STORMWATER ANALYSIS REPORT FOR:

WILHOOF, LLC
WILCO FARMERS
WILCO FARM STORE
P.O. Box 258
Mt Angel, OR 97362

PROJECT SITE
TAXMAP 17-04-33-30, LOT: 00200

Permit #_____

Prepared by

SSW ENGINEERS INC
CIVIL • STRUCTURAL • BUILDING DESIGN
SURVEYING • LAND USE PLANNING

2350 Oakmont Way, Suite 105
Eugene OR 97401
(541) 485-8383
Contact: Michael A Cox. PE

REGISTERED PROFESSIONAL ENGINEER
77009
OREGON
June 1, 2011
MICHAEL ALAN COX
RENEWS: 12/31/23

Based on the City of Eugene
Stormwater Management Manual 2014

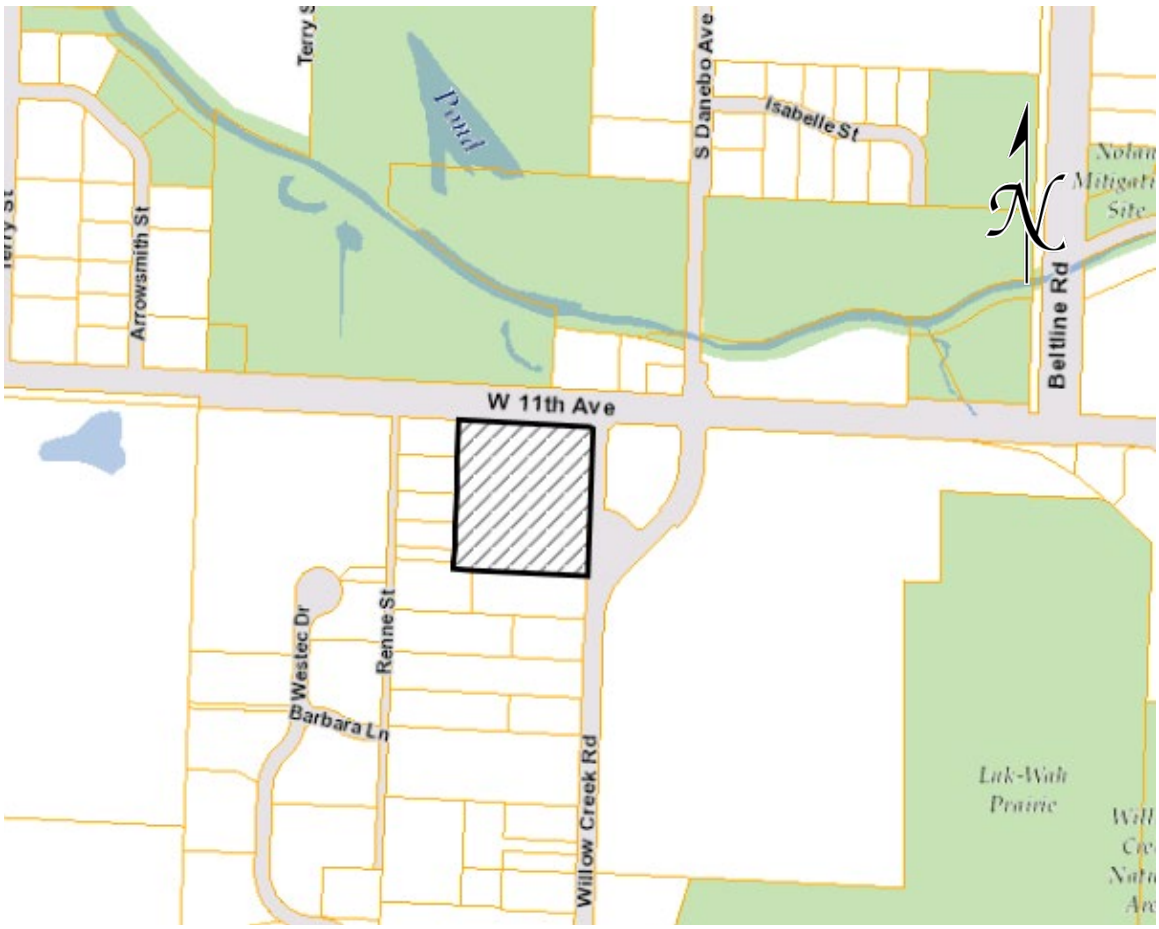
Contents

Project Overview

Location: 4818 W. 11th Ave Eugene, OR 97402

Map and Taxlot: 17-04-33-30-00200

Vicinity Map:



Development:
This project involves the construction of a new commercial building for a farm and garden store. Utility work includes the construction of electrical, gas, telephone, fire suppression water, domestic water, wastewater, and stormwater lines. Work outside the building footprint will include asphalt parking configuration, asphalt paving, concrete walkways, landscaping, stormwater quality rain gardens and planters, and subsurface stormwater detention.

The project site lies within the Lower Amazon Subbasin of the Amazon Basin Study Area per the Stormwater Basin Master Plan, dated August 2002. Drainage leaving the basin via Amazon Creek across W. 11th Avenue heading northwest to the Fern Ridge Reservoir. Portions of the site are in the 100 year flood zone and portions are in wetlands.

Permits required for the project include local building, electrical, mechanical, 1200-CN erosion control permits, and is covered under the City of Eugene MS4 NPDES permit for stormwater discharge.

Methodology

The entire site consists of soil of hydrologic group D with relatively shallow groundwater tables (see Appendix C Geotechnical Investigation & Appendix D Soil Map). Infiltration is not feasible, so filtering methods of stormwater treatment are proposed for all Basins. The existing site is a grassy, vegetated, direct-drainage lot adjacent stormwater ditches parallel to W. 11th Ave. exiting to Amazon Creek. An open-ditch stormwater system is the nearest outfall location, and in lieu of determining ultimate capacity, detention is proposed to the pre-development flows.

Stormwater BMP – Filtration Water Quality Rain Garden and Stormwater Planters (all basins)

Stormwater pollution reduction for water quality will be achieved though filtration rain gardens for all basins. Based on the City of Eugene Stormwater Management Manual (SWMM) presumptive model, the rain gardens will have a minimum depth of 6 inches, plus another 2 inches of freeboard. All pavement runoff will sheet flow to the respective basin's rain garden through City Standard notched planter curbs. At inlet locations from roof runoff, energy dissipate will be created by round rock. 8-inch vertical overflow pipes with grates for protection from debris flow into perforated underdrains, which collect treated or overflow stormwater before exiting the facilities. Each proposed planter was sized using the Santa Barbara Unit Hydrograph (SBUH) method for the 1.4 inch 24-hour pollution reduction storm. Stormwater plantings will be design-build based on the zones and approved vegetation list provided in the SWMM. Potential pollutants include suspended solids, oils, fertilizers, pesticides, pollen and sediments, and vehicle fluids.

Stormwater BMP – StormTech™ Chamber Detention

A StormTech™ Chamber facility is proposed to receive both post-treated and bypass overflow from all filtration rain gardens. The approximately 3,226 sq. ft. plan area of the chambers will allow for up to 10,748 cu. ft. of detention storage. The system has its own method of pretreatment from sediments and debris using the proprietary Isolator Row before stormwater conveys to other chambers of the system. The system will utilize a flow-control exit structure with overflow to a stormwater pump station for exiting to the nearest public stormwater manhole. The pre-existing conditions 10-year 24 hour storm event is the basis for the flow-restricting orifice.

Site Soil Classifications

The entirety of the soil at the project site is soil of hydraulic class D with hydric soil rating. Geotechnical testing in that location showed deep or no groundwater seepage into boring test pits. The soil of the site is of type:

85 – Natroy silty clay loam D

(See Appendix D: Web Soil Survey Map, USDA NRCS Web Soil Survey, and accessed 5/17/2019)

Analysis

Design Storms:

Water Quality = 1.40 in./24hr
Conveyance = 2.10 in/hr (10 yr, 10 min)

2Y-24Hour Storm=	3.12 in
5Y-24Hour Storm=	3.60 in
10Y-24Hour Storm=	4.46 in
25Y-24Hour Storm=	5.18 in

Computation Methods:

Rational Method — Storm Pipe Conveyance

Santa Barbara Unit Hydrograph (SBUH) — Rain Gardens
Detention Volume

Software Used:

Excel
AutoDesk Civil 3D

Curve Number & Design Coefficients:

CN = 100 Rain Garden Surface
CN = 98 Impervious Paving/Roof
CN = 78 Existing Meadow

Design Calculations:

Stormwater Pollution Reduction Design:

BASIN	Eugene SWMM	50% 2-year 24Hour
ALL	1.40 IN/24HR	0.15 In/hr - (not used)

See Appendix B: Stormwater Design Calculations

Stormwater Conveyance Capacity:

Rational Method: Flow Q=C*i*A

C	(roughness coeff.)
i	(inches/hr)
A	(acres)
Tc	Time of Concentration (Minutes)

Stormwater Detention

BASIN	Storm	Tc	CN	Acres	Q (cfs)	Q Restricted	Detention Required
ALL	2 year	10	98	3.83	2.81	0.85	10,398
ALL	10-year	10	98	3.83	4.08	0.85	10,712
ALL	25 year	10	98	3.83	4.71	0.85	9,833

Flow Control

The site does not lie within a Headwater Stream and is below the 500 feet elevation. No flow control is required in the train. Detention is implemented in lieu of a public system capacity analysis.

