

EXHIBIT 6
CUP16-02

SECTION 6 – PRELIMINARY STORMWATER REPORT

PRELIMINARY STORMWATER REPORT

FOR

LACAMAS HEIGHTS ELEMENTARY SCHOOL
CAMAS, WASHINGTON

Job No.: MLMA-02

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November 10, 2016


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SECTION 1 – SUMMARY REPORT

Introduction and Background

This is the stormwater report for the Lacamas Heights Elementary School project. This report is submitted concurrently with the project land-use application.

This proposal consists of constructing a new single story elementary school with associated access roads, parking, playgrounds, utilities, and landscaping. These improvements are considered on-site improvements and private stormwater facilities are proposed to manage runoff from these areas and will be owned and maintained by the Camas School District (CSD).

A new public roadway is being constructed on the school property to provide access to the school. The new roadway, right-of-way, and all related construction will be dedicated to the City of Camas, who will maintain the associated off-site stormwater facilities.

Existing Site Characteristics

The existing site contains approximately 12,850 SF of existing impervious surfaces (two residences and outbuildings) with bands of trees aligning the west and north site borders. Several hydrogeomorphic wetlands are present within the subject site and a Lacamas Lake tributary transects the northern half of the site. Site vegetation primarily consists of grass in open areas with mature conifers and several oak trees concentrated near the existing residences and the Lacamas Lake tributary. The wetlands are drained to the west and south, where water is conveyed under NE 232nd Avenue and NE 9th Street through multiple culverts. There is one wetland that drains to the east side of the property.

Site Soils

The Clark County Soils Survey classifies these soils as Lauren Loam, Lauren Gravelly Loam, Cove Silty Clay Loam and McBee Silty Clay Loam. An on-site soils study by a geotechnical engineer describe the soils as three different soil types, depending on the location and depth. The USDA provides Hydrologic Soil Group designations, in which Lauren is listed as Hydrologic Group B. However, based on the geotechnical report findings, Hydrologic Group D (SG4) is a more appropriate classifications for the near surface soils on this site.

In-situ infiltration testing performed in October 2016 by Columbia West Engineering yielded infiltration rates ranging from 0-5.9 inches per hour, as defined by the soil's approximate vertical coefficient of permeability (k).

Groundwater was encountered ranging from 3'-8.5' below existing ground surface.

Design Criteria

This project consists of converting approximately 7,800 SF of existing impervious surface to natural vegetation, constructing approximately 235,886 SF of new impervious surface. The total project disturbed area is approximately 9.75 acres.

The zoning is R-7.5 (Residential 7,500) and therefore the project is considered an urban development. Because the existing impervious surface (12,850 SF) is less than 35% of the total project site (424,652 SF), the project is considered a New Development. New Developments that add more than 5,000 SF of impervious surface are required to meet Minimum Requirements 1-9 for new impervious surfaces.

Minimum Requirement #1 – Preparation of Stormwater Site Plans

The civil drawings show the proposed on-site and off-site stormwater systems.

Minimum Requirement #2 – Construction Stormwater Pollution Prevention

The contractor is responsible for conforming to City of Camas's Erosion Prevention & Sediment Control Codes (CMC 14.06). A construction SWPPP is required for this project, and the 12 elements of the Construction SWPPP must be considered and controls developed.

1. Preserve Vegetation/Mark Clearing Limits - Land disturbing activities will be limited to the extent practicable. The Lacamas Lake Tributary and Wetlands will be protected from activity. Silt fence and tree protection fencing will be utilized to mark the clearing limits.
2. Establish Construction Access - A gravel construction entrance will be installed to minimize sediment tracking off-site.
3. Control Flow Rates –Collected stormwater runoff is proposed to be detained on-site in a pond and off-site in an underground detention facility, and released at the City's flow control requirements.
4. Install Sediment Controls - The contractor shall install sediment controls per City of Camas standard details.
5. Stabilize soils - The project will replace any permanent vegetation that may be disturbed with this project.
6. Protect Slopes – There are no steep (>40%) slopes within the project area.
7. Protect Drain Inlets - The contractor shall install sediment controls per City of Camas standard details.
8. Stabilize Channels and Outlets – There are no existing or proposed channels associated with the project. All new outlets will be stabilized with rock.
9. Control Pollutants - The contractor shall conform to the Erosion Prevention & Sediment Control Code (CMC 14.06).
10. Control Dewatering – Some dewatering may be required on this site.
11. Maintain BMPs - The contractor shall conform to the Erosion Prevention & Sediment Control Code (CMC 14.06).
12. Manage the Project - The contractor shall conform to the Erosion Prevention & Sediment Control Code (CMC 14.06).

Minimum Requirement #3 – Source Control of Pollution

There are no existing or proposed sources of pollution on the project site requiring special BMP's under this minimum requirement.

Minimum Requirement #4 – Preservation of Natural Drainage Systems and Outfalls

The project will maintain the existing Lacamas Lake Tributary, NE 232ND culverts and wetlands.

All proposed stormwater outfall locations will be stabilized with rock.

Minimum Requirement #5 - On-Site Stormwater Management

There is not enough natural vegetation on the project site (outside of the wetland boundaries) to consider Full Dispersion. Furthermore, there are limited areas to disperse runoff in accordance with the dispersion BMP's design criteria, where it will not receive high-traffic use by students and community members.

The project does propose to utilize bioretention facilities for stormwater treatment and infiltration (although it's limited) in the on-site detention facility.

