Stormwater Report

Stormwater Management Report

Vessel Multi-Family Development

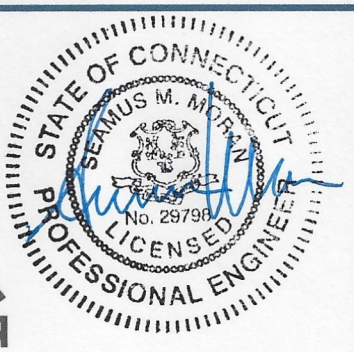
446 Hopmeadow Street
Simsbury, CT 06089

December 16, 2022

Prepared for:
Vessel Technologies, Inc.
46 West 55th Street
New York, NY 10019

Prepared by:
H+H Engineering Associates, LLC
232 Greenmanville Avenue
Suite 201
Mystic, CT 06355

H+H ENGINEERING ASSOCIATES



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TECHNICAL APPENDIX

1. INTRODUCTION

The project is located at 446 Hopmeadow Street (U.S. Route 202/CT Route 10) in Simsbury, Connecticut (hereinafter referred to as the "Site") and is identified as Lot N003C on Tax Assessor's Map G13, Block 142. The Site is located on the east side of Hopmeadow Street, approximately 200 feet north of the intersection of Hopmeadow Street and Powder Forest Drive. The Site is 1.96 acres with 149.9 linear feet of frontage along Hopmeadow Street and is currently developed as a single-family residence (see Figure 1 – Site Location Map). The Site is located in the High Density Residential 'R-15' Zoning District. Adjacent properties are located in the High Density Residential 'R-15' Zone, the Low Density Residential 'R-40' Zone, the Planned Area Development 'PAD' Zone, and the Designed Multiple Residence 'RD' Zone. Existing topography on site is moderate with contours ranging from elevation 102 along the southern property line, to elevation 84 along the northern property line. Per NRCS soil mapping, the underlying soil consists of Hinckley loamy sand (Hydrologic Group A). The Site is not located within a FEMA Flood Hazard Zone (see Figure 2 – Firmette Map).

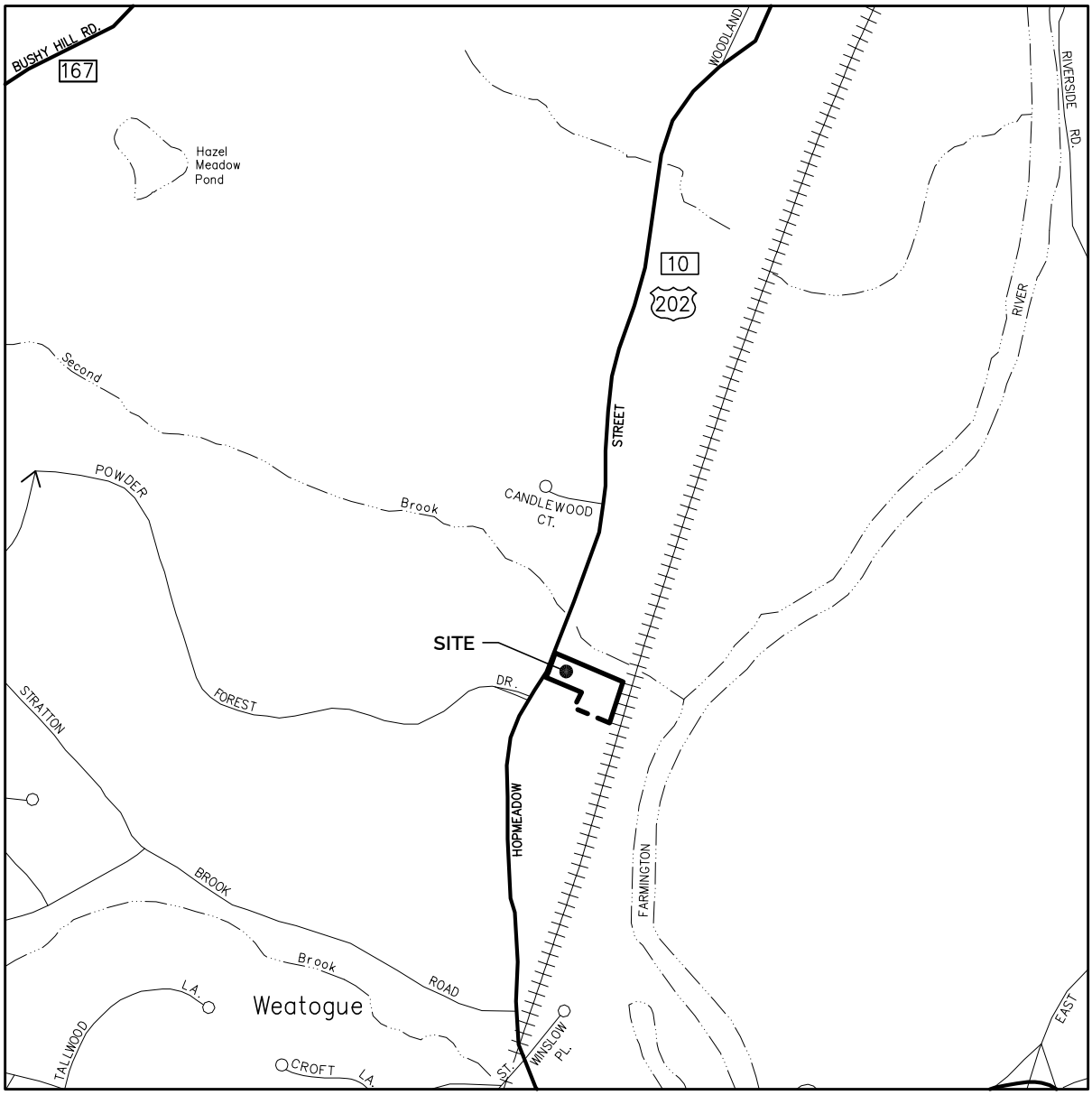
The proposed development consists of the construction of a new four-story 14,063 square-foot multi-family residential building, consisting of 77 one-bedroom units (575 square-feet) and 3 two-bedroom units (1,048 square-feet). Site improvements will include a new two-way access drive from Hopmeadow Street, a new 94 vehicle parking lot, new sanitary sewer, water, and electrical service connections, new landscaping improvements, and a new stormwater management system.

This report presents the basis of the project hydrologic and hydraulic analysis of the site, the design for the new site drainage systems, and Best Management Practices (BMPs) incorporated into the site design to manage and treat stormwater runoff in accordance with the 2004 CT DEEP Stormwater Quality Manual (SQM) and the Town of Simsbury Zoning Regulations.

2. PURPOSE OF REPORT

This report presents the basis of design for stormwater management including drainage and stormwater treatment. The report demonstrates that the development:

- Does not increase peak rates of runoff from watersheds encompassing the new buildings and parking areas.
- Does not degrade the quality of receiving groundwater, waterbodies, or watercourses.
- Complies with the 2004 CT DEEP SQM and the Town of Simsbury Stormwater Management Standards to the greatest extent practicable.



1,000 500 0 1,000

SCALE IN FEET

PROJECT NO. 2022-0013	SCALE: 1"=1,000'
DRAWN BY: SMM	DATE: 12/16/2022
CHECKED BY: SMM	DATE: 12/16/2022
SHEET NUMBER:	1 OF 1
DRAWING: FIGURE 1	

STORMWATER REPORT - SITE LOCATION MAP

VESSEL MULTI-FAMILY HOUSING

446 HOPMEADOW STREET, SIMSBURY, CT 06089

VESSEL TECHNOLOGIES, INC.

46 WEST 55TH STREET, NEW YORK, NY 10019

H+H ENGINEERING ASSOCIATES

232 Greenmanville Avenue
Suite 201
Mystic, CT 06355
860-980-8008 (O); 413-579-4488 (M)
www.hh-engineers.com

National Flood Hazard Layer FIRMette

FEMA

72°49'2"W 41°51'32"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

72°48'24"W 41°51'6"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/22/2022 at 1:44 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

3. BASIS OF DESIGN

The layout, grading and drainage design for the project are shown on the Site Development Plans. The basis of the grading and drainage design is as follows:

1. Rainfall data is from the National Weather Service NOAA Atlas 14, Volume 10, Version 3.
2. Drainage systems are designed to meet or exceed the water quality and peak rate of runoff goals established in the CT DEEP SQM.
3. Stormwater treatment Best Management Practices (BMPs) are designed to remove pollutants, such as nutrients, solids, metals, pathogens, pesticides, and hydrocarbons from stormwater runoff and to reduce temperatures of runoff from paved surfaces during hot weather.
4. Pretreatment of runoff for the removal of sediments, oil and grease will be accomplished using deep sump catch basins and outlet hoods.
5. BMPs for this project include an underground infiltration system with isolator rows designed to infiltrate the runoff generated from the proposed parking lot, a bioretention basin designed to treat and infiltrate the runoff generated from the building rooftop, and two separate drywells/basins designed to capture and infiltrate off-site runoff entering the Site.

4. HYDROLOGIC AND HYDRAULIC METHODS

The methods described in Urban Hydrology for Small Watersheds, 2nd Edition, (Technical Release Number 55 [TR-55]) from the Natural Resources Conservation Service (formerly the Soil Conservation Service – [SCS], 1986) were used to calculate stormwater peak-flow generated from pre- and post-development conditions. These methods, which are incorporated into the HydroCAD computer software program, use well documented procedures to calculate stormwater runoff volume, peak-flow rate of discharge, hydrographs and storage volumes required for floodwater reservoirs in small watersheds. The method uses the SCS Runoff Curve Number method to estimate runoff volume, calculate times of concentration, produce tabular hydrographs, and estimate basin storage capacity. Output data from all computer analysis and design are provided in the Technical Appendix.

This report presents the basis of the hydrologic and hydraulic analysis and design of the stormwater management including drainage and stormwater treatment systems completed in accordance with the Connecticut Department of Transportation Drainage Manual (Drainage Manual). The report also presents a Stormwater Management Plan prepared in accordance, to the greatest extent practical, with the 2004 CT DEEP SQM. Times of concentration applicable to the pre- and post-development were developed using the NRCS-velocity method. A minimum time of concentration of 5 minutes was used for paved surfaces and 10 minutes for vegetated areas.

