

**Florence, OR Dollar General**

US Highway 101  
Florence, OR 97439

**PREPARED FOR**



361 SUMMIT BLVD, SUITE 110  
BIRMINGHAM, AL 35243

**PREPARED BY**

**JSA CIVIL**

Engineering | Planning | Management

111 TUMWATER BLVD SE, SUITE C210

TUMWATER, WA 98501

CONTACT: CHARLIE SEVERS, PE

PHONE: 360|515|9600

**DESIGNER’S CERTIFICATION AND STATEMENT:**

I hereby certify that this Stormwater Management Report for Florence Oregon, Dollar General 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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Charlie Severs, PE  
Principal

Date



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## **1. PROJECT OVERVIEW AND DESCRIPTION**

This Stormwater Management Report was prepared for the proposed commercial development project that will be located at NE INT Oregon Coast Highway & 35<sup>th</sup> Street Florence, OR. The Stormwater Management Report was prepared to comply with the minimum technical standards and requirements that are set forth in the 2010 City of Florence Stormwater Design Manual. The proposed commercial developed will be constructed on Lane County Tax Parcel No. 1812232206800. Specifically, the proposed site improvements / construction activities include the following:

- Site Preparation, grading, and erosion control activities
- Construction of a 10,460 ft<sup>2</sup> commercial development retail building
- Construction of an impervious parking lot
- Construction of on-site stormwater facilities
- Extension of utilities (water, power, sewer, etc.)

This existing site is approximately 0.99 acres in size and currently undeveloped in a Highway Commercial H-C zone. The proposed site is bounded by a Burger King restaurant on a parcel directly south, US Highway 101 to the west, a restaurant (Chens Family Dish) to the north and residential homes to the east. The proposed site improvements will disturb the entire site. The project area generally slopes in the north to south direction. According to the National Wetland Inventory mapping center, there are no on-site wetlands. Q

Permits required for this project include City of Florence Type III Planning Commission Review, Oregon Department of Transportation Access Permit, and final building permit.

See Appendix A for Vicinity MAP

## **2. METHODOLOGY**

The existing drainage on site sheet flows from the north side to the south side of the site where it eventually is collected in catch basins and directed to the existing storm water system. Roof runoff and a portion of landscaping runoff north of the proposed building will be routed to a below-grade soakage trench. Parking lot and the remaining landscaping runoff will be conveyed to an at-grade infiltration rain garden.

The geotechnical report concludes that groundwater, generally, is approximately 8' below existing grades. 5' of separation between the bottom of the storm facilities and the groundwater elevation is feasible.

## **3. ANALYSIS**

Using Autodesk's Storm and Sanitary Analysis (SSA). This computer program was used to model, analyze, and design the drainage basin using Santa Barbra UH Hydrology Method and SCS TR-55 TOC Method. The report can be seen in the appendix.

## DESIGN ASSUMPTIONS

According to the City of Florence Stormwater manual the presumptive approach will be used for this site. The presumptive approach consists of designing to the 25-year, 24-hour storm stored and infiltrated. After reviewing the geotechnical report, the soil infiltration rate that will be used is 4 inches/hour. The curve numbers used are 98 for impervious area and 61 for pervious areas.

## CALCULATIONS

Flow Control:

Using the presumptive method Flow Control Storm event is a 25-year, 24-hour event.

The following table identifies the different land-type designation and theory respective areas for the on-site threshold discharge area.

Areas	Curve #	Acres (SF)	Percentage
Impervious Area	98	0.73 (31,804)	75%
Pervious Area	61	0.24 (10,370)	25%
Total	N/A	0.97 (42,174)	100%

Water Quality:

An infiltration rain garden will be constructed on the east side of the project area for treatment and infiltration of parking lot runoff.

## 4. ENGINEERING CONCLUSIONS

A SSA model was-up for the threshold discharge area and was completed in accordance with the city's presumptive approach requirements. To retain the 25-year, 24-hour storm event, approximately 3,500 ft<sup>3</sup> of storage is required. 4,100 ft<sup>3</sup> of storage will be provided. An infiltration rain garden with an overflow to below-grade storage (one connected system) is proposed. Stormwater overflow beyond the 25-year, 24-hour storm event will be collected in an overflow structure and connected to the city's stormwater conveyance system in 35<sup>th</sup> Street.