Minimum Requirement #6 – Runoff Treatment

This project proposes to treat the pollution generating impervious surfaces using bioretention facilities (or other approved BMPs) designed in accordance with the City of Camas Stormwater Design Standards Manual (Resolution #1193). The proposed bioretention facilities are sized to infiltrate greater than 91% of the incoming runoff file using the WWHM software program. See Section 2 for the screen shot of each of the six on-site modeled bioretention facilities to show that the 91% infiltration requirement is satisfied.

The bioretention facilities will be located upstream of the detention facility for the on-site system, and downstream of the detention facility in the off-site system. Import treatment soil media will be utilized for all bioretention facilities at an increased depth of 24" to increase phosphorus removal, given that the project is located within the Lacamas Lake watershed.

Minimum Requirement #7 – Flow Control

On-Site

A new flow control facility will be provided for the on-site system, proposed as a pond with slow infiltration through the bottom. The assumed tested infiltration rate is 0.7 inches per hour, of which a factor of safety of 4 will be applied. This is based on the tested rate in Soil Type 2 of 0.7 inches per hour in TP-1S. The pond bottom elevation is set at 5' above the anticipated high groundwater table. Groundwater monitoring will be performed in this location in the Winter/Spring of 2017.

Since the project is required to meet the flow control standard for all new impervious and converted surfaces, the existing basin in the predeveloped model is sized at 414,163 SF (equal to the new impervious and converted surface) for the on-site system. Since the site has historically drained to wetlands, the predeveloped condition is required to be modeled as the existing condition (prairie). As mentioned above, the Hydrologic Group selected is Group D. There are two points-of-compliance for the on-site project areas (Lacamas Lake Tributary and SW Wetland,). Detained stormwater will be released from the pond through a flow splitter that will convey water both to the tributary and SW Wetland.

Off-Site

Detention for the off-site areas is proposed as an underground detention facility (chambers or perforated pipe in a gravel bed). As with the on-site areas, all pre-developed areas for off-site basins are assumed the existing condition because the runoff has historically drained to a wetland (prairie and forest). There is a single point of compliance for the off-

site basin (the southwest wetland). A french drain at the back of sidewalk will intercept water from north of the roadway and convey it under the road to the wetland, bypassing the new road's stormwater system.

Minimum Requirement #8 – Wetlands Protection

There are six wetlands on the project site. Wetlands will be protected and enhanced. The proposal includes no direct wetland impacts, only indirect wetland and buffer impacts. Wetland and buffer enhancements, as well as wetland creation are part of the mitigation plan for this project. All mitigation will be accomplished on-site.

Minimum Requirement #9 – Operation and Maintenance

All maintenance of the proposed on-site stormwater collection, conveyance, treatment, and infiltration facilities will be provided by the Camas School District.

After dedication to the City of Camas, maintenance of all off-site stormwater facilities will be provided by the City.

Conveyance

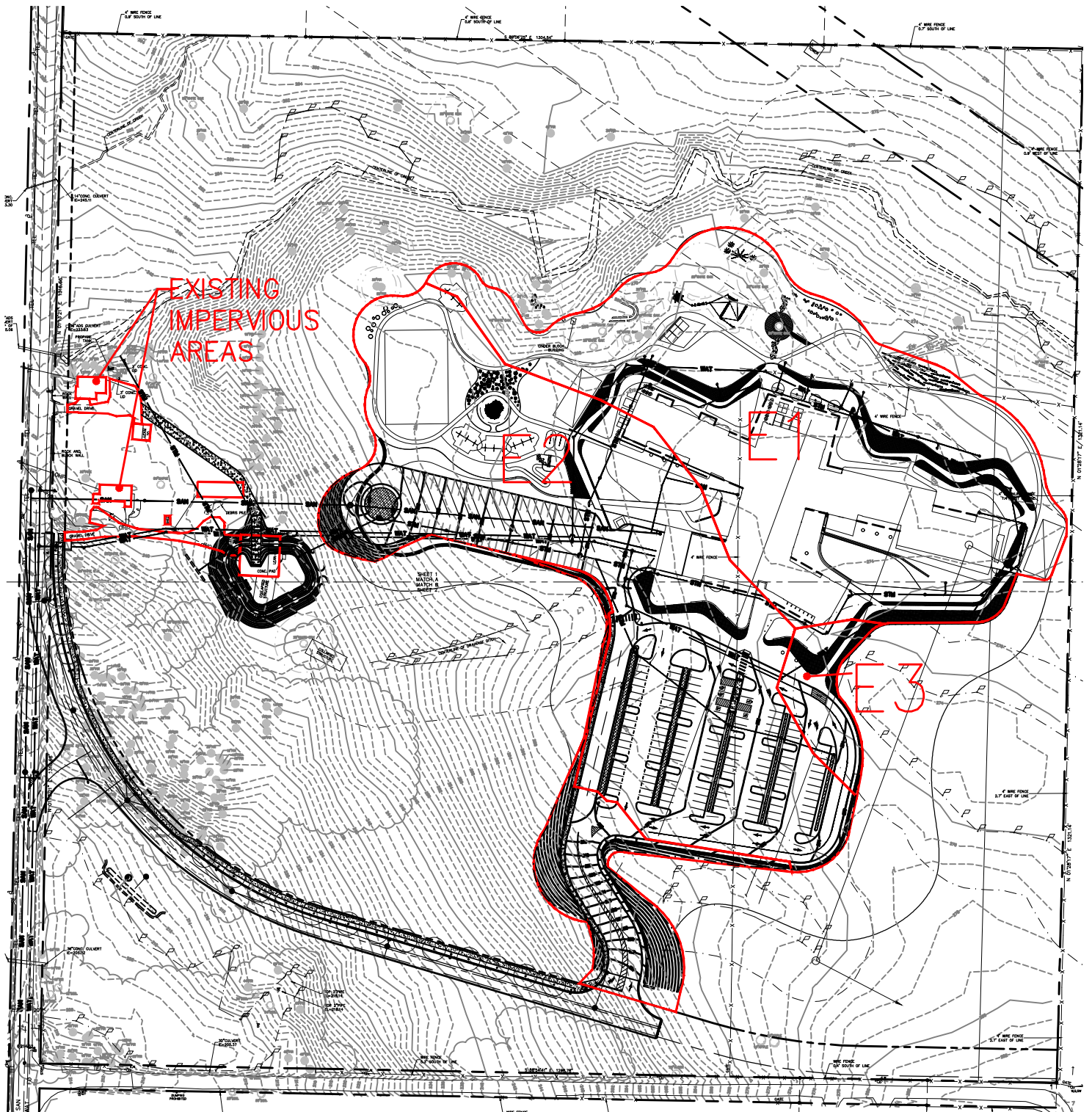
All proposed stormwater pipes will be sized to flow the 10-year peak flow as determined using a 24-hour peak flow method without surcharge in the final design.