5. STORMWATER MANAGEMENT

The existing site is developed as a single-family residence and includes buildings, a paved driveway, walkways, and lawn and wooded areas. Site improvements will increase impervious areas, resulting in rate and volume increases of stormwater runoff from the Site. Hydrologic analyses of pre- and post-development conditions were completed to assess these increases and to design mitigation measures for water quality and to reduce post-development discharges.

5.1 Existing Condition Drainage Areas and Analysis Points

The existing drainage pattern for the site in the vicinity of the proposed improvements is characterized by one drainage area that drains to the north toward Second Brook and the associated wetland, as shown on Figure 3 – Pre-Development Drainage Area Map, and described as follows:

- **DA1**: Approximately 4.67 acres of land, currently developed as multiple single-family residences, and includes 2.48 acres of lawn, 1.78 acres of woods, 0.39 acres of impervious surfaces (rooftops, pavement), and 0.02 acres of gravel.
- **Drainage Analysis Point 1**: The drainage analysis point is the southern edge of the off-site wetland to the north of the Site.

5.2 Proposed Condition Drainage Areas

The proposed development results in the modification of the drainage areas along with changes in impervious coverage (building rooftop, pavement surfaces and concrete surfaces). These conditions are shown on Figure 4 – Post-Development Drainage Area Map, and described as follows:

- **DA1**: For analysis purposes, the proposed condition DA1 was subdivided into 2 subareas.
    - **DA1A**: Approximately 1.37 acres of land, located mostly offsite, consisting of 0.67 acres of lawn, 0.55 acres of woods and 0.15 acres of impervious surfaces that drain to Stormwater Management Area C (drywell and basin).
    - **DA1B**: Approximately 0.31 acres of land, located mostly offsite, consisting of 0.20 acres of lawn, 0.06 acres of woods and 0.0514 acres of impervious surfaces that is captured on site by a new curtain and directed to Stormwater Management Area C.
- **DA2**: For analysis purposes, the proposed condition DA2 was subdivided into 2 subareas.
    - **DA2A**: Approximately 0.32 acres of new building rooftop that is directed to Stormwater Management Area B (bioretention basin).
    - **DA2B**: Approximately 0.29 acres of land, located partially offsite, consisting of 0.25 acres of lawn, and 0.04 of wood that drains to Stormwater Management Area B,

- **DA3**: Approximately 0.32 acres of land, located mostly offsite and along Hopmeadow Street, consisting of 0.16 acres of lawn, 0.13 acres of woods, and 0.03 acres of impervious surfaces that drain to Stormwater Management Area D (drywell and basin).
- **DA4**: Approximately 0.97 acres of land consisting of 0.84 acres of new pavement and walkways, and 0.13 acres of lawn that drain to Stormwater Management Area A (ADS Stormtech SC-3500).
- **DA5**: Approximately 1.09 acres of land north and east of the proposed improvements consisting of 0.43 acres of lawn, 0.64 acres of woods and 0.02 acres of impervious surfaces that drain to the wetland.

Modeling results for the existing and proposed conditions drainage areas are provided in Figure 5 – Stormwater Runoff Summary, and the hydrologic and hydraulic modeling parameters are provided in the HydroCAD printouts (Technical Appendix).

5.3 Proposed Condition Stormwater Management BMPs

For the post-development conditions, the intent of the proposed stormwater management improvements is to route stormwater runoff from new impervious surfaces through the proposed stormwater BMPs to provide water quality treatment, peak rate reduction, and promote groundwater recharge through infiltration. Additionally, runoff generated off-site that crosses onto the Site will be captured and infiltrated. Four separate Stormwater Management Areas are included in the design and are described below:

- **Stormwater Management Area A:** ADS Stormtech MC-3500 Underground Infiltration/Detention System with Isolator Rows – Catch basins within the parking lot direct the runoff from the parking area and roof (DA4) into the proposed ADS Stormtech MC-3500 infiltration/detention system, which will retain, attenuate and infiltrate stormwater runoff from the impervious areas and treat stormwater runoff through filtration using two isolator rows that are sized to treat in excess of the Water Quality Flow (WQF) and infiltrate through the 2-year storm event. The flow is directed into two separate Isolator Rows, which are a row of chambers wrapped in filter fabric which allow for sediment settling as stormwater fills the chamber and flows through the filter fabric and into the other chambers. The retained water in these chambers is then infiltrated back into the ground. Overflow from the chambers is directed to an outlet pipe and riprap apron located to the north.
- **Stormwater Management Area B:** Bioretention Basin – The stormwater runoff generated from the proposed building rooftop (DA2A) and a portion of the off-site runoff (DA2B) will be collected and discharged into the proposed Bioretention Basin which will retain, attenuate, and infiltrate stormwater runoff and treat stormwater runoff through plant filtration and infiltration. The Bioretention Basin is designed to infiltrate through the 25-year storm event. Overflow from the basin is directed to an outlet pipe and riprap apron located to the north. An overflow spillway is proposed to direct runoff toward the

catchment system located in Hopmeadow Street in case of emergency. The bioretention basin plantings are native and have been designed by a Landscape Architect.

- **Stormwater Management Area C:** Drywell and Collection Basin – Off-site stormwater runoff generated from the properties to the south continue onto the Site. A portion of this runoff (DA1A) is collected by a shallow detention basin surrounding a 6'(dia.) x 2'(h) concrete drywell which is designed to infiltrate stormwater runoff. The detention basin also provides stormwater storage capacity for larger storm events. The remaining stormwater runoff entering the Site (DA1B) is collected by a curtain drain with a 6" underdrain prior to reaching the proposed parking lot and is redirected to the concrete drywell. The Drywell and Collection Basin is designed to infiltrate through the 100-year storm event. An overflow spillway is proposed to direct runoff away from the building in case of emergency.
- **Stormwater Management Area D:** Drywell and Collection Basin – Off-site stormwater runoff generated from the properties to the south (DA3) continue onto the Site. This runoff is collected by a shallow detention basin surrounding a 6'(dia.) x 4'(h) concrete drywell which is designed to infiltrate stormwater runoff. The detention basin also provides stormwater storage capacity for larger storm events. The Drywell and Collection Basin is designed to infiltrate through the 100-year storm event. An overflow spillway is proposed to direct runoff toward the catchment system located in Hopmeadow Street in case of emergency.

The Water Quality Volume & Water Quality Flow Calculations for Stormwater Management Areas A and B are included in the Technical Appendix. A summary of the stage and storage volume for Stormwater Management Areas A, B, C and D is included in Figure 6 – Stage-Storage Summaries.

5.4 Storm Drain System Outlet Locations

Stormwater Management Area A – Outflow from the ADS Stormtech MC-3500 system is directed through an outlet control structure and 12" HDPE pipe to a wooded area to the north which then sheetflows to the off-site inland wetland.

Stormwater Management Area B – Overflow from the bioretention pond is directed through an outlet control structure and 12" HDPE pipe to a wooded area to the north which then sheetflows to the off-site inland wetland. Emergency overflow is directed through a riprap spillway located on the eastern slope of the basin and directs flow to the east, away from the proposed building.

Stormwater Management Area C – Emergency overflow from the drywell and collection basin is directed through a riprap spillway located on the northern slope of the basin and directs flow toward Stormwater Management Area A.

Stormwater Management Area D – Emergency overflow from the drywell and collection basin is directed through a riprap spillway located on the western slope of the basin and directs flow toward the catchment system in Hopmeadow Street.

PEAK RATE OF RUNOFF (CFS) SUMMARY

STORM FREQUENCY	ANALYSIS POINT - EDGE OF WETLAND		
	EXISTING	PROPOSED	CHANGE
WQV	0.00	0.00	NO CHANGE
2-YEAR	0.01	0.00	-0.01
10-YEAR	0.50	0.47	-0.03
25-YEAR	1.61	1.46	-0.15
100-YEAR	4.45	4.22	-0.23

RUNOFF VOLUME (CF) SUMMARY

STORM FREQUENCY	ANALYSIS POINT - EDGE OF WETLAND		
	EXISTING	PROPOSED	CHANGE
WQV	0	0	NO CHANGE
2-YEAR	223	0	-223
10-YEAR	6,149	1,999	-4,150
25-YEAR	13,040	4,644	-8,396
100-YEAR	27,291	12,013	-15,278

PROJECT NO. 2022-0013	SCALE: N.T.S.	STORMWATER REPORT - STORMWATER RUNOFF SUMMARY
DRAWN BY: SMM	DATE: 12/16/2022	
CHECKED BY: SMM	DATE: 12/16/2022	VESSEL MULTI-FAMILY HOUSING 446 HOPMEADOW STREET, SIMSBURY, CT 06089 VESSEL TECHNOLOGIES, INC. 46 WEST 55TH STREET, NEW YORK, NY 10019
SHEET NUMBER: 1 OF 1		
DRAWING: FIGURE 5		

H+H ENGINEERING ASSOCIATES
232 Greenmanville Avenue
Suite 201
Mystic, CT 06355
860-980-8008 (O); 413-579-4488 (M)
www.hh-engineers.com

STORMWATER MANAGEMENT AREA 'A'
ADS STORMTECH SC-3500 INFILTRATION SYSTEM

STORM FREQUENCY	WATER SURFACE ELEVATION (FT.)	STORAGE VOLUME (CF)
WQV	84.72	14
2 YEAR	85.95	1,258
10 YEAR	87.41	3,298
25 YEAR	88.23	4,298
100 YEAR	89.19	5,196

ADS STORMTECH SC-3500 INFILTRATION SYSTEM ELEVATIONS:
TOP OF STONE ELEV. = 90.20
TOP OF CHAMBER ELEV. = 89.20
BOTTOM OF CHAMBER ELEV. = 85.45
BOTTOM OF STONE ELEV. = 84.70

OUTLET CONTROL STRUCTURE ELEVATIONS:
TOP OF FRAME (MANHOLE COVER) ELEV. = 93.60
RECTANGULAR WEIR INV. ELEV. = 89.00
4"x12" UPPER ORIFICE = 87.80
4" DIA. LOW-FLOW ORIFICE = 86.00
12" INV. OUT ELEV. = 84.70

EXFILTRATION RATE = 20.0 IN/HR

STORMWATER MANAGEMENT AREA 'B'
BIORETENTION BASIN

STORM FREQUENCY	WATER SURFACE ELEVATION (FT.)	STORAGE VOLUME (CF)
WQV	91.24	267
2 YEAR	92.11	1,521
10 YEAR	92.83	2,933
25 YEAR	93.28	4,015
100 YEAR	93.50	4,576