Conveyance

Conveyance of runoff is based on a minimum of 3 feet per second flow under design storm conditions and minimum pipe slope of 0.3 percent.

Engineering Conclusions

Stormwater design and plans conform to the City of Eugene Code sections 9.6790 through 9.6796 and the 2014 Eugene Stormwater Management Manual. Stormwater from all proposed Basins will be treated in water quality rain gardens and stormwater planters, and detained as required underground Stormtech Chamber vaults. An effluent pump station conveys stormwater up to the 10-year 24 hour design storm to the public system. Beyond the 10-year 24 hour design storm event, gravity storm pipes outfall to the same nearest public storm manhole on West 11th Avenue.

Stormwater facilities constructed must be properly operated and maintained for the life of the facility.

Stormwater Plans:

See Appendix A: Project Plans

SSW ENGINEERS INC
CIVIL • STRUCTURAL • BUILDING DESIGN
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2350 Oakmont Way, Suite 105 Eugene, OR 97401
(541) 485-8383 Fax (541) 485-8384

WILHOOF, LLC	SHEET NO.	Cover
17043330-00200	PROJECT NO.	**22-8018**
Eugene, Oregon	BY	**MAC**
Stormwater Design	DATE	**2/27/23**

STORMWATER DESIGN

Design is governed by: City of Eugene Stormwater Management Manual - 2014

Pre-Development: The site is currently a vacant, undeveloped I-2 lot with access from Willow Creek Road.

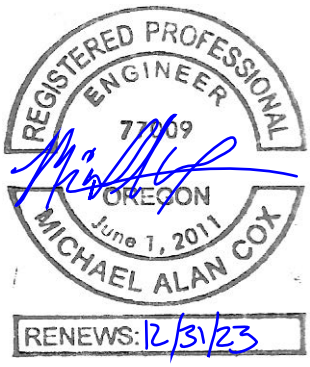
Post-Development: Approximately 4 acres of the north portion of the site will be used for construction of a new Wilco Farm Store. The project proposes construction of slab on grade building structure for retail, storage, and office space, wire yard, garden center, parking, & landscaping. Stormwater facilities are proposed to include filtration rain gardens and planters, Stormtech Chamber detention vaults, and effluent pump vault. The nearest stormwater destination is a City conveyance ditch converging the Lower Amazon subbasin runoff.

Public Storm System Capacity: In lieu of analyzing the public stormwater conveyance system for adequate capacity, detention based on the 10 year 24-hour storm is proposed. As the limiting factor, an orifice-restricted exit structure will keep post-construction outflow rates to those of pre-development. In additional efforts to comply with capacity, the outfall of the site will be directed into a City storm manhole connecting to 36" storm lines, rather than the open ditch.

Soil Data: The NRCS USDA WebSoilSurvey categorizes the existing soil as 85 - Natroy-Silty Clay Loam. The Oregon Engineering Handbook and NRCS classify this soil as drainage class D with hydric soil conditions and groundwater table less than 12 inches below ground surface.

Soil information can be found in the *Geotechnical Investigation - New Wilco Store* by FEI Tesing & Inspeciton Inc., Project 2187179, and dated January 28, 2019

Stormwater Hydraulic Calculations Method:	Filtration Rain Garden	SBUH	
Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet			
Design Storm Treated	Eugene, OR		
	Water Quality 24 Hr Storm	1.40	Inch
Detention/Flood Control	10Year-24 Hr Storm	4.46	Inch
CN runoff number			
Pre-Development			
Meadow	Hydrologic group D	78	(TR-55)
Post-Development			
Paved parking lot, roof, driveways	Hydrologic group D	98	(TR-55)
Stormwater Hydraulic Calculations Method:	Pipes	Rational Method	
Conveyance/Flooding Control	10Year-10 Min Storm	2.10	Inches/hr



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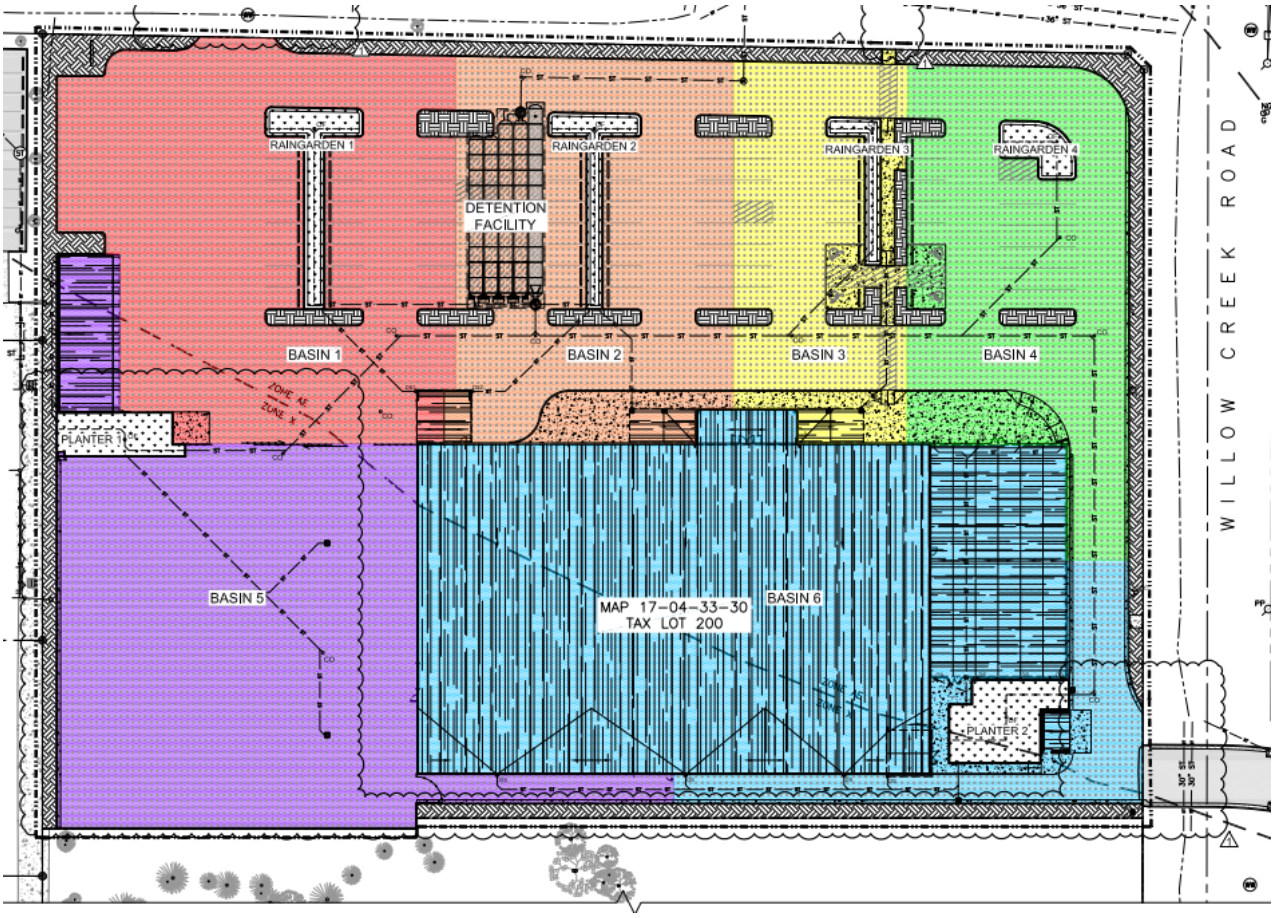
WILCO FARMERS	SHEET NO.	1
17043330-00200	PROJECT NO.	**22-8018**
Eugene, Oregon	BY	**SDRT**
Time of Concentration	DATE	**9/21/20**

STORMWATER BASIN MAP

BASIN	SQ. FT.	ACRES	Rain Garden Top/Bot		Depth
1	28832	0.662	1305 sf	902 sf	6 in
2	21287	0.489	1014 sf	624 sf	6 in
3	12406	0.285	626 sf	357 sf	6 in
4	18715	0.430	675 sf	513 sf	6 in
5	33757	0.775	1087 sf	1087 sf	6 in
6	52141	1.197	1687 sf	1687 sf	6 in
Total	**115039**	**3.838**			



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2350 Oakmont Way, Suite 105 Eugene, OR 97401
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WILHOOF, LLC	SHEET NO.	2	**OF**
17043330-00200	PROJECT NO.		**22-8018**
Eugene, Oregon	BY		**MAC**
Time of Concentration	DATE		**2/27/23**

PRE-CONSTRUCTION

Tt	(0.007*(n*L)^(0.8))/((P_2^0.5)*(s^0.4))	
	0.98	Hours
	58.64	Minutes
n	0.24	Dense grass
L	371	
P2	3.12	
s	0.0083	

Sheet flow

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

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

Surface description	n [1]
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermudagrass	0.41
Range (natural)	0.13
Woods:[3]	
Light underbrush	0.40
Dense underbrush	0.80

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

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

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} s^{0.4}} \quad \text{[eq. 3-3]}$$

where:

