Ordinance specifies the species of tree which is to be planted and the spacing between trees.

FINDINGS:
There are no new street trees required or proposed in the development.

XII. TDC SECTION 74.610 WATER SERVICE.

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

FINDINGS:
As shown on Sheet C4, this application is proposing a fire service connection to an existing 8-inch public fire service lateral at the SW 124th frontage and a domestic water connection at the existing public water main in SW Myslony Street. Water line designs will be in conformance with the Public Works Construction Code.

The plans include a valve at the connection to the public main for domestic service. A valve already exists for the fire service.

The applicant will submit water system plans that show location and other details prior to obtaining a Building Permit. A public works construction permit for the domestic and fire connections will be obtained. The applicant has not applied for a public works permit for these improvements. The applicant will need to submit water system plans that show location of the water lines, grade, materials, and other details prior to obtaining a public works permit.

This criterion is satisfied with conditions of approval PFR-2, PFR-3, PFR-17, and PFR-20.

(2) If there are undeveloped properties adjacent to the subject site, public water lines shall be extended by the applicant to the common boundary line of these properties. The lines shall be sized to provide service to future development, in accordance with the City's Water System Master Plan, TDC Chapter 12.

FINDINGS:
The property to the east is currently developed as a commercial facility with existing public water service from SW Myslony. The property to the south is undeveloped. Public water main exists in SW 124th and this property can access this existing public main. As such, this project is not proposing to extend the existing public water mains in the frontage streets.

This criterion is satisfied.

(3) As set forth is TDC Chapter 12, Water Service, the City has three water service levels. All development applicants shall be required to connect the proposed development site to the service level in which the development site is located. If the development site is located on a boundary line between two service levels the applicant shall be required to connect to the service level with the higher reservoir elevation. The applicant may also be required to install or provide pressure reducing valves to supply appropriate water pressure to the properties in the proposed development site.

FINDINGS:
As shown on Sheet C4, this application is proposing a fire service connection to an existing 8-inch public fire service lateral at the SW 124th frontage and a domestic water connection at the existing public water main in SW Myslony Street. Water line designs will be in conformance with the Public Works Construction Code. The sheet also indicates a fire DCVA will be provided at the SW 124th right of way and a reduced pressure principal backflow preventer will be provided at the domestic water meter to be installed at SW Myslony Street.

The plans include a valve at the connection to the public main for domestic service. A valve already exists for the fire service.

This criterion is satisfied with conditions of approval PFR-2, PFR-3, PFR-17, and PFR-20.

XIII. TDC SECTION 74.620 SANITARY SEWER SERVICE.

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

FINDINGS:
As shown on Sheet C4.1, this project is proposing a six-inch sanitary sewer connection to an existing public sanitary lateral at SW 124th, near the southwest corner of the site. A clean out will be installed at the right of way. Sanitary sewer line designs will be in conformance with the Public Works Construction Code and the current international plumbing code.

This criterion is satisfied with conditions of approval PFR-1, PFR-17, and PFR-19.

(2) If there are undeveloped properties adjacent to the proposed development site which can be served by the gravity sewer system on the proposed development site, the applicant shall extend public sanitary sewer lines to the common boundary line with these properties. The lines shall be sized to convey flows to include all future development from all up stream areas that can be expected to drain through the lines on the site, in accordance with the City's Sanitary Sewer System Master Plan, TDC Chapter 13.

FINDINGS:
The property to the east is currently developed as a commercial facility with an existing public service connection to the existing public sanitary sewer in SW Myslony. The property to the south is undeveloped. A public sanitary main exists in SW 124th and this property can access this existing public main. As such, this project is not proposing to extend the existing public sanitary sewer mains in the frontage streets.

This criterion is satisfied.

XIV. TDC SECTION 74.630 STORM DRAINAGE SYSTEM.

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

FINDINGS:

Sheets C 3 and 3.1 show provision for on-site collection, conveyance, and detention using a pond with outflow limited by a series of orifi installed within a control manhole. Runoff treatment is provided by a Contech Stormfilter vault with treatment cartridges and by a vegetated treatment swale. Sizing of these facilities is detailed in the submitted drainage analysis, which conforms to current Clean Water Services Resolution and Order 17-05. Following treatment and detention, runoff is directed to an existing public storm drainage system located in SW Myslony Street at the site frontage.

This criterion is satisfied with conditions of approval PFR-4, PFR-5, PFR-13, PFR-17, and PFR-19.

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

FINDINGS:
The drainage analysis provided with the application determined that there is not a downstream drainage capacity deficiency. Plans show provision for on-site detention using a pond with outflow limited by a series of orifi installed within a control manhole. Sizing is detailed in the submitted drainage analysis, which conforms to current Clean Water Services Resolution and Order 17-05.

This criterion is satisfied with conditions of approval PFR-6, PFR-7, PFR-17, and PFR-19.

(3) If there are undeveloped properties adjacent to the proposed development site which can be served by the storm drainage system on the proposed development site, the applicant shall extend storm drainage lines to the common boundary line with these properties. The lines shall be sized to convey expected flows to include all future development from all up stream areas that will drain through the lines on the site, in accordance with the Tualatin Drainage Plan in TDC Chapter 14.

FINDINGS:
The adjacent undeveloped property to the south is significantly lower than the development site and drains southerly to an existing wetland and stream. As such, runoff from that site cannot reasonably be directed to the subject development site and extension of drainage facilities to the undeveloped parcel to the south is not appropriate.

This criterion is satisfied.

XV. TDC SECTION 74.640 GRADING.

(1) Development sites shall be graded to minimize the impact of storm water runoff onto adjacent properties and to allow adjacent properties to drain as they did before the new development.

FINDINGS:
Grading shown on plan sheets C 2 and 2.1 shows all runoff from improvement areas on site will be collected within the property, treated, and detained prior to discharge to the existing public storm system in SW Myslony Street. No runoff to adjacent properties will occur and no changes to preexisting offsite drainage patterns will occur with this development.

This criterion is satisfied with conditions of approval PFR-4, PFR-5, PFR-13, PFR-17, and PFR-19.

(2) A development applicant shall submit a grading plan showing that all lots in all portions of the development will be served by gravity drainage from the building crawl spaces; and that this development will not affect the drainage on adjacent properties. The City Engineer may require the applicant to remove all excess material from the development site.

FINDINGS:
Grading shown on plan sheets C 2 and 2.1 shows all runoff from improvement areas on site will be collected within the property, treated, and detained prior to discharge to the existing public storm system in SW Myslony Street. No runoff to adjacent properties will occur and no changes to preexisting offsite drainage patterns will occur with this development. The proposed building does not have a crawl space.

This criterion is satisfied with conditions of approval PFR-4, PFR-5, PFR-13, PFR-17, and PFR-19.

XVI. TDC SECTION 74.650 WATER QUALITY, STORM WATER DETENTION AND EROSION CONTROL.

The applicant shall comply with the water quality, storm water detention and erosion control requirements in the Surface Water Management Ordinance. If required:

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

FINDINGS:
Sheets C 3 and 3.1 show provision for on-site collection, conveyance, and detention using a pond with outflow limited by a series of orifi installed within a control manhole. Runoff treatment is provided by a Contech Stormfilter vault with treatment cartridges and by a vegetated treatment swale. Sizing of these facilities is detailed in the submitted drainage analysis, which conforms to current Clean Water Services Resolution and

Order 17-05. Following treatment and detention, runoff is directed to an existing public storm drainage system located in SW Myslony Street at the site frontage.

A clean water service storm water connection permit will be obtained during the building and site development permitting process.

This criterion is satisfied with conditions of approval PFR-6 and PFR-12.

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

FINDINGS:
The application materials indicate disturbance area of 3.75 acres. The applicant has obtained a 1200CN Construction Erosion Control permit from Clean Water Services as agent for Oregon DEQ and has obtained a grading (EXGR 18 1508) and erosion control permit (EC 1218 1511) from the City of Tualatin as required prior to issuance of permits allowing construction activities.

Sheets C 3 and 3.1 show provision for on-site collection, conveyance, and detention using a pond with outflow limited by a series of orifi installed within a control manhole. Runoff treatment is provided by a Contech Stormfilter vault with treatment cartridges and by a vegetated treatment swale. Sizing of these facilities is detailed in the submitted drainage analysis, which conforms to current Clean Water Services Resolution and Order 17-05. Following treatment and detention, runoff is directed to an existing public storm drainage system located in SW Myslony Street at the site frontage.

This criterion is satisfied with conditions of approvalPFR-4, PFR-5, PFR-17, and PFR-19.

XVII. TDC 74.660 UNDERGROUND

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

FINDINGS:
The project utility lines for incoming service will all be placed below grade and conform to City standards.

This criterion is satisfied with conditions of approval PFR-14, PFR-17, and PFR-19.

(2) Any existing overhead utilities may not be upgraded to serve any proposed development. If existing overhead utilities are not adequate to serve the proposed development, the applicant shall, at their own expense, provide an underground system. The applicant shall be responsible for obtaining any off-site deeds and/or easements necessary to provide utility service to this site; the deeds and/or easements shall be submitted to the City Engineer for acceptance by the City prior to issuance of the Public Works Permit.

FINDINGS:
There are no existing overhead utilities serving this site.

This criterion is satisfied with conditions of approval PFR-14, PFR-17, and PFR-19.

XVIII. TDC SECTION 74.670 EXISTING STRUCTURES.

(1) Any existing structures requested to be retained by the applicant on a proposed development site shall be connected to all available City utilities at the expense of the applicant.

FINDINGS:
The existing residence on the site will remain during construction to serve as a project field office. As construction nears completion the utility services will be disconnected and the structure demolished.

This criterion is satisfied with conditions of approval PFR-14, PFR-17, and PFR-19.

(2) The applicant shall convert any existing overhead utilities serving existing structures to underground utilities, at the expense of the applicant.

FINDINGS:
The existing residence is not served by overhead utilities.

This criterion is satisfied with conditions of approval PFR-14, PFR-17, and PFR-19.

Four-S Corp Distribution Center

Transportation Impact Study

Tualatin, Oregon

Date:
August 28, 2018

Prepared for:
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3. No significant trends or crash patterns were identified at the intersection of SW Myslony Street at SW 124th Avenue that were indicative of safety concerns.
4. Upon removal or proper maintenance of any obstructing onsite foliage, adequate sight distance can be made available at the proposed site access intersections to ensure safe operation along SW Myslony Street and SW 124th Avenue. No other sight distance mitigation is necessary or recommended.
5. The intersection of SW Myslony Street at SW 124th Avenue, under two-way stop-control, is projected to operate at LOS F during the evening peak hour under year 2020 buildout conditions. However, upon installation of a planned traffic signal, the intersection is projected to operate at LOS B for all future year analysis scenarios. All other study intersections are currently operating acceptably per City of Tualatin standards and are projected to continue operating acceptably upon buildout of the proposed development through year 2020. No other operational mitigation is necessary or recommended.

Project Description and Location

Introduction

The proposed Four-S Corp Distribution Center will include the construction of a 52,500 square foot distribution center located at 12200 SW Myslony Avenue in Tualatin, Oregon. Based on correspondence with City of Tualatin staff, the report conducts safety and capacity/level of service analyses at the following intersections:

- SW Myslony Street at SW 124th Avenue;
- Site access at SW Myslony Street; and
- Site access at SW 124th Avenue (right-in/right-out only).

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

Project and Location Description

The project site is located north of SW Cimino Street, south of SW Myslony Street, and east SW 124th Avenue in Tualatin, Oregon, located near the western edge of the city limits. The site is predominately surrounded by industrial land-use in all directions, except to the south which is currently undeveloped.

The project site includes a single tax lot, lot 1600, which encompasses an approximate total of 5.41 acres. The eastern portion of the site is developed with a single-family detached house and storage structures. The proposed distribution center will utilize an existing access along SW Myslony Street while constructing a right-in/right-out (RIRO) access along SW 124th Avenue.

Vicinity Streets

The proposed development is expected to impact the following two nearby vicinity roadways: SW Myslony Street and SW 124th Avenue. Table 1 provides a description of each of the vicinity roadways.

Table 1: Vicinity Roadway Descriptions

Roadway	Jurisdiction	Functional Classification	Cross-Section	Speed	On-street Parking	Bicycle Lanes	Curbs	Sidewalks
SW Myslony Street	City of Tualatin	Major Collector	2 Lanes	20 mph Statutory	Permitted Both Sides	None	Partial Both Sides	Partial Both Sides
SW 124th Avenue	City of Tualatin	Major Arterial	5 Lanes	45 mph	Not Permitted	Both Sides	Both Sides	Both Sides

Note: Functional Classification based on City of Tualatin's *Transportation System Plan*.

Study Intersections

The intersection of SW Myslony Street at SW 124th Avenue is a four-legged intersection that is stop-controlled the eastbound and westbound approaches. The northbound and southbound approaches of SW 124th Avenue each have a center two-way left-turn lane (allowing left-turns from their respective approaches), one through lane, one shared through/right-turn lane, and a bicycle lane to the right of the outermost standard travel lane. The eastbound and westbound approaches each have one shared lane for all turning movements. Crosswalks are unmarked across all four intersection legs.

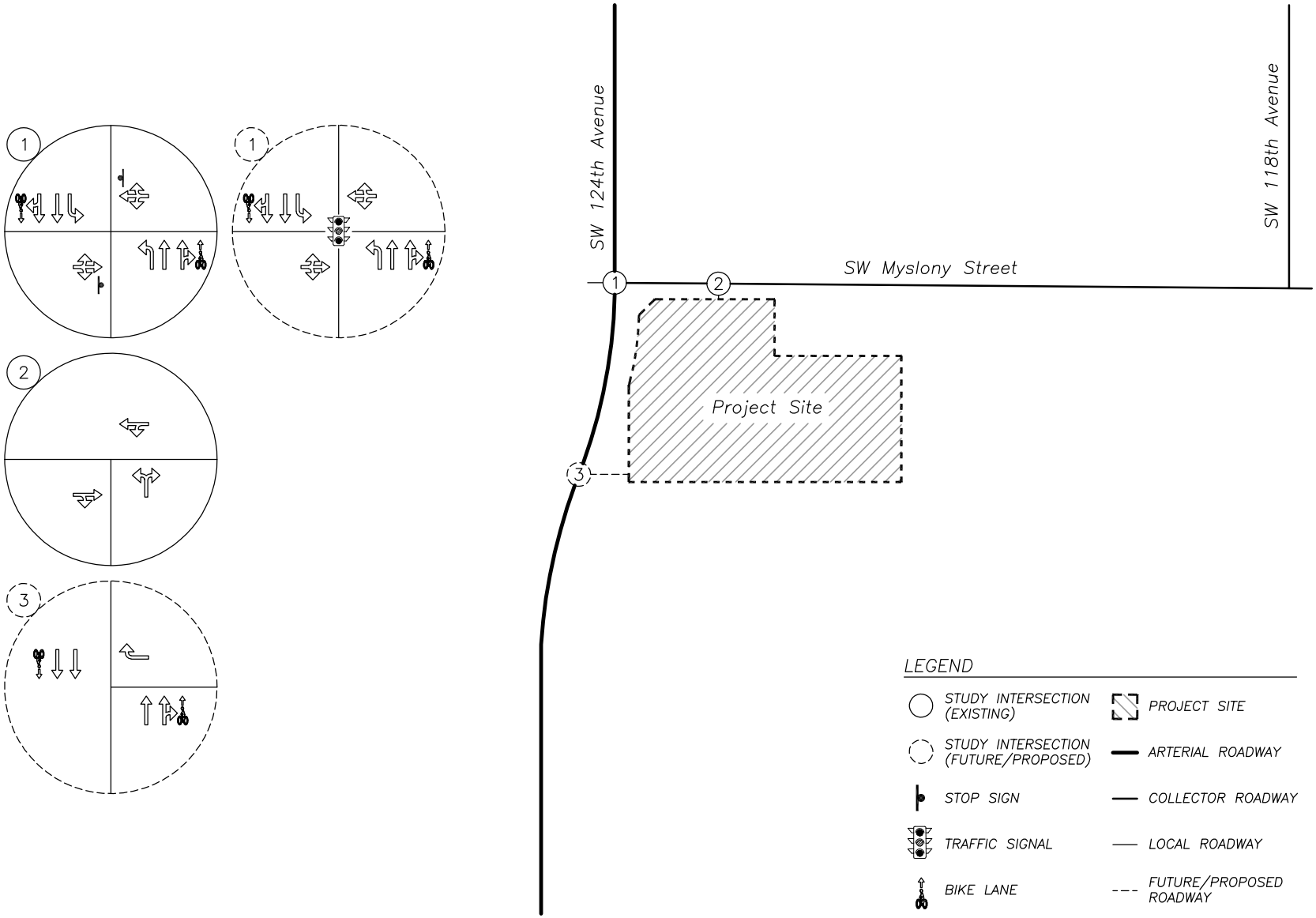
It should be noted that the intersection is planned for signalization in the near future. For the purposes of this analysis, the intersection was analyzed assuming operation under two-way stop-control and traffic signal control for future year 2020 conditions.

A vicinity map displaying the project site, vicinity streets, and the study intersections with their associated lane configurations is shown in Figure 1 on page 4.

Traffic Counts

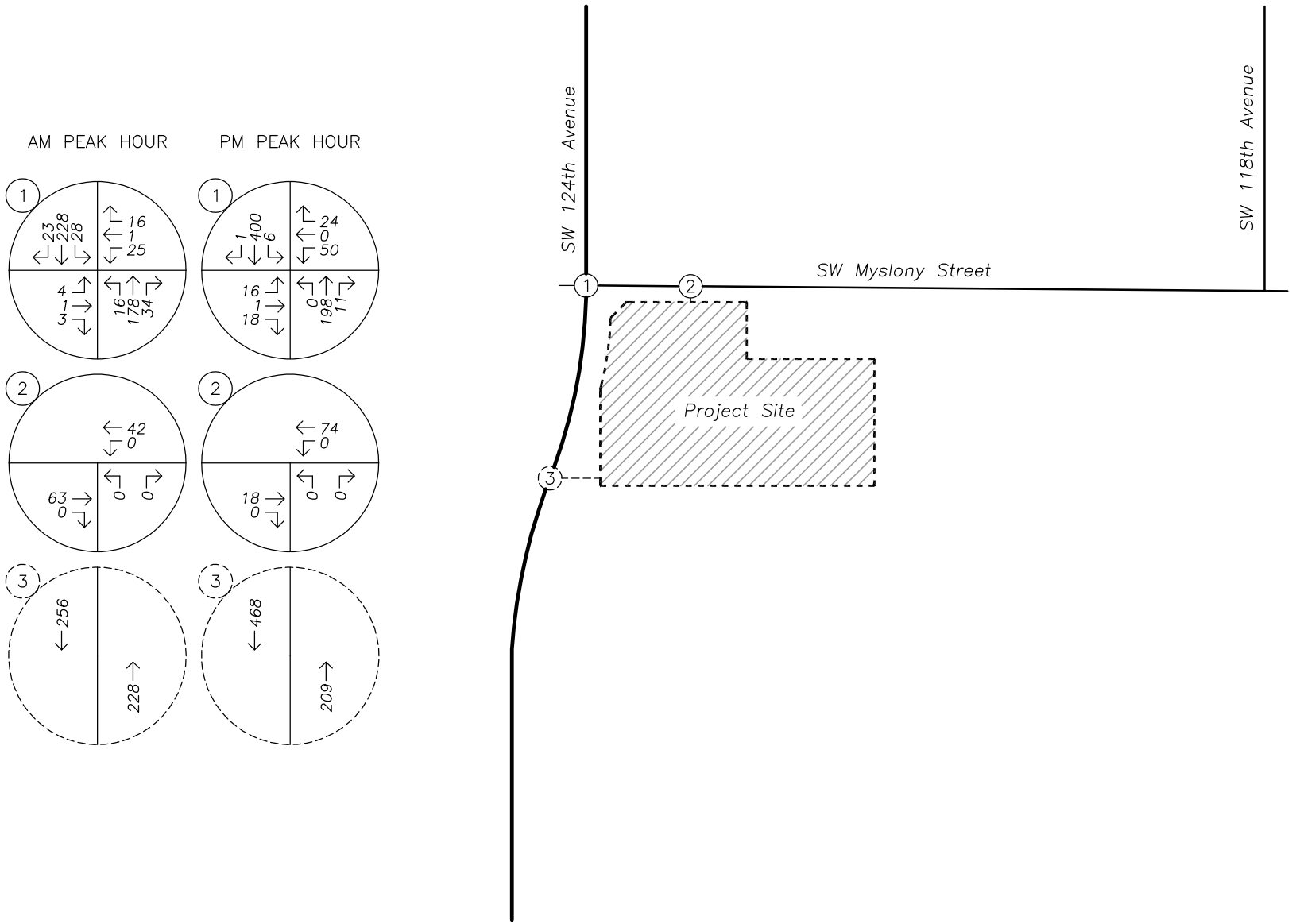
Traffic counts were conducted at the intersection of SW Myslony Street at SW 124th Avenue on Tuesday, July 10th, 2018, from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. Data was used from intersection's morning and evening peak hours. To estimate existing traffic volumes at the site access intersections along SW Myslony Street and SW 124th Avenue, traffic volumes were balanced with the intersection of SW Myslony Street at SW 124th Avenue.

Figure 2 on page 5 shows the existing morning and evening peak hour traffic volumes at the study intersections.



VICINITY MAP

FIGURE 1



TRAFFIC VOLUMES
Existing Conditions
AM & PM Peak Hours

no scale

FIGURE 2

Site Trips

Trip Generation

The proposed Four-S Corp Distribution Center will include the construction of a 52,500 square foot distribution center. To estimate the number of trips generated by the proposed development, trip rates from the *Trip Generation Manual*[1] were used. At the direction of City of Tualatin staff, data from land-use codes 110, *General Light Industrial*, was used to estimate the proposed development's trip generation based on the square footage of gross floor area.

The trip generation calculations show that the proposed development is projected to generate 37 trips during the morning peak hour, 33 trips during the evening peak hour, and 260 average weekday trips. The trip generation estimates are summarized in Table 2. Detailed trip generation calculations are included in the technical appendix to this report.

Table 2: Trip Generation Summary

	ITE Code	Size	Morning Peak Hour			Evening Peak Hour			Weekday Total
			Enter	Exit	Total	Enter	Exit	Total	
Proposed Distribution Center	110	52,500 sq.ft.	33	4	37	4	29	33	260

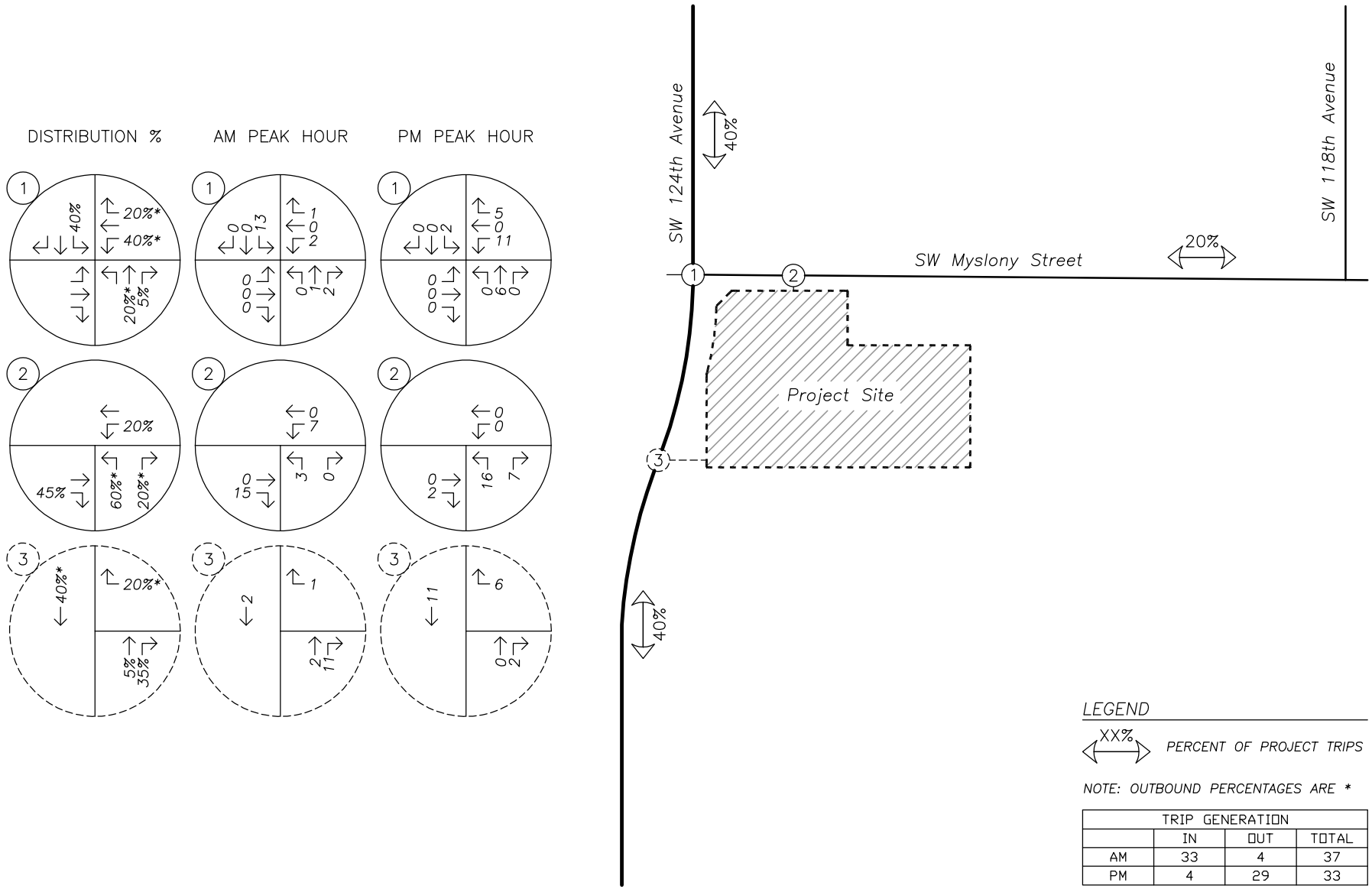
Trip Distribution

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

- Approximately 40 percent of site trips will travel to/from the north along SW 124th Avenue;
- Approximately 40 percent of site trips will travel to/from the south along SW 124th Avenue; and
- Approximately 20 percent of site trips will travel to/from the east along SW Myslony Street.

The trip distribution and assignment for the site trips generated by the proposed development during the morning and evening peak hours is shown in Figure 3 on page 7.

[1] Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10th Edition, 2017.



TRIP GENERATION			
	IN	OUT	TOTAL
AM	33	4	37
PM	4	29	33

PROPOSED DEVELOPMENT
Site Trip Distribution and Assignment
AM & PM Peak Hour

no scale

FIGURE 3

Future Traffic Volumes

Background Volumes

To provide analysis of the impact of the proposed development on the nearby transportation facilities, an estimate of future traffic volumes is required. In order to calculate the future traffic volumes a compounded growth rate of two percent per year for an assumed buildout conditions of two years was applied to the measured existing traffic volumes to approximate year 2020 background conditions.

In addition to the expected background traffic growth within the site vicinity, there are two nearby transportation projects which are expected to significantly impact future volumes along SW 124th Avenue and SW Myslony Street. The two projects include the following:

- SW 124th Avenue extension from Tualatin-Sherwood Road to Grahams Ferry Road; and
- SW Myslony Street extension (bridge) over Hedges Creek to SW 112th Avenue.

Additional rerouted traffic volumes associated with the two aforementioned projects were accounted for in the year 2020 background volumes. The following sections detail methodologies used to project rerouted volumes with completion of each project.

SW 124th Avenue Extension

To project rerouted traffic volumes associated with the SW 124th Avenue extension, methodologies similar to those conducted within with *Majestic SW 115th Avenue Industrial Project Transportation Impact Analysis* (TIA), dated August 30th, 2016, were used. The following data and assumptions detail the process used to determine rerouted volumes.

1. Morning and evening peak period (two-hour) volumes along SW 124th Avenue, between SW Myslony Street and SW Tualatin-Sherwood Road, were referenced from Metro's 2010 base and 2040 future conditions modeling data.
2. Assuming a 2 percent per year linear growth, the 2040 volumes were reduced over a 30-year period to reflect 2010 base conditions plus rerouted traffic volumes.
3. The 2010 base volumes were subtracted from the reduced 2040 volumes to obtain rerouted traffic associated with the SW 124th Avenue extension.
4. The rerouted traffic was grown linearly at a rate of 2 percent per year over a 10-year period to reflect 2020 background conditions.
5. A factor of 0.55 was applied to the 2020 two-hour reroute volumes to reflect peak volumes during a single hour.

SW Myslony Street Extension

To project rerouted traffic volumes associated with the SW Myslony Street extension, similar methodologies as described for the *SW 124th Avenue Extension* section were used, with the exception that 2010 base volumes along SW Myslony Street are not provided within the Metro modeling data. The following data and assumptions detail the process used to determine rerouted volumes.

1. Morning and evening peak period (two-hour) volumes along SW Myslony Street were referenced from Metro's 2040 future conditions modeling data.
2. Assuming a 2 percent per year linear growth, the 2040 volumes were reduced over a 20-year period to reflect 2020 conditions plus rerouted traffic volumes.
3. A factor of 0.55 was applied to the 2020 two-hour volumes to reflect peak volumes during a single hour.
4. The 2020 background condition volumes (calculated from the measured existing volumes) were subtracted from the 2020 Metro volumes to obtain rerouted traffic associated with the SW Myslony Street extension.

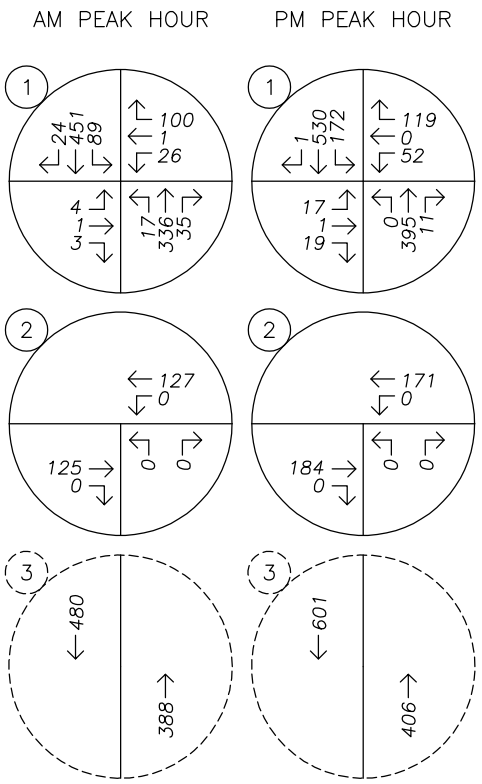
Rerouted volumes associated with the SW 124th Avenue and SW Myslony Street extension projects are shown in Figure A within the technical appendix. Figure 4 on page 10 shows the projected year 2020 background traffic volumes at the study intersections (with rerouted traffic) during the morning and evening peak hours.

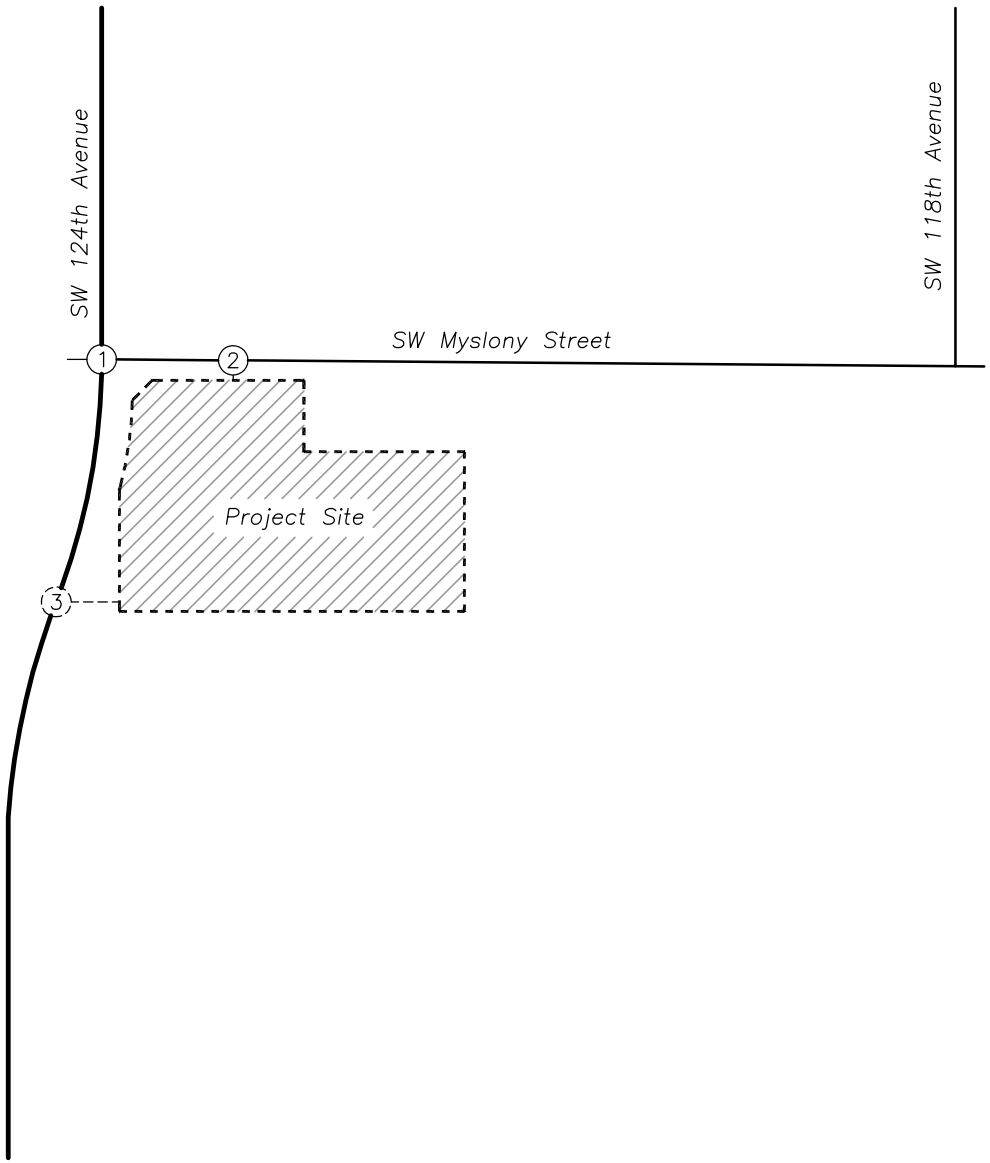
Background Volumes plus Site Trips

Peak hour trips calculated to be generated by the proposed development, as described earlier within the *Site Trips* section, were added to the projected year 2020 background traffic volumes to obtain the expected year 2020 buildout volumes.

Figure 5 on page 11 shows the projected 2020 site buildout year traffic volumes at the study intersections during the morning and evening peak hours.

GROWTH RATE: 2.0 PERCENT PER YEAR COMPOUNDED

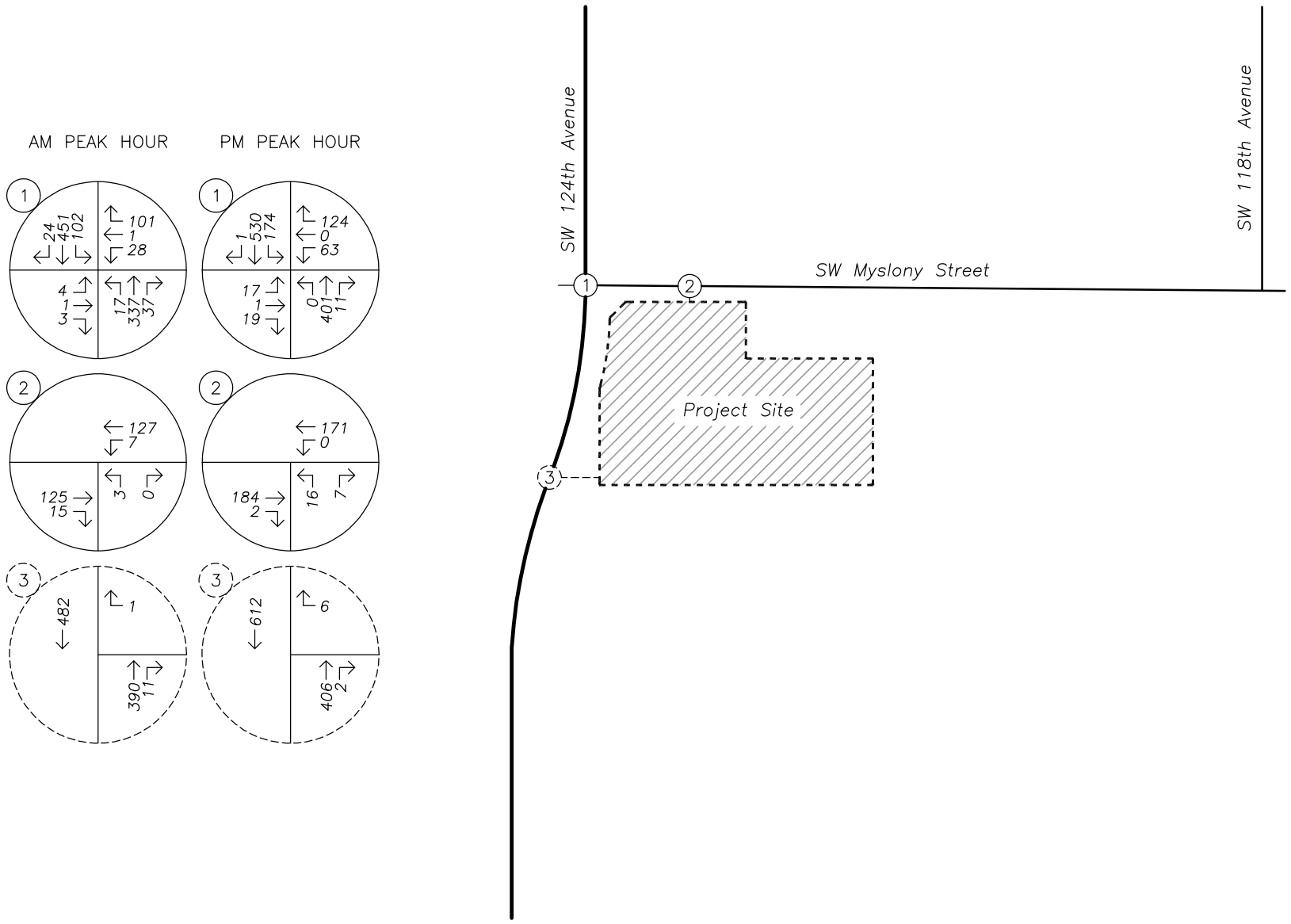




TRAFFIC VOLUMES
Year 2020 Background Conditions
AM & PM Peak Hours

no scale

FIGURE 4



TRAFFIC VOLUMES
Year 2020 Buildout Conditions
AM & PM Peak Hours

no scale

FIGURE 5

Safety Analysis

Crash Data Analysis

Using data obtained from the Oregon Department of Transportation's Crash Analysis and Reporting Unit, a review of the most recent available five years of crash history (January 2012 to December 2016) at the intersection of SW Myslony Street at SW 124th Avenue was performed. The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions, and the resulting crash rate for the intersection. Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection. Crash rates were calculated using the common assumption that traffic counted during the evening peak period represents 10 percent of the annual average daily traffic (AADT) at the intersection. Crash rates in excess of 1.0 crashes per million entering vehicles (CMEV) may be indicative of design deficiencies and therefore require a need for further investigation and possible mitigation.

The intersection of SW Myslony Street at SW 124th Avenue had four reported crashes during the analysis period. The crashes consisted of three turning-movement collisions and one sideswipe collision. Of the reported crashes, two were classified as "Property Damage Only" (*PDO*), one was classified as "Possible Injury – Complaint of Pain" (*Injury C*), and one was classified as "Non-Incapacitating Injury" (*Injury B*). The crash rate at the intersection was calculated to be 0.30 CMEV.

Based on the most recent five years of available crash data, no significant trends or crash patterns were identified at the intersection of SW Myslony Street at SW 124th Avenue that were indicative of safety concerns.

Sight Distance Analysis

Intersection sight distance was measured for the westernmost existing access along SW Myslony Street and the proposed RIRO access along SW 124th Avenue. Sight distance was measured and evaluated in accordance with standards established in *A Policy on Geometric Design of Highways and Streets*[2]. According to AASHTO, the driver's eye is assumed to be 15 feet from the near edge of the nearest travel lane of the intersecting street and at a height of 3.5 feet above the minor-street approach pavement. The vehicle driver's eye-height along the major-street approach is assumed to be 3.5 feet above the cross-street pavement.

The following sections detail sight distance measurements at the two site access intersections.

Site Access at SW Myslony Street

Based on a statutory business district speed of 20 mph, the minimum recommended intersection sight distance to ensure safe and efficient operation of the existing access intersection is 225 feet to the east and

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

west. With removal or proper maintenance of roadside foliage, intersection sight distance to the east was measured to be 286 feet prior to encroaching beyond an adjacent property's fence line. Sight distance to the west was measured back the intersection of SW Myslony Street at SW 124th Avenue.

Site Access at SW Myslony Street

Based on a posted speed of 45 mph, the minimum recommended intersection sight distance for right-turning vehicles is 430 feet to the south. Provided any obstructing onsite and roadside foliage is removed or properly maintained, intersection sight distance to the south was measured to be 382 feet prior to encroaching beyond an adjacent property's fence line.

Although sight distance to the south is less than the minimum recommended intersection sight distance, according to the AASHTO manual, stopping sight distance is considered the minimum requirement to ensure safe operation of an intersection. This is the distance that allows an oncoming driver to see a hazard on the roadway, react, and come to a complete stop if necessary to avoid a collision. Conversely, intersection sight distance is an operation measure intended to provide sufficient line of sight along the major-street so that a driver could turn from the minor-street approach without impeding traffic flow. Given that the measured intersection sight distance is greater than the minimum required stopping sight distance, the access is expected to operate safely, granted occasional delays may occur along the northbound approach of SW 124th Avenue.

Based on the sight distance analysis, upon removal or proper maintenance of any obstructing onsite foliage, adequate sight distance can be made available at the proposed site access intersections to ensure safe operation along SW Myslony Street and SW 124th Avenue. No other sight distance mitigation is necessary or recommended.

Operational Analysis

Intersection Capacity Analysis

A capacity and delay analysis were conducted for each of the study intersections per the signalized and unsignalized intersection analysis methodologies in the *Highway Capacity Manual*[3] (HCM). Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

The City of Tualatin requires intersections operate at a minimum LOS E or better. For both LOS and delay related to the analysis of unsignalized intersections, the reported result applies to the worst minor-street approach lane.

As part of a 2018 Tualatin Bond Issue for the SW Myslony Street extension project, the intersection of SW Myslony Street at SW 124th Avenue was approved and currently planned for installation of a traffic signal. As such, the analysis of SW Myslony Street at SW 124th Avenue reflects intersection operation assuming both two-way stop-control and signal control for year 2020 analysis scenarios.

The v/c, delay, and LOS results of the capacity analysis are shown in Table 3 for the morning and evening peak hours. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

[3] Transportation Research Board, *Highway Capacity Manual*, 6th Edition, 2016.

Table 3: Intersection Capacity Analysis Summary

	Morning Peak Hour			Evening Peak Hour		
	LOS	**Delay (s)**	**v/c**	**LOS**	**Delay (s)**	**v/c**
SW Myslony Street at SW 124th Avenue						
2018 Existing Conditions	B	14	0.11	B	13	0.16
2020 Background Conditions (TWSC)	C	25	0.40	E	38	0.66
2020 Background Conditions (Signal)	B	11	-	B	11	-
2020 Buildout Conditions (TWSC)	D	26	0.43	F	54	0.78
2020 Buildout Conditions (Signal)	B	11	-	B	11	-
Site Access at SW Myslony Street						
2018 Existing Conditions	A	8	< 0.01	A	9	< 0.01
2020 Background Conditions	B	11	0.01	B	12	0.01
2020 Buildout Conditions	B	11	0.01	B	13	0.08
Site Access at SW 124th Avenue						
2020 Buildout Conditions	B	11	< 0.01	B	10	0.01

Based on the results of the operational analysis, the intersection of SW Myslony Street at SW 124th Avenue, under two-way stop-control, is projected to operate at LOS F during the evening peak hour under year 2020 buildout conditions. However, upon installation of a planned traffic signal, the intersection is projected to operate at LOS B for all future year analysis scenarios. All other study intersections are currently operating acceptably per City of Tualatin standards and are projected to continue operating acceptably upon buildout of the proposed development through year 2020. No other operational mitigation is necessary or recommended.

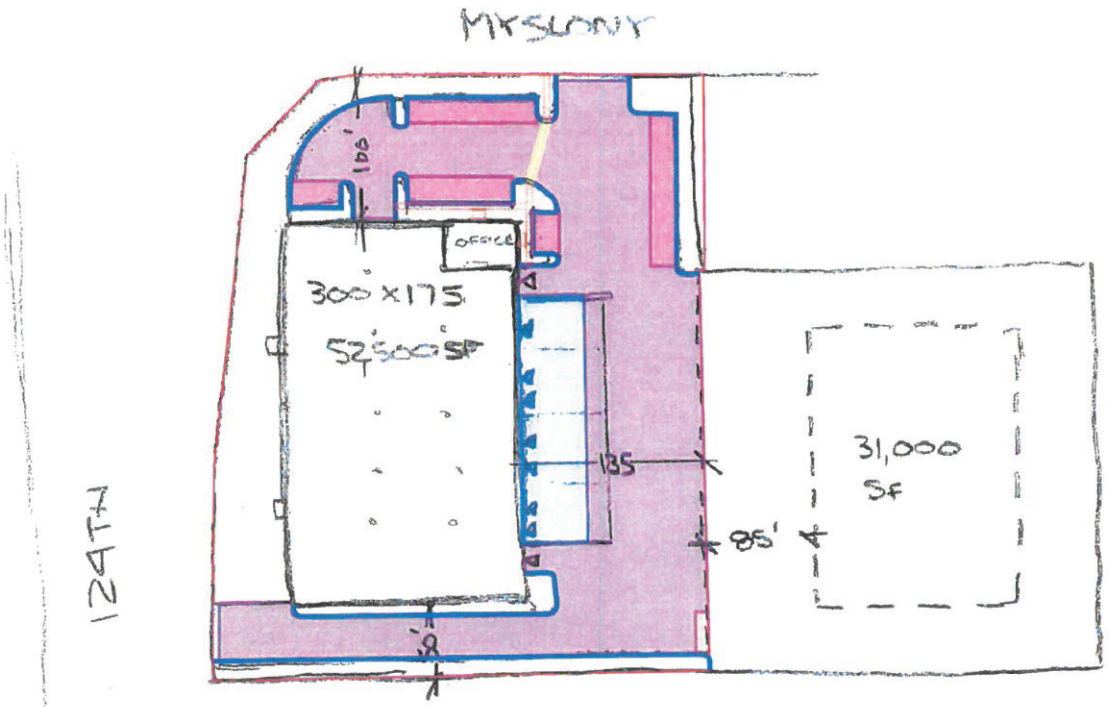
Conclusions

No significant trends or crash patterns were identified at the intersection of SW Myslony Street at SW 124th Avenue that were indicative of safety concerns.

Upon removal or proper maintenance of any obstructing onsite foliage, adequate sight distance can be made available at the proposed site access intersections to ensure safe operation along SW Myslony Street and SW 124th Avenue. No other sight distance mitigation is necessary or recommended.

The intersection of SW Myslony Street at SW 124th Avenue, under two-way stop-control, is projected to operate at LOS F during the evening peak hour under year 2020 buildout conditions. However, upon installation of a planned traffic signal, the intersection is projected to operate at LOS B for all future year analysis scenarios. All other study intersections are currently operating acceptably per City of Tualatin standards and are projected to continue operating acceptably upon buildout of the proposed development through year 2020. No other operational mitigation is necessary or recommended.

Appendix



LEGEND

- CROSSWALK
- CURBS
- DOCK PAVING
- DRIVEWAY
- HEAVY PAVING
- CAR PAVING
- SIDEWALK
- TRASH SLAB

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(303) 216-2439
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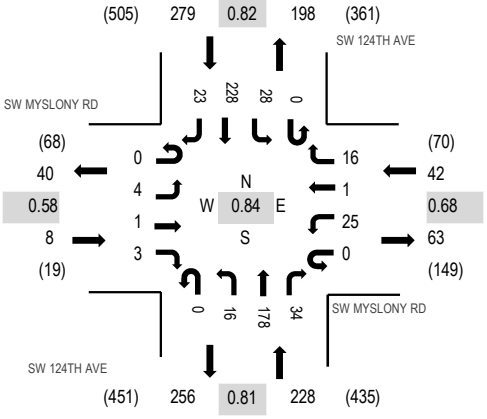
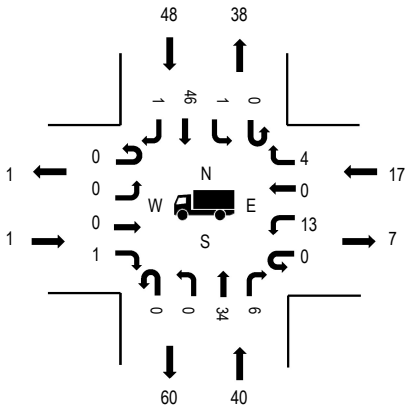
Location: SW 124TH AVE & SW MYSLONY RD AM
Date: Tuesday, July 10, 2018
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:50 AM - 08:05 AM

Peak Hour

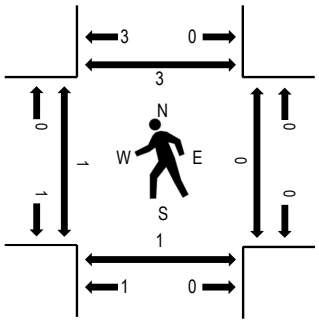
All Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	12.5%	0.58
WB	40.5%	0.68
NB	17.5%	0.81
SB	17.2%	0.82
All	19.0%	0.84

Traffic Counts - All Vehicles

Interval Start Time	SW MYSLONY RD Eastbound				SW MYSLONY RD Westbound				SW 124TH AVE Northbound				SW 124TH AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
7:00 AM	0	0	0	1	0	2	0	0	0	2	5	6	0	7	17	4	44	518
7:05 AM	0	0	0	0	0	0	0	2	0	2	11	5	0	6	14	1	41	520
7:10 AM	0	2	0	2	0	1	2	0	0	2	13	5	0	5	11	2	45	532
7:15 AM	0	0	0	0	0	0	0	1	0	2	10	9	0	7	10	2	41	528
7:20 AM	0	1	1	0	0	1	0	0	0	0	7	1	0	2	13	4	30	531
7:25 AM	0	1	0	1	0	4	0	1	0	1	10	3	0	3	9	2	35	551
7:30 AM	0	1	0	1	0	2	0	1	0	1	11	4	0	4	14	3	42	557
7:35 AM	0	0	0	0	0	4	0	5	0	3	8	2	0	2	20	1	45	550
7:40 AM	0	1	0	1	0	1	0	0	0	2	10	1	0	1	14	2	33	544
7:45 AM	0	0	0	0	0	0	0	2	0	1	15	4	0	1	18	2	43	547
7:50 AM	0	0	0	0	0	2	1	3	0	2	11	4	0	3	29	3	58	552
7:55 AM	0	0	0	0	0	3	0	1	0	0	25	4	0	7	15	6	61	539
8:00 AM	0	1	0	0	0	2	0	1	0	0	16	4	0	4	15	3	46	511
8:05 AM	0	1	0	0	0	4	0	0	0	2	21	4	0	1	18	2	53	
8:10 AM	0	0	0	0	0	1	0	2	0	2	20	1	0	1	14	0	41	
8:15 AM	0	0	1	0	0	2	0	1	0	1	14	2	0	1	22	0	44	
8:20 AM	0	0	0	1	0	3	0	0	0	1	15	3	0	2	24	1	50	
8:25 AM	0	0	0	0	0	1	0	0	0	1	12	1	0	1	25	0	41	
8:30 AM	0	0	0	0	0	2	0	1	0	0	18	1	0	0	13	0	35	
8:35 AM	0	1	0	0	0	3	0	1	0	0	12	6	0	1	14	1	39	
8:40 AM	0	0	0	0	0	1	0	0	0	1	15	3	0	1	15	0	36	
8:45 AM	0	0	0	0	0	2	0	0	0	0	17	3	0	3	23	0	48	
8:50 AM	0	1	0	0	0	1	0	0	0	0	20	1	0	2	20	0	45	
8:55 AM	0	0	0	0	0	2	0	1	0	0	12	4	0	1	13	0	33	
Count Total	0	10	2	7	0	44	3	23	0	26	328	81	0	66	400	39	1,029	
Peak Hour	0	4	1	3	0	25	1	16	0	16	178	34	0	28	228	23	557	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	0	2	3	5	7:00 AM	0	0	0	0	0	7:00 AM	1	0	0	0	1
7:05 AM	0	3	0	2	5	7:05 AM	0	0	0	0	0	7:05 AM	0	0	1	0	1
7:10 AM	1	2	3	4	10	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	0	4	0	1	5	7:15 AM	0	0	0	0	0	7:15 AM	10	1	1	1	13
7:20 AM	1	3	0	4	8	7:20 AM	0	0	0	0	0	7:20 AM	0	1	1	1	3
7:25 AM	1	2	2	1	6	7:25 AM	0	0	0	1	1	7:25 AM	10	0	0	1	11
7:30 AM	1	6	2	1	10	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	0	0	3	5	8	7:35 AM	0	0	0	0	0	7:35 AM	1	0	0	0	1
7:40 AM	0	3	1	2	6	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	0	3	1	3	7	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	0	3	1	4	8	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	0	4	1	7	12	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	0	3	1	4	8	8:00 AM	0	0	0	0	0	8:00 AM	0	1	0	0	1
8:05 AM	0	7	4	2	13	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	0	5	1	2	8	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	0	1	0	6	7	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	1	1
8:20 AM	0	1	1	6	8	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	1	1
8:25 AM	0	4	1	6	11	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	1	1
8:30 AM	0	7	1	3	11	8:30 AM	0	0	0	0	0	8:30 AM	0	0	1	0	1
8:35 AM	0	10	1	3	14	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	0	5	0	2	7	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	0	3	1	6	10	8:45 AM	0	0	0	1	1	8:45 AM	0	0	0	0	0
8:50 AM	1	5	1	1	8	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	0	3	2	4	9	8:55 AM	0	0	0	0	0	8:55 AM	0	0	1	0	1
Count Total	5	87	30	82	204	Count Total	0	0	0	2	2	Count Total	22	3	5	6	36
Peak Hour	1	40	17	48	106	Peak Hour	0	0	0	0	0	Peak Hour	1	1	0	3	5

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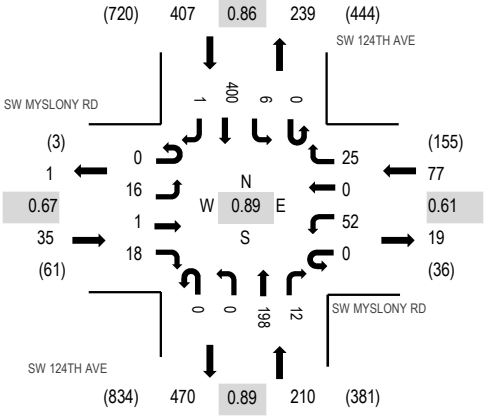
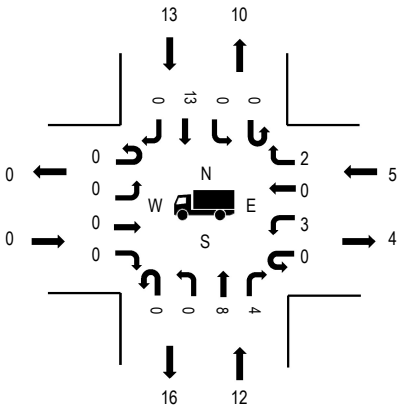
Location: SW 124TH AVE & SW MYSLONY RD PM
Date: Tuesday, July 10, 2018
Peak Hour: 04:25 PM - 05:25 PM
Peak 15-Minutes: 04:30 PM - 04:45 PM

Peak Hour

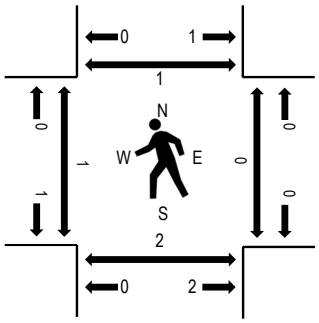
All Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.67
WB	6.5%	0.61
NB	5.7%	0.89
SB	3.2%	0.86
All	4.1%	0.89

