

## **ATTACHMENT 6** Stormwater Management Report

Myrtle Glenn Subdivision Preliminary PUD Application to City of Florence December 2, 2022 Attachment Revised/Resubmitted February 21, 2023



Exhibit H1 -PC 22 21 PUD 01, PC 22 25 SUB 03, & SR 22 48 SIR 13– Myrtle Glenn – 37th and Oak 1 of 90



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## **Stormwater Management Report**

## **Myrtle Glenn PUD**

## Map 18-12-22-11 Tax Lots 200, 1100, and 1200

**Florence**, **Oregon** 

November 22, 2022

**Revised February 1, 2023** 

## **Applicant**

William Johnson Construction, Inc. PO Box 1176 Florence, OR 97439

## **Engineer/Surveyor**

EGR & Associates, Inc. 2535B Prairie Road Eugene, Oregon 97402

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#### **Designer's Certification and Statement**

I hereby certify that this Stormwater Management Report for Myrtle Glenn PUD has been prepared by me or under my supervision and meets minimum standards of the City of Florence and normal standards of engineering practice. I hereby acknowledge and agree that the jurisdiction does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities designed by me.



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### **PROJECT OVERVIEW AND DESCRIPTION**

The project site is approximately 15.94 acres in size and is identified as Tax Lots 200, 1100, and 1200 on Lane County Assessor Map 18-12-22-11. The site is located north of 35<sup>th</sup> Street, west of Casa Del Mar subdivision and Oak Street, south of East Bank PUD and Florence Golf Links, and east of City of Florence public works facility and Florence Golf Links. Access is from 37<sup>th</sup> Street on the east side and 35<sup>th</sup> Street on the south side. A vicinity map is included in Appendix A.

The property is inside the City of Florence and is currently zoned High-Density Residential. The proposed development consists of 25 single-family attached dwellings or townhomes on Tax Lots 200 and 1200. The development will be subdivided so each townhouse is situated on a separate lot with zero setback at common walls. Areas surrounding the attached units and common ingress/egress and parking areas will consist of common space. Development on Tax Lot 1100 is not proposed at this time, thus is not included in this stormwater management plan.

Right-of-way for 37<sup>th</sup> Street abuts the east side of Tax Lot 1200 and the street will be extended approximately 590 lineal feet west from Oak Street on the south side of Tax Lot 1200 to serve the development. The townhome PUD will be north of the 37<sup>th</sup> Street extension. Underground utilities consisting of public wastewater, stormwater and water lines, franchise utilities, and private stormwater facilities will be installed to serve the development. These utilities are currently available at the 37<sup>th</sup> Street and Oak Street intersection. An existing water pipe crosses the south side of Tax Lot 1200 and an existing stormwater pipe crosses the east side of Tax Lot 1200 and the east and south sides of Tax Lot 1100.

The project site is currently vacant land overgrown with coastal brush and trees. Topography is generally flat with an approximate gradient of less than 1-percent from north to south towards 35<sup>th</sup> Street. A steep sandy dune is located along the westerly side of the site. Proposed development will include clearing and grading of the site as needed. A preliminary site grading plan is included on the stormwater management plan in Appendix A. Local groundwater and surface water generally flows from the northeast to southwest towards the Siuslaw River. The tributary watershed upgradient (northeast) from the site consists predominantly of residential developed land.

According to the Natural Resources Conservation Service (NRCS) the site soils consists predominantly of Yaquina loamy fine sand with dune land on the westerly side. The permeability is listed as moderately rapid, and the water table is listed as typically between two feet below ground surface and two feet above ground surface.

#### **METHODOLOGY**

#### Existing Hydrologic Conditions

The Florence Storm Water Management Plan, October 2000, Figure 4-3 "Groundwater Elevation, Normal Year" shows that the groundwater gradient in vicinity of the site is

approximately one percent flowing from a northeasterly to southwesterly direction towards the Siuslaw River. The site soils are generally fine dune sand overlaid with a layer of vegetative mulch. There is no visible historic surface water discharge from the site, relying solely on groundwater infiltration for stormwater management.

Rain that falls onto the site collects temporarily in localized depressions and quickly infiltrates into the sand. During times of low groundwater levels there is no stormwater discharge from the site. During times of high groundwater levels water will come to the surface and pool in low areas on the southerly side of Tax Lot 1100 until eventually reaching the level that it can overflow the curb adjacent to 35<sup>th</sup> Street. Proposed development on Tax Lots 200 and 1200 will not alter the hydrologic conditions that currently occur on Tax Lot 1100. A stormwater management plan for development on Tax Lot 1100 will be addressed at the time of future development on this area of the site.

An existing 36-inch diameter storm pipe routes stormwater from residential development to the north across the east and south sides of the site to the intersection of 35<sup>th</sup> Street and Laurelwood Street. The pipe continues south in Laurelwood Street to 34<sup>th</sup> Place, turns east and south where it then discharges into an open conveyance. The open conveyance flows southerly and westerly to the Siuslaw River.

Runoff at the intersection of 37<sup>th</sup> Street and Oak Street is collected in a piped stormwater system that flows south in Oak Street to just north of 31<sup>st</sup> Street where the pipe discharges into an open conveyance on the west side of Oak Street. This conveyance flows westerly and combines with the open conveyance described above serving the 36-inch pipe from Laurelwood Street. To the extent practicable, runoff from the extension of 37<sup>th</sup> Street will not be directed into the Oak Street piped system.

#### Proposed Stormwater Management

Stormwater management for proposed development consists of stormwater runoff from the street being directed into street-side stormwater facilities. These facilities are sized to receive the road and sidewalk runoff only with the intent that runoff from impervious surfaces associated with the townhomes be directed into private on-site stormwater facilities. Both public and private facilities will rely on infiltration for stormwater disposal with overflow pipes from each facility connected to a public stormwater pipe to be installed in 37<sup>th</sup> Street. The public pipe will connect into the existing 36-inch stormwater pipe where it crosses the extension of 37<sup>th</sup> Street.

The <u>Florence Stormwater Management Design Manual</u>, <u>Revised September 2011</u> (Florence Stormwater Manual) requires treatment and flow control using vegetated surface facilities to the maximum extent feasible with the standard requirement to maintain peak flow rates at their predevelopment levels for up to the 25-year runoff events. In high groundwater areas, such as sites with Yaquina soil type, groundwater is to be addressed per the Florence Stormwater Manual. The proposed stormwater management approach addresses groundwater by incorporating an under-drain beneath the infiltration facility that is connected into the overflow pipe from each facility that then discharges into the public piped stormwater system. This is an approved method per the Florence Stormwater Manual.

Approved stormwater facilities include vegetated swales, rain gardens and planters. A combination of these facility types will be incorporated into the development. Street-side swales will be used predominantly for street runoff except where space limitations will require a planter. Vegetated basins (rain gardens) will be used predominantly for the townhome development except where space limitations will require a planter. Facility descriptions for vegetated swales, rain gardens and planters are excerpted from the Florence Stormwater Manual and included in Appendix C.

#### ANALYSIS

#### Presumptive Approach Analysis

The Florence Stormwater Manual requires that the Presumptive Approach be used for projects with new or redeveloped impervious area of 0.5 acre or greater, which applies to this project. Presumptive Approach calculations were performed utilizing the City of Eugene <u>Stormwater</u> <u>Surface Filtration/Infiltration Facility Sizing Spreadsheet</u>. This calculator is an Excel-based spreadsheet that is downloadable from the City of Eugene web page. Runoff calculations are based on unit hydrograph method for a 24-hour storm, NRCS Type 1A rainfall distribution.

Design storms for pollution reduction and flood control are based on a water quality rainfall depth of 0.8 inches and 25-year rainfall depth of 5.06 inches, respectively (from Table 4.1 of Florence Stormwater Manual).

The infiltration rate of dune sand is expected to be greater than 10 inches per hour, but the Florence Stormwater Manual limits the infiltration rate to the assumed long term infiltration rate for the growing medium, or 4 inches per hour.

A pre-development curve number (CN) of 73 is selected based on a Hydrologic Soil Group D and brush with greater than 75-pecent coverage. A post-development CN of 98 is selected for impervious surfaces.

For purposes of this preliminary design, the development area is delineated into drainage catchments served by individual stormwater facilities located within each catchment. Catchment areas are illustrated on the Tentative Stormwater Management Plan included in Appendix A and consists of pavement and walkway surfaces in the public street (Basin 1) and roof and pavement surfaces in the townhome subdivision (Basin 2). Stormwater facilities are included in the impervious surface area calculations.

Size of each stormwater facility is controlled by the required storage needed to fully infiltrate collected stormwater for the design storm, so if the facility size meets destination requirements,

then it also meets pollution reduction requirements. Facility sizing spreadsheets for each catchment area are included in Appendix B and summarized on the Tentative Stormwater Management Plan in Appendix A. Facilities located in the street (Basin 1) will be installed as part of 37<sup>th</sup> Street construction and will be publicly owned and maintained. Facilities located in the townhome subdivision (Basin 2) will be installed as part of private improvement construction and will be privately owned and maintained. Operation and Maintenance specifications for stormwater planters are included in Appendix C.

#### **Conveyance** Pipes

A stormwater conveyance pipe will be extended with street construction. The conveyance pipe will connect into an existing 36-inch diameter storm pipe that crosses the site on the east side. The conveyance pipe will extend to the east (East Pipe) and west (West Pipe) of an existing manhole that is located within the proposed street extension. The stormwater pipe will collect stormwater from public street-side facility overflows, private facility overflows, and facility under-drains. The conveyance pipes are sized to accommodate peak flow based on 25-year overflow from the tributary stormwater facilities. Calculation worksheets for pipe sizes are included in Appendix B. Peak flows are based on peak runoff rate calculations given in the facility sizing spreadsheet for a 25-year design storm, which results in a peak runoff rate of 0.0123 gpm per square foot impervious area. Peak flows and pipe sizes are summarized below.

Table 1. Conveyance Pipe Size Summary

Ding I D	Desing Sowed	Impervious	Peak	Pipe Size
Pipe I.D.	Dasins Served	Area, s.f.	Runoff, cfs	Required
West Pipe	1A, 1B, 1D, 1E, and 2A-2F	87,791	2.41	18" @ 0.5% slope
East Pipe	1C, 1F, and 2G	16,027	0.44	12" @ 0.5% slope

#### Escape Route

The street-side stormwater facilities and on-site private stormwater facilities will be installed with overflow pipes that discharge into a public piped system located in 37<sup>th</sup> Street. If the capacity in the stormwater facilities is exceeded, then stormwater from the subdivision will discharge into the existing 36-inch stormwater pipe on the east side of the site and drain southerly and westerly through a series of closed and open conveyances to the Siuslaw River.

#### **ENGINEERING CONCLUSIONS**

1. Florence standards require treatment and flow control using vegetated surface facilities to the maximum extent feasible with the standard requirement to maintain peak flow rates at their pre-development levels for up to the 25-year runoff events.

- 2. Site soils are predominantly loamy fine sand that are well suited for infiltration systems. Thus, vegetated infiltration facilities will be used on this site for final destination of stormwater runoff from impervious surfaces.
- 3. Adequate detention storage capacity can be provided using low impact development techniques, such as stormwater swales and planters installed adjacent to the street and vegetated basins and planters installed in the townhome subdivision common area. Surface runoff from pavement, roofs, and walks will be routed into the stormwater facilities. Overflow from these facilities will be directed into the piped stormwater system installed in the street.
- 4. Street-side facilities will be publicly owned and maintained and installed at the time of street construction. Common facilities in the townhome PUD will be privately owned and maintained by a homeowner association and installed at the time of private improvement construction.

# APPENDIX A FIGURES





# APPENDIX B SIZING SPREADSHEETS AND CALCULATIONS

EUGENE	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:	Myrtle Glenn PUD			Date:	2/1/2023	
Project Address	18-12-22-11-01200			Permit Number:	NA	
	Florence OR			Catchment ID:	14	
Decigner	Clint Boograft			Catchinent ID.	<u>N</u>	
Designer.	CIIII Deecroit					
Company:	EGR & Associates					
Instructions						
1. Complete this form for	occh drainago octob	mont in the project site t	hat is to be size	ad par the Breeum	ntivo Annroach	
2. Dravida a diatinativa C	each urainage calci	ment in the project site t		eu per ine Presum	plive Approach.	
2. Provide a distinctive C	atchment ID for each	racility coordinated with	the site basin	map to correlate th	e appropriate	
3 The maximum drainag	icinty. In catchment to be m	odeled per the Presumpt	ive Approach i	s 1 acre (43 560 S	E)	
A For infiltration facilities	in Close A or P soils	where no infiltration tooti	ng bas boon n	s Tacle (43,500 S	F) filtration rate of 0.5 in/br	
For all facilition use an	maximum coil infilled	ion rate of 2.5 in/hr for to	ng has been p	nedium		
For all facilities use a f	naximum soli inilitra	Ion rate of 2.5 m/m for to	pson/growing r	nedium.		
Design Requirements:						
Choose "Yes" from the d	ropdown boxes belov	v next to the design stand	dards requirem	ents for this facility		
Pollution Reduction	on (PR) Yes	1				
Flow Cont						
	(PC) Yes					
Destination	on (DT) Tes	*An infiltration facility must be o	chosen as the facili	ty type to meet destinati	on requirements	
Site Data-Post Develop	ment		_			
Total Square Footage Impervious Area= 1959 sqft Total Square Footage Pervious Area= 0 sqft						
Im	pervious Area CN=	98		Pervi	ous Area CN=	85
Total Square Footage	e of Drainage Area=	1959 sft	Time of Co	ncentration Post [	Development=	7 min
Wei	ghted Average CN=	98				
Site Data-Pre Developm	pent (Data in th	is section is only used	if Flow Contro	ol is required)		
				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
Pre	-Development CN=	/3	Time of Co	oncentration Pre-L	Development=	5 min
Soil Data						
Tested So	oil Infiltration Rate=	10 in/hr (See Not	e 4)	Destin	ation Design=	4 in/hr
Design So	oil Infiltration Rate=	4 in/hr		Soil In	filtration Rate	
Design Storms Used Fo	or Calculations					
Demularment	Deinfell Denth	Design Sterm				
Requirement Dollution Reduction		Weter Quelity				
Pollution Reduction	U.8 Inches	water Quality				
Flow Control	5.1 inches	Flood Control				
Destination 5.1 inches Flood Control						
Facility Data						
	Facility Type=	Infiltration Stormwater	Planter	Facility	Surface Area= 2	58 sqft
	Surface Width=	6 ft		Facility Surfa	ce Perimeter=	98 ft
	Surface Length=	43 ft		Facility	Bottom Area=	78 saft
Fa	acility Side Slopes=	4 to 1		Facility Botto	om Perimeter=	82 ft
Max. F	Ponding Depth					
in Storr	nwater Facility=	6 in		В	asin Volume= 88	3.0 cf
Depth of Grow	ing Medium (Soil)=	18 in	Ratio of Fa	cility Area to Imp	ervious Area= 0.1	32

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Pollution Reduction-Calculation Results						
Peak Flow Rate to Stormwater Facility = 0.008 cfs	Peak Facility Overflow Rate= 0.000 cfs					
Total Runoff Volume to Stormwater	·					
Facility = 102 cf	Total Overflow Volume= 0 cf					
Max. Depth of Stormwater in Facility= 0.0 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 Hor	ır Drawdown Time?					
Flow Control-Calculation Results						
Peak Flow Rate to Stormwater Facility = 0.056 cfs	Peak Facility Overflow Rate= 0.000 cfs					
Total Runoff Volume to Stormwater						
Facility = 785 cf	Total Overflow Volume=0 cf					
	Peak Off-Site Flow Rate					
Max. Depth of Stormwater in Facility= 5.8 in	Filtration Facility Underdrain= N\A cfs					
Drawdown Time= 0.2 hours						
Pre-Development Runoff Data         Peak Flow Rate =         0.025 cfs         Total Runoff Volume =         380 cf         Yes         Facility Sizing Meets Flow Control Standard         YES         Meets Requirement for Post Development for YES         Meets Requirement for Maximum of 18 Hot	is? offsite flow less or equal to Pre-Development Flow? or Drawdown Time?					
Destination-Calculation Results						
Peak Flow Rate to Stormwater Facility = 0.056 cfs	Peak Facility Overflow Rate= 0.000 cfs					
Total Runoff Volume to Stormwater						
Facility = 785 cf	Total Overflow Volume= 0 cf					
Max. Depth of Stormwater in Facility= 5.8 in						
Drawdown Time= 0.2 hours						
Yes Facility Sizing Meets Destination Standards	?					
YES Meets Requirement of No Facility Flooding YES Meets Requirement for Maximum of 30 hou	? r Drawdown Time?					

EUGENE	Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet 24 Hour Storm, NRCS Type 1A Rainfall Distribution City of Eugene					
Deciset Information	version 2.1					
Project Information						
Project Name:	Myrtle Glenn PUD		Date:	2/1/2023		
Project Address:	18-12-22-11-01200		Permit Number:	NA		
	Florence, OR		Catchment ID:	<u>1B</u>		
Designer:	Clint Beecroft					
Company:	EGR & Associates					
Instructions:						
1. Complete this form for	each drainage catch	ment in the project site that i	s to be sized per the Presum	ptive Approach.		
2. Provide a distinctive C calculations with the fa	atchment ID for each	facility coordinated with the	site basin map to correlate th	e appropriate		
3. The maximum drainag	e catchment to be m	odeled per the Presumptive	Approach is 1 acre (43,560 S	F)		
4.For infiltration facilities	in Class A or B soils	where no infiltration testing h	as been perfromed use an in	filtration rate of 0.5 in/hr.		
For all facilities use a	maximum soil infiltrat	ion rate of 2.5 in/hr for topso	l/growing medium.			
Design Requirements:						
Choose "Yes" from the d	ropdown boxes belov	v next to the design standard	s requirements for this facility	1.		
Pollution Peductio		l l				
Fondion Reducin	rol (EC) Vos					
Flow Cont	rol (FC) Tes					
Destinati	on (DT) Yes	*An infiltration facility must be chose	n as the facility type to meet destinati	on requirements		
Site Data-Post Develop	ment					
Total Square Footage Impervious Area= 8672 sqft Total Square Footage Pervious Area= 0 sqft						
Im	pervious Area CN=	98	Pervi	ous Area CN= 85		
				P		
Total Square Footage	e of Drainage Area=	8672 sft T	ime of Concentration Post [	Development=10 min		
Wei	ghted Average CN=	98				
Site Data-Pre Developm	ent (Data in th	is section is only used if F	low Control is required)			
Pre	-Development CN=	73	Fime of Concentration Pre-	Development= 5 min		
Soil Data						
Tested So	oil Infiltration Rate=	10 in/hr (See Note 4)	Destin	ation Design=		
Design So	oil Infiltration Rate=	4 in/hr	Soil In	filtration Rate		
Design Storms Used Fo	or Calculations					
Demuinement	Deinfell Denth	Design Starm				
Requirement		Weter Oustin				
	U.0 INCNES	Flood Control				
Piow Control	5.1 inches					
	5. Tincnes					
Facility Data						
	Facility Type=	Infiltration Stormwater Pla	nter Facility	Surface Area= 1134 sqft		
	Surface Width=	6 ft	Facility Surfa	ce Perimeter= 390 ft		
	Surface Length=	189 ft	Facility	Bottom Area= 370 sqft		
Fa Fa	cility Side Slopes=	4 to 1	Facility Botto	m Perimeter= 374 ft		
Max. I	Ponding Depth					
in Storr	nwater Facility=	6 in	В	asin Volume= 380.0 cf		
Depth of Grow	ing Medium (Soil)=	18 in	Ratio of Facility Area to Imp	ervious Area= 0.131		