T_t = travel time (hr),
n = Manning's roughness coefficient (table 3-1)
L = flow length (ft)
P_2 = 2-year, 24-hour rainfall (in)
s = slope of hydraulic grade line (land slope, ft/ft)

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

Shallow concentrated flow

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

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

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	Wilco	**Date:**	12/5/2022 REV-1 05/15/23
Project Address:	11th Ave	**Permit Number:**	23-01679-01
	Eugene, OR 97402	**Catchment ID:**	Rain Garden 1
Designer:	MAC		
Company:	SSW ENGINEERS		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	No
Destination (DT)	No

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	28832 sqft	**Total Square Footage Pervious Area=**	0 sqft
Impervious Area CN=	98	**Pervious Area CN=**	85
Total Square Footage of Drainage Area=	28832 sft	**Time of Concentration Post Development=**	5 min
Weighted Average CN=	98		

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85	**Time of Concentration Pre-Development=**	10 min

Soil Data

Tested Soil Infiltration Rate=	2.5 in/hr (See Note 4)	**Destination Design=**	N/A in/hr
Design Soil Infiltration Rate=	2.5 in/hr	**Soil Infiltration Rate**	

Design Storms Used For Calculations

Requirement	Rainfall Depth		Design Storm
Pollution Reduction	1.4	inches	Water Quality
Flow Control	3.6	inches	Flood Control
Destination	3.6	inches	Flood Control

Facility Data

Facility Type=	Filtration Rain Garden	**Facility Surface Area=**	1008 sqft
Surface Width=	9 ft	**Facility Surface Perimeter=**	242 ft
Surface Length=	112 ft	**Facility Bottom Area=**	654 sqft
Facility Side Slopes=	3 to 1	**Facility Bottom Perimeter=**	230 ft
Max. Ponding Depth in Stormwater Facility=	6 in	**Basin Volume=**	417.8 cf
Depth of Growing Medium (Soil)=	18 in	**Ratio of Facility Area to Impervious Area=**	0.035

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.225	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	2833	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	5.9	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.623	cfs	Peak Facility Overflow Rate=	0.564	cfs
Total Runoff Volume to Stormwater Facility =	8071	cf	Total Overflow Volume=	3074	cf
Max. Depth of Stormwater in Facility=	6.0	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	0.058	cfs
Drawdown Time=	2.3	hours			

Pre-Development Runoff Data

Peak Flow Rate =	0.345	cfs
Total Runoff Volume =	5055	cf

N\A **Facility Sizing Meets Flow Control Standards?**

N\A **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
N\A **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	N/A	cfs	Peak Facility Overflow Rate=	N/A	cfs
Total Runoff Volume to Stormwater Facility =	N/A	cf	Total Overflow Volume=	N/A	cf
Max. Depth of Stormwater in Facility=	N/A	in			
Drawdown Time=	N/A	hours			

N/A **Facility Sizing Meets Destination Standards?**

N/A **Meets Requirement of No Facility Flooding?**
N/A **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	Wilco	**Date:**	12/5/2022
Project Address:	11th Ave	**Permit Number:**	
	Eugene, OR 97402	**Catchment ID:**	Rain Garden 2
Designer:	MAC		
Company:	SSW ENGINEERS		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	No
Destination (DT)	No

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	21287	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	21287	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	N/A	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	Rainfall Depth		Design Storm
Pollution Reduction	1.4	inches	Water Quality
Flow Control	3.6	inches	Flood Control
Destination	3.6	inches	Flood Control

Facility Data

Facility Type=	Filtration Rain Garden		**Facility Surface Area=**	784	sqft
Surface Width=	7	ft	**Facility Surface Perimeter=**	238	ft
Surface Length=	112	ft	**Facility Bottom Area=**	436	sqft
Facility Side Slopes=	3	to 1	**Facility Bottom Perimeter=**	226	ft
Max. Ponding Depth in Stormwater Facility=	6	in	**Basin Volume=**	307.3	cf
Depth of Growing Medium (Soil)=	18	in	**Ratio of Facility Area to Impervious Area=**	0.037	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.166	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	2091	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	5.9	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.460	cfs	Peak Facility Overflow Rate=	0.414	cfs
Total Runoff Volume to Stormwater Facility =	5959	cf	Total Overflow Volume=	2176	cf
Max. Depth of Stormwater in Facility=	6.0	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	0.045	cfs
Drawdown Time=	2.0	hours			

Pre-Development Runoff Data

Peak Flow Rate =	0.254	cfs
Total Runoff Volume =	3732	cf

N\A **Facility Sizing Meets Flow Control Standards?**

N\A **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
N\A **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	N/A	cfs	Peak Facility Overflow Rate=	N/A	cfs
Total Runoff Volume to Stormwater Facility =	N/A	cf	Total Overflow Volume=	N/A	cf
Max. Depth of Stormwater in Facility=	N/A	in			
Drawdown Time=	N/A	hours			

N/A **Facility Sizing Meets Destination Standards?**

N/A **Meets Requirement of No Facility Flooding?**
N/A **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	Wilco	**Date:**	12/5/2022
Project Address:	11th Ave	**Permit Number:**	
	Eugene, OR 97402	**Catchment ID:**	Rain Garden 3
Designer:	MAC		
Company:	SSW ENGINEERS		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	No
Destination (DT)	No

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	12406	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	12406	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	N/A	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	Rainfall Depth		Design Storm
Pollution Reduction	1.4	inches	Water Quality
Flow Control	3.6	inches	Flood Control
Destination	3.6	inches	Flood Control

Facility Data

Facility Type=	Filtration Rain Garden		**Facility Surface Area=**	462	sqft
Surface Width=	7	ft	**Facility Surface Perimeter=**	146	ft
Surface Length=	66	ft	**Facility Bottom Area=**	252	sqft
Facility Side Slopes=	3	to 1	**Facility Bottom Perimeter=**	134	ft
Max. Ponding Depth in Stormwater Facility=	6	in	**Basin Volume=**	180.8	cf
Depth of Growing Medium (Soil)=	18	in	**Ratio of Facility Area to Impervious Area=**	0.037	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.097	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	1219	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	5.9	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.268	cfs	Peak Facility Overflow Rate=	0.241	cfs
Total Runoff Volume to Stormwater Facility =	3473	cf	Total Overflow Volume=	1253	cf
Max. Depth of Stormwater in Facility=	6.0	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	0.027	cfs
Drawdown Time=	2.0	hours			

Pre-Development Runoff Data

Peak Flow Rate =	0.148	cfs
Total Runoff Volume =	2175	cf

N\A **Facility Sizing Meets Flow Control Standards?**

N\A **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
N\A **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	N/A	cfs	Peak Facility Overflow Rate=	N/A	cfs
Total Runoff Volume to Stormwater Facility =	N/A	cf	Total Overflow Volume=	N/A	cf
Max. Depth of Stormwater in Facility=	N/A	in			
Drawdown Time=	N/A	hours			

N/A **Facility Sizing Meets Destination Standards?**

N/A **Meets Requirement of No Facility Flooding?**
N/A **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	Wilco	**Date:**	12/5/2022
Project Address:	11th Ave	**Permit Number:**	
	Eugene, OR 97402	**Catchment ID:**	Rain Garden 4
Designer:	MAC		
Company:	SSW ENGINEERS		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	No
Destination (DT)	No

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	18715	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	18715	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	N/A	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	Rainfall Depth		Design Storm
Pollution Reduction	1.4	inches	Water Quality
Flow Control	3.6	inches	Flood Control
Destination	3.6	inches	Flood Control

Facility Data

Facility Type=	Filtration Rain Garden		**Facility Surface Area=**	612	sqft
Surface Width=	17	ft	**Facility Surface Perimeter=**	106	ft
Surface Length=	36	ft	**Facility Bottom Area=**	462	sqft
Facility Side Slopes=	3	to 1	**Facility Bottom Perimeter=**	94	ft
Max. Ponding Depth in Stormwater Facility=	6	in	**Basin Volume=**	270.8	cf
Depth of Growing Medium (Soil)=	18	in	**Ratio of Facility Area to Impervious Area=**	0.033	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.146	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	1839	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	5.9	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.404	cfs	Peak Facility Overflow Rate=	0.369	cfs
Total Runoff Volume to Stormwater Facility =	5239	cf	Total Overflow Volume=	2146	cf
Max. Depth of Stormwater in Facility=	6.0	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	0.035	cfs
Drawdown Time=	2.3	hours			

Pre-Development Runoff Data

Peak Flow Rate =	0.224	cfs
Total Runoff Volume =	3281	cf

N\A **Facility Sizing Meets Flow Control Standards?**

N\A **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
N\A **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	N/A	cfs	Peak Facility Overflow Rate=	N/A	cfs
Total Runoff Volume to Stormwater Facility =	N/A	cf	Total Overflow Volume=	N/A	cf
Max. Depth of Stormwater in Facility=	N/A	in			
Drawdown Time=	N/A	hours			

N/A **Facility Sizing Meets Destination Standards?**

N/A **Meets Requirement of No Facility Flooding?**
N/A **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	Wilco	**Date:**	12/5/2022 REV-1 05/15/23
Project Address:	11th Ave	**Permit Number:**	23-01679-01
	Eugene, OR 97402	**Catchment ID:**	Planter 1
Designer:	MAC		
Company:	SSW ENGINEERS		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	No
Destination (DT)	No