Traffic Counts - All Vehicles

Interval Start Time	SW MYSLONY RD Eastbound				SW MYSLONY RD Westbound				SW 124TH AVE Northbound				SW 124TH AVE Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
4:00 PM	0	5	0	1	0	6	0	7	0	0	11	0	0	0	23	1	54	688
4:05 PM	0	1	0	2	0	13	0	1	0	0	16	0	0	0	34	0	67	679
4:10 PM	0	2	0	1	0	7	0	1	0	0	18	2	0	0	14	0	45	686
4:15 PM	0	1	0	1	0	5	0	2	1	0	13	0	0	1	29	0	53	710
4:20 PM	0	1	0	1	0	3	0	0	0	0	19	2	0	0	24	0	50	716
4:25 PM	0	0	0	1	0	8	0	0	0	0	13	1	0	1	29	1	54	729
4:30 PM	0	3	0	2	0	4	0	2	0	0	25	0	0	0	33	0	69	723
4:35 PM	0	3	0	2	0	4	0	3	0	0	18	2	0	3	44	0	79	705
4:40 PM	0	0	0	5	0	3	0	0	0	0	13	2	0	2	32	0	57	679
4:45 PM	0	2	0	1	0	1	0	3	0	0	12	0	0	0	37	0	56	657
4:50 PM	0	1	0	2	0	5	0	2	0	0	19	1	0	0	34	0	64	645
4:55 PM	0	1	0	1	0	4	0	2	0	0	11	0	0	0	21	0	40	621
5:00 PM	0	0	0	0	0	1	0	4	0	0	17	0	0	0	23	0	45	629
5:05 PM	0	1	0	1	0	7	0	5	0	0	19	2	0	0	39	0	74	
5:10 PM	0	2	0	3	0	6	0	2	0	0	17	2	0	0	37	0	69	
5:15 PM	0	2	1	0	0	5	0	2	0	0	18	1	0	0	30	0	59	
5:20 PM	0	1	0	0	0	4	0	0	0	0	16	1	0	0	41	0	63	
5:25 PM	0	0	0	0	0	1	0	3	0	0	14	1	0	1	28	0	48	
5:30 PM	0	3	1	1	0	2	0	1	0	0	15	1	0	1	26	0	51	
5:35 PM	0	1	0	1	0	3	0	3	0	0	17	1	0	0	27	0	53	
5:40 PM	0	1	0	0	0	2	0	2	0	0	7	0	0	2	21	0	35	
5:45 PM	0	0	0	0	0	1	0	2	0	1	13	0	0	4	23	0	44	
5:50 PM	0	0	0	0	0	4	0	3	0	0	8	0	0	0	25	0	40	
5:55 PM	0	1	0	1	0	4	0	2	0	0	11	0	0	0	29	0	48	
Count Total	0	32	2	27	0	103	0	52	1	1	360	19	0	15	703	2	1,317	
Peak Hour	0	16	1	18	0	52	0	25	0	0	198	12	0	6	400	1	729	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	1	0	1	2	4:00 PM	0	0	0	0	0	4:00 PM	0	1	0	0	1
4:05 PM	0	1	1	2	4	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	1	0	1	2	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	1	2	0	3	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	1	0	0	1	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	1	2	1	4	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	0	0	1	1	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	0	2	1	3	6	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	1	0	2	3	4:40 PM	0	1	0	0	1	4:40 PM	0	1	0	0	1
4:45 PM	0	1	1	0	2	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	1	0	1	2	4:50 PM	0	0	0	0	0	4:50 PM	1	1	0	0	2
4:55 PM	0	1	0	0	1	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	1	0	0	1	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	1	1
5:05 PM	0	0	0	1	1	5:05 PM	0	0	1	0	1	5:05 PM	0	0	0	0	0
5:10 PM	0	1	0	2	3	5:10 PM	0	0	1	0	1	5:10 PM	0	0	0	0	0
5:15 PM	0	0	1	0	1	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	3	0	2	5	5:20 PM	0	0	1	0	1	5:20 PM	0	0	0	0	0
5:25 PM	0	1	0	1	2	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	1	2	3	6	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	1	1	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	3	3	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	2	1	3	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	0	1	1	2	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	0	19	13	27	59	Count Total	0	1	3	0	4	Count Total	1	3	0	1	5
Peak Hour	0	12	5	13	30	Peak Hour	0	1	3	0	4	Peak Hour	1	2	0	1	4

TRIP GENERATION CALCULATIONS

Land Use: General Light Industrial
Land Use Code: 110
Setting/Location General Urban/Suburban
Variable: 1,000 Square Feet of Gross Floor Area
Variable Quantity: 52.5

AM PEAK HOUR

Trip Rate: 0.70

	Enter	Exit	Total
Directional Distribution	88%	12%	
Trip Ends	**33**	**4**	**37**

PM PEAK HOUR

Trip Rate: 0.63

	Enter	Exit	Total
Directional Distribution	13%	87%	
Trip Ends	**4**	**29**	**33**

WEEKDAY

Trip Rate: 4.96

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**130**	**130**	**260**

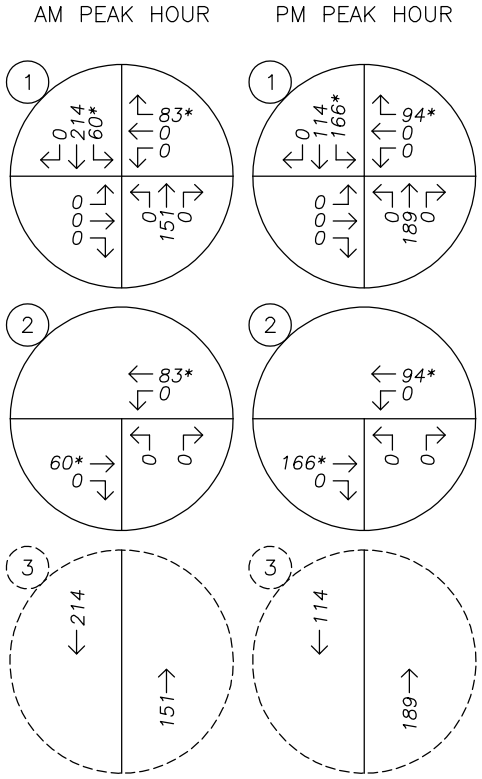
SATURDAY

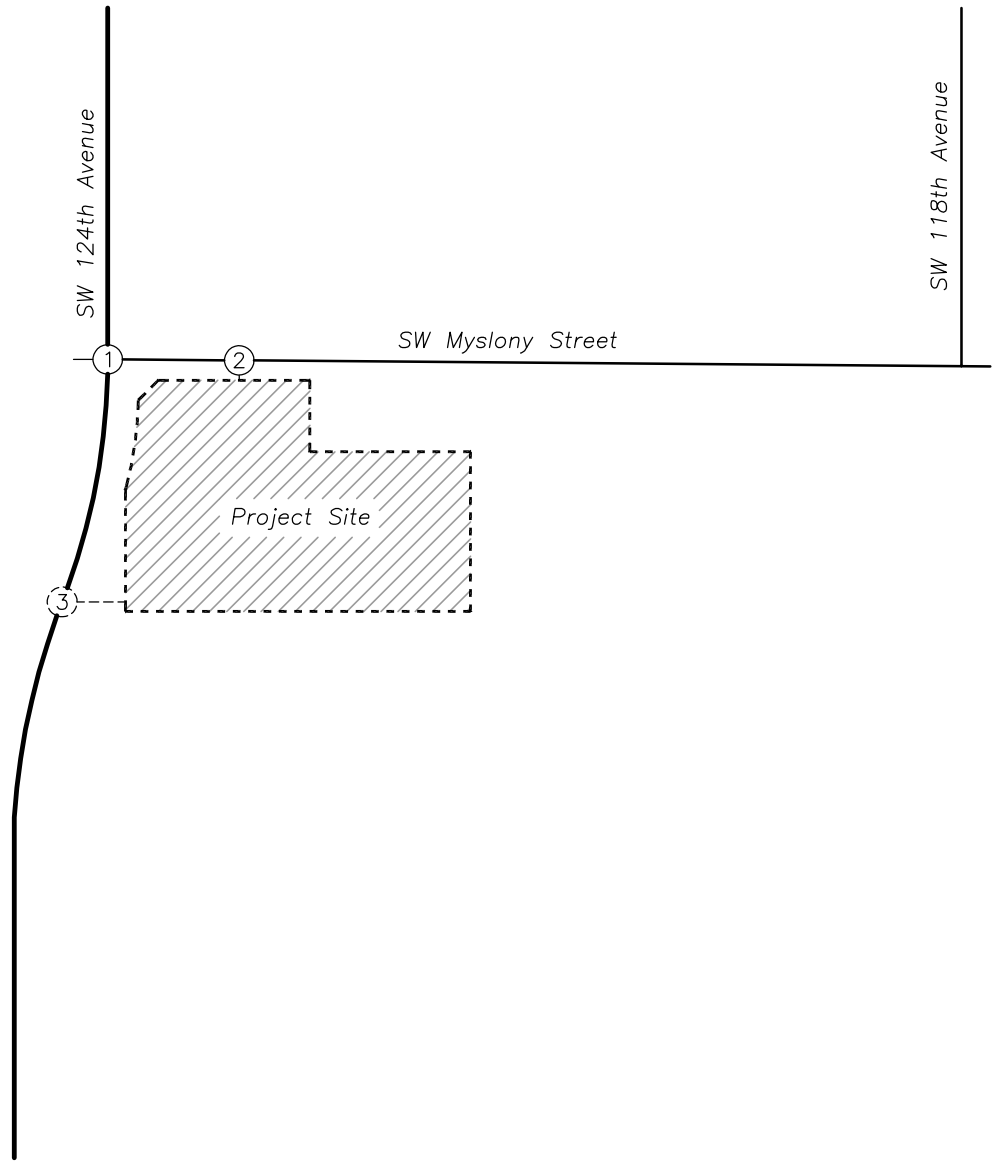
Trip Rate: 1.99

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**52**	**52**	**104**

Source: TRIP GENERATION, Tenth Edition

NOTE: SW MYSLONY STREET REROUTED TRAFFIC IS *





TRAFFIC VOLUMES
SW 124th Avenue & SW Myslony Street Extensions – Rerouted Traffic
AM & PM Peak Hours

no scale

FIGURE A

APPENDIX

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

MYSLONY ST at 124TH AVE, City of Tualatin, Washington County, 01/01/2012 to 12/31/2016

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2016														
SIDESWIPE - MEETING	0	1	0	1	0	2	0	1	0	0	1	1	0	0
YEAR 2016 TOTAL	**0**	**1**	**0**	**1**	**0**	**2**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**0**
YEAR: 2015														
TURNING MOVEMENTS	0	1	1	2	0	1	2	1	1	1	1	2	0	0
YEAR 2015 TOTAL	**0**	**1**	**1**	**2**	**0**	**1**	**2**	**1**	**1**	**1**	**1**	**2**	**0**	**0**
YEAR: 2012														
TURNING MOVEMENTS	0	0	1	1	0	0	0	0	1	1	0	1	0	0
YEAR 2012 TOTAL	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**1**	**0**	**0**
FINAL TOTAL	**0**	**2**	**2**	**4**	**0**	**3**	**2**	**2**	**2**	**2**	**2**	**4**	**0**	**0**

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF TUALATIN, WASHINGTON COUNTY

MYSLONY ST at 124TH AVE, City of Tualatin, Washington County, 01/01/2012 to 12/31/2016

1 - 4 of 4 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D C	A L S	R U G L	S C H K	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
01494	N	N	N	N	N	03/22/2012	16	SW MYSLONY ST	INTER	3-LEG	N	N	CLD	ANGL-OTH	01	NONE 0	TURN-L										02
CITY			TH			0	SW 124TH AVE	CN		STOP SIGN	N	WET	TURN			PRVTE	E -S									015	00
N			12P					02	0		N	DAY	PDO			PSNGR CAR		01	DRVR	NONE	28	M	OR-Y		028	000	02
N			45 22 35.3320693			-122 48 17.8266279																	OR<25				
															02	NONE 0	STRGHT										
																PRVTE	S -N									000	00
																PSNGR CAR		01	DRVR	NONE	26	M	EXP		000	000	00
																							OR<25				
00601	N	N	N			02/02/2015	16	SW MYSLONY ST	INTER	3-LEG	N	N	RAIN	ANGL-OTH	01	NONE 0	TURN-R										02
NONE			MO			0	SW 124TH AVE	CN		TRF SIGNAL	N	WET	TURN			PRVTE	E -N									015	00
N			5A					02	0		N	DLIT	INJ			PSNGR CAR		01	DRVR	NONE	47	M	OR-Y		028	000	02
N			45 22 35.33			-122 48 17.98																	OR<25				
															02	NONE 0	STRGHT										
																PRVTE	S -N									000	00
																TRUCK		01	DRVR	INJC	47	M	OR-Y		000	000	00
																							OR<25				
03338	N	N	N	N	N	06/16/2015	16	SW MYSLONY ST	INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										02
CITY			TU			0	SW 124TH AVE	CN		STOP SIGN	N	DRY	TURN			PRVTE	S -N									000	00
N			10A					02	0		N	DAY	PDO			PSNGR CAR		01	DRVR	NONE	34	F	OR-Y		000	000	00
N			45 22 35.33			-122 48 17.98																	OR<25				
															01	NONE 0	STRGHT										
																PRVTE	S -N									000	00
																PSNGR CAR		01	PSNG	NO<5	01	M			000	000	00
															01	NONE 0	STRGHT										
																PRVTE	S -N									000	00
																PSNGR CAR		02	PSNG	NO<5	04	M			000	000	00
															02	NONE 0	TURN-L										
																PRVTE	E -S									015	00
																TRUCK		01	DRVR	NONE	53	F	OR-Y		028	000	02
																							OR<25				
01826	N	N	N	N	N	03/18/2016	16	SW MYSLONY ST	INTER	3-LEG	N	N	CLR	O-1STOP	01	NONE 0	STRGHT										05
CITY			FR			0	SW 124TH AVE	CN		TRF SIGNAL	N	DRY	SS-M			PRVTE	N -S									000	00
N			4A					04	0		N	DLIT	INJ			PSNGR CAR		01	DRVR	INJC	47	M	NONE		044	000	05
N			45 22 35.33			-122 48 17.98																	OR<25				
															02	NONE 0	STOP										
																PRVTE	S -N									012	00
																MTRCYCLE		01	DRVR	INJB	36	M	OR-Y		000	000	00
																							OR>25				

LEVEL OF SERVICE

Level of service is used to describe the quality of traffic flow. Levels of service A to C are considered good, and rural roads are usually designed for level of service C. Urban streets and signalized intersections are typically designed for level of service D. Level of service E is considered to be the limit of acceptable delay. For unsignalized intersections, level of service E is generally considered acceptable. Here is a more complete description of levels of service:

Level of service A: Very low delay at intersections, with all traffic signal cycles clearing and no vehicles waiting through more than one signal cycle. On highways, low volume and high speeds, with speeds not restricted by other vehicles.

Level of service B: Operating speeds beginning to be affected by other traffic; short traffic delays at intersections. Higher average intersection delay than for level of service A resulting from more vehicles stopping.

Level of service C: Operating speeds and maneuverability closely controlled by other traffic; higher delays at intersections than for level of service B due to a significant number of vehicles stopping. Not all signal cycles clear the waiting vehicles. This is the recommended design standard for rural highways.

Level of service D: Tolerable operating speeds; long traffic delays occur at intersections. The influence of congestion is noticeable. At traffic signals many vehicles stop, and the proportion of vehicles not stopping declines. The number of signal cycle failures, for which vehicles must wait through more than one signal cycle, are noticeable. This is typically the design level for urban signalized intersections.

Level of service E: Restricted speeds, very long traffic delays at traffic signals, and traffic volumes near capacity. Flow is unstable so that any interruption, no matter how minor, will cause queues to form and service to deteriorate to level of service F. Traffic signal cycle failures are frequent occurrences. For unsignalized intersections, level of service E or better is generally considered acceptable.

Level of service F: Extreme delays, resulting in long queues which may interfere with other traffic movements. There may be stoppages of long duration, and speeds may drop to zero. There may be frequent signal cycle failures. Level of service F will typically result when vehicle arrival rates are greater than capacity. It is considered unacceptable by most drivers.

LEVEL OF SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-20
C	20-35
D	35-55
E	55-80
F	>80

LEVEL OF SERVICE CRITERIA
FOR UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-15
C	15-25
D	25-35
E	35-50
F	>50

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	1	3	25	1	16	16	178	34	28	228	23
Future Vol, veh/h	4	1	3	25	1	16	16	178	34	28	228	23
Conflicting Peds, #/hr	3	0	1	1	0	3	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	13	13	13	41	41	41	18	18	18	17	17	17
Mvmt Flow	5	1	4	30	1	19	19	212	40	33	271	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	500	642	151	473	635	129	299	0	0	252	0	0
Stage 1	352	352	-	270	270	-	-	-	-	-	-	-
Stage 2	148	290	-	203	365	-	-	-	-	-	-	-
Critical Hdwy	7.76	6.76	7.16	8.32	7.32	7.72	4.46	-	-	4.44	-	-
Critical Hdwy Stg 1	6.76	5.76	-	7.32	6.32	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.76	5.76	-	7.32	6.32	-	-	-	-	-	-	-
Follow-up Hdwy	3.63	4.13	3.43	3.91	4.41	3.71	2.38	-	-	2.37	-	-
Pot Cap-1 Maneuver	430	369	835	395	323	786	1151	-	-	1208	-	-
Stage 1	608	603	-	614	597	-	-	-	-	-	-	-
Stage 2	809	644	-	679	533	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	403	353	833	379	309	784	1150	-	-	1208	-	-
Mov Cap-2 Maneuver	403	353	-	379	309	-	-	-	-	-	-	-
Stage 1	598	586	-	604	587	-	-	-	-	-	-	-
Stage 2	773	633	-	656	518	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	13.6	0.6	0.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1150	-	-	489	469	1208	-	-
HCM Lane V/C Ratio	0.017	-	-	0.019	0.107	0.028	-	-
HCM Control Delay (s)	8.2	-	-	12.5	13.6	8.1	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.4	0.1	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	63	1	1	42	1	1
Future Vol, veh/h	63	1	1	42	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	11	11	41	41	40	40
Mvmt Flow	93	1	1	62	1	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	94	0	158	94
Stage 1	-	-	-	-	94	-
Stage 2	-	-	-	-	64	-
Critical Hdwy	-	-	4.51	-	6.8	6.6
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.569	-	3.86	3.66
Pot Cap-1 Maneuver	-	-	1288	-	752	868
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	870	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1288	-	751	868
Mov Cap-2 Maneuver	-	-	-	-	751	-
Stage 1	-	-	-	-	842	-
Stage 2	-	-	-	-	870	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	805	-	-	1288	-
HCM Lane V/C Ratio	0.004	-	-	0.001	-
HCM Control Delay (s)	9.5	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↑↑↱		↰	↑↑↱	
Traffic Vol, veh/h	16	1	18	50	1	24	1	198	11	6	400	1
Future Vol, veh/h	16	1	18	50	1	24	1	198	11	6	400	1
Conflicting Peds, #/hr	1	0	2	2	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	7	7	7	6	6	6	3	3	3
Mvmt Flow	18	1	20	56	1	27	1	222	12	7	449	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	580	701	228	471	695	118	451	0	0	234	0	0
Stage 1	465	465	-	230	230	-	-	-	-	-	-	-
Stage 2	115	236	-	241	465	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.64	6.64	7.04	4.22	-	-	4.16	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.64	5.64	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.64	5.64	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.57	4.07	3.37	2.26	-	-	2.23	-	-
Pot Cap-1 Maneuver	402	365	781	465	354	896	1078	-	-	1323	-	-
Stage 1	552	566	-	738	701	-	-	-	-	-	-	-
Stage 2	883	713	-	727	549	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	386	362	779	449	352	895	1077	-	-	1323	-	-
Mov Cap-2 Maneuver	386	362	-	449	352	-	-	-	-	-	-	-
Stage 1	551	563	-	737	700	-	-	-	-	-	-	-
Stage 2	853	712	-	702	546	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	13	0	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1077	-	-	520	532	1323	-	-
HCM Lane V/C Ratio	0.001	-	-	0.076	0.158	0.005	-	-
HCM Control Delay (s)	8.3	-	-	12.5	13	7.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.6	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	18	1	1	74	1	1
Future Vol, veh/h	18	1	1	74	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	61	61	61	61	61
Heavy Vehicles, %	21	21	7	7	40	40
Mvmt Flow	30	2	2	121	2	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	32	0	156	31
Stage 1	-	-	-	-	31	-
Stage 2	-	-	-	-	125	-
Critical Hdwy	-	-	4.17	-	6.8	6.6
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.263	-	3.86	3.66
Pot Cap-1 Maneuver	-	-	1548	-	754	944
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	815	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1548	-	753	944
Mov Cap-2 Maneuver	-	-	-	-	753	-
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	815	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	838	-	-	1548	-
HCM Lane V/C Ratio	0.004	-	-	0.001	-
HCM Control Delay (s)	9.3	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	1	3	26	1	100	17	336	35	89	451	24
Future Vol, veh/h	4	1	3	26	1	100	17	336	35	89	451	24
Conflicting Peds, #/hr	3	0	1	1	0	3	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	13	13	13	41	41	41	18	18	18	17	17	17
Mvmt Flow	5	1	4	31	1	119	20	400	42	106	537	29

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1009	1247	285	943	1240	224	567	0	0	442	0	0
Stage 1	765	765	-	461	461	-	-	-	-	-	-	-
Stage 2	244	482	-	482	779	-	-	-	-	-	-	-
Critical Hdwy	7.76	6.76	7.16	8.32	7.32	7.72	4.46	-	-	4.44	-	-
Critical Hdwy Stg 1	6.76	5.76	-	7.32	6.32	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.76	5.76	-	7.32	6.32	-	-	-	-	-	-	-
Follow-up Hdwy	3.63	4.13	3.43	3.91	4.41	3.71	2.38	-	-	2.37	-	-
Pot Cap-1 Maneuver	180	158	680	166	128	672	898	-	-	1015	-	-
Stage 1	338	385	-	458	476	-	-	-	-	-	-	-
Stage 2	708	525	-	444	323	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	132	138	679	148	112	670	897	-	-	1015	-	-
Mov Cap-2 Maneuver	132	138	-	148	112	-	-	-	-	-	-	-
Stage 1	330	345	-	448	466	-	-	-	-	-	-	-
Stage 2	566	513	-	394	289	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.8	20.6	0.4	1.4
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	897	-	-	191	380	1015	-	-
HCM Lane V/C Ratio	0.023	-	-	0.05	0.398	0.104	-	-
HCM Control Delay (s)	9.1	-	-	24.8	20.6	9	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	1.9	0.3	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	125	1	1	127	1	1
Future Vol, veh/h	125	1	1	127	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	11	11	41	41	40	40
Mvmt Flow	184	1	1	187	1	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	185	0	374	185
Stage 1	-	-	-	-	185	-
Stage 2	-	-	-	-	189	-
Critical Hdwy	-	-	4.51	-	6.8	6.6
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.569	-	3.86	3.66
Pot Cap-1 Maneuver	-	-	1186	-	559	769
Stage 1	-	-	-	-	763	-
Stage 2	-	-	-	-	760	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1186	-	558	769
Mov Cap-2 Maneuver	-	-	-	-	558	-
Stage 1	-	-	-	-	762	-
Stage 2	-	-	-	-	760	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	647	-	-	1186	-
HCM Lane V/C Ratio	0.005	-	-	0.001	-
HCM Control Delay (s)	10.6	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	1	19	52	1	119	1	395	11	172	530	1
Future Vol, veh/h	17	1	19	52	1	119	1	395	11	172	530	1
Conflicting Peds, #/hr	1	0	2	2	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	7	7	7	6	6	6	3	3	3
Mvmt Flow	19	1	21	58	1	134	1	444	12	193	596	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1210	1442	302	1139	1436	229	598	0	0	456	0	0
Stage 1	984	984	-	452	452	-	-	-	-	-	-	-
Stage 2	226	458	-	687	984	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.64	6.64	7.04	4.22	-	-	4.16	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.64	5.64	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.64	5.64	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.57	4.07	3.37	2.26	-	-	2.23	-	-
Pot Cap-1 Maneuver	141	134	700	150	127	758	948	-	-	1094	-	-
Stage 1	270	329	-	544	556	-	-	-	-	-	-	-
Stage 2	762	570	-	392	314	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	99	110	698	124	104	757	947	-	-	1094	-	-
Mov Cap-2 Maneuver	99	110	-	124	104	-	-	-	-	-	-	-
Stage 1	269	271	-	543	555	-	-	-	-	-	-	-
Stage 2	625	569	-	311	258	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.3	38.2	0	2.2
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	947	-	-	178	293	1094	-	-
HCM Lane V/C Ratio	0.001	-	-	0.234	0.66	0.177	-	-
HCM Control Delay (s)	8.8	-	-	31.3	38.2	9	-	-
HCM Lane LOS	A	-	-	D	E	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.9	4.3	0.6	-	-

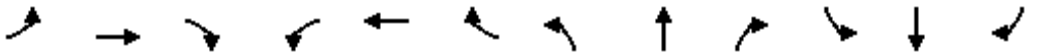
Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	184	1	1	171	1	1
Future Vol, veh/h	184	1	1	171	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	61	61	61	61	61
Heavy Vehicles, %	21	21	7	7	40	40
Mvmt Flow	302	2	2	280	2	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	304	0	587	303
Stage 1	-	-	-	-	303	-
Stage 2	-	-	-	-	284	-
Critical Hdwy	-	-	4.17	-	6.8	6.6
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.263	-	3.86	3.66
Pot Cap-1 Maneuver	-	-	1229	-	415	656
Stage 1	-	-	-	-	670	-
Stage 2	-	-	-	-	685	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1229	-	414	656
Mov Cap-2 Maneuver	-	-	-	-	414	-
Stage 1	-	-	-	-	669	-
Stage 2	-	-	-	-	685	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.1
HCM LOS			B

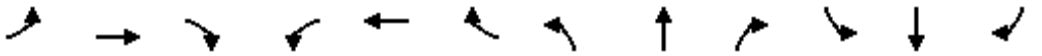
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	508	-	-	1229	-
HCM Lane V/C Ratio	0.006	-	-	0.001	-
HCM Control Delay (s)	12.1	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1	3	26	1	100	17	336	35	89	451	24
Future Volume (veh/h)	4	1	3	26	1	100	17	336	35	89	451	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1707	1707	1292	1292	1292	1633	1633	1633	1648	1648	1648
Adj Flow Rate, veh/h	5	1	4	31	1	119	20	400	42	106	537	29
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	13	13	13	41	41	41	18	18	18	17	17	17
Cap, veh/h	277	72	108	176	13	149	40	737	77	155	1007	54
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.03	0.26	0.26	0.10	0.33	0.33
Sat Flow, veh/h	516	415	621	152	77	853	1555	2835	296	1570	3021	163
Grp Volume(v), veh/h	10	0	0	151	0	0	20	218	224	106	278	288
Grp Sat Flow(s),veh/h/ln	1553	0	0	1083	0	0	1555	1552	1579	1570	1566	1618
Q Serve(g_s), s	0.0	0.0	0.0	2.3	0.0	0.0	0.4	3.5	3.5	1.9	4.2	4.2
Cycle Q Clear(g_c), s	0.2	0.0	0.0	3.8	0.0	0.0	0.4	3.5	3.5	1.9	4.2	4.2
Prop In Lane	0.50		0.40	0.21		0.79	1.00		0.19	1.00		0.10
Lane Grp Cap(c), veh/h	458	0	0	339	0	0	40	403	411	155	522	540
V/C Ratio(X)	0.02	0.00	0.00	0.45	0.00	0.00	0.50	0.54	0.55	0.68	0.53	0.53
Avail Cap(c_a), veh/h	1040	0	0	815	0	0	269	975	993	558	1271	1314
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.9	0.0	0.0	11.4	0.0	0.0	13.9	9.2	9.2	12.6	7.8	7.8
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.9	0.0	0.0	9.4	1.1	1.1	5.2	0.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.8	0.0	0.0	0.2	0.7	0.8	0.6	0.7	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.9	0.0	0.0	12.3	0.0	0.0	23.3	10.3	10.4	17.8	8.7	8.6
LnGrp LOS	A	A	A	B	A	A	C	B	B	B	A	A
Approach Vol, veh/h		10			151			462			672	
Approach Delay, s/veh		9.9			12.3			10.9			10.1	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	12.0		9.6	5.2	14.2		9.6				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.3	18.2		18.0	5.0	23.5		18.0				
Max Q Clear Time (g_c+I1), s	3.9	5.5		2.2	2.4	6.2		5.8				
Green Ext Time (p_c), s	0.1	1.9		0.0	0.0	2.9		0.7				

Intersection Summary			
HCM 6th Ctrl Delay		10.6	
HCM 6th LOS		B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	1	19	52	1	119	1	395	11	172	530	1
Future Volume (veh/h)	17	1	19	52	1	119	1	395	11	172	530	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1796	1796	1796	1811	1811	1811	1856	1856	1856
Adj Flow Rate, veh/h	19	1	21	58	1	134	1	444	12	193	596	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	0	7	7	7	6	6	6	3	3	3
Cap, veh/h	263	58	163	211	23	196	5	820	22	253	1378	2
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.00	0.24	0.24	0.14	0.38	0.38
Sat Flow, veh/h	509	301	851	330	121	1023	1725	3420	92	1767	3611	6
Grp Volume(v), veh/h	41	0	0	193	0	0	1	223	233	193	291	306
Grp Sat Flow(s),veh/h/ln	1661	0	0	1474	0	0	1725	1721	1792	1767	1763	1854
Q Serve(g_s), s	0.0	0.0	0.0	2.4	0.0	0.0	0.0	3.6	3.6	3.3	3.9	3.9
Cycle Q Clear(g_c), s	0.6	0.0	0.0	3.8	0.0	0.0	0.0	3.6	3.6	3.3	3.9	3.9
Prop In Lane	0.46		0.51	0.30		0.69	1.00		0.05	1.00		0.00
Lane Grp Cap(c), veh/h	484	0	0	430	0	0	5	413	430	253	673	707
V/C Ratio(X)	0.08	0.00	0.00	0.45	0.00	0.00	0.18	0.54	0.54	0.76	0.43	0.43
Avail Cap(c_a), veh/h	1025	0	0	973	0	0	272	977	1018	585	1307	1375
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.6	0.0	0.0	11.9	0.0	0.0	15.8	10.5	10.5	13.1	7.3	7.3
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.7	0.0	0.0	15.4	1.1	1.1	4.8	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	1.1	0.0	0.0	0.0	0.9	1.0	1.2	0.7	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.7	0.0	0.0	12.6	0.0	0.0	31.2	11.6	11.6	17.8	7.7	7.7
LnGrp LOS	B	A	A	B	A	A	C	B	B	B	A	A
Approach Vol, veh/h		41			193			457			790	
Approach Delay, s/veh		10.7			12.6			11.7			10.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	12.1		10.6	4.5	16.6		10.6				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.5	18.0		18.0	5.0	23.5		18.0				
Max Q Clear Time (g_c+I1), s	5.3	5.6		2.6	2.0	5.9		5.8				
Green Ext Time (p_c), s	0.2	1.9		0.1	0.0	3.0		0.9				

Intersection Summary		
HCM 6th Ctrl Delay		11.0
HCM 6th LOS		B

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	1	3	28	1	101	17	337	37	102	451	24
Future Vol, veh/h	4	1	3	28	1	101	17	337	37	102	451	24
Conflicting Peds, #/hr	3	0	1	1	0	3	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	13	13	13	41	41	41	18	18	18	17	17	17
Mvmt Flow	5	1	4	33	1	120	20	401	44	121	537	29

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1039	1280	285	975	1272	226	567	0	0	445	0	0
Stage 1	795	795	-	463	463	-	-	-	-	-	-	-
Stage 2	244	485	-	512	809	-	-	-	-	-	-	-
Critical Hdwy	7.76	6.76	7.16	8.32	7.32	7.72	4.46	-	-	4.44	-	-
Critical Hdwy Stg 1	6.76	5.76	-	7.32	6.32	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.76	5.76	-	7.32	6.32	-	-	-	-	-	-	-
Follow-up Hdwy	3.63	4.13	3.43	3.91	4.41	3.71	2.38	-	-	2.37	-	-
Pot Cap-1 Maneuver	170	150	680	157	121	670	898	-	-	1012	-	-
Stage 1	324	372	-	457	474	-	-	-	-	-	-	-
Stage 2	708	523	-	424	311	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	123	129	679	138	104	668	897	-	-	1012	-	-
Mov Cap-2 Maneuver	123	129	-	138	104	-	-	-	-	-	-	-
Stage 1	317	327	-	447	464	-	-	-	-	-	-	-
Stage 2	565	511	-	370	273	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.2	22.6	0.4	1.6
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	897	-	-	179	357	1012	-	-
HCM Lane V/C Ratio	0.023	-	-	0.053	0.434	0.12	-	-
HCM Control Delay (s)	9.1	-	-	26.2	22.6	9	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	2.1	0.4	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	125	15	7	127	3	1
Future Vol, veh/h	125	15	7	127	3	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	11	11	41	41	40	40
Mvmt Flow	184	22	10	187	4	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	206	0	402	195
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	207	-
Critical Hdwy	-	-	4.51	-	6.8	6.6
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.569	-	3.86	3.66
Pot Cap-1 Maneuver	-	-	1164	-	537	758
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	745	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1164	-	532	758
Mov Cap-2 Maneuver	-	-	-	-	532	-
Stage 1	-	-	-	-	747	-
Stage 2	-	-	-	-	745	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	11.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	575	-	-	1164	-
HCM Lane V/C Ratio	0.01	-	-	0.009	-
HCM Control Delay (s)	11.3	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	1	390	11	0	482
Future Vol, veh/h	0	1	390	11	0	482
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	40	40	18	18	23	23
Mvmt Flow	0	1	481	14	0	595

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	248	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.7	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.7	-	-	-	-
Pot Cap-1 Maneuver	0	648	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	648	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	648	-
HCM Lane V/C Ratio	-	-	0.002	-
HCM Control Delay (s)	-	-	10.6	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0	-

Intersection	
Int Delay, s/veh	9.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	1	19	63	1	124	1	401	11	174	530	1
Future Vol, veh/h	17	1	19	63	1	124	1	401	11	174	530	1
Conflicting Peds, #/hr	1	0	2	2	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	7	7	7	6	6	6	3	3	3
Mvmt Flow	19	1	21	71	1	139	1	451	12	196	596	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1219	1455	302	1152	1449	233	598	0	0	463	0	0
Stage 1	990	990	-	459	459	-	-	-	-	-	-	-
Stage 2	229	465	-	693	990	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.64	6.64	7.04	4.22	-	-	4.16	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.64	5.64	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.64	5.64	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.57	4.07	3.37	2.26	-	-	2.23	-	-
Pot Cap-1 Maneuver	139	131	700	147	124	754	948	-	-	1088	-	-
Stage 1	268	327	-	538	552	-	-	-	-	-	-	-
Stage 2	759	566	-	388	312	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	97	107	698	121	101	753	947	-	-	1088	-	-
Mov Cap-2 Maneuver	97	107	-	121	101	-	-	-	-	-	-	-
Stage 1	267	268	-	537	551	-	-	-	-	-	-	-
Stage 2	616	565	-	306	256	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.9	53.6	0	2.2
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	947	-	-	175	270	1088	-	-
HCM Lane V/C Ratio	0.001	-	-	0.238	0.782	0.18	-	-
HCM Control Delay (s)	8.8	-	-	31.9	53.6	9	-	-
HCM Lane LOS	A	-	-	D	F	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.9	6	0.7	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	184	2	1	171	16	7
Future Vol, veh/h	184	2	1	171	16	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	61	61	61	61	61
Heavy Vehicles, %	21	21	7	7	40	40
Mvmt Flow	302	3	2	280	26	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	305	0	588	304
Stage 1	-	-	-	-	304	-
Stage 2	-	-	-	-	284	-
Critical Hdwy	-	-	4.17	-	6.8	6.6
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.263	-	3.86	3.66
Pot Cap-1 Maneuver	-	-	1228	-	414	655
Stage 1	-	-	-	-	670	-
Stage 2	-	-	-	-	685	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1228	-	413	655
Mov Cap-2 Maneuver	-	-	-	-	413	-
Stage 1	-	-	-	-	669	-
Stage 2	-	-	-	-	685	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	13.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	465	-	-	1228	-
HCM Lane V/C Ratio	0.081	-	-	0.001	-
HCM Control Delay (s)	13.4	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

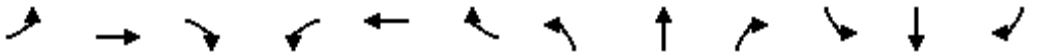
Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	6	406	2	0	612
Future Vol, veh/h	0	6	406	2	0	612
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	40	40	6	6	3	3
Mvmt Flow	0	7	456	2	0	688

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	229	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.7	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.7	-	-	-	-
Pot Cap-1 Maneuver	0	669	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	669	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	0
HCM LOS	B		

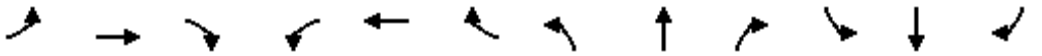
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	669	-
HCM Lane V/C Ratio	-	-	0.01	-
HCM Control Delay (s)	-	-	10.4	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1	3	28	1	101	17	337	37	102	451	24
Future Volume (veh/h)	4	1	3	28	1	101	17	337	37	102	451	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1707	1707	1292	1292	1292	1633	1633	1633	1648	1648	1648
Adj Flow Rate, veh/h	5	1	4	33	1	120	20	401	44	121	537	29
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	13	13	13	41	41	41	18	18	18	17	17	17
Cap, veh/h	276	73	111	176	14	150	40	729	80	167	1025	55
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.03	0.26	0.26	0.11	0.34	0.34
Sat Flow, veh/h	523	408	621	158	81	844	1555	2821	308	1570	3021	163
Grp Volume(v), veh/h	10	0	0	154	0	0	20	220	225	121	278	288
Grp Sat Flow(s),veh/h/ln	1552	0	0	1083	0	0	1555	1552	1577	1570	1566	1618
Q Serve(g_s), s	0.0	0.0	0.0	2.4	0.0	0.0	0.4	3.6	3.7	2.2	4.2	4.2
Cycle Q Clear(g_c), s	0.2	0.0	0.0	4.0	0.0	0.0	0.4	3.6	3.7	2.2	4.2	4.2
Prop In Lane	0.50		0.40	0.21		0.78	1.00		0.20	1.00		0.10
Lane Grp Cap(c), veh/h	459	0	0	341	0	0	40	401	408	167	531	549
V/C Ratio(X)	0.02	0.00	0.00	0.45	0.00	0.00	0.50	0.55	0.55	0.72	0.52	0.52
Avail Cap(c_a), veh/h	1020	0	0	799	0	0	263	945	961	558	1245	1287
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.0	0.0	0.0	11.6	0.0	0.0	14.2	9.5	9.5	12.8	7.8	7.8
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.9	0.0	0.0	9.4	1.2	1.2	5.8	0.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.8	0.0	0.0	0.2	0.8	0.8	0.8	0.7	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.1	0.0	0.0	12.5	0.0	0.0	23.6	10.6	10.7	18.6	8.6	8.6
LnGrp LOS	B	A	A	B	A	A	C	B	B	B	A	A
Approach Vol, veh/h		10			154			465			687	
Approach Delay, s/veh		10.1			12.5			11.2			10.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.6	12.1		9.8	5.3	14.5		9.8				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.5	18.0		18.0	5.0	23.5		18.0				
Max Q Clear Time (g_c+I1), s	4.2	5.7		2.2	2.4	6.2		6.0				
Green Ext Time (p_c), s	0.1	1.9		0.0	0.0	2.9		0.7				

Intersection Summary			
HCM 6th Ctrl Delay		10.9	
HCM 6th LOS		B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	1	19	63	1	124	1	401	11	174	530	1
Future Volume (veh/h)	17	1	19	63	1	124	1	401	11	174	530	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1796	1796	1796	1811	1811	1811	1856	1856	1856
Adj Flow Rate, veh/h	19	1	21	71	1	139	1	451	12	196	596	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	0	7	7	7	6	6	6	3	3	3
Cap, veh/h	269	58	176	224	26	199	5	815	22	256	1379	2
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.00	0.24	0.24	0.15	0.38	0.38
Sat Flow, veh/h	530	283	854	375	126	968	1725	3422	91	1767	3611	6
Grp Volume(v), veh/h	41	0	0	211	0	0	1	226	237	196	291	306
Grp Sat Flow(s),veh/h/ln	1667	0	0	1470	0	0	1725	1721	1792	1767	1763	1854
Q Serve(g_s), s	0.0	0.0	0.0	2.8	0.0	0.0	0.0	3.8	3.8	3.5	4.0	4.0
Cycle Q Clear(g_c), s	0.6	0.0	0.0	4.3	0.0	0.0	0.0	3.8	3.8	3.5	4.0	4.0
Prop In Lane	0.46		0.51	0.34		0.66	1.00		0.05	1.00		0.00
Lane Grp Cap(c), veh/h	503	0	0	449	0	0	5	410	427	256	673	708
V/C Ratio(X)	0.08	0.00	0.00	0.47	0.00	0.00	0.19	0.55	0.55	0.76	0.43	0.43
Avail Cap(c_a), veh/h	994	0	0	940	0	0	263	943	982	565	1261	1327
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.6	0.0	0.0	12.0	0.0	0.0	16.4	11.0	11.0	13.5	7.5	7.5
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.8	0.0	0.0	16.7	1.2	1.1	4.7	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	1.2	0.0	0.0	0.0	1.0	1.1	1.3	0.8	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.7	0.0	0.0	12.8	0.0	0.0	33.0	12.1	12.1	18.2	8.0	7.9
LnGrp LOS	B	A	A	B	A	A	C	B	B	B	A	A
Approach Vol, veh/h		41			211			464			793	
Approach Delay, s/veh		10.7			12.8			12.2			10.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.3	12.3		11.3	4.5	17.0		11.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.5	18.0		18.0	5.0	23.5		18.0				
Max Q Clear Time (g_c+I1), s	5.5	5.8		2.6	2.0	6.0		6.3				
Green Ext Time (p_c), s	0.2	1.9		0.1	0.0	3.0		1.0				

Intersection Summary			
HCM 6th Ctrl Delay		11.3	
HCM 6th LOS		B	

Technical Memorandum

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To: Skip Stanaway
Four-S Corp

From: Daniel Stumpf, EI
Todd Mobley, PE

Date: July 17, 2018

Subject: 19000 SW 124th Avenue Drake Property – Access Feasibility Study

Introduction

This memorandum reports the findings of an operational analysis conducted for a future unsignalized, full-movement access along SW 124th Avenue from the Drake property, located just south of 12200 SW Myslony Avenue in Tualatin, Oregon.

At the request of City of Tualatin staff, in order to allow access on SW 124th Avenue without requiring a future north/south connection onto SW Myslony Street, an analysis of operation for a future access onto SW 124th Avenue is necessary. In addition, the access intersection must operate safely whereby minimum sight distance standards must be met.

The purpose of this memorandum is to examine a worst-case development scenario with regard to projected trip generation of the property and determine the breakpoint of intersection operation of the future property access onto SW 124th Avenue, assuming the completion of the SW 124th Avenue extension south of SW Tualatin Sherwood Road.

Property Description & Vicinity Roadways

The property is located north of SW Cimino Street, south of SW Myslony Street, and east of SW 124th Avenue in Tualatin, Oregon. The property (tax lot 100) encompasses an approximate total of 9.3 acres with a significant portion of the lot being wetlands. The property is currently undeveloped; however approved access onto SW 124th Avenue is provided along the southern property line.

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

Figure 1 presents an aerial image of the nearby vicinity with the property outlined in yellow.

Figure 1: Aerial Photo of Site Vicinity (Image from Google Earth)

Operational Analysis

To evaluate the breakpoint at which the future site access intersection onto SW 124th Avenue exceeds City of Tualatin's minimum standards of acceptable operation, an analysis of potential site trip generation, future traffic volumes, and intersection operation was conducted. The following sections describe these analysis methodologies and results.

Trip Generation

To assess operation at the future access along SW 124th Avenue, a projection of trip generation for the Drake property is necessary. Since no development is currently proposed, at the request of City of Tualatin staff a worst-case development scenario was analyzed to ensure the access is projected to operate at acceptable levels of capacity per City standards.

To estimate trip generation for the site, trip rates from the *Trip Generation Manual*[1] were used. Based on the property's zoning as *General Manufacturing* (MG) and at the direction of City staff, data from land-use code 110, *General Light Industrial*, was used to estimate trip generation based on the square-footage of building gross floor area.

While determining a worst-case development size is dependent on operation at the future access intersection, a reasonable worst-case development scenario may still be defined based on the size of the site and the developable area within the property. To determine a reasonable development size, the following assumptions were made:

- Approximately 2/3 of the property is wetlands and therefore is undevelopable. This leaves approximately 135,036 square feet of developable space.
- Assuming an industrial building footprint covers roughly 30 percent of the developable area, a building of approximately 40,500 square feet may be constructed. The remaining 70 percent of the developable area is assumed as space necessary to accommodate parking lots, street right-of-way improvements, other public space, etc.

Per these assumptions, the trip generation calculations show that the property could generate up to 28 morning peak hour, 26 evening peak hour, and 200 average weekday site trips. The trip generation estimates are summarized in **Error! Reference source not found.**. Detailed trip generation calculations are included as an attachment to this study.

Table 1 – Trip Generation Summary

	ITE Code	Size / Rate	Morning Peak Hour			Evening Peak Hour			Weekday
			Enter	Exit	Total	Enter	Exit	Total	Total
General Light Industrial	110	40,500 sq.ft.	25	3	28	3	23	26	200

[1] Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10th Edition, 2017.

Trip Distribution

The directional distribution of site trips to/from the project site was estimated based on the locations of likely trip destinations and locations of major transportation facilities within the site vicinity. The following trip distribution was estimated and used for analysis:

- Approximately 60 percent of site trips will travel to/from the south along SW 124th Avenue; and
- Approximately 40 percent of site trips will travel to/from the north along SW 124th Avenue.

The trip distribution and assignment for the trips generated by the reasonable worst-case development during the morning and evening peak hours is shown in Figure 2 on page 5.

Future Traffic Volumes

2029 Background Volumes

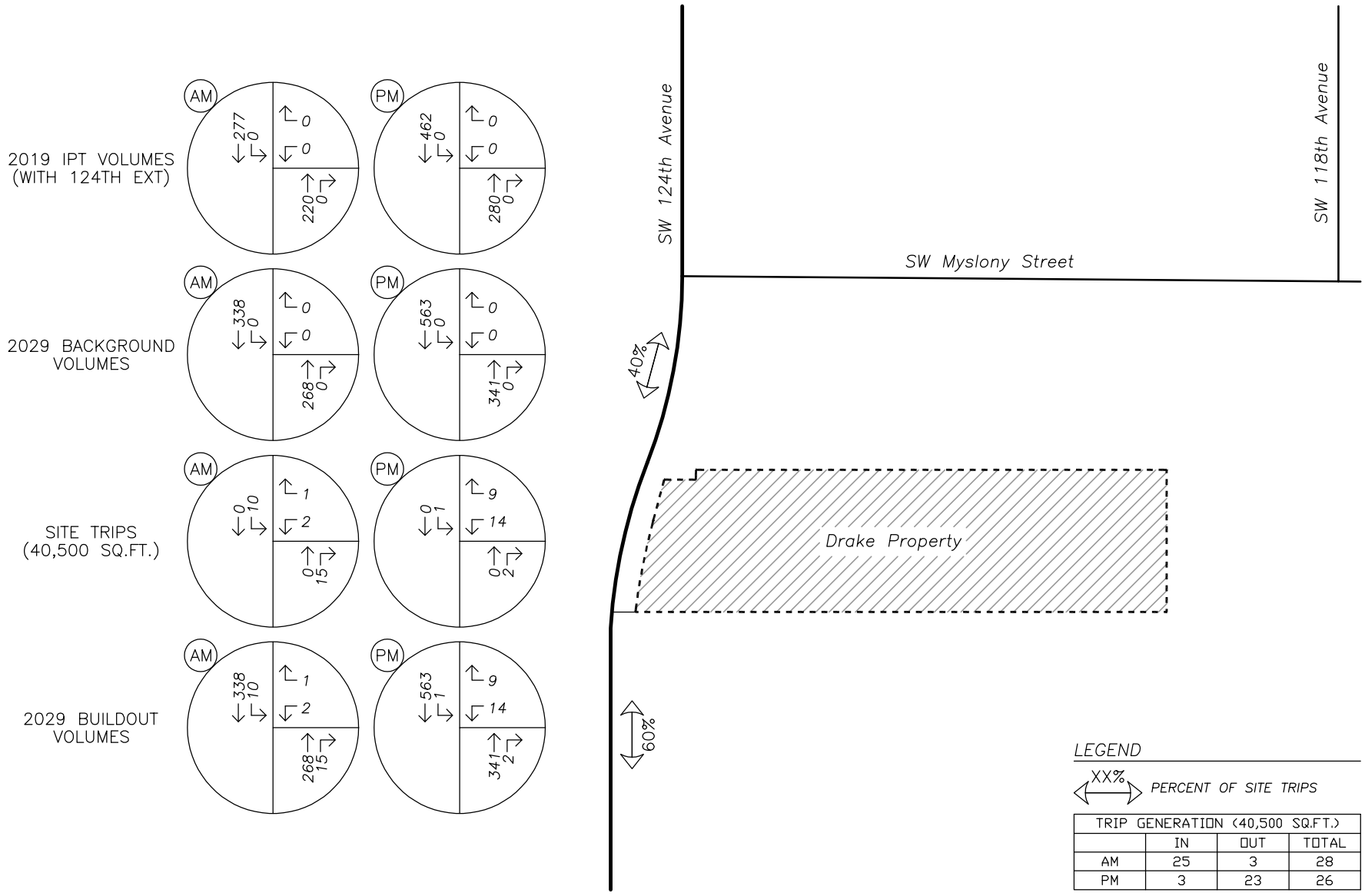
To provide an analysis of the site access intersection, an estimate of future traffic volumes along SW 124th Avenue is required. Year 2019 buildout traffic volumes (with the SW 124th Avenue extension) from the prior approved *IPT Tualatin Transportation Impact Study*, dated July 18th, 2017, was used. Volumes specific to the intersection of SW Cimino Street at SW Tualatin, traveling to/from the north, were used and grown at a rate of two percent per year over a 10-year period to reflect year 2029 background traffic conditions.

Note that the prior approved TIS volumes did not account for the proposed extension of SW Myslony Street. However, since the proposed extension is expected to reroute some traffic away from the intersection of SW Tualatin Sherwood Road at SW 124th Avenue (i.e. decrease eastbound right-turning and southbound left-turning vehicles at the intersection), analyzing the future access intersection without the reroute will provide a more conservative assessment of intersection operation.

2029 Buildout Volumes

Peak hour trips calculated to be generated under the reasonable worst-case development scenario of the property, as described earlier within the *Site Trips* section, were added to the projected year 2029 background traffic volumes to obtain the potential 2029 buildout volumes.

Figure 2 on page 5 shows the projected year 2029 background and buildout traffic volumes at the future access intersection during the morning and evening peak hours.



TRIP GENERATION (40,500 SQ.FT.)			
	IN	OUT	TOTAL
AM	25	3	28
PM	3	23	26

TRAFFIC VOLUMES
2019 IPT, 2029 Background, & 2029 Buildout Volumes (40,500 Sq.Ft.)
AM & PM Peak Hours

no scale

FIGURE 2

Capacity Analysis

To determine a worst-case development scenario for the site, a capacity and delay analysis was conducted at the future access intersection at SW 124th Avenue. The operational analysis was conducted per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual*[2] (HCM).

Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection. The City of Tualatin standards require unsignalized intersections operate at a minimum LOS E or better.

In conducting the operational analysis, the following assumptions and scenarios were analyzed:

- All analysis scenarios include the installation of a dedicated southbound left-turn lane.
- It is assumed that approximately 40 percent of outbound traffic utilizing the future access would consist of heavy vehicles.
- The intersection was analysed with and without the installation of a two-way left-turn receiving lane.

The v/c, delay, and LOS results of the capacity analysis, assuming both reasonable worst-case and worst-case development scenarios, are shown in Table 2 for the morning and evening peak hours. Detailed calculations as well as tables showing the relationship between delay and LOS are included as an attachment to this memorandum.

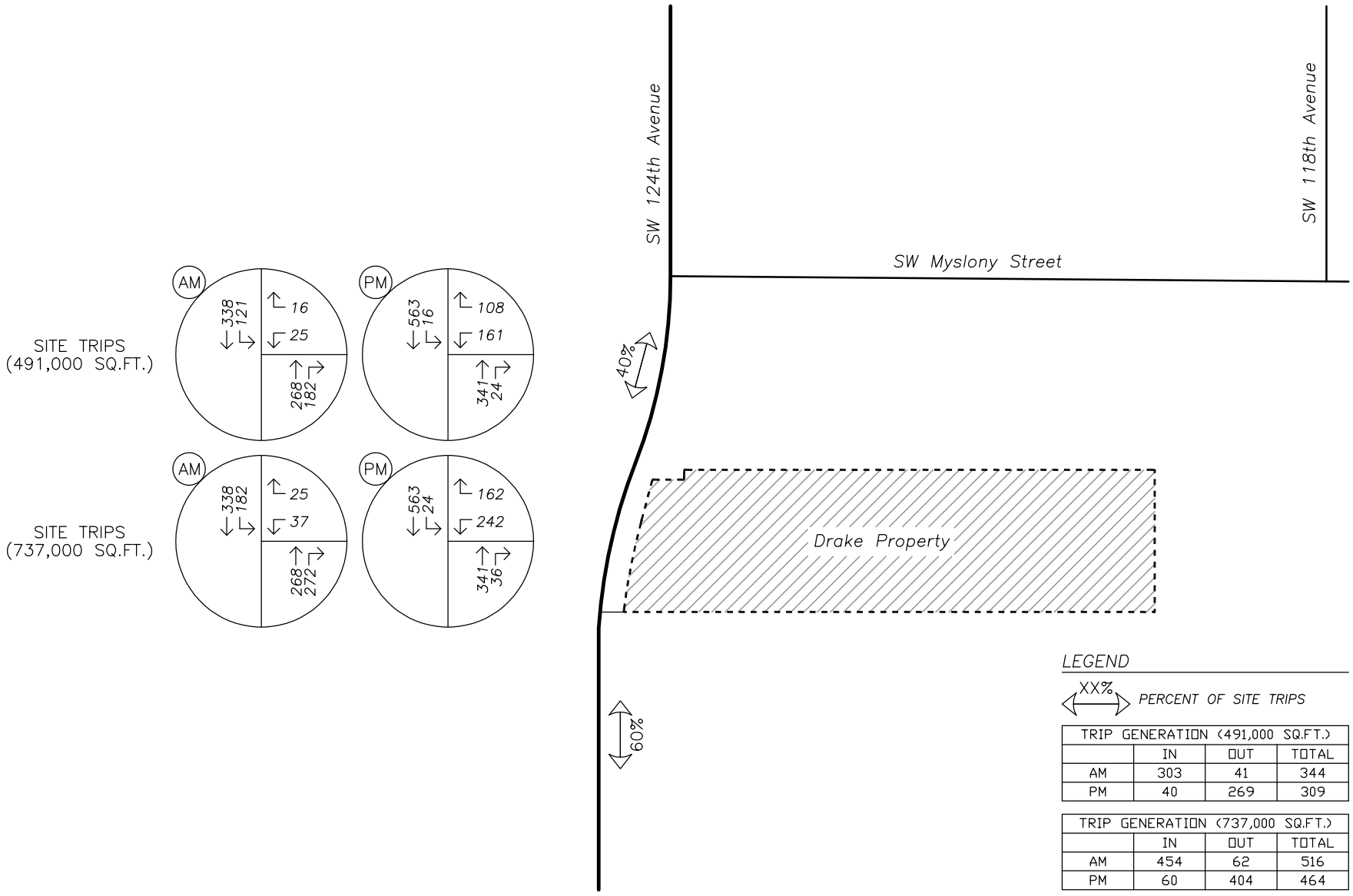
[2] Transportation Research Board, *Highway Capacity Manual, 2000.*

Table 2: Intersection Capacity Analysis Summary

	Morning Peak Hour			Evening Peak Hour		
	LOS	**Delay (s)**	**v/c**	**LOS**	**Delay (s)**	**v/c**
2020 Buildout Conditions (full-movement w/o TWLTL)						
Reasonable Worst-Case Development (40,500 sq.ft.)	B	13	0.01	C	15	0.07
Worst-Case Development (491,000 sq.ft.)	C	20	0.16	E	50	0.84
2020 Buildout Conditions (full-movement w/ TWLTL)						
Reasonable Worst-Case Development (40,500 sq.ft.)	B	11	0.01	B	12	0.05
Worst-Case Development (737,000 sq.ft.)	C	21	0.23	E	50	0.91

Based on the results of the operational analysis, a future full-movement access intersection is possible along SW 124th Avenue while meeting City of Tualatin operation standards. Although unreasonably large to construct given the limitations of developable land within the site, a 491,000 square foot general light industrial building could be constructed before the future access intersection exceeds LOS E. If a two-way left-turn receiving lane is also installed, the access could serve a development of up to 737,000 square feet.