END OF SUMMARY REPORT

SECTION 2 – ON-SITE STORMWATER ANALYSIS AND CALCULATIONS

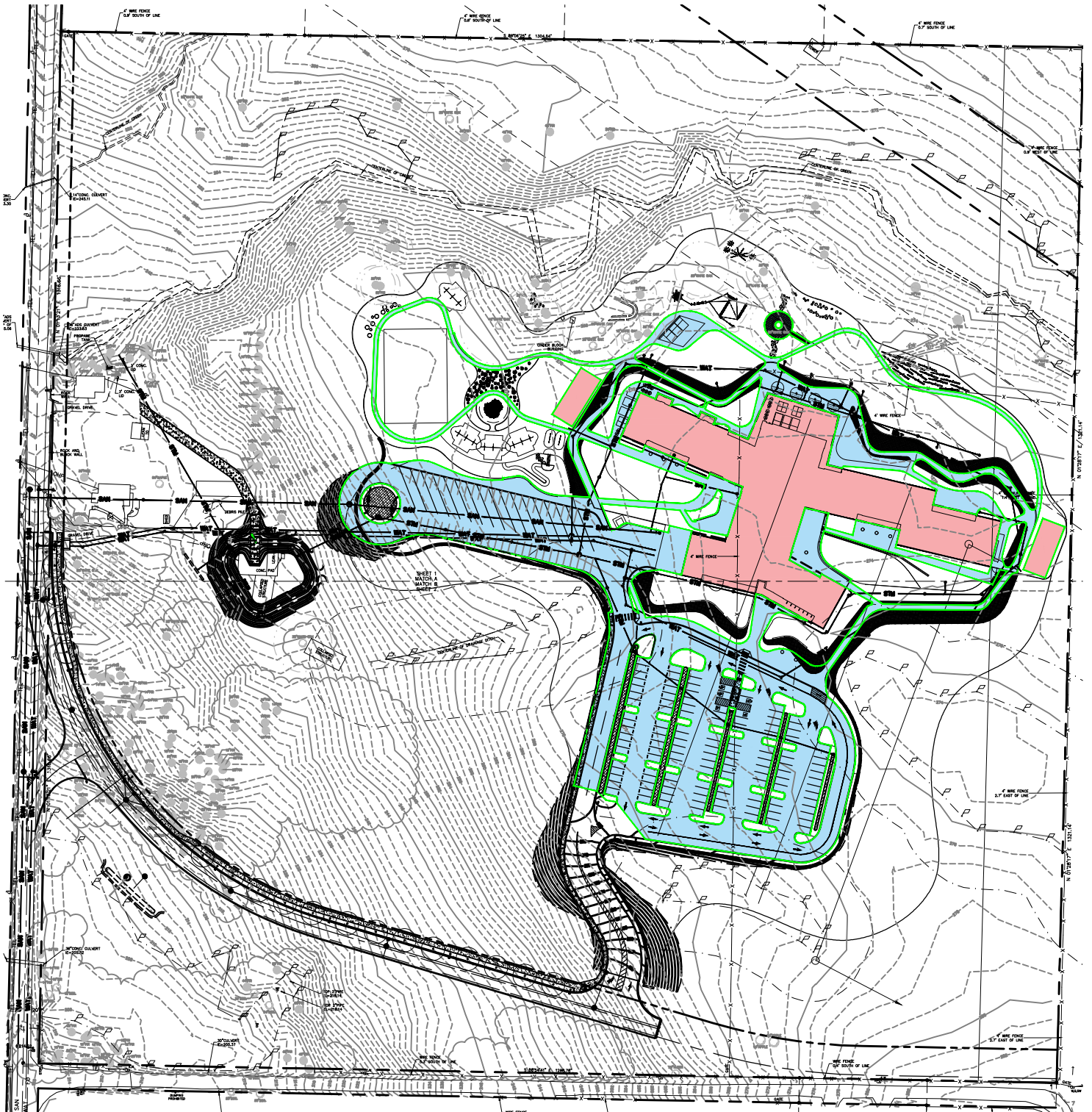


Lacamas Heights E.S. - Vicinity Map



EXISTING BASINS

SCALE: 1"=180'



PROPOSED BASINS

SCALE: 1" 180'

Lacamas Heights E.S.