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	33757	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	33757	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	N/A	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	Rainfall Depth		Design Storm
Pollution Reduction	1.4	inches	Water Quality
Flow Control	3.6	inches	Flood Control
Destination	3.6	inches	Flood Control

Facility Data

Facility Type=	Filtration Stormwater Planter		**Facility Surface Area=**	980	sqft
Surface Width=	20	ft	**Facility Surface Perimeter=**	138	ft
Surface Length=	49	ft	**Facility Bottom Area=**	980	sqft
Facility Side Slopes=	0	to 1	**Facility Bottom Perimeter=**	138	ft
Max. Ponding Depth in Stormwater Facility=	6	in	**Basin Volume=**	490.0	cf
Depth of Growing Medium (Soil)=	18	in	**Ratio of Facility Area to Impervious Area=**	0.029	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.263	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	3317	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	5.8	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.729	cfs	Peak Facility Overflow Rate=	0.672	cfs
Total Runoff Volume to Stormwater Facility =	9449	cf	Total Overflow Volume=	4326	cf
Max. Depth of Stormwater in Facility=	6.0	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	0.057	cfs
Drawdown Time=	2.5	hours			

Pre-Development Runoff Data

Peak Flow Rate =	0.403	cfs
Total Runoff Volume =	5918	cf

N\A **Facility Sizing Meets Flow Control Standards?**

N\A **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
N\A **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	N/A	cfs	Peak Facility Overflow Rate=	N/A	cfs
Total Runoff Volume to Stormwater Facility =	N/A	cf	Total Overflow Volume=	N/A	cf
Max. Depth of Stormwater in Facility=	N/A	in			
Drawdown Time=	N/A	hours			

N/A **Facility Sizing Meets Destination Standards?**

N/A **Meets Requirement of No Facility Flooding?**
N/A **Meets Requirement for Maximum of 30 hour Drawdown Time?**

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet
24 Hour Storm, NRCS Type 1A Rainfall Distribution
City of Eugene

Version 2.1

Project Information

Project Name:	Wilco	**Date:**	12/5/2022 REV-1 05/15/23
Project Address:	11th Ave	**Permit Number:**	23-01679-01
	Eugene, OR 97402	**Catchment ID:**	Planter 2
Designer:	MAC		
Company:	SSW ENGINEERS		

Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been perfromed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	No
Destination (DT)	No

*An infiltration facility must be chosen as the facility type to meet destination requirements

Site Data-Post Development

Total Square Footage Impervious Area=	52141	sqft	**Total Square Footage Pervious Area=**	0	sqft
Impervious Area CN=	98		**Pervious Area CN=**	85	
Total Square Footage of Drainage Area=	52141	sft	**Time of Concentration Post Development=**	5	min
Weighted Average CN=	98				

Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85		**Time of Concentration Pre-Development=**	10	min

Soil Data

Tested Soil Infiltration Rate=	2.5	in/hr (See Note 4)	**Destination Design=**	N/A	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	**Soil Infiltration Rate**		

Design Storms Used For Calculations

Requirement	Rainfall Depth		Design Storm
Pollution Reduction	1.4	inches	Water Quality
Flow Control	3.6	inches	Flood Control
Destination	3.6	inches	Flood Control

Facility Data

Facility Type=	Filtration Stormwater Planter		**Facility Surface Area=**	1505	sqft
Surface Width=	35	ft	**Facility Surface Perimeter=**	156	ft
Surface Length=	43	ft	**Facility Bottom Area=**	1505	sqft
Facility Side Slopes=	0	to 1	**Facility Bottom Perimeter=**	156	ft
Max. Ponding Depth in Stormwater Facility=	6	in	**Basin Volume=**	752.5	cf
Depth of Growing Medium (Soil)=	18	in	**Ratio of Facility Area to Impervious Area=**	0.029	

Pollution Reduction-Calculation Results

Peak Flow Rate to Stormwater Facility =	0.406	cfs	Peak Facility Overflow Rate=	0.000	cfs
Total Runoff Volume to Stormwater Facility =	5123	cf	Total Overflow Volume=	0	cf
Max. Depth of Stormwater in Facility=	5.9	in			
Drawdown Time=	0.2	hours			

Yes **Facility Sizing Meets Pollution Reduction Standards?**

YES **Meets Requirement of No Facility Flooding?**
YES **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Flow Control-Calculation Results

Peak Flow Rate to Stormwater Facility =	1.126	cfs	Peak Facility Overflow Rate=	1.039	cfs
Total Runoff Volume to Stormwater Facility =	14595	cf	Total Overflow Volume=	6726	cf
Max. Depth of Stormwater in Facility=	6.0	in	Peak Off-Site Flow Rate Filtration Facility Underdrain=	0.087	cfs
Drawdown Time=	2.5	hours			

Pre-Development Runoff Data

Peak Flow Rate =	0.623	cfs
Total Runoff Volume =	9141	cf

N\A **Facility Sizing Meets Flow Control Standards?**

N\A **Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?**
N\A **Meets Requirement for Maximum of 18 Hour Drawdown Time?**

Destination-Calculation Results

Peak Flow Rate to Stormwater Facility =	N/A	cfs	Peak Facility Overflow Rate=	N/A	cfs
Total Runoff Volume to Stormwater Facility =	N/A	cf	Total Overflow Volume=	N/A	cf
Max. Depth of Stormwater in Facility=	N/A	in			
Drawdown Time=	N/A	hours			

N/A **Facility Sizing Meets Destination Standards?**

N/A **Meets Requirement of No Facility Flooding?**
N/A **Meets Requirement for Maximum of 30 hour Drawdown Time?**

SSW ENGINEERS INC
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2350 Oakmont Way, Suite 105 Eugene, OR 97401
(541) 485-8383 Fax (541) 485-8384

WILCO FARMERS	SHEET NO.	**13**
17043330-00200	PROJECT NO.	**22-8018**
Eugene, Oregon	BY	**MAC**
ALL BASIN DETENTION	DATE	**9/21/20**

Santa Barbara Urban Hydrograph

Pre-Development Flow

Site 1.89 Acre

	Area (ac)	CN	Storage (S)	0.2S
Pervious	1.889	78	2.82	0.56
Impervious	0.00	98	0.20	0.04
Site	1.889			

2.74

10-year 24-hour Storm Event

Rainfall 4.46 in

Time Incrments 10 min

Tc 90.7 min * * (see TC sheet # 2)

Maximum Design Flow Rate 0.41 cfs

Post-Development Flow

	Area (ac)	CN	Storage (S)	0.2S
Pervious	0.00	80	2.50	0.50
Impervious	1.889	98	0.20	0.04
Site	1.889			

2.74

10-year 24-hour Storm Event

Rainfall 4.46 in

Time Incrments 10 min

Tc 10 min *

Maximum Design Flow Rate 1.98 cfs

Volume to detain 5300 cu.ft.

Restriction Orifice Equation Method

Orifice Opening 4.70 in

W/Grate

PEAK OVERFLOW Q = C*C2*A0*SQRT(2*g*(Head))

Q = 0.834

Gravity (g) 32.2

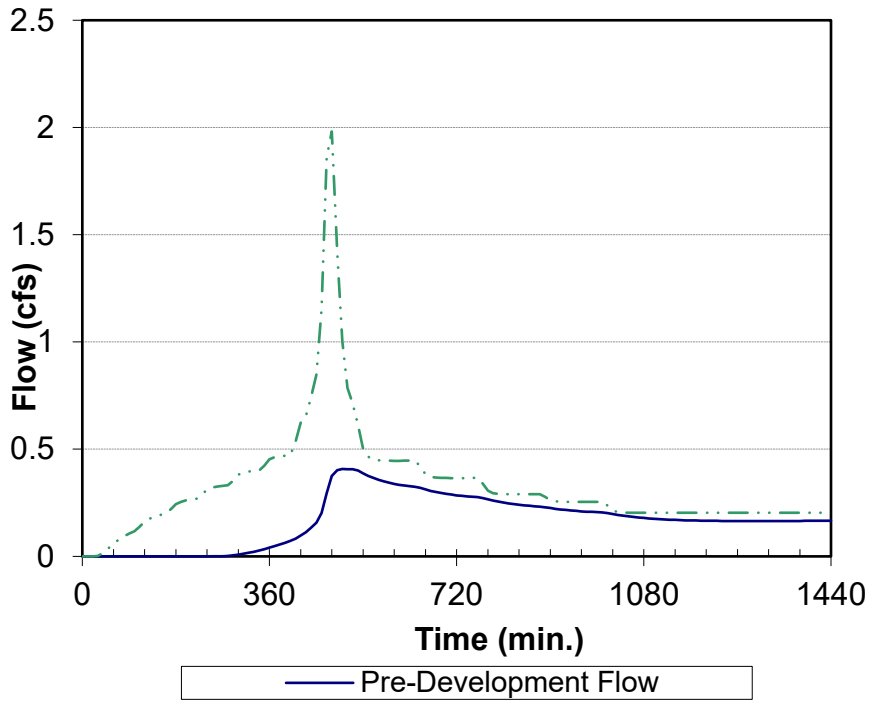
Area 0.120 sqft

FREEBOARD Head 2.000 24.00 in

C 0.61

A0 0.120 sqft

10-Year Predevelopment Flow Q = **0.408** cfs **NO**



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(541) 485-8383 Fax (541) 485-8384