Volumes associated with the worst-case development scenario, with and without a two-way left-turn lane, are shown in Figure 3 on page 8.



TRIP GENERATION (491,000 SQ.FT.)			
	IN	OUT	TOTAL
AM	303	41	344
PM	40	269	309

TRIP GENERATION (737,000 SQ.FT.)			
	IN	OUT	TOTAL
AM	454	62	516
PM	60	404	464

TRAFFIC VOLUMES
2029 Buildout Volumes (Worst-Case Development)
AM & PM Peak Hours

no scale

FIGURE 3

Sight Distance Analysis

To assess adequacy of sight distances at potential access locations along SW 124th Avenue, intersection sight distance was measured at locations near the northern and southern property lines of the site. Sight distance was measured and evaluated in accordance with standards established in *A Policy on Geometric Design of Highways and Streets*[3]. According to AASHTO, the driver's eye is assumed to be 15 feet from the near edge of the nearest travel lane of the intersecting street and at a height of 3.5 feet above the minor-street approach pavement. The vehicle driver's eye-height along the major-street approach is assumed to be 3.5 feet above the cross-street pavement.

Based on a posted speed of 45 mph along SW 124th Avenue, the calculated intersection sight distance for left-turning vehicles crossing two northbound travel lanes (assuming the raised median is replaced by a southbound receiving lane) is 530 feet to the north and south.

Assuming removal or proper maintenance of any obstructing/overgrown roadside foliage, inclusive of foliage within the median along SW 124th Avenue, intersection sight distance near the northern property line was measured to be in excess of 600 feet to the north and 392 feet to the south, limited by an onsite fence and onsite foliage. Intersection sight distance near the southern property line, also assuming removal or proper maintenance of any obstructing/overgrown roadside foliage, was measured to be in 533 feet to the north and in excess of 600 feet to the south. At the southern property line, sight distances viewing north were limited by overgrown foliage within the median and along the side of the road; however, because of significant vegetative growth, an exact measurement to the extents of sight distance without this obstructing foliage couldn't be determined.

Based on the sight distance analysis, upon removal or proper maintenance of any obstructing roadside or median foliage along SW 124th Avenue, adequate sight distance can be made available at a future access located near the southern edge of the site. If onsite foliage and the fence line are adjusted, sight distances near the northern property line may be improved upon; however, are not expected to meet the minimum recommended intersection sight distance standards to the south without having sight lines encroach on the adjacent property to the south. Accordingly, the preferred location to construct a full-movement site access would be located near the southern edge of the site.

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

Conclusions

Based on the operational analysis through year 2029, full-movement access onto SW 124th Avenue from the Drake property is possible and may accommodate a 491,000 square foot industrial building (737,000 square foot industrial building if a two-way left-turn receiving lane is provided). No restrictions to the access are necessary or recommended.

Based on the sight distance analysis, upon removal or proper maintenance of any obstructing roadside or median foliage along SW 124th Avenue, adequate sight distance can be made available at a future access located near the southern edge of the site. In addition, construction of a full-movement access near the southern property line is preferred with regard to meeting the minimum recommended intersection sight distance standards.

If you have any questions regarding this technical memorandum, please don't hesitate to contact us.

TRIP GENERATION CALCULATIONS
Reasonable Worst-Case Development Scenario

Land Use: General Light Industrial
Land Use Code: 110
Setting/Location General Urban/Suburban
Variable: 1,000 Square Feet of Gross Floor Area
Variable Quantity: 40.5

AM PEAK HOUR

Trip Rate: 0.70

	Enter	Exit	Total
Directional Distribution	88%	12%	
Trip Ends	**25**	**3**	**28**

PM PEAK HOUR

Trip Rate: 0.63

	Enter	Exit	Total
Directional Distribution	13%	87%	
Trip Ends	**3**	**23**	**26**

WEEKDAY

Trip Rate: 4.96

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**100**	**100**	**200**

SATURDAY

Trip Rate: 1.99

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**40**	**40**	**80**

Source: TRIP GENERATION, Tenth Edition

TRIP GENERATION CALCULATIONS
Worst-Case Development Scenario (No TWLTL)

Land Use: General Light Industrial
Land Use Code: 110
Setting/Location General Urban/Suburban
Variable: 1,000 Square Feet of Gross Floor Area
Variable Quantity: 491

AM PEAK HOUR

Trip Rate: 0.70

	Enter	Exit	Total
Directional Distribution	88%	12%	
Trip Ends	**303**	**41**	**344**

PM PEAK HOUR

Trip Rate: 0.63

	Enter	Exit	Total
Directional Distribution	13%	87%	
Trip Ends	**40**	**269**	**309**

WEEKDAY

Trip Rate: 4.96

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**1,218**	**1,218**	**2,436**

SATURDAY

Trip Rate: 1.99

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**489**	**489**	**978**

Source: TRIP GENERATION, Tenth Edition

TRIP GENERATION CALCULATIONS
Worst-Case Development Scenario (with TWLTL)

Land Use: General Light Industrial
Land Use Code: 110
Setting/Location General Urban/Suburban
Variable: 1,000 Square Feet of Gross Floor Area
Variable Quantity: 737

AM PEAK HOUR

Trip Rate: 0.70

	Enter	Exit	Total
Directional Distribution	88%	12%	
Trip Ends	**454**	**62**	**516**

PM PEAK HOUR

Trip Rate: 0.63

	Enter	Exit	Total
Directional Distribution	13%	87%	
Trip Ends	**60**	**404**	**464**

WEEKDAY

Trip Rate: 4.96

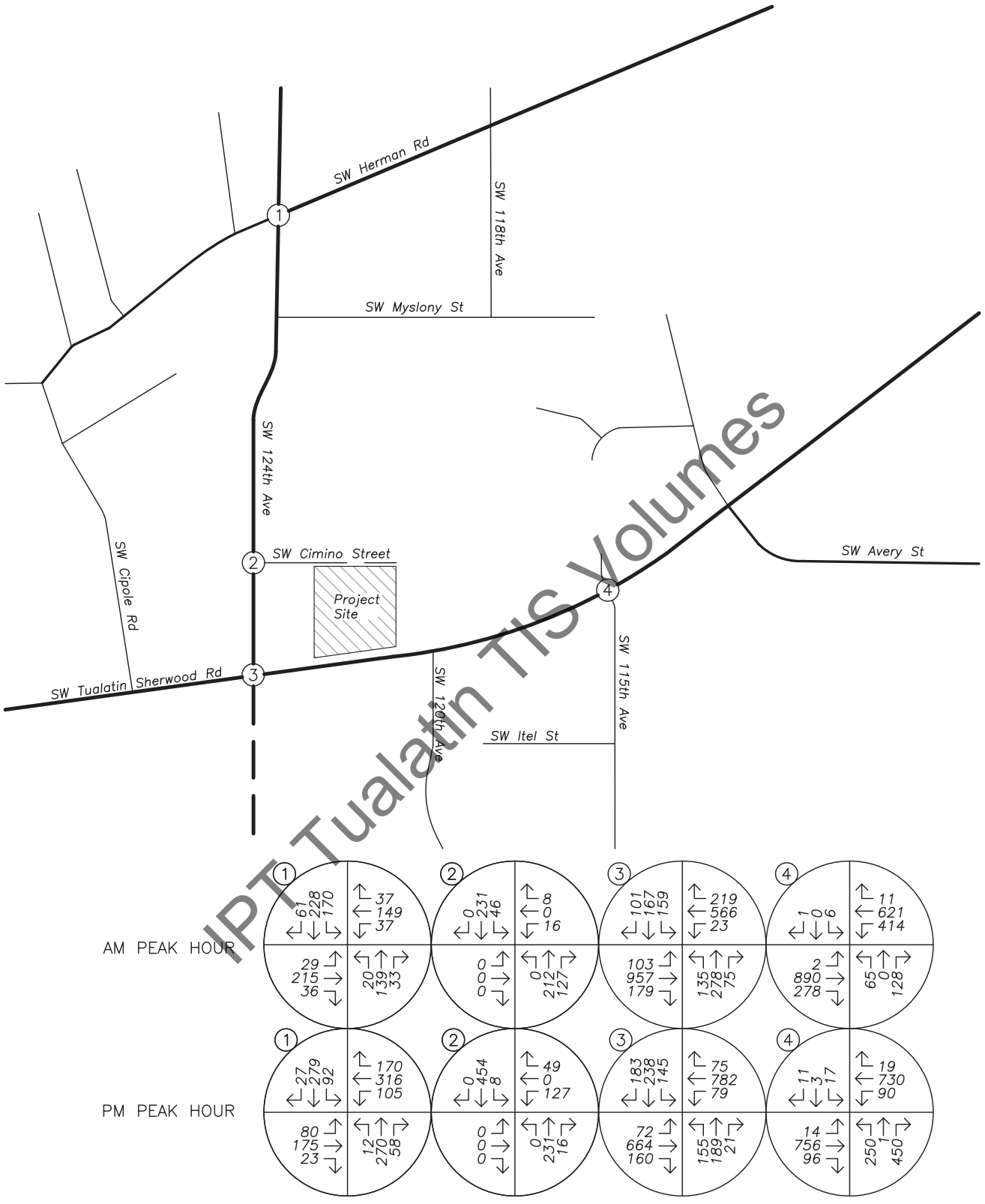
	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**1,828**	**1,828**	**3,656**

SATURDAY

Trip Rate: 1.99

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**733**	**733**	**1,466**

Source: TRIP GENERATION, Tenth Edition



TRAFFIC VOLUMES
Year 2019 Background Plus Site Conditions with 124th Avenue Extension

no scale

FIGURE 7

PAGE 13

LEVEL OF SERVICE

Level of service is used to describe the quality of traffic flow. Levels of service A to C are considered good, and rural roads are usually designed for level of service C. Urban streets and signalized intersections are typically designed for level of service D. Level of service E is considered to be the limit of acceptable delay. For unsignalized intersections, level of service E is generally considered acceptable. Here is a more complete description of levels of service:

Level of service A: Very low delay at intersections, with all traffic signal cycles clearing and no vehicles waiting through more than one signal cycle. On highways, low volume and high speeds, with speeds not restricted by other vehicles.

Level of service B: Operating speeds beginning to be affected by other traffic; short traffic delays at intersections. Higher average intersection delay than for level of service A resulting from more vehicles stopping.

Level of service C: Operating speeds and maneuverability closely controlled by other traffic; higher delays at intersections than for level of service B due to a significant number of vehicles stopping. Not all signal cycles clear the waiting vehicles. This is the recommended design standard for rural highways.

Level of service D: Tolerable operating speeds; long traffic delays occur at intersections. The influence of congestion is noticeable. At traffic signals many vehicles stop, and the proportion of vehicles not stopping declines. The number of signal cycle failures, for which vehicles must wait through more than one signal cycle, are noticeable. This is typically the design level for urban signalized intersections.

Level of service E: Restricted speeds, very long traffic delays at traffic signals, and traffic volumes near capacity. Flow is unstable so that any interruption, no matter how minor, will cause queues to form and service to deteriorate to level of service F. Traffic signal cycle failures are frequent occurrences. For unsignalized intersections, level of service E or better is generally considered acceptable.

Level of service F: Extreme delays, resulting in long queues which may interfere with other traffic movements. There may be stoppages of long duration, and speeds may drop to zero. There may be frequent signal cycle failures. Level of service F will typically result when vehicle arrival rates are greater than capacity. It is considered unacceptable by most drivers.

LEVEL OF SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-20
C	20-35
D	35-55
E	55-80
F	>80

LEVEL OF SERVICE CRITERIA
FOR UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-15
C	15-25
D	25-35
E	35-50
F	>50

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	1	268	15	10	338
Future Vol, veh/h	2	1	268	15	10	338
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	40	40	18	18	26	26
Mvmt Flow	2	1	288	16	11	363

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	500	152	0	0	304	0
Stage 1	296	-	-	-	-	-
Stage 2	204	-	-	-	-	-
Critical Hdwy	7.6	7.7	-	-	4.62	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	6.6	-	-	-	-	-
Follow-up Hdwy	3.9	3.7	-	-	2.46	-
Pot Cap-1 Maneuver	416	759	-	-	1097	-
Stage 1	627	-	-	-	-	-
Stage 2	708	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	412	759	-	-	1097	-
Mov Cap-2 Maneuver	412	-	-	-	-	-
Stage 1	621	-	-	-	-	-
Stage 2	708	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	486	1097	-
HCM Lane V/C Ratio	-	-	0.007	0.01	-
HCM Control Delay (s)	-	-	12.5	8.3	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	16	268	182	121	338
Future Vol, veh/h	25	16	268	182	121	338
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	40	40	18	18	26	26
Mvmt Flow	27	17	288	196	130	363

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	828	242	0	0	484	0
Stage 1	386	-	-	-	-	-
Stage 2	442	-	-	-	-	-
Critical Hdwy	7.6	7.7	-	-	4.62	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	6.6	-	-	-	-	-
Follow-up Hdwy	3.9	3.7	-	-	2.46	-
Pot Cap-1 Maneuver	243	655	-	-	924	-
Stage 1	557	-	-	-	-	-
Stage 2	517	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	209	655	-	-	924	-
Mov Cap-2 Maneuver	209	-	-	-	-	-
Stage 1	478	-	-	-	-	-
Stage 2	517	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.9	0	2.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	285	924	-
HCM Lane V/C Ratio	-	-	0.155	0.141	-
HCM Control Delay (s)	-	-	19.9	9.5	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.5	0.5	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	9	341	2	1	563
Future Vol, veh/h	14	9	341	2	1	563
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	40	40	4	4	5	5
Mvmt Flow	16	10	383	2	1	633

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	703	193	0	0	385	0
Stage 1	384	-	-	-	-	-
Stage 2	319	-	-	-	-	-
Critical Hdwy	7.6	7.7	-	-	4.2	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	6.6	-	-	-	-	-
Follow-up Hdwy	3.9	3.7	-	-	2.25	-
Pot Cap-1 Maneuver	299	710	-	-	1149	-
Stage 1	558	-	-	-	-	-
Stage 2	608	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	299	710	-	-	1149	-
Mov Cap-2 Maneuver	299	-	-	-	-	-
Stage 1	557	-	-	-	-	-
Stage 2	608	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	387	1149	-
HCM Lane V/C Ratio	-	-	0.067	0.001	-
HCM Control Delay (s)	-	-	15	8.1	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	11.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	161	108	341	24	16	563
Future Vol, veh/h	161	108	341	24	16	563
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	40	40	4	4	5	5
Mvmt Flow	181	121	383	27	18	633

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	750	205	0	0	410	0
Stage 1	397	-	-	-	-	-
Stage 2	353	-	-	-	-	-
Critical Hdwy	7.6	7.7	-	-	4.2	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	6.6	-	-	-	-	-
Follow-up Hdwy	3.9	3.7	-	-	2.25	-
Pot Cap-1 Maneuver	277	696	-	-	1124	-
Stage 1	549	-	-	-	-	-
Stage 2	582	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	273	696	-	-	1124	-
Mov Cap-2 Maneuver	273	-	-	-	-	-
Stage 1	540	-	-	-	-	-
Stage 2	582	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	49.8	0	0.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	361	1124	-
HCM Lane V/C Ratio	-	-	0.837	0.016	-
HCM Control Delay (s)	-	-	49.8	8.3	-
HCM Lane LOS	-	-	E	A	-
HCM 95th %tile Q(veh)	-	-	7.6	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	1	268	15	10	338
Future Vol, veh/h	2	1	268	15	10	338
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	40	40	18	18	26	26
Mvmt Flow	2	1	288	16	11	363

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	500	152	0	0	304	0
Stage 1	296	-	-	-	-	-
Stage 2	204	-	-	-	-	-
Critical Hdwy	7.6	7.7	-	-	4.62	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	6.6	-	-	-	-	-
Follow-up Hdwy	3.9	3.7	-	-	2.46	-
Pot Cap-1 Maneuver	416	759	-	-	1097	-
Stage 1	627	-	-	-	-	-
Stage 2	708	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	412	759	-	-	1097	-
Mov Cap-2 Maneuver	542	-	-	-	-	-
Stage 1	621	-	-	-	-	-
Stage 2	708	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	599	1097	-
HCM Lane V/C Ratio	-	-	0.005	0.01	-
HCM Control Delay (s)	-	-	11	8.3	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	2.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	37	25	268	272	182	338
Future Vol, veh/h	37	25	268	272	182	338
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	40	40	18	18	26	26
Mvmt Flow	40	27	288	292	196	363

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1008	290	0	0	580	0
Stage 1	434	-	-	-	-	-
Stage 2	574	-	-	-	-	-
Critical Hdwy	7.6	7.7	-	-	4.62	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	6.6	-	-	-	-	-
Follow-up Hdwy	3.9	3.7	-	-	2.46	-
Pot Cap-1 Maneuver	181	605	-	-	842	-
Stage 1	522	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	139	605	-	-	842	-
Mov Cap-2 Maneuver	216	-	-	-	-	-
Stage 1	400	-	-	-	-	-
Stage 2	433	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.9	0	3.7
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	292	842	-
HCM Lane V/C Ratio	-	-	0.228	0.232	-
HCM Control Delay (s)	-	-	20.9	10.6	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.9	0.9	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	9	341	2	1	563
Future Vol, veh/h	14	9	341	2	1	563
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	40	40	4	4	5	5
Mvmt Flow	16	10	383	2	1	633

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	703	193	0	0	385	0
Stage 1	384	-	-	-	-	-
Stage 2	319	-	-	-	-	-
Critical Hdwy	7.6	7.7	-	-	4.2	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	6.6	-	-	-	-	-
Follow-up Hdwy	3.9	3.7	-	-	2.25	-
Pot Cap-1 Maneuver	299	710	-	-	1149	-
Stage 1	558	-	-	-	-	-
Stage 2	608	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	299	710	-	-	1149	-
Mov Cap-2 Maneuver	461	-	-	-	-	-
Stage 1	557	-	-	-	-	-
Stage 2	608	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	534	1149	-
HCM Lane V/C Ratio	-	-	0.048	0.001	-
HCM Control Delay (s)	-	-	12.1	8.1	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	14.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	242	162	341	36	24	563
Future Vol, veh/h	242	162	341	36	24	563
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	40	40	4	4	5	5
Mvmt Flow	272	182	383	40	27	633

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	774	212	0	0	423	0
Stage 1	403	-	-	-	-	-
Stage 2	371	-	-	-	-	-
Critical Hdwy	7.6	7.7	-	-	4.2	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	6.6	-	-	-	-	-
Follow-up Hdwy	3.9	3.7	-	-	2.25	-
Pot Cap-1 Maneuver	~ 266	688	-	-	1112	-
Stage 1	544	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 260	688	-	-	1112	-
Mov Cap-2 Maneuver	421	-	-	-	-	-
Stage 1	531	-	-	-	-	-
Stage 2	568	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	49.9	0	0.3
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	499	1112	-
HCM Lane V/C Ratio	-	-	0.91	0.024	-
HCM Control Delay (s)	-	-	49.9	8.3	-
HCM Lane LOS	-	-	E	A	-
HCM 95th %tile Q(veh)	-	-	10.5	0.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

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SOLID STATE AREA LIGHTING

RAZAR-PT1 SERIES-PLED

S P E C I F I C A T I O N S

OPTICAL/ELECTRICAL HOUSING

Heavy cast low copper aluminum (A356 alloy; <0.2% copper) assembly with integral cooling fins. The Optical Panel mounting surface is milled flat (surface variance <± .003") to facilitate thermal transfer of heat to housing and cooling fins. Solid barrier wall separates optical and electrical compartments. The optical and electrical compartments are integrated to create one assembly. Minimum wall thickness is .188".

SINGLE ARM POST TOP MOUNTING

A single, heavy wall cast aluminum arm (A356 alloy, <0.2% copper) connects the Optical/Electrical Housing to the slip fitter hub. Arm is triangular in cross-section transitioning from the apex facing to the pole centerline at the hub to the apex facing outward at the fixture body. Field wiring is accessed through a cover at the mounting hub. Tenon maximum 2⅞" diameter x 3½" height. All exposed hardware is stainless steel.

PLED™ OPTICS

Emitters (LED's) are arrayed on a metal core PCB panel with each emitter located on a copper thermal transfer pad and enclosed by an LED refractor. In asymmetric distributions, a micro-reflector inside the refractor re-directs the house side emitter output towards the street side and functions as a house side shielding element. Refractors are injection molded H12 acrylic. Each LED refractor is sealed to the PCB to meet an IP66 over an emitter and all refractors are retained by an aluminum frame. Any one Panel, or group of Panels in a luminaire, have the same optical pattern. Panels are field replaceable and field rotatable in 90° increments.

LED DRIVERS

Drivers are UL and cUL recognized mounted on a single plate and factory prewired with quick-disconnect plugs. Constant current driver is electronic and has a power factor of >0.90 and a minimum operating temperature of -40°F. In-line terminal blocks facilitate wiring between the driver and optical arrays. Drivers accept an input of 120-277V, 50/60Hz or 347V-480V, 50,60Hz. (0 - 10V dimmable driver is standard. Driver has a minimum of 3KV internal surge protection. Luminaire supplied with 20KV surge protector for field accessible installation.)

AMBER LED's

PCA (Phosphor Converted Amber) LED's utilize phosphors to create color output similar to LPS lamps and have a slight output in the blue spectral bandwidth. **TRA** (True Amber) LED's utilize material that emits light in the amber spectral bandwidth only without the use of phosphors.

FINISH

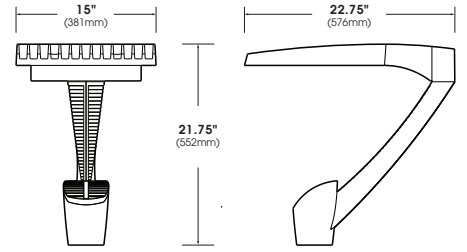
Electrostatically applied TGIC Polyester Powder Coat on substrate prepared with 20 PSI power wash at 140°F. Four step sand blast and iron phosphate pretreatment for protection and paint adhesion. 400°F bake for maximum hardness and durability. Texture finish is standard.

PROJECT NAME:

FIXTURE TYPE:

RZR-PT1 PLED

PATENT PENDING



FRONT VIEW SIDE VIEW

c UL us LISTED

MADE IN THE USA

2018002

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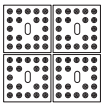
RZR- PT1 SERIES - PLED

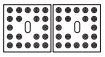
SPECIFICATIONS

PLED™ MODULES

RZR LED POST TOP1
E.P.A.= 1.13
Available in:
80 &40 LED Array



80 LED Array



40 LED Array

Approximate Average Lumens – 4000K
(Lumens median of all distributions)

	350mA			525mA			700mA			1050mA		
	Watts	Lumens	HID Eq.	Watts	Lumens	HID Eq.	Watts	Lumens	HID Eq.	Watts	Lumens	HID Eq.
40	45	5997	70-100	66	8653	100-150	87	10995	175	134	14647	200-250
80	87	11622	175-200	131	16736	200-250	174	21235	400	N/A	N/A	N/A

Spec/Order Example: RZR-PT1-LED/PLED-V-SQ/80LED-700mA/NW/277/RAL9005

SPEC / ORDERING INFORMATION

MODEL | OPTICS | LED MODE | VOLTAGE | FINISH | OPTIONS

MODEL

☐ RZR-PT1

OPTICS

- ☐ TYPE II **PLED-II** . . . . . 
- ☐ TYPE II FRONT ROW **PLED-II-FR** . . . . .
- ☐ TYPE II MEDIAN ILLUMINATOR **PLED-II-ML** . . . . . 
- ☐ TYPE III **PLED-III-M** . . . . . 
- ☐ TYPE III **PLED-III-W** . . . . 
- ☐ TYPE IV **PLED-IV** . . . . . 
- ☐ TYPE IV **PLED-IV-FT** . . . . . 
- ☐ TYPE V NARROW **PLED-V-SQ-N** . . . 
- ☐ TYPE V **PLED-V-SQ-M** . . 
- ☐ TYPE V **PLED-V-SQ-W** . . 

LED MODE

NO. LEDs
- ☐ 80LED
- ☐ 40LED

DRIVE CURRENT
- ☐ 350mA
- ☐ 525mA
- ☐ 700mA[1]
- ☐ 1050mA[1] (40LED ONLY)

COLOR TEMP - CCT
- ☐ NW (4000K)* *STANDARD
- ☐ CW (5000K)
- ☐ WW (3000K)

CONSULT FACTORY FOR OTHER LED COLORS

AMBER[2]
- ☐ PHOSPHOR CONVERTED AMBER **PCA**
- ☐ TRUE AMBER[3] **TRA**

NOTES:
1 - 700mA and 1050mA NOT FOR USE WITH TRA LED'S
2 - NARROW BAND AMBERS HAVE NO DEFINABLE CCT EQUIVALENT
3 - AVAILABLE IN 350mA & 525mA DRIVE CURRENTS ONLY

VOLTAGE

- ☐ 120
- ☐ 208
- ☐ 240
- ☐ 277
- ☐ 347
- ☐ 480

FINISH

STANDARD TEXTURED FINISH

- ☐ BLACK **RAL-9005-T**
- ☐ WHITE **RAL-9003-T**
- ☐ GREY **RAL-7004-T**
- ☐ DARK BRONZE **RAL-8019-T**
- ☐ GREEN **RAL-6005-T**

FOR SMOOTH FINISH REPLACE SUFFIX "T" WITH SUFFIX "S" (EXAMPLE: RAL-9005-S)

CONSULT FACTORY FOR CUSTOM COLORS

OPTIONS

- ☐ HIGH-LOW DIMMING FOR HARDWIRED SWITCHING OR NONINTEGRATED MOTION SENSOR . . . . . **HLSW**
- ☐ INTERNAL HOUSE SIDE SHIELD . . . **HS-PLED**
- ☐ PHOTO CELL + VOLTAGE (EXAMPLE: PC120V) . . **PC+V**
- ☐ TWIST LOCK PHOTO CELL + VOLTAGE (EXAMPLE: PC120V) . . **TPC+V**
- ☐ TWIST LOCK RECEPTACLE ONLY . . . **TPR**
- ☐ 7-PIN TWIST LOCK RECEPTACLE ONLY . . . **TPR7**
- ☐ SINGLE FUSE (120V, 277V, 347V) . . **SF**
- ☐ DOUBLE FUSE (208V, 240V, 480V) . . **DF**
- ☐ STEP DIM MOTION SENSOR (PROGRAMMED 50/100) **MS-F211**
- ☐ REMOTE MOTION SENSOR CONFIGURATOR **MS-FC10**

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RZR- PT1 SERIES - PLED

LED/ELECTRICAL GUIDE

LED COUNT	SOURCE TYPE	SOURCE	INITIAL LUMENS - 4000K CCT	INITIAL LUMENS - 3000K CCT	INITIAL LUMENS - 5000K CCT	L70 GREATER THAN (HR)	STARTING TEMP.	SYSTEM WATTS	VOLTS	MAX INPUT AMPS
40	LED	40 PLED Optical Module - 350mA	5,585 - 6,408	5,306 - 6,088	5,864 - 6,729	60,000+	-20°F	45	120 277	0.38 0.17
40	LED	40 PLED® Optical Module - 525mA	8,059 - 9,246	7,656 - 8,784	8,462 - 9,709	60,000+	-20°F	66	120 277	0.55 0.24
40	LED	40 PLED® Optical Module - 700mA	10,240 - 11,749	9,728 - 11,162	10,752 - 12,337	60,000+	-20°F	87	120 277	0.73 0.32
40	LED	40 PLED® Optical Module - 1050mA	13,642 - 15,652	12,960 - 14,870	14,324 - 16,435	60,000+	-20°F	134	120 277	1.12 0.49
80	LED	80 PLED® Optical Module - 350mA	10,824 - 12,419	10,283 - 11,798	11,365 - 13,040	60,000+	-20°F	87	120 277	0.75 0.33
80	LED	80 PLED® Optical Module - 525mA	15,587 - 17,884	14,808 - 16,990	16,366 - 18,778	60,000+	-20°F	131	120 277	1.10 0.48
80	LED	80 PLED® Optical Module - 700mA	19,767 - 22,680	18,779 - 21,546	20,755 - 23,814	60,000+	-20°F	174	120 277	1.45 0.63

NOTES:

1. Max Input Amps is the highest of starting, operating, or open circuit currents
2. Lumen values for LED Modules vary according to the distribution type
3. System Watts includes the source watts and all driver components.
4. Fuse value should be sufficient to protect all wiring components. For electronic driver and LED component protection, use surge suppressor supplied with luminaire. **Note: Surge suppressors are considered a perishable device.**
5. L70(10K) – TM-21 6x rule applied

WARNING: All fixtures must be installed in accordance with local codes or the National Electrical Code. Failure to do so may result in serious personal injury.

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Evolve™ LED Wall Pack

N Series (EWNB)

current
powered by GE

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Product Features

The next generation of the GE Evolve™ LED Wall Pack is designed to efficiently illuminate walkways, area, and general lighting applications. The EWNB features an advanced LED optical system that provides high uniformity, excellent vertical light distribution, reduced on-site glare and effective security light levels. The EWNB Wall Pack offers identical photometrics to the EANB Area Light, which allows lighting designers to capitalize on the same features without compromising site layouts. In keeping with a sleek design strategy, this product offers a modern look, balancing the need for photometric scalability with reliable workhorse performance.

Applications

- Wall mounted, site, area and general lighting utilizing an advanced LED optical system providing uniformity, vertical light distribution, reduced on-site glare and effective security light levels.

Housing

- Die-cast aluminum housing.
- Slim architectural design incorporates an integral heat sink and light engine, ensuring maximum heat transfer, long LED life, and a reduced Effective Projected Area (EPA).
- Meets 1G vibration level per ANSI C136.31-2001. For 2G rating contact manufacturer.

LED & Optical Assembly

- Structured LED array for optimized area light and wall pack photometric distribution.
- Evolve™ LED light engine utilizes reflective technology to optimize application efficiency and minimize glare.
- Utilizes high brightness LEDs, 70 CRI at 3000K, 4000K & 5000K typical.

Lumen Maintenance

- Projected L90>50,000 hours per IES TM-21
- Projected Lxx per IES TM-21 at 25°C for reference:

SKU	LXX (10K)@HOURS		
	25,000 HR	50,000 HR	100,000 HR
EWNB	L98	L95	L90

NOTES: 1) Projected Lxx based on LM-80 (10,000 hour testing).
2) DOE Lighting Facts Verification Testing Tolerances apply to initial luminous flux and lumen maintenance measurements.

Lumen Ambient Temperature Factors:

LUMEN AMBIENT TEMPERATURE FACTORS:	
AMBIENT TEMPERATURE (°C)	INITIAL FLUX FACTOR
10	1.02
20	1.01
25	1.00
30	0.99
40	0.98
50	0.97

DLC Standard qualified models available. Please refer to http://www.designlights.org/QPL for complete information.

Ratings

- UL/cUL listed, suitable for wet locations.
- IP66 rated optical enclosure per ANSI C136.25-2009.
- Temperature rated at –40° to 50°C.
- Upward Light Output Ratio (ULOR) = 0
- Title 24 compliant with "H" motion sensor option.
- Compliant with the material restriction requirements of RoHS.

Mounting

- Flush wall mount with convenient tab and slot mounting for easy "J" box installation. 1/2" conduit holes are included for non-"J" box installation.

Finish

- Corrosion resistant polyester powder painted, minimum 2.0 mil. thickness.
- Standard colors: Black and Dark Bronze.
- RAL & custom colors available.

Electrical

- 120-277 VAC and 347-480 VAC available.
- System power factor is >90% and THD <20%.
- ANSI C136.41 7-pin dimming receptacle, standard.
- ANSI photo electric sensors (PE) available for all voltages. Light Grid compatible.
- Dimming/Occupancy:
  - Wired 0-10V continuous dimming
  - DALI digital dimming. Contact manufacturer for availability.
  - Standalone motion sensor based dimming using "H" option code.
- Surge Protection per ANSI C136.2-2015.
  - 6kV/3kA "Basic" surge protection, standard.
  - 10kV/5kA "Enhanced" surge protection optional.
- EMI: Title 47 CFR Part 15 Class A

Accessories

- Escutcheon Plates - See page 6
- PE Accessories - See Page 3

Ordering Number Logic

Evolve LED Wall Pack N Series (EWNB)

E W N _ _ _ B _ _ _ _ 7 _ _ _ _ _ _ _ _ _ _ _ _

PROD. ID	PHOTOMETRIC SERIES	VOLTAGE	OPTICAL CODE	CRI	LED COLOR TEMP	PE FUNCTION	MOUNTING ARM	COLOR	OPTIONS
E = Evolve **W** = Wall Pack **N** = Housing Series	**B** = Photometric Series "B"	**0** = 120-277* **1** = 120 **2** = 208 **3** = 240 **4** = 277 **5** = 480 **D** = 347 **H** = 347-480V* * Not available with Fusing. Must choose a discreet voltage with F Option.		**7** = 70 (min)	**30** = 3000K◇ **40** = 4000K **50** = 5000K ◇Select 3000K CCT for IDA Approved units	**1** = None **3** = Button PE* **A** = ANSI C136.41 7-pin PE Receptacle # **D** = ANSI C136.41 7-pin PE Receptacle with Shorting Cap # *Only available with voltage 1,2,3 and 4. # Order Dimming/Control PE as a separate item. See accessories section of this datasheet for ordering information.	**N** = None Required	**BLCK** = Black **DKBZ** = Dark Bronze **GRAY** = Gray **WHTE** = White Contact manufacturer for other colors.	**D** = External Dimming Leads Provided (0-10Volt Input) **F** = Fusing **L** = Tool less entry **R** = 10kV Enhanced Surge Protection **H** = Motion Sensor # **U** = DALI Dimming+^ **XXX** = Special Options # R & H options cannot be purchased together. Not available with voltage 5, D and H. + Compatible with LightGrid 2.0 nodes. ^ Not compatible at 347-480V, with A-level optical code, or with motion sensor control.

	OPTICAL CODE	TYPE	TYPICAL INITIAL LUMENS 3000K	TYPICAL INITIAL LUMENS 4000K & 5000K	TYPICAL SYSTEM WATTAGE 120-277V, 347-480V	BUG RATING 3000K B-U-G	BUG RATING 4000K & 5000K B-U-G	IES FILE NUMBER 3000K	IES FILE NUMBER 4000K	IES FILE NUMBER 5000K
TYPE IV	A4	Asymmetric Forward	4,000	4,300	44	B1-U0-G1	B1-U0-G1	EWNB_A4730__.IES	EWNB_A4740__.IES	EWNB_A4750__.IES
TYPE IV	B4	Asymmetric Forward	5,800	6,200	58	B1-U0-G2	B1-U0-G2	EWNB_B4730__.IES	EWNB_B4740__.IES	EWNB_B4750__.IES
TYPE IV	C4	Asymmetric Forward	7,500	8,000	70	B1-U0-G2	B1-U0-G2	EWNB_C4730__.IES	EWNB_C4740__.IES	EWNB_C4750__.IES
TYPE IV	D4	Asymmetric Forward	9,200	9,800	89	B1-U0-G2	B2-U0-G2	EWNB_D4730__.IES	EWNB_D4740__.IES	EWNB_D4750__.IES
TYPE IV	E4	Asymmetric Forward	10,800	11,500	98	B2-U0-G2	B2-U0-G2	EWNB_E4730__.IES	EWNB_E4740__.IES	EWNB_E4750__.IES
TYPE IV	F4	Asymmetric Forward	12,900	13,700	125	B2-U0-G3	B2-U0-G3	EWNB_F4730__.IES	EWNB_F4740__.IES	EWNB_F4750__.IES
TYPE III	A3	Asymmetric Wide	4,300	4,600	44	B1-U0-G1	B1-U0-G1	EWNB_A3730__.IES	EWNB_A3740__.IES	EWNB_A3750__.IES
TYPE III	B3	Asymmetric Wide	6,200	6,600	58	B1-U0-G1	B1-U0-G1	EWNB_B3730__.IES	EWNB_B3740__.IES	EWNB_B3750__.IES
TYPE III	C3	Asymmetric Wide	8,100	8,600	70	B1-U0-G2	B1-U0-G2	EWNB_C3730__.IES	EWNB_C3740__.IES	EWNB_C3750__.IES
TYPE III	D3	Asymmetric Wide	9,900	10,500	89	B2-U0-G2	B2-U0-G2	EWNB_D3730__.IES	EWNB_D3740__.IES	EWNB_D3750__.IES
TYPE III	E3	Asymmetric Wide	11,600	12,400	98	B2-U0-G2	B2-U0-G2	EWNB_E3730__.IES	EWNB_E3740__.IES	EWNB_E3750__.IES
TYPE III	F3	Asymmetric Wide	13,900	14,700	125	B2-U0-G2	B2-U0-G2	EWNB_F3730__.IES	EWNB_F3740__.IES	EWNB_F3750__.IES
TYPE II	A2	Asymmetric Narrow	4,200	4,500	44	B1-U0-G1	B1-U0-G1	EWNB_A2730__.IES	EWNB_A2740__.IES	EWNB_A2750__.IES
TYPE II	B2	Asymmetric Narrow	6,100	6,500	58	B1-U0-G1	B1-U0-G1	EWNB_B2730__.IES	EWNB_B2740__.IES	EWNB_B2750__.IES
TYPE II	C2	Asymmetric Narrow	7,900	8,400	70	B2-U0-G2	B2-U0-G2	EWNB_C2730__.IES	EWNB_C2740__.IES	EWNB_C2750__.IES
TYPE II	D2	Asymmetric Narrow	9,700	10,300	89	B2-U0-G2	B2-U0-G2	EWNB_D2730__.IES	EWNB_D2740__.IES	EWNB_D2750__.IES
TYPE II	E2	Asymmetric Narrow	11,400	12,100	98	B2-U0-G2	B2-U0-G2	EWNB_E2730__.IES	EWNB_E2740__.IES	EWNB_E2750__.IES
TYPE II	F2	Asymmetric Narrow	13,600	14,400	125	B2-U0-G2	B2-U0-G2	EWNB_F2730__.IES	EWNB_F2740__.IES	EWNB_F2750__.IES

PE Accessories (to be ordered separately)

SAP Number	Part Number	Description
93029237	PED-MV-LED-7	ANSI C136.41 Dimming PE, 120-277V
93029238	PED-347-LED-7	ANSI C136.41 Dimming PE, 347V
93029239	PED-480-LED-7	ANSI C136.41 Dimming PE, 480V

SAP Number	Part Number	Description
28299	PECOTL	STANDARD 120-277V
28294	PEC5TL	STANDARD 480V
80436	PECDTL	STANDARD 347V
73251	SCCL-PECTL	Shorting cap

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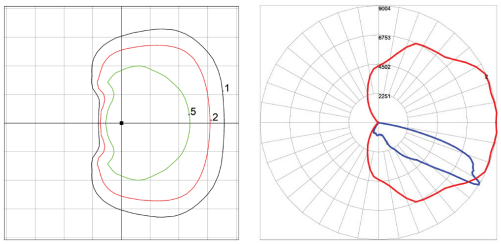
Photometrics

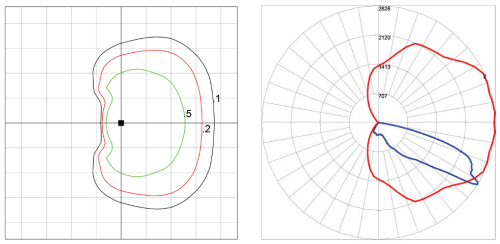
EWNB Type IV - Asymmetric Forward (F4)
13,700 Lumens, 5000K (EWNB_F4750___.IES)



Grid Distance in Units
of Mounting Height at 30' Initial
Footcandle Values at Grade

— Vertical plane through horizontal angle
of maximum candlepower at 45°
— Vertical plane through horizontal angle of 72.5°

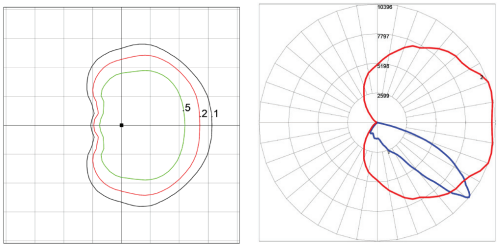
EWNB Type IV - Asymmetric Forward (A4)
4,300Lumens, 5000K (EWNB_A4750___.IES)



Grid Distance in Units
of Mounting Height at 15' Initial
Footcandle Values at Grade

— Vertical plane through horizontal angle
of maximum candlepower at 45°
— Vertical plane through horizontal angle of 72.5°

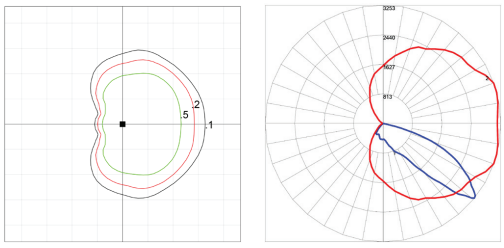
EWNB Type III - Asymmetric Wide (F3)
14,700 Lumens, 5000K (EWNB_F3750___.IES)



Grid Distance in Units
of Mounting Height at 30' Initial
Footcandle Values at Grade

— Vertical plane through horizontal angle
of maximum candlepower at 20°
— Vertical plane through horizontal angle of 52.5°

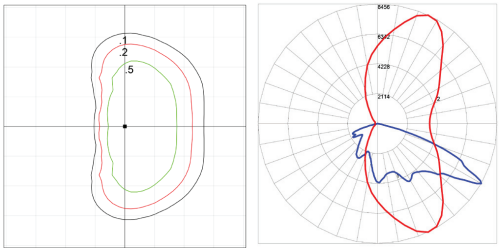
EWNB Type III - Asymmetric Wide (A3)
4,600 Lumens, 5000K (EWNB_A3750___.IES)



Grid Distance in Units
of Mounting Height at 15' Initial
Footcandle Values at Grade

— Vertical plane through horizontal angle
of maximum candlepower at 20°
— Vertical plane through horizontal angle of 52.5

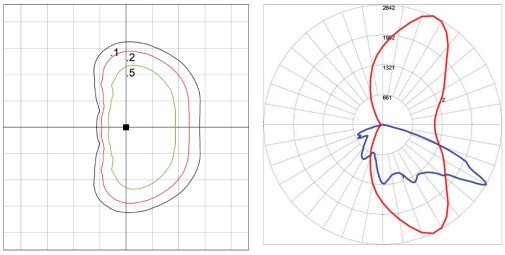
EWNB Type II - Asymmetric Narrow (F2)
14,400 Lumens, 5000K (EWNB_F2750___.IES)



Distance in Units
of Mounting Height at 30' Initial
Footcandle Values at Grade

— Vertical plane through horizontal angle
of maximum candlepower at 65°
— Vertical plane through horizontal angle of 60°

EWNB Type II - Asymmetric Narrow (A2)
4,500 Lumens, 5000K (EWNB_A2750___.IES)



Grid Distance in Units
of Mounting Height at 15' Initial
Footcandle Values at Grade

— Vertical plane through horizontal angle
of maximum candlepower at 65°
— Vertical plane through horizontal angle of 60°

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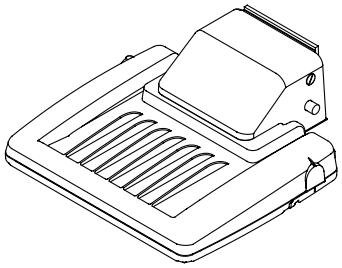
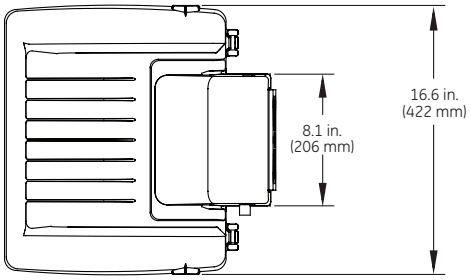
Product Dimensions

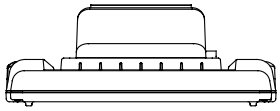
Isometric View



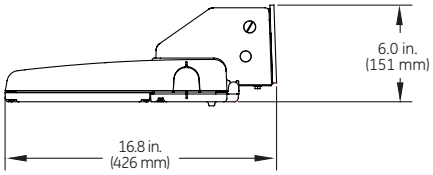
Top View



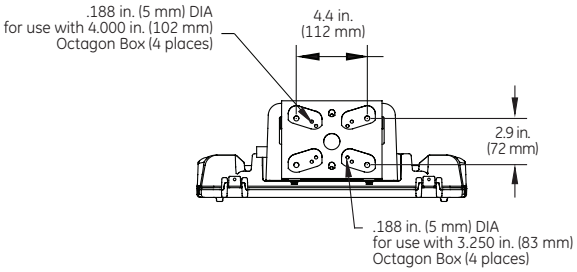
Front View



Side View



Back View



DATA

- Approximate Net Weight: 17 lbs (7.71 kgs)
- Effective Projected Area (EPA): 0.42 sq ft max (0.04 sq. m)

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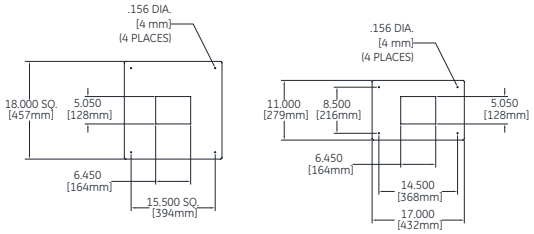
Accessories:

Escutcheon Plates

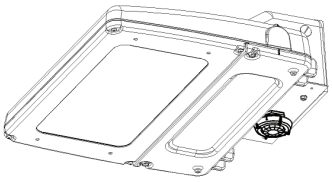
Cover unsightly debris and marks left behind from replacing HID product with escutcheon plates. Available in square and rectangular sizes, as well as in an assortment of colors to match the luminaire. Accessories are ordered and shipped separately from the luminaire.

E W N E _ _ _ _

PROD. ID	PHOTOMETRIC SERIES	DETAIL	COLOR
E = Evolve	**E** = Escutcheon Plate	**1** = 17" x 11"	**BLCK** = Black
W = Wall Pack		**2** = 18" x 18"	**DKBZ** = Dark Bronze
N = Housing Series			**GRAY** = Gray
			WHTE = White
			RAL custom colors available. Contact Manufacturer.



H-Motion Sensing Option:



- Intended for mounting applications between 8-25ft.
- Provides a coverage area radius for walking motion of 15-20ft (4.57-6.10m).
- Provides 180° of coverage (~180° is blocked by the wall).
- Delivered factory setting of 50% dimmed light output with no occupancy.
- May be reprogrammed using additional remote programmer.
  Remote Programmer part number: WS FSIR-100 PROGRAMMER (197634).
- Photoelectric control is integrated through the motion sensor, and is offered as standard.

Sensor Pattern:

Sensing Pattern Wall Pack Fixture
8 – 25 ft.

current powered by GE

www.currentbyge.com

OLP3116 (Rev 05/04/17)

OLD REPUBLIC TITLE COMPANY OF OREGON
A MEMBER OF THE OLD REPUBLIC TITLE INSURANCE GROUP
1 SW Columbia Street, Suite 750 ▪ Portland OR ▪ 97258 ▪ Phone 503-219-2300 ▪ Fax 503-796-9805

Preliminary Title Report
5th SUPPLEMENTAL

Date Prepared:
August 29, 2018

Our Order Number 5516000168-CS

When Replying Please Contact:

Escrow Officer:
Cheryl Springer Lentz
cspringer@ortc.com
503-219-2300

Buyer:
Four-S Corp.
Donald F. Stanaway, II
Scott H. Stanaway

Title Officer:
Christine Ritter
critter@ortc.com

Seller:
Ronald L. Endicott

Property Address:

12200 SW Myslony Street, Tualatin, OR 97062

In response to the above referenced application for a policy of title insurance, OLD REPUBLIC TITLE COMPANY OF OREGON, as Issuing Agent of Old Republic National Title Insurance Company, hereby reports that it is prepared to issue, or cause to be issued, as of the effective date hereof, a Policy or Policies of Title Insurance, and in the form and amount shown in Schedule A, describing the land and the estate or interest therein hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an Exception in Schedule B below or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations of said policy forms.

The printed Exceptions and Exclusions from the coverage and Limitations on Covered Risks of said Policy or Policies are set forth in Exhibit I attached.

Please read the exceptions shown or referred to below and the exceptions and exclusions set forth in Exhibit I of this report carefully. The exceptions and exclusions are meant to provide you with notice of matters which are not covered under the terms of the title insurance policy and should be carefully considered.

This report is for the exclusive use of the person to whom it is addressed, is preliminary to the issuance of a policy of title insurance issued by Old Republic National Title Insurance Company and shall become null and void unless a policy is issued and the full premium paid. Title insurance is conditioned on recordation of satisfactory instruments that establish the interests of the parties to be insured; until such recordation, the Company may cancel or revise this report for any reason.

SCHEDULE A

1. Effective Date:

   August 24, 2018

2. The Policies and endorsements to be insured and the related premiums are:

	Amount	Premium
ALTA Owners Policy - 2006 (OTIRO No. PO-04)	$2,100,000.00	$3,750.00
Total Owner Policy Premium		$3,750.00
Proposed Insured: Four-S Corp., Donald F. Stanaway, II and Scott H. Stanaway		
Transfer Tax		$2,100.00
ALTA STANDARD Loan Policy - 2006 (OTIRO No. PL-05)	$1,374,644.00	$100.00
Total 1st Loan Policy Premium		
Proposed Insured: Stockman Bank		
Local Govt. Lien Search Charge: $25.00		

3. Title to the estate or interest in the land is at the Effective Date vested in:

   Ronald L. Endicott

4. The estate or interest in the land described or referred is:

   Fee

5. The land referred to in this report is described as follows:

   Lots 1 and 2, and the West three-fourths of Lot 3, EXCEPT the North 163 feet of said Lot 3, TUALATIN VALLEY ACRES, Washington County, Oregon.

   Together with an easement over the East 30 feet of the North 163 feet of the West three-fourths of Lot 3, TUALATIN VALLEY ACRES, as set forth in Deed recorded June 20, 1969, in Book 747, Page 548, Records of Washington County.

   EXCEPTING THEREFROM that portion conveyed to the City of Tualatin for road purposes in deed recorded March 26, 2002 as Recorder's Fee Number 2002-034631, Washington County Records.

   FUTHER EXCEPTING THEREFROM that portion conveyed to the City of Tualatin for road purposes in deed recorded June 14, 2006, as Recorder's Fee Number 2006-071111, Washington County Records.

SCHEDULE B

STANDARD EXCEPTIONS

1. Tax or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public record; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.

2. Any facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.

3. Easements, claims of easements, or encumbrances not shown by the public records, reservations or exceptions in patents or in acts authorization the issuance thereof; water rights, claims or title to water.

4. Any encroachment (of existing improvements located on the subject land onto adjoining land or of existing improvements located on adjoining land onto the subject land), encumbrance, violation, variation, or adverse circumstance affecting the title that would be disclosed by an accurate and complete land survey of the subject land.)

5. Any lien, or right to lien, for unemployment taxes, workmen's compensation, services, labor, equipment rental or material heretofore or hereafter furnished, imposed by law and not shown by the public records.

The exceptions to coverage 1-5 inclusive as set forth above will remain on any subsequently issued Standard Coverage Title Insurance Policy.

In order to remove these exceptions to coverage in the issuance of any Extended Coverage Policy the following items are required to be furnished to the Company; additional exceptions to coverage may be added upon review of such information;

A. Survey or alternative acceptable to the Company
B. Affidavit regarding possession
C. Proof that there is no new construction or remodeling of any improvement located on the premises. In the event of new construction or remodeling the following is required.

    i. Satisfactory evidence that no construction liens will be filed; or
    ii. Adequate security to protect against actual or potential construction liens.
    iii. Payment of additional premiums as required by the Industry Rate filing approved by the Insurance Division of the State of Oregon.

SPECIAL EXCEPTIONS

6. Taxes and assessments, general and special, for the fiscal year 2018-2019, a lien, but not yet due or payable.

   Taxes and assessments, general and special, for the fiscal year 2017-2018, paid in full:

Assessor's Parcel No.	:	R530544
Map Tax No.	:	2S122C-01600
Code No.	:	088.15
Original Amount	:	$6,230.90

7. Local agency liens, if any, in favor of the City of Tualatin.

8. **INTENTIONALLY DELETED**

9. Rights of the public, County and/or City, in and to that portion of said land lying within the lines of streets, roads and highways.

10. Conditions, restrictions and/or easements contained in and imposed by Ordinance No. 674-85, Leveton Tax Increment Plan, Recorded: September 24, 1985, Recording No.: 85-037690

    Amended by instrument,
    Recorded: September 24, 1985, Recording No. 85-037691
    Recorded: September 21, 1989, Recording No. 89-044013
    Recorded: June 29, 1998, Recording No. 98-069448
    Recorded: May 23, 2002, Recording No. 2002-059374

11. The herein described property is within, and is subject to the regulations and restrictions of the Tualatin Central Urban Renewal Area, as imposed by the City of Tualatin, including any amendments thereto.
    Recorded: June 11, 1998, Recording No. 98-062035

12. An easement affecting that portion of said land and for the purposes stated herein and incidental purposes as provided in the following

Granted To	:	City of Tualatin
For	:	Slope and public utility
Recorded	:	June 14, 2006 in Official Records under Document No. 2006-071112

13. **INTENTIONALLY DELETED**

14. Rights of tenants in possession as tenants only under unrecorded leases.

15. Personal property taxes, if any.

16. **INTENTIONALLY DELETED**

17. We find no open Deeds of Trust of record. Please verify by inquiry of Escrow Personnel and/or Agents whether or not we have overlooked something and advise the Title Dept. accordingly prior to closing.

End of Exceptions

---------- Informational Notes ----------

A. There are no matters against the party(ies) shown below which would appear as exceptions to coverage in a title insurance product:

Parties: Ronald L. Endicott, Donald F. Stanaway or Scott H. Stanaway

B. Note: Examination of judgments and/or tax liens pertaining to Four-S Corp has not been done. Any judgments and/or tax liens against said party will become a lien against the subject property upon said party acquiring legal title.

C. A copy of a proper resolution authorizing the execution of the documents to be insured passed by Board of Directors of Four-S Corporation, must be furnished prior to closing. The resolution should specify the officers authorized to sign on behalf of the corporation.

D. The above numbered report (including any supplements or amendments thereto) is hereby modified and/or supplemented to reflect the following additional items relating to the issuance of an American Land Title Association loan form policy:

NONE

NOTE: Our investigation has been completed and there is located on said land a commercial building known as 12200 SW Myslony Street, Tualatin, OR 97062.

The ALTA loan policy, when issued, will contain the ALTA 9 Endorsement and 22 series Endorsement.

Unless shown elsewhere in the body of this report, there appear of record no transfers or agreements to transfer the land described herein within the last three years prior to the date hereof, except as follows:

Quitclaim Deed executed by Cindy R. Woods to Ronald L. Endicott, recorded June 8, 2012 in Official Records under Document No. 2012-046648.

Personal Representative's Deed executed by Joann M. Endicott, the duly appointed, qualified and acting personal representative of the estate of Ronald G. Endicott, deceased to Ronald L. Endicott and Cindy R. Woods, each as to an undivided 50% interest, recorded June 08, 2012 in Official Records under Document No. 2012-046647.

Warranty Deed executed by Vito Elmer Pileggi and Thelma E. Pileggi to Ronald G. Endicott and Henrietta L. Endicott, recorded June 14, 1971 in Official Records under Document No. Book: 826, Page: 501.

E. NOTE: Due to the differences between federal and state laws concerning marijuana and the activities associated with it, including but not limited to its cultivation, manufacture, distribution or sale, Old Republic Title will not close or insure any transaction involving property that is associated with these activities.

F. NOTE: No utility search has been made or will be made for water, sewer or storm drainage charges unless the City/Service District claims them as liens (i.e. foreclosable) and reflects them on its lien docket as of the date of closing. Buyers should check with the appropriate city bureau or water service district and obtain a billing cutoff. Such charges must be adjusted outside of escrow.

G. Facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the Land or by making inquiry of persons in possession thereof. To remove this item, the Company will require an affidavit and indemnity on a form supplied by the Company.

H. Any lien, or right to a lien, for services, labor, material, equipment rental or workers compensation heretofore or hereafter furnished, imposed by law and not shown by the public records. To remove this item, the Company will require an affidavit and indemnity on a form supplied by the Company.

I. IMPORTANT NOTICE TO TRANSFEROR(S) REGARDING WITHHOLDING TAX:

Effective January 1, 2008, Oregon law (ORS 314.258) requires closing agents closing a transaction for the transfer of certain Oregon real property interests to: (a) withhold from the transferor's proceeds an amount specified by law; and (b) remit the amount withheld to the Oregon Department of Revenue.

State mandated forms must be completed by all transferors in order to either: (a) claim or certify an exemption from the requirements of ORS 314.258; or (b) certify the withholding amount due pursuant to ORS 314.258.