Drainage Basin Area Tabulation for WWHM Flow Control Modeling

Existing Basins

Basin	Description	Imperv. Area (SF Ac)		Prairie Area (SF Ac)		Total Area (SF)	Total Area (Ac)
E1	North	0	0.00	199,479	4.58	199,479	4.58
E2	West	0	0.00	201,129	4.62	201,129	4.62
E3	East	0	0.00	13,555	0.31	13,555	0.31
							9.51

Proposed Basins

Basin	Description	Imperv. Area (SF Ac)		Lawn Area (SF Ac)		Total Area (SF)	Total Area (Ac)
System RG - To New Bioretention Facility							
RG1	Bus Parking	33,735	0.77	0	0.00	33,735	0.77
RG2	Bus Drive Aisle	26,083	0.60	0	0.00	26,083	0.60
RG3	Parking	24,123	0.55	0	0.00	24,123	0.55
RG4	Parking	10,029	0.23	0	0.00	10,029	0.23
RG5	Parking	11,918	0.27	0	0.00	11,918	0.27
RG6	Parking	2,731	0.06	0	0.00	2,731	0.06
2.49				0.00		2.49	
System A - To New Detention Pond							
A1	AC/Sidewalk	159,175	3.65	0	0.00	159,175	3.65
A2	Building	54,374	1.25	0	0.00	54,374	1.25
A3	Portables	4,200	0.10	0	0.00	4,200	0.10
A4	Pervious	0	0.00	196,414	4.51	196,414	4.51
5.00				4.51		9.51	

SCENARIOS

☐ Predeveloped
☒ Mitigated

Run Scenario

Basic Elements

Pro Elements

LID Toolbox

Commercial Toolbox

Move Elements

X 40
Y 54

Basin 1 Mitigated

Subbasin Name:
☐ Designate as Bypass for POC

Flows To:

Surface

Interflow

Groundwater

Area in Basin

Available Pervious Acres

Available Impervious Acres

☒ Show Only Selected

Pervious Total Acres
Impervious Total Acres
Basin Total Acres

Facility Name

Downstream Connections

Outlet 1

Outlet 2

Outlet 3

☐ Precipitation Applied to Facility
☐ Evaporation Applied to Facility

Facility Dimensions

Facility Bottom Elevation (ft)
Bottom Length (ft)
Bottom Width (ft)
Effective Depth (ft)
Left Side Slope (H/V)
Bottom Side Slope (H/V)
Right Side Slope (H/V)
Top Side Slope (H/V)

Infiltration

☒ Yes
☐ No

Measured Infiltration Rate (in/hr)
Reduction Factor (infiltration)
Use Wetted Surface Area (sidewalls)
Total Volume Infiltrated (ac-ft)
Total Volume Through Riser (ac-ft)
Total Volume Through Facility (ac-ft)
Percent Infiltrated

Target %:

Determine Outlet With Tide Gate

☐ Use Tide Gate

Tide Gate Elevation (ft)
Downstream Connection

Overflow Elevation (ft)
Iterations

Facility Type

Auto Pond Quick Pond

Facility Dimension Diagram

Outlet Structure Data

Riser Height (ft)
Riser Diameter (in)
Riser Type
Notch Type

Orifice Number Diameter Height

1

2

3

Pond Volume at Riser Head (ac-ft)

Initial Stage (ft)

Schematic

SCENARIOS

☐ Predeveloped
☒ Mitigated

Run Scenario

Basic Elements

Pro Elements

LID Toolbox

Commercial Toolbox

Move Elements

Save x,y Load x,y

X 0
Y 42

Basin 2 Mitigated

Subbasin Name: Basin 2

Designate as Bypass for POC:

Surface

Interflow

Groundwater

Flows To: RG 2 RG 2

Area in Basin

Available Pervious Acres

Available Impervious Acres

☒ Show Only Selected
☒ ROADS/FLAT 6

Pervious Total 0 Acres

Impervious Total 0.6 Acres

Basin Total 0.6 Acres

Deselect Zero Select By: GO

RG 2 Mitigated

Facility Name RG 2

Facility Type Trapezoidal Pond

Outlet 1

Outlet 2

Outlet 3

Downstream Connections

0 0 0

Precipitation Applied to Facility

Evaporation Applied to Facility

Auto Pond

Quick Pond

Facility Dimension Diagram

Facility Dimensions

Facility Bottom Elevation (ft)

Bottom Length (ft)

Bottom Width (ft)

Effective Depth (ft)

Left Side Slope (H/V)

Bottom Side Slope (H/V)

Right Side Slope (H/V)

Top Side Slope (H/V)

0

193

5

2

3

3

3

3

Outlet Structure Data

Riser Height (ft)

Riser Diameter (in)

Riser Type

Notch Type

0.5

6

Flat

Orifice Number

Diameter (in)

Height (ft)

1 0 0

2 0 0

3 0 0

Pond Volume at Riser Head (ac-ft)

.015

Show Pond Table

Open Table

Initial Stage (ft)

Infiltration

Measured Infiltration Rate (in/hr)

Reduction Factor (infiltr factor)

Use Wetted Surface Area (sidewalls)

Total Volume Infiltrated (ac-ft)

Total Volume Through Riser (ac-ft)

Total Volume Through Facility (ac-ft)

Percent Infiltrated

Yes

6

0.25

NO

108.031

10.608

118.64

91.06

Size Infiltration Pond

Target %: 100

Tide Gate

Time Series

Demand

Determine Outlet With Tide Gate

☐ Use Tide Gate

Tide Gate Elevation (ft)

Downstream Connection

Overflow Elevation (ft)