WILCO FARMERS	SHEET NO.	**14**	
17043330-00200	PROJECT NO.	**22-8018**	
Eugene, Oregon	BY	**MAC**	
ALL BASIN DETENTION	DATE	**9/21/20**	

Pre-Development Flow

Data represent 9 minutes before and after peak flow

					Pervious Area		Impervious Area				
Time Increment	Time	Rainfall Distribution	Rainfall in Increment	Accumul. Rainfall	Accumul. Runoff	Incremental Runoff	Accumul. Runoff	Incremental Runoff	Total Runoff	Instant Flowrate	Design Flowrate
	min.	fraction	inches	inches	inches	inches	inches	inches	inches	cfs	cfs
42	410	0.0134	0.0598	1.193	0.115	0.019	0.979	0.058	0.019	0.22	0.08
43	420	0.0134	0.0598	1.253	0.135	0.020	1.038	0.098	0.020	0.23	0.10
44	430	0.0134	0.0598	1.313	0.157	0.022	1.096	0.059	0.022	0.25	0.11
45	440	0.0180	0.0803	1.393	0.188	0.031	1.175	0.079	0.031	0.36	0.13
46	450	0.0180	0.0803	1.474	0.222	0.033	1.254	0.079	0.033	0.38	0.16
47	460	0.0340	0.1516	1.625	0.290	0.068	1.404	0.149	0.068	0.78	0.20
48	470	0.0540	0.2408	1.866	0.411	0.121	1.642	0.238	0.121	1.38	0.29
49	480	0.0270	0.1204	1.986	0.477	0.066	1.761	0.119	0.066	0.75	0.37
50	490	0.0180	0.0803	2.067	0.522	0.045	1.841	0.080	0.045	0.52	0.40
51	500	0.0134	0.0598	2.127	0.557	0.035	1.900	0.059	0.035	0.40	0.41
52	510	0.0134	0.0598	2.186	0.592	0.035	1.959	0.059	0.035	0.40	0.41
53	520	0.0134	0.0598	2.246	0.628	0.036	2.018	0.059	0.036	0.41	0.41
54	530	0.0088	0.0392	2.285	0.652	0.024	2.057	0.039	0.024	0.27	0.40
55	540	0.0088	0.0392	2.325	0.677	0.024	2.096	0.039	0.024	0.28	0.39
56	550	0.0088	0.0392	2.364	0.701	0.024	2.135	0.039	0.024	0.28	0.38
57	560	0.0088	0.0392	2.403	0.726	0.025	2.174	0.039	0.025	0.28	0.37
58	570	0.0088	0.0392	2.442	0.751	0.025	2.213	0.039	0.025	0.29	0.36
59	580	0.0088	0.0392	2.482	0.776	0.025	2.252	0.039	0.025	0.29	0.35
60	590	0.0088	0.0392	2.521	0.801	0.025	2.291	0.039	0.025	0.29	0.34

Post-Development Flow

Data represent 9 minutes before and after peak flow

					Pervious Area		Impervious Area				
Time Increment	Time	Rainfall Distribution	Rainfall in Increment	Accumul. Rainfall	Accumul. Runoff	Incremental Runoff	Accumul. Runoff	Incremental Runoff	Total Runoff	Instant Flowrate	Design Flowrate
	min.	fraction	A	inches	inches	inches	inches	inches	inches	cfs	cfs
40	390	0.0095	0.0424	1.091	0.113	0.014	0.880	0.041	0.041	0.47	0.47
41	400	0.0095	0.0424	1.134	0.128	0.015	0.921	0.041	0.041	0.47	0.47
42	410	0.0134	0.0598	1.193	0.151	0.022	0.979	0.058	0.058	0.67	0.54
43	420	0.0134	0.0598	1.253	0.174	0.024	1.038	0.058	0.058	0.67	0.62
44	430	0.0134	0.0598	1.313	0.200	0.025	1.096	0.059	0.059	0.67	0.65
45	440	0.0180	0.0803	1.393	0.235	0.036	1.175	0.079	0.079	0.90	0.74
46	450	0.0180	0.0803	1.474	0.273	0.038	1.254	0.079	0.079	0.90	0.85
47	460	0.0340	0.1516	1.625	0.349	0.076	1.404	0.149	0.149	1.71	1.15
48	470	0.0540	0.2408	1.866	0.483	0.133	1.642	0.238	0.238	2.72	1.86
49	480	0.0270	0.1204	1.986	0.554	0.072	1.761	0.119	0.119	1.36	1.98
50	490	0.0180	0.0803	2.067	0.604	0.049	1.841	0.080	0.080	0.91	1.42
51	500	0.0134	0.0598	2.127	0.641	0.038	1.900	0.059	0.059	0.68	0.71
52	510	0.0134	0.0598	2.186	0.679	0.038	1.959	0.059	0.059	0.68	0.61
53	520	0.0134	0.0598	2.246	0.718	0.039	2.018	0.059	0.059	0.68	0.50
54	530	0.0088	0.0392	2.285	0.744	0.026	2.057	0.039	0.039	0.45	0.46
55	540	0.0088	0.0392	2.325	0.770	0.026	2.096	0.039	0.039	0.45	0.45
56	550	0.0088	0.0392	2.364	0.796	0.026	2.135	0.039	0.039	0.45	0.45
57	560	0.0088	0.0392	2.403	0.823	0.026	2.174	0.039	0.039	0.45	0.45
58	570	0.0088	0.0392	2.442	0.849	0.027	2.213	0.039	0.039	0.45	0.45

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

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INSTALLATION INSTRUCTIONS
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EUGENE, OR, USA

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
10. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

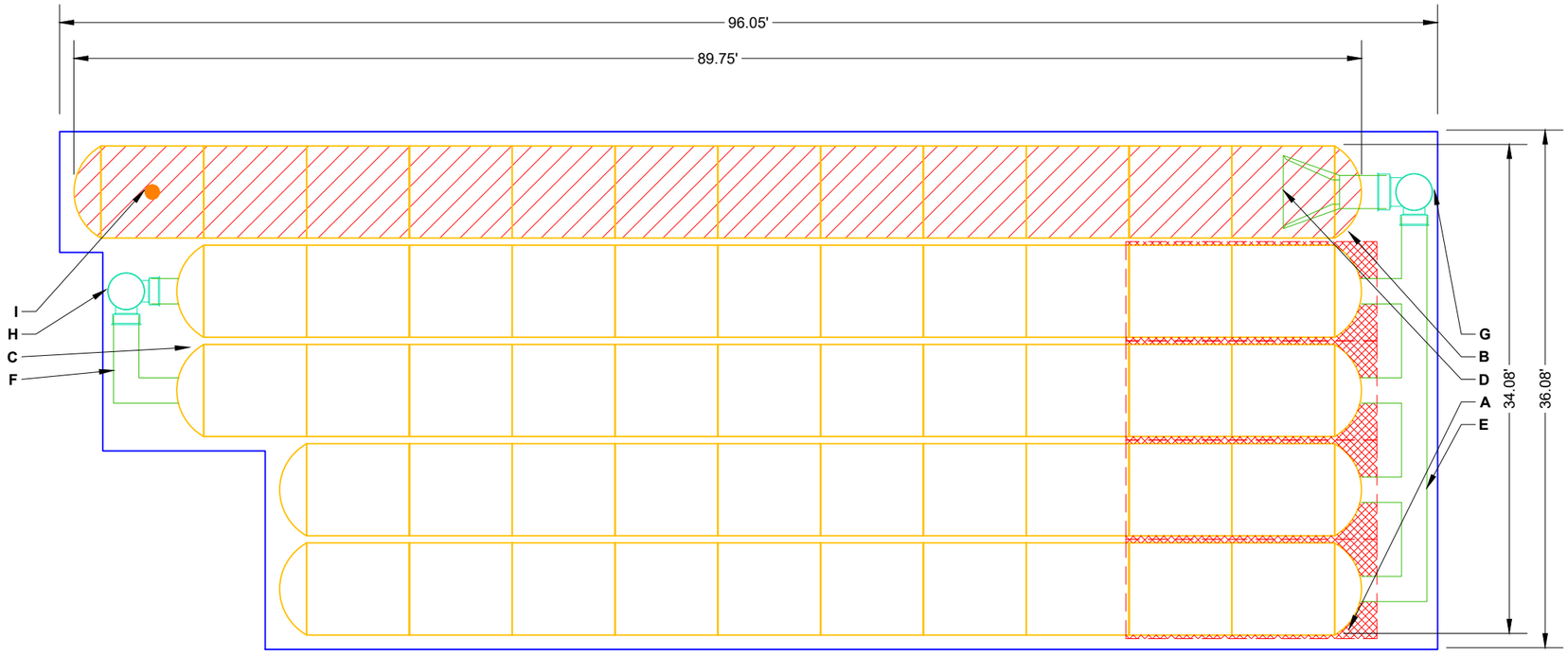
CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT		PROPOSED ELEVATIONS	
54	STORMTECH MC-3500 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	393.50
10	STORMTECH MC-3500 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	387.50
12	STONE ABOVE (in)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	387.00
9	STONE BELOW (in)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	387.00
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	387.00
10748	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	386.50
		TOP OF MC-3500 CHAMBER:	385.50
		18" x 18" TOP MANIFOLD INVERT:	383.42
		24" ISOLATOR ROW PLUS INVERT:	381.92
		18" x 18" BOTTOM MANIFOLD INVERT:	381.90
3226	SYSTEM AREA (SF)	18" BOTTOM CONNECTION INVERT:	381.90
264.3	SYSTEM PERIMETER (ft)	BOTTOM OF MC-3500 CHAMBER:	381.75
624	THERMOPLASTIC LINER (SY) (20% OVERAGE)	BOTTOM OF STONE:	381.00

PLEASE NOTE THAT AN UNDERDRAIN IS REQUIRED TO ENSURE THE FOUNDATION STONE CAN DRAIN AND BE INCLUDED IN VOLUME CALCULATIONS. THE TOOL CURRENTLY IS UNABLE TO SHOW AN UNDERDRAIN FOR THE CURRENT CONFIGURATION.