You should consult with your tax or legal advisor in order to complete these forms prior to the closing of your transaction. Failure to timely deliver the appropriate form(s) to your closing agent may delay your closing or increase your withholding amount.

We are not legal or tax advisors. Although we may provide you with these forms and provide some assistance in filling out the forms, by law we are unable to advise you on the selection of which form(s) you must complete or the content in the forms.

J. Recording charge (per document):

COUNTY: FIRST PAGE EACH ADDITIONAL PAGE

Clackamas $53.00 $5.00 | Multnomah $42.00 $5.00 | Washington $41.00 $5.00

**NOTE: A multiple transaction document bears an additional $5.00 charge for each additional transaction. A document that fails to conform to certain formatting and page one requirements bears an additional $20.00 charge.

RECORDING CHARGES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

NOTE REGARDING ARBITRATION: THE POLICY OR POLICIES OF TITLE INSURANCE TO BE ISSUED WILL CONTAIN A CLAUSE PERMITTING ARBITRATION OF CLAIMS AT THE REQUEST OF EITHER THE INSURED OR THE COMPANY. UPON REQUEST, THE COMPANY WILL PROVIDE A COPY OF THIS CLAUSE AND THE CURRENTLY APPLICABLE ARBITRATION RULES. FOR THE APPLICABLE ENDORSEMENT CHARGE, THE COMPANY WILL DELETE THE ARBITRATION CLAUSE IF IT RECEIVES BEFORE CLOSING A WRITTEN REQUEST FOR THE ENDORSEMENT.

K. NOTE: It is our policy in Oregon to identify a reduced title insurance charge on Schedule A when it appears to us that your transaction qualifies for a reduced charge. The reduction usually is computed as a percentage of the Company’s basic rate. If a reduced charge appears on Schedule A, it is one of the following:

Short Term Rate: A discount of 25% of the basic rate applies when title insurance has been issued for the property within the previous three years.

Builder–Developer Rate: A discount of 35% of the basic rate may apply when a party to the transaction is a builder or developer and the property is residential.

Simultaneous Issue Rate: A special rate may apply when two or more policies are issued simultaneously, such as a loan policy with an owner’s policy or two loan policies.

IF YOU THINK A REDUCED RATE APPLIES TO YOUR TRANSACTION BUT IT DOES NOT APPEAR ON SCHEDULE A, PLEASE INFORM YOUR ESCROW OFFICER OR TITLE OFFICER. You may contact your escrow officer or title officer at the phone number, email address or mailing address shown on this report.

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We are not legal or tax advisors. Although we may we may provide you with these forms and provide some assistance in filling out forms, by law we are unable to advise you on the selection of which form(s) you must complete or the content in the forms.

NOTICE TO CUSTOMERS

YOU WILL BE REVIEWING, APPROVING AND SIGNING IMPORTANT DOCUMENTS AT CLOSING. LEGAL CONSEQUENCES FOLLOW FROM THE SELECTION AND USE OF THESE DOCUMENTS. THESE CONSEQUENCES AFFECT YOUR RIGHTS AND OBLIGATIONS. YOU MAY CONSULT AN ATTORNEY ABOUT THESE DOCUMENTS. YOU SHOULD CONSULT AN ATTORNEY IF YOU HAVE QUESTIONS OR CONCERNS ABOUT THE TRANSACTION OR ABOUT THE DOCUMENTS. IF YOU WISH TO REVIEW TRANSACTION DOCUMENTS THAT YOU HAVE NOT YET SEEN, PLEASE CONTACT THE ESCROW AGENT.

CONDITIONS

The policy to be issued contains an arbitration clause. All arbitrable matters when the Amount of Insurance is $2,000,000 or less shall be arbitrated at the option of either the Company of Insured as the exclusive remedy of the parties. You may review a copy of the arbitration rules at http://www.alta.org. If a policy other than the 2006 ALTA Owner's Policy of Title Insurance, 2006 ALTA Loan Policy of Title Insurance or 2006 ALTA Short Form Residential Loan Policy is ultimately issued, the arbitration provisions of the issued policy shall control.

Exhibit I

AMERICAN LAND TITLE ASSOCIATION
OWNER'S POLICY OF TITLE INSURANCE - 2006
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (ii) the occupancy, use, or enjoyment of the Land;
   (iii) the character, dimensions, or location of any improvement erected on the Land;
   (iv) the subdivision of land; or
   (v) environmental protection;
   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.

1. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.

2. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 9 and 10); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.

3. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction vesting the Title as shown in Schedule A, is:
   (a) a fraudulent conveyance or fraudulent transfer; or
   (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.

4. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Data of Policy and the date of recording of the deed or other instrument of transfer in Public Records that vests Title as shown in Schedule A.

EXCEPTIONS FROM COVERAGE – SCHEDULE B, PART ONE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.

2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.

3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.

4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.

5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the public records.

6. Any lien or right to a lien for services, labor or material not shown by the public records.

Exhibit I

AMERICAN LAND TITLE ASSOCIATION
LOAN POLICY OF TITLE INSURANCE - 2006
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions, or location of any improvement erected on the Land;
   (iii) the subdivision of land; or
   (iv) environmental protection; or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.

2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.

3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13, or 14); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.

4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.

5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law.

6. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
   (a) a fraudulent conveyance or fraudulent transfer,or
   (b) a preferential transfer for any reason not stated in Covered Risk 13(b) of this policy.

7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b).

EXCEPTIONS FROM COVERAGE – SCHEDULE B, PART 1, SECTION ONE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.

2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.

3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.

4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.

5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.

OLD REPUBLIC TITLE

rev. 07/2016

FACTS

WHAT DOES OLD REPUBLIC TITLE DO WITH YOUR PERSONAL INFORMATION?

Why?	Financial companies choose how they share your personal information. Federal law gives consumers the right to limit some but not all sharing. Federal law also requires us to tell you how we collect, share, and protect your personal information. Please read this notice carefully to understand what we do.
What?	The types of personal information we collect and share depend on the product or service you have with us. This information can include: • Social Security number and employment information • Mortgage rates and payments and account balances • Checking account information and wire transfer instructions When you are *no longer* our customer, we continue to share your information as described in this notice.
How?	All financial companies need to share customers' personal information to run their everyday business. In the section below, we list the reasons financial companies can share their customers' personal information; the reasons Old Republic Title chooses to share; and whether you can limit this sharing.

Reasons we can share your personal information	Does Old Republic Title share?	Can you limit this sharing?
For our everyday business purposes — such as to process your transactions, maintain your account(s), or respond to court orders and legal investigations, or report to credit bureaus	**Yes**	**No**
For our marketing purposes — to offer our products and services to you	**No**	**We don't share**
For joint marketing with other financial companies	**No**	**We don't share**
For our affiliates' everyday business purposes — information about your transactions and experiences	**Yes**	**No**
For our affiliates' everyday business purposes — information about your creditworthiness	**No**	**We don't share**
For our affiliates to market to you	**No**	**We don't share**
For non-affiliates to market to you	**No**	**We don't share**

Questions	**Go to** www.oldrepublictitle.com (*Contact Us*)

Who we are	
Who is providing this notice?	Companies with an Old Republic Title name and other affiliates. Please see below for a list of affiliates.

What we do	
How does Old Republic Title protect my personal information?	To protect your personal information from unauthorized access and use, we use security measures that comply with federal law. These measures include computer safeguards and secured files and buildings. For more information, visit http://www.OldRepublicTitle.com/newnational/Contact/privacy.
How does Old Republic Title collect my personal information?	We collect your personal information, for example, when you: • Give us your contact information or show your driver's license • Show your government-issued ID or provide your mortgage information • Make a wire transfer We also collect your personal information from others, such as credit bureaus, affiliates, or other companies.
Why can't I limit all sharing?	Federal law gives you the right to limit only: • Sharing for affiliates' everyday business purposes - information about your creditworthiness • Affiliates from using your information to market to you • Sharing for non-affiliates to market to you State laws and individual companies may give you additional rights to limit sharing. See the "Other important information" section below for your rights under state law.

Definitions	
Affiliates	Companies related by common ownership or control. They can be financial and nonfinancial companies. • *Our affiliates include companies with an Old Republic Title name, and financial companies such as Attorneys' Title Fund Services, LLC, Lex Terrae National Title Services, Inc., Mississippi Valley Title Services Company, and The Title Company of North Carolina.*
Non-affiliates	Companies not related by common ownership or control. They can be financial and non-financial companies. • *Old Republic Title does not share with non-affiliates so they can market to you.*
Joint marketing	A formal agreement between non-affiliated financial companies that together market financial products or services to you. • *Old Republic Title doesn't jointly market*.

Other Important Information

Oregon residents only: We are providing you this notice under state law. We may share your personal information (described on page one) obtained from you or others with non-affiliate service providers with whom we contract, such as notaries and delivery services, in order to process your transactions. You may see what personal information we have collected about you in connection with your transaction (other than personal information related to a claim or legal proceeding). To see your information, please click on "Contact Us" at www.oldrepublictitle.com and submit your written request to the Legal Department. You may see and copy the information at our office or ask us to mail you a copy for a reasonable fee. If you think any information is wrong, you may submit a written request online to correct or delete it. We will let you know what actions we take. If you do not agree with our actions, you may send us a statement.

Affiliates Who May be Delivering This Notice

American First Abstract, LLC	**American First Title & Trust Company**	**American Guaranty Title Insurance Company**	**Attorneys' Title Fund Services, LLC**	**Compass Abstract, Inc.**
eRecording Partners Network, LLC	**Genesis Abstract, LLC**	**Kansas City Management Group, LLC**	**L.T. Service Corp.**	**Lenders Inspection Company**
Lex Terrae National Title Services, Inc.	**Lex Terrae, Ltd.**	**Mara Escrow Company**	**Mississippi Valley Title Services Company**	**National Title Agent's Services Company**
Old Republic Branch Information Services, Inc.	**Old Republic Diversified Services, Inc.**	**Old Republic Exchange Company**	**Old Republic National Title Insurance Company**	**Old Republic Title and Escrow of Hawaii, Ltd.**
Old Republic Title Co.	**Old Republic Title Company of Conroe**	**Old Republic Title Company of Indiana**	**Old Republic Title Company of Nevada**	**Old Republic Title Company of Oklahoma**
Old Republic Title Company of Oregon	**Old Republic Title Company of St. Louis**	**Old Republic Title Company of Tennessee**	**Old Republic Title Information Concepts**	**Old Republic Title Insurance Agency, Inc.**
Old Republic Title, Ltd.	**Republic Abstract & Settlement, LLC**	**Sentry Abstract Company**	**The Title Company of North Carolina**	**Title Services, LLC**
Trident Land Transfer Company, LLC				

Four S Properties Building
Storm Drainage Calculations

SW Myslony Street
Tualatin, Oregon

August 2018
Project Number: 18206

TM RIPPEY
CONSULTING ENGINEERS

7650 SW Beveland Street,
Suite 100
Tigard, Oregon 97223

Phone: 503 443 3900
Fax: 503 443 3700
email:kkoroch@tmrippey.com

Table of Contents

Introduction

This project is a new commercial building and is located south of SW Myslony Street, east of SW 124th Avenue in Tualatin. The site is largely undeveloped although a single family residence and storage building exist on the eastern portion of the site. These two structures will remain until future site development occurs. The proposed development is a new commercial building to be located on the western portion of the site.

The site consists of one parcel, Tax Lot 1600 which is approximately 5.26 acres.

The site slopes to the north and currently, runoff from the site drains to SW Myslony overland. A public storm system exists at the frontage and with development, runoff from the site will be detained in a surface pond, treated, and discharged to this existing public system, via a new connection to an existing inlet at the south curb line of Myslony Street at the site's northern frontage.

Water Quality Treatment

Water quality treatment design conforms to current City of Tualatin and Clean Water Services (CWS) standards. The standards specify a water quality event of 0.36 inches of rainfall over four hours. Water quality treatment of the paved surfaces is provided by two Contech Stormwater Solutions water quality cartridge systems, one is a single cartridge Stormfilter catch basin treating the northern portion of the paved area and the other is a four cartridge Stormfilter treatment manhole that treats the east and southern paved areas. The remaining impervious area is the building roof and treatment for it is provided by a vegetated treatment swale located west of the building.

Impervious area for the development is approximately 98,375 square feet. Of this, 6,220 square feet is the northeast paving area.

Storm treatment calculations for the northeast paving area are as follows:

WQ Volume = (0.36 in x 6,220 sf) / 12 in/ft = 187 cubic feet.
WQ Flow = 187 cf /14,400 sec = 0.0130 cfs.

Using Contech's standard treatment cartridge, at a capacity of 0.0334 cfs per cartridge, 1 cartridge is required for treatment of this area. A one cartridge Contech Stormfilter catch basin will be utilized to provide the required treatment.

Storm treatment calculations for the east and south paving areas are as follows:

WQ Volume = (0.36 in x 39,531 sf) / 12 in/ft = 1,186 cubic feet.
WQ Flow = 1,186 cf /14,400 sec = 0.0824 cfs.

Using Contech's low drop treatment cartridge, at a capacity of 0.0223 cfs per cartridge, 4 cartridges are required for treatment of this area. A Contech Stormfilter treatment manhole with four cartridges will be utilized to provide the required treatment.

Storm treatment calculations for the building roof are as follows:

WQ Volume = (0.36 in x 52,624 sf) / 12 in/ft = 1,579 cubic feet.
WQ Flow = 1,579 cf /14,400 sec = 0.1096 cfs.

CWS requires vegetated swales to be a minimum of 2 ft. wide, and 100 ft. long, with a slope of 0.50% minimum, with a minimum swale residence time of 9 minutes. HydroCAD software was utilized to determine that a 100 ft. swale, with 0.50% slope and 4 ft. bottom width provides 12.8 minutes of residence time at a maximum depth of 0.18 ft. The swale has capacity to convey the 100 year rainfall event at a depth of 0.73 ft. and 0.28 ft./sec flow velocity, complying with CWS requirements.

See the appendix for detailed calculations and HydroCAD output.

Runoff Flow Control

As noted above, following development approximately 98,375 square feet of new impervious surface will exist.

Runoff has been modeled using HydroCAD software employing Santa Barbara Unit Hydrograph methodology. The portions of the site that are currently pervious are modeled with a runoff curve number, CN of 79. CN for the impervious areas is 98.

Detention is provided with a surface pond at the northern portion of the development area. See the table below for specific detention information and the construction plans for pond configuration.

Control Structure Discharge	2 Year	10 Year	25 Year
Predevelopment Runoff, cfs	0.28	0.62	0.80
Post Development Runoff, cfs	1.30	1.82	2.07
Controlled Outflow, cfs	0.27	0.58	0.75
Orifice Elevation, ft.	134.75	138.07	138.07
Orifice Diameter, in.	3.00	6*	**
Water Surface Elevation, ft.	138.07	138.41	138.54
Detained Volume, cf.	4,938	6,800	7,604

*"Orifice" is a notch weir, 6 inches wide.
**notched weir sized for 10 year event controls for 25 year event as well.

Runoff for pipe sizing is modeled using HydroCAD™ software employing Santa Barbara Unit Hydrograph (SBUH) methodology. Rainfall is based on the 25 (3.90") year Type 1A storm event, per CWS R & O 17-5, Section 5.04.2.b.2, and Drawing 1280. Pipe sizing is based on Manning's Equation with a roughness coefficient, n, of 0.013. See attached pipe sizing spreadsheet.

As no changes to site outflow will occur because of the provided flow control, the downstream system will experience no additional flow and no modifications will occur.

Future Development

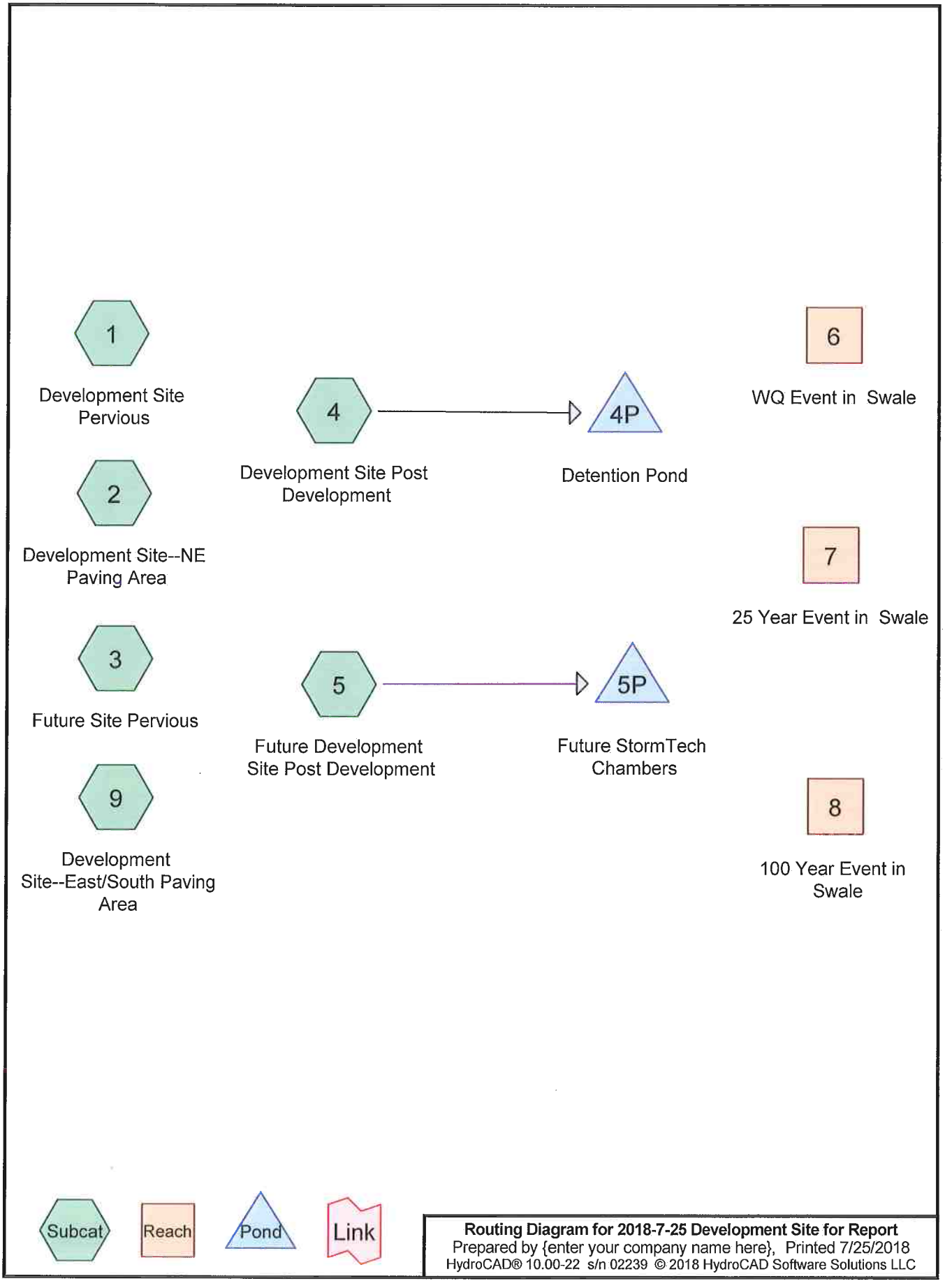
As noted above the eastern portion of the site will be left undeveloped, although the developer may demolish the two existing buildings. With the initial development of the western portion of the site, a storm pipe routed to the initially constructed storm system will be provided. The sizing of this pipe assumes that runoff flow control and treatment will be provided on the future portion of the site when development occurs. The sizing of the pipe presumes treatment will utilize Contech's low flow cartridge system and detention will occur within ADS Stormtech SC 740 chambers. See the appendix for detention sizing calculations for this future development area.

Downstream Analysis

This development site currently slopes northerly toward Myslony Street and runoff from the site currently flows overland to the public storm system in Myslony Street. At the site frontage a curb inlet collects runoff from the street and site and flow is directed north via a 10 inch diameter storm pipe to an existing public system at the north side of Myslony. The controlled site outflow is less than 5% of the existing flow in the public main.

Appendix 1

HydroCAD Output for Detention
HydroCAD Output for Pipe Sizing
Site Conveyance Calculations
Water Quality Treatment Calculations
Basin Map
City As Built Plans


1
Development Site Pervious
2
Development Site--NE Paving Area
3
Future Site Pervious
9
Development Site--East/South Paving Area
4
Development Site Post Development
4P
Detention Pond
5
Future Development Site Post Development
5P
Future StormTech Chambers
6
WQ Event in Swale
7
25 Year Event in Swale
8
100 Year Event in Swale
Subcat
Reach
Pond
Link
Routing Diagram for 2018-7-25 Development Site for Report
Prepared by {enter your company name here}, Printed 7/25/2018
HydroCAD® 10.00-22 s/n 02239 © 2018 HydroCAD Software Solutions LLC

Time span=0.00-80.00 hrs, dt=0.01 hrs, 8001 points
Runoff by SBUH method, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Development Site Runoff Area=98,375 sf 0.00% Impervious Runoff Depth=0.84"
Flow Length=410' Tc=18.3 min CN=79 Runoff=0.28 cfs 6,865 cf

Subcatchment 2: Development Site--NE Runoff Area=6,220 sf 100.00% Impervious Runoff Depth=2.27"
Tc=5.0 min CN=98 Runoff=0.08 cfs 1,177 cf

Subcatchment 3: Future Site Pervious Runoff Area=65,025 sf 0.00% Impervious Runoff Depth=0.84"
Flow Length=200' Tc=5.0 min CN=79 Runoff=0.24 cfs 4,538 cf

Subcatchment 4: Development Site Post Runoff Area=98,375 sf 100.00% Impervious Runoff Depth=2.27"
Tc=5.0 min CN=98 Runoff=1.30 cfs 18,615 cf

Subcatchment 5: Future Development Runoff Area=65,025 sf 100.00% Impervious Runoff Depth=2.27"
Tc=5.0 min CN=98 Runoff=0.86 cfs 12,305 cf

Subcatchment 9: Development Runoff Area=39,531 sf 100.00% Impervious Runoff Depth=2.27"
Tc=5.0 min CN=98 Runoff=0.52 cfs 7,480 cf

Reach 6: WQ Event in Swale Avg. Flow Depth=0.18' Max Vel=0.13 fps Inflow=0.11 cfs 31,684 cf
n=0.240 L=100.0' S=0.0050 '/' Capacity=0.11 cfs Outflow=0.11 cfs 31,509 cf

Reach 7: 25 Year Event in Swale Avg. Flow Depth=0.68' Max Vel=0.27 fps Inflow=1.11 cfs 319,720 cf
n=0.240 L=100.0' S=0.0050 '/' Capacity=1.12 cfs Outflow=1.11 cfs 318,886 cf

Reach 8: 100 Year Event in Swale Avg. Flow Depth=0.73' Max Vel=0.28 fps Inflow=1.28 cfs 368,686 cf
n=0.240 L=100.0' S=0.0050 '/' Capacity=1.29 cfs Outflow=1.28 cfs 367,763 cf

Pond 4P: Detention Pond Peak Elev=138.07' Storage=4,938 cf Inflow=1.30 cfs 18,615 cf
Outflow=0.27 cfs 18,615 cf

Pond 5P: Future StormTech Chambers Peak Elev=142.00' Storage=3,029 cf Inflow=0.86 cfs 12,305 cf
Outflow=0.24 cfs 11,999 cf

Total Runoff Area = 372,551 sf Runoff Volume = 50,980 cf Average Runoff Depth = 1.64"
43.86% Pervious = 163,400 sf 56.14% Impervious = 209,151 sf

Summary for Subcatchment 1: Development Site Pervious

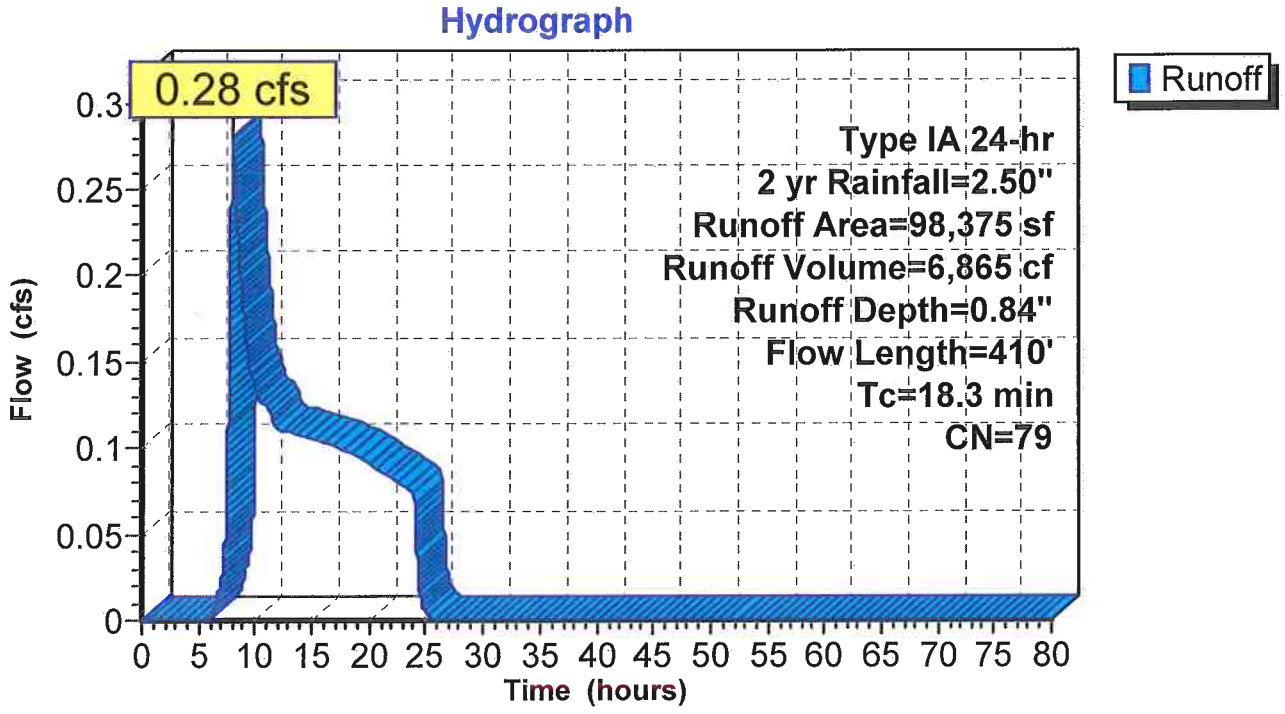
Runoff = 0.28 cfs @ 8.01 hrs, Volume= 6,865 cf, Depth= 0.84"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

Area (sf)	CN	Description
98,375	79	Pasture/grassland/range, Fair, HSG C
98,375		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.0125	0.14		**Sheet Flow,** Range n= 0.130 P2= 2.50"
6.4	310	0.0133	0.81		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
18.3	410	Total			

Subcatchment 1: Development Site Pervious



Summary for Subcatchment 2: Development Site--NE Paving Area

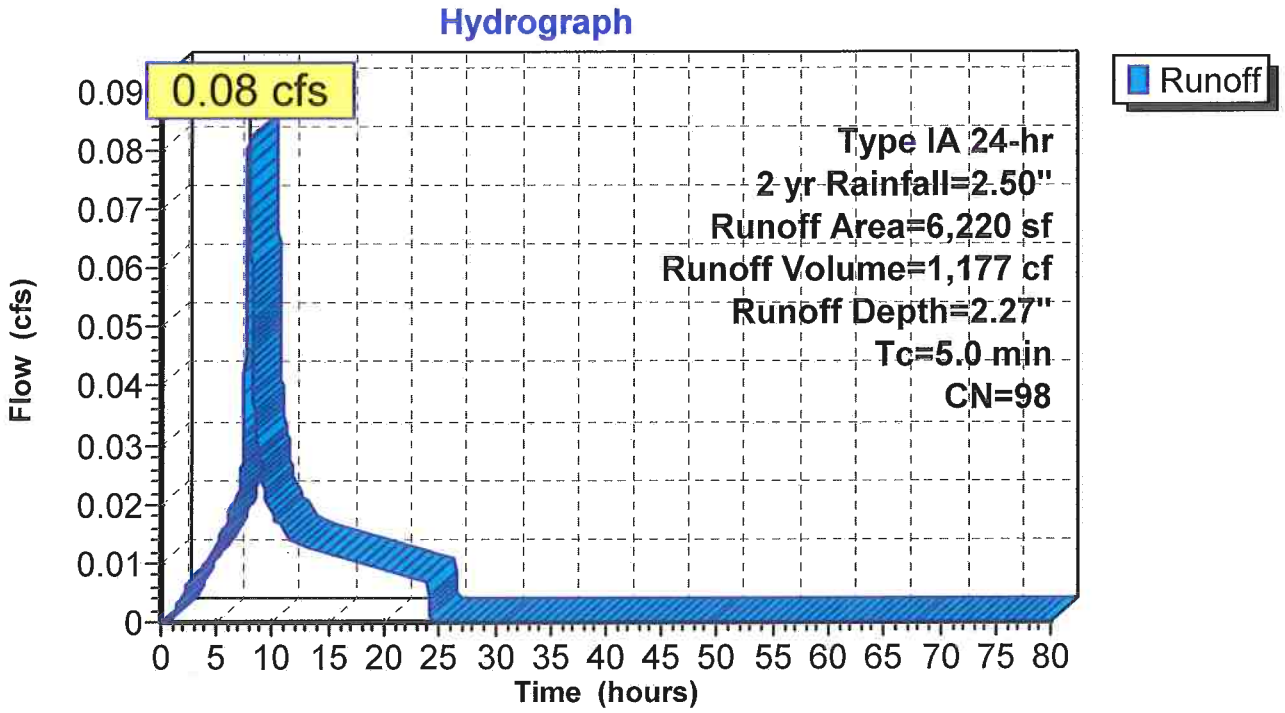
Runoff = 0.08 cfs @ 7.88 hrs, Volume= 1,177 cf, Depth= 2.27"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

Area (sf)	CN	Description
6,220	98	Paved parking, HSG C
6,220		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2: Development Site--NE Paving Area



Summary for Subcatchment 3: Future Site Pervious

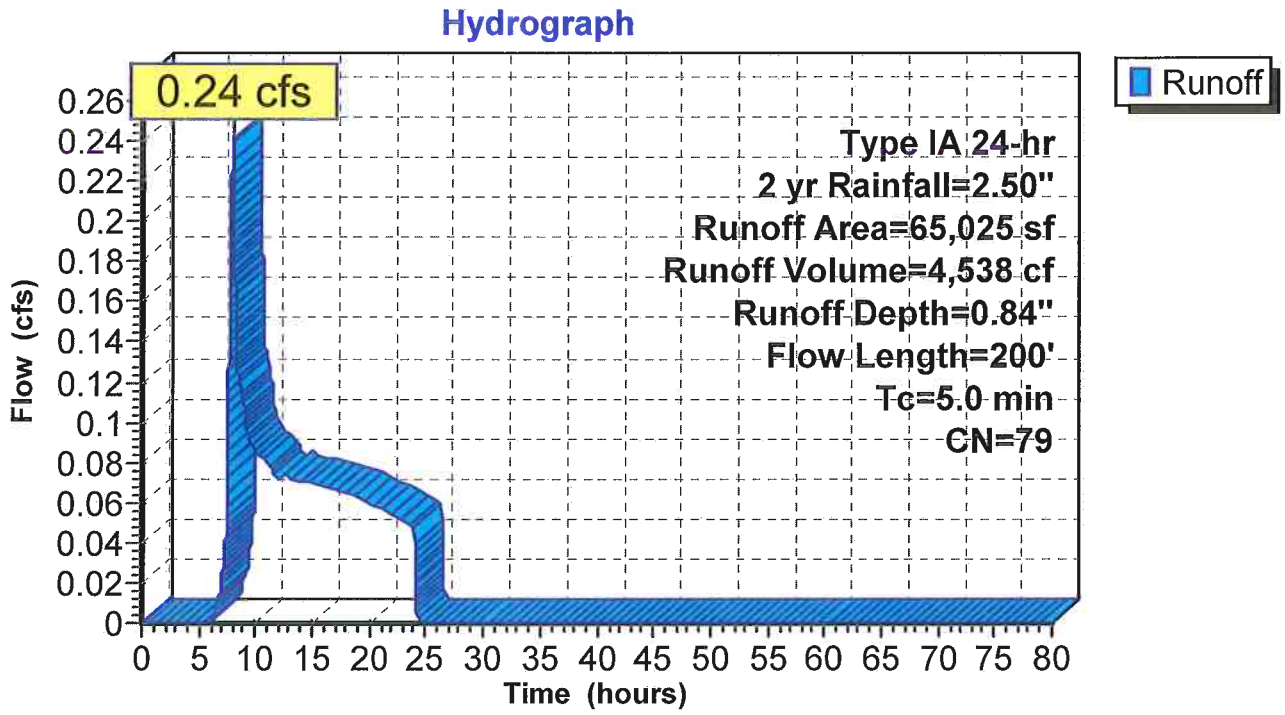
Runoff = 0.24 cfs @ 8.00 hrs, Volume= 4,538 cf, Depth= 0.84"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

Area (sf)	CN	Description
65,025	79	Pasture/grassland/range, Fair, HSG C
65,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	200		0.67		**Direct Entry, Sheet Flow**

Subcatchment 3: Future Site Pervious



Summary for Subcatchment 4: Development Site Post Development

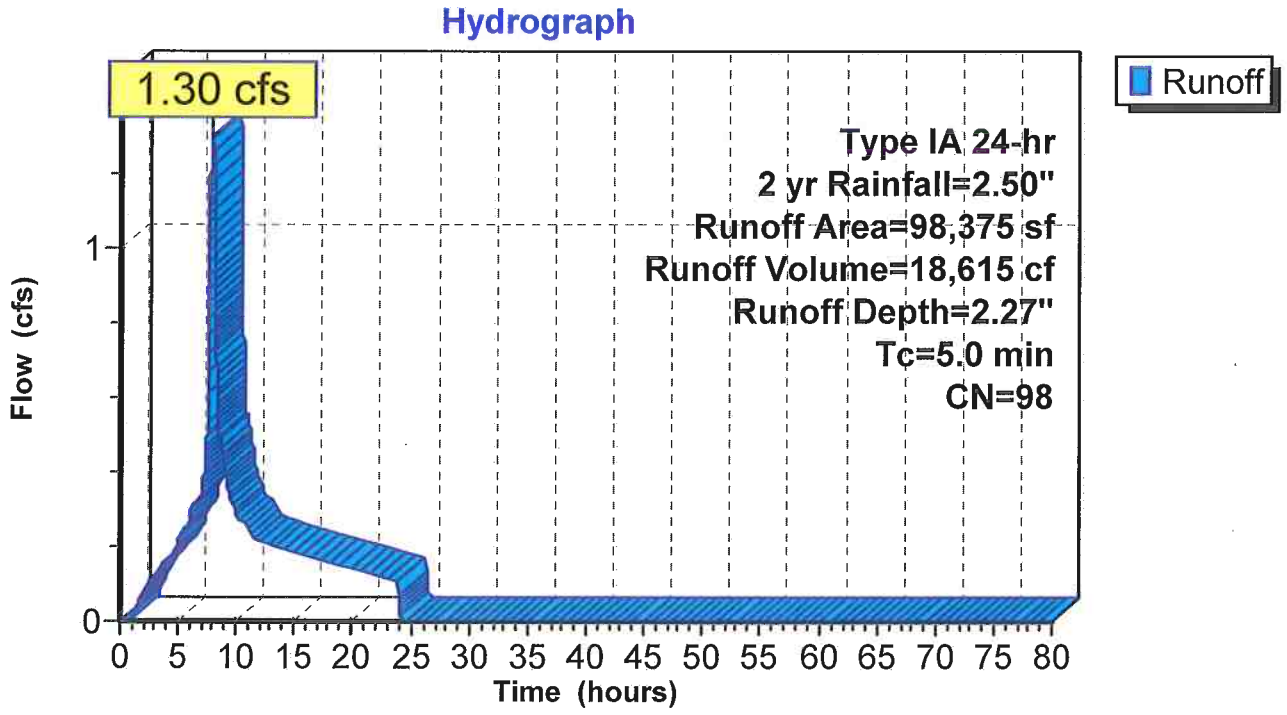
Runoff = 1.30 cfs @ 7.88 hrs, Volume= 18,615 cf, Depth= 2.27"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

Area (sf)	CN	Description
98,375	98	Paved parking & roofs
98,375		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4: Development Site Post Development



Summary for Subcatchment 5: Future Development Site Post Development

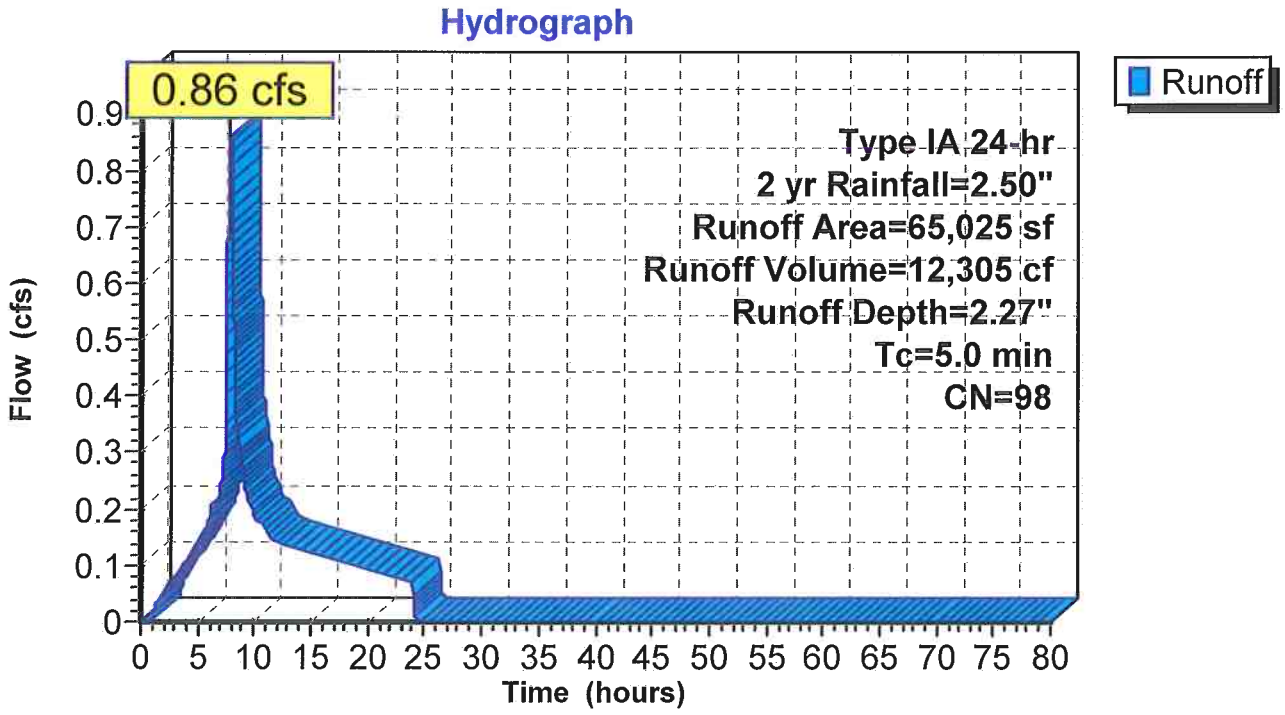
Runoff = 0.86 cfs @ 7.88 hrs, Volume= 12,305 cf, Depth= 2.27"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

Area (sf)	CN	Description
65,025	98	Paved parking & roofs
65,025		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5: Future Development Site Post Development



Summary for Subcatchment 9: Development Site--East/South Paving Area

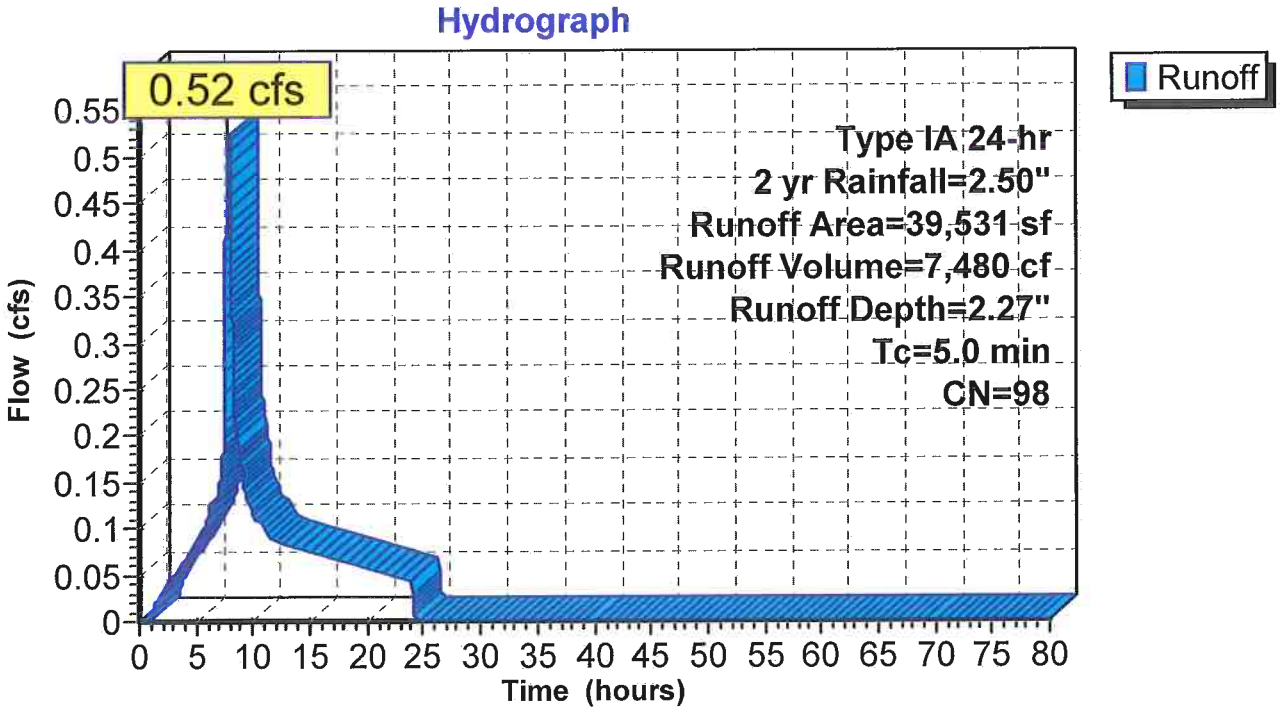
Runoff = 0.52 cfs @ 7.88 hrs, Volume= 7,480 cf, Depth= 2.27"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

Area (sf)	CN	Description
39,531	98	Paved roads w/curbs & sewers, HSG C
39,531		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9: Development Site--East/South Paving Area



Summary for Pond 4P: Detention Pond

Inflow Area = 98,375 sf,100.00% Impervious, Inflow Depth = 2.27" for 2 yr event
Inflow = 1.30 cfs @ 7.88 hrs, Volume= 18,615 cf
Outflow = 0.27 cfs @ 10.26 hrs, Volume= 18,615 cf, Atten= 79%, Lag= 142.7 min
Primary = 0.27 cfs @ 10.26 hrs, Volume= 18,615 cf

Routing by Stor-Ind method, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Peak Elev= 138.07' @ 10.26 hrs Surf.Area= 5,325 sf Storage= 4,938 cf

Plug-Flow detention time= 209.4 min calculated for 18,615 cf (100% of inflow)
Center-of-Mass det. time= 209.3 min (881.9 - 672.6)

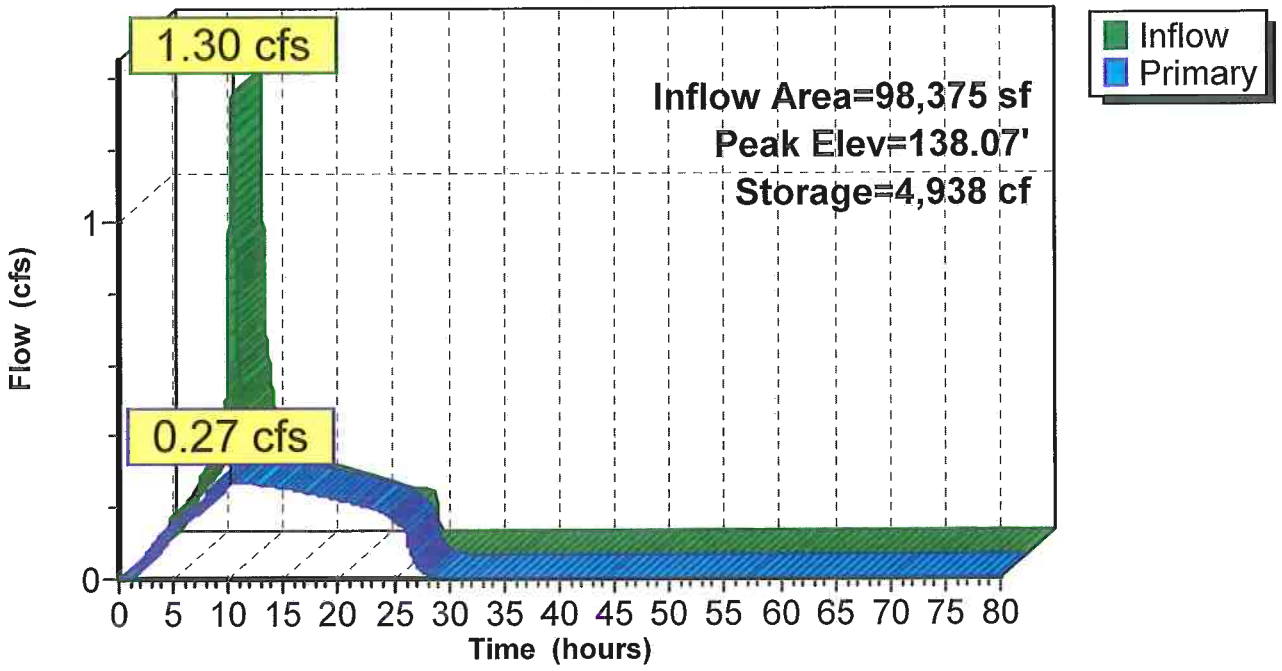
Volume	Invert	Avail.Storage	Storage Description
#1	137.00'	115,500 cf	**20.00'W x 195.00'L x 10.00'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	136.75'	**18.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 136.75' / 136.25' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	134.75'	**3.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	138.07'	**0.5' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.27 cfs @ 10.26 hrs HW=138.07' (Free Discharge)
└**1=Culvert** (Passes 0.27 cfs of 5.24 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 5.54 fps)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.00 cfs @ 0.15 fps)

Pond 4P: Detention Pond

Hydrograph



Summary for Pond 5P: Future StormTech Chambers

Inflow Area = 65,025 sf,100.00% Impervious, Inflow Depth = 2.27" for 2 yr event
Inflow = 0.86 cfs @ 7.88 hrs, Volume= 12,305 cf
Outflow = 0.24 cfs @ 9.20 hrs, Volume= 11,999 cf, Atten= 73%, Lag= 79.4 min
Primary = 0.24 cfs @ 9.20 hrs, Volume= 11,999 cf

Routing by Stor-Ind method, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Peak Elev= 142.00' @ 9.20 hrs Surf.Area= 4,138 sf Storage= 3,029 cf

Plug-Flow detention time= 161.3 min calculated for 11,997 cf (98% of inflow)
Center-of-Mass det. time= 142.5 min (815.2 - 672.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	139.75'	4,394 cf	**6.25'W x 195.86'L x 3.50'H Field A Z=3.0** 12,226 cf Overall - 1,240 cf Embedded = 10,986 cf x 40.0% Voids
#2A	140.25'	1,240 cf	**ADS_StormTech SC-740 +Cap** x 27 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
		5,635 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	140.25'	**12.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 140.25' / 139.75' S= 0.0500 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	138.25'	**2.6" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	142.00'	**4.1" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.24 cfs @ 9.20 hrs HW=142.00' (Free Discharge)
↑**1=Culvert** (Passes 0.24 cfs of 4.23 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 0.23 cfs @ 6.37 fps)
3=Orifice/Grate (Orifice Controls 0.00 cfs @ 0.16 fps)

Pond 5P: Future StormTech Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

27 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 193.86' Row Length +12.0" End Stone x 2 = 195.86' Base Length
1 Rows x 51.0" Wide + 12.0" Side Stone x 2 = 6.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

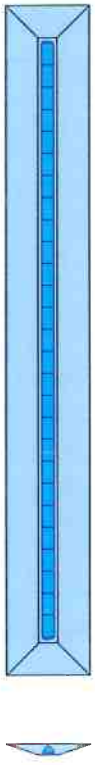
3.0 '/' Side-Z x Height = 126.0" Flare/Side
Base Length + Flare x 2 = 216.86' Top Length
Base Width + Flare x 2 = 27.25' Top Width

27 Chambers x 45.9 cf = 1,240.4 cf Chamber Storage

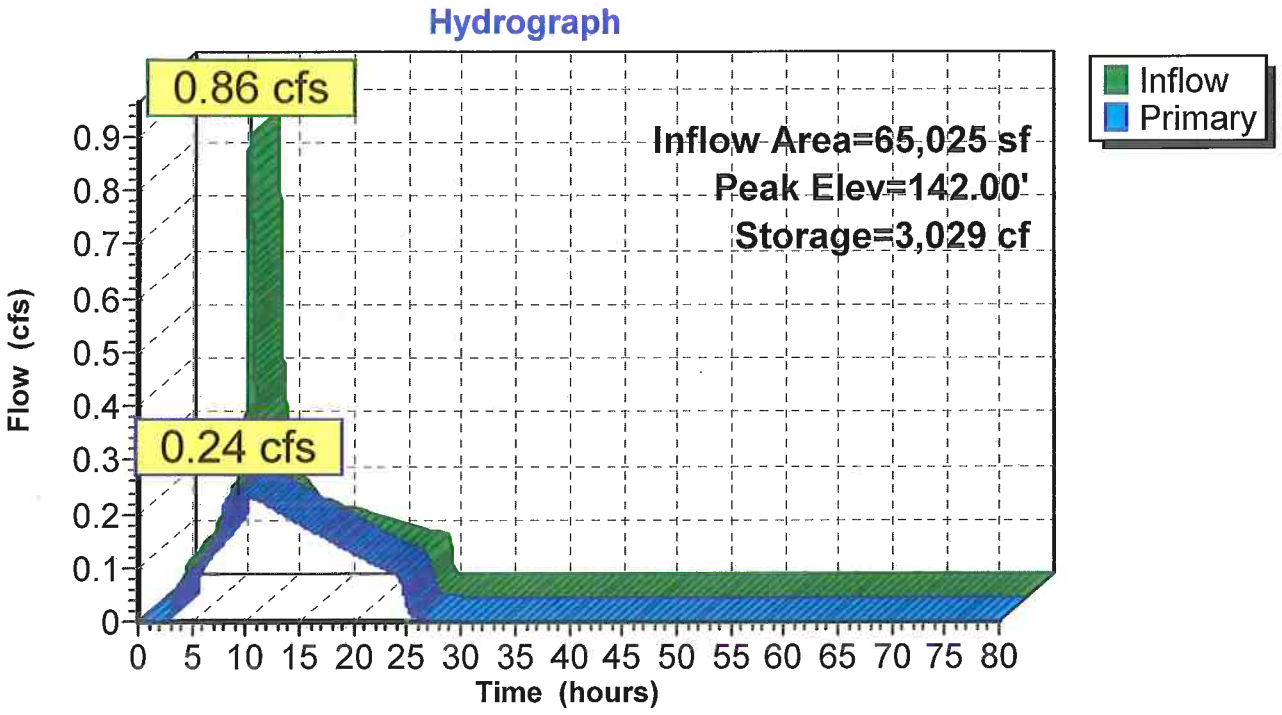
12,226.3 cf Field - 1,240.4 cf Chambers = 10,985.9 cf Stone x 40.0% Voids = 4,394.4 cf Stone Storage

Chamber Storage + Stone Storage = 5,634.7 cf = 0.129 af
Overall Storage Efficiency = 46.1%
Overall System Size = 195.86' x 6.25' x 3.50'

27 Chambers
452.8 cy Field
406.9 cy Stone



Pond 5P: Future StormTech Chambers



Time span=0.00-80.00 hrs, dt=0.01 hrs, 8001 points
Runoff by SBUH method, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Development Site Runoff Area=98,375 sf 0.00% Impervious Runoff Depth=1.53"
Flow Length=410' Tc=18.3 min CN=79 Runoff=0.62 cfs 12,520 cf

Subcatchment 2: Development Site--NE Runoff Area=6,220 sf 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=0.12 cfs 1,667 cf

Subcatchment 3: Future Site Pervious Runoff Area=65,025 sf 0.00% Impervious Runoff Depth=1.53"
Flow Length=200' Tc=5.0 min CN=79 Runoff=0.51 cfs 8,276 cf

Subcatchment 4: Development Site Post Runoff Area=98,375 sf 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=1.82 cfs 26,370 cf

Subcatchment 5: Future Development Runoff Area=65,025 sf 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=1.21 cfs 17,430 cf

Subcatchment 9: Development Runoff Area=39,531 sf 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=0.73 cfs 10,596 cf

Reach 6: WQ Event in Swale Avg. Flow Depth=0.18' Max Vel=0.13 fps Inflow=0.11 cfs 31,684 cf
n=0.240 L=100.0' S=0.0050 '/' Capacity=0.11 cfs Outflow=0.11 cfs 31,509 cf

Reach 7: 25 Year Event in Swale Avg. Flow Depth=0.68' Max Vel=0.27 fps Inflow=1.11 cfs 319,720 cf
n=0.240 L=100.0' S=0.0050 '/' Capacity=1.12 cfs Outflow=1.11 cfs 318,886 cf

Reach 8: 100 Year Event in Swale Avg. Flow Depth=0.73' Max Vel=0.28 fps Inflow=1.28 cfs 368,686 cf
n=0.240 L=100.0' S=0.0050 '/' Capacity=1.29 cfs Outflow=1.28 cfs 367,763 cf

Pond 4P: Detention Pond Peak Elev=138.41' Storage=6,800 cf Inflow=1.82 cfs 26,370 cf
Outflow=0.58 cfs 26,370 cf

Pond 5P: Future StormTech Chambers Peak Elev=142.48' Storage=3,972 cf Inflow=1.21 cfs 17,430 cf
Outflow=0.51 cfs 17,124 cf

Total Runoff Area = 372,551 sf Runoff Volume = 76,859 cf Average Runoff Depth = 2.48"
43.86% Pervious = 163,400 sf 56.14% Impervious = 209,151 sf

Summary for Subcatchment 1: Development Site Pervious

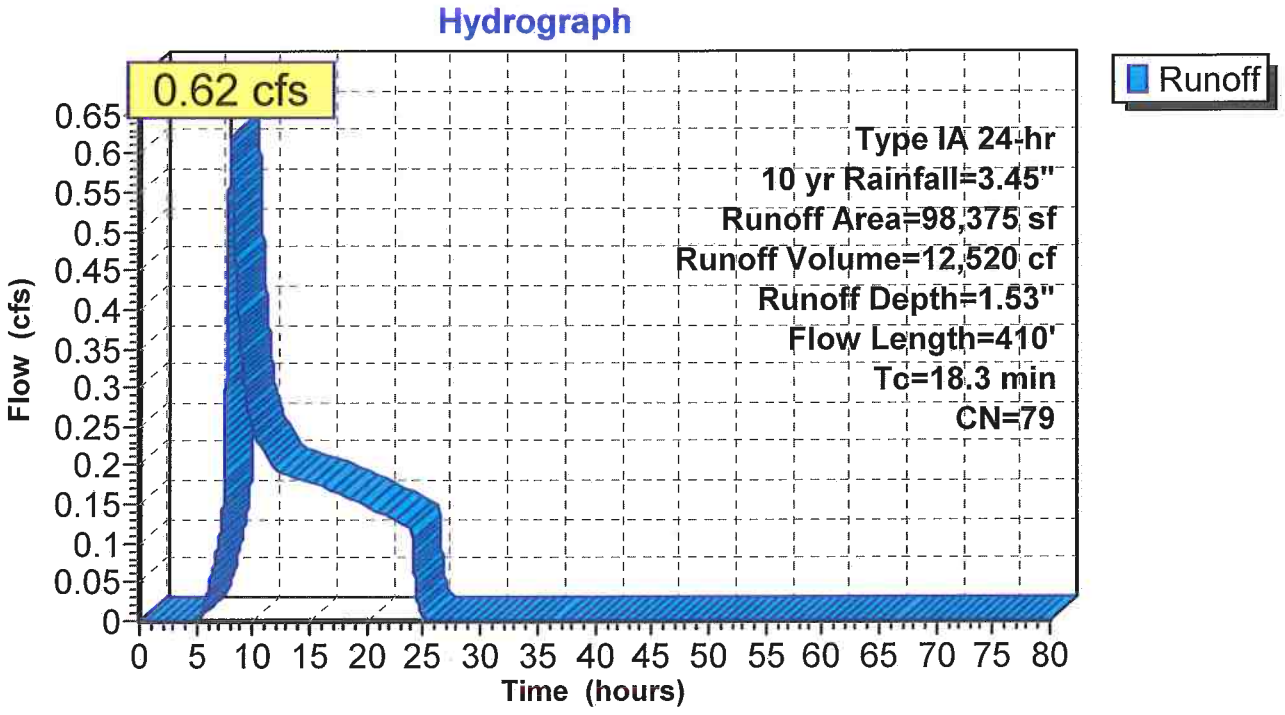
Runoff = 0.62 cfs @ 8.01 hrs, Volume= 12,520 cf, Depth= 1.53"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