BIORETENTION BASIN ELEVATIONS:
TOP OF BERM ELEV. = 94.10
TOP OF SPILLWAY ELEV. = 93.60
BOTTOM OF BASIN ELEV. = 91.00

OUTLET CONTROL STRUCTURE ELEVATIONS:
TOP OF FRAME (CB GRATE) ELEV. = 93.40
12" INV. OUT ELEV. = 90.00

EXFILTRATION RATE = 2.0 IN/HR

PROJECT NO. 2022-0013	SCALE: N.T.S.
DRAWN BY: SMM	DATE: 12/16/2022
CHECKED BY: SMM	DATE: 12/16/2022
SHEET NUMBER:	1 OF 2
DRAWING: FIGURE 6	

STORMWATER REPORT -
STORMWATER TREATMENT PRACTICES
STAGE-STORAGE SUMMARIES

VESSEL MULTI-FAMILY HOUSING
446 HOPMEADOW STREET, SIMSBURY, CT 06089

VESSEL TECHNOLOGIES, INC.
46 WEST 55TH STREET, NEW YORK, NY 10019

H+H ENGINEERING ASSOCIATES
232 Greenmanville Avenue
Suite 201
Mystic, CT 06355
860-980-8008 (O); 413-579-4488 (M)
www.hh-engineers.com

STORMWATER MANAGEMENT AREA 'C'
DRYWELL AND COLLECTION BASIN

STORM FREQUENCY	WATER SURFACE ELEVATION (FT.)	STORAGE VOLUME (CF)
WQV	89.10	0
2 YEAR	89.12	1
10 YEAR	93.41	253
25 YEAR	93.76	548
100 YEAR	94.29	1,656

DRYWELL ELEVATIONS:
TOP OF FRAME (CB GRATE) ELEV. = 93.00
6" INV. IN (FROM CURTAIN DRAIN) = 91.70
BOTTOM OF DRYWELL ELEV. = 90.10
BOTTOM OF STONE ELEV. = 89.10

COLLECTION BASIN ELEVATIONS:
TOP OF BERM ELEV. = 94.80
TOP OF SPILLWAY ELEV. = 94.30
BOTTOM OF BASIN ELEV. = 93.00

EXFILTRATION RATE = 20.0 IN/HR

STORMWATER MANAGEMENT AREA 'D'
DRYWELL AND COLLECTION BASIN

STORM FREQUENCY	WATER SURFACE ELEVATION (FT.)	STORAGE VOLUME (CF)
WQV	91.50	0
2 YEAR	91.50	0
10 YEAR	92.40	33
25 YEAR	97.83	251
100 YEAR	98.51	393

DRYWELL ELEVATIONS:
TOP OF FRAME (CB GRATE) ELEV. = 97.40
BOTTOM OF DRYWELL ELEV. = 92.50
BOTTOM OF STONE ELEV. = 91.50

COLLECTION BASIN ELEVATIONS:
TOP OF BERM ELEV. = 100.10
TOP OF SPILLWAY ELEV. = 99.60
BOTTOM OF BASIN ELEV. = 97.40

EXFILTRATION RATE = 20.0 IN/HR

PROJECT NO. 2022-0013	SCALE: N.T.S.
DRAWN BY: SMM	DATE: 12/16/2022
CHECKED BY: SMM	DATE: 12/16/2022
SHEET NUMBER:	2 OF 2
DRAWING: FIGURE 6	

STORMWATER REPORT -
STORMWATER TREATMENT PRACTICES
STAGE-STORAGE SUMMARIES

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6. SOURCE CONTROL AND POLLUTION PREVENTION MAINTENANCE AND OPERATION

Source control and pollution prevention practices for this project are intended to eliminate the generation of pollutants at their source, reduce the types and concentration of pollutants in stormwater runoff and to assure that the BMPs continue to function to remove oil and grease and TSS. The site property managers will be responsible for maintaining the stormwater management system and the goal of this section is to inform managers about system operations.

The following maintenance and operation measures are recommended for source control.

Parking Lots

The access drive and parking areas shall be swept once per year, preferably after the end of the winter sanding season.

Landscaping

Normal landscaping maintenance shall consist of pruning, mulching, planting, mowing lawns, raking leaves, etc. Use of fertilizers and pesticides will be controlled and limited to minimal amounts necessary for healthy landscape maintenance.

Trees will be fertilized no more than once in the spring with an organic fertilizer. Shrubs and lawn will be fertilized with an organic slow-release fertilizer each spring. Liming of lawn areas to control pH will also be done in the spring if soil testing indicates that it is necessary.

Pesticides will only be used as a control method when a problem has been clearly identified and other natural control methods are not successful. All pesticide applications shall be by licensed applicators, where necessary.

Trash Collection

Trash receptacles service the facility, and dumpsters exist on-site. The pickup of trash will occur on a regular basis and all trash will be disposed of legally off-site.

Outdoor Storage

There will be no outdoor storage of hazardous chemicals, fertilizer, pesticides, or herbicides anywhere on site.

Snow Removal & Storage

Snow shall be shoveled and plowed from sidewalk and parking areas as soon as practical during and after winter storms and deposited in snow storage areas on the site or removed.

Catch Basins and Manholes

A Connecticut-Licensed hauler shall pump the sumps of onsite catch basins and manholes and shall dispose of the sand legally. Road sand may be reused for winter sanding but may not be

stored on-site. As part of the hauling contract, the hauler shall notify the property owner in writing where the material is being disposed.

For the first three years each catch basin and manhole shall be inspected every four months, with one inspection occurring during the month of April. Any debris occurring within one foot from the bottom of each sump shall be removed by Vacuum "Vactor" type of maintenance equipment. After the first three years the inspection schedule may be adjusted to meet actual operating conditions, however, one inspection shall always be conducted in April.

Stormtech underground infiltration systems and Isolator Rows

The Isolator rows shall be cleaned at the end of construction once the contributing areas are fully stabilized. For the first year of operation following construction, the chamber rows shall be inspected once every 6 months.

After the first year of operation, the chambers shall be inspected a minimum of once per year. If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of the sediment. When the average depth of accumulation exceeds 3", a clean-out should be performed and properly disposed off-site. Clean-out should be accomplished using a Jetvac process.

A detailed maintenance logbook shall be kept on-site for the units by the property owner/manager. Information is to include, but not be limited to, the date of inspection, record of sediment depth, general observations, and date of cleaning performed.

Maintenance of all Stormtech systems should follow all manufacturers' recommendations.

Bioretention Basin

The bioretention basin shall be inspected every six months and/or after storm events of 2 inches of rainfall or greater. Inspections shall include the following:

- Inspect filter media standing water or other evidence of clogging.
- Check for sediment accumulation, trash, and debris.
- Check for blockages, structural integrity, and evidence of erosion at inlets, outlets, and overflow spillways.

Regular maintenance includes the following:

- Prune trees and shrubs as needed.
- Basin floor/side slopes shall be mowed 6" to 8" as needed. grass clippings, leaves and accumulated sediment and debris shall be removed during the summer; however, plant matter shall be left in place over winter months to insulate the soil and add organic matter to the soil. removal criteria shall include when plant matter is smothering or killing vegetation and aesthetics.
- Remove sediment greater than 1.0 inch deep in March-April in the filter media bed in a manner to minimize damage to vegetation.
- Inspect soil and repair eroded areas seasonally or as necessary.

- Remove any invasive species (including roots) that have become established within the basin and embankments.
- If there is an accumulation of organic debris or sediment on the floor of the basin, or if ponded water is regularly observed more than 48 hours after a rainfall event, the top 6" shall be removed and the exposed soil surface rototilled to a depth of 12". Sedimentation should be removed when it is visibly dry and readily separates from the basin floor to minimize smearing. After this work has been done, the bottom of the basin shall be restored to its original condition.
- No pesticides or non-organic fertilizers shall be used in areas draining to the bioretention basin.

Drywells and Collection Basins

The drywells shall be cleaned at the end of construction once the contributing areas are fully stabilized. For the first year of operation following construction, the drywells shall be inspected once every 6 months.

After the first year of operation, the drywells shall be inspected a minimum of once per year. If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of the sediment. When the average depth of accumulation exceeds 3", a clean-out should be performed and properly disposed off-site. Clean-out should be accomplished using a Jetvac process.

Collection Basins shall be routinely checked for sediment accumulation, trash, and debris. Basin shall be mowed to 4-6" as needed. Grass clippings, leaves and accumulated sediment and debris shall be removed. Remove any invasive species (including roots) that have become established within the basin and embankments.

A detailed maintenance logbook shall be kept on-site for the units by the property owner/manager. information is to include, but not be limited to, the date of inspection, record of sediment depth, general observations, and date of cleaning performed.

7. CONCLUSION

The new stormwater management improvements were designed in accordance with the 2004 CT DEEP SQM and Simsbury regulations. BMPs were incorporated in the site design that attenuate post-development runoff rates, treat in excess of the WQV/WQF and infiltrate in excess of the WQV and GRV from the development. Overall, the stormwater management system provides quantitative and qualitative improvements for the site.