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	18" TOP CORED END CAP, PART#: MC3500IEPP18TC / TYP OF ALL 18" TOP CONNECTIONS	20.03"	
PREFABRICATED END CAP	B	24" BOTTOM CORED END CAP, PART#: MC3500IEPP24BC / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	2.06"	
PREFABRICATED END CAP	C	18" BOTTOM CORED END CAP, PART#: MC3500IEPP18BC / TYP OF ALL 18" BOTTOM CONNECTIONS	1.77"	
FLAMP	D	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MC350024RAMP		
MANIFOLD	E	18" x 18" TOP MANIFOLD, ADS N-12	20.03"	
MANIFOLD	F	18" x 18" BOTTOM MANIFOLD, ADS N-12	1.77"	
NYLOPLAST (INLET W/ ISO PLUS ROW)	G	30" DIAMETER (24.00" SUMP MIN)		16.2 CFS IN
NYLOPLAST (OUTLET)	H	30" DIAMETER (DESIGN BY ENGINEER)		8.0 CFS OUT
INSPECTION PORT	I	4" SEE DETAIL		



ISOLATOR ROW PLUS (SEE DETAIL)

PLACE MINIMUM 17.50' OF ADSPLUS175 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

THERMOPLASTIC LINER (SEE TECH NOTE #6.50 PROVIDED BY OTHERS / DESIGN BY OTHERS)

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

WILCO
EUGENE, OR, USA
DRAWN: MC
CHECKED: N/A
DATE:
PROJECT #:

DATE	DRW	CHK	DESCRIPTION

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

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Chamber System

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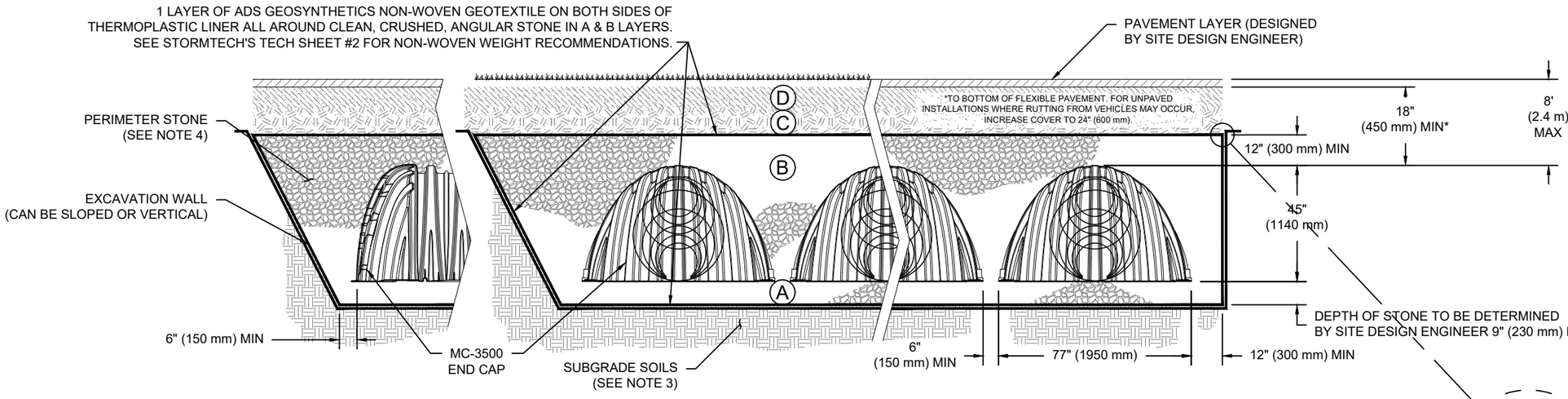
ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

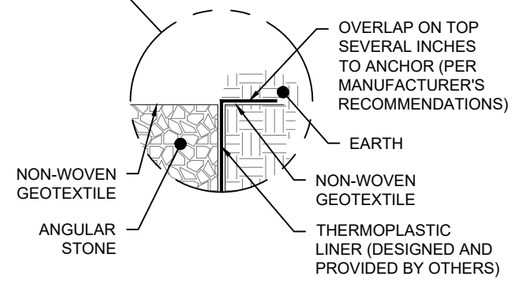
	MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.



THERMOPLASTIC LINER DETAIL

WILCO
EUGENE, OR, USA
DATE:
DRAWN: MC
PROJECT #:
CHECKED: N/A

DESCRIPTION	CHK	DRW	DATE

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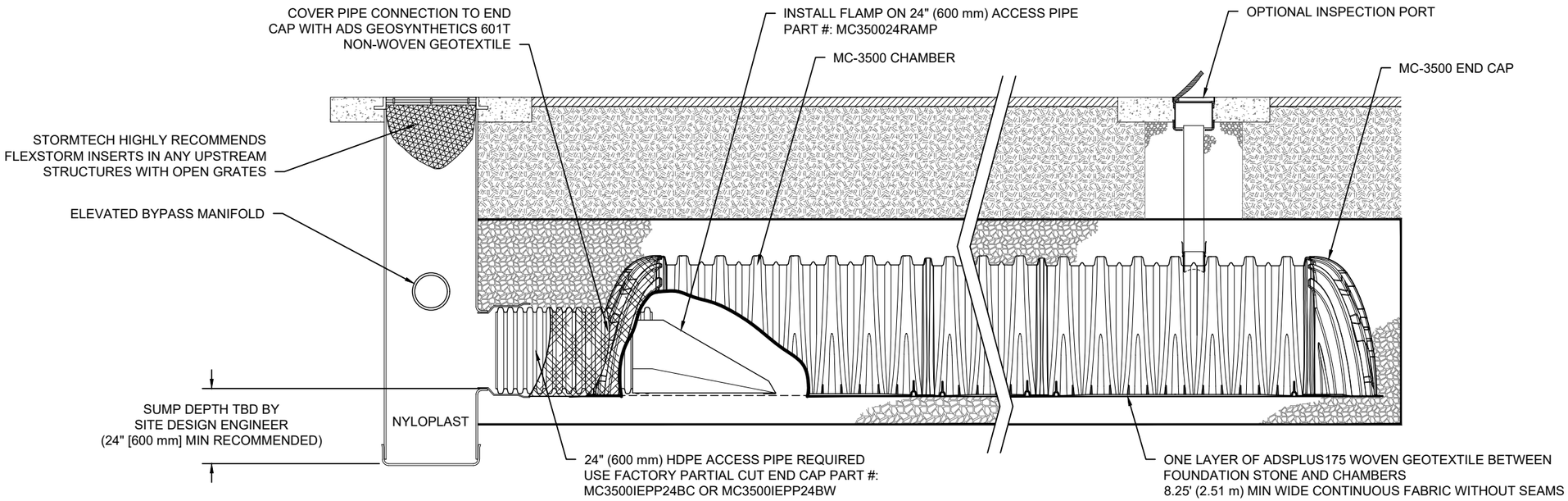


MC-3500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

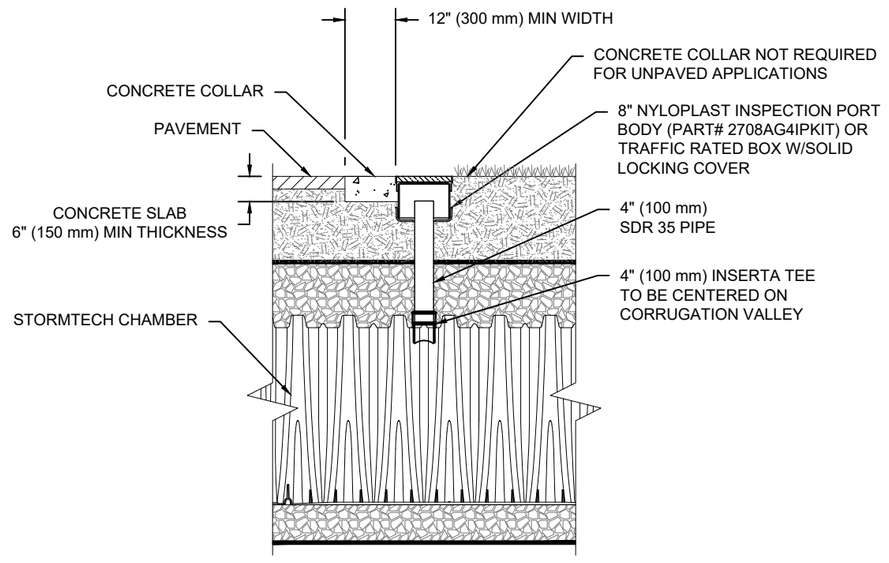
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION VALLEY.