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Pollution Reduction-Calculation Results							
Peak Flow Rate to Stormwater Facility = 0.032 cfs	Peak Facility Overflow Rate= 0.000 cfs						
Total Runoff Volume to Stormwater							
Facility = 451 cf	Total Overflow Volume= 0 cf						
Max. Depth of Stormwater in Facility= 0.0 in							
Drawdown Time= 0.2 hours							
Yes Facility Sizing Meets Pollution Reduction Standards?							
YES Meets Requirement of No Facility Floodin	ng?						
YES Meets Requirement for Maximum of 18 He	our Drawdown Time?						
Flow Control-Calculation Results							
Peak Flow Rate to Stormwater Facility = 0.238 cfs	Peak Facility Overflow Rate= 0.000 cfs						
Total Runoff Volume to Stormwater	·						
Facility = 3471 cf	Total Overflow Volume=0 cf						
	Peak Off-Site Flow Rate						
Max. Depth of Stormwater in Facility= 5.8 in	Filtration Facility Underdrain= NVA cfs						
Drawdown Time= 0.2 hours							
Pre-Development Runoff Data							
Peak Flow Rate = 0.112 cfs							
Yes Facility Sizing Meets Flow Control Standa	rds?						
YES Meets Requirement for Post Developmen	t offsite flow less or equal to Pre-Development Flow?						
TES Meets Requirement for Maximum of 18 Ho							
Destination-Calculation Results							
Peak Flow Rate to Stormwater Facility = 0.238 cfs	Peak Facility Overflow Rate= 0.000 cfs						
Total Runoff Volume to Stormwater	Total Overflew Velumer						
Facility = 34/1 cr							
Drawdown Time= 0.2 hours							
Yes Facility Sizing Meets Destination Standard	ds?						
YES Meets Requirement of No Facility Floodin	aa?						
YES Meets Requirement for Maximum of 30 ho	our 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:	Myrtle Glenn PUD		Date: 2/1/2023			
Project Address:	18-12-22-11-01200		Permit Number: NA			
'''	Florence OR		Catchment ID: 1C			
Designer:	Clint Beecroft					
Company:	FGR & Associates					
Company.	LOIL & POODIACO					
Instructions:						
1 Complete this form for	each drainage catchmer	nt in the project site that is to be si	zed per the Presumptive Approach			
2. Provide a distinctive C	each urainage calchiner	sility apardinated with the site hasi	a man to correlate the appropriate			
2. Provide a distinctive C	atchment ID for each fac	any coordinated with the site basin	i map to correlate the appropriate			
Calculations with the la	scillty.		in 1 mm (42 ECO CE)			
3. The maximum drainag	e catchment to be model	led per the Presumptive Approach	IS Lacre (43,500 SF)			
4.For inflitration facilities	In Class A or B soils whe	ere no inflitration testing has been	perfromed use an inflitration rate of 0.5 in/nr.			
For all facilities use a	maximum soil infiltration r	rate of 2.5 in/hr for topsoil/growing	medium.			
Design Requirements:						
Choose "Yes" from the d	ropdown boxes below ne:	xt to the design standards require	ments for this facility.			
Dellution Deducti				1		
Pollution Reducti	on (PR) res					
Flow Cont	rol (FC) Yes					
Destinati	on (DT) Yes *An i	infiltration facility must be chosen as the fac	ility type to meet destination requirements			
Site Data-Post Development						
Total Square Footage Impervious Area= 3860 soft Total Square Footage Pervious Area=						
Impanyious Area CN= 08 Bassious Area CN= 05						
Total Square Footag	e of Drainage Area=	3860 sft Time of C	oncentration Post Development=	in		
Wei	abted Average CN=	98				
Site Data-Pre Developm	ent (Data in this s	ection is only used if Flow Cont	rol is required)			
Pro	-Development CN=	73 Time of 0	Concentration Pre-Development=	in		
Soil Data						
Tested S	oil Infiltration Rate=	10 in/hr (See Note 4)	Destination Design=	/hr		
Design S	oil Infiltration Rate=	4 in/hr	Soil Infiltration Rate			
Dealers Oferma Hand F	- Oslavlations					
Design Storms Used Fo	or Calculations					
Requirement	Rainfall Depth Des	sign Storm				
	0.8 inches Wat	ter Quality				
Pollution Reduction		10 1 1				
Flow Control	5.1 inches Floo	od Control				
Pollution Reduction Flow Control Destination	5.1 inches Floo 5.1 inches Floo	od Control				
Pollution Reduction Flow Control Destination	5.1 inches Floo 5.1 inches Floo	od Control				
Pollution Reduction Flow Control Destination Facility Data	5.1 inches Flor	od Control od Control	Facility States Arrow Freedom	0		
Pollution Reduction Flow Control Destination Facility Data	5.1 inches Flor 5.1 inches Flor Facility Type= Infil	Itration Stormwater Planter	Facility Surface Area= 504 sq	ft		
Pollution Reduction Flow Control Destination Facility Data	5.1 inches Flor 5.1 inches Flor Facility Type= Infil Surface Width=	Itration Stormwater Planter	Facility Surface Area= 504 sq Facility Surface Perimeter= 180 ft	ft		
Pollution Reduction Flow Control Destination Facility Data	5.1 inches Flor 5.1 inches Flor Facility Type= Infil Surface Width= Surface Length=	Itration Stormwater Planter 6 ft 84 ft	Facility Surface Area= 504 sq Facility Surface Perimeter= 180 ft Facility Bottom Area= 160 sq	ft		
Pollution Reduction Flow Control Destination Facility Data	5.1 inches Flor 5.1 inches Flor Facility Type= Infil Surface Width= Surface Length= acility Side Slopes=	Itration Stormwater Planter 6 ft 84 ft 4 to 1	Facility Surface Area=       504 sq         Facility Surface Perimeter=       180 ft         Facility Bottom Area=       160 sq         Facility Bottom Perimeter=       164 ft	ft		
Pollution Reduction Flow Control Destination Facility Data	5.1 inches Flor 5.1 inches Flor Facility Type= Infi Surface Width= Surface Length= acility Side Slopes= Ponding Depth	Itration Stormwater Planter 6 ft 84 ft 4 to 1	Facility Surface Area=       504 sq         Facility Surface Perimeter=       180 ft         Facility Bottom Area=       160 sq         Facility Bottom Perimeter=       164 ft	ft		
Pollution Reduction Flow Control Destination Facility Data Facility Data	5.1 inches Flor 5.1 inches Flor Facility Type= Infi Surface Width= Surface Length= acility Side Slopes= Ponding Depth nwater Facility=	Itration Stormwater Planter 6 ft 84 ft 4 to 1 6 in	Facility Surface Area=       504 sq         Facility Surface Perimeter=       180 ft         Facility Bottom Area=       160 sq         Facility Bottom Perimeter=       164 ft         Basin Volume=       170.0 cf	ft ft		

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Pollution Reduction-Calculation Results							
Peak Flow Rate to Stormwater Facility = 0.014 cfs	Peak Facility Overflow Rate= 0.000 cfs						
Total Runoff Volume to Stormwater							
Facility = 201 cf	Total Overflow Volume= 0 cf						
Max. Depth of Stormwater in Facility= 0.0 in							
Drawdown Time= 0.2 hours							
Yes Facility Sizing Meets Pollution Reduction Standards?							
YES Meets Requirement of No Facility Flooding	g?						
YES Meets Requirement for Maximum of 18 Ho	our Drawdown Time?						
Flow Control-Calculation Results							
Peak Flow Rate to Stormwater Facility = 0.106 cfs	Peak Facility Overflow Rate= 0.000 cfs						
Total Runoff Volume to Stormwater							
Facility = 1545 cf	Total Overflow Volume=0cf						
	Peak Off-Site Flow Rate						
Max. Depth of Stormwater in Facility= 5.8 in	Filtration Facility Underdrain= N\A cfs						
Drawdown Time= 0.2 hours							
Pre-Development Runoff Data Peak Flow Rate = 0.050 cfs Total Runoff Volume = 749 cf Yes Facility Sizing Meets Flow Control Standau	rds?						
YES Meets Requirement for Post Development YES Meets Requirement for Maximum of 18 Ho	offsite flow less or equal to Pre-Development Flow? our Drawdown Time?						
Destination-Calculation Results							
Peak Flow Rate to Stormwater Facility = 0.106 cfs Total Runoff Volume to Stormwater	Peak Facility Overflow Rate= 0.000 cfs						
Facility = 1545 cr							
Drawdown Time= 0.2 hours							
Yes Facility Sizing Meets Destination Standard	s?						
YES Meets Requirement of No Facility Flooding YES Meets Requirement for Maximum of 30 ho	g? ur Drawdown Time?						

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EUGENE	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:	Myrtle Gle	n Subdiv	ision		Date:	2/1/2023	
Project Address:	<u>18-12-22-1</u>	1-01200			Permit Number:	NA NA	
	Florence,	OR			Catchment ID:	1D	
Designer:	Clint Beec	roft				39	
Company	EGP & As	sociatos					
Company.	LONGAS	Sociales					
Instructions:					desette Deserve	- 4: A	
1. Complete this form for	each draina	age catch	ment in the project site th		ed per the Presum	puve Approach.	
2. Provide a distinctive C	atchment ID	) for each	facility coordinated with	the site basin	map to correlate th	e appropriate	
calculations with the fa	acility.						
3. The maximum drainag	je catchmen	t to be m	odeled per the Presumpt	ive Approach i	s 1 acre (43,560 S	F)	
4.For infiltration facilities	in Class A d	or B soils	where no infiltration testi	ng has been p	erfromed use an in	filtration rate of 0.5 ir	n/hr.
For all facilities use a	maximum so	oil infiltrat	ion rate of 2.5 in/hr for to	, psoil/growing n	nedium.		
Dealer Dealer to							
Design Requirements:							
Choose "Yes" from the d	ropdown bo	xes belov	v next to the design stand	lards requirem	ents for this facility	/.	
Pollution Poducti		Vac					
Pollution Reducti		Tes					
Flow Cont	rol (FC)	Yes					
Destinati	on (DT)	Yes	*An infiltration facility must be c	hosen as the facili	ty type to meet destinati	ion requirements	
			.)				
Site Data-Post Develop	ment						
Total Square Footage Impervious Area= 4785 sqft Total Square Footage Pervious Area= 0 sqft							
In	npervious A	rea CN=	98		Pervi	ious Area CN=	85
Total Square Footage	e of Drainag	ge Area=	4785 sft	Time of Cor	ncentration Post I	Development=	10 min
Wei	ahted Aver	age CN=	98				
	gintou r tr or	age en					
Site Data-Pre Developm	nent (C	Data in th	is section is only used	if Flow Contro	ol is required)		
Pre	-Developm	ent CN=	73	Time of Co	oncentration Pre-	Development=	5 min
Soil Data							
Tested S	oil Infiltratio	on Rate=	10 in/hr (See Not	e 4)	Destin	ation Design=	4 in/hr
Design Se	oil Infiltratio	on Rate=	4 in/hr		Soil In	filtration Rate	
Design Storms Used Fo	or Calculati	ons					
Requirement	Rainfall	Depth	Design Storm				
Pollution Reduction	0.8/in	ches	Water Quality				
Flow Control	E 1	choc	Flood Control				
	5.1 In	ches					
Destination	5.1 (in	cnes	FIDDA CONTROL				
Facility Data							
	Easili	ty Typo-	Infiltration Stormwater	Planter I	Essilia	Surface Area-	343 soft
	Facili	ty type=	a slow	riditter	Facility Conf	Surface Area-	000 4
	Surface	e width=	3.5 ft		Facility Surfa	ce Perimeter=	203 π
	Surface	Length=	98 ft		Facility	Bottom Area=	343 sqft
Fa Fa	acility Side	Slopes=	0 to 1		Facility Botto	om Perimeter=	203 ft
Max.	Ponding De	epth					
in Stor	mwater Fac	ility=	10 in		B	Basin Volume=	285.8 cf
Depth of Grow	ing Mediur	n (Soil)=	18 in	Ratio of Fa	cility Area to Imp	ervious Area=	0.072
	-						

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Pollution Reduction-Calculation Results							
Peak Flow Rate to Stormwater Facility = 0.018 cfs	Peak Facility Overflow Rate= 0.000 cfs						
Total Runoff Volume to Stormwater							
Facility = 249 cf	Total Overflow Volume= 0 cf						
Max. Depth of Stormwater in Facility= 0.0 in							
Drawdown Time= 0.2 hours							
Yes Facility Sizing Meets Pollution Reduction Standards?							
YES Meets Requirement of No Facility Flo	boding?						
YES Meets Requirement for Maximum of	18 Hour Drawdown Time?						
Flow Control-Calculation Results							
Peak Flow Rate to Stormwater Facility = 0.131 cfs	Peak Facility Overflow Rate= 0.000 cfs						
Total Runoff Volume to Stormwater							
Facility = 1915 cf	Total Overflow Volume= 0 cf						
	Peak Off-Site Flow Rate						
Max. Depth of Stormwater in Facility= 9.3 in	Filtration Facility Underdrain= N\A cfs						
Drawdown Time= 0.2 hours							
Pre-Development Runoff Data							
Peak Flow Rate = 0.062 cfs							
Total Runoff Volume = 928 cf							
Yes Facility Sizing Meets Flow Control Sta	ndards?						
YES Meets Requirement for Post Develop YES Meets Requirement for Maximum of	ment offsite flow less or equal to Pre-Development Flow? 18 Hour Drawdown Time?						
Destination-Calculation Results							
Peak Flow Rate to Stormwater Facility = 0.131 ofs	Peak Facility Overflow Rate= 0.000 cfs						
Total Runoff Volume to Stormwater							
Facility = 1915 cf	Total Overflow Volume= 0 cf						
Max. Depth of Stormwater in Facility= 9.3 in							
Drawdown Time= 0.2 hours							
Yes Facility Sizing Meets Destination Stan	dards?						
YES Meets Requirement of No Facility Flor YES Meets Requirement for Maximum of	ooding? 30 hour Drawdown Time?						

EUGENE	Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet 24 Hour Storm, NRCS Type 1A Rainfall Distribution City of Eugene						
Project Information							
Project Name:	Myrtle Glenn BLID		_	Date	2/1/2023		
Project Name:	18 42 22 44 04200			Date.	2/1/2023		
Project Address:	16-12-22-11-01200			Permit Number:	NA		
	Florençe, OR			Catchment ID:	<u>1E</u>		
Designer:	Clint Beecroft						
Company:	EGR & Associates						
Instructions:							
1. Complete this form for	each drainage catch	ment in the project site	that is to be siz	ed per the Presum	otive Approach.		
2. Provide a distinctive C	atchment ID for each	facility coordinated with	h the site basin	map to correlate th	e appropriate		
calculations with the fa	acility.						
3. The maximum drainag	e catchment to be m	odeled per the Presump	otive Approach i	s 1 acre (43,560 S	F)		
4.For infiltration facilities	in Class A or B soils	where no infiltration test	ting has been p	erfromed use an in	, filtration rate of 0.	.5 in/hr.	
For all facilities use a	maximum soil infiltrat	ion rate of 2.5 in/hr for to	opsoil/arowina r	medium.			
			opeenigreeningr				
Design Requirements:							
Choose "Yes" from the d	ropdown boxes belov	v next to the design star	ndards requirem	ents for this facility	ι.		
Pollution Reducti		1					
Flow Cont	rol (FC) Tes						
Destinati	on (DT) Yes	*An infiltration facility must be	chosen as the facil	ity type to meet destination	ion requirements		
	H)						
Site Data-Post Development							
Total Square Footage Impervious Area= 5366 sqft Total Square Footage Pervious Area= 0 sqft							
l In	pervious Area CN=	98		Pervi	ous Area CN=	85	
	•						
Total Square Footag	e of Drainage Area=	5366 sft	Time of Co	ncentration Post I	Development=	10 min	
Wei	ahted Average CN=	98			L		
	ginear to enage out						
Site Data-Pre Developh	nent (Data in tr	is section is only used	a if Flow Contr	oi is requirea)			
Pre	e-Development CN=	73	Time of Co	oncentration Pre-I	Development=	5 min	
Soil Data							
Tested Se	oil Infiltration Rate=	10 in/hr (See No	ote 4)	Destin	ation Design=[	4 in/hr	
Design Se	oil Infiltration Rate=	-4 in/hr		Soil In	filtration Rate		
Design Storms Used Fo	or Calculations						
Requirement	Rainfall Depth	Design Storm	1				
Pollution Reduction	0.8 inches	Water Quality	1				
Flow Control	5 1 inches	Flood Control	1				
Destination	5.1 inches	Flood Control	1				
Facility Data							
	Facility Type=	Infiltration Stormwate	er Planter	Facility	Surface Area=	702 sqft	
	Surface Width=	6 ft		Facility Surfa	ce Perimeter=	246 ft	
	Surface Length=	117 ft		Facility	Bottom Area=	226 sqft	
E E	acility Side Slopes=	4 to 1		Facility Botto	m Perimeter=	230 ft	
Max	Ponding Depth				F		
in Stor	mwater Facility=	6 in		B	asin Volume=	236.0 cf	
Depth of Grow	/ing Medium (Soil)=	18 in	Ratio of Fa	acility Area to Imp	ervious Area=	0.131	

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Pollution Reduction-Calculation Results				
Peak Flow Rate to Stormwater Facility = 0.020 cfs	Peak Facility Overflow Rate= 0.000 cfs			
Total Runoff Volume to Stormwater				
Facility = 279 cf	Total Overflow Volume= 0 cf			
Max. Depth of Stormwater in Facility= 0.0 in				
Drawdown Time= 0.2 hours				
Yes Facility Sizing Meets Pollution Reductio	n Standards?			
YES Meets Requirement of No Facility Floor	ding?			
YES Meets Requirement for Maximum of 18	Hour Drawdown Time?			
Flow Control-Calculation Results				
Peak Flow Rate to Stormwater Facility = 0 147 cfs	Peak Facility Overflow Rate= 0.000 cfs			
Total Runoff Volume to Stormwater				
Facility = 2148 cf	Total Overflow Volume= 0 cf			
	Peak Off-Site Flow Rate			
Max. Depth of Stormwater in Facility= 5.8 in	Filtration Facility Underdrain= N\A cfs			
Drawdown Time= 0.2 hours				
Pre-Development Runoff Data				
Peak Flow Rate = 0.069 cfs				
Total Runoff Volume = 1041 cf				
Yes Facility Sizing Meets Flow Control Stand	dards?			
YES Meets Requirement for Post Developmed YES Meets Requirement for Maximum of 18	ent offsite flow less or equal to Pre-Development Flow? Hour Drawdown Time?			
Destination-Calculation Results				
Peak Flow Rate to Stormwater Facility = 0.147 cfs Total Runoff Volume to Stormwater	Peak Facility Overflow Rate= 0.000 cfs			
Facility = 2148 cf	Total Overflow Volume=0 cf			
Max. Depth of Stormwater in Facility= 5.8 in				
Drawdown Time= 0.2 hours				
Yes Facility Sizing Meets Destination Standa	ards?			
YES Meets Requirement of No Facility Flooding? YES Meets Requirement for Maximum of 30 hour Drawdown Time?				