## 5. STORMWATER FACILITY DETAILS/EXHIBITS

See Appendix B for stormwater facility BMP Details

## 6. OPERATIONS AND MAINTENANCE AGREEMENT

See Appendix A.4 for Operations and Maintenance Plan and O&M Form. The property owner will be responsible for all long-term Operations and Maintenance costs.

Note: O&M manual will be provided with the final report.

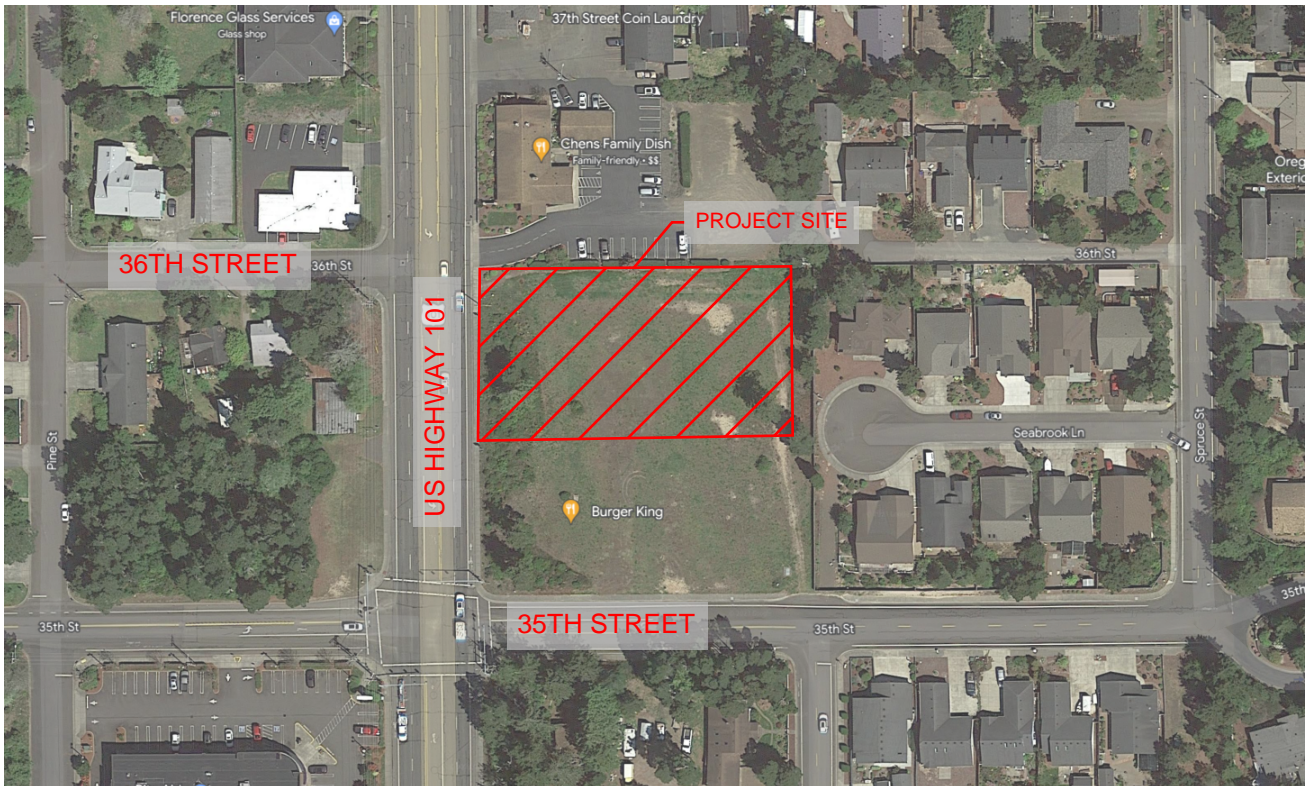
## 7. ADDITIONAL FORMS

Appendix A.3 and A.4 from the Florence Stormwater Design Manual.