Technical Appendices
for
Stormwater Management Report

Vessel Multi-Family Development
446 Hopmeadow Street
Simsbury, CT 06089

December 16, 2022

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Vessel Technologies, Inc.
46 West 55th Street
New York, NY 10019

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232 Greenmanville Avenue
Suite 201
Mystic, CT 06355

H+H ENGINEERING ASSOCIATES

Appendix A – Water Quality Volume and Water Quality Flow Calculations

WQV & WQF CALCULATIONS - STORMWATER MANAGEMENT AREA 'A'

Project:	446 Hopmeadow Street, Simsbury	**Calculated By**	**Date**
Client:	Vessel Technologies, Inc.	SMM	12/14/2022

Water Quality Volume (WQV)

0.97	ac	A = Area draining to the practice
0.84	ac	A_I = Impervious area draining to the practice
0.87	decimal	I = Percent impervious area draining to the practice, in decimal form
0.83	unitless	R_V = Runoff coefficient = 0.05 + (0.9 x I)
0.81	ac-in	WQV = 1" x R_V x A
2,934	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1.00	inches	P = amount of rainfall.
0.83	inches	Q = Water Quality Depth. Q=WQV/A
98	unitless	CN = unit peak discharge curve number. $CN=1000/(10+5P+10Q-10*[Q^2+1.25*Q*P]^{0.5})$
0.2	inches	S = potential maximum retention. S = (1000/CN) - 10
0.032	inches	Ia = initial abstraction. Ia=0.2S
10.0	minutes	T_c = Time of Concentration
590.0	cfs/mi^2/in	qu is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III
0.745	cfs	WQF = qu x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac

Designer Notes:

Stormwater Management Area 'A'

ADS Stormtech SC-3500 Infiltration System

ADS Stormtech SC-740 Isolator Row Sizing:

- Two isolator rows are provided (total units = 21).
- Treated flow rate = 0.40 CFS / unit X 21 units = 8.40 CFS
- Treated flow rate > WQF
- (Inflow rate from 100-year storm event = 6.83 CFS)

qu obtained from exhibit 4-III for NRCS type III rainfall distribution

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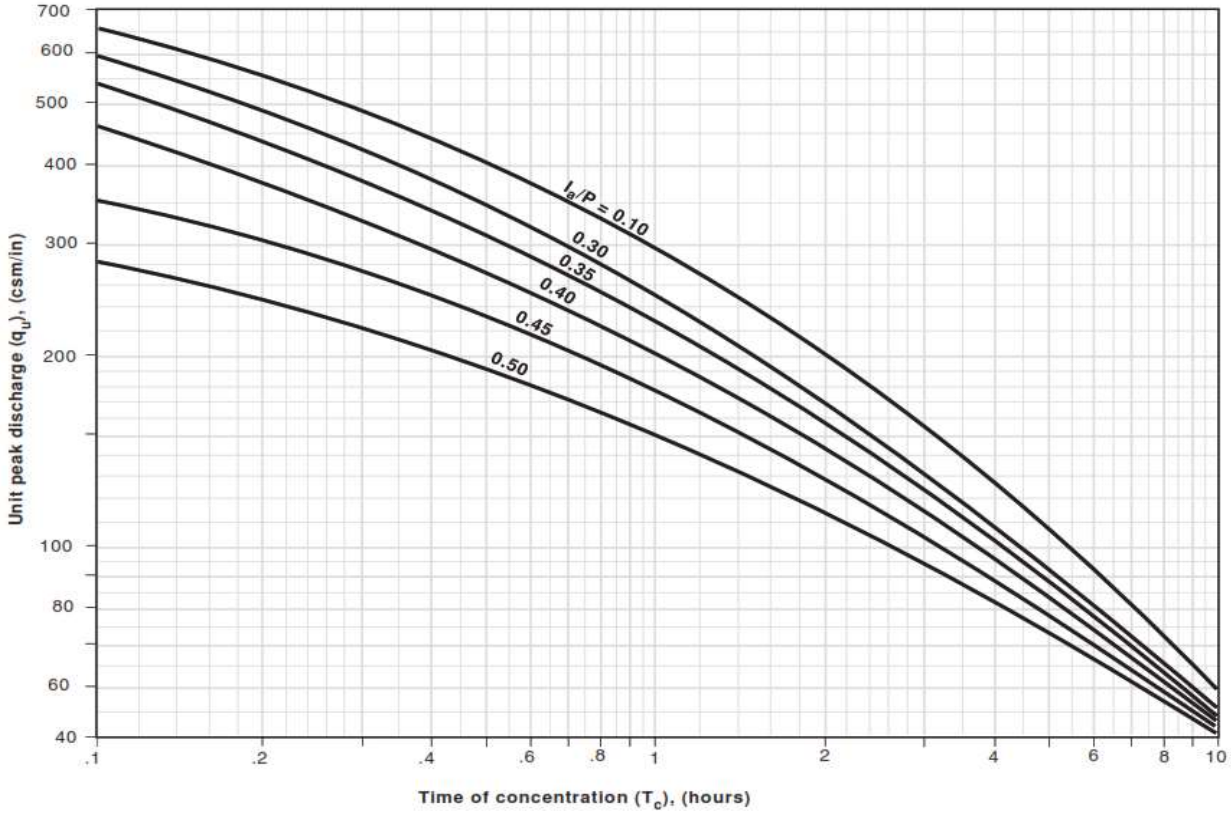
Exhibit 4-III Unit peal discharge (q_u) for NRCS (SCS) type III rainfall distribution



WQV & WQF CALCULATIONS - STORMWATER MANAGEMENT AREA 'B'

Project:	446 Hopmeadow Street, Simsbury	**Calculated By**	**Date**
Client:	Vessel Technologies, Inc.	SMM	12/14/2022

Water Quality Volume (WQV)

0.62	ac	A = Area draining to the practice
0.32	ac	A_I = Impervious area draining to the practice
0.52	decimal	I = Percent impervious area draining to the practice, in decimal form
0.52	unitless	R_V = Runoff coefficient = 0.05 + (0.9 x I)
0.32	ac-in	WQV = 1" x R_V x A
1,167	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1.00	inches	P = amount of rainfall.
0.52	inches	Q = Water Quality Depth. Q=WQV/A
94	unitless	CN = unit peak discharge curve number. $CN=1000/(10+5P+10Q-10^{*}[Q^2+1.25^{*}Q^{*}P]^{0.5})$
0.6	inches	S = potential maximum retention. S = (1000/CN) - 10
0.121	inches	Ia = initial abstraction. Ia=0.2S
	minutes	T_c = Time of Concentration
	$cfs/mi^2/in$	qu is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III
0.000	cfs	WQF = qu x WQV. Conversion: to convert "$cfs/mi^2/in$ * ac-in" to "cfs" multiply by $1mi^2/640ac$

Designer Notes:

Stormwater Management Area 'B'

Bioretention Basin

Treated volume (volume stored prior to discharging) = 4,315 CF

Contributing WQV = 1,157 CF

Treated volume = 373% of Water Quality Volume

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WQV & WQF CALCULATIONS - STORMWATER MANAGEMENT AREA 'C'

Project:	446 Hopmeadow Street, Simsbury	**Calculated By**	**Date**
Client:	Vessel Technologies, Inc.	SMM	12/14/2022

Water Quality Volume (WQV)

1.68	ac	A = Area draining to the practice
0.20	ac	A_I = Impervious area draining to the practice
0.12	decimal	I = Percent impervious area draining to the practice, in decimal form
0.16	unitless	R_V = Runoff coefficient = 0.05 + (0.9 x I)
0.26	ac-in	WQV = 1" x R_V x A
958	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1.00	inches	P = amount of rainfall.
0.16	inches	Q = Water Quality Depth. Q=WQV/A
84	unitless	CN = unit peak discharge curve number. $CN=1000/(10+5P+10Q-10^{*}[Q^2+1.25^{*}Q^{*}P]^{0.5})$
1.9	inches	S = potential maximum retention. S = (1000/CN) - 10
0.374	inches	Ia = initial abstraction. Ia=0.2S
	minutes	T_c = Time of Concentration
	$cfs/mi^2/in$	qu is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III
0.000	cfs	WQF = qu x WQV. Conversion: to convert "$cfs/mi^2/in$ * ac-in" to "cfs" multiply by $1mi^2/640ac$

Designer Notes:

Stormwater Management Area 'C'

Drywell and Collection Basin

Treated volume (volume stored through 100-yr event) = 1,656 CF

Contributing WQV = 958 CF

Treated volume = 173% of Water Quality Volume

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WQV & WQF CALCULATIONS - STORMWATER MANAGEMENT AREA 'D'

Project:	446 Hopmeadow Street, Simsbury	**Calculated By**	**Date**
Client:	Vessel Technologies, Inc.	SMM	12/14/2022

Water Quality Volume (WQV)

0.32	ac	A = Area draining to the practice
0.03	ac	A_I = Impervious area draining to the practice
0.09	decimal	I = Percent impervious area draining to the practice, in decimal form
0.13	unitless	R_V = Runoff coefficient = 0.05 + (0.9 x I)
0.04	ac-in	WQV = 1" x R_V x A
156	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1.00	inches	P = amount of rainfall.
0.13	inches	Q = Water Quality Depth. Q=WQV/A
83	unitless	CN = unit peak discharge curve number. $CN=1000/(10+5P+10Q-10*[Q^2+1.25*Q*P]^{0.5})$
2.0	inches	S = potential maximum retention. S = (1000/CN) - 10
0.407	inches	Ia = initial abstraction. Ia=0.2S
	minutes	T_c = Time of Concentration
	$cfs/mi^2/in$	qu is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III
0.000	cfs	WQF = qu x WQV. Conversion: to convert "$cfs/mi^2/in$ * ac-in" to "cfs" multiply by $1mi^2/640ac$

Designer Notes:

Stormwater Management Area 'C'

Drywell and Collection Basin

Treated volume (volume stored through 100-yr event) = 393 CF

Contributing WQV = 156 CF

Treated volume = 252% of Water Quality Volume

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Appendix B – Riprap Apron Design

Outlet Protection Design Outlet EW-1

Reference: Connecticut Department of Transportation Drainage Manual, Dated October 2000

A. Apron width at culvert end (W_1) = 3 Sp where Sp = outlet pipe diameter

B. Apron length (La) = $\frac{1.8\ (Q-5)}{(Sp)^{3/2}}$ + 10

C. Apron width at downstream end (W) = 3Sp + 0.7La where La = apron length

Type A Riprap Apron (Tailwater Condition) : TW<0.5 dia of outlet

Peak Q(25yr)= 1.34 cfs PIPE DIA= 1 ft

A. W_1= 3(Sp) = ft 3 ft

B. La = $\frac{1.8\ (Q-5)}{(Sp)^{1.5}}$ + 10 = ft **Use 5' min.** 4 ft

C. W_2 = 3(Sp) + 0.7(La) = ft 6 ft

Table 11.11 Allowable Outlet Velocities for Type A and B Riprap Aprons

Outlet Velocity - mps (fps)	Riprap Specification
0-2.44 (0-8)	Modified
2.44-3.05 (8-10)	Intermediate
3.05-4.27 (10-14)	Standard

V(25yr)= 4.6 fps Therfore; Use Modified Riprap

Outlet Protection Design Outlet FES-1

Reference: Connecticut Department of Transportation Drainage Manual, Dated October 2000