Area (sf)	CN	Description
98,375	79	Pasture/grassland/range, Fair, HSG C
98,375		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.0125	0.14		**Sheet Flow,** Range n= 0.130 P2= 2.50"
6.4	310	0.0133	0.81		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
18.3	410	Total			

Subcatchment 1: Development Site Pervious



Summary for Subcatchment 2: Development Site--NE Paving Area

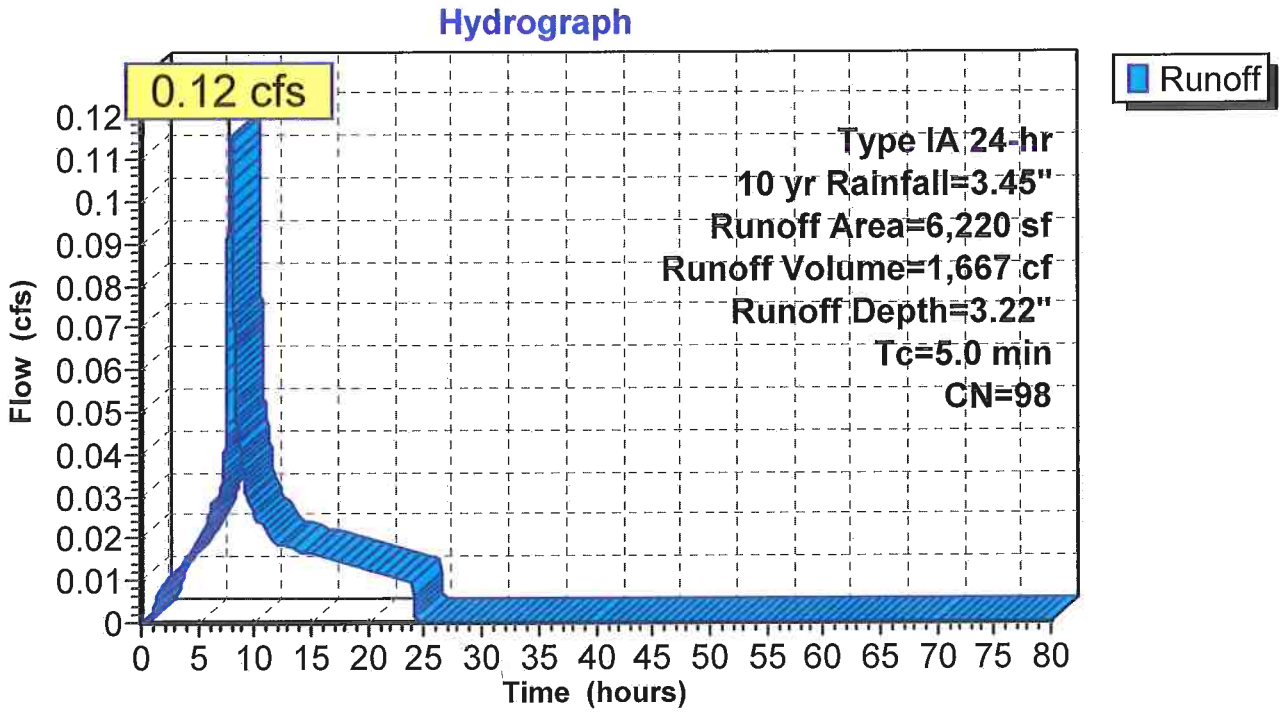
Runoff = 0.12 cfs @ 7.88 hrs, Volume= 1,667 cf, Depth= 3.22"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

Area (sf)	CN	Description
6,220	98	Paved parking, HSG C
6,220		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2: Development Site--NE Paving Area



Summary for Subcatchment 3: Future Site Pervious

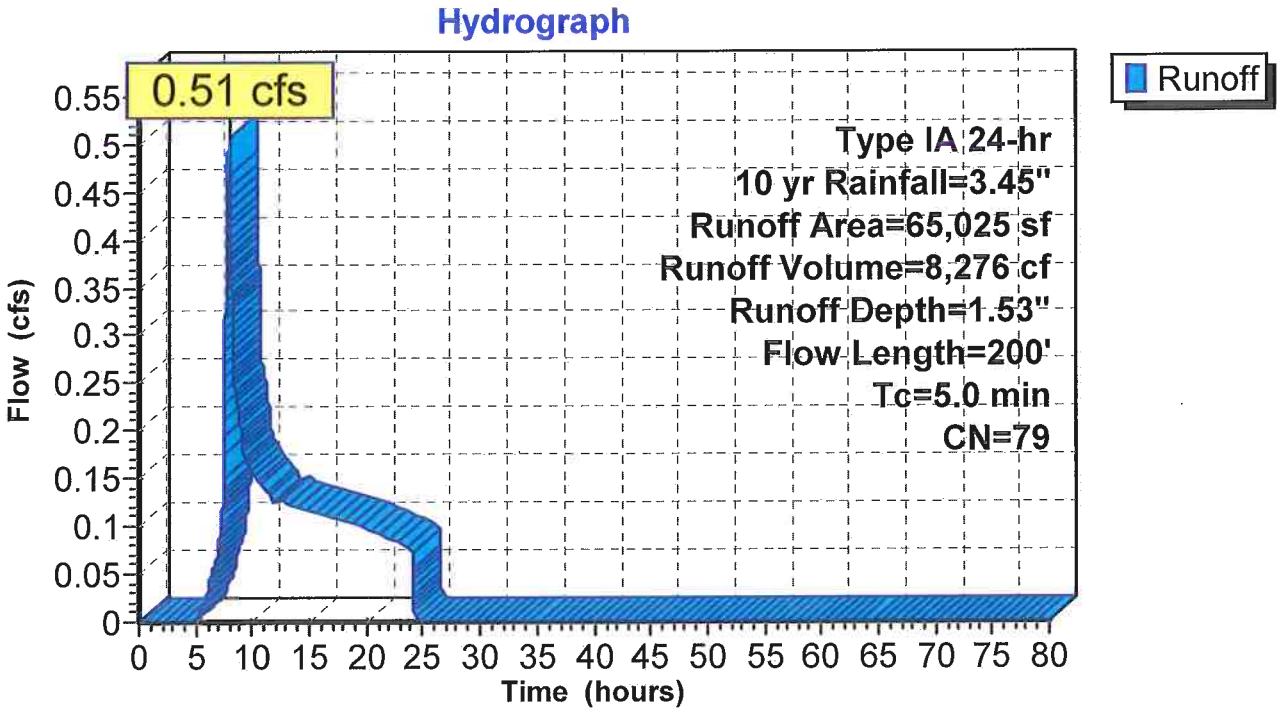
Runoff = 0.51 cfs @ 7.99 hrs, Volume= 8,276 cf, Depth= 1.53"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

Area (sf)	CN	Description
65,025	79	Pasture/grassland/range, Fair, HSG C
65,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	200		0.67		**Direct Entry, Sheet Flow**

Subcatchment 3: Future Site Pervious



Summary for Subcatchment 4: Development Site Post Development

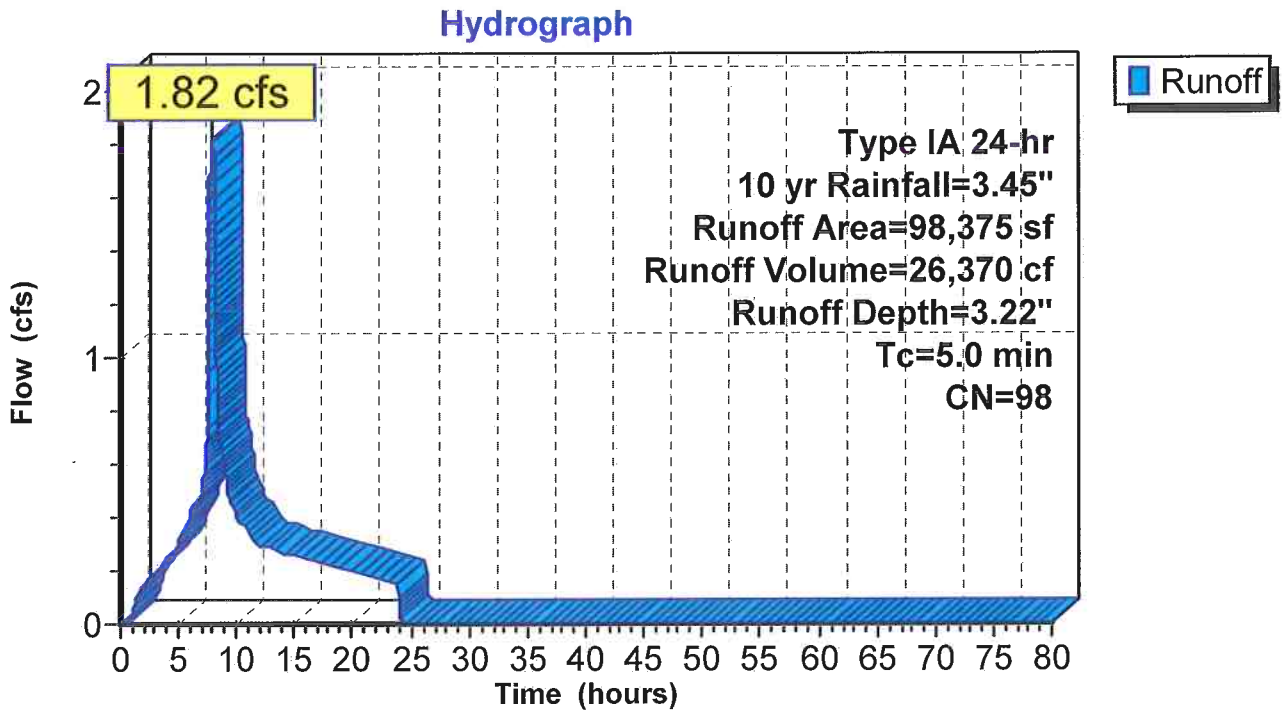
Runoff = 1.82 cfs @ 7.88 hrs, Volume= 26,370 cf, Depth= 3.22"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

Area (sf)	CN	Description
98,375	98	Paved parking & roofs
98,375		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4: Development Site Post Development



Summary for Subcatchment 5: Future Development Site Post Development

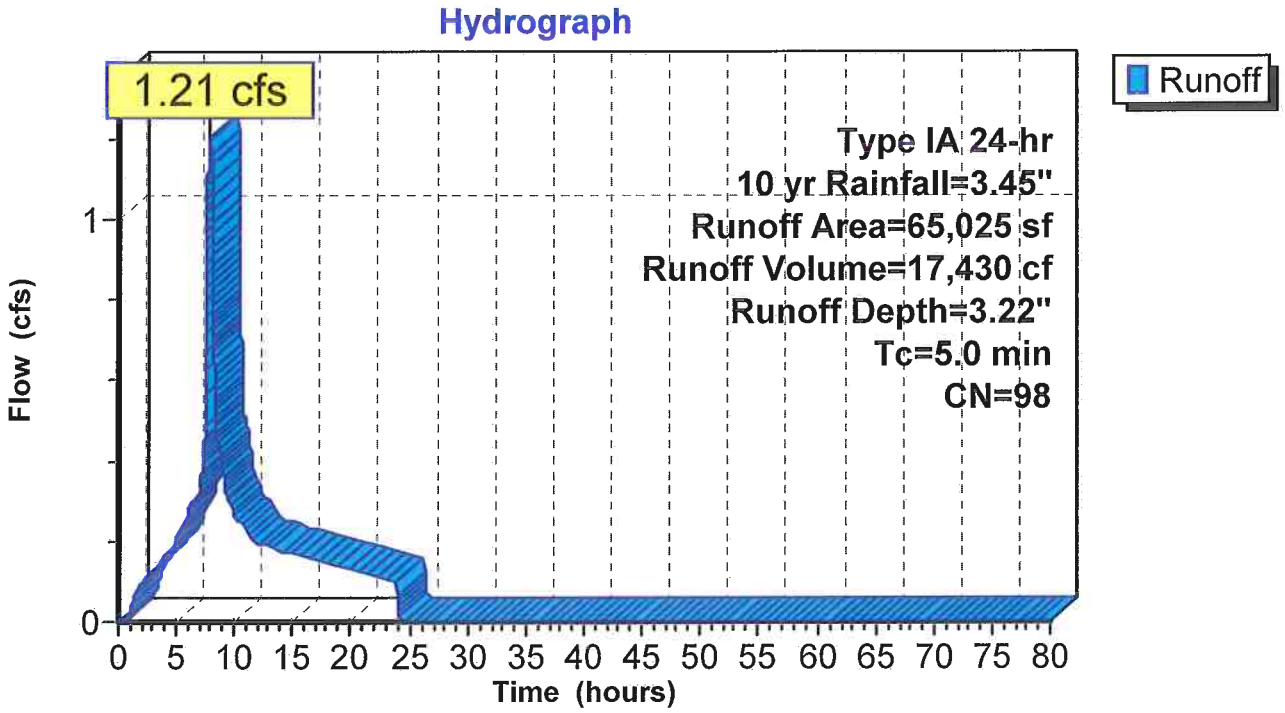
Runoff = 1.21 cfs @ 7.88 hrs, Volume= 17,430 cf, Depth= 3.22"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

Area (sf)	CN	Description
65,025	98	Paved parking & roofs
65,025		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5: Future Development Site Post Development



Summary for Subcatchment 9: Development Site--East/South Paving Area

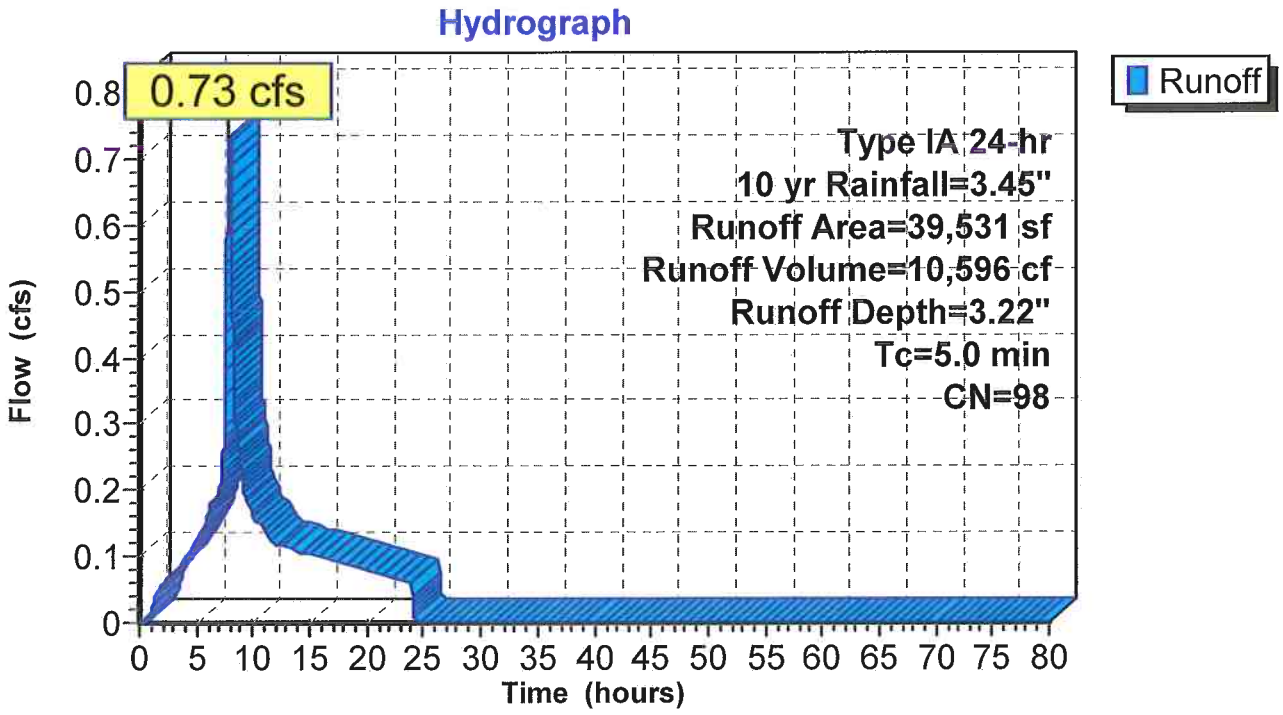
Runoff = 0.73 cfs @ 7.88 hrs, Volume= 10,596 cf, Depth= 3.22"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 yr Rainfall=3.45"

Area (sf)	CN	Description
39,531	98	Paved roads w/curbs & sewers, HSG C
39,531		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9: Development Site--East/South Paving Area



Summary for Pond 4P: Detention Pond

Inflow Area = 98,375 sf,100.00% Impervious, Inflow Depth = 3.22" for 10 yr event
Inflow = 1.82 cfs @ 7.88 hrs, Volume= 26,370 cf
Outflow = 0.58 cfs @ 8.94 hrs, Volume= 26,370 cf, Atten= 68%, Lag= 63.6 min
Primary = 0.58 cfs @ 8.94 hrs, Volume= 26,370 cf

Routing by Stor-Ind method, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Peak Elev= 138.41' @ 8.94 hrs Surf.Area= 5,787 sf Storage= 6,800 cf

Plug-Flow detention time= 222.2 min calculated for 26,370 cf (100% of inflow)
Center-of-Mass det. time= 222.2 min (885.4 - 663.2)

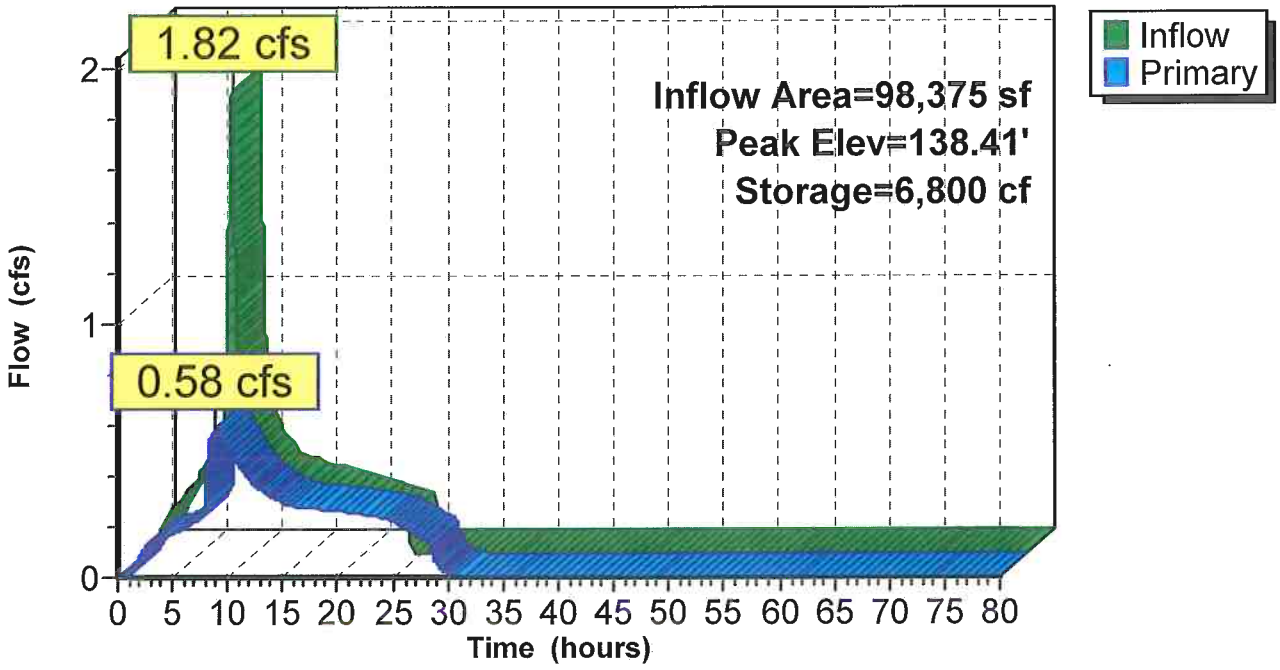
Volume	Invert	Avail.Storage	Storage Description
#1	137.00'	115,500 cf	**20.00'W x 195.00'L x 10.00'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	136.75'	**18.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 136.75' / 136.25' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	134.75'	**3.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	138.07'	**0.5' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.58 cfs @ 8.94 hrs HW=138.41' (Free Discharge)
└**1=Culvert** (Passes 0.58 cfs of 7.05 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.30 cfs @ 6.20 fps)
  └**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.28 cfs @ 1.90 fps)

Pond 4P: Detention Pond

Hydrograph



Summary for Pond 5P: Future StormTech Chambers

Inflow Area = 65,025 sf,100.00% Impervious, Inflow Depth = 3.22" for 10 yr event
Inflow = 1.21 cfs @ 7.88 hrs, Volume= 17,430 cf
Outflow = 0.51 cfs @ 8.40 hrs, Volume= 17,124 cf, Atten= 58%, Lag= 31.3 min
Primary = 0.51 cfs @ 8.40 hrs, Volume= 17,124 cf

Routing by Stor-Ind method, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Peak Elev= 142.48' @ 8.40 hrs Surf.Area= 4,801 sf Storage= 3,972 cf

Plug-Flow detention time= 163.3 min calculated for 17,124 cf (98% of inflow)
Center-of-Mass det. time= 149.7 min (812.9 - 663.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	139.75'	4,394 cf	**6.25'W x 195.86'L x 3.50'H Field A Z=3.0** 12,226 cf Overall - 1,240 cf Embedded = 10,986 cf x 40.0% Voids
#2A	140.25'	1,240 cf	**ADS_StormTech SC-740 +Cap** x 27 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
		5,635 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	140.25'	**12.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 140.25' / 139.75' S= 0.0500 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	138.25'	**2.6" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	142.00'	**4.1" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.51 cfs @ 8.40 hrs HW=142.48' (Free Discharge)
↑—**1=Culvert** (Passes 0.51 cfs of 4.97 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 7.19 fps)
—**3=Orifice/Grate** (Orifice Controls 0.24 cfs @ 2.67 fps)

Pond 5P: Future StormTech Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

27 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 193.86' Row Length +12.0" End Stone x 2 = 195.86' Base Length
1 Rows x 51.0" Wide + 12.0" Side Stone x 2 = 6.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

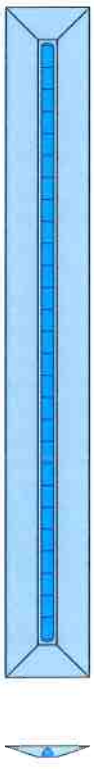
3.0 '/' Side-Z x Height = 126.0" Flare/Side
Base Length + Flare x 2 = 216.86' Top Length
Base Width + Flare x 2 = 27.25' Top Width

27 Chambers x 45.9 cf = 1,240.4 cf Chamber Storage

12,226.3 cf Field - 1,240.4 cf Chambers = 10,985.9 cf Stone x 40.0% Voids = 4,394.4 cf Stone Storage

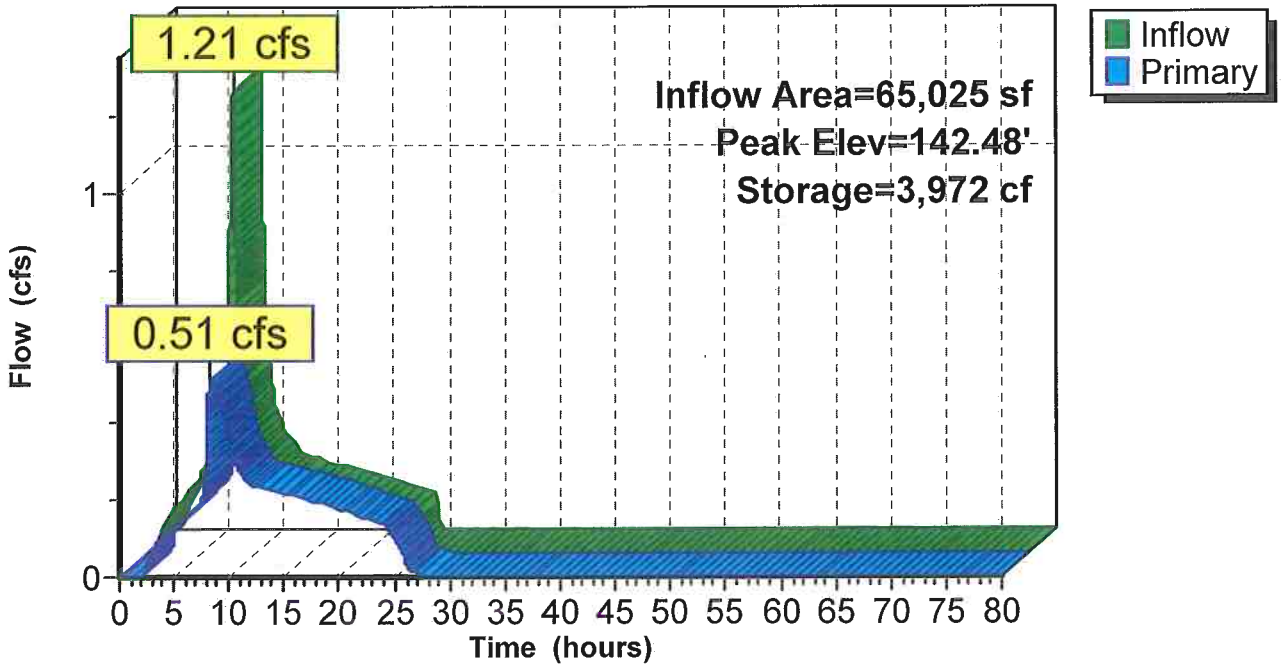
Chamber Storage + Stone Storage = 5,634.7 cf = 0.129 af
Overall Storage Efficiency = 46.1%
Overall System Size = 195.86' x 6.25' x 3.50'

27 Chambers
452.8 cy Field
406.9 cy Stone



Pond 5P: Future StormTech Chambers

Hydrograph



Time span=0.00-80.00 hrs, dt=0.01 hrs, 8001 points
Runoff by SBUH method, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Development Site Runoff Area=98,375 sf 0.00% Impervious Runoff Depth=1.88"
Flow Length=410' Tc=18.3 min CN=79 Runoff=0.80 cfs 15,434 cf

Subcatchment 2: Development Site--NE Runoff Area=6,220 sf 100.00% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=98 Runoff=0.13 cfs 1,900 cf

Subcatchment 3: Future Site Pervious Runoff Area=65,025 sf 0.00% Impervious Runoff Depth=1.88"
Flow Length=200' Tc=5.0 min CN=79 Runoff=0.65 cfs 10,201 cf

Subcatchment 4: Development Site Post Runoff Area=98,375 sf 100.00% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=98 Runoff=2.07 cfs 30,048 cf

Subcatchment 5: Future Development Runoff Area=65,025 sf 100.00% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=98 Runoff=1.37 cfs 19,862 cf

Subcatchment 9: Development Runoff Area=39,531 sf 100.00% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=98 Runoff=0.83 cfs 12,075 cf

Reach 6: WQ Event in Swale Avg. Flow Depth=0.18' Max Vel=0.13 fps Inflow=0.11 cfs 31,684 cf
n=0.240 L=100.0' S=0.0050 '/' Capacity=0.11 cfs Outflow=0.11 cfs 31,509 cf

Reach 7: 25 Year Event in Swale Avg. Flow Depth=0.68' Max Vel=0.27 fps Inflow=1.11 cfs 319,720 cf
n=0.240 L=100.0' S=0.0050 '/' Capacity=1.12 cfs Outflow=1.11 cfs 318,886 cf

Reach 8: 100 Year Event in Swale Avg. Flow Depth=0.73' Max Vel=0.28 fps Inflow=1.28 cfs 368,686 cf
n=0.240 L=100.0' S=0.0050 '/' Capacity=1.29 cfs Outflow=1.28 cfs 367,763 cf

Pond 4P: Detention Pond Peak Elev=138.54' Storage=7,604 cf Inflow=2.07 cfs 30,048 cf
Outflow=0.75 cfs 30,048 cf

Pond 5P: Future StormTech Chambers Peak Elev=142.72' Storage=4,474 cf Inflow=1.37 cfs 19,862 cf
Outflow=0.61 cfs 19,556 cf

Total Runoff Area = 372,551 sf Runoff Volume = 89,519 cf Average Runoff Depth = 2.88"
43.86% Pervious = 163,400 sf 56.14% Impervious = 209,151 sf

Summary for Subcatchment 1: Development Site Pervious

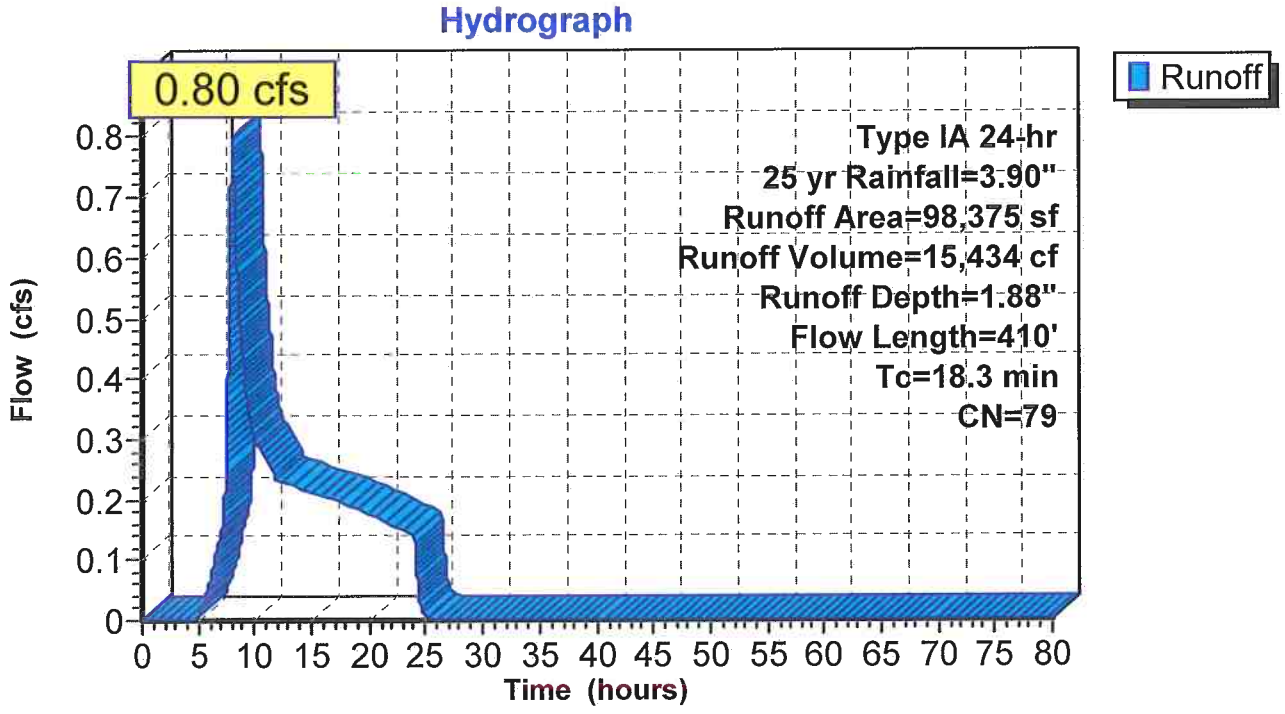
Runoff = 0.80 cfs @ 8.01 hrs, Volume= 15,434 cf, Depth= 1.88"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

Area (sf)	CN	Description
98,375	79	Pasture/grassland/range, Fair, HSG C
98,375		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.0125	0.14		**Sheet Flow,** Range n= 0.130 P2= 2.50"
6.4	310	0.0133	0.81		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
18.3	410	Total			

Subcatchment 1: Development Site Pervious



Summary for Subcatchment 2: Development Site--NE Paving Area

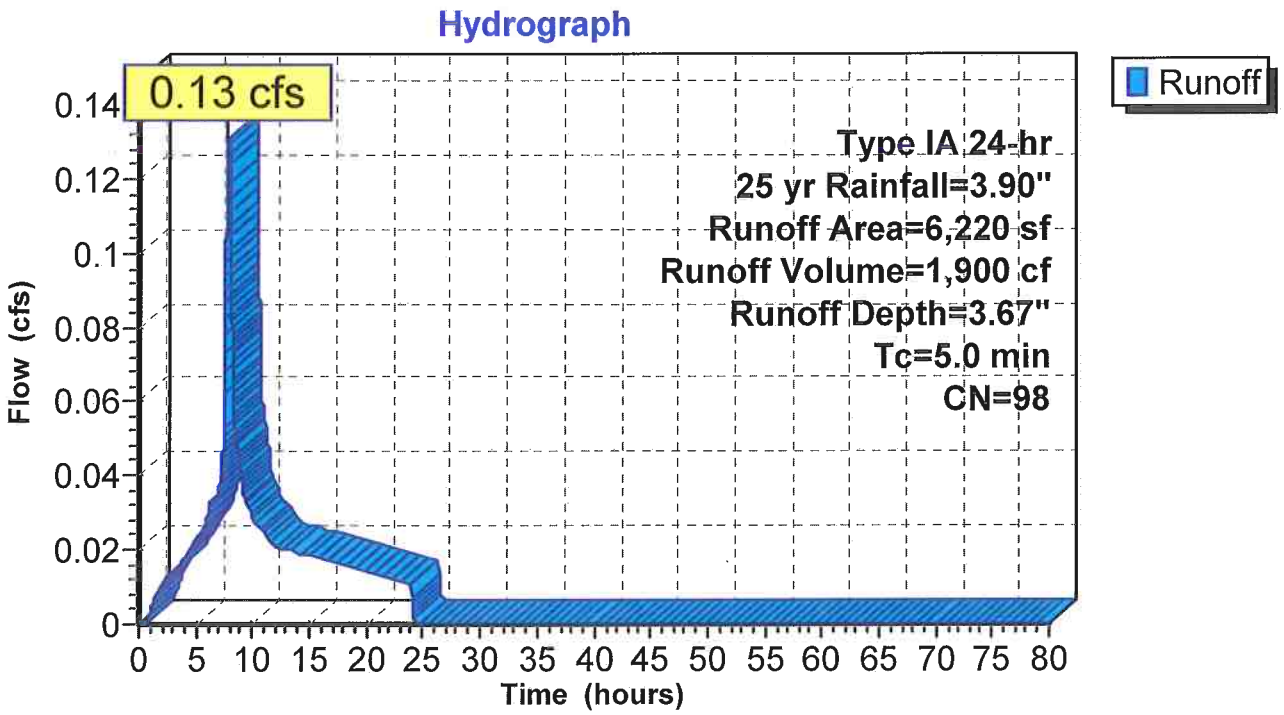
Runoff = 0.13 cfs @ 7.88 hrs, Volume= 1,900 cf, Depth= 3.67"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

Area (sf)	CN	Description
6,220	98	Paved parking, HSG C
6,220		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2: Development Site--NE Paving Area



Summary for Subcatchment 3: Future Site Pervious

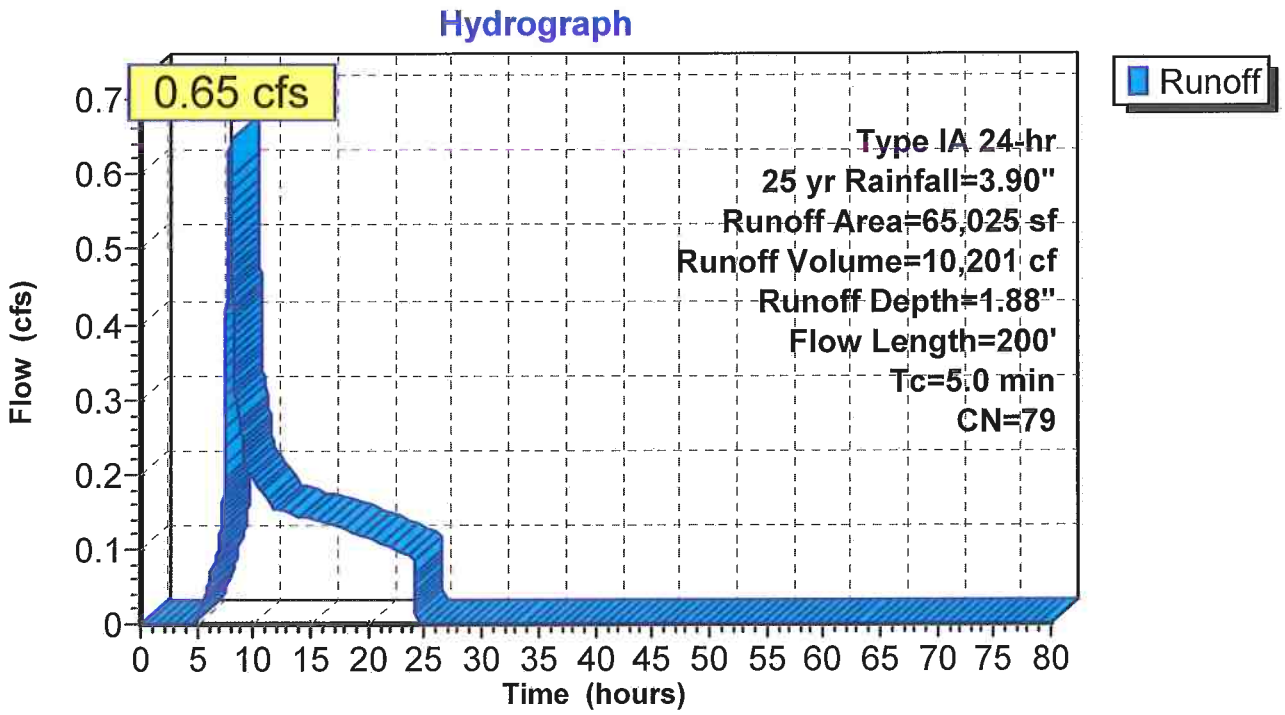
Runoff = 0.65 cfs @ 7.98 hrs, Volume= 10,201 cf, Depth= 1.88"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

Area (sf)	CN	Description
65,025	79	Pasture/grassland/range, Fair, HSG C
65,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	200		0.67		**Direct Entry, Sheet Flow**

Subcatchment 3: Future Site Pervious



Summary for Subcatchment 4: Development Site Post Development

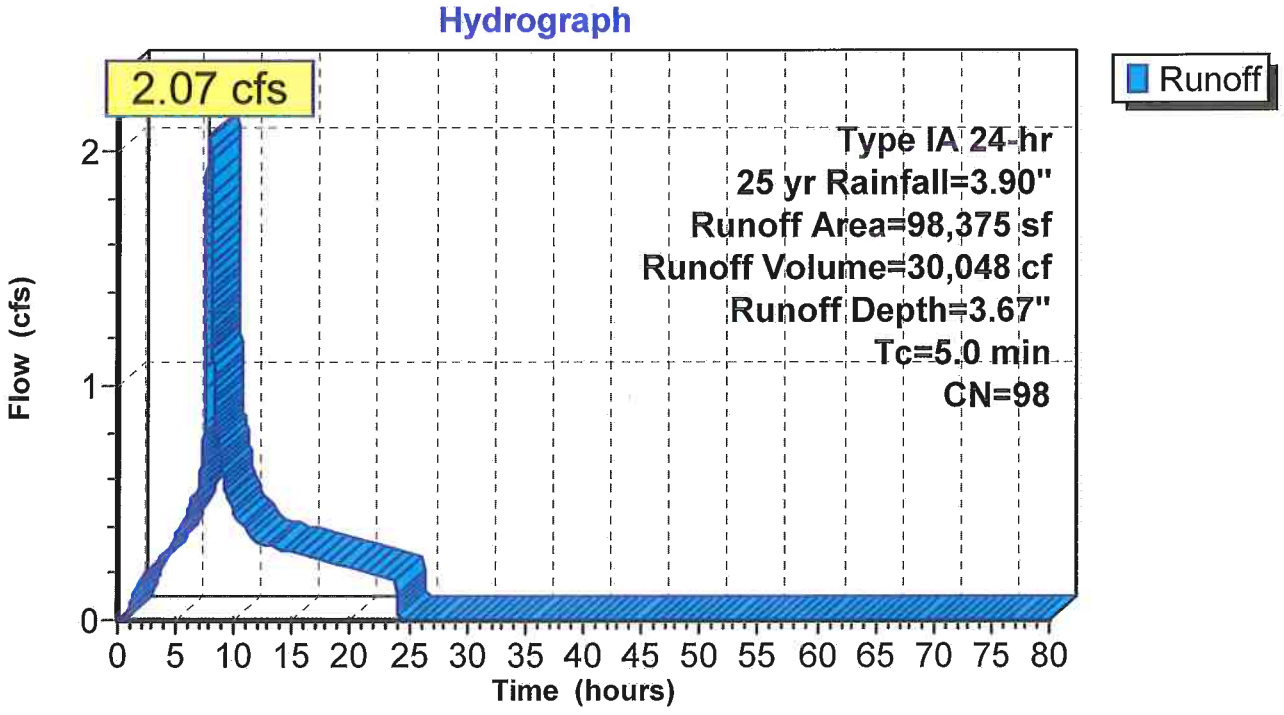
Runoff = 2.07 cfs @ 7.88 hrs, Volume= 30,048 cf, Depth= 3.67"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

Area (sf)	CN	Description
98,375	98	Paved parking & roofs
98,375		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4: Development Site Post Development



Summary for Subcatchment 5: Future Development Site Post Development

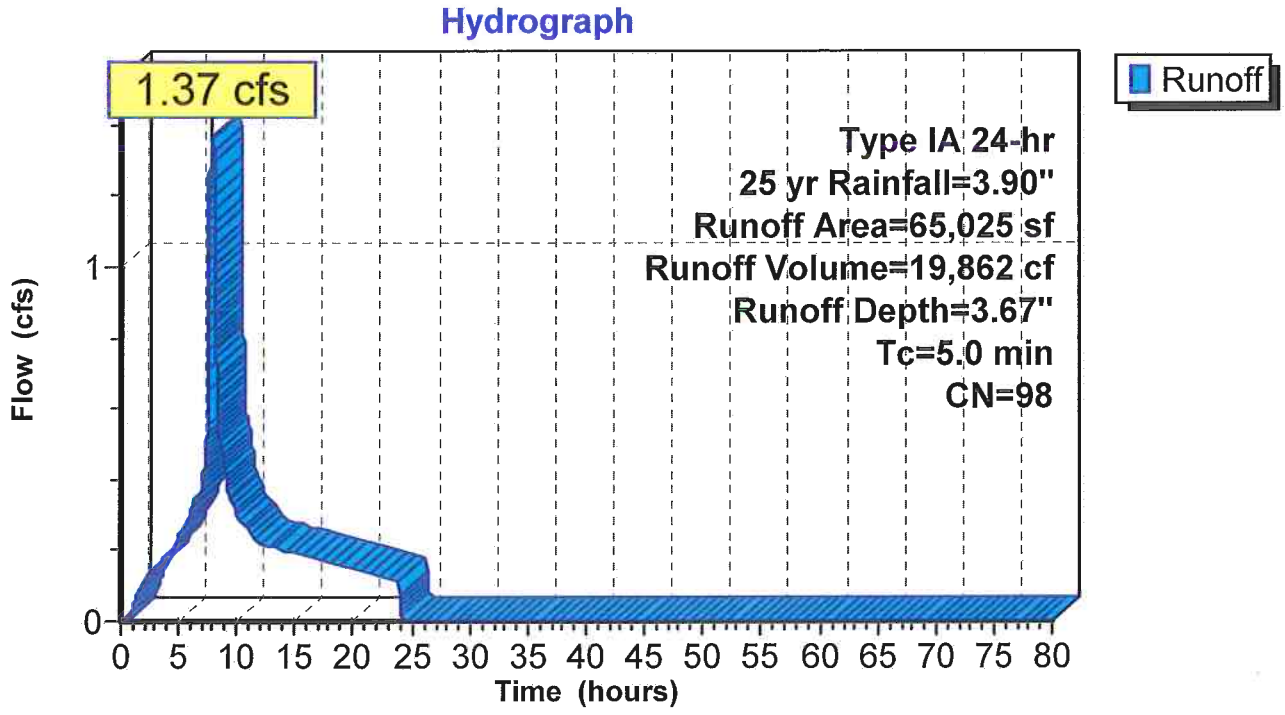
Runoff = 1.37 cfs @ 7.88 hrs, Volume= 19,862 cf, Depth= 3.67"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

Area (sf)	CN	Description
65,025	98	Paved parking & roofs
65,025		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5: Future Development Site Post Development



Summary for Subcatchment 9: Development Site--East/South Paving Area

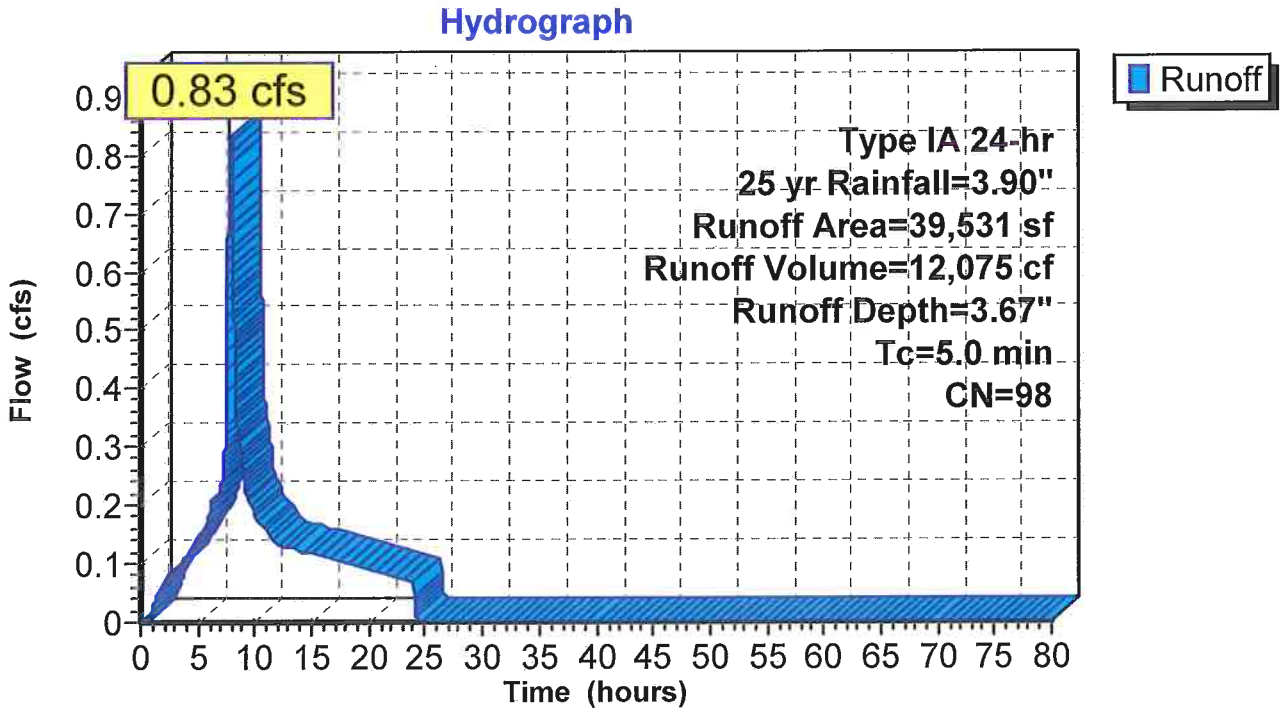
Runoff = 0.83 cfs @ 7.88 hrs, Volume= 12,075 cf, Depth= 3.67"

Runoff by SBUH method, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

Area (sf)	CN	Description
39,531	98	Paved roads w/curbs & sewers, HSG C
39,531		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 9: Development Site--East/South Paving Area



Summary for Pond 4P: Detention Pond

Inflow Area = 98,375 sf,100.00% Impervious, Inflow Depth = 3.67" for 25 yr event
Inflow = 2.07 cfs @ 7.88 hrs, Volume= 30,048 cf
Outflow = 0.75 cfs @ 8.72 hrs, Volume= 30,048 cf, Atten= 64%, Lag= 50.5 min
Primary = 0.75 cfs @ 8.72 hrs, Volume= 30,048 cf

Routing by Stor-Ind method, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Peak Elev= 138.54' @ 8.72 hrs Surf.Area= 5,978 sf Storage= 7,604 cf

Plug-Flow detention time= 218.2 min calculated for 30,048 cf (100% of inflow)
Center-of-Mass det. time= 218.2 min (878.3 - 660.1)

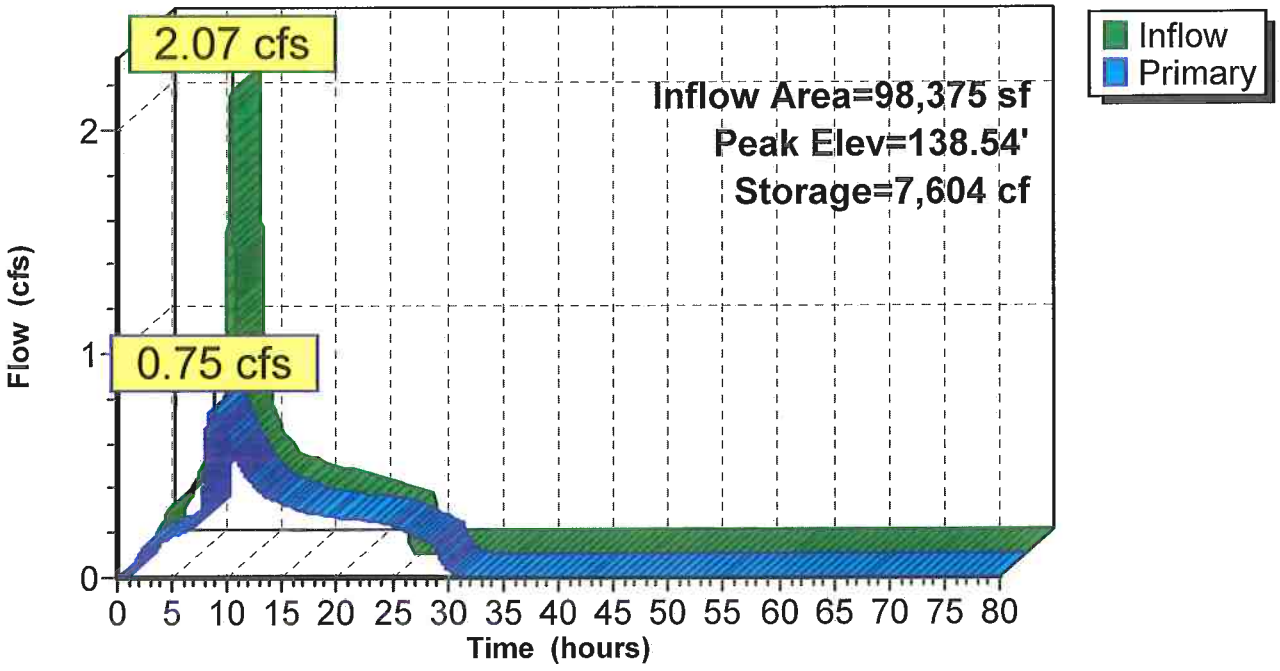
Volume	Invert	Avail.Storage	Storage Description
#1	137.00'	115,500 cf	**20.00'W x 195.00'L x 10.00'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	136.75'	**18.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 136.75' / 136.25' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	134.75'	**3.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	138.07'	**0.5' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.75 cfs @ 8.72 hrs HW=138.54' (Free Discharge)
└─**1=Culvert** (Passes 0.75 cfs of 7.61 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.32 cfs @ 6.45 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.43 cfs @ 2.25 fps)

Pond 4P: Detention Pond

Hydrograph



Summary for Pond 5P: Future StormTech Chambers

Inflow Area = 65,025 sf,100.00% Impervious, Inflow Depth = 3.67" for 25 yr event
Inflow = 1.37 cfs @ 7.88 hrs, Volume= 19,862 cf
Outflow = 0.61 cfs @ 8.36 hrs, Volume= 19,556 cf, Atten= 56%, Lag= 29.2 min
Primary = 0.61 cfs @ 8.36 hrs, Volume= 19,556 cf

Routing by Stor-Ind method, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Peak Elev= 142.72' @ 8.36 hrs Surf.Area= 5,150 sf Storage= 4,474 cf

Plug-Flow detention time= 162.5 min calculated for 19,553 cf (98% of inflow)
Center-of-Mass det. time= 150.6 min (810.8 - 660.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	139.75'	4,394 cf	**6.25'W x 195.86'L x 3.50'H Field A Z=3.0** 12,226 cf Overall - 1,240 cf Embedded = 10,986 cf x 40.0% Voids
#2A	140.25'	1,240 cf	**ADS_StormTech SC-740 +Cap** x 27 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
		5,635 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	140.25'	**12.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 140.25' / 139.75' S= 0.0500 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	138.25'	**2.6" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	142.00'	**4.1" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.61 cfs @ 8.36 hrs HW=142.72' (Free Discharge)
↑—**1=Culvert** (Passes 0.61 cfs of 5.31 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.28 cfs @ 7.57 fps)
—**3=Orifice/Grate** (Orifice Controls 0.33 cfs @ 3.58 fps)

Pond 5P: Future StormTech Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

27 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 193.86' Row Length +12.0" End Stone x 2 = 195.86' Base Length
1 Rows x 51.0" Wide + 12.0" Side Stone x 2 = 6.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

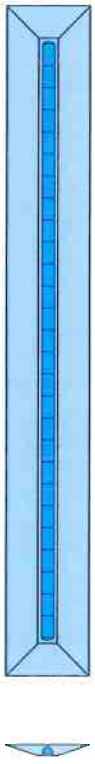
3.0 '/' Side-Z x Height = 126.0" Flare/Side
Base Length + Flare x 2 = 216.86' Top Length
Base Width + Flare x 2 = 27.25' Top Width

27 Chambers x 45.9 cf = 1,240.4 cf Chamber Storage

12,226.3 cf Field - 1,240.4 cf Chambers = 10,985.9 cf Stone x 40.0% Voids = 4,394.4 cf Stone Storage

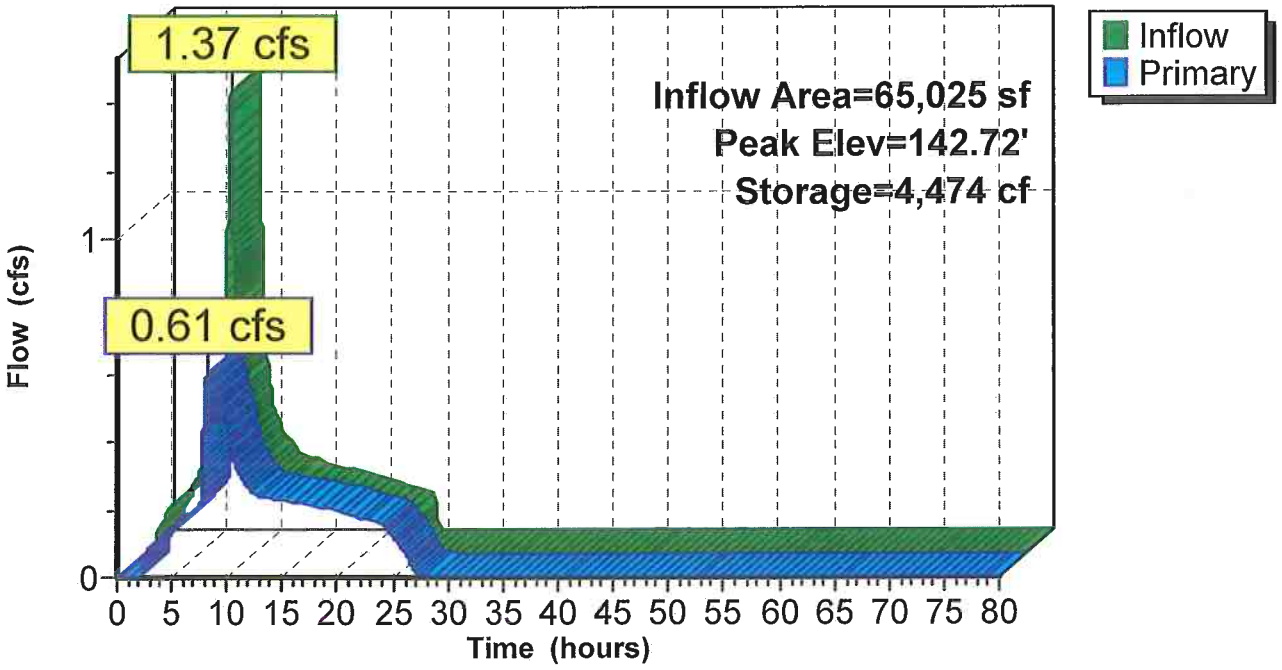
Chamber Storage + Stone Storage = 5,634.7 cf = 0.129 af
Overall Storage Efficiency = 46.1%
Overall System Size = 195.86' x 6.25' x 3.50'