4" PVC INSPECTION PORT DETAIL
(MC SERIES CHAMBER)
NTS

WILCO
EUGENE, OR, USA
DATE:
DRAWN: MC
PROJECT #:
CHECKED: N/A

DESCRIPTION	CHK	DRW	DATE

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HILLIARD, OH 43026
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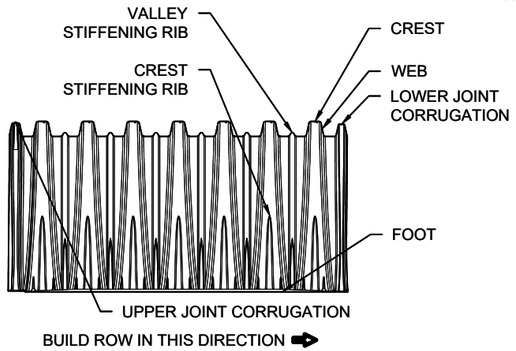
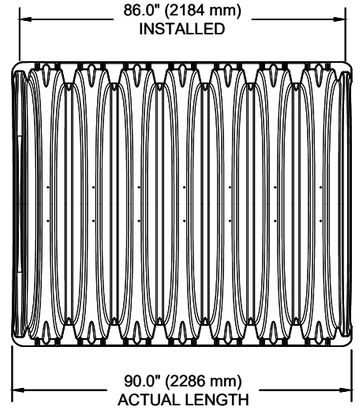
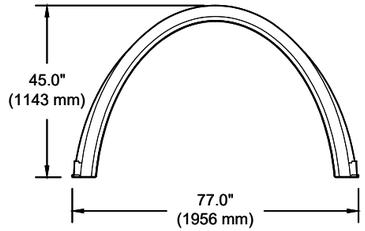
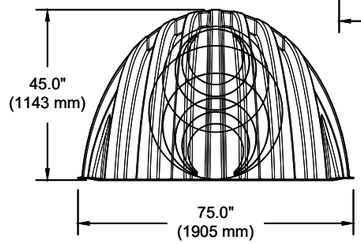
MC-3500 TECHNICAL SPECIFICATION

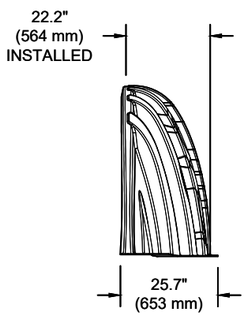
NTS











NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m³)
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET	(4.96 m³)
WEIGHT	134 lbs.	(60.8 kg)

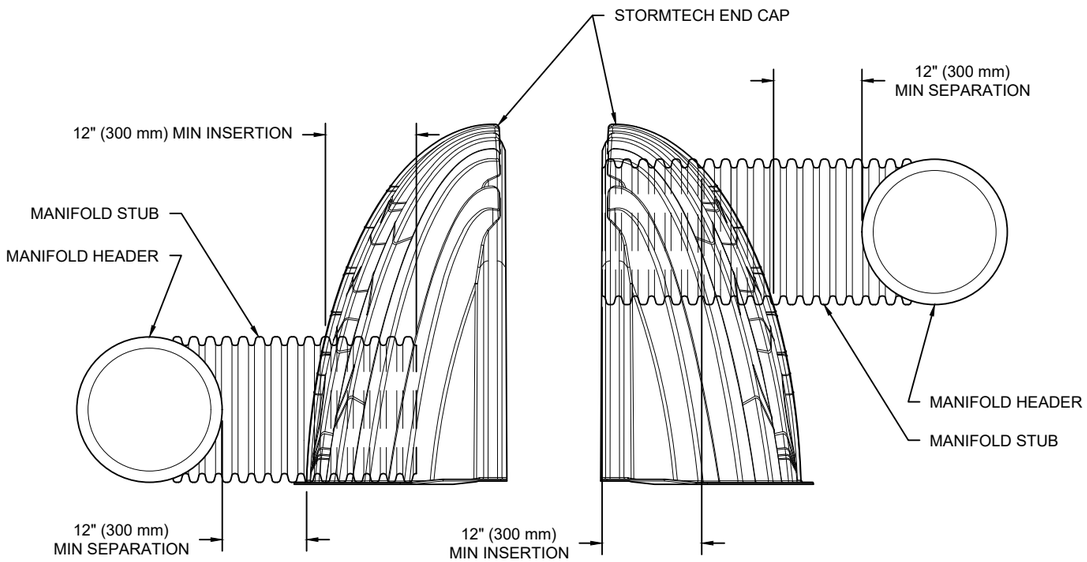
NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m³)
WEIGHT	49 lbs.	(22.2 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" SPACING BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY

MC-SERIES END CAP INSERTION DETAIL

NTS

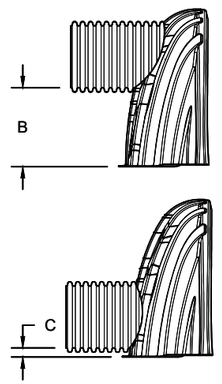


NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A WELDED CROWN PLATE END WITH "C"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18TW			
MC3500IEPP18BC		---	1.77" (45 mm)
MC3500IEPP18BW			
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24TW			
MC3500IEPP24BC		---	2.06" (52 mm)
MC3500IEPP24BW			
MC3500IEPP30BC	30" (750 mm)	---	2.75" (70 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PRECORED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

WILCO
EUGENE, OR, USA
DATE:
DRAWN: MC
PROJECT #:
CHECKED: N/A

DESCRIPTION	CHK	DRW	DATE

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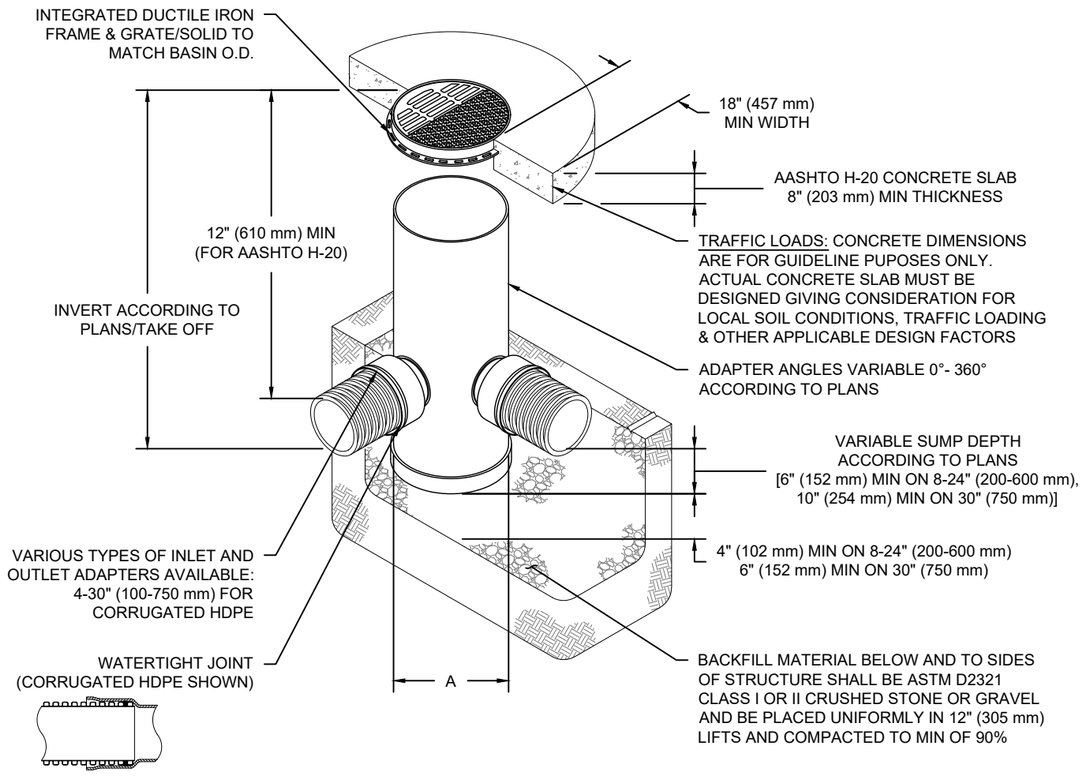
NYLOPLAST DRAIN BASIN