A. Apron width at culvert end (W_1) = 3 Sp where Sp = outlet pipe diameter

B. Apron length (La) = $\frac{1.8\,(Q-5)}{(Sp)^{3/2}}$ + 10

C. Apron width at downstream end (W) = 3Sp + 0.7La where La = apron length

Type A Riprap Apron (Tailwater Condition) : TW<0.5 dia of outlet

Peak Q(25yr)= 0 cfs PIPE DIA= 1 ft

A. W_1= 3(Sp) = ft 3 ft

B. La = $\frac{1.8\,(Q-5)}{(Sp)^{1.5}}$ + 10 = ft **Use 5' min.** 1 ft

C. W_2 = 3(Sp) + 0.7(La) = ft **Use 5' min.** 4 ft

Table 11.11 Allowable Outlet Velocities for Type A and B Riprap Aprons

Outlet Velocity - mps (fps)	Riprap Specification
0-2.44 (0-8)	Modified
2.44-3.05 (8-10)	Intermediate
3.05-4.27 (10-14)	Standard

V(25yr)= 0 fps Therfore; Use Modified Riprap

Outlet Protection Design Outlet FES-2

Reference: Connecticut Department of Transportation Drainage Manual, Dated October 2000

A. Apron width at culvert end (W_1) = 3 Sp where Sp = outlet pipe diameter

B. Apron length (La) = $\frac{1.8\,(Q-5)}{(Sp)^{3/2}} + 10$

C. Apron width at downstream end (W) = 3Sp + 0.7La where La = apron length

Type A Riprap Apron (Tailwater Condition) : TW<0.5 dia of outlet

Peak Q(25yr)= 2.16 cfs PIPE DIA= 1 ft

A. W_1= 3(Sp) = ft 3 ft

B. La = $\frac{1.8\,(Q-5)}{(Sp)^{1.5}} + 10$ = ft 5 ft

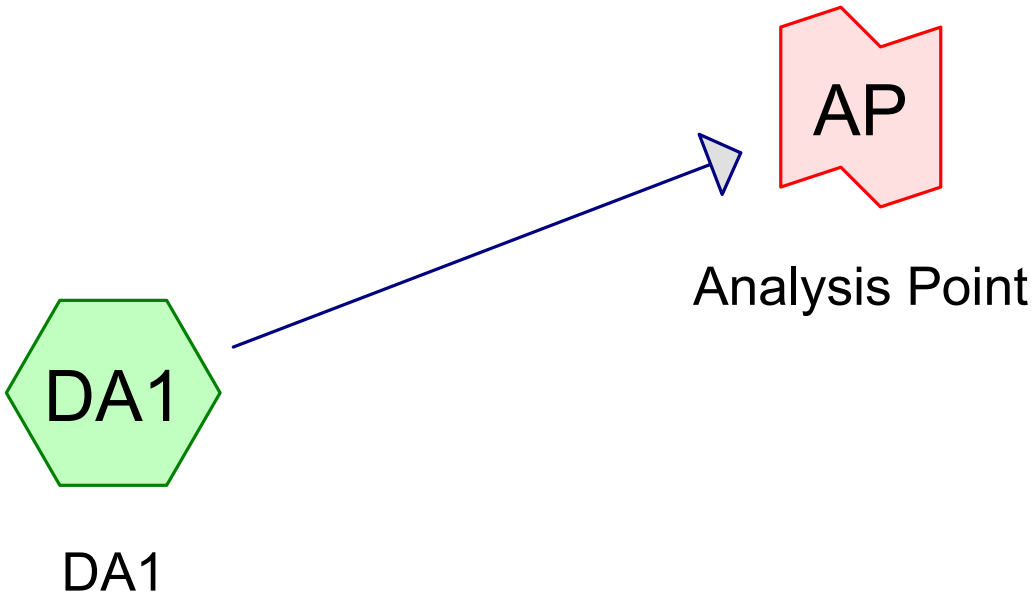
C. W_2 = 3(Sp) + 0.7(La) = ft 7 ft

Table 11.11 Allowable Outlet Velocities for Type A and B Riprap Aprons

Outlet Velocity - mps (fps)	Riprap Specification
0-2.44 (0-8)	Modified
2.44-3.05 (8-10)	Intermediate
3.05-4.27 (10-14)	Standard

V(25yr)= 5.05 fps Therfore; Use Modified Riprap

Appendix C – Pre-Development HydroCAD Report



Subcat Reach Pond Link

Routing Diagram for pre development
Prepared by HH Engineering Assoc, Printed 12/14/2022

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	WQV	Type III 24-hr		Default	24.00	1	1.00	2
2	2-Year	Type III 24-hr		Default	24.00	1	3.32	2
3	10-Year	Type III 24-hr		Default	24.00	1	5.35	2
4	25-Year	Type III 24-hr		Default	24.00	1	6.61	2
5	100-Year	Type III 24-hr		Default	24.00	1	8.56	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
684	76	Gravel roads, HSG A (DA1)
108,124	39	Pasture/grassland/range, Good, HSG A (DA1)
11,948	98	Paved parking, HSG A (DA1)
4,938	98	Roofs, HSG A (DA1)
77,918	30	Woods, Good, HSG A (DA1)
203,612	**41**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
203,612	HSG A	DA1
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
203,612		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
684	0	0	0	0	684	Gravel roads
108,124	0	0	0	0	108,124	Pasture/grassland/range, Good
11,948	0	0	0	0	11,948	Paved parking
4,938	0	0	0	0	4,938	Roofs
77,918	0	0	0	0	77,918	Woods, Good
203,612	**0**	**0**	**0**	**0**	**203,612**	**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1 Runoff Area=203,612 sf 8.29% Impervious Runoff Depth=0.00"
Flow Length=764' Tc=22.5 min CN=41 Runoff=0.00 cfs 0 cf

Link AP: Analysis Point Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 203,612 sf Runoff Volume = 0 cf Average Runoff Depth = 0.00"
91.71% Pervious = 186,726 sf 8.29% Impervious = 16,886 sf

Summary for Subcatchment DA1: DA1

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link AP : Analysis Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr WQV Rainfall=1.00"

Area (sf)	CN	Description
108,124	39	Pasture/grassland/range, Good, HSG A
11,948	98	Paved parking, HSG A
77,918	30	Woods, Good, HSG A
4,938	98	Roofs, HSG A
684	76	Gravel roads, HSG A
203,612	41	Weighted Average
186,726		91.71% Pervious Area
16,886		8.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	24	0.0824	0.23		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
11.7	76	0.0485	0.11		**Sheet Flow, sheetflow** Woods: Light underbrush n= 0.400 P2= 3.43"
0.6	35	0.0368	0.96		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
0.1	22	0.0345	3.77		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
1.5	61	0.0100	0.70		**Shallow Concentrated Flow, shallow** Short Grass Pasture Kv= 7.0 fps
2.0	127	0.0450	1.06		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
1.5	136	0.0441	1.47		**Shallow Concentrated Flow, shallow** Short Grass Pasture Kv= 7.0 fps
3.4	283	0.0750	1.37		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
22.5	764	Total			

Summary for Link AP: Analysis Point

Inflow Area = 203,612 sf, 8.29% Impervious, Inflow Depth = 0.00" for WQV event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1 Runoff Area=203,612 sf 8.29% Impervious Runoff Depth=0.01"
Flow Length=764' Tc=22.5 min CN=41 Runoff=0.01 cfs 223 cf

Link AP: Analysis Point Inflow=0.01 cfs 223 cf
Primary=0.01 cfs 223 cf

Total Runoff Area = 203,612 sf Runoff Volume = 223 cf Average Runoff Depth = 0.01"
91.71% Pervious = 186,726 sf 8.29% Impervious = 16,886 sf

Summary for Subcatchment DA1: DA1

Runoff = 0.01 cfs @ 21.88 hrs, Volume= 223 cf, Depth= 0.01"
Routed to Link AP : Analysis Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.32"

Area (sf)	CN	Description
108,124	39	Pasture/grassland/range, Good, HSG A
11,948	98	Paved parking, HSG A
77,918	30	Woods, Good, HSG A
4,938	98	Roofs, HSG A
684	76	Gravel roads, HSG A
203,612	41	Weighted Average
186,726		91.71% Pervious Area
16,886		8.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	24	0.0824	0.23		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
11.7	76	0.0485	0.11		**Sheet Flow, sheetflow** Woods: Light underbrush n= 0.400 P2= 3.43"
0.6	35	0.0368	0.96		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
0.1	22	0.0345	3.77		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
1.5	61	0.0100	0.70		**Shallow Concentrated Flow, shallow** Short Grass Pasture Kv= 7.0 fps
2.0	127	0.0450	1.06		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
1.5	136	0.0441	1.47		**Shallow Concentrated Flow, shallow** Short Grass Pasture Kv= 7.0 fps
3.4	283	0.0750	1.37		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
22.5	764	Total			

Summary for Link AP: Analysis Point

Inflow Area = 203,612 sf, 8.29% Impervious, Inflow Depth = 0.01" for 2-Year event
Inflow = 0.01 cfs @ 21.88 hrs, Volume= 223 cf
Primary = 0.01 cfs @ 21.88 hrs, Volume= 223 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1 Runoff Area=203,612 sf 8.29% Impervious Runoff Depth=0.36"
Flow Length=764' Tc=22.5 min CN=41 Runoff=0.50 cfs 6,149 cf

Link AP: Analysis Point Inflow=0.50 cfs 6,149 cf
Primary=0.50 cfs 6,149 cf

Total Runoff Area = 203,612 sf Runoff Volume = 6,149 cf Average Runoff Depth = 0.36"
91.71% Pervious = 186,726 sf 8.29% Impervious = 16,886 sf

Summary for Subcatchment DA1: DA1

Runoff = 0.50 cfs @ 12.61 hrs, Volume= 6,149 cf, Depth= 0.36"
Routed to Link AP : Analysis Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.35"

Area (sf)	CN	Description
108,124	39	Pasture/grassland/range, Good, HSG A
11,948	98	Paved parking, HSG A
77,918	30	Woods, Good, HSG A
4,938	98	Roofs, HSG A
684	76	Gravel roads, HSG A
203,612	41	Weighted Average
186,726		91.71% Pervious Area
16,886		8.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	24	0.0824	0.23		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
11.7	76	0.0485	0.11		**Sheet Flow, sheetflow** Woods: Light underbrush n= 0.400 P2= 3.43"
0.6	35	0.0368	0.96		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
0.1	22	0.0345	3.77		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
1.5	61	0.0100	0.70		**Shallow Concentrated Flow, shallow** Short Grass Pasture Kv= 7.0 fps
2.0	127	0.0450	1.06		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
1.5	136	0.0441	1.47		**Shallow Concentrated Flow, shallow** Short Grass Pasture Kv= 7.0 fps
3.4	283	0.0750	1.37		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
22.5	764	Total			