27 Chambers
452.8 cy Field
406.9 cy Stone



Pond 5P: Future StormTech Chambers

Hydrograph



Summary for Reach 6: WQ Event in Swale

Inflow = 0.11 cfs @ 0.00 hrs, Volume= 31,684 cf, Incl. 0.11 cfs Base Flow
Outflow = 0.11 cfs @ 5.31 hrs, Volume= 31,509 cf, Atten= 0%, Lag= 318.6 min

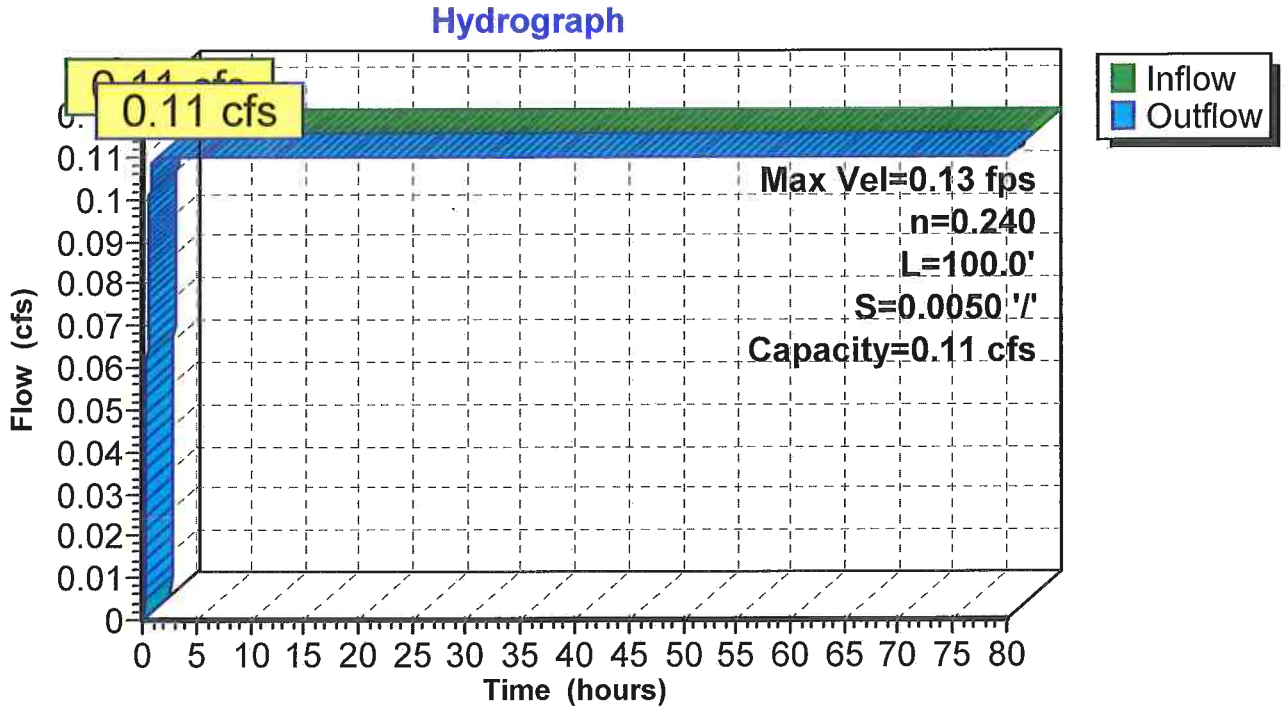
Routing by Stor-Ind+Trans method, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.13 fps, Min. Travel Time= 13.1 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 13.1 min

Peak Storage= 86 cf @ 5.09 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.18' Flow Area= 0.8 sf, Capacity= 0.11 cfs

4.00' x 0.18' deep channel, n= 0.240
Side Slope Z-value= 4.0 '/' Top Width= 5.44'
Length= 100.0' Slope= 0.0050 '/'
Inlet Invert= 248.00', Outlet Invert= 247.50'

‡

Reach 6: WQ Event in Swale



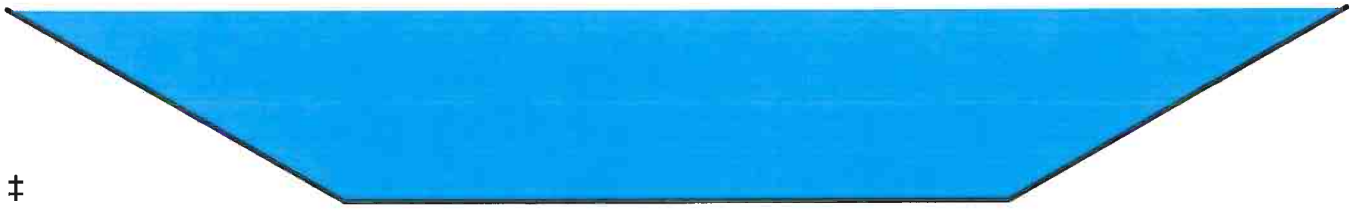
Summary for Reach 7: 25 Year Event in Swale

Inflow	=	1.11 cfs @	0.00 hrs, Volume=	319,720 cf,	Incl. 1.11 cfs Base Flow
Outflow	=	1.11 cfs @	2.65 hrs, Volume=	318,886 cf,	Atten= 0%, Lag= 159.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.27 fps, Min. Travel Time= 6.1 min
Avg. Velocity = 0.27 fps, Avg. Travel Time= 6.1 min

Peak Storage= 407 cf @ 2.55 hrs
Average Depth at Peak Storage= 0.68'
Bank-Full Depth= 0.68' Flow Area= 4.1 sf, Capacity= 1.12 cfs

4.00' x 0.68' deep channel, n= 0.240
Side Slope Z-value= 3.0 '/' Top Width= 8.08'
Length= 100.0' Slope= 0.0050 '/'
Inlet Invert= 248.00', Outlet Invert= 247.50'



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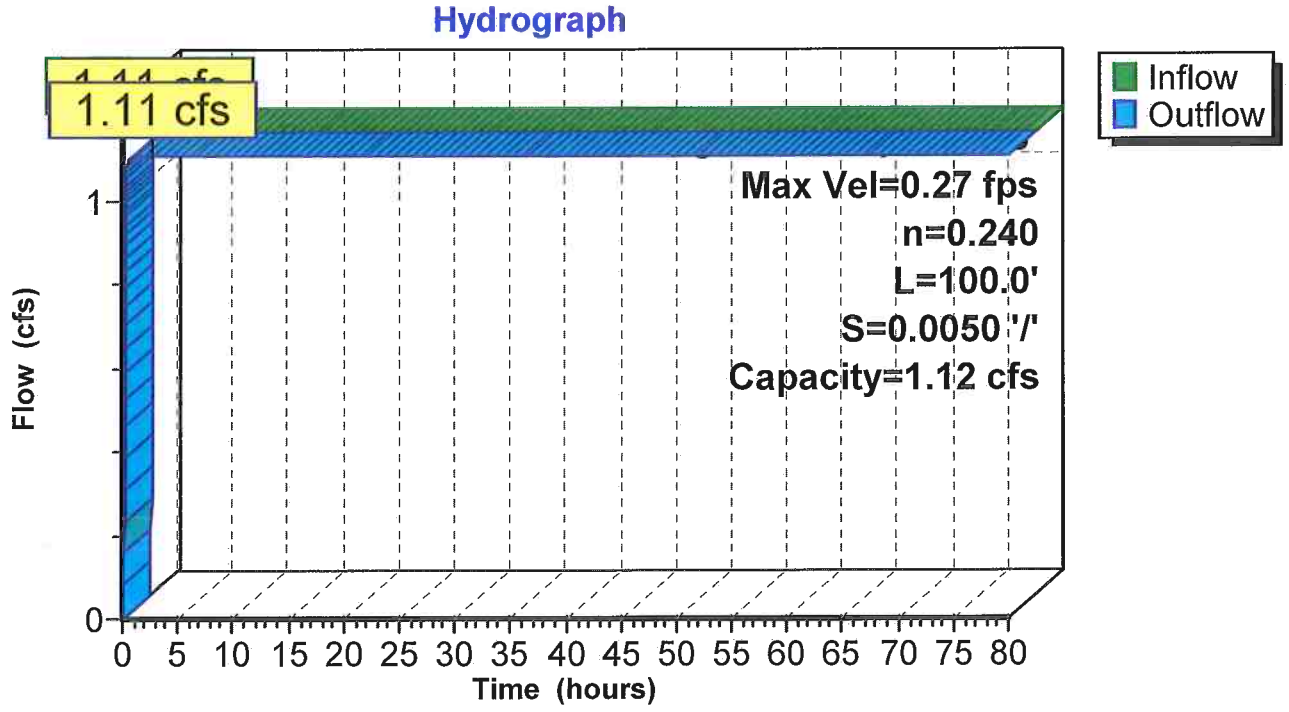
Reach 7: 25 Year Event in Swale



Summary for Reach 8: 100 Year Event in Swale

Inflow = 1.28 cfs @ 0.00 hrs, Volume= 368,686 cf, Incl. 1.28 cfs Base Flow
Outflow = 1.28 cfs @ 2.60 hrs, Volume= 367,763 cf, Atten= 0%, Lag= 156.0 min

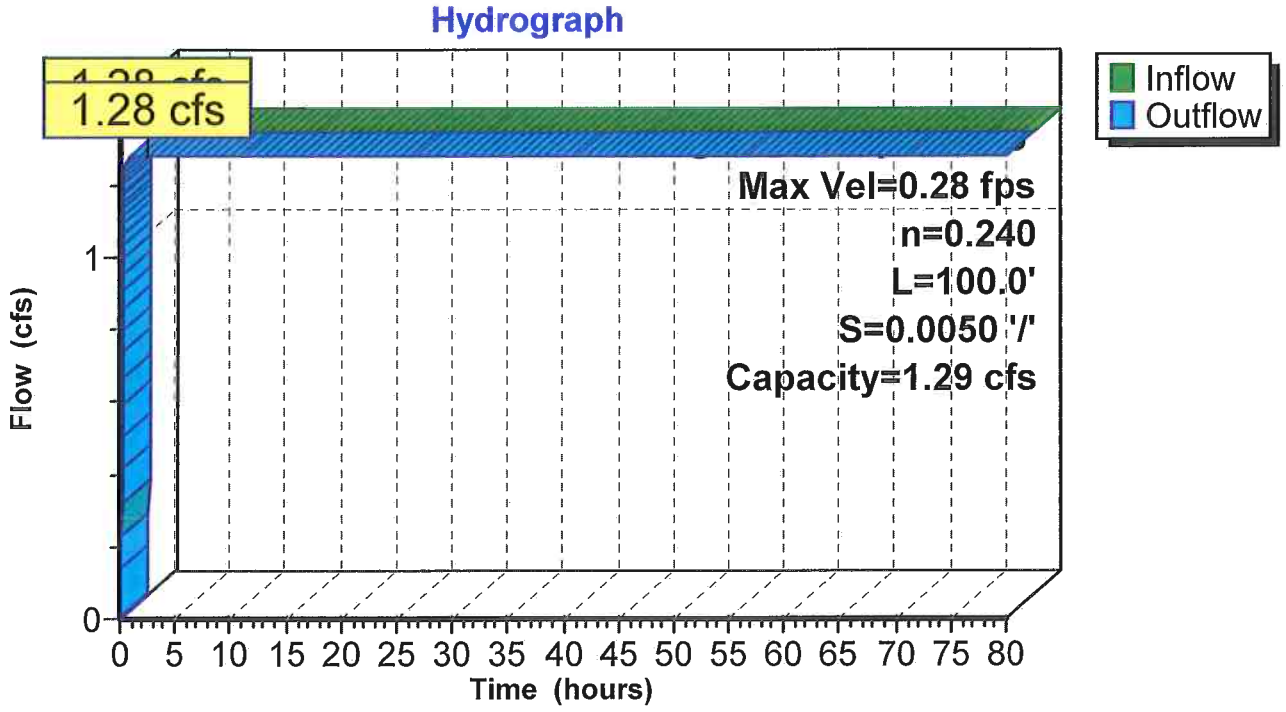
Routing by Stor-Ind+Trans method, Time Span= 0.00-80.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.28 fps, Min. Travel Time= 5.9 min
Avg. Velocity = 0.28 fps, Avg. Travel Time= 5.9 min

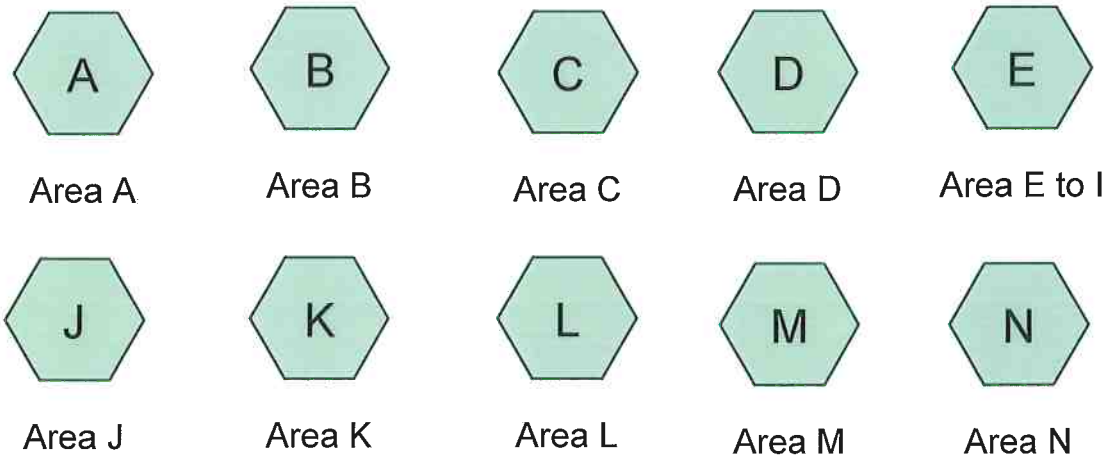
Peak Storage= 450 cf @ 2.49 hrs
Average Depth at Peak Storage= 0.73'
Bank-Full Depth= 0.73' Flow Area= 4.5 sf, Capacity= 1.29 cfs

4.00' x 0.73' deep channel, n= 0.240
Side Slope Z-value= 3.0 '/' Top Width= 8.38'
Length= 100.0' Slope= 0.0050 '/'
Inlet Invert= 248.00', Outlet Invert= 247.50'

‡

Reach 8: 100 Year Event in Swale





Subcat Reach Pond Link

Routing Diagram for 2018-6-13 Pipe Sizing
Prepared by {enter your company name here}, Printed 7/25/2018

Time span=0.10-80.00 hrs, dt=0.01 hrs, 7991 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A: Area A Runoff Area=6,844 sf 100.00% Impervious Runoff Depth=3.67"
Flow Length=200' Tc=5.0 min CN=0/98 Runoff=0.14 cfs 0.048 af

Subcatchment B: Area B Runoff Area=3,087 sf 100.00% Impervious Runoff Depth=3.67"
Flow Length=200' Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.022 af

Subcatchment C: Area C Runoff Area=13,700 sf 100.00% Impervious Runoff Depth=3.67"
Flow Length=200' Tc=5.0 min CN=0/98 Runoff=0.29 cfs 0.096 af

Subcatchment D: Area D Runoff Area=8,900 sf 100.00% Impervious Runoff Depth=3.67"
Flow Length=200' Tc=10.0 min CN=0/98 Runoff=0.18 cfs 0.062 af

Subcatchment E: Area E to I Runoff Area=1,400 sf 100.00% Impervious Runoff Depth=3.67"
Flow Length=200' Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.010 af

Subcatchment J: Area J Runoff Area=9,568 sf 100.00% Impervious Runoff Depth=3.67"
Flow Length=200' Tc=15.0 min CN=0/98 Runoff=0.18 cfs 0.067 af

Subcatchment K: Area K Runoff Area=22,080 sf 100.00% Impervious Runoff Depth=3.67"
Flow Length=200' Tc=5.0 min CN=0/98 Runoff=0.46 cfs 0.155 af

Subcatchment L: Area L Runoff Area=20,976 sf 100.00% Impervious Runoff Depth=3.67"
Flow Length=200' Tc=5.0 min CN=0/98 Runoff=0.44 cfs 0.147 af

Subcatchment M: Area M Runoff Area=6,220 sf 100.00% Impervious Runoff Depth=3.67"
Flow Length=200' Tc=5.0 min CN=0/98 Runoff=0.13 cfs 0.044 af

Subcatchment N: Area N Runoff Area=65,025 sf 100.00% Impervious Runoff Depth=3.67"
Flow Length=200' Tc=5.0 min CN=0/98 Runoff=1.37 cfs 0.456 af

Total Runoff Area = 3.623 ac Runoff Volume = 1.107 af Average Runoff Depth = 3.67"
0.00% Pervious = 0.000 ac 100.00% Impervious = 3.623 ac

Summary for Subcatchment A: Area A

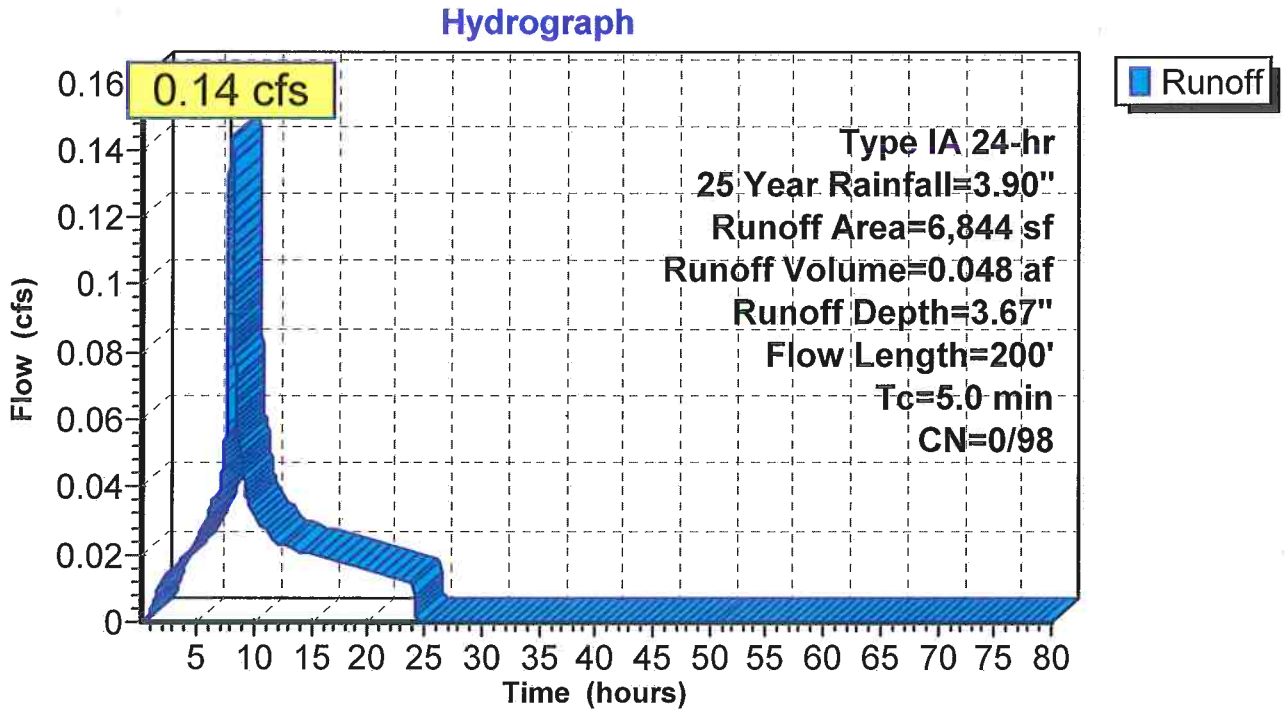
Runoff = 0.14 cfs @ 7.88 hrs, Volume= 0.048 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.10-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
6,844	98	Paved parking, HSG C
6,844		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	200		0.67		**Direct Entry, Sheet Flow**

Subcatchment A: Area A



Summary for Subcatchment B: Area B

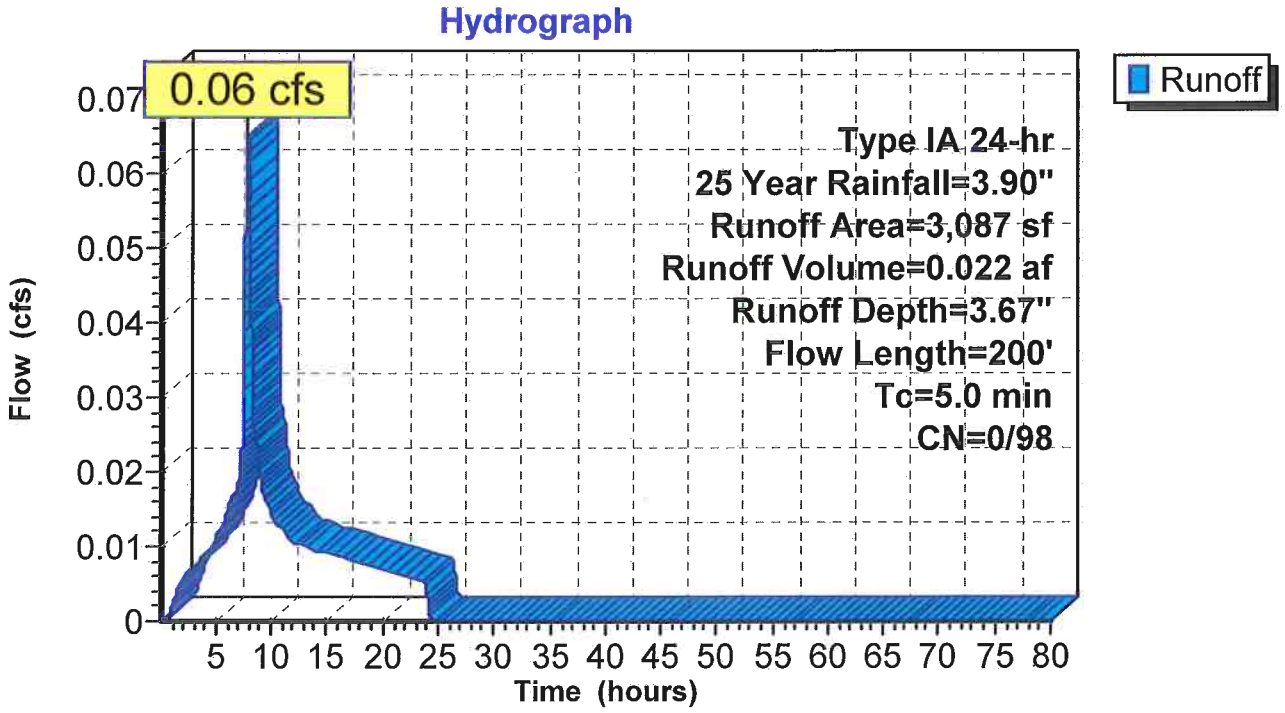
Runoff = 0.06 cfs @ 7.88 hrs, Volume= 0.022 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.10-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
3,087	98	Paved parking, HSG C
3,087		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	200		0.67		**Direct Entry, Sheet Flow**

Subcatchment B: Area B



Summary for Subcatchment C: Area C

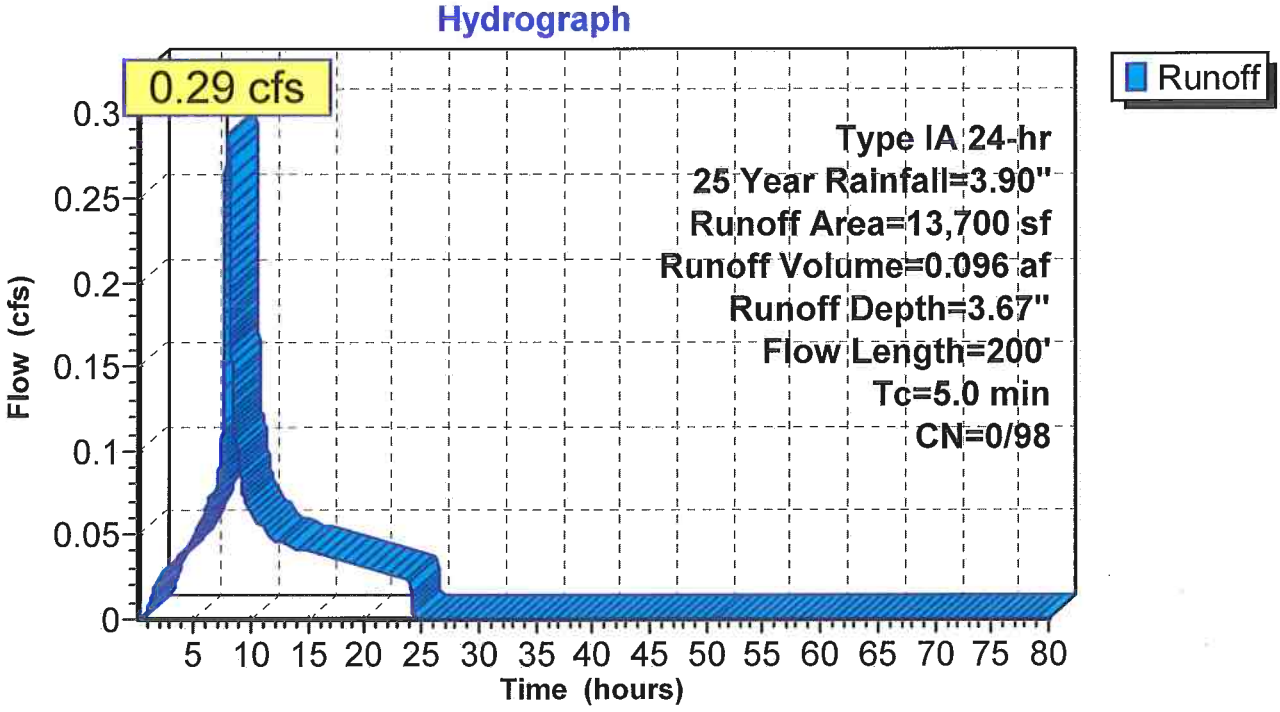
Runoff = 0.29 cfs @ 7.88 hrs, Volume= 0.096 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.10-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
13,700	98	Paved parking, HSG C
13,700		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	200		0.67		**Direct Entry, Sheet Flow**

Subcatchment C: Area C



Summary for Subcatchment D: Area D

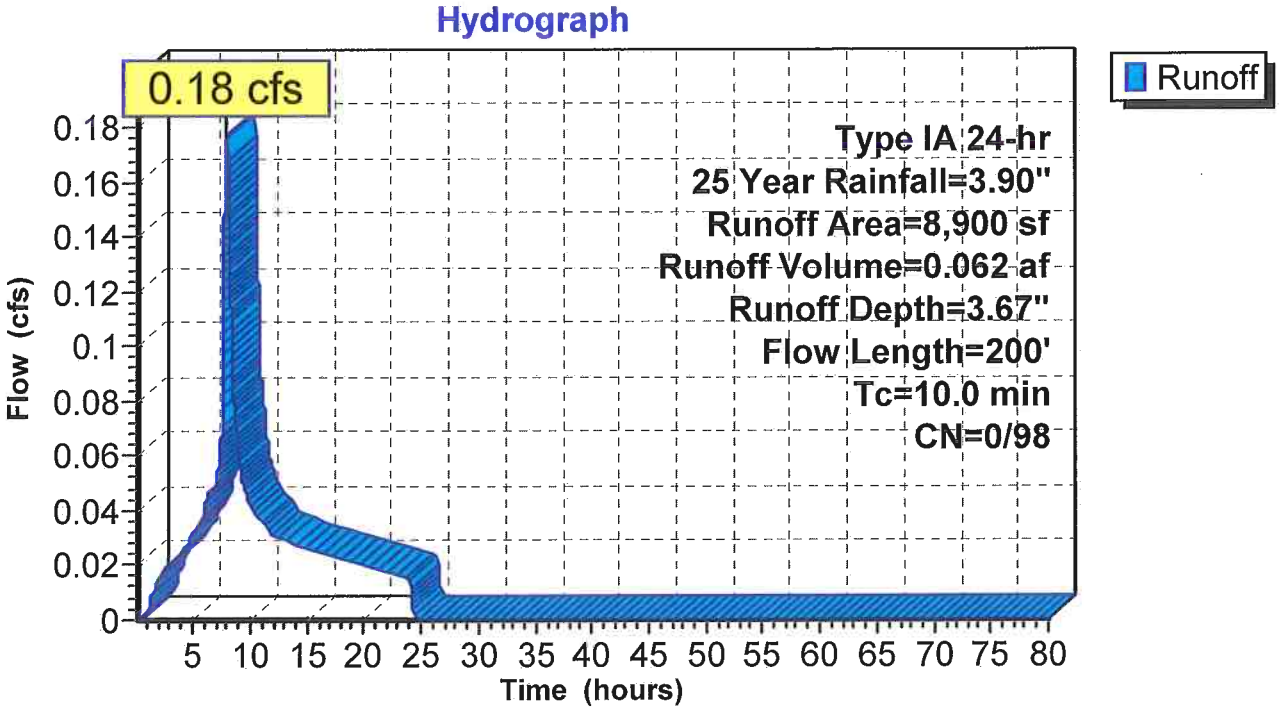
Runoff = 0.18 cfs @ 7.96 hrs, Volume= 0.062 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.10-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
8,900	98	Paved parking, HSG C
8,900		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	200		0.33		**Direct Entry, Sheet Flow**

Subcatchment D: Area D



Summary for Subcatchment E: Area E to I

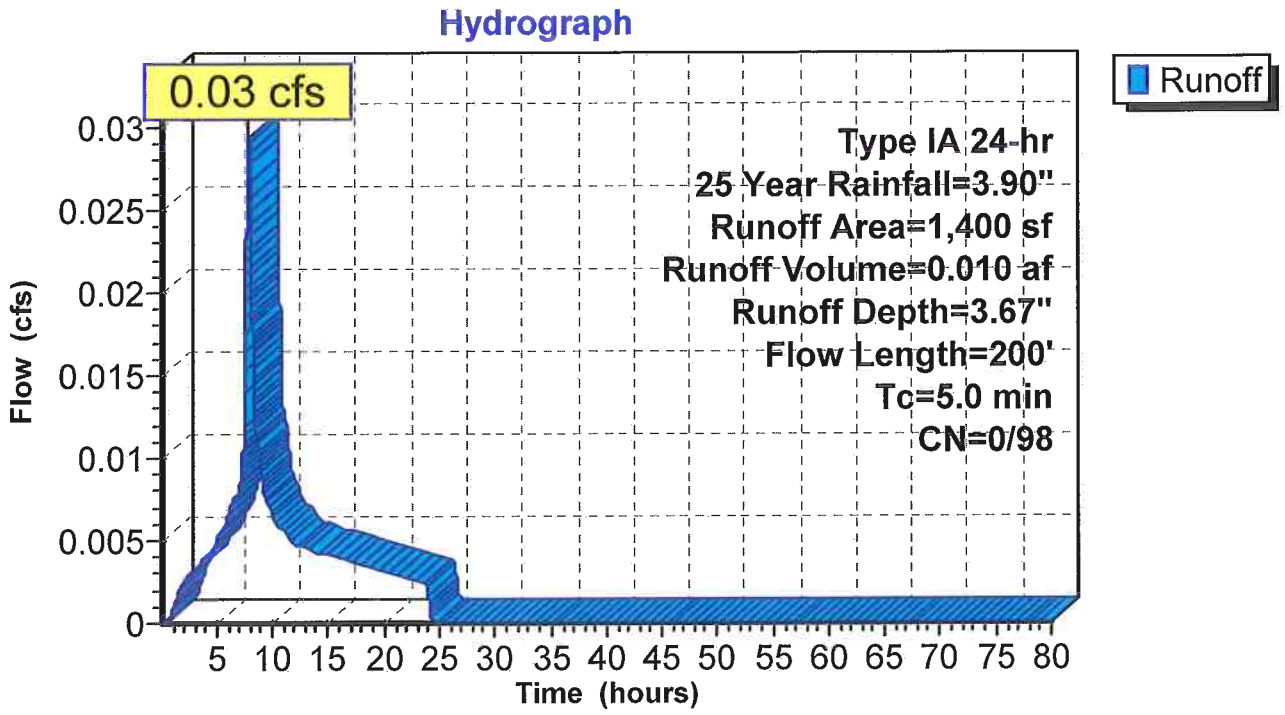
Runoff = 0.03 cfs @ 7.88 hrs, Volume= 0.010 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.10-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
1,400	98	Paved parking, HSG C
1,400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	200		0.67		**Direct Entry, Sheet Flow**

Subcatchment E: Area E to I



Summary for Subcatchment J: Area J

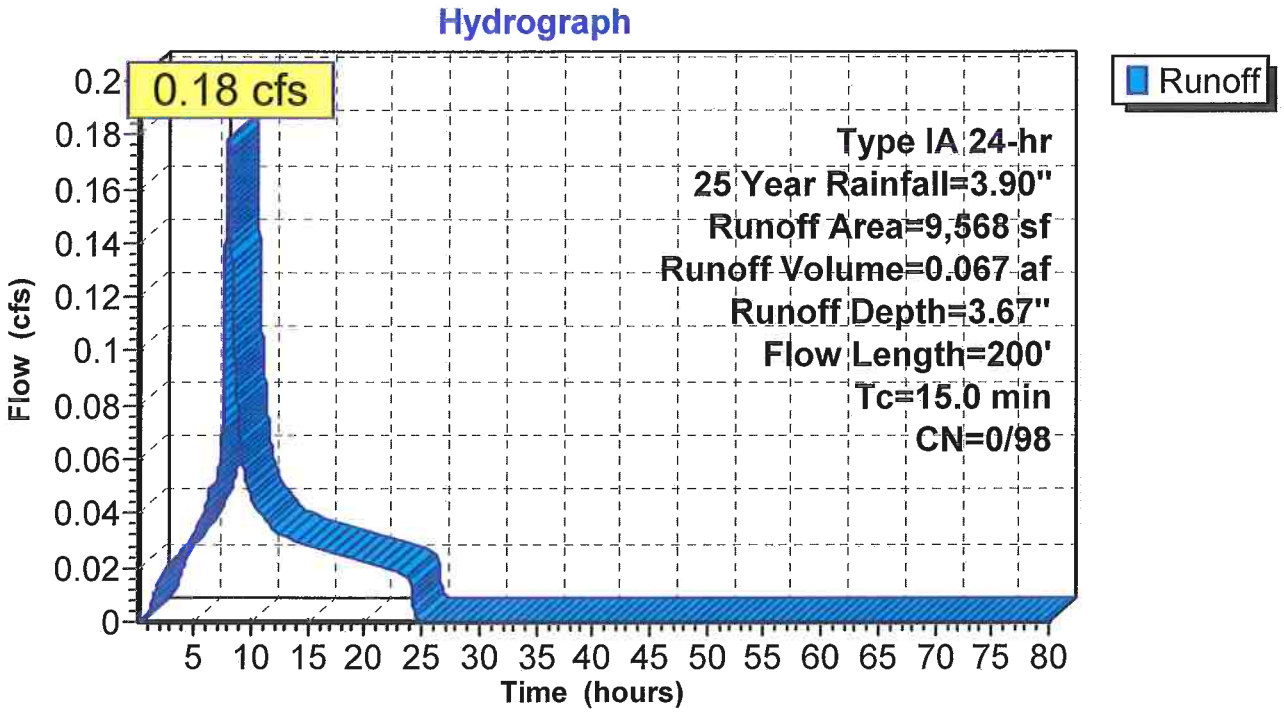
Runoff = 0.18 cfs @ 8.00 hrs, Volume= 0.067 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.10-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
9,568	98	Roofs, HSG C
9,568		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	200		0.22		**Direct Entry, Sheet Flow**

Subcatchment J: Area J



Summary for Subcatchment K: Area K

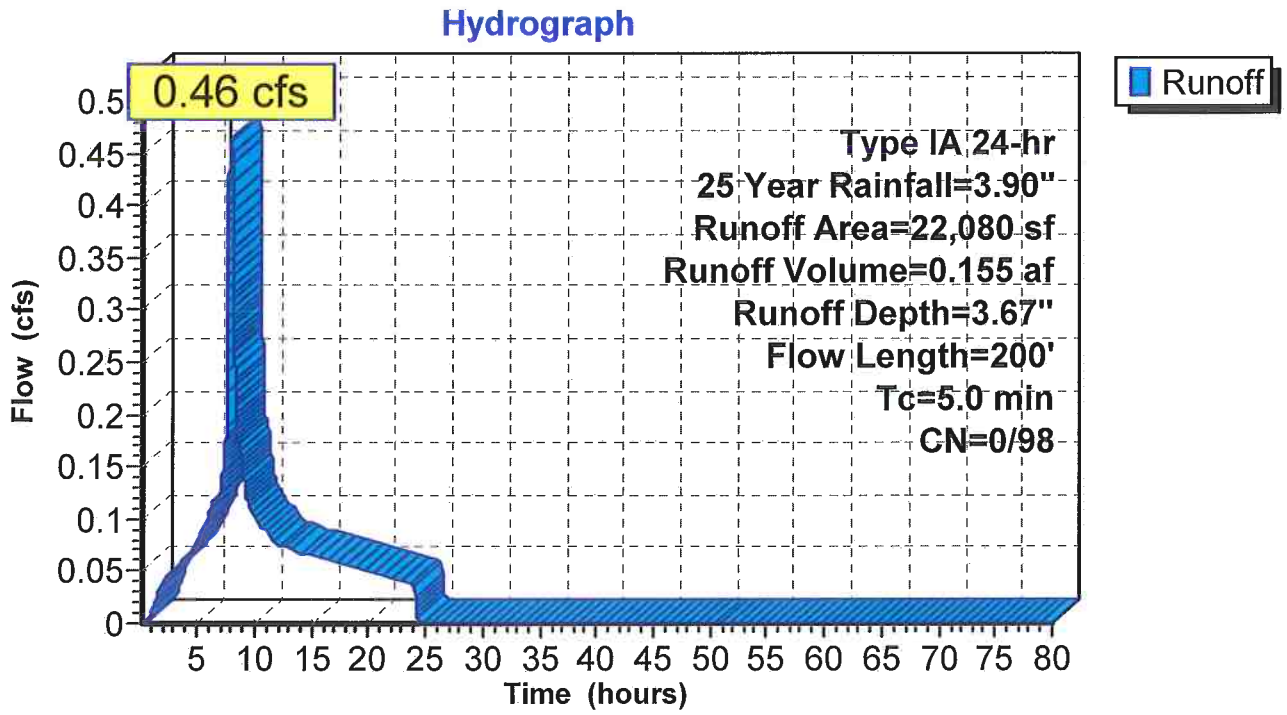
Runoff = 0.46 cfs @ 7.88 hrs, Volume= 0.155 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.10-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
22,080	98	Roofs, HSG C
22,080		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	200		0.67		**Direct Entry, Sheet Flow**

Subcatchment K: Area K



Summary for Subcatchment L: Area L

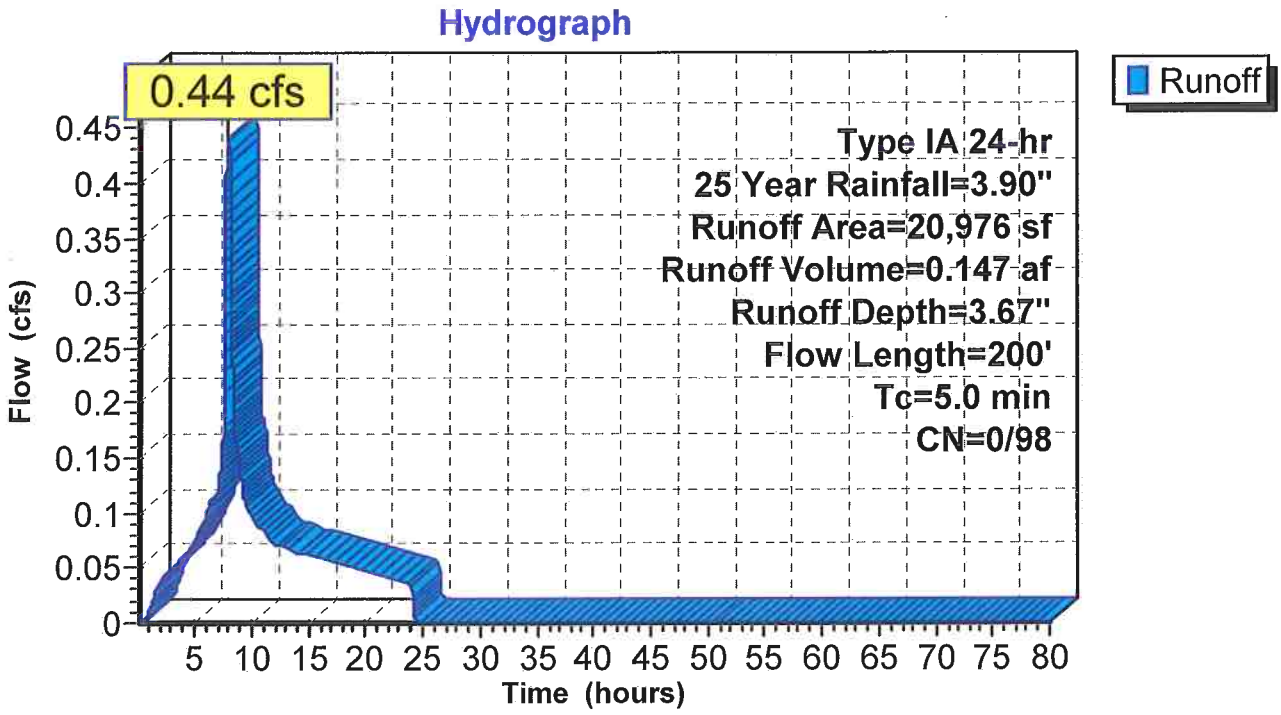
Runoff = 0.44 cfs @ 7.88 hrs, Volume= 0.147 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.10-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
20,976	98	Roofs, HSG C
20,976		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	200		0.67		**Direct Entry, Sheet Flow**

Subcatchment L: Area L



Summary for Subcatchment M: Area M

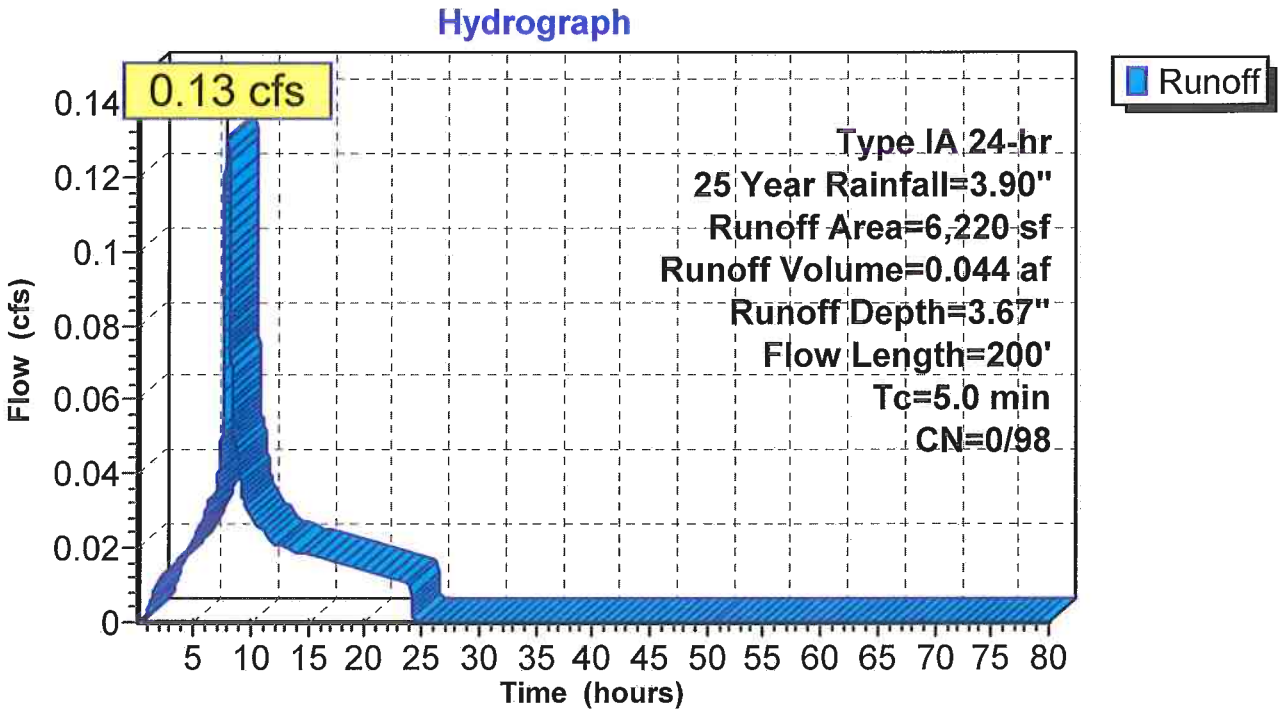
Runoff = 0.13 cfs @ 7.88 hrs, Volume= 0.044 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.10-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
6,220	98	Paved parking, HSG C
6,220		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	200		0.67		**Direct Entry, Sheet Flow**

Subcatchment M: Area M



Summary for Subcatchment N: Area N

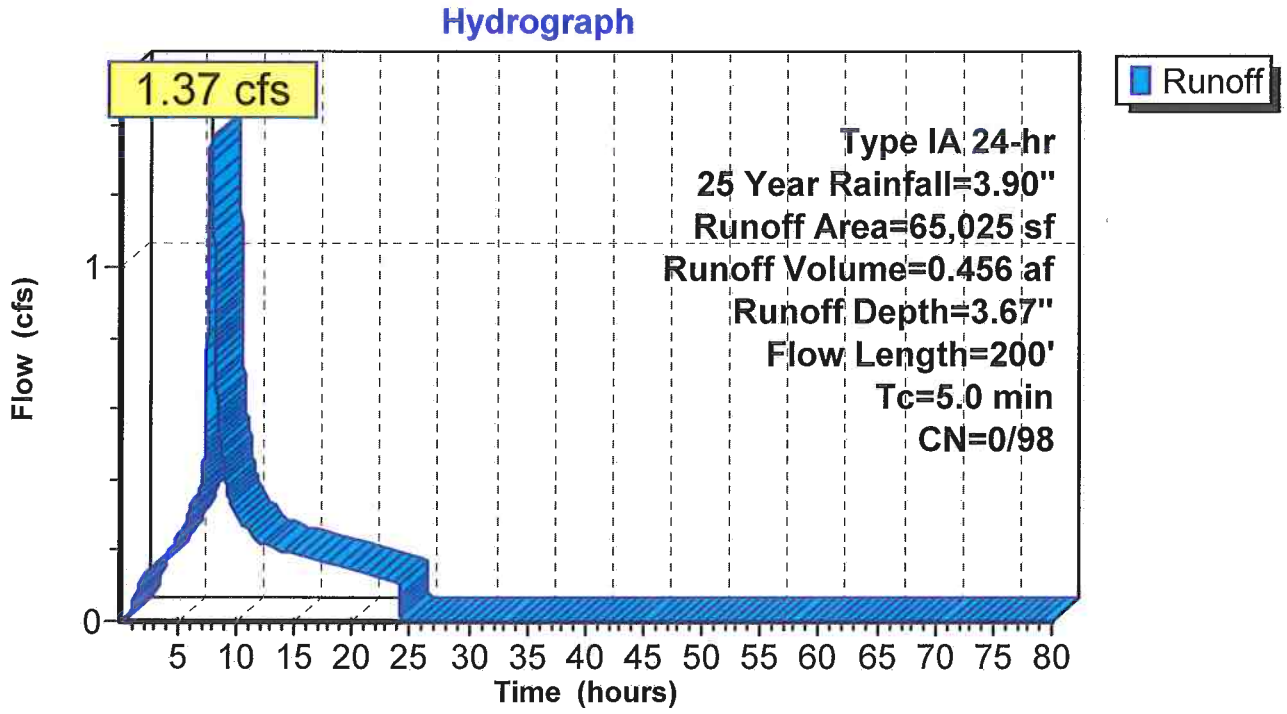
Runoff = 1.37 cfs @ 7.88 hrs, Volume= 0.456 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.10-80.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
65,025	98	Paved parking, HSG C
65,025		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	200		0.67		**Direct Entry, Sheet Flow**

Subcatchment N: Area N



TM Rippey Consulting Engineers

STORM SEWER DESIGN FORM
Project Number: 18206
Four S Building
June 13, 2018

Unit Conversion (acre/ft^2) 2.30E-05
Runoff Based on HydroCad
Rainfall 3.90 inches 25 Year event
Manning's Coefficient (n)= 0.013

7650 SW Beveland St
Suite 100
Tigard, Oregon 97223
Phone: 503 443 3900

DESIGN AREA	DRAINAGE BASIN PIPE #	AREA ft^2	AREA acres	Equiv. Area for 100% Runoff (C)(A)	CUMULATIVE DRAINAGE AREA acres	PIPE LENGTH L	PIPE SIZE in	INVERT SLOPE ft/ft	DESIGN DISCHARGE cfs	FULL FLOW CAPACITY cfs	VELOC. @ Q/Qf V	T_t	COMMENTS
A	1	6844.00	0.1571	0.141	0.1571	70	6	0.0100	0.140	0.566	4.04	4.72	Paving
B	2	3087.00	0.0709	0.064	0.0709	10	6	0.0100	0.060	0.566	9.44	1.57	Paving
	3	9931.00	0.2280	0.205	0.2280	150	6	0.0100	0.200	0.566	2.83	7.08	
C	4	13700.00	0.3145	0.283	0.3145	20	6	0.0070	0.290	0.474	1.63	0.54	Paving
	5	23631.00	0.5425	0.488	0.5425	70	8	0.0050	0.490	0.862	1.76	2.05	
D	6	8900.00	0.2043	0.184	0.2043	20	6	0.0100	0.180	0.566	3.15	1.05	Paving
	7	32531.00	0.7468	0.672	0.7468	45	10	0.0030	0.670	1.211	1.81	1.36	
E	8	1400.00	0.0321	0.029	0.0321	25	4	0.0050	0.030	0.136	4.53	1.89	Paving
F	9	1400.00	0.0321	0.029	0.0321	5	4	0.0100	0.030	0.192	6.40	0.53	Paving
	10	2800.00	0.0643	0.058	0.0643	25	4	0.0050	0.060	0.136	2.26	0.94	
G	11	1400.00	0.0321	0.029	0.0321	5	4	0.0100	0.030	0.192	6.40	0.53	Paving
	12	4200.00	0.0964	0.087	0.0964	30	4	0.0050	0.090	0.136	1.51	0.75	
H	13	1400.00	0.0321	0.029	0.0321	10	4	0.0100	0.030	0.192	6.40	1.07	Paving

TM Rippey Consulting Engineers

STORM SEWER DESIGN FORM
Project Number: 18206
Four S Building
June 13, 2018

Unit Conversion (acre/ft^2) 2.30E-05
Runoff Based on HydroCad
Rainfall 3.90 inches 25 Year event
Manning's Coefficient (n)= 0.013

7650 SW Beveland St
Suite 100
Tigard, Oregon 97223
Phone: 503 443 3900

DESIGN AREA	DRAINAGE BASIN PIPE #	AREA ft^2	AREA acres	Equiv. Area for 100% Runoff (C)(A)	CUMULATIVE DRAINAGE AREA acres	PIPE LENGTH L	PIPE SIZE in	INVERT SLOPE ft/ft	DESIGN DISCHARGE cfs	FULL FLOW CAPACITY cfs	VELOC. @ Q/Qf V	T_t	COMMENTS
	14	5600.00	0.1286	0.116	0.1286	30	6	0.0050	0.120	0.400	3.34	1.67	
I	15	1400.00	0.0321	0.029	0.0321	10	4	0.0100	0.030	0.192	6.40	1.07	Paving
	16	7000.00	0.1607	0.145	0.1607	40	6	0.0030	0.150	0.310	2.07	1.38	
	17	39531.00	0.9075	0.817	0.9075	5	10	0.0030	0.820	1.211	1.48	0.12	To Treatment MH
	18	39531.00	0.9075	0.817	0.9075	155	10	0.0030	0.820	1.211	1.48	3.81	To Detention Pond
J		9568.00	0.2197	0.198	0.2197	10	6	0.0100	0.180	0.566	3.15	0.52	Roof
K		22080.00	0.5069	0.456	0.5069	10	6	0.0200	0.460	0.801	1.74	0.29	Roof
L	19	20976.00	0.4815	0.433	0.4815	70	6	0.0100	0.440	0.566	1.29	1.50	Roof to Swale
	20	52624.00	1.2081	1.087	1.2081	30	6	0.0600	1.080	1.387	1.28	0.64	Swale to Detention Pond
M	21	6220.00	0.1428	0.129	0.1428	30	6	0.0030	0.130	0.310	2.39	1.19	Paving
	22	98375.00	2.2584	2.033	2.2584	30	10	0.0135	2.030	2.568	1.27	0.63	To Public CB at Myslony
N	23	65025.00	1.4928	1.343	1.4928	30	12	0.0030	1.370	1.969	1.44	0.72	Future Development Site
	24	163400.00	3.7511	3.376	3.7511	30	18	0.0030	3.400	5.805	1.71	0.85	To Public CB at Myslony

TM RIPPEY
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Tigard, Oregon 97223

Phone: 503 443 3900
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kkoroch@tmrippey.com

July 25, 2018

Four S Development
Project Number: 18206

Storm Water Quality Treatment Sizing

East and South Paved Areas
Contech Stormfilter Cartridge Manhole

Impervious Area 39,531 ft^2

Water Quality Volume

$$WQV(cf) = \frac{0.36 \text{ in.} \times 39{,}531 \text{ } ft^2}{12 \text{ (in/ft)}}$$

$$= \mathbf{1{,}186} \text{ } \mathbf{cf}$$

Water Quality Flow

$$WQF(cfs) = \frac{1{,}186 \text{ cf}}{14{,}400 \text{ sec}}$$

$$= \mathbf{0.0824} \text{ } \mathbf{cfs}$$

Cartridge Flow Rate 0.0223 cfs (10 gpm)

Cartridges Required 3.69
Use 4 cartridges

Northeast Paved Areas
Contech Stormfilter Cartridge Catch Basin

Impervious Area	6,220	ft^2					
Water Quality Volume	WQV(cf)	=	0.36	in.	X	6,220	ft^2
				12	(in/ft)		
		=	**186.60**		**cf**		
Water Quality Flow	WQF(cfs)	=	186.60	cf			
			14,400	sec			
		=	**0.0130**		**cfs**		
Cartridge Flow Rate			0.0334		cfs	(15 gpm)	
Cartridges Required			0.3880				
			Use 1 cartridge				

Building Roof
Vegetated Treatment Swale

Impervious Area	52,624	ft^2					
Water Quality Volume	WQV(cf)	=	0.36	in.	X	52,624	ft^2
				12	(in/ft)		
		=	**1,578.72**		**cf**		
Water Quality Flow	WQF(cfs)	=	1,578.72	cf			
			14,400	sec			
		=	**0.1096**		**cfs**		

Swale sizing based HydroCAD output using 0.11 cfs flow, 4 ft. bottom width, 4h:1v side slopes, 100 ft. swale length and 0.50% swale slope.

Velocity	=	0.13	fps	
Travel Time	=	Length	÷	Velocity
	=	100	÷	0.13
	=	769	sec	
	=	12.8	min	OK

From HydroCAD, WQ flow depth is 0.18 ft. For 25 year rainfall event, flow is 1.11 cfs with 0.68 ft. flow depth and 0.27 fps velocity. For 100 year rainfall event, flow is 1.28 cfs with 0.73 ft. flow depth and 0.28 fps velocity. This complies with CWS standards. Minimum swale freeboard required is 1.73 ft.