# APPENDIX A VICINITY MAP

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**JSACIVIL**

Engineering | Planning | Management

111 Tumwater Blvd SE | Tumwater, WA | 98501

**FLORENCE, OR DOLLAR GENERAL**

**APPENDIX A - VICINITY MAP**

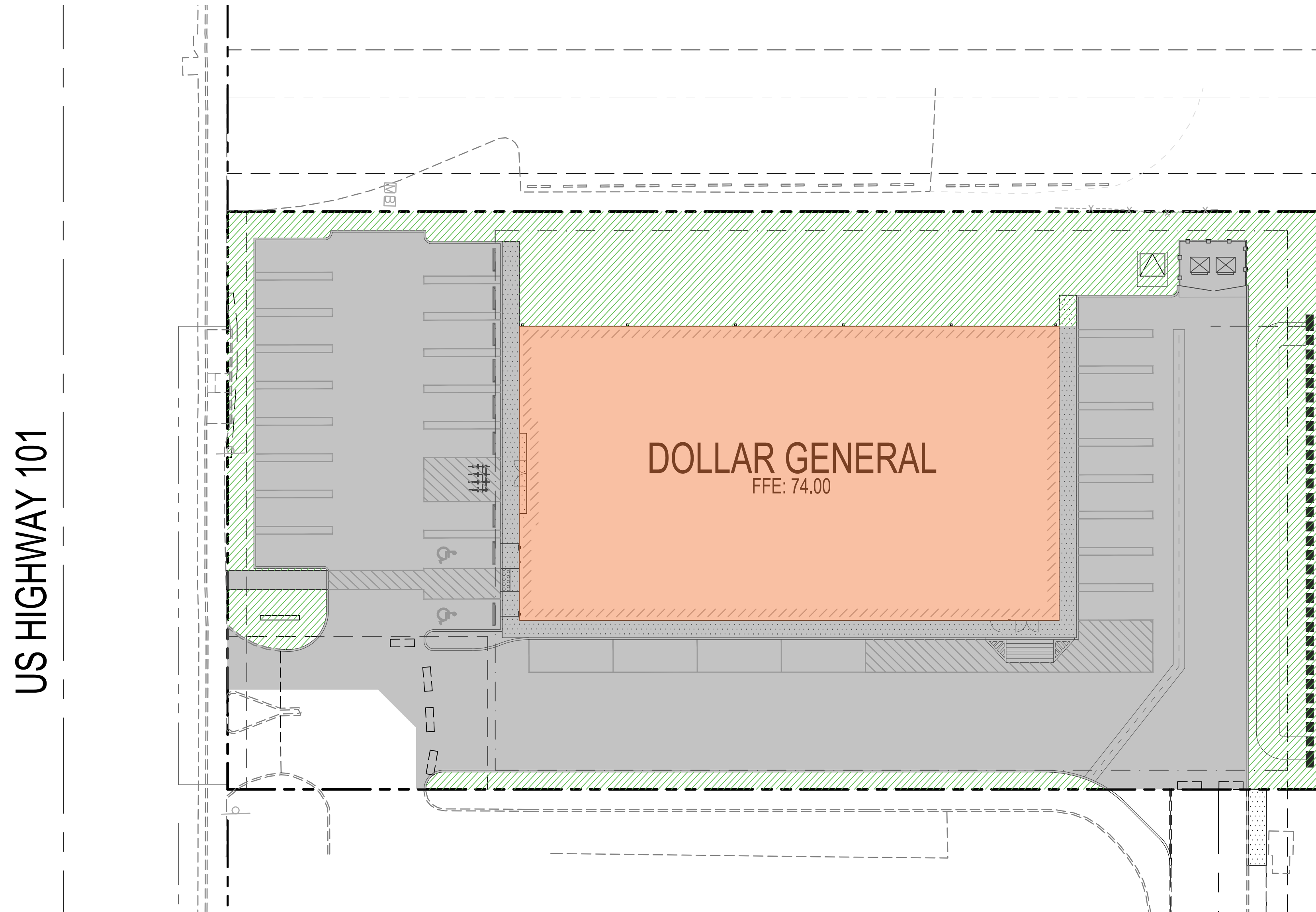
# APPENDIX B BASIN MAP

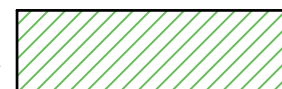


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# BASIN MAP EXHIBIT



- 10,370 SQ. FT.  PERVIOUS LANDSCAPE AREA
- 20,934 SQ. FT.  PARKING LOT & SIDEWALK AREA
- 10,870 SQ. FT.  ROOF AREA

# APPENDIX C

## STORMWATER FACILITY BMP

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**APPENDIX D**  
**A.3 - STORMWATER MANAGEMENT**  
**REPORT CHECKLIST**

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## APPENDIX A.3 Stormwater Management Report Checklist

The Stormwater Management Report is required for every site improvement where the Presumptive or Performance Approach is used and the minimum submittal requirements are as follows. All reports shall be paginated and securely fastened (including maps and exhibits).