NTS



NOTES

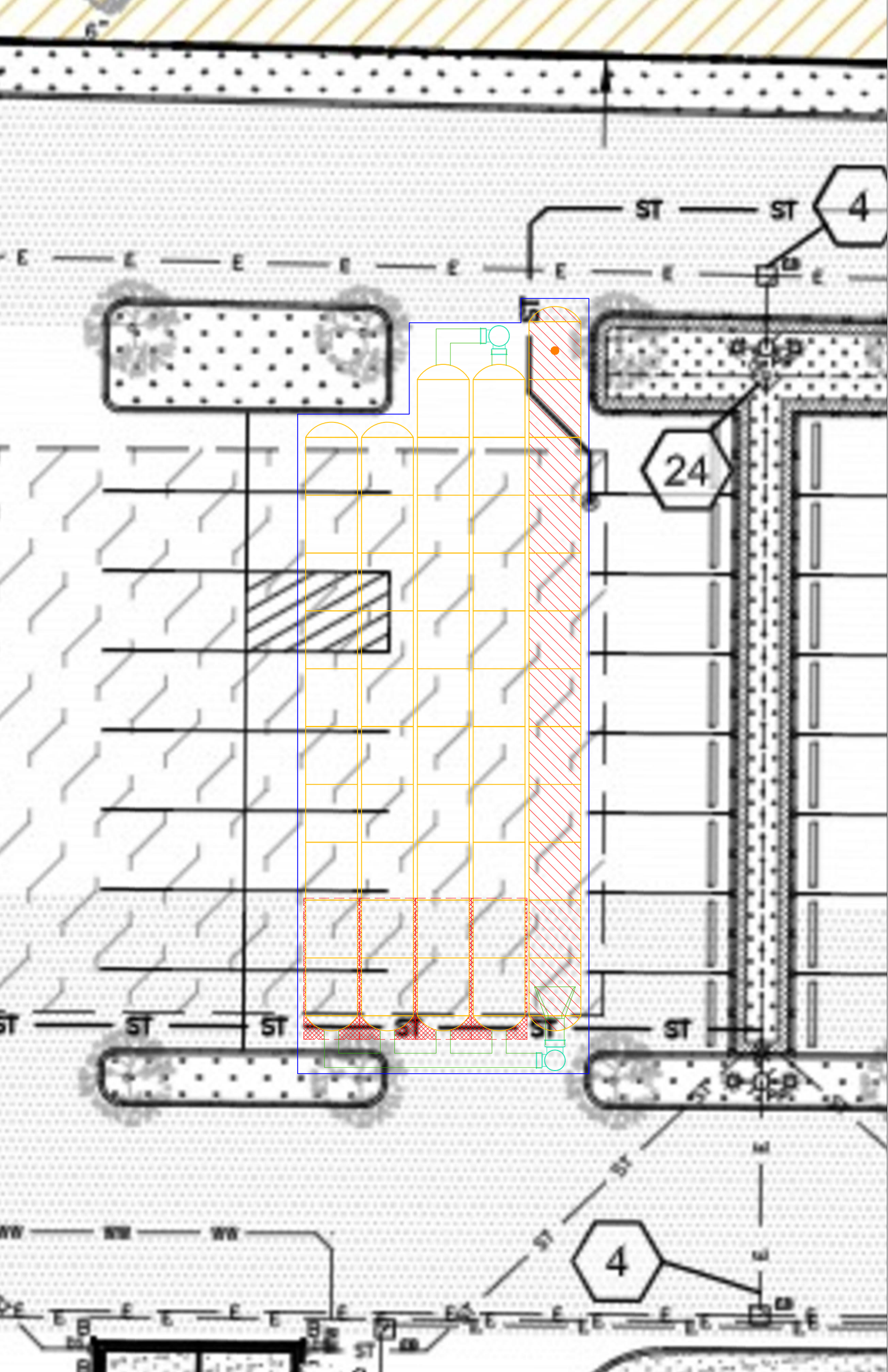
1. 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION: **WWW.NYLOPLAST-US.COM**
6. TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

WILCO
EUGENE, OR, USA
DATE:
DRAWN: MC
PROJECT #:
CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

Nyloplast®
770-932-2443 | WWW.NYLOPLAST-US.COM
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473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STORM DRAINAGE DESIGN SUMMARY -- RATIONAL METHOD

City of Eugene, 10 Year, 10 Min. Duration

Project: WILCO | Storm Frequency: 10 Year | 2350 Oakmont Way, Suite 105 | Computed by: MAC | Date: 2/27/23

Number: 23-8018 | Manning n 0.009 PVC | Eugene, Oregon 97401 | Checked by: MAC | Date: 2/27/2023

SSW ENGINEERS INC
CIVIL • STRUCTURAL • BUILDING DESIGN
SURVEYING • LAND USE PLANNING

Location Description				Tributary Areas						Pipe Data					Conc. Time		Elevation Computations				
																	Invert Elevations			Remarks	
Location	From Street / Station	To Street / Station		a Incre- Area Acres	A Total Area Acres	C	C * A Equiv- Area Acres	I in. per hr.	Q cfs	Diam. Of Pipe In.	Slope	V fps	Q CFS	Length Ft.	Time of Flow Min.	Time of Concen- Min.	Upper End	Fall / Drop	Lower End		
Basin1																					
Roof 1	ds1	RG1	312.5	0.007	0.007	0.9	0.006	2.1	0.0136	4	0.0170	4.1243	0.3599	61	0.25	10.25	388.63	1.04	387.59		
RG1	RG1	DET1	28855	0.662	0.662	0.9	0.596	2.1	1.2520	8	0.0060	3.8838	1.3557	103	0.44	10.69	386.09	0.62	385.47		
Basin 2																					
Roof 1	ds2	RG2	312.5	0.007	0.007	0.9	0.006	2.1	0.0136	4	0.0149	3.8500	0.3360	70	0.30	10.30	388.63	1.04	387.59		
Roof 2	ds3	RG2	981	0.023	0.023	0.9	0.020	2.1	0.0426	4	0.0200	4.4670	0.3898	52	0.19	10.50	388.63	1.04	387.59		
RG2	RG2	DET1	21287	0.489	0.489	0.9	0.440	2.1	0.9236	6	0.0247	6.5005	1.2764	28	0.07	10.57	386.09	0.69	385.40		
Basin 3																					
Roof 3	ds4	RG3	981	0.023	0.023	0.9	0.020	2.1	0.0426	4	0.0078	2.7905	0.2435	82	0.49	10.49	388.63	0.64	387.99		
RG3	RG3	J4	12406	0.285	0.285	0.9	0.256	2.1	0.5383	6	0.0050	2.9267	0.5747	38	0.22	10.71	386.49	0.19	386.30		
Basin 4																					
RG4	RG4	J2	18715	0.430	0.430	0.9	0.387	2.1	0.8120	6	0.0293	7.0905	1.3922	92	0.22	10.22	385.64	2.70	382.94		
Basin 5																					
CB1	CB1	SP1	16888	0.388	0.388	0.9	0.349	2.1	0.7327	8	0.0025	2.5070	0.8751	76	0.51	10.51	386.65	0.19	386.46		
CB2	CB2	SP1	16888	0.388	0.775	0.9	0.698	2.0	1.3957	10	0.0020	2.6020	1.4192	92	0.59	10.59	386.38	0.18	386.19		
Downspout from Garden Roof drains directly to Rain Garden 5																					
SP1	SP1	J1	33776	0.775	0.775	0.9	0.698	2.0	1.3957	8	0.0134	5.7932	2.0222	186	0.54	10.54	384.19	2.48	381.71		
Basin 6																					
Roof 4	ds5	J3	37902	0.870	0.870	0.9	0.783	2.1	1.6445	8	0.0104	5.1133	1.7849	220	0.72	10.72	388.29	2.29	386.00		
CB3	CB3	J3	5092	0.117	0.117	0.9	0.105	2.0	0.2104	4	0.0700	8.3569	0.7293	15	0.03	10.75	387.22	1.05	386.17		
J3	J3	SP2		0.987	0.987	0.9	0.888	2.0	1.7766	8	0.0104	5.1133	1.7849	12	0.04	10.79	386.00	0.12	385.88		
CB4	CB4	SP2	2752	0.063	0.063	0.9	0.057	2.1	0.1194	4	0.0104	3.2212	0.2811	2	0.01	10.01	387.64	0.02	387.62		
RG6	SP2	J2	52141	1.197	1.197	0.9	1.077	2.1	2.2623	10	0.0060	4.5067	2.4580	239	0.88	10.88	384.21	1.43	382.78		
J2	J2	J4	70856	1.627	1.627	0.9	1.464	2.0	2.9279	12	0.0060	5.0892	3.9971	83	0.27	11.16	382.61	0.50	382.11		
J4	J4	J1	83262	1.911	1.911	0.9	1.720	2.0	3.4406	12	0.0060	5.0892	3.9971	118	0.39	11.54	382.11	0.71	381.40		
J1	J1	DET1	117038	2.687	2.687	0.9	2.418	1.9	4.5945	12	0.0090	6.2330	4.8954	14.5	0.04	11.58	381.40	0.13	381.27	381.57	
DET1	DET1	MH1	167180	3.838	3.838	0.9	3.454	1.9	6.5629	12	0.0150	8.0467	6.3199	118	0.24	11.83	381.27	1.77	379.50	1.03844286	
		MH1	Max flow from detention						1.9800	12	0.0080	5.8765	4.6154		0.00	11.83	379.50	0.00	379.50		
MH1	MH2								1.9800	12	0.0080	5.8765	4.6154	41	0.12	11.94	383.75	0.33	383.42		
		4"		265.00																	
		6"		158.00																	
		8"		179.00				Total Q =	1.9800	cfs											
		10"		331.00																	
		12"		333.50																	