Appendix 2

Construction Plans

GENERAL UTILITY NOTES

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE JURISDICTION.
2. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT EDITION OF THE PLUMBING CODE, BUILDING CODE, AND THE FIRE CODE.
3. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
4. THE CONTRACTOR SHALL NOTIFY THE OREGON UTILITY NOTIFICATION CENTER (800 332 2344) THREE BUSINESS DAYS PRIOR TO ANY EXCAVATION.
5. EXISTING CONDITIONS BASED ON TOPOGRAPHIC, BOUNDARY, AND UTILITY SURVEY PREPARED BY FORD ENGINEERING, INC., DATED MAY 2018.
6. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF PRIVATE UTILITIES SUCH AS GAS, TELEPHONE, POWER, CABLE TELEVISION, ETC. CONFIRM VAULT LOCATIONS WITH ARCHITECT.
7. THE CONTRACTOR SHALL KEEP THE ARCHITECT AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 48-HOUR NOTICE IS REQUIRED.
8. THE CONTRACTOR SHALL VERIFY AND CONFIRM EXISTING CONDITIONS. EXISTING UTILITIES AND POINTS OF CONNECTION TO EXISTING UTILITIES AND LOCATIONS WHERE NEW UTILITIES WILL CROSS EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR BY POTHOLING PRIOR TO CONSTRUCTION OR ORDERING MATERIALS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SCHEDULE POTHOLING SUCH THAT IF CONFLICTS ARE ENCOUNTERED, SUFFICIENT TIME EXISTS TO PREPARE MODIFIED DESIGNS AND HAVE THE MODIFICATIONS APPROVED BY THE JURISDICTION WITHOUT IMPACTING THE PROJECT SCHEDULE.
9. THIS PLAN IS GENERALLY DIAGRAMMATIC. IT DOES NOT SHOW EVERY JOINT, BEND, FITTING, OR ACCESSORY REQUIRED FOR CONSTRUCTION.
10. INSTALL CLEANOUTS AT 100' MAX. AND AT ALL LATERALS PER CODE. PROVIDE CLEANOUTS AS REQUIRED BY THE CURRENT OREGON PLUMBING SPECIALTY CODE. NOT ALL REQUIRED CLEANOUTS ARE SHOWN.
11. STORM PIPE FITTINGS ARE TO BE ECCENTRIC.
12. UTILITIES WITHIN TWO FEET OF A BUILDING SHALL BE CONSTRUCTED OF MATERIALS APPROVED FOR INTERIOR USE AS DESCRIBED IN THE CURRENT EDITION OF THE PLUMBING CODE.
13. CHANGES IN DIRECTION OF DRAINAGE AND SEWER PIPING SHALL BE MADE BY THE APPROPRIATE USE OF APPROVED FITTINGS AND SHALL BE OF THE ANGLES PRESENTED BY ONE-SIXTEENTH BEND, ONE-EIGHTH BEND, ONE-SIXTH BEND OR OTHER APPROVED FITTINGS OF EQUIVALENT SWEEP.
14. IF DEWATERING IS REQUIRED DURING CONSTRUCTION, THE CONTRACTOR SHALL PREPARE A DEWATERING PLAN CONSISTENT WITH CITY OF TUALATIN AND CLEAN WATER SERVICES (CWS) REQUIREMENTS, AND OBTAIN APPROVAL OF THE PLAN FROM BOTH JURISDICTIONS PRIOR TO PROCEEDING WITH DEWATERING.
15. THE CONTRACTOR SHALL CLEAN ALL CATCH BASINS AND STORM LINES IMPACTED BY SITE DEVELOPMENT FOLLOWING COMPLETION OF CONSTRUCTION OR AS DIRECTED BY THE CITY OF TUALATIN AND CWS. NO SEDIMENT SHALL BE ALLOWED TO ENTER THE STORM SYSTEM.
16. COORDINATE WITH CITY OF TUALATIN FOR NEW DOMESTIC WATER SERVICE AND METER AT SW MYSLONY STREET FRONTAGE. CONTRACTOR TO INSTALL 2-INCH SERVICE PIPE FROM METER TO CITY OF TUALATIN APPROVED REDUCED PRESSURE DOMESTIC BACKFLOW PREVENTER IN AN ABOVE GRADE HEATED ENCLOSURE ADJACENT TO THE RIGHT OF WAY. EXTEND 2-INCH WATER SERVICE PIPE TO BUILDING. SIZE OF DOMESTIC SERVICE, CAPACITY OF METER, BUILDING DOMESTIC WATER DEMAND AND SIZE OF BACKFLOW PREVENTER AND PIPING TO BUILDING IS ASSUMED AND TO BE CONFIRMED BY BUILDING PLUMBING DESIGNER PRIOR TO CONSTRUCTION OR ORDERING MATERIAL. CONTRACTOR TO PROVIDE 4"-THICK CONCRETE PAD ON 6" OF 1"-0" COMPACTED CRUSHED AGGREGATE FOR DOMESTIC BACKFLOW PREVENTER. EXTEND PAD 12" BEYOND PERIMETER OF BACKFLOW PREVENTER ENCLOSURE. COORDINATE WITH BUILDING PLUMBING DESIGNER. PROVIDE DEDICATED ELECTRICAL CIRCUIT FOR BACKFLOW PREVENTER HEATED ENCLOSURE. CONTRACTOR TO DETERMINE IF REMOTE METER READER IS REQUIRED AND PROVIDE AS DIRECTED BY CITY OF TUALATIN. IRRIGATION CONNECTION IS TO BE DOWNSTREAM OF BUILDING WATER METER AND TO BE OF CITY OF TUALATIN APPROVED TYPE. SEE LANDSCAPE PLANS FOR DISCUSSION OF IRRIGATION BACKFLOW PREVENTER AND CONTINUATION TO IRRIGATION SYSTEM. NO CONNECTIONS MAY OCCUR BETWEEN DOMESTIC METER AND BACKFLOW PREVENTER.
17. COORDINATE WITH CITY OF TUALATIN FOR RETURN OF BLOW OFF REMOVED AT SITE FIRE CONNECTION. FIRE DCDA WILL BE AT RIGHT OF WAY WITH SIZE TO BE CONFIRMED BY CONTRACTOR IN CONSULTATION WITH BUILDING FIRE SYSTEM DESIGNER. FIRE BACKFLOW PREVENTER AND PIPE LINE SIZE IS ASSUMED AND TO BE CONFIRMED BY BUILDING FIRE SYSTEM DESIGNER BASED ON THEIR FLOW TESTING.
18. INSTALL AUTOMATIC DRAIN VALVE IN VAULT AT LOW POINT OF FDC LINE. PROVIDE DRAINAGE FROM VAULT TO CITY OF TUALATIN APPROVED LOCATION. SIZE OF FDC PIPE IS ASSUMED AND TO BE CONFIRMED BY BUILDING FIRE SYSTEM DESIGNER. FDC TO CONFORM TO REQUIREMENTS OF TUALATIN VALLEY FIRE AND RESCUE (TVF&R).
19. WATER LINE, FITTINGS, VALVES, HYDRANTS, AND COMPONENTS TO CONFORM TO THE REQUIREMENTS OF CITY OF TUALATIN. HYDRANTS TO ALSO CONFORM TO REQUIREMENTS OF TVF&R.
20. BUILDING SANITARY PIPE SIZE IS ASSUMED AND TO BE CONFIRMED BY BUILDING PLUMBING DESIGNER BASED ON THEIR CALCULATION OF DESIGN FIXTURE DISCHARGE. SEE BUILDING PLUMBING PLANS FOR SANITARY CONTINUATION WITHIN BUILDING. INVERT ELEVATION OF EXISTING SITE SANITARY SEWER LATERAL IS ASSUMED AND TO BE CONFIRMED BY CONTRACTOR BY POTHOLING BEFORE CONSTRUCTION OR ORDERING MATERIAL. SEPARATE PUBLIC WORKS PERMIT REQUIRED FOR CONNECTION TO THIS LATERAL.

LEGEND

	PROPOSED	EXISTING
PROJECT BOUNDARY		
PROPERTY LINE		
EASEMENT LINE		
FENCE		
CURB		
EDGE OF PAVEMENT		
1' CONTOUR	144	
5' CONTOUR	145	
STORM SEWER LINE	SD	
WATER LINE	W	
SANITARY SEWER LINE	SS	
GAS LINE		
OVERHEAD UTILITY WIRE		
UNDERGROUND POWER LINE		
COMMUNICATION LINE		
EXISTING FEATURE OR CONDITION		(E)
CATCH BASIN	CB	
TOP OF CURB	TC	
GUTTER	G	
BACKFLOW PREVENTER	BFP	
PERFORATED PIPE	PERF	
TOP OF STEP	TS	
BOTTOM OF STEP	BS	
TOP OF WALL	TW	
BOTTOM OF WALL AT FINISHED GRADE	BW	
FINISHED GRADE	FG	
FOOTING	FTG	
BACKFLOW PREVENTER	BFP	
WATER SURFACE ELEVATION	WSE	
GROWING MEDIUM	GM	
BOTTOM	BOT	
GENERAL GRADING NOTES	GGN	
GENERAL UTILITY NOTES	GUN	

GENERAL GRADING NOTES

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE JURISDICTION AND THE PROJECT GEOTECHNICAL INVESTIGATION.
2. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS, INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
3. THE CONTRACTOR SHALL NOTIFY THE OREGON UTILITY NOTIFICATION CENTER (800 332 2344) THREE BUSINESS DAYS PRIOR TO ANY EXCAVATION.
4. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF PRIVATE UTILITIES SUCH AS GAS, TELEPHONE, POWER, DATA, ETC. CONFIRM VAULT LOCATIONS WITH THE ARCHITECT.
5. THE CONTRACTOR SHALL KEEP THE ARCHITECT AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 48-HOUR NOTICE IS REQUIRED.
6. EXISTING CONDITIONS BASED ON TOPOGRAPHIC, BOUNDARY, AND UTILITY SURVEY PREPARED BY FORD ENGINEERING, INC., DATED MAY 2018.
7. FINISHED GRADES ARE TO BE BROUGHT TO WITHIN 0.08 FT. IN 10 FT. OF THE GRADES SHOWN AT SUBGRADE AND TO WITHIN 0.03 FT. IN 10 FT. AT FINISH GRADE. CONTRACTOR TO ALLOW FOR PLACEMENT OF REQUIRED TOPSOIL AND PLANTINGS IN ROUGH GRADING.
8. GRADING ELEVATIONS AS SHOWN ON PLANS ARE FINISHED GRADE, WHICH INCLUDES PAVING, BASE ROCK, AND SUBGRADE SOIL. GENERAL CONTRACTOR IS RESPONSIBLE TO COORDINATE GRADING WITH BOTH EXCAVATOR AND PAVING CONTRACTOR.
9. SEE PROJECT GEOTECHNICAL ANALYSIS FOR PAVING, EXCAVATION, FILL, AND COMPACTION REQUIREMENTS.
10. IF DEWATERING IS REQUIRED DURING CONSTRUCTION, THE CONTRACTOR SHALL PREPARE A DEWATERING PLAN CONSISTENT WITH CITY OF TUALATIN AND CLEAN WATER SERVICES (CWS) REQUIREMENTS, AND OBTAIN APPROVAL OF THE PLAN FROM BOTH JURISDICTIONS PRIOR TO PROCEEDING WITH DEWATERING.
11. THE CONTRACTOR SHALL CLEAN ALL CATCH BASINS AND STORM LINES IMPACTED BY SITE DEVELOPMENT FOLLOWING COMPLETION OF CONSTRUCTION OR AS DIRECTED BY THE CITY OF TUALATIN AND CWS. NO SEDIMENT SHALL BE ALLOWED TO ENTER NEW OR EXISTING INLETS.
12. SITE RETAINING WALLS (OTHER THAN AT TRUCK DOCKS) TO BE CONTRACTOR DESIGN-BUILD MODULAR BLOCK. MATERIAL TO BE AS APPROVED BY ARCHITECT.

AUGUST 2018 - PERMIT SUBMITTAL

T.M. RIPPEY CONSULTING ENGINEERS
2650 SW Bevelend, Suite 100
Tigard, Oregon 97223
Phone: (503) 443-3900
Fax: (503) 443-3902

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 25, 1997
KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

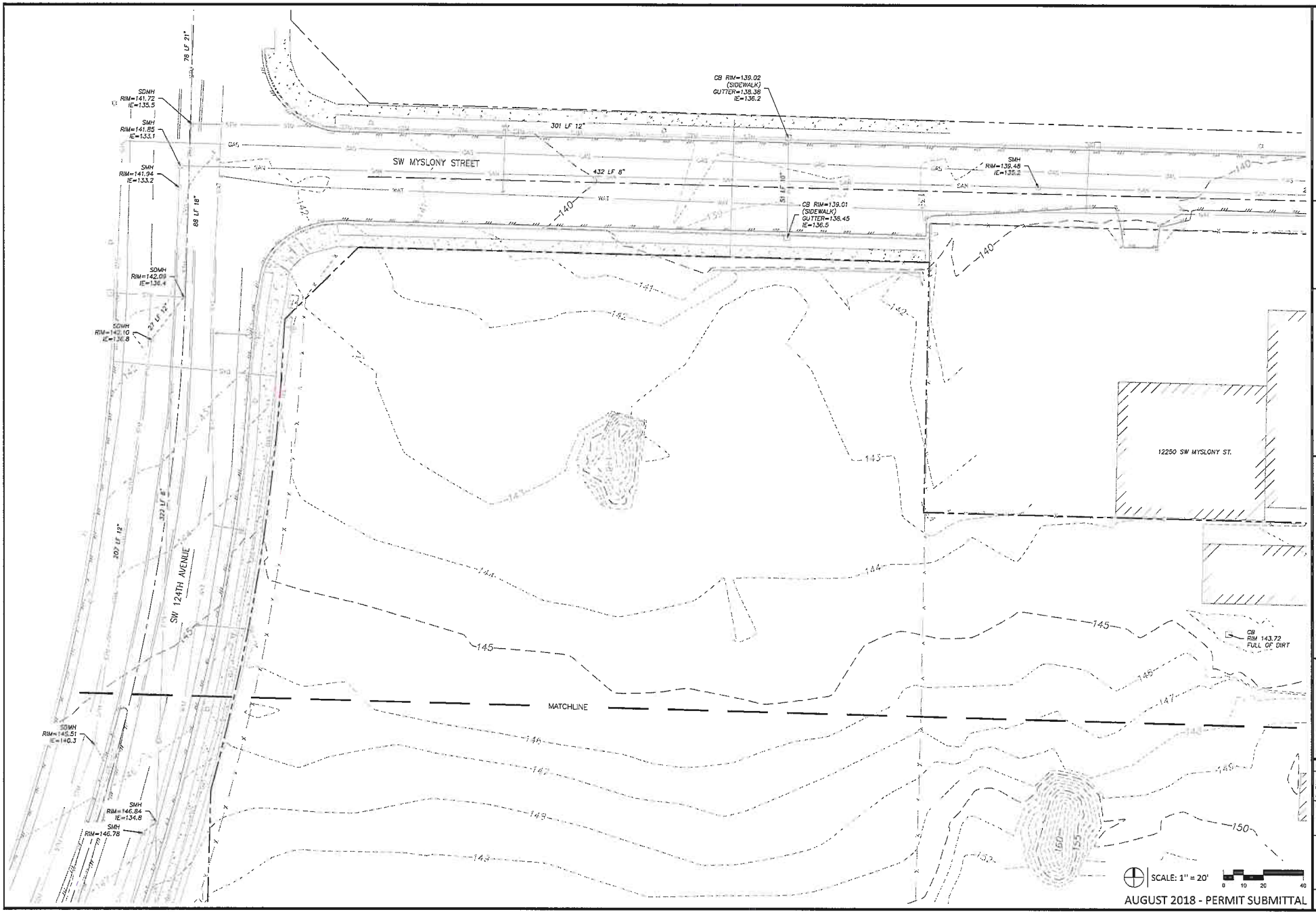
GENERAL NOTES & LEGEND

REVISIONS:

DATE: AUGUST 3, 2018
FILE NAME: TMR18206 CIVIL
DRAWN BY: AB
CHK'D BY: KJK

SHEET
C0

PROJECT No.
18206



Ford Engineering, Inc.
Civil Engineering & Land Surveying
12305 Lake Way NW
Stanwood, Washington 98292
Phone (360) 386-2931
Fax (503) 266-2331

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

EXISTING CONDITIONS PLAN
NORTH

REVISIONS:

DATE: AUGUST 3, 2018
FILE NAME: TMR18206 CIVIL
DRAWN BY: AS
CHKD BY: KIK

SHEET
C1

PROJECT No.
18206

Ford Engineering, Inc.
Civil Engineering & Land Surveying
13333 SW Hwy 99W
Sherwood, Washington 97140
Phone: (503) 925-2270
Fax: (503) 925-2272

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

EXISTING
CONDITIONS PLAN
SOUTH

REVISIONS:

DATE: AUGUST 3, 2018
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DRAWN BY: AS
CHK'D BY: KH

SHEET
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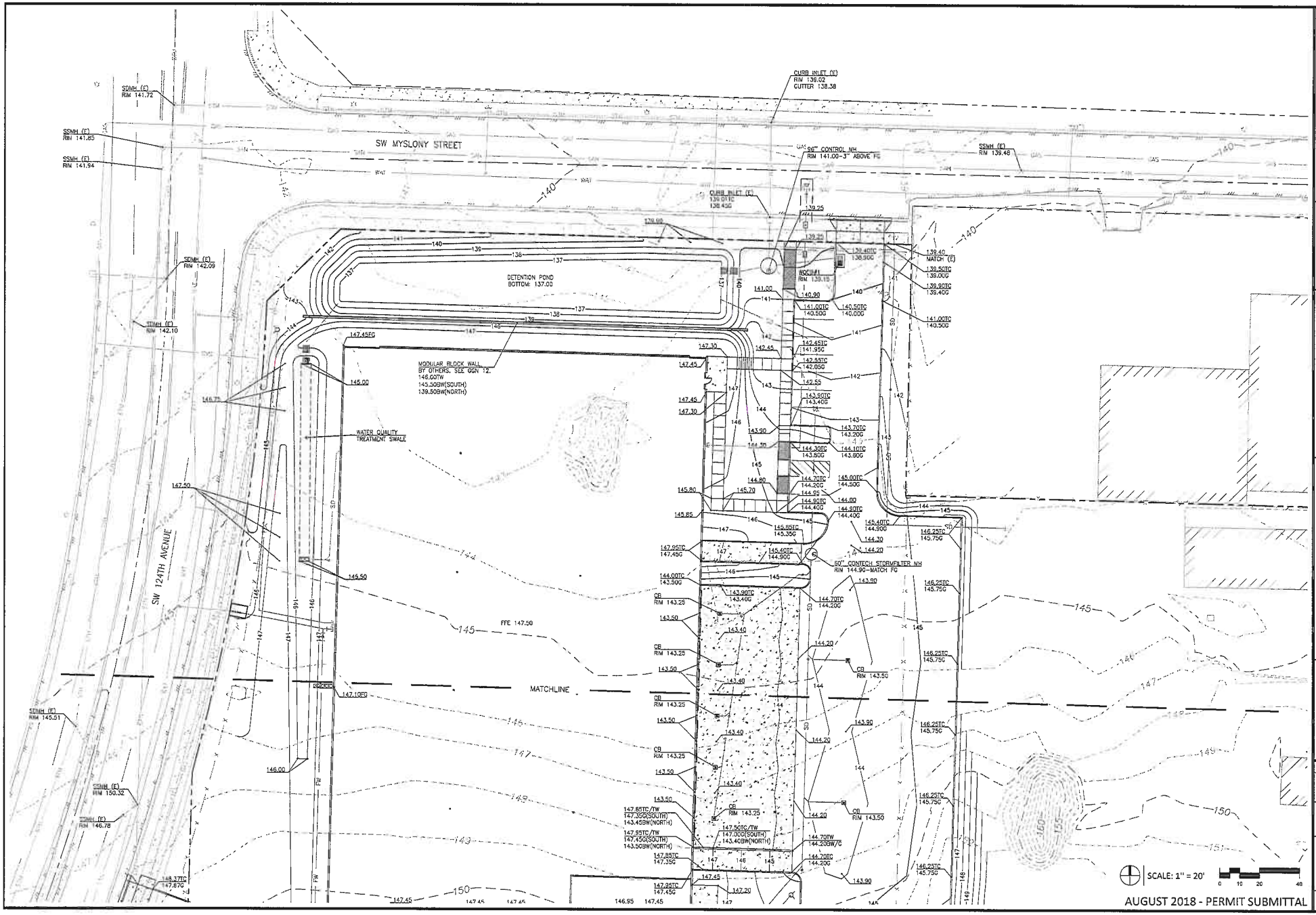
PROJECT No.
18206



AUGUST 2018 - PERMIT SUBMITTAL

TMR
T.M. RIPPEY
CONSULTING ENGINEERS
7650 SW Beveland, Suite 100
Tigard, Oregon 97223
Phone: (503) 443-3900
Fax: (503) 443-3700

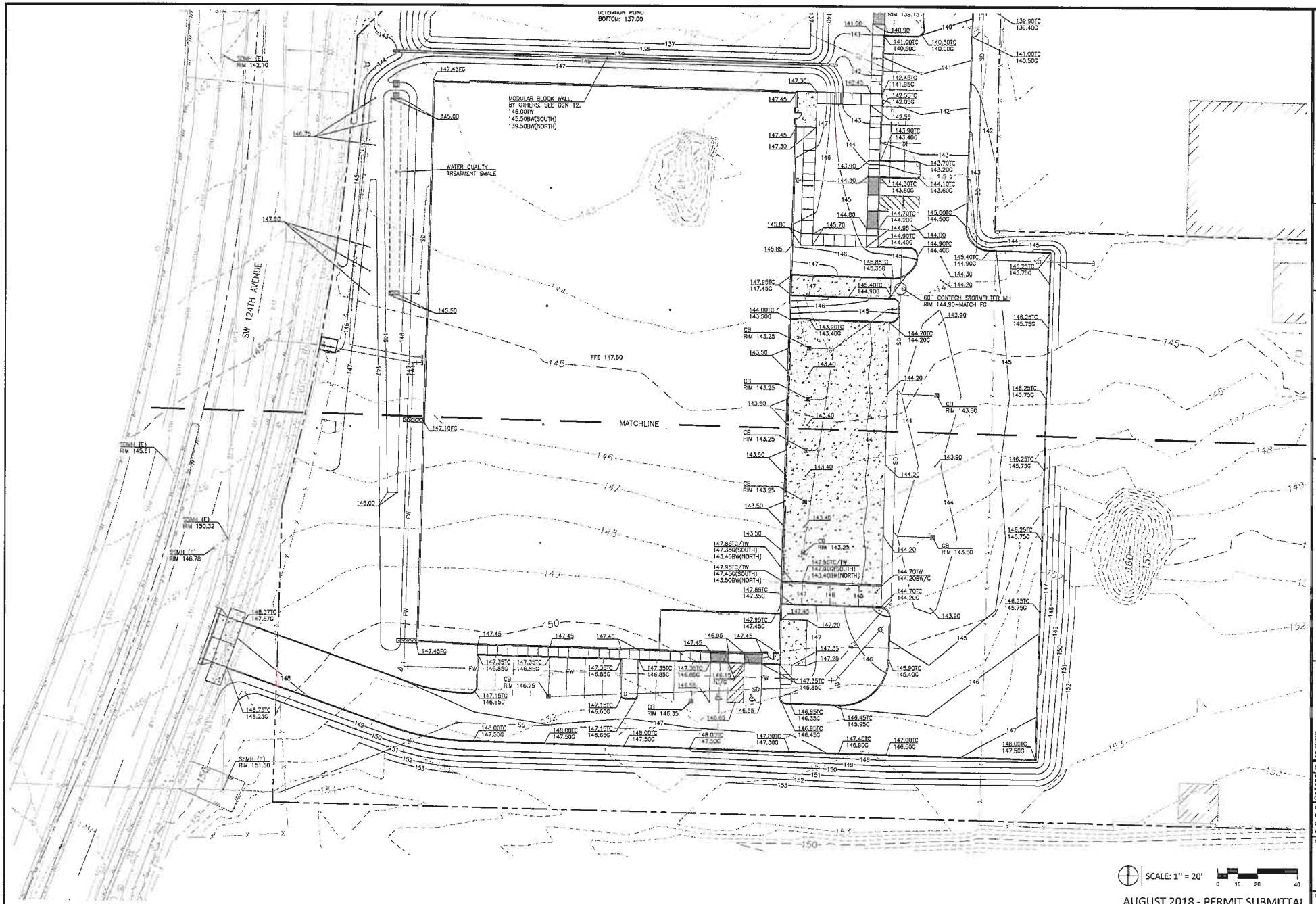
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 29, 1997
KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

NORTH GRADING PLAN

REVISIONS:

DATE: AUGUST 3, 2018
FILE NAME: TMR18206 GRADING
DRAWN BY: AS
CHKD BY: KK
SHEET
C2
PROJECT No.
18206



AUGUST 2018 - PERMIT SUBMITTAL

TMR
T.M. RIPPEY
CONSULTING ENGINEERS
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REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 25, 1997
KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

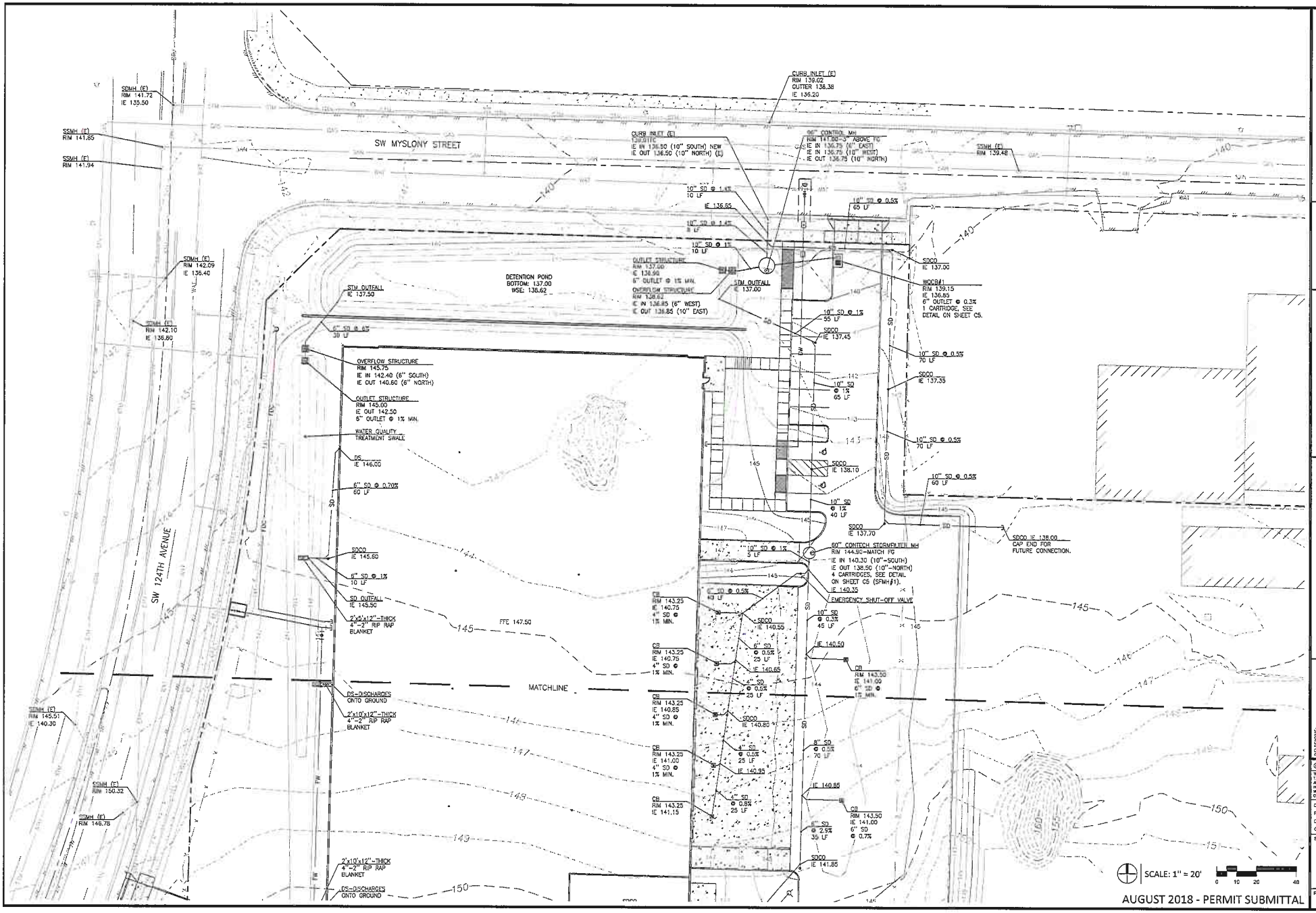
SOUTH GRADING PLAN

REVISIONS:

DATE: AUGUST 3, 2018
FILE NAME: TMR18206 CIVIL
DRAWN BY: AS
CHKD BY: KK

SHEET
C2.1

PROJECT No.
18206



AUGUST 2018 - PERMIT SUBMITTAL

TMR
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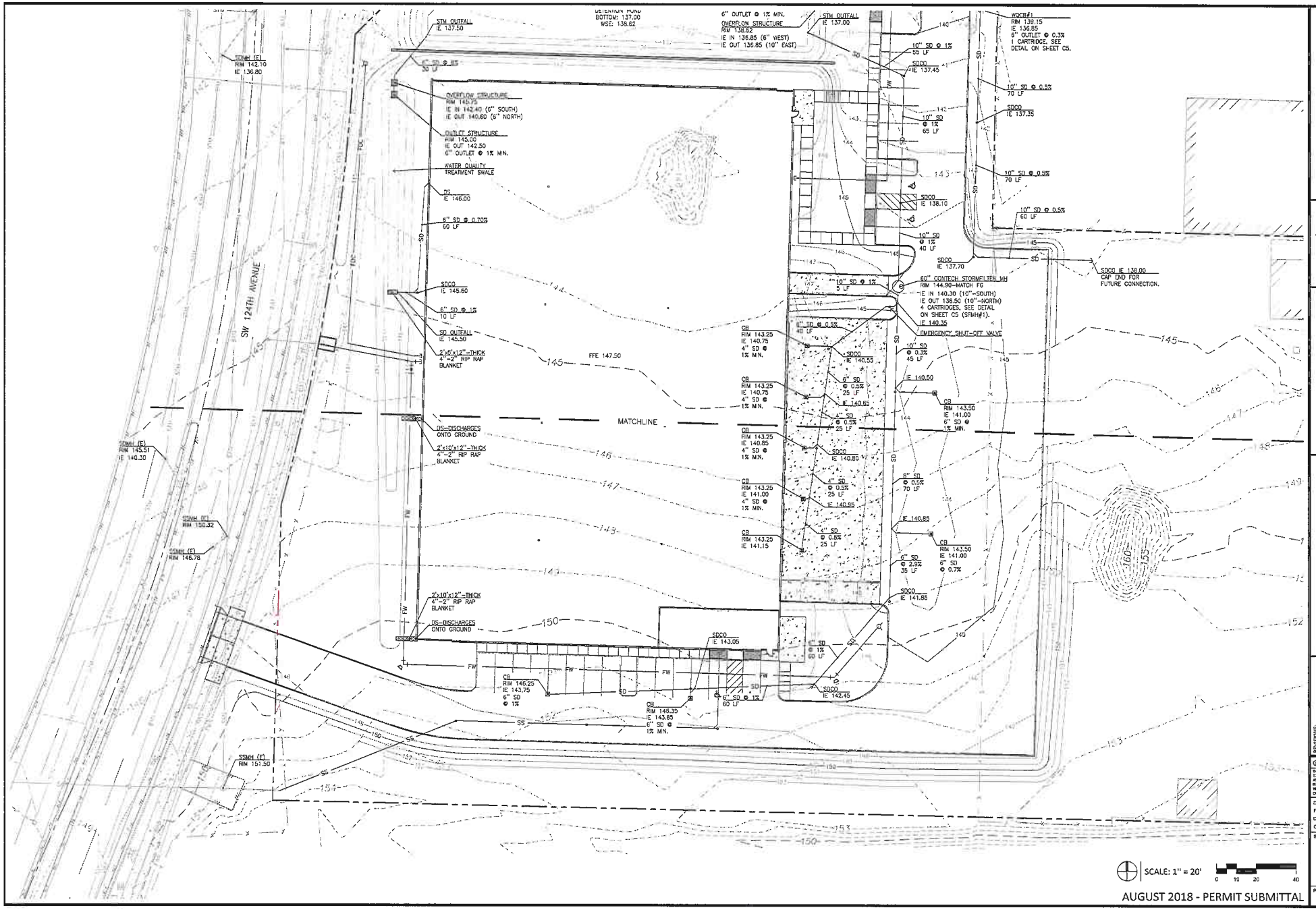
REGISTERED PROFESSIONAL ENGINEER
16504
OREGON
JULY 25, 1975
KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

NORTH
STORMWATER PLAN

REVISIONS:

DATE: AUGUST 3, 2018
FILE NAME: TMR18206 CIVIL
DRAWN BY: AS
CHKD BY: KJK
SHEET
C3
PROJECT No.
18206



SCALE: 1" = 20'

0 10 20 40

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T.M. RIPPEY CONSULTING ENGINEERS
7600 SW Beveland, Suite 100
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REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 25, 1997
KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

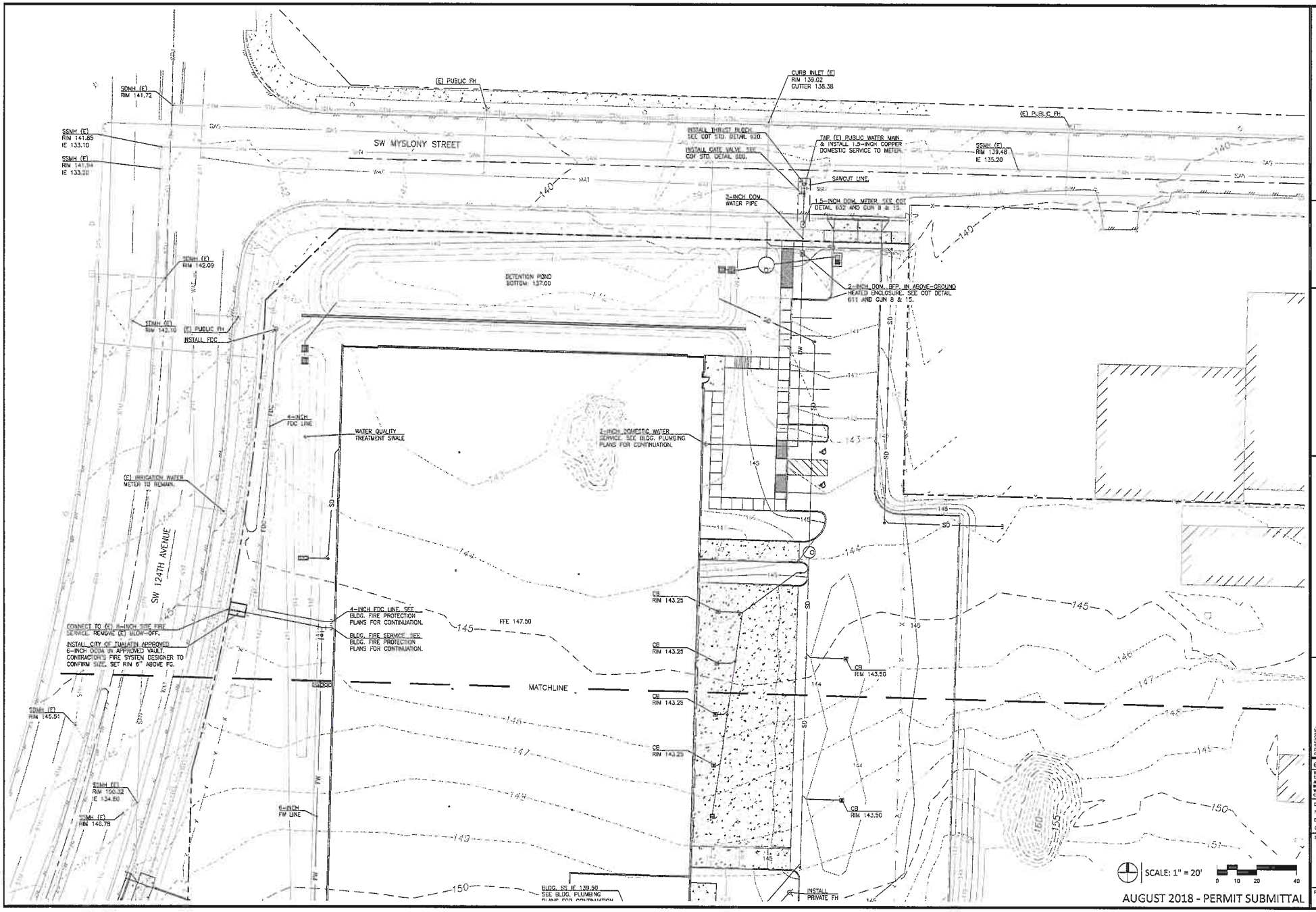
SOUTH
STORMWATER PLAN

REVISIONS:

DATE: AUGUST 3, 2018
FILE NAME: TMR18206 CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET
C3.1

PROJECT No.
18206



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TMR
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Fax: (503) 443-3100

REGISTERED PROFESSIONAL ENGINEER
13004
OREGON
JULY 25, 1981
KARL KOROOH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

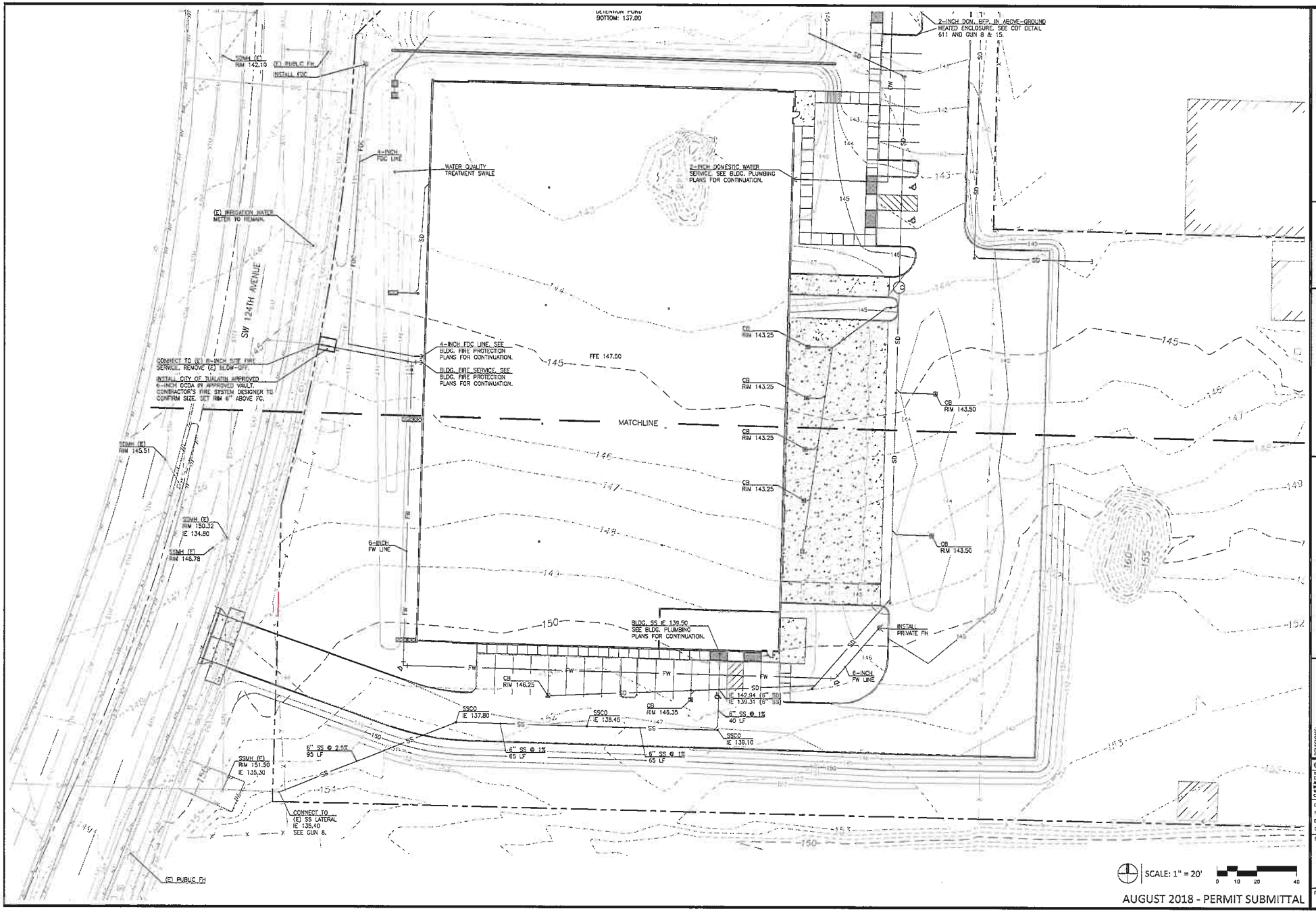
NORTH
SANITARY SEWER
& WATER PLAN

REVISIONS:

DATE: AUGUST 3, 2018
FILE NAME: TM18206 CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET
C4

PROJECT No.
18206



SCALE: 1" = 20'

0 10 20 40

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REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 25, 1997
KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

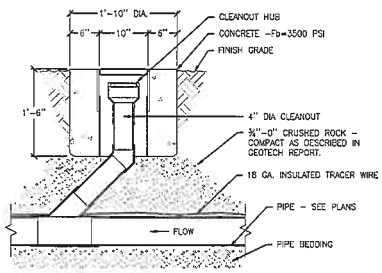
SOUTH
SANITARY SEWER
& WATER PLAN

REVISIONS:

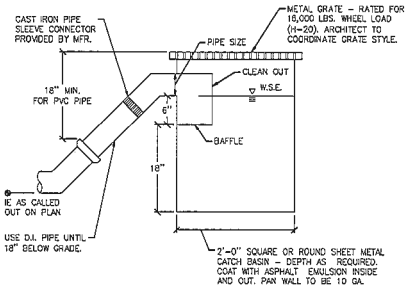
DATE: AUGUST 3, 2018
TILE NAME: TMR18206 CIVIL
DRAWN BY: AR
CHKD BY: KJK

SHEET
C4.1

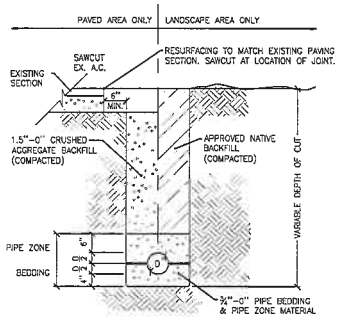
PROJECT No.
18206



1 TYPICAL CLEANOUT DETAIL
NOT TO SCALE

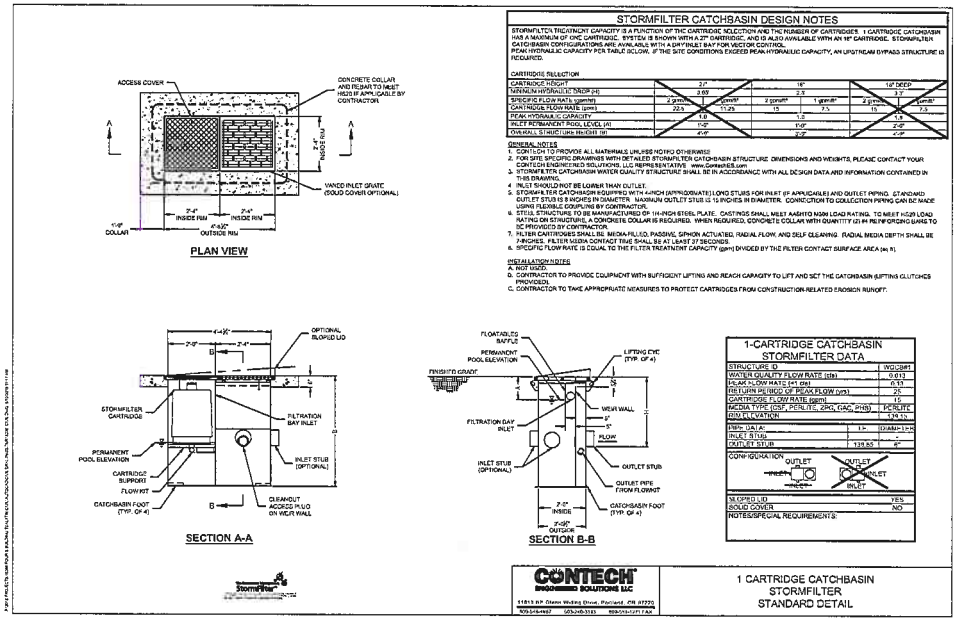


2 CATCH BASIN DETAIL
NOT TO SCALE



NOTE: VERIFY ALL REQUIREMENTS W/ JURISDICTION PRIOR TO START OF CONSTRUCTION

3 TRENCH BACKFILL DETAIL (PRIVATE SIDE ONLY)
NOT TO SCALE



STORMFILTER CATCHBASIN DESIGN NOTES

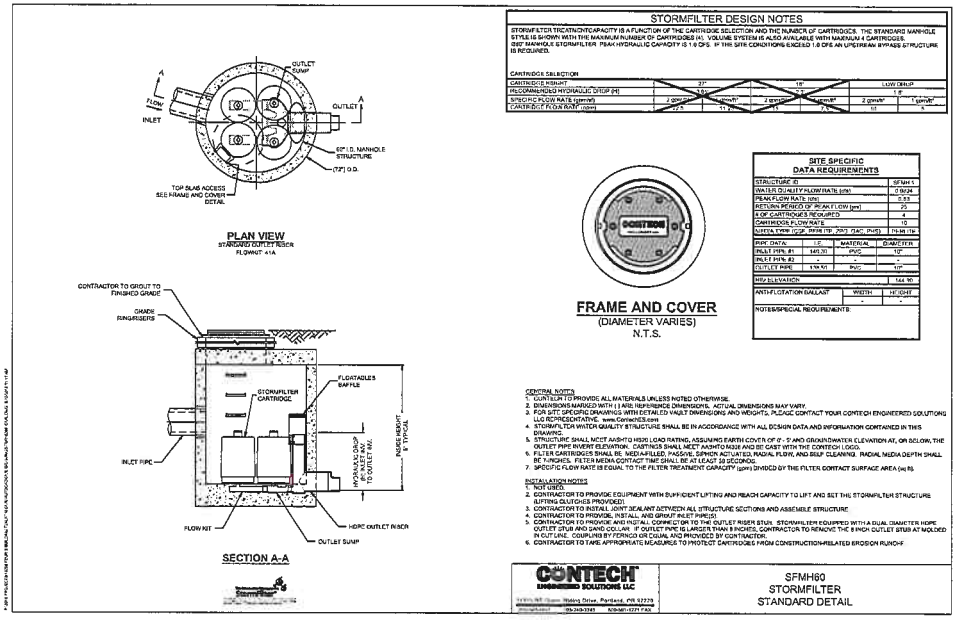
STORMFILTER TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. 1 CARTRIDGE CATCHBASIN HAS A MAXIMUM OF ONE CARTRIDGE. SYSTEM IS SHOWN WITH A 27" CARTRIDGE, AND IS ALSO AVAILABLE WITH AN 18" CARTRIDGE. STORMFILTER CATCHBASIN CONFIGURATIONS ARE AVAILABLE WITH A DRY INLET BAY FOR VECTOR CONTROL. PEAK HYDRAULIC CAPACITY FOR TABLE BELOW. IF THE SITE CONDITIONS EXCEED PEAK HYDRAULIC CAPACITY, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

CARTRIDGE SELECTION	27"		18"		18" DEEP
CARTRIDGE HEIGHT	27"		18"		18" DEEP
MINIMUM HYDRAULIC DROP (H)	3.69		2.8		3.7
SPECIFIC FLOW RATE (gpm/sf)	2 gpm/sf	1 gpm/sf*	2 gpm/sf	1 gpm/sf*	2 gpm/sf	1 gpm/sf*
CARTRIDGE FLOW RATE (gpm)	22.5	11.25	15	7.5	15	7.5
PEAK HYDRAULIC CAPACITY	1.0		1.0		1.0
INLET PERMANENT POOL LEVEL (A)	1'-0"		1'-0"		2'-0"
OVERALL STRUCTURE HEIGHT (B)	4'-0"		3'-0"		4'-0"

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STORMFILTER CATCHBASIN STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. STORMFILTER CATCHBASIN WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
4. INLET SHOULD NOT BE LOWER THAN OUTLET.
5. STORMFILTER CATCHBASIN EQUIPPED WITH 4-INCH (APPROXIMATE) LONG STUBS FOR INLET (IF APPLICABLE) AND OUTLET PIPING. STANDARD OUTLET STUB IS 8 INCHES IN DIAMETER. MAXIMUM OUTLET STUB IS 15 INCHES IN DIAMETER. CONNECTION TO COLLECTION PIPING CAN BE MADE USING FLEXIBLE COUPLING BY CONTRACTOR.
6. STEEL STRUCTURE TO BE MANUFACTURED OF 14-INCH STEEL PLATE. CASTINGS SHALL MEET AASHTO M306 LOAD RATING. TO MEET H20 LOAD RATING ON STRUCTURE, A CONCRETE COLLAR IS REQUIRED. WHEN REQUIRED, CONCRETE COLLAR WITH QUANTITY (2) #4 REINFORCING BARS TO BE PROVIDED BY CONTRACTOR.
7. FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 37 SECONDS.
8. SPECIFIC FLOW RATE IS EQUAL TO THE FILTER TREATMENT CAPACITY (gpm) DIVIDED BY THE FILTER CONTACT SURFACE AREA (sf).

INSTALLATION NOTES
A. NOT USED
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CATCHBASIN (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

1-CARTRIDGE CATCHBASIN STORMFILTER DATA	
STRUCTURE ID	[VOID#1]
WATER QUALITY FLOW RATE (cfs)	0.013
PEAK FLOW RATE (cfs)	0.13
RETURN PERIOD OF PEAK FLOW (yrs)	25
CARTRIDGE FLOW RATE (gpm)	15
MEDIA TYPE (CSF, PERLITE, ZPG, GAC, PHS)	PERLITE
RIM ELEVATION	139.53
INLET DATA	1 > [DIAMETER] IN
INLET 1 (IN)	-
OUTLET STUB	139.05 4"
CONFIGURATION	OUTLET / INLET
MODIFIED LID	YES
SOLID COVER	NO
NOTES/SPECIAL REQUIREMENTS:	



CENTRAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR SITE SPECIFIC DRAWINGS WITH DETAILED VAULT DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO H20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5' AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
6. FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 37 SECONDS.
7. SPECIFIC FLOW RATE IS EQUAL TO THE FILTER TREATMENT CAPACITY (gpm) DIVIDED BY THE FILTER CONTACT SURFACE AREA (sf).

INSTALLATION NOTES
A. NOT USED
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THIS STORMFILTER STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL AND GROUT IN SET PIPE(S).
E. CONTRACTOR TO PROVIDE, INSTALL AND CONNECT OUTLET RISER STUB. STORMFILTER EQUIPPED WITH A DUAL DIAMETER HDPE OUTLET RISER AND SAND COLLAR. IF OUTLET PIPE IS LARGER THAN 8 INCHES, CONTRACTOR TO REMOVE THE 8 INCH OUTLET STUB AT MOLDED IN CUTLINE. COUPLING BY FERNCO OR EQUAL AND PROVIDED BY CONTRACTOR.
F. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

SITE SPECIFIC DATA REQUIREMENTS			
STRUCTURE ID			SFMH 1
WATER QUALITY FLOW RATE (cfs)			0.1624
PEAK FLOW RATE (cfs)			0.53
RETURN PERIOD OF PEAK FLOW (yrs)			25
# OF CARTRIDGES REQUIRED			4
CARTRIDGE FLOW RATE			10
MEDIA TYPE (CSF, PERLITE, ZPG, GAC, PHS)			PERLITE
RIM ELEVATION			144.90
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE #1	140.30	PVC	12"
INLET PIPE #2	-	-	-
OUTLET PIPE	139.50	PVC	12"
RIM ELEVATION			144.90
ANTI-FLOTATION BALLAST	WIDTH		HEIGHT
	-		-
NOTES/SPECIAL REQUIREMENTS:			

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REGISTERED PROFESSIONAL ENGINEER 15594 OREGON JULY 25, 1997 KARL KOROH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

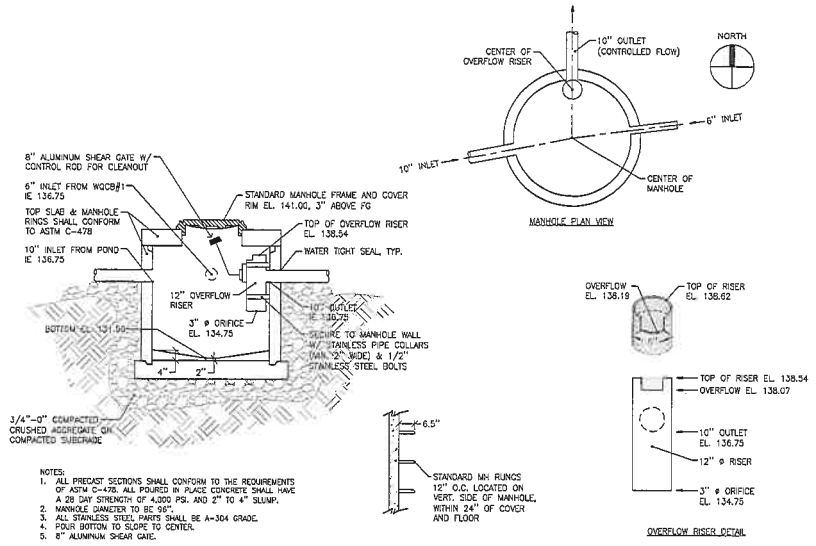
DETAILS

REVISIONS:

DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHKD BY: KK

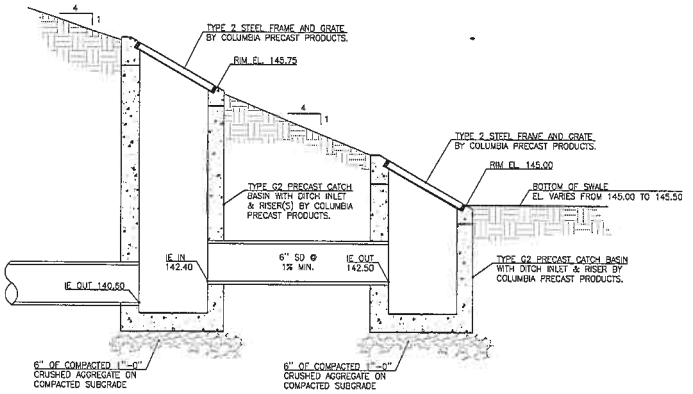
SHEET
C5

PROJECT No.
18206

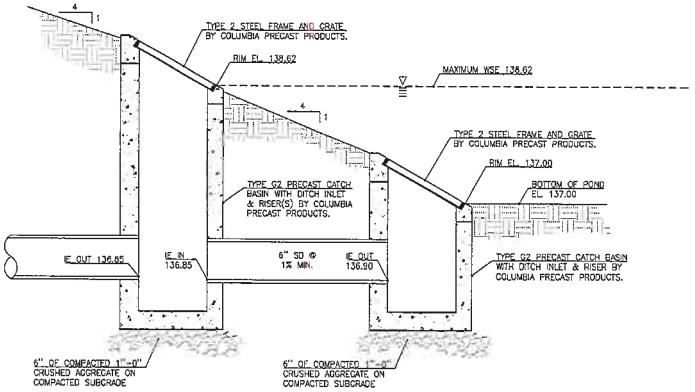


NOTES:
1. ALL PRECAST SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478. ALL POURED IN PLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 4,000 PSI. AND 2" TO 4" SLUMP.
2. MANHOLE DIAMETER TO BE 96".
3. ALL STAINLESS STEEL PARTS SHALL BE A-304 GRADE.
4. POUR BOTTOM TO SLOPE TO CENTER.
5. 8" ALUMINUM SHEAR GATE.

1 96" DIA. STORM OUTLET CONTROL MANHOLE
NOT TO SCALE



2 W.Q. TREATMENT SWALE OUTLET DETAIL
NOT TO SCALE



3 DETENTION POND OUTLET DETAIL
NOT TO SCALE

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CONSULTING ENGINEERS
7650 SW Beveland, Suite 100
Tigard, OR 97223
Phone: (503) 443-3900
Fax: (503) 443-3700

REGISTERED PROFESSIONAL ENGINEER
15504
OREGON
JULY 25, 1981
KARL KOROCH
EXPIRES: 6/30/19

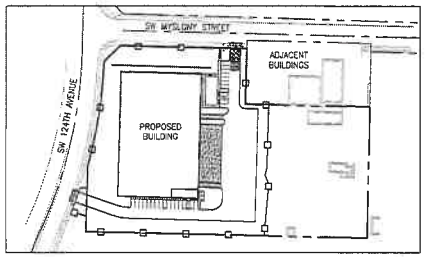
FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

DETAILS

REVISIONS:

DATE: AUGUST 3, 2018
FILE NAME: TMR18206 CIVIL
DRAWN BY: JSS
CHK'D BY: KJK
SHEET
C5.1
PROJECT No.
18206

ESC PLAN FOR SITES 1 TO 5 ACRES



SITE MAP

NOT TO SCALE

VICINITY MAP

NOT TO SCALE

PROJECT LOCATION

SOUTHEAST CORNER OF THE INTERSECTION OF SW 124th AVENUE AND SW MYSLONY STREET.
TUALATIN, OREGON 97224
LATITUDE = 45° 22' 33"N LONGITUDE = 122° 48' 15"W

PROPERTY DESCRIPTION

TAX LOT 1600 LOCATED IN THE SW 1/4 OF SECTION 22, TOWNSHIP 2 SOUTH, RANGE 1 WEST, WILLAMETTE MERIDIAN, WASHINGTON COUNTY, OREGON

ATTENTION EXCAVATORS

OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THESE RULES FROM THE CENTER BY CALLING 503 232 1987. IF YOU HAVE ANY QUESTIONS ABOUT THE RULES, YOU MAY CONTACT THE CENTER. YOU MUST NOTIFY THE CENTER AT LEAST TWO BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL 503 246 6699.