-					
EUGENE	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:	Myrtle Glenn PUD		Date	: <mark>2/1/2023</mark>	
Project Address:	<u>18-12-22-11-01200</u>		Permit Number	: <mark>NA</mark>	
	Florence, OR		Catchment ID:	<u>1F</u>	
Designer:	Clint Beecroft				
Company:	EGR & Associates				
Instructions:					
<ol> <li>Complete this form for</li> <li>Provide a distinctive C calculations with the fa</li> <li>The maximum drainag</li> <li>For infiltration facilities For all facilities use a list</li> </ol>	each drainage catch atchment ID for each acility. Je catchment to be m in Class A or B soils maximum soil infiltrat	ment in the project site that facility coordinated with the odeled per the Presumptive where no infiltration testing ion rate of 2.5 in/hr for top:	at is to be sized per the Presum ne site basin map to correlate th re Approach is 1 acre (43,560 S g has been perfromed use an ir soil/arowing medium.	ptive Approach. ne appropriate SF) nfiltration rate of 0.5 in/hr.	
Design Requirements:					
Choose "Yes" from the d	ropdown boxes below	v next to the design standa	ards requirements for this facilit	у.	
Pollution Reducti Flow Contr Destinati	on (PR) Yes rol (FC) Yes on (DT) Yes	*An infiltration facility must be ch	osen as the facility type to meet destina	tion requirements	
Site Data-Post Develop	ment				
Total Square Footag	Total Square Footage Impervious Area=       4574       sqft       Total Square Footage Pervious Area=       0       sqft         Impervious Area CN=       98       Pervious Area CN=       85				
Total Square Footage Wei	e of Drainage Area= ghted Average CN=	4574 sft 98	Time of Concentration Post	Development= 10 min	
Site Data-Pre Developm	nent (Data in th	is section is only used if	Flow Control is required)		
Pre	e-Development CN=	73	Time of Concentration Pre-	Development= 5 min	
Soil Data					
Tested So Design So	oil Infiltration Rate= oil Infiltration Rate=	10 in/hr (See Note 4 in/hr	4) Destir Soil I	nation Design= 4 in/hr nfiltration Rate	
Design Storms Used For Calculations					
Requirement	Rainfall Depth	Design Storm			
Pollution Reduction	0.8 inches	Water Quality			
Flow Control	5.1 inches	Flood Control			
Destination	5,1 inches	Flood Control			
racility Data					
	Facility Type=	Infiltration Stormwater F	Planter Facility	Surface Area= 696 sqft	
	Surface Width=	6 ft	Facility Surfa	ace Perimeter= 244 ft	
	Surface Length=	116 ft	Facility	Bottom Area= 224 sqft	
Fa	acility Side Slopes=	4 to 1	Facility Bott	om Perimeter= 228 ft	
Max. Ponding Depth					
Depth of Growing Medium (Soil)=  18 in Ratio of Facility Area to Impervious Area=  0.152					

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Pollution Reduction-Calculation Results				
Peak Flow Rate to Stormwater Facility = 0.017 cfs	Peak Facility Overflow Rate= 0.000 cfs			
Total Runoff Volume to Stormwater	· []			
Facility = 238 cf	Total Overflow Volume= 0 cf			
Max. Depth of Stormwater in Facility= 0.0 in				
Drawdown Time= 0.2 hours				
<b>Yes</b> Facility Sizing Meets Pollution Reduction	on Standards?			
YES Meets Requirement of No Facility Floor	ding?			
YES Meets Requirement for Maximum of 18	Hour Drawdown Time?			
Flow Control-Calculation Results				
Peak Flow Rate to Stormwater Facility = 0 125 cfs	Peak Facility Overflow Rate= 0.000 cfs			
Total Runoff Volume to Stormwater				
Facility = 1831 cf	Total Overflow Volume= 0 cf			
	Peak Off-Site Flow Rate			
Max. Depth of Stormwater in Facility= 4.9 in	Filtration Facility Underdrain= NVA cfs			
Drawdown Time= 0.2 hours				
Pre-Development Runoff Data				
Peak Flow Rate = 0.059 cfs				
Total Runoff Volume = 887 cf				
Yes Facility Sizing Meets Flow Control Stand	dards?			
YES Meets Requirement for Post Developm YES Meets Requirement for Maximum of 18	ent offsite flow less or equal to Pre-Development Flow? Hour Drawdown Time?			
Destination-Calculation Results				
Peak Flow Rate to Stormwater Facility = 0.125 cfs	Peak Facility Overflow Rate= 0.000 cfs			
Total Runoff Volume to Stormwater				
Facility = 1831 cf	Total Overflow Volume=0 cf			
Max. Depth of Stormwater in Facility= 4.9 in				
Drawdown Time= 0.2 hours				
Yes Facility Sizing Meets Destination Standa	ards?			
YES Meets Requirement of No Facility Floor	dina?			
YES Meets Requirement for Maximum of 30 hour Drawdown Time?				

EUGENE	Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet 24 Hour Storm, NRCS Type 1A Rainfall Distribution City of Eugene					
	Version 21					
Project Information			1000			
Project Name:	Myrtle Glenn PUD			Date:	2/1/2023	
Project Address:	18-12-22-11-01200			Permit Number:	NA	
	Florence, OR			Catchment ID:	1G	
Designer:	Clint Beecroft					
Company:	FGR & Associates					
[	E Str. of Mary and a street of					
Instructions:						
1 Complete this form for	r each drainage catch	ment in the project site th	at is to be siz	ed per the Presum	tive Approach	
2 Provide a distinctive C	atchment ID for each	facility coordinated with t	he site basin	map to correlate th	e appropriate	
calculations with the fa	acility					
3 The maximum drainag	ie catchment to be m	odeled ner the Presumptiv	Annroach	is 1 acre (43 560 SI	Ξ)	
4 For infiltration facilities	in Class A or B soils	where no infiltration testin	a has heen n	erfromed use an in	iltration rate of 0	5 in/hr
For all facilities use a	maximum soil infiltrat	ion rate of 2.5 in/br for ton	soil/growing	medium	initiation rate of 0.5	5 11/11.
T OF All TACILITIES USE A			soli/growing			
Design Requirements:						
Choose "Yes" from the d	ropdown boxes belov	v next to the design stand	ards requiren	nents for this facility		
Pollution Reductiv		l'				
Flow Cont						
Flow Cont	rol (FC) Yes					
Destination	on (DT) Yes	*An infiltration facility must be ch	iosen as the facil	lity type to meet destinati	on requirements	
Olfe Date Date Date			_			
Site Data-Post Development						
Total Square Footage Impervious Area= 2858 sqft Total Square Footage Pervious Area= 0 sqft						
Impervious Area CN= 98 Pervious Area CN= 85						
Total Square Footage	e of Drainage Area=	2858 sft	Time of Co	ncentration Post	Development=	10 min
Wei	ghted Average CN=	98				
Site Date Bre Developm	Data in th	is section is only used i	Elow Contr	ol in required)		
Site Data-Pre Developin	ient (Data in th	is section is only used i	r Flow Contr	oi is required)		
Pre	e-Development CN=	73	Time of C	oncentration Pre-D	Development=	5 min
Soll Data						
Tested So	oil Infiltration Rate=	10 in/hr (See Note	4)	Destin	ation Design=[	4 in/hr
Design So	oil Infiltration Rate=	4 in/hr		Soil In	filtration Rate	
Design Storms Used For Calculations						
Paguiramar4	Painfall Danth	Decian Storm				
Pollution Deduction		Water Quality				
Follution Reduction	U.O INCNES	Vivater Quality				
Flow Control	5.1 inches	Flood Control				
Destination 5.1 inches Flood Control						
Facility Data						
	Facility Type=	Infiltration Stormwater	Planter	Facility S	Surface Area=	390 sqft
	Surface Width=	6 ft		Facility Surfa	ce Perimeter=	142 ft
	Surface Length=	65 ft		Facility	Bottom Area	122 saft
F:	acility Side Slopes=	4 to 1		Facility Botto	m Perimeter=	126 ft
May	Ponding Depth			. acinty Botto		
in Stormwater Facility= 6 in Basin Volume= 132 0 of						
Depth of Growing Medium (Soil)= 18 in Ratio of Facility Area to Impervious Area= 0 136						

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Pollution Reduction-Calculation Results				
Peak Flow Rate to Stormwater Facility = 0.011 cfs	Peak Facility Overflow Rate= 0.000 cfs			
Total Runoff Volume to Stormwater				
Facility = 149 cf	Total Overflow Volume= 0 cf			
Max. Depth of Stormwater in Facility= 0.0 in				
Drawdown Time= 0.2 hours	S			
Yes         Facility Sizing Meets Pollution	n Reduction Standards?			
YES Meets Requirement of No R YES Meets Requirement for Max	Facility Flooding? ximum of 18 Hour Drawdown Time?			
Flow Control-Calculation Results				
Peak Flow Rate to Stormwater Facility = 0.078 cfs	Peak Facility Overflow Rate= 0.000 cfs			
Total Runoff Volume to Stormwater				
Facility = 1144 cf	Total Overflow Volume=0cf			
	Peak Off-Site Flow Rate			
Max. Depth of Stormwater in Facility= 5.5 in	Filtration Facility Underdrain= NVA cfs			
Drawdown Time= 0.2 hours	5			
Pre-Development Runoff Data Peak Flow Rate = 0.037 cfs Total Runoff Volume = 554 cf				
Facility Sizing Meets Flow Co	ntrol Standards?			
YES Meets Requirement for Pos YES Meets Requirement for Max	st Development offsite flow less or equal to Pre-Development Flow? kimum of 18 Hour Drawdown Time?			
Destination-Calculation Results				
Peak Flow Rate to Stormwater Facility = 0.078 cfs Total Runoff Volume to Stormwater	Peak Facility Overflow Rate= 0.000 cfs			
Facility = 1144 cf	Total Overflow Volume=0cf			
Max. Depth of Stormwater in Facility= 5.5 in				
Drawdown Time= 0.2 hours	5			
Yes Facility Sizing Meets Destination Standards?				
YES Meets Requirement of No Facility Flooding? YES Meets Requirement for Maximum of 30 hour Drawdown Time?				

EUGENE	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:	Myrtle Glenn PUD			Date: 2/1/2023	
Project Address:	18-12-22-11-01200			Permit Number: NA	
1	Florence, OR			Catchment ID: 1H	
Designer:	Clint Beecroft				
Company:	EGR & Associates				
[					
Instructions:					
1. Complete this form for	each drainage catch	ment in the project site that is	to be size	ed per the Presumptive Approach.	
2 Provide a distinctive C	atchment ID for each	facility coordinated with the s	ite basin i	map to correlate the appropriate	
calculations with the fa	acility				
3 The maximum drainad	e catchment to be m	odeled per the Presumptive A	nnroach i	s 1 acre (43 560 SE)	
4 For infiltration facilities	in Class A or B soils	where no infiltration testing ha	s heen n	erfromed use an infiltration rate of 0.5 in/br	
For all facilities use a	maximum soil infiltrat	ion rate of 2.5 in/hr for tonsoil/	arowina r	nedium	
T OF All facilities use a			growing i		
Design Requirements:					
Choose "Yes" from the d	ropdown boxes belov	v next to the design standards	requirem	ents for this facility.	
Pollution Reducti					
Fondton Reduction					
Flow Cont	rol (FC) Yes				
Destinati	on (DT) Yes	*An infiltration facility must be chosen	as the facili	ty type to meet destination requirements	
Site Data-Post Develop	ment				
Total Square Footag	Total Square Footage Impervious Area= 5765 sqft Total Square Footage Pervious Area= 0 sqft				
l Im	pervious Area CN=	98		Pervious Area CN=	
Total Square Footage	e of Drainage Area=	5765 sft Tin	ne of Coi	ncentration Post Development=	min
Wei	ghted Average CN=	98			
Olto Data Das Davidas			0 1	1. · · ·	
Site Data-Pre Developm	ient (Data in th	is section is only used if Flo	ow Contro	ol is required)	
Pre	-Development CN=	73 Ti	ime of Co	oncentration Pre-Development=	min
Soil Data					
Tested So	oil Infiltration Rate=	10 in/hr (See Note 4)		Destination Design=	lin/hr
Design So	oil Infiltration Rate=	4 in/hr		Soil Infiltration Rate	
Design Storms Lised Ed	or Calculations				
besign otorinis osed i e			_		
Requirement	Rainfall Depth	Design Storm			
Pollution Reduction	0.8 inches	Water Quality			
Flow Control	5.1 inches	Flood Control			
Destination	5.1 inches	Flood Control			
Facility Data					
	Feelliter True	Infilmation Chammer to Di	44.0 1	Facility Conference Among The	1 0
	Facility Type=	innutration Stormwater Plan	ter		sqft
	Surrace Width=	611		Facility Surface Perimeter= 270	π
_	Surrace Length=	129 m		Facility Bottom Area= 250	sqft
Fa Fa	acility Side Slopes=	4 to 1		Facility Bottom Perimeter= 254	n l
Max. Ponding Depth					
In Stormwater Facility = 6 in Basin Volume= 260.0 cf					
	Depth of Growing Medium (Soll)-				

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Pollution Reduction-Calculation Results				
Peak Flow Rate to Stormwater Facility = 0.022 cfs	Peak Facility Overflow Rate= 0.000 cfs			
Total Runoff Volume to Stormwater				
Facility = 300 cf	Total Overflow Volume= 0 cf			
Max. Depth of Stormwater in Facility= 0.0 in				
Drawdown Time= 0.2 hours				
Yes Facility Sizing Meets Pollution Reduction	ı Standards?			
YES Meets Requirement of No Facility Floodi	ing?			
YES Meets Requirement for Maximum of 18 H	lour Drawdown Time?			
Flow Control-Calculation Results				
Peak Flow Rate to Stormwater Facility = 0.158 cfs	Peak Facility Overflow Rate= 0.000 cfs			
Total Runoff Volume to Stormwater				
Facility = 2307 cf	Total Overflow Volume= 0 cf			
	Peak Off-Site Flow Rate			
Max. Depth of Stormwater in Facility= 5.6 in	Filtration Facility Underdrain= N\A cfs			
Drawdown Time= 0.2 hours				
Pre-Development Runoff Data Peak Flow Rate = 0.075 cfs Total Runoff Volume = 1118 cf				
Yes Facility Sizing Meets Flow Control Stands	ards?			
YES Meets Requirement for Post Development YES Meets Requirement for Maximum of 18 H	nt offsite flow less or equal to Pre-Development Flow? lour Drawdown Time?			
Destination-Calculation Results				
Peak Flow Rate to Stormwater Facility = 0.158 cfs Total Runoff Volume to Stormwater Facility = 2307 cf	Peak Facility Overflow Rate= 0.000 cfs Total Overflow Volume= 0 cf			
Max. Depth of Stormwater in Facility= 5.6 in				
Drawdown Time= 0.2 hours				
Yes Facility Sizing Meets Destination Standar	rds?			
YES Meets Requirement of No Facility Flooding? YES Meets Requirement for Maximum of 30 hour Drawdown Time?				

EUGENE	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:	Myrtle Glenn PUD			Date:	2/1/2023	
Project Address	18-12-22-11-01200		Pe	rmit Number	NA	
l'injest Address.	Elorence OP		Ca	tchment ID:	24	
Designer	Clint Beecroft					
Company:	EGP & Accordiator					
Company.	EGN & ASSociates					
Instructions:						
1 Complete this form for	each drainage catch	ment in the project site the	at is to be sized n	or the Presum	tive Approach	
2. Provide a distinctive C	atobmont ID for oach	facility accrdinated with the	ai is io be sized p	to corrolate the		
coloulations with the f			ne site basin map	to correlate the		
2 The maximum drained	icility.	adalad par the Presumptiv		aara (42 560 SE	EN EN	
A For infiltration facilities		utere per the Fresumptiv	a haa haan narfra	acre (43,500 Sr	) Sitration rate of 0 5 in/hr	
4.For initiation facilities	In Class A or D solls	where no initiation testing	g has been penid	med use an m	initation rate of 0.5 m/nr.	
For all facilities use a	maximum soli inflitrat	ion rate of 2.5 in/nr for tops	soll/growing medi	ium.		
Design Requirements:						
Choose "Yes" from the d	ropdown boxes belov	v next to the design standa	ards requirements	s for this facility		
Pollution Reduction	on (PR) Yes	ľ				
Elow Cont						
Plow Cont						
Destinati	on (DT) Tes	*An infiltration facility must be cho	osen as the facility typ	e to meet destination	on requirements	
Site Data-Post Develop	ment					
Table Service						
Total Square Footag	e Impervious Area=	4974 sqft	lotal Squa	are Footage Pe	ervious Area=	osqft
Impervious Area CN= 98 Pervious Area CN= 85						
T.4.10		4074 - 4	Time ( 0		·····	
I otal Square Footage	e of Drainage Area=	4974 sft	Time of Concer	ntration Post L	evelopment=	5 min
Wei	ghted Average CN=	98				
Site Data-Pre Developm	nent (Data in th	is section is only used if	f Flow Control is	required)		
Pre	-Development CN=	73	Time of Conce	entration Pre-D	evelopment=	5 min
Soil Data						-4
Tested C.	il Infiltration Data-	10 in/hr (See Mate	4)	Deet	tion Design	Alin/br
Design S	n Infiltration Rate=	-4 in/hr	7)	Soil In	filtration Rate	
Design of				001111	Indiadon Nate	
Design Storms Used Fo	or Calculations					
Requirement	Rainfall Depth	Design Storm				
Pollution Reduction	0.8 inches	Water Quality				
Flow Control	5.1 inches	Flood Control				
Destination	5.1 inches	Flood Control				
Facility Data						
	Facility Type=	Infiltration Rain Garden		Facility	Surface Area= 426.2	2 soft
1	Surface Width-	21 1 ft		Facility Surface	e Perimeter=	S #
	Surface I and	20.2 #		Easility	Bottom Area	1 ooff
E.	scility Side Slopes-	20.2 It		Facility Botto	m Perimeter	a fi
May	Ponding Depth	3 10 1				-
in Stormwater Facility= 12 in Basin Volume= 338 3 of						
Depth of Grow	Depth of Growing Medium (Soil)= 18 in Ratio of Facility Area to Impervious Area= 0.086					
			. tatle of Fuolin	, succession in pe	0.00	ц.

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Pollution Reduction-Calculation Results			
Peak Flow Rate to Stormwater Facility = 0.021 cfs	Peak Facility Overflow Rate= 0.000 cfs		
Total Runoff Volume to Stormwater			
Facility = 259 cf	Total Overflow Volume= 0 cf		
Max. Depth of Stormwater in Facility= 0.0 in			
Drawdown Time= 0.2 hours			
Yes Facility Sizing Meets Pollution Reduction	on Standards?		
YES Meets Requirement of No Facility Floo	ding?		
YES Meets Requirement for Maximum of 18	3 Hour Drawdown Time?		
Flow Control-Calculation Results			
Peak Flow Rate to Stormwater Facility = 0.152 cfs	Peak Facility Overflow Rate= 0.000 cfs		
Total Runoff Volume to Stormwater	-		
Facility = 1995 cf	Total Overflow Volume= 0 cf		
	Peak Off-Site Flow Rate		
Max. Depth of Stormwater in Facility= 11.9 in	Filtration Facility Underdrain= N\A cfs		
Drawdown Time= 0.2 hours			
Pre-Development Runoff Data			
Peak Flow Rate = 0.064 cfs			
Total Runoff Volume = 965 cf			
Yes Facility Sizing Meets Flow Control Stan	dards?		
YES Meets Requirement for Post Developm YES Meets Requirement for Maximum of 18	ent offsite flow less or equal to Pre-Development Flow? } Hour Drawdown Time?		
Destination-Calculation Results			
Peak Flow Rate to Stormwater Facility = 0.152 cfs	Peak Facility Overflow Rate= 0.000 cfs		
Total Runoff Volume to Stormwater			
Facility = 1995 cf	Total Overflow Volume= 0 cf		
Max. Depth of Stormwater in Facility= 11.9 in			
Drawdown Time= 0.2 hours			
Yes Facility Sizing Meets Destination Stand	ards?		
YES Meets Requirement of No Facility Floo	dina?		
YES Meets Requirement for Maximum of 30 hour Drawdown Time?			