Iterations

0

0

0

Bio-Retention #2

SCENARIOS

☐ Predeveloped

☒ Mitigated

Run Scenario

Basic Elements

Pro Elements

LID Toolbox

Commercial Toolbox

Move Elements

Save x,y Load x,y

X: 40 Y: 48

Basin 3 Mitigated

Subbasin Name: ☐ Designate as Bypass for POC

Flows To: Surface Interflow Groundwater

Area in Basin ☒ Show Only Selected

Available Pervious Acres

Available Impervious Acres ☒ ROADS/FLAT

Pervious Total Acres

Impervious Total Acres

Basin Total Acres

Deselect Zero Select By: GO

Facility Name RG 3

Facility Type

Downstream Connections

Outlet 1 Outlet 2 Outlet 3

☐ Precipitation Applied to Facility

☐ Evaporation Applied to Facility

Facility Dimensions

Facility Bottom Elevation (ft)

Bottom Length (ft)

Bottom Width (ft)

Effective Depth (ft)

Left Side Slope (H/V)

Bottom Side Slope (H/V)

Right Side Slope (H/V)

Top Side Slope (H/V)

Infiltration

Measured Infiltration Rate (in/hr)

Reduction Factor(infiltr*factor)

Use Wetted Surface Area (sidewalls)

Total Volume Infiltrated (ac-ft)

Total Volume Through Riser (ac-ft)

Total Volume Through Facility (ac-ft)

Percent Infiltrated

Size Infiltration Pond

Target %:

Tide Gate Demand

Determine Outlet With Tide Gate

☐ Use Tide Gate

Tide Gate Elevation (ft) Downstream Connection

Overflow Elevation (ft) Iterations

SCENARIOS

☐ Predeveloped
☒ Mitigated

Run Scenario

Basic Elements

Pro Elements

LID Toolbox

Commercial Toolbox

Move Elements

Save x,y Load x,y

X: 20 Y: 54

Basin 4 Mitigated

Subbasin Name: ☐ Designate as Bypass for POC

Flows To: Surface Interflow Groundwater

Area in Basin Available Pervious Acres Available Impervious Acres

☒ Show Only Selected

☒ ROADS/FLAT

Pervious Total Acres
Impervious Total Acres
Basin Total Acres

Select By:

Facility Name

Downstream Connections

Outlet 1 Outlet 2 Outlet 3

☐ Precipitation Applied to Facility
☐ Evaporation Applied to Facility

Facility Dimensions

Facility Bottom Elevation (ft)
Bottom Length (ft)
Bottom Width (ft)
Effective Depth (ft)
Left Side Slope (H/V)
Bottom Side Slope (H/V)
Right Side Slope (H/V)
Top Side Slope (H/V)

Infiltration

Measured Infiltration Rate (in/hr)
Reduction Factor (infiltr factor)
Use Wetted Surface Area (sidewalls)
Total Volume Infiltrated (ac-ft)
Total Volume Through Riser (ac-ft)
Total Volume Through Facility (ac-ft)
Percent Infiltrated

Target %:

Tide Gate Demand

☐ Use Tide Gate

Tide Gate Elevation (ft) Downstream Connection
Overflow Elevation (ft) Iterations

Basin 4 Mitigated

Subbasin Name: ☐ Designate as Bypass for POC

Flows To: Surface Interflow Groundwater

Area in Basin Available Pervious Acres Available Impervious Acres

☒ Show Only Selected

☒ ROADS/FLAT

Pervious Total Acres
Impervious Total Acres
Basin Total Acres

Select By:

Facility Name

Downstream Connections

Outlet 1 Outlet 2 Outlet 3

☐ Precipitation Applied to Facility
☐ Evaporation Applied to Facility

Facility Dimensions

Facility Bottom Elevation (ft)
Bottom Length (ft)
Bottom Width (ft)
Effective Depth (ft)
Left Side Slope (H/V)
Bottom Side Slope (H/V)
Right Side Slope (H/V)
Top Side Slope (H/V)

Infiltration

Measured Infiltration Rate (in/hr)
Reduction Factor (infiltr factor)
Use Wetted Surface Area (sidewalls)
Total Volume Infiltrated (ac-ft)
Total Volume Through Riser (ac-ft)
Total Volume Through Facility (ac-ft)
Percent Infiltrated

Target %:

Tide Gate Demand

☐ Use Tide Gate

Tide Gate Elevation (ft) Downstream Connection
Overflow Elevation (ft) Iterations

SCENARIOS

☐ Predeveloped

☒ Mitigated

Run Scenario

Basic Elements

Pro Elements

LID Toolbox

Commercial Toolbox

Move Elements

Save x,y Load x,y

X: 40 Y: 36

Basin 5 Mitigated

Subbasin Name: ☐ Designate as Bypass for POC

Flows To: Surface Interflow Groundwater

Area in Basin ☒ Show Only Selected

Available Pervious Acres

Available Impervious Acres ☒ ROADS/FLAT

Pervious Total Acres

Impervious Total Acres

Basin Total Acres

Deselect Zero

Select By: GO

RG 5 Mitigated

Facility Name Facility Type

Outlet 1 Outlet 2 Outlet 3

Auto Pond Quick Pond

Facility Dimension Diagram

Outlet Structure Data

Riser Height (ft)

Riser Diameter (in)

Riser Type

Notch Type

Orifice Number Diameter Height (in) (ft)

1

2

3

Pond Volume at Riser Head (ac-ft)

Show Pond Table

Initial Stage (ft)

Size Infiltration Pond

Target %:

Tide Gate Time Series Demand

Determine Outlet With Tide Gate

☐ Use Tide Gate

Tide Gate Elevation (ft) Downstream Connection

Overflow Elevation (ft) Iterations

SCHEMATICS

Predeveloped

Mitigated

Run Scenario

Basic Elements

Pro Elements

LID Toolbox

Commercial Toolbox

Move Elements

Save x,y Load x,y

X 40

Y 42

Basin 6 Mitigated

Subbasin Name: Basin 6

Designate as Bypass for POC

Surface

Interflow

Groundwater

Flows To : RG 6 RG 6

Area in Basin

Available Pervious Acres

Available Impervious Acres

ROADS/FLAT 06

Pervious Total 0 Acres

Impervious Total 0.06 Acres

Basin Total 0.06 Acres

Deselect Zero

Select By: GO

RG 6 Mitigated

Facility Name RG 6

Facility Type Trapezoidal Pond

Outlet 1

Outlet 2

Outlet 3

Downstream Connections

Precipitation Applied to Facility

Evaporation Applied to Facility

Facility Dimensions

Facility Bottom Elevation (ft)

Bottom Length (ft)

Bottom Width (ft)

Effective Depth (ft)

Left Side Slope (H/V)

Bottom Side Slope (H/V)

Right Side Slope (H/V)

Top Side Slope (H/V)

Outlet Structure Data

Riser Height (ft)

Riser Diameter (in)

Riser Type Flat

Notch Type

Orifice Number

Diameter (in)

Height (ft)

Infiltration

Measured Infiltration Rate (in/hr)

Reduction Factor (infiltration)

Use Wetted Surface Area (sidewalls)

Total Volume Infiltrated (ac-ft)

Total Volume Through Riser (ac-ft)

Total Volume Through Facility (ac-ft)

Percent Infiltrated

Size Infiltration Pond

Target %: 100

Tide Gate

Time Series

Demand

Determine Outlet With Tide Gate

Use Tide Gate

Tide Gate Elevation (ft)

Downstream Connection

Overflow Elevation (ft)

Iterations

Bio-Retention #6

The screenshot shows the 'Basin 1 Mitigated' window. The 'Schematic' tab is active, displaying a grid with a blue trapezoidal pond labeled 'A1' and a green square with a rain cloud. The 'Subbasin Name' is 'Basin 1'. The 'Flows To' section shows 'Surface' as 'Trapezoidal Pond 1', 'Interflow' as 'Trapezoidal Pond 1', and 'Groundwater' as empty. The 'Area in Basin' section shows 'Available Pervious' as 'SG4, Field, Flat' (9.51 Acres) and 'Available Impervious' as 'ROADS/FLAT' (0 Acres). The 'Pervious Total' is 9.51 Acres, 'Impervious Total' is 0 Acres, and 'Basin Total' is 9.51 Acres.

Schematic

SCENARIOS

☐ Predeveloped
☒ Mitigated

Run Scenario

Basic Elements

Pro Elements

LID Toolbox

Commercial Toolbox

Move Elements

Save x,y

Load x,y

X 0

Y 0

#

Trapezoidal Pond 1 Mitigated

Facility Name

Trapezoidal Pond 1

Facility Type

Trapezoidal Pond

Outlet 1

0

Outlet 2

0

Outlet 3

0

Downstream Connections

☒ Precipitation Applied to Facility
☐ Evaporation Applied to Facility

Auto Pond

Quick Pond

Facility Dimension Diagram

Facility Dimensions

Facility Bottom Elevation (ft)

0

Bottom Length (ft)

62.8

Bottom Width (ft)

62.8

Effective Depth (ft)

4

Left Side Slope (H/V)

2.5

Bottom Side Slope (H/V)

2.5

Right Side Slope (H/V)

2.5

Top Side Slope (H/V)

2.5

Outlet Structure Data

Riser Height (ft)

3

Riser Diameter (in)

18

Riser Type

Flat

Notch Type

Infiltration

Yes

Measured Infiltration Rate (in/hr)

0.7

Reduction Factor (infiltration factor)

0.25

Use Wetted Surface Area (sidewalls)

NO

Total Volume Infiltrated (ac-ft)

70.487

Total Volume Through Riser (ac-ft)

1448.011

Total Volume Through Facility (ac-ft)

1518.50

Percent Infiltrated

4.64

Size Infiltration Pond

Target %: 100

Orifice

Diameter

Height

Number

(in)

(ft)

1

5.9375

0

2

6.5

2.4375

3

4.5

2.6

Pond Volume at Riser Head (ac-ft)

.345

Show Pond Table

Open Table

Initial Stage (ft)

Tide Gate

Time Series

Demand

Determine Outlet With Tide Gate

☐ Use Tide Gate

Tide Gate Elevation (ft)

0

Downstream Connection

Overflow Elevation (ft)