Summary for Link AP: Analysis Point

Inflow Area = 203,612 sf, 8.29% Impervious, Inflow Depth = 0.36" for 10-Year event
Inflow = 0.50 cfs @ 12.61 hrs, Volume= 6,149 cf
Primary = 0.50 cfs @ 12.61 hrs, Volume= 6,149 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1 Runoff Area=203,612 sf 8.29% Impervious Runoff Depth=0.77"
Flow Length=764' Tc=22.5 min CN=41 Runoff=1.61 cfs 13,040 cf

Link AP: Analysis Point Inflow=1.61 cfs 13,040 cf
Primary=1.61 cfs 13,040 cf

Total Runoff Area = 203,612 sf Runoff Volume = 13,040 cf Average Runoff Depth = 0.77"
91.71% Pervious = 186,726 sf 8.29% Impervious = 16,886 sf

Summary for Subcatchment DA1: DA1

Runoff = 1.61 cfs @ 12.49 hrs, Volume= 13,040 cf, Depth= 0.77"
Routed to Link AP : Analysis Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.61"

Area (sf)	CN	Description
108,124	39	Pasture/grassland/range, Good, HSG A
11,948	98	Paved parking, HSG A
77,918	30	Woods, Good, HSG A
4,938	98	Roofs, HSG A
684	76	Gravel roads, HSG A
203,612	41	Weighted Average
186,726		91.71% Pervious Area
16,886		8.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	24	0.0824	0.23		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
11.7	76	0.0485	0.11		**Sheet Flow, sheetflow** Woods: Light underbrush n= 0.400 P2= 3.43"
0.6	35	0.0368	0.96		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
0.1	22	0.0345	3.77		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
1.5	61	0.0100	0.70		**Shallow Concentrated Flow, shallow** Short Grass Pasture Kv= 7.0 fps
2.0	127	0.0450	1.06		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
1.5	136	0.0441	1.47		**Shallow Concentrated Flow, shallow** Short Grass Pasture Kv= 7.0 fps
3.4	283	0.0750	1.37		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
22.5	764	Total			

Summary for Link AP: Analysis Point

Inflow Area = 203,612 sf, 8.29% Impervious, Inflow Depth = 0.77" for 25-Year event
Inflow = 1.61 cfs @ 12.49 hrs, Volume= 13,040 cf
Primary = 1.61 cfs @ 12.49 hrs, Volume= 13,040 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1 Runoff Area=203,612 sf 8.29% Impervious Runoff Depth=1.61"
Flow Length=764' Tc=22.5 min CN=41 Runoff=4.45 cfs 27,291 cf

Link AP: Analysis Point Inflow=4.45 cfs 27,291 cf
Primary=4.45 cfs 27,291 cf

Total Runoff Area = 203,612 sf Runoff Volume = 27,291 cf Average Runoff Depth = 1.61"
91.71% Pervious = 186,726 sf 8.29% Impervious = 16,886 sf

Summary for Subcatchment DA1: DA1

Runoff = 4.45 cfs @ 12.39 hrs, Volume= 27,291 cf, Depth= 1.61"
Routed to Link AP : Analysis Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.56"

Area (sf)	CN	Description
108,124	39	Pasture/grassland/range, Good, HSG A
11,948	98	Paved parking, HSG A
77,918	30	Woods, Good, HSG A
4,938	98	Roofs, HSG A
684	76	Gravel roads, HSG A
203,612	41	Weighted Average
186,726		91.71% Pervious Area
16,886		8.29% Impervious Area

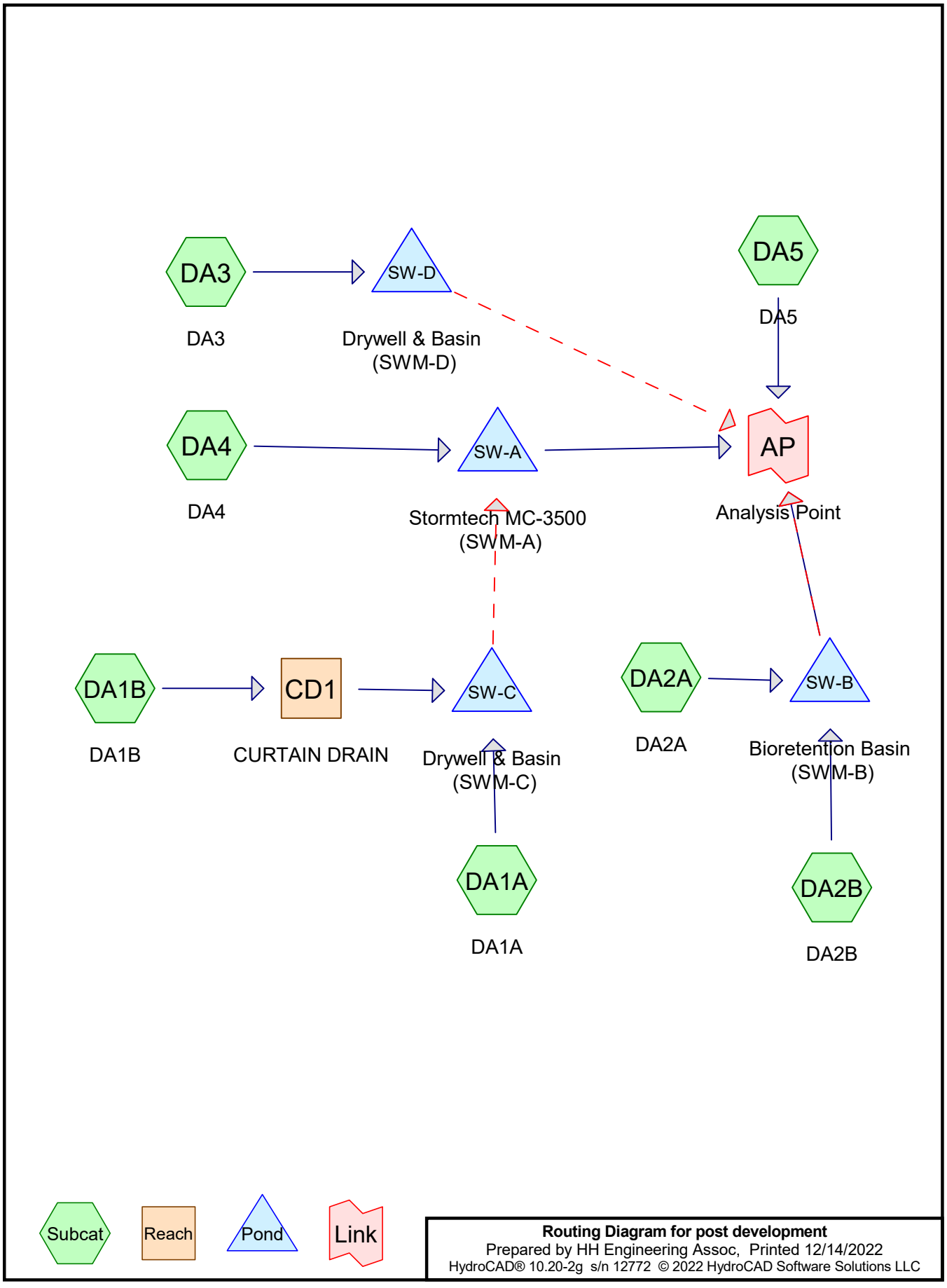
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	24	0.0824	0.23		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
11.7	76	0.0485	0.11		**Sheet Flow, sheetflow** Woods: Light underbrush n= 0.400 P2= 3.43"
0.6	35	0.0368	0.96		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
0.1	22	0.0345	3.77		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
1.5	61	0.0100	0.70		**Shallow Concentrated Flow, shallow** Short Grass Pasture Kv= 7.0 fps
2.0	127	0.0450	1.06		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
1.5	136	0.0441	1.47		**Shallow Concentrated Flow, shallow** Short Grass Pasture Kv= 7.0 fps
3.4	283	0.0750	1.37		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
22.5	764	Total			

Summary for Link AP: Analysis Point

Inflow Area = 203,612 sf, 8.29% Impervious, Inflow Depth = 1.61" for 100-Year event
Inflow = 4.45 cfs @ 12.39 hrs, Volume= 27,291 cf
Primary = 4.45 cfs @ 12.39 hrs, Volume= 27,291 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Appendix D – Post-Development HydroCAD Report



Routing Diagram for post development
Prepared by HH Engineering Assoc, Printed 12/14/2022

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	WQV	Type III 24-hr		Default	24.00	1	1.00	2
2	1-Year	Type III 24-hr		Default	24.00	1	2.65	2
3	2-Year	Type III 24-hr		Default	24.00	1	3.32	2
4	5-Year	Type III 24-hr		Default	24.00	1	4.43	2
5	10-Year	Type III 24-hr		Default	24.00	1	5.35	2
6	25-Year	Type III 24-hr		Default	24.00	1	6.61	2
7	50-Year	Type III 24-hr		Default	24.00	1	7.53	2
8	100-Year	Type III 24-hr		Default	24.00	1	8.56	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
80,497	39	>75% Grass cover, Good, HSG A (DA1A, DA1B, DA2B, DA3, DA4, DA5)
47,330	98	Paved parking, HSG A (DA1A, DA1B, DA3, DA4, DA5)
14,063	98	Roofs, HSG A (DA2A)
61,709	30	Woods, Good, HSG A (DA1A, DA1B, DA2B, DA3, DA5)
203,599	**54**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
203,599	HSG A	DA1A, DA1B, DA2A, DA2B, DA3, DA4, DA5
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
203,599		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
80,497	0	0	0	0	80,497	>75% Grass cover, Good	
47,330	0	0	0	0	47,330	Paved parking	
14,063	0	0	0	0	14,063	Roofs	
61,709	0	0	0	0	61,709	Woods, Good	
203,599	**0**	**0**	**0**	**0**	**203,599**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	SW-A	84.70	84.10	44.0	0.0136	0.012	0.0	12.0	0.0
2	SW-B	90.00	87.00	125.0	0.0240	0.010	0.0	12.0	0.0

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA1A: DA1A Runoff Area=1.366 ac 10.54% Impervious Runoff Depth=0.00"
Flow Length=337' Tc=17.4 min CN=42 Runoff=0.00 cfs 0 cf

Subcatchment DA1B: DA1B Runoff Area=13,628 sf 16.84% Impervious Runoff Depth=0.00"
Tc=10.0 min CN=47 Runoff=0.00 cfs 0 cf