EUGENE	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:	Myrtle Glenn PUD			Date:	2/1/2023	
Project Address:	<u>18-12-22-11-01200</u>			Permit Number:	NA	
	Florence, OR			Catchment ID:	<u>2B</u>	
Designer:	Clint Beecroft					
Company:	EGR & Associates					
Instructions:						
<ol> <li>Complete this form for 2. Provide a distinctive C calculations with the fa 3. The maximum drainag 4.For infiltration facilities</li> </ol>	r each drainage catch catchment ID for each acility. ge catchment to be me in Class A or <b>B</b> soils	ment in the project site tha facility coordinated with th odeled per the Presumptiv where no infiltration testing	it is to be siz le site basin e Approach g has been p	ed per the Presum map to correlate th is 1 acre (43,560 S erfromed use an in	ptive Approach. e appropriate F) filtration rate of 0.5 in/hr.	
For all facilities use a	maximum soil infiltrati	on rate of 2.5 in/hr for tops	soil/growing	medium.		
Design Requirements:						
Choose "Yes" from the d	Iropdown boxes below	v next to the design standa	rds requiren	nents for this facility	1.	
Pollution Reducti Flow Cont Destinati	on (PR) Yes rol (FC) Yes on (DT) Yes	*An infiltration facility must be cho	osen as the facil	ity type to meet destinati	ion requirements	
Site Data Pact Davalan	mont					
Total Square Footag	Site Data-Post Development         Total Square Footage Impervious Area=       12635       sqft       Total Square Footage Pervious Area=       0       sqft         Impervious Area CN=       98       Pervious Area CN=       85					0 sqft 85
Total Square Footag Wei	e of Drainage Area= ghted Average CN=	12635 sft 98	Time of Co	ncentration Post I	Development=	5 min
Site Data-Pre Developm	nent (Data in th	is section is only used if	Flow Contr	ol is required)		
Pro	Pre-Development CN= 73 Time of Concentration Pre-Development= 5 min				5 min	
Soil Data						
Tested So Design So	oil Infiltration Rate= oil Infiltration <del>Rate=</del>	10 in/hr (See Note 4 in/hr	4)	Destin Soil In	ation Design=[ filtration Rate	4 in/hr
Design Storms Used Fe	or Calculations					
Requirement	Rainfall Depth	Design Storm				
Pollution Reduction	0.8 inches	Water Quality				
Flow Control	5.1 inches	Flood Control				
Destination	5.1 inches	Flood Control				
E Illia D-4						
Facility Data						
F: Max. in Stor Depth of Grow	Facility Type= Surface Width= Surface Length= acility Side Slopes= Ponding Depth mwater Facility= ving Medium (Soil)=	Infiltration Rain Garden 21 ft 49.5 3 to 1 12 in 18 in	Ratio of F	Facility Surfa Facility Surfa Facility Facility Botto B acility Area to Imp	Surface Area=         103           ce Perimeter=         0           Bottom Area=         0           om Perimeter=         0           asin Volume=         86           ervious Area=         0	9.5 sqft 141 ft 553 sqft 117 ft 4.0 cf
				activity is a set to mile		

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Pollution Reduction-Calculation Results						
Peak Flow Rate to Stormwater Facility = 0.052 cfs	Peak Facility Overflow Rate= 0.000 cfs					
Total Runoff Volume to Stormwater						
Facility = 659 cf	Total Overflow Volume=0cf					
Max. Depth of Stormwater in Facility= 0.0 in						
Drawdown Time= 0.2 hours						
Yes Facility Sizing Meets Pollution Reduction	Standards?					
YES Meets Requirement of No Facility Floodin	ng?					
YES Meets Requirement for Maximum of 18 He	our Drawdown Time?					
Flow Control-Calculation Results						
Peak Flow Rate to Stormwater Facility = 0.387 cfs	Peak Facility Overflow Rate= 0.000 cfs					
Total Runoff Volume to Stormwater						
Facility = 5068 cf	Total Overflow Volume=0 cf					
	Peak Off-Site Flow Rate					
Max. Depth of Stormwater in Facility= 11.4 in	Filtration Facility Underdrain= N\A cfs					
Drawdown Time= 0.2 hours						
Pre-Development Runoff Data Peak Flow Rate = 0.163 cfs Total Runoff Volume = 2451 cf Yes Facility Sizing Meets Flow Control Standa	rds?					
YES Meets Requirement for Post Development YES Meets Requirement for Maximum of 18 Ho	t offsite flow less or equal to Pre-Development Flow? our Drawdown Time?					
Destination-Calculation Results						
Peak Flow Rate to Stormwater Facility = 0.387 cfs Total Runoff Volume to Stormwater Facility = 5068 cf Max. Depth of Stormwater in Facility= 11.4 in	Peak Facility Overflow Rate=       0.000 cfs         Total Overflow Volume=       0 cf					
Drawdown Time= 0.2 hours						
Yes Facility Sizing Meets Destination Standard	ds?					
YES Meets Requirement of No Facility Flooding? YES Meets Requirement for Maximum of 30 hour Drawdown Time?						
EUGENE	Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet 24 Hour Storm, NRCS Type 1A Rainfall Distribution City of Eugene					
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Project Information	Ver5i0112.1					
Project Name:	Mutte Glenn Bill		Data	2/1/2022		
Project Address	19-12-22-11-0120	0	Parmit Number			
Project Address.		2	Cetebrant ID:			
Desimon	Clint Decoreft		Catchment ID:	20		
Designer:	Clint Beecron					
Company:	EGR & Associate	<u>s</u>				
Instructions:						
1. Complete this form for	r each drainage cat	chment in the project site th	at is to be sized per the Presum	ptive Approach.		
2. Provide a distinctive C calculations with the fa	atchment ID for ea	ch facility coordinated with t	he site basin map to correlate th	e appropriate		
3. The maximum drainag	e catchment to be	modeled per the Presumptiv	ve Approach is 1 acre (43,560 S	F)		
4.For infiltration facilities	in Class A or B soi	s where no infiltration testir	g has been perfromed use an in	filtration rate of 0.5 in/hr.		
For all facilities use a	maximum soil infiltr	ation rate of 2.5 in/hr for tor	soil/arowing medium.			
Design Requirements:						
Choose "Yes" from the d	ropdown boxes bel	ow next to the design stand	ards requirements for this facility	Ι.		
Dollution Doducti		7				
Pollution Reduction	on (PR) Tes	_				
Flow Cont	rol (FC) Yes					
Destinati	on (DT) Yes	*An infiltration facility must be ch	osen as the facility type to meet destinat	ion requirements		
Site Data-Post Develop	ment					
Total Square Footag	e Impervious Area	= <u>12230</u> sqft	Total Square Footage P	ervious Area= 0sqft		
"	ipervious Area Civ	- 90	Perv	ious Area CN- 85		
Total Square Footage	e of Drainage Area	= 12303 sft	Time of Concentration Post	Development= <mark>5</mark> min		
Wei	ghted Average CN	=97				
Site Data-Pre Developm	nent (Data in	this section is only used i	f Flow Control is required)			
Pre	e-Development CN	= 73	Time of Concentration Pre-	Development= 5 min		
Soil Data						
Tested Se	oil Infiltration Rate	= 10 in/hr (See Note	4) Destin	ation Design= 41in/br		
Design So	oil Infiltration Rate	= 4 in/hr	Soil Ir	filtration Rate		
Design Storms Used Fo	or Calculations					
Requirement	Rainfall Depth	Design Storm				
Pollution Reduction	0.8 linches	Water Quality				
Flow Control	5 1 inches	Flood Control				
Destination	5 1 inches	Flood Control				
	0,110105					
Facility Data						
	Facility Type	= Infiltration Rain Garden	Facility	Surface Area= 1117.8 sqft		
	Surface Width	= 20.7 ft	Facility Surfa	ce Perimeter= 149.4 ft		
	Surface Length	= 54 ft	Facility	Bottom Area= 706 sqft		
Fa Fa	acility Side Slopes	= 3 to 1	Facility Botto	om Perimeter= 125 ft		
Max.	Ponding Depth		-			
in Stor	mwater Facility=	12 in	B	asin Volume= 929.7 cf		
Depth of Grow	ring Medium (Soil)	= <u>18</u> in	Ratio of Facility Area to Imp	ervious Area= 0.091		

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Pollution Reduction-Calculation Results							
Peak Flow Rate to Stormwater Facility = 0.046 cfs	Peak Facility Overflow Rate= 0.000 cfs						
Total Runoff Volume to Stormwater							
Facility = 592 cf	Total Overflow Volume= 0 cf						
Max. Depth of Stormwater in Facility= 0.0 in							
Drawdown Time= 0.2 hours							
Yes Facility Sizing Meets Pollution Reduction Standards?							
YES Meets Requirement of No Facility Flood YES Meets Requirement for Maximum of 18	ing? Hour Drawdown Time?						
Flow Control-Calculation Results							
Peak Flow Rate to Stormwater Facility = 0.374 cfs	Peak Facility Overflow Rate= 0.000 cfs						
Total Runoff Volume to Stormwater							
Facility = 4865 cf	Total Overflow Volume= 0 cf						
	Peak Off-Site Flow Rate						
Max. Depth of Stormwater in Facility= 9.6 in	Filtration Facility Underdrain= N\A cfs						
Drawdown Time= 0.2 hours							
Pre-Development Runoff Data							
Peak Flow Rate = 0.159 cfs							
Total Runoff Volume = 2386 cf							
Yes Facility Sizing Meets Flow Control Stand	ards?						
YES Meets Requirement for Post Developme YES Meets Requirement for Maximum of 18	nt offsite flow less or equal to Pre-Development Flow? Hour Drawdown Time?						
Destination-Calculation Results							
Peak Flow Pate to Stormwater Facility = 0.374 of	Beak Facility Overflow Bate= 0.000 of						
Total Runoff Volume to Stormwater							
Facility = 4865 cf	Total Overflow Volume= 0 cf						
Max. Depth of Stormwater in Facility= 9.6 in							
Drawdown Time= 0.2 hours							
Yes Facility Sizing Meets Destination Standar	rds?						
YES Meets Requirement of No Facility Flood YES Meets Requirement for Maximum of 30 h	ing? hour Drawdown Time?						

EUGENE	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:	Myrtle Glenn PUD			Date:	2/1/2023	
Project Address:	18-12-22-11-01200		Permi	it Number:	NA	
-	Florence, OR		Catch	ment ID:	2D	
Designer:	Clint Beecroft					
Company:	EGR & Associates					
Instructions:						
<ol> <li>Complete this form for</li> <li>Provide a distinctive C calculations with the fa</li> <li>The maximum drainag</li> <li>For infiltration facilities For all facilities use a list</li> </ol>	each drainage catch atchment ID for each acility. ge catchment to be m in Class A or B soils maximum soil infiltrat	ament in the project site that a facility coordinated with the odeled per the Presumptive where no infiltration testing ion rate of 2.5 in/hr for top	at is to be sized per the ne site basin map to o ve Approach is 1 acre g has been perfromed soil/growing medium.	he Presump correlate the e (43,560 SF d use an inf	otive Approach. e appropriate =) filtration rate of 0.5 in	/hr.
Design Requirements:						
Choose "Yes" from the d	ropdown boxes below	v next to the design standa	ards requirements for	this facility.		
Pollution Reduction Flow Contro Destination	on (PR) Yes rol (FC) Yes on (DT) Yes	*An infiltration facility must be ch	osen as the facility type to r	meet destinatio	on requirements	
Site Data-Post Develop	ment					
Total Square Footage	e Impervious Area= pervious Area CN=	11172 sqft 98	Total Square	Footage Pe Pervie	ervious Area= ous Area CN=	0 sqft 85
Total Square Footage Wei	e of Drainage Area= ghted Average CN=	11172 sft 98	Time of Concentrat	tion Post D	evelopment=	5 min
Site Data-Pre Developm	ent (Data in th	is section is only used if	Flow Control is req	uired)		
Pre	-Development CN=	73	Time of Concentra	ation Pre-D	evelopment=	5 min
Soil Data						
Tested So Design So	oil Infiltration Rate= oil Infiltration <del>Rate=</del>	10 in/hr (See Note 4 in/hr	4)	Destina Soil In	ation Design=[ filtration Rate	4 in/hr
Design Storms Used Fo	or Calculations					
Poquiromort	Painfall Danth	Design Storm				
Pollution Reduction		Water Quality				
Flow Control	5 1 inches	Flood Control				
Destination	5.1 inches	Flood Control				
Facility Data						
	Facility Type=	Infiltration Rain Garden		Facility S	Surface Area=	992.2 sqft
	Surface Width=	20.5 ft	Fac	ility Surfac	ce Perimeter=	137.8 ft
	Surface Length=	48.4 ft		Facility I	Bottom Area=	615 sqft
Fa Fa	acility Side Slopes=	3 to 1	Fac	cility Botto	m Perimeter=	114 ft
Max. F	Ponding Depth			_		
in Storr Depth of Grow	nwater Facility= ing Medium (Soil)=	12 in 18 in	Ratio of Facility A	Ba rea to Impe	asın Volume= ervious Area=	821.5 cf 0.089

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Pollution Reduction-Calculation Results						
Peak Flow Rate to Stormwater Facility = 0.046 cfs	Peak Facility Overflow Rate= 0.000 cfs					
Total Runoff Volume to Stormwater						
Facility = 582 cf	Total Overflow Volume= 0 cf					
Max. Depth of Stormwater in Facility= 0.0 in						
Drawdown Time= 0.2 hours						
Yes Facility Sizing Meets Pollution Reduction Standards?						
YES Meets Requirement of No Facility Floo	oding?					
YES Meets Requirement for Maximum of 1	8 Hour Drawdown Time?					
Flow Control-Calculation Results						
Peak Flow Rate to Stormwater Facility = 0.342 cfs	Peak Facility Overflow Rate= 0.000 cfs					
Total Runoff Volume to Stormwater						
Facility = 4481 cf	Total Overflow Volume= 0 cf					
	Peak Off-Site Flow Rate					
Max. Depth of Stormwater in Facility= 10.2 in	Filtration Facility Underdrain= N\A cfs					
Drawdown Time= 0.2 hours						
Pre-Development Runoff Data Peak Flow Rate = 0.144 cfs Total Runoff Volume = 2167 cf Yes Facility Sizing Meets Flow Control Stan	ndards?					
YES Meets Requirement for Post Developm	nent offsite flow less or equal to Pre-Development Flow?					
Destinction Colouistion Desuits						
Peak Flow Rate to Stormwater Facility = 0.342 cfs	Peak Facility Overflow Rate= 0.000 cfs					
Total Runoff Volume to Stormwater	Total Question Values					
Her Danth of Stormuster in Englither 10.2 in						
max. Depth of Stormwater in Facility-						
Drawdown Time= 0.2 nours						
<b>Yes</b> Facility Sizing Meets Destination Stand	lards?					
YES Meets Requirement of No Facility Floo YES Meets Requirement for Maximum of 3	oding? 0 hour Drawdown Time?					

Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet         24 Hour Storm, NRCS Type 1A Rainfall Distribution         Project Mare:         Version 2.1         Project Mare:       Mufte Gienn PUD         Company:       Elecano.08         Company:       EGR Associates         Instructions:       .         1. Complete this form for each drailage catchment in the project site that is to be sized per the Presumptive Approach.         2. Provide a dilation Cases A or B solis where no infiltration readinge dualthere dualty coordinated with the site basin map to correlate the appropriate catculators with the facility.         3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 are (43.560 SF)         4. For all facilities to class A or B solis where no infiltration tacity must be dosen as the facility type to meet distination read or 0.5 in/r.         For all facilities are maximum soil infiltration rate of 2.5 in/hr to topool/growing medium.         Design Requirements:         Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility. </th <th>r</th> <th></th> <th></th> <th></th> <th></th>	r					
Version 2.1           Project Name:         Myrite Signn PUD         Date: 2/1/2023           Project Address:         18-222-11-01/200           Project Address:         Date: 2/1/2023           Project Address:         Date: 2/1/2023           Designer:         Callin Beacroft	EUGENE	Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet 24 Hour Storm, NRCS Type 1A Rainfall Distribution City of Eugene				
Project Marma:       Mutic Signa PUD         Project Adfress:       18-12-32-11-01200         Permit Number:       MA         Compary:       EGR & Associates         Instructions:       Cathomet ID:         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 catchatons with the facility.         3. The maximum drainage catchment to be modeled per the Presumptive Approach. is 1 acre (43,560 SF)         4. For infitization facilities in Class A of B solie where on infitiration testing has been performed use an infitiration rate of 0.5 in/hr.         For all facilities in Class A of B solie where on infitiration testing has been performed use an infitiration rate of 0.5 in/hr.         For all facilities in Class A of B solie where on infitiration testing has been performed use an infitiration rate of 0.5 in/hr.         For all facilities in Class A of B solie where on infitiration testing the acres on the design standards requirements         Site Data-Post Development       Total Square Footage Impervious Area       0         Total Square Footage of Drainage Areas <th></th> <th>Version 2.1</th> <th></th> <th></th> <th></th>		Version 2.1				
Project Name: Martle Glann PUD Project Name: 18:12:22:11:01200 Project Name: NA Catchment ID: 2E Provide a distance of the second of th	Project Information					
Project Address: 18:12:22:11:0120 Elorence.OR Designer: Cint Bearch Company: EOR & Associates 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 performed use an infiltration rate of 0.5 inftr. For all facilities use a maximum soil infiltration rate of 2.5 inftr for topsol/growing medium. Design Requirements: Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility. Pollution Reduction (PR) Yes Perivous Area CN= 98 Total Square Footage of Drainage Areas 190225 sqft Total Square Footage Pervious Areas 19025 sqft Time of Concentration Post Developments 58 Data-Post Development Total Square Footage of Drainage Areas 19025 sqft Time of Concentration Post Developments 59 min Weighted Average CN= 59 min 50 II Data Tested Soil Infiltration Rates 100 infitr (See Note 4) Destination Design= 50 II Infitration Rates 100 infitr (See Note 4) Destination Design= 100 infitr (See Note 4) 100 in fitr (See Note 4) 100 in fitteration Rates 100 in fittera	Project Name:	Myrtle Glenn PUD		Date: 2/1/2023		
Catchment ID:       Zet         Designer:       CintleBescreft         Company:       EGR & Associates         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 inflittent facilities use a maximum soil infiltration rate of 2.5 in/hr for topsol/growing medium.       .         Design Requirements:       .         Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.       .         Pollution Reduction (PR)       Yes         Yes"       Yes         Pollution Reduction (DT)       Yes         Yes       Yes         Total Square Footage Impervious Areas       19025 sqft         Total Square Footage Impervious Areas       19025 sqft         Total Square Footage Impervious Areas       19025 sqft         Time of Concentration Post Development       5 min         Soit Data	Project Address	18-12-22-11-01200		Permit Number: NA		
Designer: Cint Bescrift Company: EGR & Associates 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 infinition facilities in Class A or B soils where no infituation testing has been performed use an infituation rate of 0.5 in/hr. For all facilities use a maximum soil infituation rate of 2.5 in/hr for topoolig/rowing medium. Design Requirements: Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility. Pollution Reduction (PR) Yes Destination (DT) Yes No infituation facility must be chosen as the facility type to meet destination requirements Site Data-Post Development Total Square Footage of Drainage Areas 190225 sqft Time of Concentration Post Developments Site Data-Pro Development (Data in this section is only used if Flow Control is required) Pre-Development CN= 73 Time of Concentration Post Developments 5 min Soil Data Tested Soil Infiltration Rate= 100/m/hr (See Note 4) Design Site Data-Pro Development CN= 73 Time of Concentration Design= 10/m/hr Soil Data Tested Soil Infiltration Rate= 10/m/hr (See Note 4) Design Soil Infiltration Rate Providue Area CN= 10/m/hr (See Note 4) Design Soil Infiltration Rate Providue Area CN= 10/m/hr (See Note 4) Design Soil Infiltration Rate Providue Area CN= 10/m/hr (See Note 4) Design Soil Infiltration Rate Providue Area CN= 10/m/hr (See Note 4) Design Soil Infiltration Rate Providue Area CN= 10/m/hr (See Note 4) Design Soil Infiltration Rate Providue Area CN= 10/m/hr (See Note 4) Design Soil Infiltration Rate Providue Area CN= 10/m/hr (See Note 4) Design Soil Infiltration Rate Providue Area CN= 10/m/hr (See Note 4) Desinder Control 5.1 inches Flood Co		Florence OR		Catchment ID: 2E		
Company: EGR & Associates 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 distinutive 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 infittation facilities use a maximum soil infitration rate of 0.5 infitr. For all facilities use a maximum soil infitration rate of 2.5 infit for topsoil/growing medium. <b>Design Requirements:</b> Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.  Pollution Reduction (PR) Yes Flow Control (FC) Yes C	Decimper	Clint Boograft				
Comparison       Even a resolutions         Instructions: <ul> <li>Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.</li> <li>Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.</li> <li>The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43.560 SF)</li> <li>A For infiltration facilities use a maximum soil infiltration rate of 2.5 in/hr for topsol/growing medium.</li> </ul> <li>Design Requirements:         <ul> <li>Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.</li> <li>Pollution Reduction (PR) Yes</li> <li>Flow Control (FC) Yes</li> <li>Pollution Reduction (DT) Yes</li> <li>An infiltration facility must be chosen as the facility type to meet destination requirements</li> </ul> </li> <li>Site Data-Post Development</li> <li>Total Square Footage Impervious Areas 19025 sqft</li> <li>Total Square Footage of Drainage Areas 19025 sqft</li> <li>Total Square Footage of Drainage Areas 19025 sqft</li> <li>Time of Concentration Post Development= 5 min</li> <li>Weighted Average CN= 98</li> <li>Site Data-Pro Development (Data in this section is only used if Flow Control is required)</li> <li>Pre-Development Colata in this section is only used if Flow Control is required)</li> <li>Pre-Development Similarition Rate 100 in/hr (See Note 4)</li> <li>Design Soli Inflitration Rate 100 in/hr (See Note 4)</li> <li>Design Soli Inflitration Rate 100 in/hr (See Note 4)</li> <li>Design Soli Inflitration Rate 100 in/hr (See Note 4)</li> <li>D</li>	Compony	ECD & Accordiates				
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 to be modeled per the Presumptive Approach is 1 acre (43.560 SF) 3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43.560 SF) 3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43.560 SF) 3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43.560 SF) 4. Ari infiltration 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 Destination (DT) Yes	Company:	COR & ASSOCIATES				
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Tested Soil Infiltration Rate       10       in/hr (See Note 4)       Destination Design=       4       4       in/hr         Design Soil Infiltration Rate       4       in/hr       Soil Infiltration Rate       4       in/hr         Design Storms Used For Calculations       Example       Design Storm       Soil Infiltration Rate       4         Pollution Reduction       0.8       inches       Water Quality       4       4       4         Pollution Reduction       0.8       inches       Flood Control       5       5       5       5       5         Flow Control       5.1       inches       Flood Control       5 <td>Soil Data</td> <td></td> <td></td> <td></td> <td></td>	Soil Data					
Design Soil Infiltration Rate       4 in/hr       Soil Infiltration Rate         Design Storms Used For Calculations       Design Storm       Design Storm         Requirement       Rainfall Depth       Design Storm         Pollution Reduction       0.8 inches       Water Quality         Flow Control       5.1 inches       Flood Control         Destination       5.1 inches       Flood Control         Facility Data       Facility Surface Area=       1521.57 sqft         Facility Type=       Infiltration Rain Garden       Facility Surface Area=       1521.57 sqft         Surface Length=       75.7 ft       Facility Bottom Area=       983 sqft         Facility Side Slopes=       3 to 1       Facility Bottom Perimeter=       168 ft         Max. Ponding Depth in Stormwater Facility=       12 in       Basin Volume=       1270.2 of         Depth of Growing Medium (Soil)=       18 in       Ratio of Facility Area to Impervious Area=       0.080	Tested Se	oil Infiltration Rate=	10 in/hr (See Note	4) Destination Design= 4 in/hr		
Design Storms Used For Calculations         Requirement       Rainfall Depth       Design Storm         Pollution Reduction       0.8 inches       Water Quality         Flow Control       5.1 inches       Flood Control         Destination       5.1 inches       Flood Control         Facility Data       Facility Type=       Inflitration Rain Garden       Facility Surface Area=       1521.57 sqft         Facility Data       Facility Surface Width=       20.1 ft       Facility Surface Perimeter=       191.6 ft         Surface Length=       75.7 ft       Facility Bottom Area=       983 sqft         Facility Side Slopes=       3 to 1       Facility Bottom Perimeter=       168 ft         Max. Ponding Depth in Stormwater Facility=       12       in       Ratio of Facility Area to Impervious Area=       0.080	Design So	oil Infiltration Rate=	-4 in/hr	Soil Infiltration Rate		
Requirement       Rainfall Depth       Design Storm         Pollution Reduction       0.8       inches       Water Quality         Flow Control       5.1       inches       Flood Control         Destination       5.1       inches       Flood Control         Destination       5.1       inches       Flood Control         Facility Data       Facility Surface Area       1521.57       sqft         Surface Width=       20.1       ft       Facility Surface Perimeter=       191.6       ft         Surface Length=       75.7       ft       Facility Bottom Area       983       sqft         Facility Side Slopes=       3       to 1       Facility Bottom Perimeter=       168       ft         Max. Ponding Depth in Stormwater Facility=       12       in       Basin Volume=       1270.2       cf         Depth of Growing Medium (Soil)=       18       in       Ratio of Facility Area to Impervious Area       0.080	Design Storms Used Fo	or Calculations				
Pollution Reduction       0.8 inches       Water Quality         Flow Control       5.1 inches       Flood Control         Destination       5.1 inches       Flood Control         Facility Data       Facility Type=       Infiltration Rain Garden       Facility Surface Area=       1521.57 sqft         Surface Width=       20.1 ft       Facility Surface Perimeter=       191.6 ft         Surface Length=       75.7 ft       Facility Bottom Area=       983 sqft         Facility Side Slopes=       3 to 1       Facility Bottom Perimeter=       168 ft         Max. Ponding Depth in Stormwater Facility=       12       in       Basin Volume=       1270.2 cf         Depth of Growing Medium (Soil)=       18 in       Ratio of Facility Area to Impervious Area=       0.080       0.080	Requirement	Rainfall Depth	Design Storm			
Flow Control       5.1 inches       Flood Control         Destination       5.1 inches       Flood Control         Facility Data       Facility Type=       Infiltration Rain Garden       Facility Surface Area=       1521.57 sqft         Surface Width=       20.1 ft       Facility Surface Perimeter=       191.6 ft         Surface Length=       75.7 ft       Facility Bottom Area=       983 sqft         Facility Side Slopes=       3 to 1       Facility Bottom Perimeter=       168 ft         Max. Ponding Depth in Stormwater Facility=       12       in       Basin Volume=       1270.2 cf         Depth of Growing Medium (Soil)=       18 in       Ratio of Facility Area to Impervious Area=       0.080	Pollution Reduction	0.8 inches	Water Quality			
Destination       5.1 inclusion       Flood Control         Facility Data       Facility Type=       Infiltration Rain Garden       Facility Surface Area=       1521.57 sqft         Facility Data       Surface Width=       20.1 fit       Facility Surface Perimeter=       191.6 fit         Surface Length=       75.7 fit       Facility Bottom Area=       983 sqft         Facility Side Slopes=       3 to 1       Facility Bottom Perimeter=       168 fit         Max. Ponding Depth in Stormwater Facility=       12 in       Basin Volume=       1270.2 cf         Depth of Growing Medium (Soil)=       18 in       Ratio of Facility Area to Impervious Area=       0.080	Flow Control	5 1 inches	Flood Control			
Facility Data       Facility Type       Infiltration Rain Garden       Facility Surface Area       1521.57       sqft         Surface Width=       20.1       ft       Facility Surface Perimeter=       191.6       ft         Surface Length=       75.7       ft       Facility Bottom Area       983       sqft         Facility Side Slopes=       3       to 1       Facility Bottom Perimeter=       168       ft         Max. Ponding Depth       12       in       Basin Volume=       1270.2       cf         Depth of Growing Medium (Soil)=       18       in       Ratio of Facility Area to Impervious Area       0.080	Destination	5 1 inches	Flood Control			
Facility Data         Facility Type=       Infiltration Rain Garden       Facility Surface Area=       1521.57 sqft         Surface Width=       20.1 ft       Facility Surface Perimeter=       191.6 ft         Surface Length=       75.7 ft       Facility Bottom Area=       983 sqft         Facility Side Slopes=       3 to 1       Facility Bottom Perimeter=       168 ft         Max. Ponding Depth in Stormwater Facility=       12       in       Basin Volume=       1270.2 cf         Depth of Growing Medium (Soil)=       18 in       Ratio of Facility Area to Impervious Area=       0.080	Bestingtion	0.1   110100				
Facility Type=Infiltration Rain GardenFacility Surface Area=1521.57sqftSurface Width=20.1 ftFacility Surface Perimeter=191.6 ftSurface Length=75.7 ftFacility Bottom Area=983sqftFacility Side Slopes=3 to 1Facility Bottom Perimeter=168ftMax. Ponding Depth12inBasin Volume=1270.2cfDepth of Growing Medium (Soil)=18inRatio of Facility Area to Impervious Area=0.080	Facility Data					
Surface Width=       20.1 ft       Facility Surface Perimeter=       191.6 ft         Surface Length=       75.7 ft       Facility Bottom Area=       983 sqft         Facility Side Slopes=       3 to 1       Facility Bottom Perimeter=       168 ft         Max. Ponding Depth in Stormwater Facility=       12       in       Basin Volume=       1270.2 cf         Depth of Growing Medium (Soil)=       18 in       Ratio of Facility Area to Impervious Area=       0.080		Facility Type=	Infiltration Rain Garden	Facility Surface Area= 1521.57 sqft		
Surface Length=       75.7 ft       Facility Bottom Area       983 sqft         Facility Side Slopes=       3 to 1       Facility Bottom Perimeter=       168 ft         Max. Ponding Depth in Stormwater Facility=       12 in       Basin Volume=       1270.2 cf         Depth of Growing Medium (Soil)=       18 in       Ratio of Facility Area to Impervious Area=       0.080		Surface Width=	20.1 ft	Facility Surface Perimeter= 191.6 ft		
Facility Side Slopes=       3 to 1       Facility Bottom Perimeter=       168 ft         Max. Ponding Depth		Surface Length=	75.7 ft	Facility Bottom Area= 983 sqft		
Max. Ponding Depth       Basin Volume         in Stormwater Facility=       12         Depth of Growing Medium (Soil)=       18         in       Ratio of Facility Area to Impervious Area=         0.080	Fa Fa	acility Side Slopes=	3 to 1	Facility Bottom Perimeter= 168 ft		
in Stormwater Facility= 12 in Basin Volume= 1270.2 cf Depth of Growing Medium (Soil)= 18 in Ratio of Facility Area to Impervious Area= 0.080	Max.	Ponding Depth				
Depth of Growing Medium (Soil)= 18 in Ratio of Facility Area to Impervious Area= 0.080	in Stor	mwater Facility=	12 in	Basin Volume= 1270.2 cf		
	Depth of Grow	/ing Medium (Soil)=	18 in	Ratio of Facility Area to Impervious Area= 0.080		

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Pollution Reduction-Calculation Results	
Peak Flow Rate to Stormwater Facility = 0.079 cfs	Peak Facility Overflow Rate= 0.000 cfs
Total Runoff Volume to Stormwater	
Facility = 992 cf	Total Overflow Volume= 0 cf
Max. Depth of Stormwater in Facility= 0.0 in	
Drawdown Time= 0.2 hours	
Facility Sizing Meets Pollution Reduction S	Standards?
YES Meets Requirement of No Facility Flooding	J?
YES Meets Requirement for Maximum of 18 Ho	ur Drawdown Time?
Flow Control-Calculation Results	
Peak Flow Pate to Stormwater Facility = 0.582 cfs	Peak Facility Overflow Rate= 0.000 cfs
Total Runoff Volume to Stormwater	
Facility = 7631 cf	Total Overflow Volume= 0 cf
	Peak Off-Site Flow Rate
Max, Depth of Stormwater in Facility= 11.7 in	Filtration Facility Underdrain= N\A cfs
Drawdown Time= 0.2 hours	
Pre-Development Runoff Data	
Peak Flow Rate = 0.246 cfs	
Total Runoff Volume = 3690	
Yes Facility Sizing Meets Flow Control Standar	ds?
YES Meets Requirement for Post Development YES Meets Requirement for Maximum of 18 Ho	offsite flow less or equal to Pre-Development Flow? ur Drawdown Time?
Destination-Calculation Results	
Peak Flow Rate to Stormwater Facility = 0.582 cfs Total Runoff Volume to Stormwater	Peak Facility Overflow Rate= 0.000 cfs
Facility = 7631 cf	Total Overflow Volume= 0 cf
Max. Depth of Stormwater in Facility= 11.7 in	
Drawdown Time= 0.2 hours	
Yes Facility Sizing Meets Destination Standard	s?
YES Meets Requirement of No Facility Flooding YES Meets Requirement for Maximum of 30 ho	g? ur Drawdown Time?

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FUGENE	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:	Myrtle Glenn PUD		Date:	2/1/2023		
Project Address:	<u>18-12-22-11-01200</u>		Permit Number:	NA		
	Florence, OR		Catchment ID:	<u>2F</u>		
Designer:	Clint Beecroft					
Company:	EGR & Associates					
Instructions:						
1. Complete this form fo	r each drainage catch	ment in the project site that	is to be sized per the Presum	otive Approach.		
2. Provide a distinctive C	atchment ID for each	n facility coordinated with the	site basin map to correlate th	e appropriate		
calculations with the f	acility.					
3. The maximum drainag	ge catchment to be m	odeled per the Presumptive	Approach is 1 acre (43,560 S	F)		
4.For infiltration facilities	in Class A or B soils	where no infiltration testing	has been perfromed use an in	filtration rate of 0.5 in/hr.		
For all facilities use a	maximum soil infiltra	ion rate of 2.5 in/hr for topso	bil/growing medium.			
Design Requirements:						
Choose "Yes" from the c	Iropdown boxes below	w next to the design standar	ds requirements for this facility	·.		
Pollution Reducti	on (PR) Yes	1				
Flow Cont	rol (FC) Yes					
Destinati		*An infiltration facility must be chose	an as the facility type to meet destinat	on requirements		
Destinut		An initiation lacinty must be chose	en as the facility type to meet destinati	onrequirementa		
Site Data-Post Develop	ment					
Total Square Footag	e Impervious Area=	5145 sqft	Total Square Footage P	ervious Area=0sqft		
in In	npervious Area CN=	98	Pervi	ous Area CN=85		
Total Square Footag	e of Drainage Area=	5145 sft	Time of Concentration Post I	Development= 5 min		
Wei	ghted Average CN=	98				
Site Data-Pre Developm	nent (Data in th	is section is only used if F	Flow Control is required)			
Pr	-Development CN=	73	Time of Concentration Pre-	Development=		
	-Development on-		Time of concentration freq			
Soil Data						
Tested S	oil Infiltration Rate=	10 in/hr (See Note 4)	Destin	ation Design= 4 in/hr		
Design S	oil Infiltration Rate=	-4 in/hr	Soil In	filtration Rate		
Design Storms Used Fo	or Calculations					
Requirement	Rainfall Depth	Design Storm				
Pollution Reduction	0.8 inches	Water Quality				
Flow Control	5 1 inches	Flood Control				
List out of	5 1 inches	Flood Control				
Destination	0.111101103	esu control				
Destination						
Destination Facility Data						
Destination Facility Data	Facility Type=	Infiltration Rain Garden	Facility	Surface Area= 445.76 sqft		
Destination Facility Data	Facility Type= Surface Width=	Infiltration Rain Garden	Facility Facility	Surface Area= 445.76 sqft ce Perimeter= 84.6 ft		
Destination Facility Data	Facility Type= Surface Width= Surface Length=	Infiltration Rain Garden 19.9 ft 22.4 ft	Facility Facility Surfa Facility Surfa	Surface Area= 445.76 sqft ce Perimeter= 84.6 ft Bottom Area= 228 sqft		
Destination Facility Data	Facility Type= Surface Width= Surface Length= acility Side Slopes=	Infiltration Rain Garden 19.9 ft 22.4 ft 3 to 1	Facility Facility Surfa Facility Surfa Facility Facility Botto	Surface Area= 445.76 sqft ce Perimeter= 84.6 ft Bottom Area= 228 sqft om Perimeter= 61 ft		
Destination Facility Data F. Max.	Facility Type= Surface Width= Surface Length= acility Side Slopes= Ponding Depth	Infiltration Rain Garden 19.9 ft 22.4 ft 3 to 1	Facility Facility Surfa Facility Facility Facility Botto	Surface Area= 445.76 sqft ce Perimeter= 84.6 ft Bottom Area= 228 sqft om Perimeter= 61 ft		
Destination Facility Data F Max. in Stor	Facility Type= Surface Width= Surface Length= acility Side Slopes= Ponding Depth mwater Facility=	Infiltration Rain Garden 19.9 ft 22.4 ft 3 to 1 12 in	Facility Facility Facility Surfa Facility Facility Botto B	Surface Area= 445.76 sqft ce Perimeter= 84.6 ft Bottom Area= 228 sqft m Perimeter= 61 ft asin Volume= 354.9 cf		

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Poliution Reduction-Calculation Results	
Peak Flow Rate to Stormwater Facility = 0.021 cfs	Peak Facility Overflow Rate= 0.000 cfs
Total Runoff Volume to Stormwater	
Facility = 268 cf	Total Overflow Volume= 0 cf
Max. Depth of Stormwater in Facility= 0.0 in	
Drawdown Time= 0.2 hours	
Yes Facility Sizing Meets Pollution Reduction	a Standards?
YES Meets Requirement of No Facility Flood	ing?
YES Meets Requirement for Maximum of 18 H	Hour Drawdown Time?
Flow Control-Calculation Results	
Peak Flow Rate to Stormwater Facility = 0.158 cfs	Peak Facility Overflow Rate= 0.000 cfs
Total Runoff Volume to Stormwater	
Facility = 2064 cf	Total Overflow Volume= 0 cf
	Peak Off-Site Flow Rate
Max. Depth of Stormwater in Facility= 11.7 in	Filtration Facility Underdrain= N\A cfs
Drawdown Time= 0.2 hours	
Pre-Development Runoff Data	
Peak Flow Rate = 0.067 cfs	
Total Runoff Volume = 998 cf	
Yes Facility Sizing Meets Flow Control Stands	ards?
YES Meets Requirement for Post Development YES Meets Requirement for Maximum of 18 H	nt offsite flow less or equal to Pre-Development Flow? lour Drawdown Time?
Destination-Calculation Results	
Peak Flow Rate to Stormwater Facility = 0.158 cfs	Peak Facility Overflow Rate= 0.000 cfs
Total Runoff Volume to Stormwater	
Facility =2064 cf	Total Overflow Volume= 0 cf
Max. Depth of Stormwater in Facility= 11.7 in	
Drawdown Time= 0.2 hours	
Yes Facility Sizing Meets Destination Standar	rds?
YES Meets Requirement of No Facility Floodi	na?
YES Meets Requirement for Maximum of 30 h	iour Drawdown Time?