- Engineers scale: Maximum 1"=10' Minimum 1"=50'
- All site topography with existing and proposed contours and spot elevations as necessary
- If there are streets, provide the names
- If curbs and no section view, show the curb height
- Utility structures, underground and overhead lines
- Sidewalks
- Surface materials
- Dimensions

### 1) Cover Sheet

- Project name and owner
- Site address
- Associated permit numbers
- Submittal date
- Engineer
- Firm
- Address
- Contact information

### 2) Designer's Certification and Statement

"I hereby certify that this Stormwater Management Report for \_\_\_\_\_ (name of project) 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."

Requires Design Professional's Oregon registration stamp

### 3) Table of Contents

### 4) Project Overview and Description

- Size and location of project site (vicinity map)
- Property zoning
- Type of development/proposed improvements
- Watershed description
- Permits required (local, state, federal)
- Existing vs. post-construction conditions



7) Engineering Conclusions

- Based on compliance with Stormwater Design Manual
- How water quality, flow control, and discharge requirements are satisfied
- Post-construction peak flow=pre-development peak flow (2-yr 24-hr events)

8) Stormwater Facility Details/Exhibits

- Contour maps of pre and post development
- Impervious area identification
- Watershed delineation
- Existing and new drainageways
- Point(s) of discharge
- Delineation of each catchment (area treated by one facility)
- Landscape plans (see Appendix D.1)

9) Operations and Maintenance Plan and O&M Form (See Appendix A.4)

- Must include entity responsible for long-term fiscal responsibilities of O&M

10) Additional Forms

- Source Control Special Circumstances Installations (if applicable)
- Special Circumstances (if applicable)

11) Associated Reports Submitted

**APPENDIX E**  
**A.4 - OPERATIONS AND**  
**MAINTENANCE PLAN**

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**After Recording Return to:**

**Name:**

**Address:**

Place Recording Label Here

**APPENDIX A.4**

**Form O&M: Operations and Maintenance Plan**

**Permit Application No .** \_\_\_\_\_

**Owner Name:** \_\_\_\_\_

**Phone:** *(area code required)* \_\_\_\_\_

**Mailing Address:** *(return address for records)* \_\_\_\_\_

**City/State/Zip:** \_\_\_\_\_

**Site Address:** \_\_\_\_\_

**City/State/Zip:** \_\_\_\_\_

**Site Legal Description:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**1 Responsible Party for Maintenance** *(check one)*

Homeowner association    Property Owner    Other *(describe)*

**2 Contact Information for Responsible Party(ies) if Other than Owner**

Daytime Phone: *(area code required)* \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

Emergency/After Hours Phone: \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

Contact Name and Address: \_\_\_\_\_

**Instructions**

**Simplified Sizing Approach:** Attach O&M Specifications from the Florence Stormwater Design Manual Appendix H.

**Presumptive and Performance Sizing Approach:** Attach the site-specific O&M Plan (See Stormwater Design Manual Section 6).

**3 Site Plan**

Show all facility locations in relation to labeled streets, buildings, or other permanent features on the site. Also show the sources of runoff entering the facility, and the final onsite/offsite discharge point.

*Please complete the table below*

Maintaining the stormwater management facility on this site plan is a required condition of building permit approval for the identified property. The property owner is required to operate and maintain this facility in accordance with the O&M specifications or plan on file with the City of Florence. That requirement is binding on all current and future



owners of the property. Failure to comply with the O&M specifications or plan may result in enforcement action, including penalties. The O&M specifications or plan may be modified by written consent of new owners and written approval by re-filing with the Community Development Department.

**Complete and recorded O&M Forms shall be submitted to:**

Community Development Department, 250 Highway 101, Florence, OR, 97439  
Office hours are 8 - 5, Monday through Friday. Call 541-997-3436 for assistance.

*Required Site Plan (insert here or attach separate sheet)*

I Have Attached a Site Plan

*Please complete this table*

Facility Type	Size (sf)	Drainage is from:	Impervious Area Treated (sf)	Discharge Point

**BY SIGNING BELOW** filer accepts and agrees to the terms and conditions contained in this O&M Form and in any document executed by filer and recorded with it. To be signed in the presence of a notary.