Subcatchment DA2A: DA2A Runoff Area=14,063 sf 100.00% Impervious Runoff Depth=0.79"
Tc=5.0 min CN=98 Runoff=0.30 cfs 927 cf

Subcatchment DA2B: DA2B Runoff Area=12,794 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=189' Tc=11.5 min CN=38 Runoff=0.00 cfs 0 cf

Subcatchment DA3: DA3 Runoff Area=14,032 sf 9.11% Impervious Runoff Depth=0.00"
Tc=10.0 min CN=41 Runoff=0.00 cfs 0 cf

Subcatchment DA4: DA4 Runoff Area=42,316 sf 86.93% Impervious Runoff Depth=0.32"
Tc=10.0 min CN=90 Runoff=0.30 cfs 1,129 cf

Subcatchment DA5: DA5 Runoff Area=1.085 ac 1.47% Impervious Runoff Depth=0.00"
Flow Length=332' Tc=11.4 min CN=35 Runoff=0.00 cfs 0 cf

Reach CD1: CURTAIN DRAIN Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0 cf
n=0.033 L=163.0' S=0.0166 '/' Capacity=45.63 cfs Outflow=0.00 cfs 0 cf

Pond SW-A: Stormtech MC-3500 (SWM-A) Peak Elev=84.72' Storage=14 cf Inflow=0.30 cfs 1,129 cf
Discarded=0.30 cfs 1,129 cf Primary=0.00 cfs 0 cf Outflow=0.30 cfs 1,129 cf

Pond SW-B: Bioretention Basin (SWM-B) Peak Elev=91.24' Storage=267 cf Inflow=0.30 cfs 927 cf
Discarded=0.05 cfs 927 cf Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.05 cfs 927 cf

Pond SW-C: Drywell & Basin (SWM-C) Peak Elev=89.10' Storage=0 cf Inflow=0.00 cfs 0 cf
Discarded=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.00 cfs 0 cf

Pond SW-D: Drywell & Basin (SWM-D) Peak Elev=91.50' Storage=0 cf Inflow=0.00 cfs 0 cf
Discarded=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.00 cfs 0 cf

Link AP: Analysis Point Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 203,599 sf Runoff Volume = 2,056 cf Average Runoff Depth = 0.12"
69.85% Pervious = 142,206 sf 30.15% Impervious = 61,393 sf

Summary for Subcatchment DA1A: DA1A

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr WQV Rainfall=1.00"

Area (ac)	CN	Description
0.673	39	>75% Grass cover, Good, HSG A
0.549	30	Woods, Good, HSG A
0.144	98	Paved parking, HSG A
1.366	42	Weighted Average
1.222		89.46% Pervious Area
0.144		10.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	24	0.0824	0.23		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
11.7	76	0.0485	0.11		**Sheet Flow, Sheetflow** Woods: Light underbrush n= 0.400 P2= 3.43"
0.6	35	0.0368	0.96		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	22	0.0345	3.77		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.5	61	0.0100	0.70		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
1.7	99	0.0394	0.99		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	20	0.3400	4.08		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
17.4	337	Total			

Summary for Subcatchment DA1B: DA1B

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Reach CD1 : CURTAIN DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr WQV Rainfall=1.00"

Area (sf)	CN	Description
8,726	39	>75% Grass cover, Good, HSG A
2,607	30	Woods, Good, HSG A
2,295	98	Paved parking, HSG A
13,628	47	Weighted Average
11,333		83.16% Pervious Area
2,295		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2A: DA2A

Runoff = 0.30 cfs @ 12.07 hrs, Volume= 927 cf, Depth= 0.79"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr WQV Rainfall=1.00"

Area (sf)	CN	Description
14,063	98	Roofs, HSG A
14,063		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2B: DA2B

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr WQV Rainfall=1.00"

Area (sf)	CN	Description
11,225	39	>75% Grass cover, Good, HSG A
1,569	30	Woods, Good, HSG A
12,794	38	Weighted Average
12,794		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0150	0.16		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
0.9	89	0.0550	1.64		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
11.5	189	Total			

Summary for Subcatchment DA3: DA3

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Pond SW-D : Drywell & Basin (SWM-D)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr WQV Rainfall=1.00"

Area (sf)	CN	Description
7,100	39	>75% Grass cover, Good, HSG A
5,653	30	Woods, Good, HSG A
1,279	98	Paved parking, HSG A
14,032	41	Weighted Average
12,753		90.89% Pervious Area
1,279		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA4: DA4

Runoff = 0.30 cfs @ 12.15 hrs, Volume= 1,129 cf, Depth= 0.32"
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr WQV Rainfall=1.00"

Area (sf)	CN	Description
5,530	39	>75% Grass cover, Good, HSG A
36,786	98	Paved parking, HSG A
42,316	90	Weighted Average
5,530		13.07% Pervious Area
36,786		86.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA5: DA5

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link AP : Analysis Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr WQV Rainfall=1.00"

Area (ac)	CN	Description
0.427	39	>75% Grass cover, Good, HSG A
0.642	30	Woods, Good, HSG A
0.016	98	Paved parking, HSG A
1.085	35	Weighted Average
1.069		98.53% Pervious Area
0.016		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	18	0.1330	0.27		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
7.5	82	0.0240	0.18		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
1.9	118	0.0220	1.04		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.2	14	0.0500	1.12		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.2	32	0.1400	2.62		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.5	68	0.2350	2.42		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
11.4	332	Total			

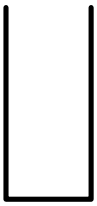
Summary for Reach CD1: CURTAIN DRAIN

Inflow Area = 13,628 sf, 16.84% Impervious, Inflow Depth = 0.00" for WQV event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 4.50' Flow Area= 9.0 sf, Capacity= 45.63 cfs

2.00' x 4.50' deep channel, n= 0.033 Riprap, 1-inch
Length= 163.0' Slope= 0.0166 '/'
Inlet Invert= 96.00', Outlet Invert= 93.30'



Stage-Area-Storage for Reach CD1: CURTAIN DRAIN

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
96.00	0.0	0
96.05	0.1	16
96.10	0.2	33
96.15	0.3	49
96.20	0.4	65
96.25	0.5	82
96.30	0.6	98
96.35	0.7	114
96.40	0.8	130
96.45	0.9	147
96.50	1.0	163
96.55	1.1	179
96.60	1.2	196
96.65	1.3	212
96.70	1.4	228
96.75	1.5	245
96.80	1.6	261
96.85	1.7	277
96.90	1.8	293
96.95	1.9	310
97.00	2.0	326
97.05	2.1	342
97.10	2.2	359
97.15	2.3	375
97.20	2.4	391
97.25	2.5	408
97.30	2.6	424
97.35	2.7	440
97.40	2.8	456
97.45	2.9	473
97.50	3.0	489
97.55	3.1	505
97.60	3.2	522
97.65	3.3	538
97.70	3.4	554
97.75	3.5	571
97.80	3.6	587
97.85	3.7	603
97.90	3.8	619
97.95	3.9	636
98.00	4.0	652
98.05	4.1	668
98.10	4.2	685
98.15	4.3	701
98.20	4.4	717
98.25	4.5	734
98.30	4.6	750
98.35	4.7	766
98.40	4.8	782
98.45	4.9	799
98.50	5.0	815
98.55	5.1	831
98.60	5.2	848
98.65	5.3	864
98.70	5.4	880
98.75	5.5	897
98.80	5.6	913
98.85	5.7	929
98.90	5.8	945
98.95	5.9	962
99.00	6.0	978
99.05	6.1	994
99.10	6.2	1,011
99.15	6.3	1,027
99.20	6.4	1,043
99.25	6.5	1,060
99.30	6.6	1,076
99.35	6.7	1,092
99.40	6.8	1,108
99.45	6.9	1,125
99.50	7.0	1,141
99.55	7.1	1,157
99.60	7.2	1,174
99.65	7.3	1,190
99.70	7.4	1,206
99.75	7.5	1,223
99.80	7.6	1,239
99.85	7.7	1,255
99.90	7.8	1,271
99.95	7.9	1,288
100.00	8.0	1,304
100.05	8.1	1,320
100.10	8.2	1,337
100.15	8.3	1,353
100.20	8.4	1,369
100.25	8.5	1,386
100.30	8.6	1,402
100.35	8.7	1,418
100.40	8.8	1,434
100.45	8.9	1,451
100.50	**9.0**	**1,467**

Summary for Pond SW-A: Stormtech MC-3500 (SWM-A)

Inflow Area = 42,316 sf, 86.93% Impervious, Inflow Depth = 0.32" for WQV event
Inflow = 0.30 cfs @ 12.15 hrs, Volume= 1,129 cf
Outflow = 0.30 cfs @ 12.16 hrs, Volume= 1,129 cf, Atten= 1%, Lag= 0.9 min
Discarded = 0.30 cfs @ 12.16 hrs, Volume= 1,129 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 84.72' @ 12.16 hrs Surf.Area= 1,761 sf Storage= 14 cf

Plug-Flow detention time= 0.8 min calculated for 1,129 cf (100% of inflow)
Center-of-Mass det. time= 0.8 min (867.3 - 866.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	84.70'	2,519 cf	**22.75'W x 77.40'L x 5.50'H Field A** 9,685 cf Overall - 3,388 cf Embedded = 6,297 cf x 40.0% Voids
#2A	85.45'	3,388 cf	**ADS_StormTech MC-3500 d +Cap** x 30 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 30 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		5,907 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	84.70'	**12.0" Round Outlet Pipe** L= 44.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 84.70' / 84.10' S= 0.0136 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	86.00'	**4.0" Vert. Low Flow Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	87.80'	**11.0" W x 4.0" H Vert. Upper Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	89.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Discarded	84.70'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.82 cfs @ 12.16 hrs HW=84.72' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.82 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=84.70' (Free Discharge)
└**1=Outlet Pipe** (Controls 0.00 cfs)
  ├**2=Low Flow Orifice** (Controls 0.00 cfs)
  ├**3=Upper Orifice** (Controls 0.00 cfs)
  └**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SW-A: Stormtech MC-3500 (SWM-A) - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

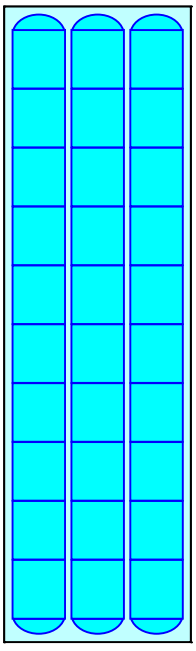
10 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 75.40' Row Length +12.0" End Stone x 2 = 77.40' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