LOCAL AGENCY-SPECIFIC EROSION CONTROL NOTES

1. IF VEGETATIVE SEED MIXES ARE SPECIFIED, SEEDING MUST TAKE PLACE NO LATER THAT SEPTEMBER 1; THE TYPE AND PERCENTAGES OF SEED IN THE MIX MUST BE IDENTIFIED ON THE PLANS.
2. ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE DISCHARGED OVER AN UNDISTURBED, PREFERABLY VEGETATED AREA, AND THROUGH A SEDIMENT CONTROL BMP I.E. (FILTER BAG).
3. ALL EXPOSED SOILS MUST BE COVERED DURING THE WET WEATHER PERIOD, OCTOBER 01 - MAY 31.

RATIONALE STATEMENT

A COMPREHENSIVE LIST OF AVAILABLE BEST MANAGEMENT PRACTICES (BMP) OPTIONS BASED ON DEQ GUIDANCE MANUAL HAS BEEN REVIEWED TO COMPLETE THIS EROSION AND SEDIMENT CONTROL PLAN. SOME OF THE ABOVE LISTED BMP'S WERE NOT CHOSEN BECAUSE THEY WERE DETERMINED TO NOT EFFECTIVELY MANAGE EROSION PREVENTION AND SEDIMENT CONTROL FOR THIS PROJECT BASED ON SPECIFIC SITE CONDITIONS, INCLUDING SOIL CONDITIONS TOPOGRAPHIC CONSTRAINTS, ACCESSIBILITY TO THE SITE, AND OTHER RELATED CONDITIONS, AS THE PROJECT PROGRESSES AND THERE IS A NEED TO REVISE THE ESC PLAN, AN ACTION PLAN WILL BE SUBMITTED.

KK

THE PERMITTEE IS REQUIRED TO MEET ALL THE CONDITIONS OF THE 1200-CN PERMIT. THIS ESCP AND GENERAL CONDITIONS HAVE BEEN DEVELOPED TO FACILITATE COMPLIANCE WITH THE 1200-CN PERMIT REQUIREMENTS. IN CASES OF DISCREPANCIES OR OMISSIONS, THE 1200-CN PERMIT REQUIREMENTS SUPERCEDE REQUIREMENTS OF THIS PLAN.

PROJECT TEAM

OWNER	APPLICANT	CIVIL ENGINEER	SURVEYOR
FOUR S CORPORATION CONTACT: SKIP STANAWAY 16316 SW 72ND AVENUE PORTLAND, OR 97224 PHONE: 503 905 2245	FOUR S CORPORATION CONTACT: SKIP STANAWAY 16316 SW 72ND AVENUE PORTLAND, OR 97224 PHONE: 503 905 2245	TM RIPPEY CONSULTING ENGINEERS CONTACT: KARL KOROCH, PE 7650 SW BEVELAND ST, SUITE 100 TIGARD, OR 97223 PHONE: 503 443 3900	FORD ENGINEERING, INC. CONTACT: FRED FORD 12205 IOKA WAY NW SILVERDALE, WA 98383 PHONE: 503 624 2050

STANDARD EROSION AND SEDIMENT CONTROL PLAN DRAWING NOTES

1. ALL PERMIT REGISTRANTS MUST IMPLEMENT THE ESCP. FAILURE TO IMPLEMENT ANY OF THE CONTROL MEASURES OR PRACTICES DESCRIBED IN THE ESCP IS A VIOLATION OF THE PERMIT.
2. THE ESCP MEASURES SHOWN ON THIS PLAN ARE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, UPGRADE THESE MEASURES AS NEEDED TO COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL EROSION AND SEDIMENT CONTROL REGULATIONS.
3. SUBMISSION OF ALL ESCP REVISIONS IS NOT REQUIRED. SUBMITTAL OF THE ESCP REVISIONS IS ONLY UNDER SPECIFIC CONDITIONS. SUBMIT ALL NECESSARY REVISION TO DEQ OR AGENT.
4. PHASE CLEARING AND GRADING TO THE MAXIMUM EXTENT PRACTICAL TO PREVENT EXPOSED INACTIVE AREAS FROM BECOMING A SOURCE OF EROSION.
5. IDENTIFY, MARK, AND PROTECT (BY FENCING OFF OR OTHER MEANS) CRITICAL RIPARIAN AREAS AND VEGETATION INCLUDING IMPORTANT TREES AND ASSOCIATED ROOTING ZONES, AND VEGETATION AREAS TO BE PRESERVED. IDENTIFY VEGETATIVE BUFFER ZONES BETWEEN THE SITE AND SENSITIVE AREAS (E.G., WETLANDS), AND OTHER AREAS TO BE PRESERVED, ESPECIALLY IN PERIMETER AREAS.
6. PRESERVE EXISTING VEGETATION WHEN PRACTICAL AND RE-VEGETATE OPEN AREAS. RE-VEGETATE OPEN AREAS WHEN PRACTICABLE BEFORE AND AFTER GRADING OR CONSTRUCTION. IDENTIFY THE TYPE OF VEGETATIVE SEED MIX USED.
7. EROSION AND SEDIMENT CONTROL MEASURES INCLUDING PERIMETER SEDIMENT CONTROL MUST BE IN PLACE BEFORE VEGETATION IS DISTURBED AND MUST REMAIN IN PLACE AND BE MAINTAINED, REPAIRED, AND PROMPTLY IMPLEMENTED FOLLOWING PROCEDURES ESTABLISHED FOR THE DURATION OF CONSTRUCTION, INCLUDING PROTECTION FOR ACTIVE STORM DRAIN INLETS AND CATCH BASINS AND APPROPRIATE NON-STORMWATER POLLUTION CONTROLS.
8. ESTABLISH CONCRETE TRUCK AND OTHER CONCRETE EQUIPMENT WASHOUT AREAS BEFORE BEGINNING CONCRETE WORK. DIRECT ALL WASH WATER INTO A PIT OR LEAK-PROOF CONTAINER. HANDLE WASH WATER AS WASTE, CONCRETE DISCHARGE TO WATERS OF THE STATE IS PROHIBITED.
9. APPLY TEMPORARY AND/OR PERMANENT SOIL STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS AS GRADING PROGRESSES AND FOR ALL ROADWAYS INCLUDING GRAVEL ROADWAYS.
10. ESTABLISH MATERIAL AND WASTE STORAGE AREAS, AND OTHER NON-STORMWATER CONTROLS.
11. PREVENT TRACKING OF SEDIMENT ONTO PUBLIC OR PRIVATE ROADS USING BMPS SUCH AS: GRAVELED (OR PAVED) EXITS AND PARKING AREAS, GRAVEL ALL UNPAVED ROADS LOCATED ONSITE, OR USE AN EXIT TIRE WASH. THESE BMPS MUST BE IN PLACE PRIOR TO LAND-DISTURBING ACTIVITIES.
12. WHEN TRUCKING SATURATED SOILS FROM THE SITE, EITHER USE WATER-TIGHT TRUCKS OR DRAIN LOADS ON SITE.
13. USE BMPS TO PREVENT OR MINIMIZE STORMWATER EXPOSURE TO POLLUTANTS FROM SPILLS; VEHICLE AND EQUIPMENT FUELING, MAINTENANCE, AND STORAGE; OTHER CLEANING AND MAINTENANCE ACTIVITIES; AND WASTE HANDLING ACTIVITIES. THESE POLLUTANTS INCLUDE FUEL, HYDRAULIC FLUID, AND OTHER OILS FROM VEHICLES AND MACHINERY, AS WELL AS DEBRIS, LEFTOVER PAINTS, SOLVENTS, AND GLUES FROM CONSTRUCTION OPERATIONS.
14. IMPLEMENT THE FOLLOWING BMPS WHEN APPLICABLE: WRITTEN SPILL PREVENTION AND RESPONSE PROCEDURES. EMPLOYEE TRAINING ON SPILL PREVENTION AND PROPER DISPOSAL PROCEDURES, SPILL KITS IN ALL VEHICLES, REGULAR MAINTENANCE SCHEDULE FOR VEHICLES AND MACHINERY, MATERIAL DELIVERY AND STORAGE CONTROLS, TRAINING AND SIGNAGE, AND COVERED STORAGE AREAS FOR WASTE AND SUPPLIES.
15. USE WATER, SOIL-BINDING AGENT OR OTHER DUST CONTROL TECHNIQUE AS NEEDED TO AVOID WIND-BLOWN SOIL.
16. THE APPLICATION RATE OF FERTILIZERS USED TO REESTABLISH VEGETATION MUST FOLLOW MANUFACTURER'S RECOMMENDATIONS TO MINIMIZE NUTRIENT RELEASES TO SURFACE WATERS. EXERCISE CAUTION WHEN USING TIME-RELEASE FERTILIZERS WITHIN ANY WATERWAY RIPARIAN ZONE.
17. IF A STORMWATER TREATMENT SYSTEM (FOR EXAMPLE, ELECTRO-COAGULATION, FLOCCULATION, FILTRATION, ETC.) FOR SEDIMENT OR OTHER POLLUTANT REMOVAL IS EMPLOYED, SUBMIT AN OPERATION AND MAINTENANCE PLAN (INCLUDING SYSTEM SCHEMATIC, LOCATION OF SYSTEM, LOCATION OF INLET, LOCATION OF DISCHARGE, DISCHARGE DISPERSION DEVICE DESIGN, AND A SAMPLING PLAN AND FREQUENCY) BEFORE OPERATING THE TREATMENT SYSTEM. OBTAIN PLAN APPROVAL BEFORE OPERATING THE TREATMENT SYSTEM. OPERATE AND MAINTAIN THE TREATMENT SYSTEM ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
18. AT THE END OF EACH WORKDAY SOIL STOCKPILES MUST BE STABILIZED OR COVERED, OR OTHER BMPS MUST BE IMPLEMENTED TO PREVENT DISCHARGES TO SURFACE WATERS OR CONVEYANCE SYSTEMS LEADING TO SURFACE WATERS.
19. CONSTRUCTION ACTIVITIES MUST AVOID OR MINIMIZE EXCAVATION AND CREATION OF BARE GROUND DURING WET WEATHER OCTOBER 01 - MAY 31.
20. SEDIMENT FENCE: REMOVE TRAPPED SEDIMENT BEFORE IT REACHES 1/3 OF THE ABOVE GROUND FENCE HEIGHT AND BEFORE FENCE REMOVAL.
21. OTHER SEDIMENT BARRIERS (SUCH AS BIOBAGS): REMOVE SEDIMENT BEFORE IT REACHES TWO INCHES IN DEPTH ABOVE GROUND HEIGHT, AND BEFORE BMP REMOVAL.
22. CATCH BASINS: CLEAN BEFORE RETENTION CAPACITY HAS BEEN REDUCED BY 50%. SEDIMENT BASINS AND SEDIMENT TRAPS: REMOVE TRAPPED SEDIMENTS BEFORE DESIGN CAPACITY HAS BEEN REDUCED BY 50% AND AT COMPLETION OF PROJECT.
23. WITHIN 24 HOURS, SIGNIFICANT SEDIMENT THAT HAS LEFT THE CONSTRUCTION SITE, MUST BE REMEDIATED. INVESTIGATE THE CAUSE OF THE SEDIMENT RELEASE AND IMPLEMENT STEPS TO PREVENT A RECURRENCE OF THE DISCHARGE WITHIN THE SAME 24 HOURS. ANY IN-STREAM CLEAN UP OF SEDIMENT SHALL BE PERFORMED ACCORDING TO THE OREGON DIVISION OF STATE LANDS REQUIRED TIMEFRAME.
24. THE INTENTIONAL WASHING OF SEDIMENT INTO STORM SEWERS OR DRAINAGE WAYS MUST NOT OCCUR. VACUUMING OR DRY SWEEPING AND MATERIAL PICKUP MUST BE USED TO CLEANUP RELEASED SEDIMENTS.
25. PROVIDE PERMANENT EROSION CONTROL MEASURES ON ALL EXPOSED AREAS. DO NOT REMOVE TEMPORARY SEDIMENT CONTROL PRACTICES UNTIL PERMANENT VEGETATION OR OTHER COVER OF EXPOSED AREAS IS ESTABLISHED. HOWEVER, DO REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AS EXPOSED AREAS BECOME STABILIZED, UNLESS DOING SO CONFLICTS WITH LOCAL REQUIREMENTS. PROPERLY DISPOSE OF CONSTRUCTION MATERIALS AND WASTE, INCLUDING SEDIMENT RETAINED BY TEMPORARY BMPS.
26. IF VEGETATIVE SEED MIXES ARE SPECIFIED, SEEDING MUST TAKE PLACE NO LATER THAT SEPTEMBER 1; THE TYPE AND PERCENTAGES OF SEED IN THE MIX MUST BE IDENTIFIED ON THE PLANS.
27. ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE DISCHARGED OVER AN UNDISTURBED, PREFERABLY VEGETATED AREA, AND THROUGH A SEDIMENT CONTROL BMP I.E. (FILTER BAG).
28. ALL EXPOSED SOILS MUST BE COVERED DURING THE WET WEATHER PERIOD, OCTOBER 01 - MAY 31.
29. IF WATER OF THE STATE IS WITHIN THE PROJECT SITE OR WITHIN 50 FEET OF THE PROJECT BOUNDARY, MAINTAIN THE EXISTING NATURAL BUFFER WITHIN THE 50-FOOT ZONE FOR THE DURATION OF THE PERMIT COVERAGE, OR MAINTAIN LESS THAN THE ENTIRE EXISTING NATURAL BUFFER AND PROVIDE ADDITIONAL EROSION AND SEDIMENT CONTROL BMPS.

INSPECTION FREQUENCY

SITE CONDITION	MINIMUM FREQUENCY
1. ACTIVE PERIOD	WEEKLY WHEN STORMWATER RUNOFF, INCLUDING RUNOFF FROM SNOW MELT, IS OCCURRING. AT LEAST ONCE EVERY MONTH, REGARDLESS OF WHETHER STORMWATER RUNOFF IS OCCURRING.
2. PRIOR TO THE SITE BECOMING INACTIVE OR IN ANTICIPATION OF SITE INACCESSIBILITY.	ONCE TO ENSURE THAT EROSION AND SEDIMENT CONTROL MEASURES ARE IN WORKING ORDER. ANY NECESSARY MAINTENANCE AND REPAIR MUST BE MADE PRIOR TO LEAVING THE SITE.
3. INACTIVE PERIODS GREATER THAN 14 CONSECUTIVE CALENDAR DAYS.	ONCE EVERY MONTH.
4. PERIODS DURING WHICH THE SITE IS INACCESSIBLE DUE TO INCLEMENT WEATHER.	IF PRACTICAL, INSPECTIONS MUST OCCUR DAILY AT A RELEVANT AND ACCESSIBLE DISCHARGE POINT OR DOWNSTREAM LOCATION.
5. PERIODS DURING WHICH DISCHARGE IS UNLIKELY DUE TO FROZEN CONDITIONS	MONTHLY. RESUME MONITORING IMMEDIATELY UPON MELT, OR WHEN WEATHER CONDITIONS MAKE DISCHARGES LIKELY.

* HOLD A PRE-CONSTRUCTION MEETING OF PROJECT CONSTRUCTION PERSONNEL THAT INCLUDES THE INSPECTOR TO DISCUSS EROSION AND SEDIMENT CONTROL MEASURES AND CONSTRUCTION LIMITS.
* ALL INSPECTIONS MUST BE MADE IN ACCORDANCE WITH DEQ 1200-CN PERMIT REQUIREMENTS.
* INSPECTION LOGS MUST BE KEPT IN ACCORDANCE WITH DEQ'S 1200-CN PERMIT REQUIREMENTS.
* RETAIN A COPY OF THE ESCP AND ALL REVISIONS ON SITE AND MAKE IT AVAILABLE ON REQUEST TO DEQ, AGENT, OR THE LOCAL MUNICIPALITY. DURING INACTIVE PERIODS OF GREATER THAN SEVEN CONSECUTIVE CALENDAR DAYS, RETAIN THE ESCP AT THE CONSTRUCTION SITE OR AT ANOTHER LOCATION.

NARRATIVE DESCRIPTIONS

EXISTING SITE CONDITIONS
TWO RESIDENTIAL BUILDINGS, WITH OPEN AREAS AND VEGETATION.

DEVELOPED CONDITIONS
WESTERN PORTION OF SITE TO BE PROPOSED SINGLE BUILDING WITH ASSOCIATED PAVED PARKING, LANDSCAPING & UTILITIES. EASTERN PORTION OF SITE TO REMAIN.

NATURE OF CONSTRUCTION ACTIVITY AND ESTIMATED TIME TABLE
* MASS GRADING: AUGUST 2018
* TEMP. STABILIZATION: SEPTEMBER 2018
* FINAL STABILIZATION: JULY 2019

TOTAL SITE AREA = 229,881 SF = 5.28 ACRES

TOTAL DISTURBED AREA = 163,304 SF = 3.75 ACRES

SITE SOIL CLASSIFICATION
21B HILLSBORO SILT LOAM (3%-7% SLOPES)

ON-SITE SOILS HAVE A MODERATE EROSION POTENTIAL. FILL MATERIAL SHALL BE GENERATED ON-SITE FROM GRADING EXCAVATION, UTILITY TRENCH SPOILS AND FROM AN APPROVED OFF-SITE APPROVED LOCATION TO BE DETERMINED BY THE GENERAL CONTRACTOR.

RECEIVING WATER BODIES
RUNOFF FROM THE BUILDING IS CONVEYED TO A VEGETATED TREATMENT SWALE WEST OF THE BUILDING. RUNOFF FROM THE PAVED AREAS EAST AND SOUTH OF THE BUILDING IS CONVEYED TO A CONTECH STORMWATER MANAGEMENT CARTRIDGE MANHOLE EAST OF THE BUILDING. RUNOFF FROM THE PAVED AREA NORTHEAST OF THE BUILDING IS CONVEYED TO A CONTECH STORMWATER MANAGEMENT CARTRIDGE CATCH BASIN ADJACENT TO THE NORTH SITE ACCESS. FROM THESE LOCATIONS, RUNOFF IS CONVEYED TO A DETENTION POND LOCATED ALONG THE NORTH SITE BOUNDARY. DISCHARGE FROM THE POND IS CONTROLLED BY A SERIES OF ORIFI IN A CONTROL MANHOLE. DISCHARGE IS ROUTED TO THE EXISTING PUBLIC STORM DRAINAGE SYSTEM IN MYSLONY STREET ADJACENT TO THE SITE'S NORTH BOUNDARY. THE PUBLIC STORM SYSTEM ROUTES FLOW WEST THEN NORTH IN SW 124TH AVE, DISCHARGING INTO THE HEDGES CREEK WATERWAY SYSTEM WEST OF THE SITE, WHICH ULTIMATELY DRAINS TO THE TUALATIN RIVER, WILLAMETTE RIVER, COLUMBIA RIVER, AND PACIFIC OCEAN.

THE PERMITTEE IS REQUIRED TO MEET ALL THE CONDITIONS OF THE 1200-CN PERMIT. THIS ESCP AND GENERAL CONDITIONS HAVE BEEN DEVELOPED TO FACILITATE COMPLIANCE WITH THE 1200-CN PERMIT REQUIREMENTS. IN CASES OF DISCREPANCIES OR OMISSIONS, THE 1200-CN PERMIT REQUIREMENTS SUPERCEDE REQUIREMENTS OF THIS PLAN.

PERMITTEE'S SITE INSPECTOR

PERLO CONSTRUCTION
CONTACT: TIM KOPSTAD
16101 SW 72ND AVE, SUITE 200
TIGARD, OR 97224
PHONE: 503 624 2080
EMAIL: tkopstad@perlo.biz

QUALIFICATION PROGRAM AND NUMBER:
ECO-3-5111804

DESCRIPTION OF EXPERIENCE:
RECEIVED TRAINING IN CERTIFIED EROSION & SEDIMENT CONTROL LEAD.

BMP MATRIX FOR CONSTRUCTION PHASES

REFER TO DEQ GUIDANCE MANUAL FOR A COMPREHENSIVE LIST OF AVAILABLE BMPs.

	CLEARING	MASS GRADING	UTILITY INSTALLATION	STREET CONSTRUCTION	FINAL STABILIZATION	WET WEATHER (OCT. 1 TO MAY 31)
EROSION PREVENTION						
PRESERVE NATURAL VEGETATION	*	X	X		X	X
GROUND COVER					X	X
HYDRAULIC APPLICATIONS					X	
PLASTIC SHEETING						X
MATTING					X	X
DUST CONTROL	X	X	X		X	X
TEMPORARY/PERMANENT SEEDING		X	X		X	X
BUFFER ZONE						
SEDIMENT CONTROL						
SEDIMENT FENCE PERIMETER	*	X	X		X	X
SEDIMENT FENCE INTERNAL						
STRAW WATTLES						
FILTER BERM						
INLET PROTECTION	*	X	X		X	X
BENCHING						
SEDIMENT TRAP						
NATURAL BUFFER ENCROACHMENT						
RUN OFF CONTROL						
CONSTRUCTION ENTRANCE	*	X	X			X
PIPE SLOPE DRAIN						
OUTLET PROTECTION	X	X	X		X	
SURFACE ROUGHENING						
CHECK DAMS						
POLLUTION PREVENTION						
PROPER SIGNAGE	X	X	X		X	X
WET WEATHER MEASURES	X	X	X		X	X
SPILL KIT ON-SITE	X	X	X		X	X
CONCRETE WASHOUT AREA	X	X	X		X	X
OTHER						

* ADDITIONAL BMP'S REQUIRED FOR WORK WITHIN 50' OF WATER OF THE STATE.
** BMP THAT WILL BE INSTALLED PRIOR TO ANY GROUND DISTURBING ACTIVITY.

SHEET INDEX

AUGUST 2018 - PERMIT SUBMITTAL

TMR T.M. RIPPEY CONSULTING ENGINEERS
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Phone: (503) 443-3900
Fax: (503) 443-3700

REGISTERED PROFESSIONAL ENGINEER 15504 OREGON JULY 25, 1997 KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

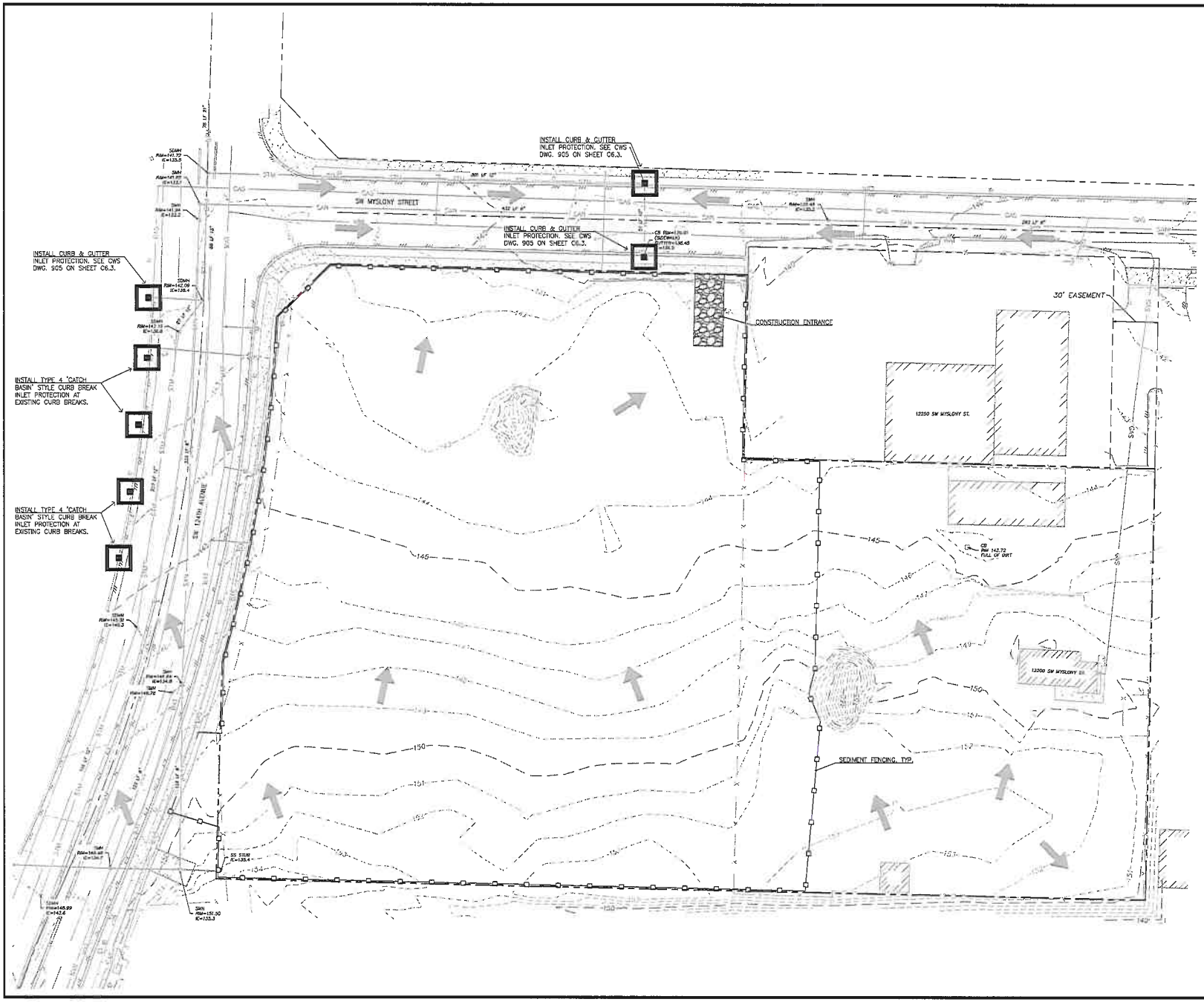
EROSION & SEDIMENT CONTROL COVER SHEET

REVISIONS:

DATE: AUGUST 3, 2018
FILE NAME: TMR1820E.DWG, CIVIL
DRAWN BY: AS
CHK'D BY: KRK

SHEET
C6

PROJECT No.
18206



LEGEND

- PROJECT BOUNDARY
- PROPERTY LINE
- EDGE OF PAVEMENT
- 1' CONTOUR
- 5' CONTOUR
- STORM SEWER LINE
- WATER LINE
- SANITARY SEWER LINE
- GAS LINE
- OVERHEAD UTILITY WIRE
- EXISTING FEATURE OR CONDITION
- EROSION CONTROL FENCE SEE DETAIL ON SHEET C6.3
- EXISTING SURFACE DRAINAGE FLOW DIRECTION
- INLET PROTECTION SEE DETAILS ON SHEET C6.3 & C6.4
- CONSTRUCTION ENTRANCE SEE DETAIL ON SHEET C6.3

PRE-CONSTRUCTION, CLEARING & DEMOLITION NOTES

1. ALL BASE ESC MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, GRAVEL CONSTRUCTION ENTRANCES, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. SEDIMENT BARRIERS APPROVED FOR USE INCLUDE SEDIMENT FENCE, BERMS CONSTRUCTED OUT OF MULCH, CHIPPINGS, OR OTHER SUITABLE MATERIAL, STRAW WATTLES, OR OTHER APPROVED MATERIALS.
3. SENSITIVE RESOURCES INCLUDING, BUT NOT LIMITED TO, TREES, WETLANDS, AND RIPARIAN PROTECTION AREAS SHALL BE CLEARLY DELINEATED WITH ORANGE CONSTRUCTION FENCING OR CHAIN LINK FENCING IN A MANNER THAT IS CLEARLY VISIBLE TO ANYONE IN THE AREA. NO ACTIVITIES ARE PERMITTED TO OCCUR BEYOND THE CONSTRUCTION BARRIER.
4. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES INCLUDING, BUT NOT LIMITED TO, STREET SWEEPING, AND VACUUMING, MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
5. RUN-ON AND RUN-OFF CONTROLS SHALL BE IN PLACE AND FUNCTIONING PRIOR TO BEGINNING SUBSTANTIAL CONSTRUCTION ACTIVITIES. RUN-ON AND RUN-OFF CONTROL MEASURES INCLUDE: SLOPE DRAINS (WITH OUTLET PROTECTION), CHECK DAMS, SURFACE ROUGHENING, AND BANK STABILIZATION.

SCALE: 1" = 60'

0 30 60 120

AUGUST 2018 - PERMIT SUBMITTAL

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REGISTERED PROFESSIONAL ENGINEER
15004
OREGON
JULY 25, 1997
KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

CLEARING, DEMOLITION & MASS GRADING EROSION & SEDIMENT CONTROL PLAN

REVISIONS:

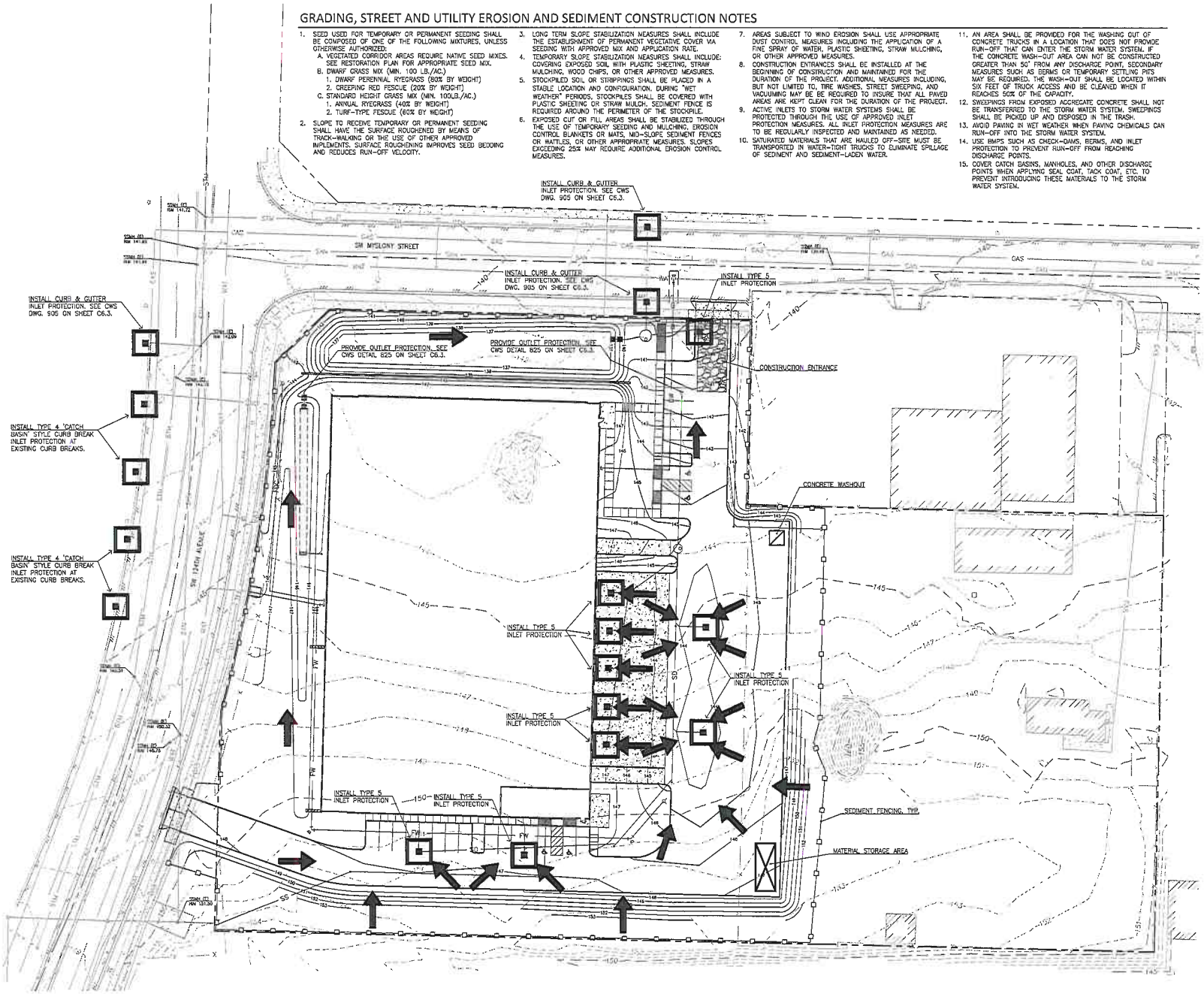
DATE: AUGUST 3, 2018
FILE NAME: TMR18206 CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET
C6.1

PROJECT No.
18206

GRADING, STREET AND UTILITY EROSION AND SEDIMENT CONSTRUCTION NOTES

1. SEED USED FOR TEMPORARY OR PERMANENT SEEDING SHALL BE COMPOSED OF ONE OF THE FOLLOWING MIXTURES, UNLESS OTHERWISE AUTHORIZED:
   A. VEGETATED CORRIDOR AREAS REQUIRE NATIVE SEED MIXES. SEE RESTORATION PLAN FOR APPROPRIATE SEED MIX.
   B. DWARF GRASS MIX (MIN. 100 LB./AC.)
      1. DWARF PERENNIAL RYEGRASS (80% BY WEIGHT)
      2. CREEPING RED FESCUE (20% BY WEIGHT)
   C. STANDARD HEIGHT GRASS MIX (MIN. 100LB./AC.)
      1. ANNUAL RYEGRASS (40% BY WEIGHT)
      2. TURF-TYPE FESCUE (60% BY WEIGHT)
2. SLOPE TO RECEIVE TEMPORARY OR PERMANENT SEEDING SHALL HAVE THE SURFACE ROUGHENED BY MEANS OF TRACK-WALKING OR THE USE OF OTHER APPROVED IMPLEMENTS. SURFACE ROUGHENING IMPROVES SEED BEDDING AND REDUCES RUN-OFF VELOCITY.
3. LONG TERM SLOPE STABILIZATION MEASURES SHALL INCLUDE THE ESTABLISHMENT OF PERMANENT VEGETATIVE COVER VIA SEEDING WITH APPROVED MIX AND APPLICATION RATE.
4. TEMPORARY SLOPE STABILIZATION MEASURES SHALL INCLUDE: COVERING EXPOSED SOIL WITH PLASTIC SHEETING, STRAW MULCHING, WOOD CHIPS, OR OTHER APPROVED MEASURES.
5. STOCKPILED SOIL OR STRIPPINGS SHALL BE PLACED IN A STABLE LOCATION AND CONFIGURATION. DURING "WET WEATHER" PERIODS, STOCKPILES SHALL BE COVERED WITH PLASTIC SHEETING OR STRAW MULCH. SEDIMENT FENCE IS REQUIRED AROUND THE PERIMETER OF THE STOCKPILE.
6. EXPOSED CUT OR FILL AREAS SHALL BE STABILIZED THROUGH THE USE OF TEMPORARY SEEDING AND MULCHING, EROSION CONTROL BLANKETS OR MATS, MID-SLOPE SEDIMENT FENCES OR WATTLES, OR OTHER APPROPRIATE MEASURES. SLOPES EXCEEDING 25% MAY REQUIRE ADDITIONAL EROSION CONTROL MEASURES.
7. AREAS SUBJECT TO WIND EROSION SHALL USE APPROPRIATE DUST CONTROL MEASURES INCLUDING THE APPLICATION OF A FINE SPRAY OF WATER, PLASTIC SHEETING, STRAW MULCHING, OR OTHER APPROVED MEASURES.
8. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES INCLUDING, BUT NOT LIMITED TO, TIRE WASHES, STREET SWEEPING, AND VACUUMING MAY BE BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
9. ACTIVE INLETS TO STORM WATER SYSTEMS SHALL BE PROTECTED THROUGH THE USE OF APPROVED INLET PROTECTION MEASURES. ALL INLET PROTECTION MEASURES ARE TO BE REGULARLY INSPECTED AND MAINTAINED AS NEEDED.
10. SATURATED MATERIALS THAT ARE HAULED OFF-SITE MUST BE TRANSPORTED IN WATER-TIGHT TRUCKS TO ELIMINATE SPILLAGE OF SEDIMENT AND SEDIMENT-LADEN WATER.
11. AN AREA SHALL BE PROVIDED FOR THE WASHING OUT OF CONCRETE TRUCKS IN A LOCATION THAT DOES NOT PROVIDE RUN-OFF THAT CAN ENTER THE STORM WATER SYSTEM. IF THE CONCRETE WASH-OUT AREA CAN NOT BE CONSTRUCTED GREATER THAN 50' FROM ANY DISCHARGE POINT, SECONDARY MEASURES SUCH AS BERMS OR TEMPORARY SETTLING PITS MAY BE REQUIRED. THE WASH-OUT SHALL BE LOCATED WITHIN SIX FEET OF TRUCK ACCESS AND BE CLEANED WHEN IT REACHES 50% OF THE CAPACITY.
12. SWEEPINGS FROM EXPOSED AGGREGATE CONCRETE SHALL NOT BE TRANSFERRED TO THE STORM WATER SYSTEM. SWEEPINGS SHALL BE PICKED UP AND DISPOSED IN THE TRASH.
13. AVOID PAVING IN WET WEATHER WHEN PAVING CHEMICALS CAN RUN-OFF INTO THE STORM WATER SYSTEM.
14. USE BMPS SUCH AS CHECK-DAMS, BERMS, AND INLET PROTECTION TO PREVENT RUN-OFF FROM REACHING DISCHARGE POINTS.
15. COVER CATCH BASINS, MANHOLES, AND OTHER DISCHARGE POINTS WHEN APPLYING SEAL COAT, TACK COAT, ETC. TO PREVENT INTRODUCING THESE MATERIALS TO THE STORM WATER SYSTEM.



LEGEND

- PROJECT BOUNDARY
- PROPERTY LINE
- EDGE OF PAVEMENT
- 1' CONTOUR
- 5' CONTOUR
- STORM SEWER LINE (SD)
- WATER LINE (W)
- SANITARY SEWER LINE (SS)
- EXISTING FEATURE OR CONDITION (E)
- EROSION CONTROL FENCE — SEE DETAIL ON SHEET C5.3
- PROPOSED SURFACE DRAINAGE FLOW DIRECTION
- INLET PROTECTION — SEE DETAILS ON SHEET C5.3 & C5.4
- CONSTRUCTION ENTRANCE — SEE DETAIL ON SHEET C5.3
- CONCRETE WASHOUT — SEE DETAIL ON SHEET C5.3
- MATERIAL STORAGE AREA

EROSION AND SEDIMENT CONTROL BMP IMPLEMENTATION

1. ALL BASE ESC MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, GRAVEL CONSTRUCTION ENTRANCES, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. ALL 'SEDIMENT BARRIERS (TO BE INSTALLED AFTER GRADING)' SHALL BE INSTALLED IMMEDIATELY FOLLOWING ESTABLISHMENT OF FINISHED GRADE AS SHOWN ON THESE PLANS.
3. LONG TERM SLOPE STABILIZATION MEASURES 'INCLUDING MATTING' SHALL BE IN PLACE OVER ALL EXPOSED SOILS BY OCTOBER 1.
4. THE STORM WATER FACILITY SHALL BE CONSTRUCTED AND LANDSCAPED PRIOR TO THE STORM WATER SYSTEM FUNCTIONING AND SITE PAVING.
5. INLET PROTECTION SHALL BE IN-PLACE IMMEDIATELY FOLLOWING PAVING ACTIVITIES.

TEMPORARY STABILIZATION

FOLLOWING MASS GRADING A MINIMUM OF 6" OF 1"-0" CRUSHED AGGREGATE WILL BE PLACED AT THE BUILDING PAD AND PAVED AREAS. OTHER DISTURBED AREAS WILL BE SEEDED WITH A MIX AS IDENTIFIED IN CONSTRUCTION NOTE 1 ON THIS SHEET. THIS WILL REMAIN IN PLACE UNTIL BUILDING AND SITE UTILITIES PERMITS ARE ISSUED FOR THE PROJECT. FINAL STABILIZATION OF NON-PAVED AREAS WILL INCLUDE THE ADDITION OF LANDSCAPE PLANTINGS AS REQUIRED BY THE CITY OF TUALATIN DEVELOPMENT CODE.

SCALE: 1" = 60'

AUGUST 2018 - PERMIT SUBMITTAL

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REGISTERED PROFESSIONAL ENGINEER 13584 OREGON JULY 29, 1981 KARL KOROCH
EXPIRES: 6/30/19

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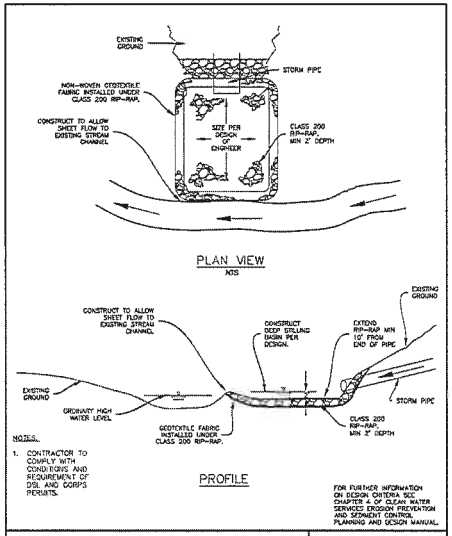
GRADING & UTILITY CONSTRUCTION EROSION & SEDIMENT CONTROL PLAN

REVISIONS:

DATE: AUGUST 3, 2018
FILE NAME: TMR18206 CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET
C6.2

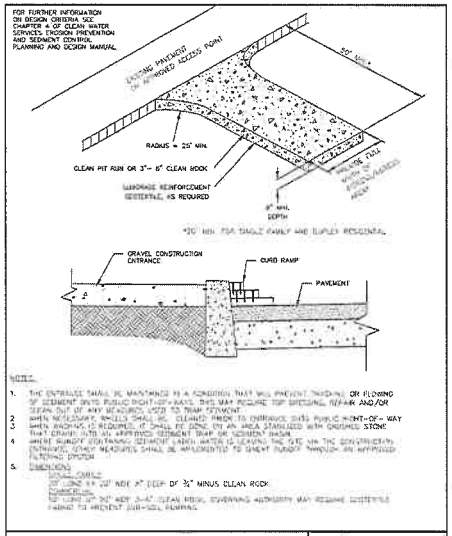
PROJECT No.
18206



OUTLET PROTECTION
STILLING BASIN

DRAWING NO. 825 REVISED 12-16

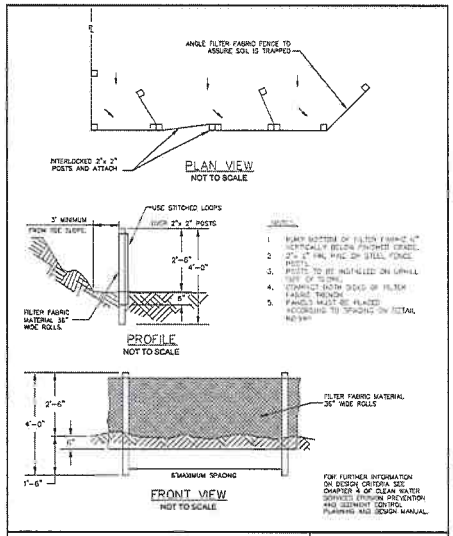
CleanWater Services



CONSTRUCTION ENTRANCE

DRAWING NO. 855 REVISED 12-16

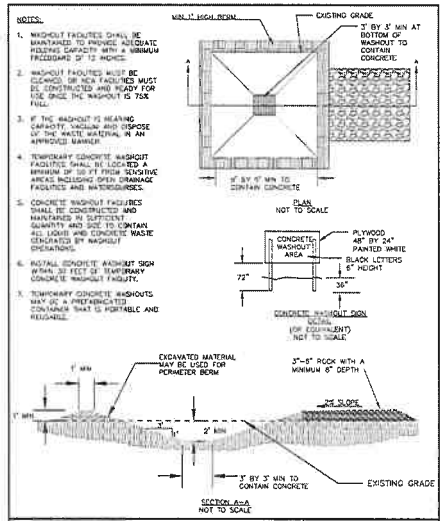
CleanWater Services



SEDIMENT FENCE

DRAWING NO. 870 REVISED 12-16

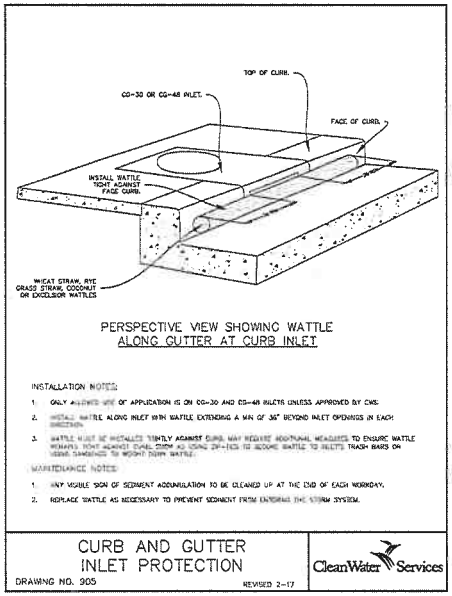
CleanWater Services



CONCRETE WASHOUT

DRAWING NO. 1000 REVISED 12-16

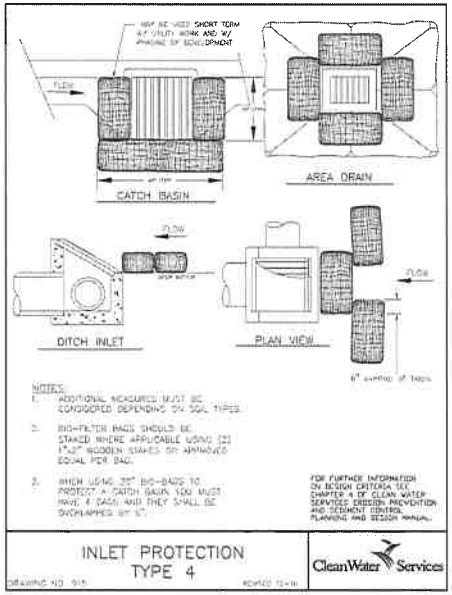
CleanWater Services



CURB AND GUTTER
INLET PROTECTION

DRAWING NO. 905 REVISED 2-17

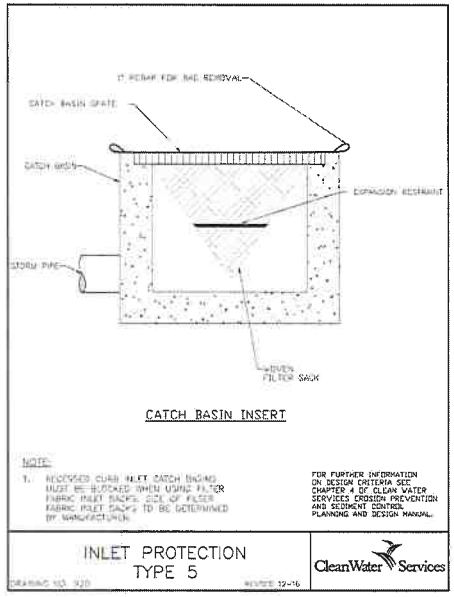
CleanWater Services



INLET PROTECTION
TYPE 4

DRAWING NO. 915 REVISED 12-16

CleanWater Services



INLET PROTECTION
TYPE 5

DRAWING NO. 920 REVISED 12-16

CleanWater Services

AUGUST 2018 - PERMIT SUBMITTAL

TMR
T.M. RIPPEY
CONSULTING ENGINEERS
7650 SW Beveland, Suite 100
Tigard, Oregon 97223
Phone: (503) 941-9290
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REGISTERED PROFESSIONAL ENGINEER
15504
OREGON
JULY 25, 1981
KARL KOROCH
EXPIRES: 6/30/19

FOUR S CORP.
WAREHOUSE BUILDING
12200 MYSLONY STREET
TUALATIN, OR 97062

EROSION & SEDIMENT CONTROL DETAILS

REVISIONS:

DATE: AUGUST 3, 2018
FILE NAME: TMR18206_CIVIL
DRAWN BY: AS
CHK'D BY: KJK

SHEET
C6.3

PROJECT No.
18206

Appendix 3

Operation and Maintenance

Stormwater Facility Maintenance and Operation Plan

Four S Properties Building

August 2018

Project Owner:	Four S Properties
Facility Address:	SW Myslony Street Tualatin, Oregon
Jurisdiction:	City of Tualatin
Case Files:	
Civil Engineer:	TM Rippey Consulting Engineers Karl Koroch, PE 7650 SW Beveland Street Suite 100 Tigard, Oregon 97223

Responsibility:
The storm drainage facilities will be maintained by the owner's maintenance staff.

Description:
This site is approximately 5.26 acres of building, paving, and landscape. Storm runoff is directed to a surface pond to provide detention for runoff flow control. Outflow is limited by a control manhole. Runoff treatment for the paving is provided by a treatment catch basin and a treatment manhole, each containing a series of cartridges. Runoff treatment for the building roof is provided by a vegetated swale west of the building. The site facilities discharge to a public conveyance system located at the along the site frontage at Myslony Street.

Inspection and Maintenance Schedule:
The system shall be inspected and maintained monthly and within 48 hours after each major storm event. For this O & M plan, a major storm event is defined as greater than 0.5 inches of rainfall in 24 hours. All components of storm system must be maintained frequently or they will cease to function effectively. The owner shall keep a log, recording inspection dates, observations, and maintenance activities. Receipts shall be saved when maintenance is performed and there is a record of expense.

Inspection and Maintenance Schedule:
The following items shall be inspected and maintained as stated:

Detention System:
- Check condition of pond biannually.
- Sediment shall be removed from pond bottom pipes biannually.
- Quarterly inspection for clogging shall be performed.

Flow Control Structure and Piping:
- Check condition of control structure and internal components annually.
- Sediment shall be removed from around overflow riser and from pipes biannually.
- Quarterly inspection for clogging shall be performed.

Contech Treatment System:
- Check condition of structure, internal components, and piping biannually. Contact Contech, Inc. for inspection and maintenance of treatment cartridges.
- Sediment shall be removed from inlet sump biannually.
- Quarterly inspection for clogging shall be performed.

Vegetated Swale:
- Check condition of outlet structure, internal components, and piping biannually.
- Sediment shall be removed from inlet sump biannually.
- Maintain plantings as required by Clean Water Services.
- Quarterly inspection for clogging shall be performed.

Source Control:
Source control measures prevent pollutants form mixing with stormwater. Typical non-structural control measures include raking and removing leaves and limited and controlled application of pesticides, herbicides, and fertilizers.

Spill Prevention:
Spill prevention measures shall be exercised when handling substances that can contaminate stormwater. Virtually all sites present dangers from spills. If hazardous substances are spilled within the vicinity of the stormwater facilities, identify the spill and provide appropriate cleanup and notify appropriate authorities.

Insects and Rodents:
- Insects and rodents shall not be harbored in any part of the storm system.
- Pest control measures shall be taken when insects or rodents are found to be present. Standing water and food sources shall be prevented.

- If sprays are considered, a mosquito larvicide such as Bacillus thurendensis or Altoside formulations can be applied only if absolutely necessary and shall not be used where it will enter the groundwater or come into contact with any standing water. Sprays shall be applied only by licensed individuals or contractors.
- Holes in the ground located in and around the storm system shall be filled.
- Outfalls draining into vegetated swales shall be inspected and cleaned regularly to ensure no rodent activity, which can clog or decrease the efficiency of the storm system.

Access:
Access shall be maintained for all facilities so operation and maintenance can be performed as regularly scheduled.

REPUBLIC SERVICES

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

October 26, 2018

Skip D.F. Stanaway AIA
A & I Distributors-Portland

Re: Four S Warehouse Facility
12200 SW Myslony St.
Tualatin, OR 97062

Dear Skip,

Thank you, for sending us the final site plans for this proposed renovation in Tualatin.

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

The design location of the enclosure sent 10/25/2018 repositioned to the East to allow for greater separation between enclosure and any obstacles to the West will allow access for our trucks.

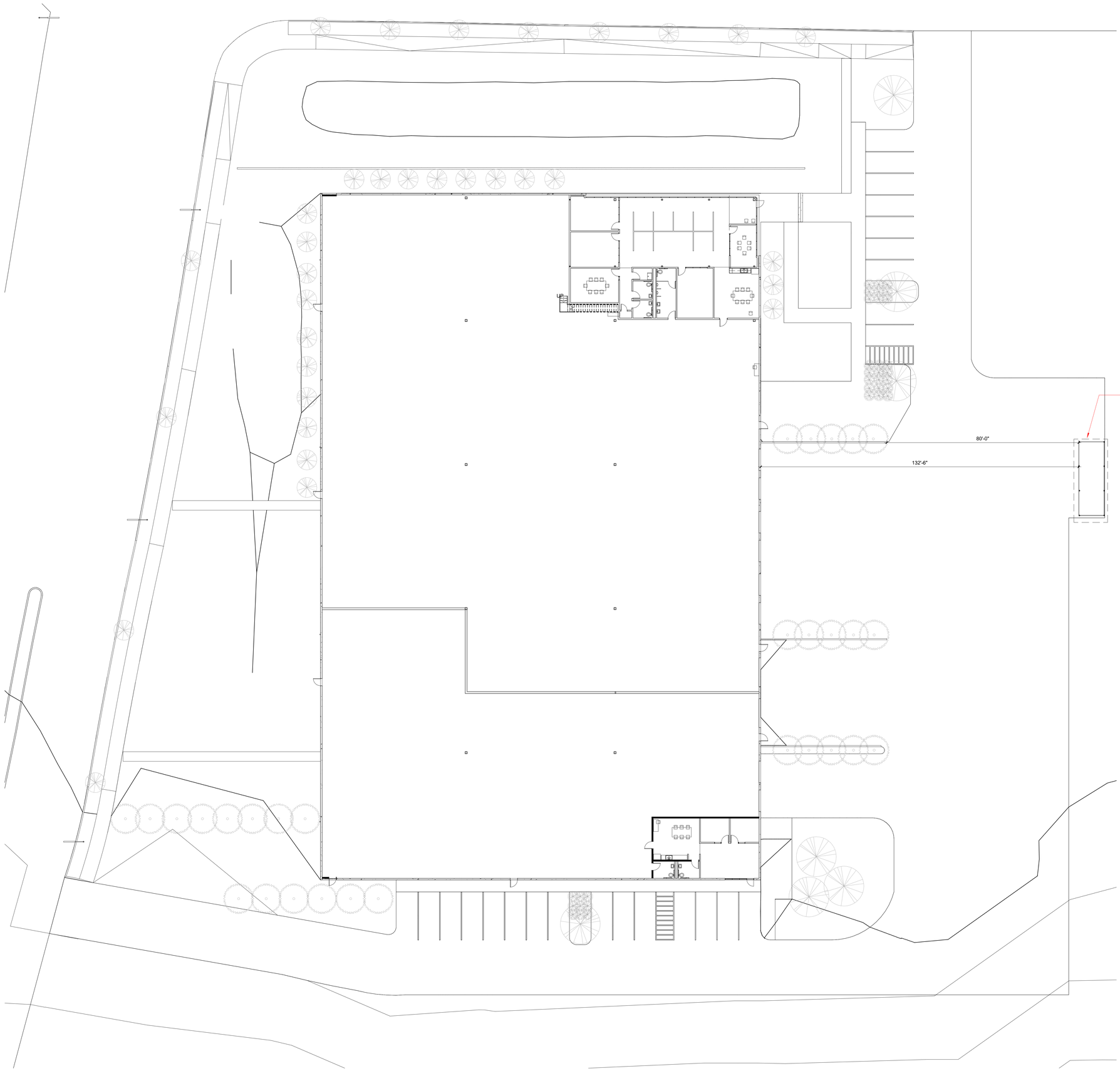
The enclosure design dimensions sent 10/23/2018 which includes 10' wide post to post ID and 10' depth, and gate swing radius are adequate for our trucks to service containers.

As we discussed, a backstop positioned at the rear of each enclosure to protect the back wall should be installed.

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

Sincerely,

Kelly Herrod
Operations Supervisor
Republic Services Inc.



1 LEVEL 1 - Site Copy 1
A1 1/16" = 1'-0"

10/25/2018 2:37:51 PM

SRG

SRG PARTNERSHIP, INC

621 SW COLUMBIA STREET
PORTLAND, OR 97205

SRGPARTNERSHIP.COM

FOUR-S CORP.
WAREHOUSE FACILITY
12200 SW MYSLONY ST

Progress Set

Drawing Title
Unnamed

Drawing scales indicated apply to 30" x 42" drawing sheets. Scale may not be accurate if drawing plots are less than this size.

Revisions

Number	Description	Date

Drawn by
Author

Checked by
Checker

Date
Issue Date

Project No
218021

Consultant Project No

Owner Project No

Drawing No
A1