\_\_\_\_\_  
*Filer signature*

**INDIVIDUAL Acknowledgement**  
**STATE of OREGON county of:**

\_\_\_\_\_  
This instrument was acknowledged before me on:

\_\_\_\_\_  
By:

\_\_\_\_\_  
Notary Signature:

My Commission Expires: \_\_\_\_\_ *for notary seal*

---

**CORPORATE Acknowledgement**  
**STATE of OREGON county of:**

\_\_\_\_\_  
This instrument was acknowledged before me on:

\_\_\_\_\_  
By:

\_\_\_\_\_  
As (title):

\_\_\_\_\_  
Of (corporation):

\_\_\_\_\_  
Notary Signature:

My Commission Expires: \_\_\_\_\_

# APPENDIX F SSA REPORT

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# RAIN GARDEN WITH ADDITIONAL BELOW-GRADE STORAGE

## Project Description

File Name .....

## Project Options

Flow Units ..... CFS  
 Elevation Type ..... Elevation  
 Hydrology Method ..... Santa Barbara UH  
 Time of Concentration (TOC) Method ..... SCS TR-55  
 Link Routing Method ..... Hydrodynamic  
 Enable Overflow Ponding at Nodes ..... YES  
 Skip Steady State Analysis Time Periods ..... YES

## Analysis Options

Start Analysis On ..... 00:00:00      0:00:00  
 End Analysis On ..... 00:00:00      0:00:00  
 Start Reporting On ..... 00:00:00      0:00:00  
 Antecedent Dry Days ..... 0      days  
 Runoff (Dry Weather) Time Step ..... 0 01:00:00      days hh:mm:ss  
 Runoff (Wet Weather) Time Step ..... 0 00:05:00      days hh:mm:ss  
 Reporting Time Step ..... 0 00:05:00      days hh:mm:ss  
 Routing Time Step ..... 30      seconds

## Number of Elements

	Qty
Rain Gages .....	1
Subbasins .....	1
Nodes.....	2
<i>Junctions</i> .....	0
<i>Outfalls</i> .....	1
<i>Flow Diversions</i> .....	0
<i>Inlets</i> .....	0
<i>Storage Nodes</i> .....	1
Links.....	1
<i>Channels</i> .....	0
<i>Pipes</i> .....	1
<i>Pumps</i> .....	0
<i>Orifices</i> .....	0
<i>Weirs</i> .....	0
<i>Outlets</i> .....	0
Pollutants .....	0
Land Uses .....	0

## Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	RAIN_GAGE	Time Series	25-YEAR, 24-HOUR EVENT	Cumulative	inches	Oregon	Lane	25.00	5.06	SCS Type IA 24-hr

## Subbasin Summary

SN Subbasin ID	Area (ac)	Impervious Area (%)	Impervious Area Curve Number	Pervious Area Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1 DEVELOPED_CONDITIONS	0.97	61.00	98.00	76.00	5.05	3.94	3.82	0.93	0 00:05:00

## Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft <sup>2</sup> )	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Out-01	Outfall	0.00					0.00	0.00					
2	Stor-01	Storage Node	69.50	72.50	0.00		0.00	0.93	72.00				0.00	0.00



# Subbasin Hydrology

## Subbasin : DEVELOPED\_CONDITIONS

### Input Data

Area (ac) ..... 0.97  
 Impervious Area (%) ..... 61  
 Impervious Area Curve Number ..... 98  
 Pervious Area Curve Number ..... 76  
 Rain Gage ID ..... RAIN\_GAGE

### Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
32			
Composite Area & Weighted CN	0.97		89.42

### Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

$$T_c = (0.007 * ((n * L_f)^{0.8}) / ((P^{0.5}) * (S_f^{0.4})))$$

Where :

Tc = Time of Concentration (hr)  
 n = Manning's roughness  
 Lf = Flow Length (ft)  
 P = 2 yr, 24 hr Rainfall (inches)  
 Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 \* (Sf<sup>0.5</sup>) (unpaved surface)  
 V = 20.3282 \* (Sf<sup>0.5</sup>) (paved surface)  
 V = 15.0 \* (Sf<sup>0.5</sup>) (grassed waterway surface)  
 V = 10.0 \* (Sf<sup>0.5</sup>) (nearly bare & untilled surface)  
 V = 9.0 \* (Sf<sup>0.5</sup>) (cultivated straight rows surface)  
 V = 7.0 \* (Sf<sup>0.5</sup>) (short grass pasture surface)  
 V = 5.0 \* (Sf<sup>0.5</sup>) (woodland surface)  
 V = 2.5 \* (Sf<sup>0.5</sup>) (forest w/heavy litter surface)  
 Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)  
 Lf = Flow Length (ft)  
 V = Velocity (ft/sec)  
 Sf = Slope (ft/ft)