EUGENE	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:	Myrtle Glenn PUD			Date: 2/1/2023	
Project Address:	18-12-22-11-01200			Permit Number: NA	
	Florence OR			Catchment ID: 2G	
Designer:	Clint Beecroft				
Company:	EGP & Associator				
Company.	LON & ASSociates				
Instructions:					
1 Complete this form for	r oach drainaga aatab	mont in the project site the	t is to be siz	ad partha Procumptive Approach	
2. Drovide e distinctive C	each urainage calch	facility accordinated with th		ed per the Presumptive Approach.	
2. Provide a distinctive C		racility coordinated with th	e site basin	map to correlate the appropriate	
	acility.				
3. The maximum drainag	je catchment to be m	odeled per the Presumptive	e Approach	s 1 acre (43,560 SF)	
4.For inflitration facilities	In Class A or B solls	where no inflitration testing	) nas been p	erromed use an inflitration rate of 0.5 in/nr.	
For all facilities use a	maximum soil infiltrat	on rate of 2.5 in/hr for tops	soil/growing i	nedium.	
Design Requirements:					
Choose "Yes" from the d	ropdown boxes belov	v next to the design standa	rds requirem	ents for this facility.	
Pollution Reducti					
Elow Cont					
Flow Cont	rol (FC) Tes				
Destination	on (DT) Yes	*An infiltration facility must be cho	sen as the facil	ity type to meet destination requirements	
Site Data Past Davalan	mont				
Sile Data-Post Develop	Inent				
Total Square Footag	e Impervious Area=	4175 sqft	Total	Square Footage Pervious Area=	0 sqft
Im	pervious Area CN=	98		Pervious Area CN=	85
Total Square Footage	e of Drainage Area=	4175 sft	Time of Co	ncentration Post Development=	10 min
Wei	ghted Average CN=	98			
Site Data-Pre Developm	ant (Data in th	is section is only used if	Flow Contr	ol is required)	
Site Data-Fie Developii		section is only used in	riow contr		
Pre	e-Development CN=	73	Time of Co	oncentration Pre-Development=	5 min
Soil Data					
Tested So	oil Infiltration Rate=	10 in/hr (See Note	4)	Destination Design=	4 in/hr
Design So	oil Infiltration Rate=	4 in/hr		Soil Infiltration Rate	
Design Storms Used Fo	or Calculations				
Requirement	Rainfall Denth	Design Storm			
Pollution Reduction	0.8 inches	Water Quality			
Flow Control	5 1 inches	Flood Control			
Destination	5.1 inches	Flood Control			
	5.1 lincnes				
Facility Data					
	Facility Type=	Infiltration Stormwater P	lanter	Facility Surface Area=	272 sqft
	Surface Width=	4 ft		Facility Surface Perimeter=	144 ft
	Surface Length=	68 ft		Facility Bottom Area=	272 sqft
Fa	acility Side Slopes=	0 to 1		Facility Bottom Perimeter=	144 ft
Max. I	Ponding Depth				-1
in Storr	nwater Facility=	12 in		Basin Volume= 27	2.0 cf
Depth of Grow	ving Medium (Soil)=	18 in	Ratio of Fa	acility Area to Impervious Area= 0.0	065

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Pollution Reduction-Calculation Results							
Peak Flow Rate to Stormwater Facility = 0.016 cfs	Peak Facility Overflow Rate= 0.000 cfs						
Total Runoff Volume to Stormwater							
Facility = 217 cf	Total Overflow Volume= 0 cf						
Max. Depth of Stormwater in Facility= 0.0 in							
Drawdown Time= 0.2 hours							
Yes Facility Sizing Meets Pollution Reduction Standards?							
YES Meets Requirement of No Faci	lity Flooding?						
YES Meets Requirement for Maximu	um of 18 Hour Drawdown Time?						
Flow Control-Calculation Results							
Peak Flow Rate to Stormwater Facility = 0.114 cfs	Peak Facility Overflow Rate= 0.000 cfs						
Total Runoff Volume to Stormwater							
Facility = 1671 cf	Total Overflow Volume=0 cf						
	Peak Off-Site Flow Rate						
Max. Depth of Stormwater in Facility= 11.5 in	Filtration Facility Underdrain= NA cfs						
Drawdown Time= 0.2 hours							
Pre-Development Runoff Data Peak Flow Rate = 0.054 cfs Total Runoff Volume = 810 cf							
Facility Sizing Meets Flow Contro	ol Standards?						
YES Meets Requirement for Post De YES Meets Requirement for Maximu	evelopment offsite flow less or equal to Pre-Development Flow? um of 18 Hour Drawdown Time?						
Destination-Calculation Results							
Peak Flow Rate to Stormwater Facility = 0.114 cfs Total Runoff Volume to Stormwater	Peak Facility Overflow Rate= 0.000 cfs						
	Total Overflow Volume=0cf						
Drawdown Time= 0.2 hours							
Yes Facility Sizing Meets Destination	Standards?						
YES Meets Requirement of No Facil YES Meets Requirement for Maximu	lity Flooding? um of 30 hour Drawdown Time?						

V	Vorksheet for We	st Pipe-2	25 Year	Flow	
Project Description					
Friction Method Solve For	Manning Formula Normal Depth				
Input Data					
Roughness Coefficient Channel Slope Diameter Discharge		0.013 0.00500 1.50 2.68	ft/ft ft ft³/s		
Results					
Normal Depth Flow Area Wetted Perimeter Hydraulic Radius Top Width Critical Depth Percent Full Critical Slope Velocity Velocity Head Specific Energy Froude Number Maximum Discharge Discharge Full Slope Full Flow Type	SubCritical	0.62 0.69 2.10 0.33 1.48 0.62 41.5 0.00506 3.86 0.23 0.85 0.99 7.99 7.43 0.00065	ft ft <sup>2</sup> ft ft ft ft ft/ft ft/s ft ft ft <sup>3</sup> /s ft <sup>3</sup> /s ft/ft		
GVF Input Data					
Downstream Depth Length Number Of Steps		0.00 0.00 0	ft ft		
GVF Output Data					
Upstream Depth Profile Description		0.00	ft		
Profile Headloss Average End Depth Over Rise Normal Depth Over Rise		0.00 0.00 41.55	ft % %		
Downstream Velocity		Infinity	ft/s		

Bentley Systems, Inc. Haestad Methods Sollatinte CEntre Master V8i (SELECTseries 1) [08.11.01.03] 27 Siemons Company Drive Suite 200 W Watertown, CT 06795 USA +1-203-755-1666 Page 1 of 2

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## **Worksheet for West Pipe-25 Year Flow**

GVF Output Data		
Upstream Velocity	Infinity	ft/s
Normal Depth	0.62	ft
Critical Depth	0.62	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00506	ft/ft

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W	orksheet for Ea	st Pipe-2	25 Year Flow
Project Description			
Friction Method Solve For	Manning Formula Normal Depth		
Input Data			
Roughness Coefficient Channel Slope Diameter Discharge		0.013 0.00500 1.00 0.49	ft/ft ft ft³/s
Results			
Normal Depth Flow Area Wetted Perimeter Hydraulic Radius Top Width Critical Depth Percent Full Critical Slope Velocity Velocity Head Specific Energy Froude Number Maximum Discharge Discharge Full Slope Full Flow Type	SubCritical	0.30 0.20 1.16 0.17 0.92 0.29 29.9 0.00562 2.48 0.10 0.39 0.94 2.71 2.52 0.00019	ft ft <sup>2</sup> ft ft ft ft ft/ft ft/ft ft <sup>3</sup> /s ft <sup>3</sup> /s ft <sup>3</sup> /s ft <sup>9</sup> /s
GVF Input Data			
Downstream Depth Length Number Of Steps GVE Output Data		0.00 0.00 0	ft ft
Upstream Depth		0.00	ft
Profile Description Profile Headloss Average End Depth Over Rise Normal Depth Over Rise		0.00 0.00 29.90	ft % %
Normal Depth Over Rise Downstream Velocity		29.90 Infinity	∽ ft/s

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Exhibit H1 -

PC 22 21 PUD 01, PC 22 25 SUB 03, & SR 22 48 SIR 13- Myrtle Glenn - 37th and Oak

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<b>Worksheet</b>	for	East	Pipe-25	Year	Flow	

GVF Output Data		
Upstream Velocity	Infinity	ft/s
Normal Depth	0.30	ft
Critical Depth	0.29	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00562	ft/ft

 Bentley Systems, Inc. Haestad Methods Soßadidle@EfiderMaster V8i (SELECTseries 1) [08.11.01.03]

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# Swale 1A 25-year Flow

Project Description		
Friction Method	Manning Formula	
Solve For	Normal Depth	
Input Data		
Roughness Coefficient	0.350	
Channel Slope	0.00500	ft/ft
Left Side Slope	4.00	ft/ft (H:∨)
Right Side Slope	4.00	ft/ft (H:∨)
Bottom Width	2.00	ft
Discharge	0.06	ft³/s
Results		
Normal Depth	0.23	ft
Flow Area	0.65	ft²
Wetted Perimeter	3.86	ft
Hydraulic Radius	0.17	ft
Top Width	3.80	ft
Critical Depth	0.03	ft
Critical Slope	5.89961	ft/ft
Velocity	0.09	ft/s
Velocity Head	0.00	ft
Specific Energy	0.23	ft
Froude Number	0.04	
Flow Type	Subcritical	
GVF Input Data		
Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	
GVF Output Data		
Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.23	ft
Critical Depth	0.03	ft
Channel Slope	0.00500	ft/ft

Bentley Systems, Inc. Haestad Methods SoftBatidhe@EnderMaster V8i (SELECTseries 1) [08.11.01.03] 1/31/2023 12:24:03 PM 27 Siemons Company Drive Suite 200 W Watertown, CT 06795 USA +1-203-755-1666 Page 1 of 2

## Swale 1A 25-year Flow

#### GVF Output Data

Critical Slope

5.89961 ft/ft

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	Swale 1B 25-Year	Flow
Project Description		
Friction Method	Manning Formula	
Solve For	Normal Depth	
Input Data		
Roughness Coefficient	0.350	
Channel Slope	0.00500	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	0.24	ft³/s
Results		
Normal Depth	0.46	ft
Flow Area	1.77	ft²
Wetted Perimeter	5.79	ft
Hydraulic Radius	0.30	ft
Top Width	5.68	ft
Critical Depth	0.07	ft
Critical Slope	4.49200	ft/ft
Velocity	0.14	ft/s
Velocity Head	0.00	ft
Specific Energy	0.46	ft
Froude Number	0.04	
Flow Type	Subcritical	
GVF Input Data		
Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	
GVF Output Data		
Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.46	ft
Critical Depth	0.07	ft
Channel Slope	0.00500	ft/ft

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## Swale 1B 25-Year Flow

**GVF** Output Data

Critical Slope

4.49200 ft/ft

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	Swale 1C	25-Year	Flow	
Project Description				
Friction Method	Manning Formula			
Solve For	Normal Depth			
Input Data				
Roughness Coefficient		0.350		
Channel Slope		0.00500	ft/ft	
Left Side Slope		4.00	ft/ft (H:V)	
Right Side Slope		4.00	ft/ft (H:V)	
Bottom Width		2.00	ft	
Discharge		0.11	ft³/s	
Results				
Normal Depth		0.31	ft	
Flow Area		1.00	ft²	
Wetted Perimeter		4.56	ft	
Hydraulic Radius		0.22	ft	
Top Width		4.48	ft	
Critical Depth		0.04	ft	
Critical Slope		5.21490	ft/ft	
Velocity		0.11	ft/s	
Velocity Head		0.00	ft	
Specific Energy		0.31	ft	
Froude Number		0.04		
Flow Type	Subcritical			
GVF Input Data				
Downstream Depth		0.00	ft	
Length		0.00	ft	
Number Of Steps		0		
GVF Output Data				
Upstream Depth		0.00	ft	
Profile Description				
Profile Headloss		0.00	ft	
Downstream Velocity		Infinity	ft/s	
Upstream Velocity		Infinity	ft/s	
Normal Depth		0.31	ft	
Critical Depth		0.04	ft	
Channel Slope		0.00500	ft/ft	

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## Swale 1C 25-Year Flow

# GVF Output Data

Critical Slope

5.21490 ft/ft

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	Planter 1D	25-Year	Flow
Project Description			
Friction Method Solve For	Manning Formula Normal Depth		
Input Data			
Roughness Coefficient Channel Slope Bottom Width Discharge		0.350 0.00500 3.50 0.13	ft/ft ft ft³/s
Results			
Normal Depth Flow Area Wetted Perimeter Hydraulic Radius Top Width Critical Depth Critical Slope Velocity Velocity Head Specific Energy Froude Number Flow Type	Subcritical	0.30 1.06 4.11 0.26 3.50 0.04 5.59828 0.12 0.00 0.30 0.04	ft ft <sup>2</sup> ft ft ft ft/ft ft/s ft
GVF Input Data			
Downstream Depth Length Number Of Steps		0.00 0.00 0	ft ft
GVF Output Data			
Upstream Depth Profile Description		0.00	ft
Profile Headloss		0.00	ft
Lownstream Velocity		Infinity	ivs ft/s
Normal Depth		0.30	ft
Critical Depth		0.04	ft
Channel Slope		0.00500	 ft/ft
Critical Slope		5.59828	ft/ft

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	Swale 1E	25-Year	Flow	
Project Description				
Friction Method	Manning Formula			
Solve For	Normal Depth			
Input Data				
Roughness Coefficient		0.350		
Channel Slope		0.00500	ft/ft	
Left Side Slope		4.00	ft/ft (H:V)	
Right Side Slope		4.00	ft/ft (H:V)	
Bottom Width		2.00	ft	
Discharge		0.15	ft³/s	
Results				
Normal Depth		0.36	ft	
Flow Area		1.26	ft²	
Wetted Perimeter		5.00	ft	
Hydraulic Radius		0.25	ft	
Top Width		4.91	ft	
Critical Depth		0.05	ft	
Critical Slope		4.90771	ft/ft	
Velocity		0.12	ft/s	
Velocity Head		0.00	ft	
Specific Energy		0.36	ft	
Froude Number		0.04		
Flow Type	Subcritical			
GVF Input Data				
Downstream Depth		0.00	ft	
Length		0.00	ft	
Number Of Steps		0		
GVF Output Data				
Upstream Depth		0.00	ft	
Profile Description				
Profile Headloss		0.00	ft	
Downstream Velocity		Infinity	ft/s	
Upstream Velocity		Infinity	ft/s	
Normal Depth		0.36	ft	
Critical Depth		0.05	ft	
Channel Slope		0.00500	ft/ft	

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### Swale 1E 25-Year Flow

#### **GVF** Output Data

Critical Slope

4.90771 ft/ft

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	Swale 1F	25-Year	Flow
Project Description			
Friction Method	Manning Formula		
Solve For	Normal Depth		
Input Data			
Roughness Coefficient		0.350	
Channel Slope		0.00500	ft/ft
Left Side Slope		4.00	ft/ft (H:V)
Right Side Slope		4.00	ft/ft (H:V)
Bottom Width		2.00	ft
Discharge		0.12	ft³/s
Results			
Normal Depth		0.32	ft
Flow Area		1.07	ft²
Wetted Perimeter		4.67	ft
Hydraulic Radius		0.23	ft
Top Width		4.59	ft
Critical Depth		0.05	ft
Critical Slope		5.11754	ft/ft
Velocity		0.11	ft/s
Velocity Head		0.00	ft
Specific Energy		0.32	ft
Froude Number		0.04	
Flow Type	Subcritical		
GVF Input Data			
Downstream Depth		0.00	ft
Length		0.00	ft
Number Of Steps		0	
GVF Output Data			
Upstream Depth		0.00	ft
Profile Description			
Profile Headloss		0.00	ft
Downstream Velocity		Infinity	ft/s
Upstream Velocity		Infinity	ft/s
Normal Depth		0.32	ft
Critical Depth		0.05	ft
Channel Slope		0.00500	ft/ft

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### Swale 1F 25-Year Flow

#### GVF Output Data

Critical Slope

5.11754 ft/ft

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	Swale 1G 2	25-Year	Flow	
Project Description				
Friction Method	Manning Formula			
Solve For	Normal Depth			
Input Data				
Roughness Coefficient		0.350		
Channel Slope		0.00500	ft/ft	
Left Side Slope		4.00	ft/ft (H:V)	
Right Side Slope		4.00	ft/ft (H:V)	
Bottom Width		2.00	ft	
Discharge		0.08	ft³/s	
Results				
Normal Depth		0.26	ft	
Flow Area		0.80	ft²	
Wetted Perimeter		4.16	ft	
Hydraulic Radius		0.19	ft	
Top Width		4.10	ft	
Critical Depth		0.04	ft	
Critical Slope		5.56087	ft/ft	
Velocity		0.10	ft/s	
Velocity Head		0.00	ft	
Specific Energy		0.26	ft	
Froude Number		0.04		
Flow Type	Subcritical			
GVF Input Data				
Downstream Depth		0.00	ft	
Length		0.00	ft	
Number Of Steps		0		
GVF Output Data				
Upstream Depth		0.00	ft	
Profile Description				
Profile Headloss		0.00	ft	
Downstream Velocity		Infinity	ft/s	
Upstream Velocity		Infinity	ft/s	
Normal Depth		0.26	ft	
Critical Depth		0.04	ft	
Channel Slope		0.00500	ft/ft	

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## Swale 1G 25-Year Flow

#### **GVF** Output Data

Critical Slope

5.56087 ft/ft

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## Swale 1H 25-Year Flow

#### **Project Description**

Friction Method Solve For	Manning Formula Normal Depth	
Input Data		
Roughness Coefficient	0.350	
Channel Slope	0.00500	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	0.16	ft³/s
Results		
Normal Depth	0.38	ft
Flow Area	1.32	ft²
Wetted Perimeter	5.10	ft
Hydraulic Radius	0.26	ft
Top Width	5.00	ft
Critical Depth	0.06	ft
Critical Slope	4.84598	ft/ft
Velocity	0.12	ft/s
Velocity Head	0.00	ft
Specific Energy	0.38	ft
Froude Number	0.04	
Flow Type	Subcritical	
GVF Input Data		
Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	
GVF Output Data		
Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.38	ft
Critical Depth	0.06	ft
Channel Slope	0.00500	ft/ft

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## Swale 1H 25-Year Flow

#### GVF Output Data

Critical Slope

4.84598 ft/ft

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	Planter 2G	25-Year	Flow
Project Description			
Friction Method	Manning Formula		
Solve For	Normal Depth		
Input Data			
Roughness Coefficient		0.350	
Channel Slope		0.00500	ft/ft
Bottom Width		4.00	ft
Discharge		0.11	ft³/s
Results			
Normal Depth		0.25	ft
Flow Area		1.00	ft²
Wetted Perimeter		4.50	ft
Hydraulic Radius		0.22	ft
Top Width		4.00	ft
Critical Depth		0.03	ft
Critical Slope		5.94043	ft/ft
Velocity		0.11	ft/s
Velocity Head		0.00	ft
Specific Energy		0.25	ft
Froude Number		0.04	
Flow Type	Subcritical		
GVF Input Data			
Downstream Depth		0.00	ft
Length		0.00	ft
Number Of Steps		0	
GVF Output Data			
Upstream Depth		0.00	ft
Profile Description			
Profile Headloss		0.00	ft
Downstream Velocity		Infinity	ft/s
Upstream Velocity		Infinity	ft/s
Normal Depth		0.25	ft
Critical Depth		0.03	ft
Channel Slope		0.00500	ft/ft
Critical Slope		5.94043	ft/ft

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# APPENDIX C

# FLORENCE STORMWATER MANUAL EXCERPTS

# Stormwater Planters



See Appendix I.1 SW-130 for typical private property planter detail and Appendix I.3 SW-310 through SW-313 for typical Green Street planter details.

**Description:** Stormwater planters are structural landscaped reservoirs used to collect, filter, and/or infiltrate stormwater runoff, allowing pollutants to settle and filter out as the water percolates through the planter soil before infiltrating into the ground below or piped to its downstream destination. In addition to providing pollution reduction, flow rates and volumes can also be managed with stormwater planters. Stormwater planters can be used to help fulfill a site's required landscaping area requirement and should be integrated into the overall site design. Numerous design variations of shape, wall treatment, and planting scheme can be used to fit the character of a site. Stormwater planters may provide either "infiltration treatment" or "filtration treatment".

## **5.4.1 Infiltration Stormwater Planters:**

Groundwater In high groundwater areas, groundwater must be addressed per Section 4.6.

**Construction Considerations:** Location of *Infiltration Stormwater Planters* should be clearly marked before site work begins to avoid soil disturbance during construction. No vehicular traffic, except that specifically used to construct the facility, should be allowed within 10 feet facility areas.