0

Iterations

0

Detention Pond Summary

Schematic

SCENARIOS

☐ Predeveloped

☒ Mitigated

Run Scenario

Basic Elements

Pro Elements

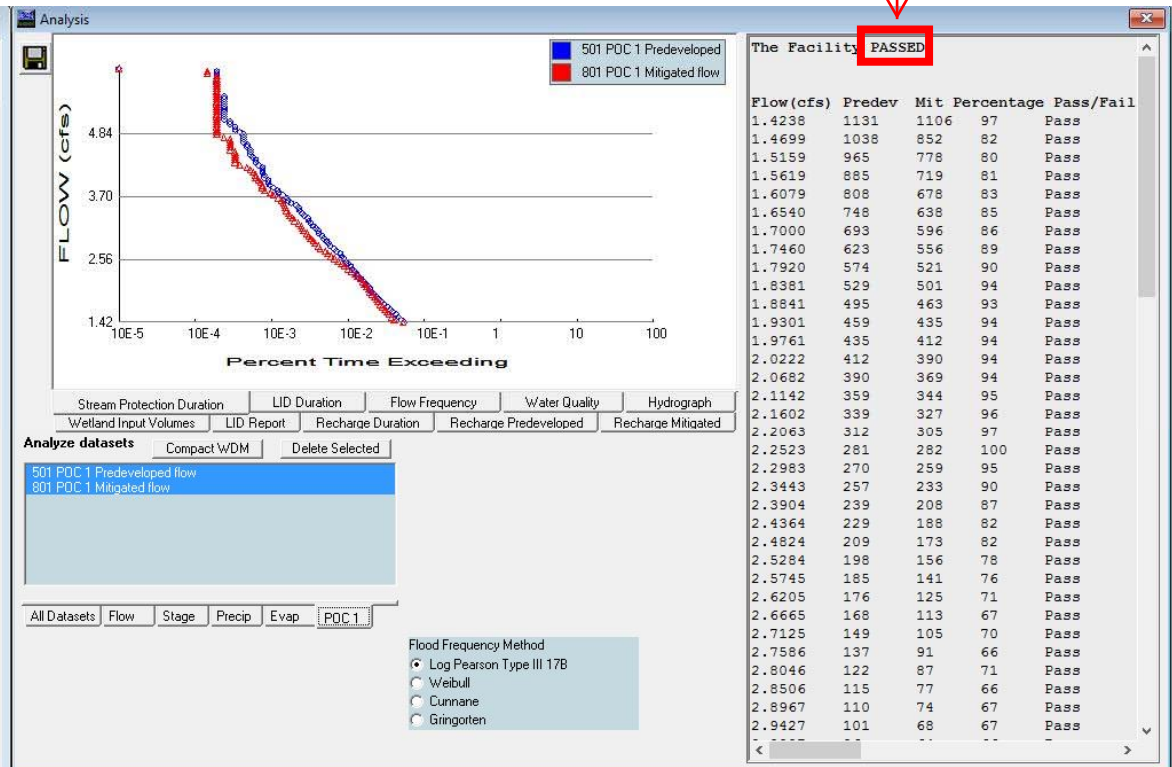
LID Toolbox

Commercial Toolbox

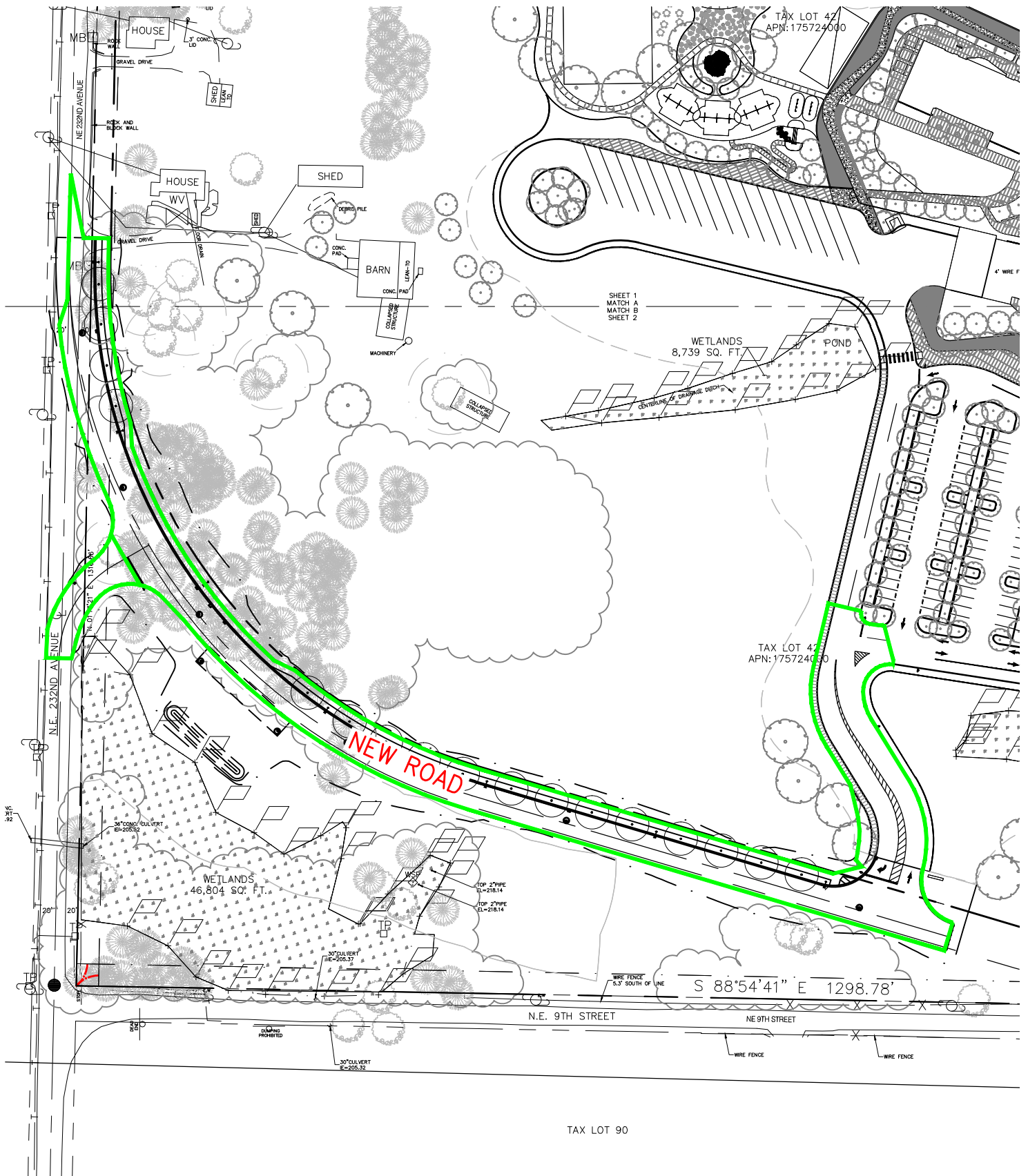
Move Elements

Save x,y Load x,y

X 40 Y 30



SECTION 3 – OFF-SITE STORMWATER ANALYSIS AND CALCULATIONS



OFF-SITE ROADWAY BASIN

OFF-SITE BASIN SUMMARY TABLE

Existing Condition - Phase 1

	s.f.	Total acre		acre
Impervious	1,985	0.05	Moderate (5-15%)	0.05
Forest	20,934	0.48	Moderate (5-15%)	0.24
			Steep (>15%)	0.24
Pasture	39,971	0.92	Moderate (5-15%)	0.92
	62,890	1.44		1.44

Proposed Condition - Phase 1

	s.f.	Total acre		acre
Impervious - To Detent.	53,546	1.23	Flat (0-5%)	0.74
			Moderate (5-15%)	0.49
Impervious - To Wetland	3,381	0.08	Flat (0-5%)	0.08
Lawn	5,963	0.14	Flat (0-5%)	0.07
			Moderate (5-15%)	0.07
	62,890	1.44		1.44

OFF-SITE WWHM SCREEN SHOTS

WWHM2012 OFFSITE-PH1-SG4

File Edit View Help Summary Report

Basin Help

SCENARIOS

Basin 1 Mitigated

Subbasin Name: Directly to Wetland

Flows To: Surface Interflow Groundwater

Area in Basin

Available Pervious	Acres	Available Impervious	Acres
SG4 Forest, Mod	0	ROADS/PLAT	0
SG4 Forest, Steep	0	ROADS/MOD	00
SG4 Field, Mod	0		
SG4 Lawn, Flat	0		
SG4 Lawn, Mod	0		

Previous Total: 0 Acres
Impervious Total: 0.08 Acres
Basin Total: 0.08 Acres

Basin 2 Mitigated

Subbasin Name: To Detention Facility

Flows To: Surface Interflow Groundwater

Area in Basin

Available Pervious	Acres	Available Impervious	Acres
SG4 Forest, Mod	0	ROADS/PLAT	74
SG4 Forest, Steep	0	ROADS/MOD	49
SG4 Field, Mod	0		
SG4 Lawn, Flat	07		
SG4 Lawn, Mod	07		

Previous Total: 0.14 Acres
Impervious Total: 1.23 Acres