Channel Flow Equation :

$$V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n$$

$$R = A_q / W_p$$

$$T_c = (L_f / V) / (3600 \text{ sec/hr})$$

Where :

Tc = Time of Concentration (hr)  
 Lf = Flow Length (ft)  
 R = Hydraulic Radius (ft)  
 Aq = Flow Area (ft<sup>2</sup>)  
 Wp = Wetted Perimeter (ft)  
 V = Velocity (ft/sec)  
 Sf = Slope (ft/ft)  
 n = Manning's roughness

User-Defined TOC override (minutes): 5.00

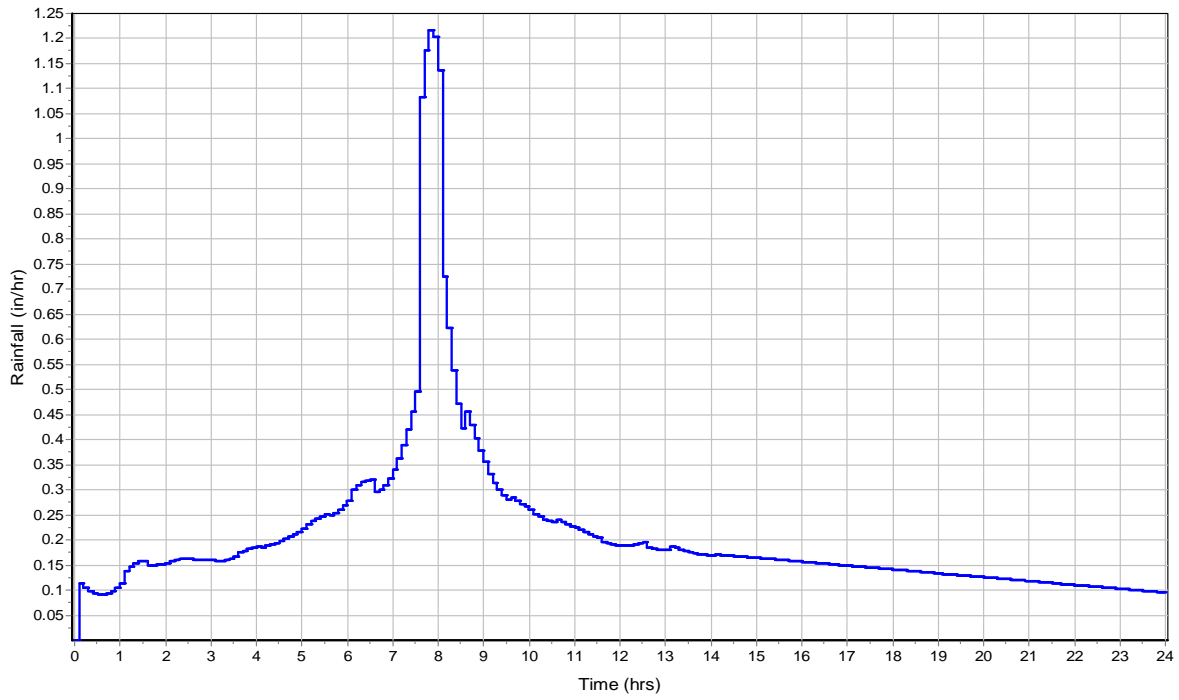
### Subbasin Runoff Results

Total Rainfall (in) ..... 5.05  
 Total Runoff (in) ..... 3.94  
 Peak Runoff (cfs) ..... 0.93  
 Weighted Curve Number ..... 89.42  
 Time of Concentration (days hh:mm:ss) ..... 0 00:05:00