**Soil:** Topsoil shall be used within the top 18 inches of the facility per **Appendix B** to support plant growth. Maximum design infiltration rate of the facility is controlled by the infiltration rate of the growing medium and shall not be greater than 4 in/hr. With a demonstrated hardship, higher design infiltration rates may be used with the <u>infiltration blend soil</u> (see **Appendix B**) if stormwater from vehicular surfaces is pretreated. Design infiltration rate shall be demonstrated with testing certified by a professional Engineer or Geologist and shall not exceed 10 inches per hour. The bottom shall be covered in non-floatable mulch or washed pea gravel.

**Dimensions and Slopes:** See **Appendix I** for detail drawings. Facility storage depth must be at least 9 inches, unless a larger than- required planter square-footage is used. Minimum *Infiltration Stormwater Planter* width is 30 inches. Planters shall be constructed without slope.

**Setbacks:** Required setback for *Infiltration Stormwater Planters* is 5 feet from property lines and 10 feet from structures. Easements for non-buildable areas on adjacent properties may be required if facilities are located next to property lines.

## **5.4.2 Filtration Stormwater Planters:**

**Design Considerations:** These facilities are appropriate for facilities located within 10-feet of building foundations or in high groundwater areas with an approved impermeable membrane. Filtration Planters shall only be used where infiltration planters are not feasible.

#### **Construction Considerations:**

Special attention needs to be paid to the planter waterproofing if constructed adjacent to building structures. The walls of a *Filtration Stormwater Planter* can often times be incorporated with the building foundation plans. The bottom of *Filtration Stormwater Planters* must be lined with an impermeable membrane of 60 mil plastic film.

**Soil:** Topsoil shall be used within the top 18 inches of the facility per **Appendix B** to support plant growth. Maximum design infiltration rate of the facility is controlled by the infiltration rate of the growing medium and shall not be greater than 4 in/hr. With a demonstrated hardship, higher design infiltration rates may be used with the <u>infiltration blend soil</u> (see **Appendix B**) if stormwater from vehicular surfaces is pretreated. Design infiltration rate shall be demonstrated with testing certified by a professional Engineer or Geologist and shall not exceed 10 inches per hour. The bottom shall be covered in non-floatable mulch or washed pea gravel.

**Dimensions and Slopes:** Facility storage depth must be at least 9 inches, unless a larger thanrequired planter square-footage is used. Minimum *Filtration Stormwater Planter* width is 18 inches. Planters shall be constructed without slope.

Setbacks: A setback for Filtration Stormwater Planters is not required.

## **5.4.3 General Requirements**

**Planter Walls:** Planter walls shall be made of stone, concrete, brick, wood, or other durable material. Chemically treated wood that can leach out toxic chemicals and contaminate stormwater shall not be used.

**Simplified Sizing:** Individual Stormwater Planters sized with the Simplified Approach shall be designed to receive less than 0.5 acre of impervious area runoff. For stormwater planters a Simplified Approach sizing factor of 0.06 may be used to receive credit.

**Presumptive Method Sizing:** The Presumptive Approach may be used to downsize the Simplified Approach sizing factor. The applicant shall size stormwater planter to have sufficient storage

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volume for the entire 25 year storm. Planters shall be designed to pond water for less than 18 hours after each storm event.

Landscaping: Plantings shall be designed at the following quantities per 100 square feet of facility area. Facility area is equivalent to the area of the planter.

Zone A (wet): 115 herbaceous plants or 100 herbaceous plants and 4 small shrubs

Note: Tree planting is not required in planters, but tree planting is encouraged near planters.

#### Checklist of minimal information to be shown on the permit drawings:

- 1) Facility dimensions and setbacks from property lines and structures
- 2) Profile view of facility, including typical cross-sections with dimensions
- 3) Planter wall material and waterproofing membrane specification
- 4) Growing medium specification
- 5) Drain rock specification (if applicable)
- 6) Filter fabric specification (if applicable)

7) All stormwater piping associated with the facility, including pipe materials, sizes, slopes,

- and invert elevations at every bend or connection (if applicable)
- 8) Stormwater destination
- 9) Landscaping plan

**Inspection requirements and schedule:** The following table shall be used to determine which stormwater facility components require City inspection, and when the inspection shall be requested. Please note that, while not all facility components may require an inspection call, inspectors will inspect for all required components in the field.

#### **Facility Component Inspection Requirement**

Planter grading/ excavation	
Structural components/ liner	Call for Inspection
Piping (if applicable)	Call for Inspection
Filter fabric (if applicable)	
Growing medium	Call for Inspection
Plantings	Call for Inspection

**Operations and Maintenance requirements: See Chapter 6** 

# 5.5 Rain Gardens



See Appendix I.1 SW-140 for typical rain garden details.

**Description:** Rain gardens are landscaped reservoirs used to collect, filter, and/or infiltrate stormwater runoff, allowing pollutants to settle and filter out as the water percolates through the planter soil before infiltrating into the ground below or being piped to its downstream destination. In addition to providing pollution reduction, flow rates and volumes can also be managed with rain gardens. Rain gardens can be used to help fulfill a site's required landscaping area requirement and should be integrated into the overall site design. Numerous design variations of shape, and planting scheme can be used to fit the character of a site. Rain gardens may provide either "infiltration treatment" or "filtration treatment".

**Simplified Method Sizing:** A Simplified Approach sizing factor of 0.06 may be used to receive credit for pollution reduction and flow control. The square-footage is determined at the peak water surface prior to overflow.

**Presumptive Method Sizing:** The Presumptive Approach may be used to downsize the Simplified Approach sizing factor. The applicant shall size stormwater planter to have sufficient storage volume for the entire 25 year storm. Planters shall be designed to pond water for less than 18 hours after each storm event.

**Soil:** Topsoil shall be used within the top 18 inches of the facility per **Appendix B** to support plant growth. Maximum design infiltration rate of the facility is controlled by the infiltration rate of the growing medium and shall not be greater than 4 in/hr. With a demonstrated hardship, higher design infiltration rates may be used with the <u>infiltration blend soil</u> (see **Appendix B**) if stormwater from vehicular surfaces is pretreated. Design infiltration rate shall be demonstrated with testing certified by a professional Engineer or Geologist and shall not exceed 10 inches per hour. The bottom shall be covered in non-flotable mulch or washed pea gravel.

Geometry/Slopes: See Appendix I for detail drawings.

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• There is no shape requirement for rain gardens. They can be designed as square, rectangular, circular, oblong, or irregular.

• The minimum width for any rain garden shall be 5 feet.

• The maximum side slopes within rain gardens shall be 3 horizontal to 1 vertical.

• The minimum ponding depth shall be 6 inches. Maximum ponding depth shall be 12 inches during water quality storm.

• The minimum depth of soil amendment for rain gardens shall be 18 inches. See Appendix B for the required soil amendment specifications to be included with the permit plans.

### 5.5.1 Infiltration Rain Gardens:

**Infiltration Rain Gardens- Applicability:** Infiltration rain gardens are used to manage stormwater flowing from all types of impervious surfaces on private property and from the public right-of-way. If located within 10 feet from building foundations or upslope of building structures, a filtration rain garden must be used instead with an impermeable liner.

Groundwater In high groundwater areas, groundwater must be addressed per Section 4.6.

**Piping for Infiltration Rain Gardens:** Piping per Plumbing Code requirements shall be used to direct stormwater from impervious if used within the public street right-of-way or within or surfaces to infiltration rain gardens, or adjacent to parking lot areas, stormwater may flow directly into them via curb openings. An overflow drain, when required, shall be constructed to allow at least 6 inches but not more than 12 inches of water to pond in the rain garden prior to overflow. On private property, this overflow drain and piping must meet Plumbing Code requirements and shall direct excess stormwater to an approved disposal point as identified on the Public Works Permit drawings.

Within the public street right-of-way, this overflow drain and piping must meet City of Florence Public Works Standards and shall direct excess stormwater to an approved disposal point.

#### 5.5.2 Filtration Rain Gardens:

**Filtration Rain Gardens- Applicability:** Filtration rain gardens are used to manage stormwater flowing from all types of impervious surfaces on private property, when rain garden must be located within 10 feet of building foundations, immediately upslope of building structures.

**Piping for Filtration Rain Gardens:** Piping per Plumbing Code requirements shall be used to direct stormwater from impervious surfaces to filtration rain gardens, or if used within or adjacent to parking lot areas, stormwater may flow directly into them via curb openings. An overflow drain shall be constructed to allow at least 6 inches but not more than 12 inches of water to pond in the rain garden prior to overflow. A perforated system of pipes shall be constructed 18" under the filtration rain to drain water that has filtered through the topsoil and prevent long-term ponding. On private property, this overflow drain and piping must meet Plumbing Code requirements and shall dire excess and filtered stormwater to an approved disposal point as identified on the subdivision's Public Works Permit drawings.
# **5.5.3 General Requirements**

# Setbacks

For infiltration rain gardens and filtration rain gardens without an impermeable liner:

• Minimum setback from building structures shall be 10 feet.

• Infiltration rain gardens or filtration rain gardens without a liner may not be located immediately upslope of building structures.

• There is not a required setback for filtration rain garden as long as an impermeable 60 mils a PVC liner is used.

• Infiltration rain gardens shall be set back a minimum of 5 feet from property lines.

Landscaping: Vegetation provides filtration and root uptake functions, protects from rain and wind erosion, and enhances aesthetic conditions. Plantings shall be designed at the following quantities per 100 square feet of facility area. Facility area is equivalent to the area of the rain garden calculated from Form SIM.

Zone A (wet): 115 herbaceous plants or 100 herbaceous plants and 4 small shrubs Zone B (moderate to dry): 1 tree, 3 large shrubs/small trees, and 4 small shrubs.

## **Facility Component Inspection Requirement**

Rain Garden grading/ excavation	
Structural components/ liner	Call for Inspection
Piping (if applicable)	Call for Inspection
Filter fabric (if applicable)	
Growing medium	Call for Inspection
Plantings	Call for Inspection

**Operations and Maintenance requirements: See Chapter 6** 

# 5.3 Vegetated Swales



See Appendix I SW-120 for typical private property swale detail and Appendix I SW-300-302 for typical Green Street swale details.

**Description:** Swales are long and narrow landscaped depressions used to collect and convey stormwater runoff, allowing pollutants to settle and filter out as the water flows from one bay to the next through the facility. Swales should be integrated into the overall site design and can be used to help fulfill a site's required landscaping area requirement.

**Design Considerations:** When designing swales, slopes and depth should be kept as mild as possible to avoid safety risks, improve aesthetics, and prevent erosion within the facility. For street swales in the public right-of-way all applicable City requirements for other street elements (curbs, sidewalks, trees, etc.) must be met. Swales located next to public sidewalks shall have a minimum 12"-wide flat area between the swale and the sidewalk.

**Construction Considerations:** Swale areas should be clearly marked before site work begins to avoid soil disturbance and compaction during construction.

# **Design Requirements:**

Groundwater In high groundwater areas, groundwater must be addressed per Section 4.6.

Growing Medium: Topsoil shall be used within the top 18 inches of the facility per Appendix
B to support plant growth. Maximum design infiltration rate of the facility is controlled by the infiltration rate of the growing medium and shall not be greater than 4 in/hr. With a demonstrated hardship, higher design infiltration rates may be used with the infiltration blend soil (see Appendix
B) if stormwater from vehicular surfaces is pretreated. Design infiltration rate shall be demonstrated with testing certified by a professional Engineer or Geologist and shall not exceed 10 inches per hour. Areas subject to inundation shall be covered in non-floatable mulch or washed pea gravel. Side slopes shall be covered with suitable mulch such as fine or medium hemlock bark mulch.

**Dimensions and Slopes:** See **Appendix I** for detail drawings. The minimum swale width is 5 feet on private property and 8 feet on streets. A 2-foot-wide flat bottom width is required where feasible. Swales designed with the Simplified Approach are 9 inches deep measured from the top

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of the growing medium to the overflow inlet elevation. Swales designed with the Presumptive Approach vary in depth from 6 to 12 inches. In all cases, maximum side slopes are 3 horizontal to 1 vertical and 4 horizontal to 1 vertical is required immediately adjacent to pedestrian areas. Maximum longitudinal slope is 6 percent. Freeboard for swales must be noted on the plans. Freeboard can be defined as the vertical distance between the design water surface elevation and overtopping elevation or the vertical distance between the top of the check dam and the outside berm or curb elevation (whichever is lower).

**Flow spreader:** The swale shall incorporate a flow-spreading device at the inlet to the swale. The flow spreader shall provide a uniform flow distribution across the swale bottom. Private swales may use riprap to disperse the flow from the inlet pipe. In swales with a bottom width greater than 6 feet, a flow spreader shall be installed at least every 50 feet.

**Check dams:** Check dams are required in swales to allow water to pool and infiltrate into the ground. They shall be constructed of durable, non-toxic materials such as rock, brick, concrete, or soil by integrating these materials into the grading of the swale. Check dams are as long as the width of the swale, perpendicular to flow line. They generally form a 12 inch wide bench on top and measure 4 to 10 inches high, depending on the depth of the facility. See **Appendix I.3 SW-340** for typical check dam details.

Access routes: Access routes to the swale for maintenance purposes must be shown on the plans. Public swales require a minimum 10-foot wide access route for maintenance, not to exceed 10 percent in slope.

**Setbacks:** Required setback from building foundations is 10 feet unless lined with impermeable fabric. Easements for non-buildable areas on adjacent properties may be required if facilities are located next to property lines.

**Simplified Approach Sizing:** Swales sized with the Simplified Approach shall be designed to receive less than 0.5 acre of impervious area runoff. For these projects, a Simplified Approach sizing factor of 0.09 for vegetated swales may be used to receive credit for pollution reduction. Swales with greater than 0.5 acre of impervious area to manage must use the Presumptive Approach to size the swale.

# **Presumptive Approach Sizing Criteria:**

1) <u>Pollution Reduction Criteria (no flow control)</u>: The swale width and profile shall be designed to convey runoff from the Water Quality Design Storm (See Table 4.2) and shall meet the following criteria:

• Maximum flow depth during the Water Quality Design Storm is 4 inches.

• Maximum water velocity during the Water Quality Design Storm is 0.9 feet per second.

• Minimum hydraulic residence time (time for design flow rate to pass through the swale) of 9 minutes. (if infiltration not possible)

• Minimum longitudinal slope of 0.5 percent, maximum slope of 6 percent. For slopes greater than 2 percent, check dams shall be used (one dam every 12 feet).

• Designed using a Manning "n" value of 0.35 for vegetated swales.

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2) <u>Flow Control Criteria:</u> In order for swale facilities to meet flow control requirements under the presumptive approach the swale shall be designed to store and infiltrate the entire 25 yr Design Storm. The areas behind each check dam shall be modeled as individual infiltration basins varying in depth from the height of the check dam to zero. The length of the pool is dependent on the height of the check dam and the slope of the swale.

3) Vegetation shall be established as soon as possible after the swale is completed, and before water is allowed to enter the facility.

4) Unless vegetation is established, biodegradable erosion control matting appropriate for low-velocity flows (approximately 1 foot per second) shall be installed in the flow area of the swale before allowing water to flow through the swale.

# Landscaping:

#### **Vegetated Swales**

Vegetation provides filtration and root uptake functions, protects from rain and wind erosion, and enhances aesthetic conditions. The "facility area" is equivalent to the area of the swale, including bottom and side slopes. The minimum plant material quantities per **100** square feet of facility area shall be as follows:

#### **Private Swales:**

Zone A (wet): 115 herbaceous plants or 100 herbaceous plants and 4 small shrubs Zone B (moderate to dry): 1 tree, 3 large shrubs/small trees, 4 small shrubs, and 140 groundcover plants

#### **Public Swales:**

Zone A (wet): 115 herbaceous plants or 100 herbaceous plants and 4 small shrubs Zone B (moderate to dry): 12 small shrubs, and 70 groundcover plants

The delineation between Zone A and Zone B shall be either the height of the check dam or the overflow outlet elevation which ever is lower.

**Trees:** For private swales, the following evergreen or deciduous trees shall be retained or planted within or adjacent to the swale and continuing approximately 30 feet on center the length of the swale:

Evergreen trees: Minimum height: 6 feet Deciduous trees: Minimum caliper: 1 ½ inches at 6 inches above base.

# Stormwater Report Requirements For Presumptive Approach: Checklist of minimal information to be shown on the permit drawings:

1) Facility dimensions and setbacks from property lines and structures

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- 2) Profile view of facility, including typical cross-sections with dimensions
- 3) Growing medium specification
- 4) Filter fabric specification (if applicable)
- 5) All curb cut details and stormwater piping associated with the facility, including pipe materials, sizes, slopes, and invert elevations at every bend or connection
- 6) Landscaping plan

**Inspection requirements and schedule:** The following table shall be used to determine which stormwater facility components require City inspection, and when the inspection shall be requested:

## **Facility Component Inspection Requirement**

Swale grading		
Curbs / curb cuts	Call for Inspection	
Piping (if applicable)	Call for Inspection	
Filter fabric (if applicable)		
Growing medium	Call for Inspection	
Plantings/seeding/sod	Call for Inspection	

**Operations and Maintenance requirements: See Chapter 6.** 

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# APPENDIX D

# PRE-DEVELOPED VERSUS POST-DEVELOPED RUNOFF

Presumptive Approach calculations were performed utilizing the City of Eugene <u>Stormwater</u> <u>Surface Filtration/Infiltration Facility Sizing Spreadsheet</u>. This calculator is an Excel-based spreadsheet that is downloadable from the City of Eugene web page. Runoff calculations are based on Santa Barbara Unit Hydrograph method for a 24-hour storm, NRCS Type 1A rainfall distribution. Pre- and post-developed peak runoff from each basin as calculated in the "flow control calculation results" section of the worksheet (see worksheets in Appendix B) and are summarized below.

Pre- and post-developed peak flows are based on the pre- and post-developed time of concentration (Tc), determined following the procedures in Appendix C.1: SBUH Method, Portland Stormwater Management Manual – August 1, 2008 (Appendix C.1). For shallow concentrated flow over paved surfaces, the flow velocity can be calculated as:

$$V = 20.3282(s)^{0.5}$$

Per Appendix C.1, minimum time of concentration is 5 minutes. Longer times of concentration reduces calculated peak flow, so for developed conditions the maximum time of concentration is conservatively selected to be 10 minutes.

## Post-Developed Time of Concentration

The post-developed time of concentration is the travel time of runoff flowing over the street impervious surfaces plus the travel time of flow through the stormwater facility to the outlet. Basin 1A has the shortest time of concentration for developed conditions. The length of street impervious surfaces is approximately 17 feet at a two-percent slope to the gutter then one-half percent slope to the stormwater facility. Stormwater facilities adjacent to the street have one-half percent slope.

For shallow concentrated flow over paved surfaces, the flow velocities are:

$$V(2\%) = 20.3282(0.02)^{0.5} = 2.9$$
 fps  
 $V(0.5\%) = 20.3282(0.005)^{0.5} = 1.44$  fps

Travel times for street surfaces are based on 17 feet at 2-percent slope and 15 feet at one-half percent slope, as follows:

$$Tt = 17 \text{ ft}/(60 \text{x} 2.9 \text{ fps}) = 0.1 \text{ minute}$$

$$Tt = 15 \text{ ft}/(60 \text{x} 1.44 \text{ fps}) = 0.2 \text{ minute}$$

The worksheet for Basin 1A (in Appendix B) shows a peak runoff of approximately 0.056 cfs. Flow velocity in the swale is approximately 0.1 fps (see worksheets for channel flows in Appendix B). The swale bottom length is 39 feet.

 $Tt = 39 \text{ ft}/(60 \times 0.1 \text{ fps}) = 6.5 \text{ minutes}.$ 

Tc = 0.1 minute + 0.2 minute + 6.5 minutes = 6.8 minutes.