Basin Total: 1.37 Acres

WWHM2012 OFFSITE-PH1-SG4

File Edit View Help Summary Report

Analysis Help

Gravel Trench Bed 1 Mitigated

Facility Name: Gravel Trench Bed 1

Downstream Connection: Outlet 1 Outlet 2 Outlet 3

Facility Type: Gravel Trench/Bed

Facility Dimensions

Trench Length (ft): 100
Trench Bottom Width (ft): 18
Effective Total Depth (ft): 5
Top and bottom slope (H/V): 0
Left Side Slope (H/V): 0.01
Right Side Slope (H/V): 0.01

Material Layers for Trench/Bed

Layer	Thickness (ft)	Porosity (0-1)
Layer 1	5	0.63
Layer 2	0	0
Layer 3	0	0
Layer 4	0	0
Layer 5	0	0

Infiltration: NO

Outlet Structure Data

Orifice Number	Diameter (in)	Height (ft)
1	2	0
2	3	3.07
3	1.87	3.4

Trench Volume at Riser Head (ac-ft): .106

Show Trench: Open Table

Initial Stage (ft): 0

Analysis

Flow (cfs) vs Percent Time Exceeding

501 POC 1 Predisdeveloped flow
801 POC 1 Mitigated flow

The Facility PASSED

Flow (cfs)	Predev	Mit	Percentage	Pass/Fail
0.2312	936	570	60	Pass
0.2386	870	549	63	Pass
0.2460	800	528	66	Pass
0.2534	732	508	69	Pass
0.2608	675	493	73	Pass
0.2681	618	464	75	Pass
0.2755	567	443	78	Pass
0.2829	541	410	75	Pass
0.2903	511	378	73	Pass
0.2977	465	357	76	Pass
0.3051	426	331	77	Pass
0.3124	407	308	75	Pass
0.3198	384	293	76	Pass
0.3272	349	272	77	Pass
0.3346	330	260	78	Pass
0.3420	313	249	79	Pass
0.3493	295	227	76	Pass
0.3567	279	213	76	Pass
0.3641	258	196	75	Pass
0.3715	241	182	75	Pass
0.3789	226	173	76	Pass
0.3863	211	161	76	Pass
0.3936	199	144	72	Pass
0.4010	181	138	76	Pass
0.4084	172	131	76	Pass
0.4158	163	115	70	Pass
0.4232	155	105	66	Pass
0.4305	137	96	70	Pass
0.4379	127	87	68	Pass
0.4453	119	80	67	Pass
0.4527	115	73	63	Pass
0.4601	111	66	59	Pass
0.4675	97	60	61	Pass
0.4748	89	56	62	Pass