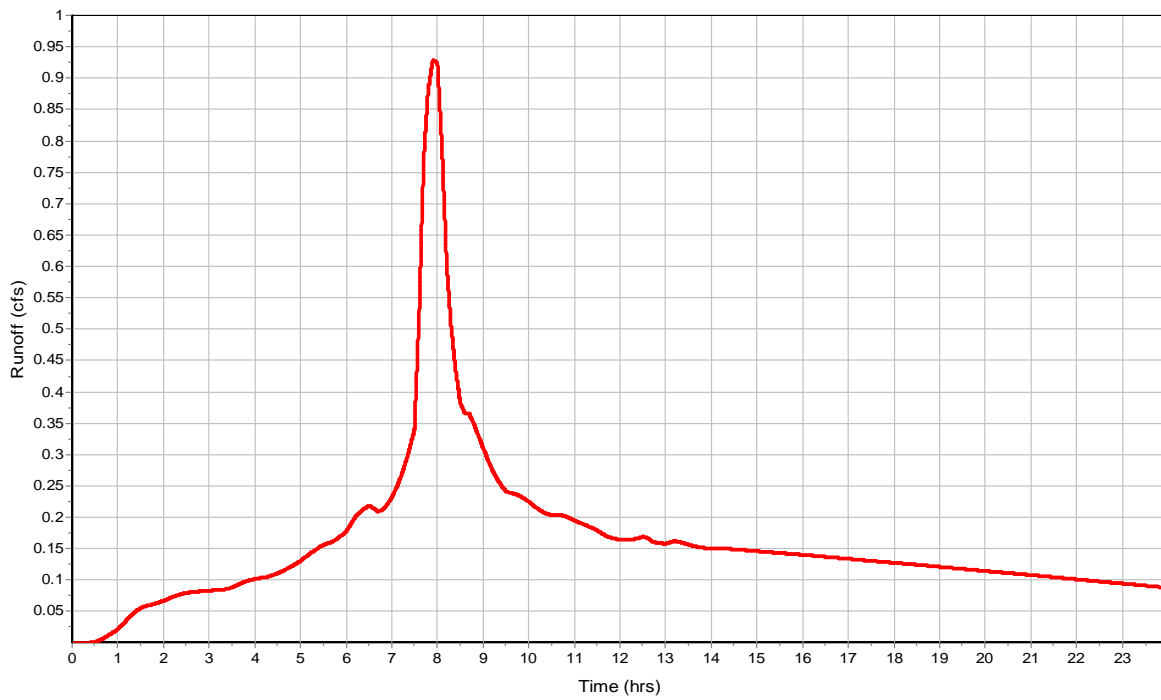


Subbasin : DEVELOPED\_CONDITIONS

Rainfall Intensity Graph



Runoff Hydrograph



## Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Pipe Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	Link-01	10.00	72.25	2.75	69.50	69.50	2.75	27.5000	CIRCULAR	18.000	18.000	0.0150	0.5000	0.5000	0.0000	0.00	No	1

## Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-01	0.00	0 00:00	47.74	0.00	0.00		0.00	0.00	0.00		Calculated

# Storage Nodes

## Storage Node : Stor-01

### Input Data

Invert Elevation (ft) ..... 69.50  
Max (Rim) Elevation (ft) ..... 72.50  
Max (Rim) Offset (ft) ..... 3.00  
Initial Water Elevation (ft) ..... 0.00  
Initial Water Depth (ft) ..... -69.50  
Ponded Area (ft<sup>2</sup>) ..... 0.00  
Evaporation Loss ..... 0.00

### Infiltration/Exfiltration

Constant Flow Rate (cfs) ..... 0.15

### Storage Area Volume Curves

Storage Curve : RAIN GARDE W/ BELOW-GRADE STORAGE

Stage (ft)	Storage Area (ft <sup>2</sup> )	Storage Volume (ft <sup>3</sup> )
0	0	0
0.5	1556	389
1	1670	835
1.5	1789.33	1342
2	1911	1911
2.5	2760	3450
3	2766.67	4150

### Storage Area Volume Curves



— Storage Area    — Storage Volume

**Storage Node : Stor-01 (continued)**

**Output Summary Results**

Peak Inflow (cfs) .....	0.93
Peak Lateral Inflow (cfs) .....	0.93
Peak Outflow (cfs) .....	0
Peak Exfiltration Flow Rate (cfm) .....	9
Max HGL Elevation Attained (ft) .....	72
Max HGL Depth Attained (ft) .....	2.5
Average HGL Elevation Attained (ft) .....	71.16
Average HGL Depth Attained (ft) .....	1.66
Time of Max HGL Occurrence (days hh:mm) .....	0 14:20
Total Exfiltration Volume (1000-ft <sup>3</sup> ) .....	11.456
Total Flooded Volume (ac-in) .....	0
Total Time Flooded (min) .....	0
Total Retention Time (sec) .....	0