Thus, a post-developed time of concentration of 7 minutes is used for Basin 1A. The calculated time of concentration for all other stormwater swales and planters exceed 10 minutes, thus a maximum of 10 minutes is used. Travel distances to the rain gardens in Basins 2A through 2F are short resulting in travel times of less than 5 minutes, thus a minimum time of concentration of 5 minutes is used for the rain gardens.

# Pre-Developed Time of Concentration

Rain that falls onto the site collects temporarily in localized depressions and quickly infiltrates into the sand. During times of low groundwater levels there is no stormwater runoff from the site (i.e. Tc = 0). During times of high groundwater levels when water is at the surface runoff will occur in a manner that mimics a paved surface. Basin 1B has the longest travel distance at approximately 263 feet. For an average ground slope of one percent over a travel length of 263 feet, the travel time is:

$$V = 20.3282(0.01)^{0.5} = 2.0$$
 fps; Tt = 263 ft/(60x2.0 fps) = 2.2 minutes

Per Appendix C.1, minimum time of concentration is 5 minutes. Travel distances for all other basins are less than for Basin 1B, thus a pre-developed time of concentration of 5 minutes is used for all basins.

# Pre-Developed and Post-Developed Runoff

The following summarizes the pre-developed peak flow rate of each basin, post-developed peak flow rate to the respective stormwater facility, and the peak facility overflow rate from the stormwater facility for each basin. These numbers were obtained from the "Flow Control Calculation Results" section of the facility sizing spreadsheets in Appendix B.

Basin I.D. Pre-Developed Peak Flow Rate, cfs	Pro Dovolonad	Post-Developed		
	Peak Flow Rate to Facility, cfs	Peak Overflow Rate from Facility, cfs		
1A	0.025	0.056	0.0	
1B	0.112	0.238	0.0	
1C	0.050	0.106	0.0	
1D	0.062	0.131	0.0	
1E	0.069	0.147	0.0	
1F	0.059	0.125	0.0	
1G	0.037	0.078	0.0	
1H	0.075	0.158	0.0	
2A	0.064	0.152	0.0	
2B	0.163	0.387	0.0	
2C	0.159	0.374	0.0	
2D	0.144	0.342	0.0	
2E	0.246	0.582	0.0	
2F	0.067	0.158	0.0	
2G	0.054	0.114	0.0	

# APPENDIX E

# FLORENCE STORMWATER DESIGN MANUAL EXCERPTED OPERATION AND MAINTENANCE PLANS

#### Stormwater Planters

#### **Operations & Maintenance Plan**

**Planters** are designed to allow runoff to filter through layers of topsoil (thus capturing pollutants) and then either infiltrate into the native soils (infiltration planter) or be collected in a pipe to be discharged off-site (flow-through planter). The planter is sized to accept runoff and temporarily store the water in a reservoir on top of the soil. The flow-through planter is designed with an impervious bottom or is placed on an impervious surface. Water should drain through the planter within 3-4 hours after a storm event. All facility components and vegetation shall be inspected for proper operations and structural stability. These inspections shall occur, at a minimum, quarterly for the first 2 years from the date of installation, 2 times per year thereafter, and within 48 hours after each major storm event. The facility owner must keep a log, recording all inspection dates, observations, and maintenance activities. The following items shall be inspected and maintained as stated:

Downspout from rooftop or sheet flow from paving allows unimpeded stormwater flow to the planter.

- Debris shall be removed routinely (e.g., no less than every 6 months) and upon discovery.
- Damaged pipe shall be repaired upon discovery.

Splash Blocks prevent splashing against adjacent structures and convey water without disrupting media.
Any deficiencies in structure such as cracking, rotting, and failure shall be repaired.

**Planter Reservoir** receives and detains storm water prior to infiltration. Water should drain from reservoir within 3-4 hours of storm event.

- Sources of clogging shall be identified and corrected.
- Topsoil may need to be amended with sand or replaced all together.

Filter Media consisting of sand, gravel, and topsoil shall allow stormwater to percolate uniformly through the planter.

The planter shall be excavated and cleaned, and gravel or soil shall be replaced to correct low infiltration rates.

- Holes that are not consistent with the design and allow water to flow directly through the planter to the ground shall be plugged.
- Sediment accumulation shall be hand removed with minimum damage to vegetation using proper erosion control measures. Sediment shall be removed if it is more than 4 inches thick or so thick as to damage or kill vegetation.
  - Litter and debris shall be removed routinely (e.g., no less than quarterly) and upon discovery.

Planter shall contain filter media and vegetation.

• Structural deficiencies in the planter including rot, cracks, and failure shall be repaired.

Overflow Pipe salely conveys flow exceeding reservoir capacity to an approved stormwater receiving system.

- Overflow pipe shall be cleared of sediment and debris when 50% of the conveyance capacity is plugged.
- Damaged pipe shall be repaired or replaced upon discovery.

Vegetation shall be healthy and dense enough to provide filtering while protecting underlying soils from erosion.

- Mulch shall be replenished at least annually.
- Vegetation, large shrubs or trees that limit access or interfere with planter operation shall be pruned or removed.
- Fallen leaves and debris from deciduous plant foliage shall be raked and removed.
- Nuisance or prohibited vegetation from the Eugene Plant List shall be removed when discovered. Invasive vegetation contributing up to 25% of vegetation of all species shall be removed and replaced.
- Dead vegetation shall be removed to maintain less than 10% of area coverage or when planter function is impaired. Vegetation shall be replaced within a specific timeframe, e.g., 3 months, or immediately if required to maintain cover density and control erosion where soils are exposed.

**Debris and Litter** shall be removed to ensure stormwater infiltration and to prevent clogging of overflow drains and interference with plant growth.

**Spill Prevention** measures shall be exercised when handling substances that contaminate stormwater. Releases of pollutants shall be corrected as soon as identified.

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#### Stormwater Planters

#### **Operations & Maintenance Plan**

**Training and/or written guidance information** for operating and maintaining stormwater planters shall be provided to all property owners and tenants. A copy of the O&M Plan shall be provided to all property owners and tenants.

Access to the stormwater planter shall be safe and efficient. Egress and ingress routes shall be maintained to design standards. Roadways shall be maintained to accommodate size and weight of vehicles, if applicable.

- Obstacles preventing maintenance personnel and/or equipment access to the stormwater planter shall be removed.
- Gravel or ground cover shall be added if erosion occurs, e.g., due to vehicular or pedestrian traffic.

Insects & Rodents shall not be harbored in the stormwater planter.

Pest control measures shall be taken when insects/rodents are found to be present.

- If a complaint is received or an inspection reveals that a stormwater facility is significantly infested with mosquitoes or other vectors, the property owner/owners or their designee may be required to eliminate the infestation at the City inspector's discretion. Control of the infestation shall be attempted by using first non-chemical methods and secondly, only those chemical methods specifically approved by the City's inspector. Acceptable methods include but are not limited to the following:
  - i) Installation of predacious bird or bat nesting boxes.
  - ii) Alterations of pond water levels approximately every four days in order to disrupt mosquito larval development cycles.
  - iii) Stocking ponds and other permanent water facilities with fish or other predatory species.
  - iv) If non-chemical methods have proved unsuccessful, contact the City inspector prior to use of chemical methods such as the mosquito larvicides Bacillus thurengensis var. israeliensis or other approved larvacides. These materials may only be used with City inspector approval if evidence can be provided that these materials will not migrate off-site or enter the public stormwater system. Chemical larvicides shall be applied by a licensed individual or contractor.
- Holes in the ground located in and around the stormwater planter shall be filled and compacted.

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# Rain Gardens

# **Operations & Maintenance Plan**

A **vegetated Infiltration Basin** is a vegetated depression created by excavation, berms, or small dams to provide for short-term ponding of surface water until it percolates into the soil. The basin shall infiltrate stormwater within 24 hours. All facility components and vegetation shall be inspected for proper operations and structural stability, at a minimum, quarterly for the first 2 years from the date of installation, 2 times per year thereafter, and within 48 hours after each major storm event. The facility owner must keep a log, recording all inspection dates, observations, and maintenance activities. The following items shall be inspected and maintained as stated:

Basin Inlet shall assure unrestricted stormwater flow to the vegetated basin.

- Sources of erosion shall be identified and controlled when native soil is exposed or erosion channels are present.
- Inlet shall be cleared when conveyance capacity is plugged.
- Rock splash pads shall be replenished to prevent erosion.

Embankment, Dikes, Berms & Side Slopes retain water in the infiltration basin.

- Structural deficiencies shall be corrected upon discovery:
- Slopes shall be stabilized using appropriate erosion control measures when soil is exposed/ flow channels are forming.
- Sources of erosion damage shall be identified and controlled.

**Overflow or Emergency Spillway** conveys flow exceeding reservoir capacity to an approved stormwater receiving system.

- Overflow shall be cleared when 25% of the conveyance capacity is plugged.
- Sources of erosion damage shall be identified and controlled when soil is exposed.
- Rocks or other armament shall be replaced when only one layer of rock exists.

**Filter Media** shall allow stormwater to percolate uniformly through the infiltration basin. If water remains 36-48 hours after storm, sources of possible clogging shall be identified and corrected.

• Basin shall be raked and, if necessary, soil shall be excavated, and cleaned or replaced.

**Sediment/** Basin Debris Management shall prevent loss of infiltration basin volume caused by sedimentation. Gauges located at the opposite ends of the basin shall be maintained to monitor sedimentation.

• Sediment and debris exceeding 4" in depth shall be removed every 2-5 years or sooner if performance is affected.

**Debris and Litter** shall be removed to ensure stormwater infiltration and to prevent clogging of overflow drains and interference with plant growth.

• Restricted sources of sediment and debris, such as discarded lawn clippings, shall be identified and prevented.

**Vegetation** shall be healthy and dense enough to provide filtering while protecting underlying soils from erosion.

- Mulch shall be replenished as needed to ensure healthy plant growth.
- Vegetation, large shrubs or trees that limit access or interfere with basin operation shall be pruned or removed.
- Grass shall be mowed to 4"-9" high and grass clippings shall be removed no less than 2 times per year.
- Fallen leaves and debris from deciduous plant foliage shall be raked and removed.
- Nuisance or prohibited vegetation from the Eugene Plant List (such as blackberries or English Ivy) shall be removed when discovered. Invasive vegetation contributing up to 25% of vegetation of all species shall be removed.
- Dead vegetation shall be removed to maintain less than 10% of area coverage or when infiltration basin function is impaired. Vegetation shall be replaced within 3 months, or immediately if required to control erosion.

**Spill Prevention** measures shall be exercised when handling substances that contaminate stormwater. Releases of pollutants shall be corrected as soon as identified.

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#### **Rain Gardens**

#### **Operations & Maintenance Plan**

**Training and/or written guidance information** for operating and maintaining vegetated infiltration basins shall be provided to all property owners and tenants. A copy of the O&M Plan shall be provided to all property owners and tenants.

Access to the infiltration basin shall be safe and efficient. Egress and ingress routes shall be maintained to design standards. Roadways shall be maintained to accommodate size and weight of vehicles, if applicable.

- Obstacles preventing maintenance personnel and/or equipment access to the infiltration basin shall be removed.
- Gravel or ground cover shall be added if erosion occurs, e.g., due to vehicular or pedestrian traffic.

**Insects & Rodents** shall not be harbored in the infiltration basin. Pest control measures shall be taken when insects/rodents are found to be present.

- If a complaint is received or an inspection reveals that a stormwater facility is significantly infested with mosquitoes or other vectors, the property owner/owners or their designee may be required to eliminate the infestation at the City inspector's discretion. Control of the infestation shall be attempted by using first non-chemical methods and secondly, only those chemical methods specifically approved by the City's inspector. Acceptable methods include but are not limited to the following:
  - i) Installation of predacious bird or bat nesting boxes.
  - ii) Alterations of pond water levels approximately every four days in order to disrupt mosquito larval development cycles.
  - iii) Stocking ponds and other permanent water facilities with fish or other predatory species.
  - iv) If non-chemical methods have proved unsuccessful, contact the City inspector prior to use of chemical methods such as the mosquito larvicides Bacillus thurengensis var. israeliensis or other approved larvacides. These materials may only be used with City inspector approval if evidence can be provided that these materials will not migrate off-site or enter the public stormwater system. Chemical larvicides shall be applied by a licensed individual or contractor.
- Holes in the ground located in and around the infiltration basin shall be filled.

If used at this site, the following will be applicable:

Fences shall be maintained to preserve their functionality and appearance.

- Collapsed fences shall be restored to an upright position.
- Jagged edges and damaged fences shall be repaired or replaced.

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### Swales (Vegetated, Grassy, and Street) Operations & Maintenance Plan

**Swales** are planted or grassed open channels that trap pollutants by filtering and slowing flows, allowing particles to settle out. The swale should drain within 48 hours of a storm event. All facility components, vegetation, and source controls shall be inspected for proper operations and structural stability, at a minimum, quarterly for the first 2 years from the date of installation, 2 times per year thereafter, and within 48 hours after each major storm event. The facility owner must keep a log, recording all inspection dates, observations, and maintenance activities. The facility owner must keep a log, recording all inspection dates, observations, and maintenance activities. The following items shall be inspected and maintained as stated:

Swale Inlet (such as curb cuts or pipes) shall maintain a calm flow of water entering the swale.

- Source of erosion shall be identified and controlled when native soil is exposed or erosion channels are forming.
- Sediment accumulation shall be hand-removed with minimum damage to vegetation using proper erosion control measures. Sediment shall be removed if it is more than 4" thick or so thick as to damage or kill vegetation.
- Inlet shall be cleared when conveyance capacity is plugged. Sources of sediment and debris shall be identified and corrected.
- Rock splash pads shall be replenished to prevent erosion.

Side Slopes shall be maintained to prevent erosion that introduces sediment into the swale.

• Slopes shall be stabilized and planted using appropriate erosion control measures when native soil is exposed or erosion channels are forming.

**Swale Media** shall allow stormwater to percolate uniformly through the landscape swale. If the swale does not drain within 48 hours, it shall be tilled and replanted according to design specifications.

- Annual or semi-annual tilling shall be implemented if compaction or clogging continues.
- Debris in quantities that inhibit operation shall be removed routinely (e.g., no less than quarterly), or upon discovery.

**Swale Outlet** shall maintain sheet flow of water exiting swale unless a collection drain is used. Source of erosion damage shall be identified and controlled when native soil is exposed or erosion channels are forming.

- Outlets such as drains and overland flow paths shall be cleared when 50% of the conveyance capacity is plugged.
- Sources of sediment and debris shall be identified and corrected.

**Vegetation** shall be healthy and dense enough to provide filtering while protecting underlying soils from erosion.

Mulch shall be replenished as needed to ensure survival of vegetation.

- Vegetation, large shrubs or trees that interfere with landscape swale operation shall be pruned.
- Fallen leaves and debris from deciduous plant foliage shall be removed.
- Grassy swales shall be mowed to keep grass 4" to 9" in height. Clippings shall be removed to remove pollutants absorbed in grasses.
- Nuisance and prohibited vegetation from the Eugene Plant List (such as blackberries and English Ivy) shall be removed when discovered. Invasive vegetation contributing up to 25% of vegetation of all species shall be removed and replaced.
- Dead vegetation and woody material shall be removed to maintain less than 10% of area coverage or when swale function is impaired. Vegetation shall be replaced within 3 months, or immediately if required to maintain cover density and control erosion where soils are exposed.

**Debris and Litter** shall be removed to ensure stormwater conveyance and to prevent clogging of inlet drains and interference with plant growth.

**Spill Prevention** measures shall be exercised when handling substances that contaminate stormwater. Releases of pollutants shall be corrected as soon as identified.

**Training and/or written guidance information** for operating and maintaining swales shall be provided to all property owners and tenants. A copy of the O&M Plan shall be provided to all property owners and tenants.

Access to the swale shall be safe and efficient. Egress and ingress routes shall be maintained to design standards. Roadways shall be maintained to accommodate size and weight of vehicles, if applicable.

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#### Swales (Vegetated, Grassy, and Street) Operations & Maintenance Plan

Obstacles preventing maintenance personnel and/or equipment access to the swale shall be removed.
Gravel or ground cover shall be added if erosion occurs, e.g., due to vehicular or pedestrian traffic.

**Insects & Rodents** shall not be harbored in the swale. Pest control measures shall be taken when insects/rodents are found to be present.

- If a complaint is received or an inspection reveals that a stormwater facility is significantly infested with mosquitoes or other vectors, the property owner/owners or their designee may be required to eliminate the infestation at the City inspector's discretion. Control of the infestation shall be attempted by using first non-chemical methods and secondly, only those chemical methods specifically approved by the City's inspector. Acceptable methods include but are not limited to the following:
  - i) Installation of predacious bird or bat nesting boxes.
  - ii) Alterations of pond water levels approximately every four days in order to disrupt mosquito larval development cycles.
  - iii) Stocking ponds and other permanent water facilities with fish or other predatory species.
  - iv) If non-chemical methods have proved unsuccessful, contact the City inspector prior to use of chemical methods such as the mosquito larvicides Bacillus thurengensis var. israeliensis or other approved larvacides. These materials may only be used with City inspector approval if evidence can be provided that these materials will not migrate off-site or enter the public stormwater system. Chemical larvicides shall be applied by a licensed individual or contractor.

• Holes in the ground located in and around the swale shall be filled.

If used at this site, the following will be applicable:

Check Dams shall control and distribute flow.

- Causes for altered water flow shall be identified, and obstructions cleared upon discovery.
- Causes for channelization shall be identified and repaired.

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# STORMWATER MANAGEMENT FACILITY INSPECTION & MAINTENANCE LOG (SAMPLE)

**Property Address:** 

	_
Increation	Date
mapection	Date.

**Inspected By:** 

Approximate Date/Time of Last Rainfall:

Type of Stormwater Management Facility:

Location of Facility on Site (In relation to buildings or other permanent structures):

Water levels and observations (Oil sheen, smell, turbidity, etc.):

Sediment accumulation & record of sediment removal:

Condition of vegetation (Height, survival rates, invasive species present, etc.) & record of replacement and management (mowing, weeding, etc.):

Condition of physical properties such as inlets, outlets, piping, fences, irrigation facilities, and side slopes. Record damaged items and replacement activities:

Presence of insects or vectors. Record control activities:

Identify safety hazards present. Record resolution activities:

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# APPENDIX F

# STORMWATER FACILITY LANDSCAPE PLAN

Exhibit H1 -PC 22 21 PUD 01, PC 22 25 SUB 03, & SR 22 48 SIR 13– Myrtle Glenn – 37th and Oak Landscaping of public and private stormwater facilities will be in conformance with the Florence Stormwater Design Manual. Final landscape plans will be prepared at time of engineered public and private improvement plans.

Swales and raingardens are delineated between Zone A (wet) and Zone B (moderate to dry). Zone A includes the bottom and sides up to the height of the overflow outlet elevation. Zone B is the area of facility above the overflow outlet elevation. The entire area of stormwater planters is Zone A. The facility area is equivalent to the area of the facility, including bottom and side slopes.

# Stormwater Planter Landscaping (public and private)

The minimum plant material quantities per 100 square feet of facility area will be as follows:

Zone A: 115 herbaceous plants or 100 herbaceous plants and 4 small shrubs.

Plant material species will be selected from the city-approved plant list. Tree planting is not required in planters.

# Swale Landscaping (public)

The minimum plant material quantities per 100 square feet of facility area will be as follows:

Zone A: 115 herbaceous plants or 100 herbaceous plants and 4 small shrubs.

Zone B: 12 small shrubs, and 70 groundcover plants.

Plant material species will be selected from the city-approved plant list.

# Rain Garden Landscaping (private)

The minimum plant material quantities per 100 square feet of facility area will be as follows:

Zone A: 115 herbaceous plants or 100 herbaceous plants and 4 small shrubs.

Zone B: 1 tree, 3 large shrubs/small trees, and 4 small shrubs.

Plant material species will be selected from the city-approved plant list.