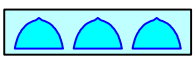
30 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 3,388.0 cf Chamber Storage

9,684.7 cf Field - 3,388.0 cf Chambers = 6,296.7 cf Stone x 40.0% Voids = 2,518.7 cf Stone Storage

Chamber Storage + Stone Storage = 5,906.6 cf = 0.136 af
Overall Storage Efficiency = 61.0%
Overall System Size = 77.40' x 22.75' x 5.50'

30 Chambers
358.7 cy Field
233.2 cy Stone





Stage-Area-Storage for Pond SW-A: Stormtech MC-3500 (SWM-A)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
84.70	**1,761**	0
84.80	1,761	70
84.90	1,761	141
85.00	1,761	211
85.10	1,761	282
85.20	1,761	352
85.30	1,761	423
85.40	1,761	493
85.50	1,761	602
85.60	1,761	750
85.70	1,761	897
85.80	1,761	1,044
85.90	1,761	1,190
86.00	1,761	1,335
86.10	1,761	1,480
86.20	1,761	1,624
86.30	1,761	1,768
86.40	1,761	1,910
86.50	1,761	2,052
86.60	1,761	2,193
86.70	1,761	2,333
86.80	1,761	2,472
86.90	1,761	2,610
87.00	1,761	2,747
87.10	1,761	2,882
87.20	1,761	3,017
87.30	1,761	3,150
87.40	1,761	3,281
87.50	1,761	3,411
87.60	1,761	3,540
87.70	1,761	3,667
87.80	1,761	3,791
87.90	1,761	3,914
88.00	1,761	4,035
88.10	1,761	4,153
88.20	1,761	4,269
88.30	1,761	4,382
88.40	1,761	4,492
88.50	1,761	4,599
88.60	1,761	4,702
88.70	1,761	4,800
88.80	1,761	4,892
88.90	1,761	4,976
89.00	1,761	5,055
89.10	1,761	5,130
89.20	1,761	5,202
89.30	1,761	5,273
89.40	1,761	5,343
89.50	1,761	5,414
89.60	1,761	5,484
89.70	1,761	5,554
89.80	1,761	5,625
89.90	1,761	5,695
90.00	1,761	5,766
90.10	1,761	5,836
90.20	1,761	**5,907**

Summary for Pond SW-B: Bioretention Basin (SWM-B)

Inflow Area = 26,857 sf, 52.36% Impervious, Inflow Depth = 0.41" for WQV event
Inflow = 0.30 cfs @ 12.07 hrs, Volume= 927 cf
Outflow = 0.05 cfs @ 12.51 hrs, Volume= 927 cf, Atten= 82%, Lag= 26.3 min
Discarded = 0.05 cfs @ 12.51 hrs, Volume= 927 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 91.24' @ 12.51 hrs Surf.Area= 1,180 sf Storage= 267 cf

Plug-Flow detention time= 34.6 min calculated for 927 cf (100% of inflow)
Center-of-Mass det. time= 34.6 min (821.5 - 786.9)

Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.00	1,031	0	0
92.00	1,649	1,340	1,340
93.00	2,324	1,987	3,327
94.00	3,055	2,690	6,016
94.10	3,132	309	6,325

Device	Routing	Invert	Outlet Devices
#1	Primary	90.00'	**12.0" Round Outlet Pipe** L= 125.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.00' / 87.00' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	93.40'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	93.60'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Discarded	91.00'	**2.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.05 cfs @ 12.51 hrs HW=91.24' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
└**1=Outlet Pipe** (Passes 0.00 cfs of 2.67 cfs potential flow)
└**2=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-B: Bioretention Basin (SWM-B)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.00	1,031	0
91.05	1,062	52
91.10	1,093	106
91.15	1,124	162
91.20	1,155	219
91.25	1,186	277
91.30	1,216	337
91.35	1,247	399
91.40	1,278	462
91.45	1,309	527
91.50	1,340	593
91.55	1,371	661
91.60	1,402	730
91.65	1,433	801
91.70	1,464	873
91.75	1,495	947
91.80	1,525	1,023
91.85	1,556	1,100
91.90	1,587	1,178
91.95	1,618	1,258
92.00	1,649	1,340
92.05	1,683	1,423
92.10	1,716	1,508
92.15	1,750	1,595
92.20	1,784	1,683
92.25	1,818	1,773
92.30	1,851	1,865
92.35	1,885	1,958
92.40	1,919	2,054
92.45	1,953	2,150
92.50	1,987	2,249
92.55	2,020	2,349
92.60	2,054	2,451
92.65	2,088	2,554
92.70	2,122	2,660
92.75	2,155	2,767
92.80	2,189	2,875
92.85	2,223	2,985
92.90	2,257	3,097
92.95	2,290	3,211
93.00	2,324	3,327
93.05	2,361	3,444
93.10	2,397	3,563
93.15	2,434	3,683
93.20	2,470	3,806
93.25	2,507	3,930
93.30	2,543	4,057
93.35	2,580	4,185
93.40	2,616	4,315
93.45	2,653	4,446
93.50	2,690	4,580
93.55	2,726	4,715
93.60	2,763	4,852
93.65	2,799	4,992
93.70	2,836	5,132
93.75	2,872	5,275
93.80	2,909	5,420
93.85	2,945	5,566
93.90	2,982	5,714
93.95	3,018	5,864
94.00	3,055	6,016
94.05	3,093	6,170
94.10	**3,132**	**6,325**

Summary for Pond SW-C: Drywell & Basin (SWM-C)

Inflow Area = 73,131 sf, 11.72% Impervious, Inflow Depth = 0.00" for WQV event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 89.10' @ 0.00 hrs Surf.Area= 31 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	89.10'	3,214 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.10	31	0	0
90.10	44	38	38
91.10	44	44	82
92.10	44	44	126
93.00	15	27	152
93.50	564	145	297
94.00	2,107	668	965
94.30	2,623	709	1,674
94.80	3,537	1,540	3,214

Device	Routing	Invert	Outlet Devices
#1	Discarded	89.10'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	94.30'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=89.10' (Free Discharge)
1=Exfiltration (Passes 0.00 cfs of 0.01 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=89.10' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-C: Drywell & Basin (SWM-C)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
89.10	31	0
89.20	32	3
89.30	34	6
89.40	35	10
89.50	36	13
89.60	38	17
89.70	39	21
89.80	40	25
89.90	41	29
90.00	43	33
90.10	44	38
90.20	44	42
90.30	44	46
90.40	44	51
90.50	44	55
90.60	44	60
90.70	44	64
90.80	44	68
90.90	44	73
91.00	44	77
91.10	44	82
91.20	44	86
91.30	44	90
91.40	44	95
91.50	44	99
91.60	44	104
91.70	44	108
91.80	44	112
91.90	44	117
92.00	44	121
92.10	44	126
92.20	41	130
92.30	38	134
92.40	34	137
92.50	31	141
92.60	28	143
92.70	25	146
92.80	21	148
92.90	18	150
93.00	15	152
93.10	125	159
93.20	235	177
93.30	344	206
93.40	454	246
93.50	564	297
93.60	873	369
93.70	1,181	471
93.80	1,490	605
93.90	1,798	769
94.00	2,107	965
94.10	2,279	1,184
94.20	2,451	1,420
94.30	2,623	1,674
94.40	2,806	1,945
94.50	2,989	2,235
94.60	3,171	2,543
94.70	3,354	2,869
94.80	**3,537**	**3,214**

Summary for Pond SW-D: Drywell & Basin (SWM-D)

Inflow Area = 14,032 sf, 9.11% Impervious, Inflow Depth = 0.00" for WQV event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 91.50' @ 0.00 hrs Surf.Area= 31 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	91.50'	2,064 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	31	0	0
92.50	44	38	38
93.50	44	44	82
94.50	44	44	126
95.50	44	44	170
96.50	44	44	214
97.40	4	22	235
98.00	97	30	265
99.00	709	403	668
99.06	1,117	55	723
100.00	1,424	1,194	1,917
100.10	1,505	146	2,064

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	99.60'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.50' (Free Discharge)
1=Exfiltration (Passes 0.00 cfs of 0.01 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.50' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-D: Drywell & Basin (SWM-D)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.50	31	0
91.60	32	3
91.70	34	6
91.80	35	10
91.90	36	13
92.00	38	17
92.10	39	21
92.20	40	25
92.30	41	29
92.40	43	33
92.50	44	38
92.60	44	42
92.70	44	46
92.80	44	51
92.90	44	55
93.00	44	60
93.10	44	64
93.20	44	68
93.30	44	73
93.40	44	77
93.50	44	82
93.60	44	86
93.70	44	90
93.80	44	95
93.90	44	99
94.00	44	104
94.10	44	108
94.20	44	112
94.30	44	117
94.40	44	121
94.50	44	126
94.60	44	130
94.70	44	134
94.80	44	139
94.90	44	143
95.00	44	148
95.10	44	152
95.20	44	156
95.30	44	161
95.40	44	165
95.50	44	170
95.60	44	174
95.70	44	178
95.80	44	183
95.90	44	187
96.00	44	192
96.10	44	196
96.20	44	200
96.30	44	205
96.40	44	209
96.50	44	214
96.60	40	218
96.70	35	221
96.80	31	225
96.90	26	228
97.00	22	230
97.10	17	232
97.20	13	233
97.30	8	234
97.40	4	235
97.50	19	236
97.60	35	239
97.70	51	243
97.80	66	249
97.90	82	256
98.00	97	265
98.10	158	278
98.20	219	297
98.30	281	322
98.40	342	353
98.50	403	390
98.60	464	434
98.70	525	483
98.80	587	539
98.90	648	601
99.00	709	668
99.10	1,130	768
99.20	1,163	883
99.30	1,195	1,001
99.40	1,228	1,122
99.50	1,261	1,246
99.60	1,293	1,374
99.70	1,326	1,505
99.80	1,359	1,639
99.90	1,391	1,777
100.00	1,424	1,917
100.10	**1,505**	**2,064**

Summary for Link AP: Analysis Point

Inflow Area = 116,436 sf, 44.27% Impervious, Inflow Depth = 0.00" for WQV event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA1A: DA1A Runoff Area=1.366 ac 10.54% Impervious Runoff Depth=0.00"
Flow Length=337' Tc=17.4 min CN=42 Runoff=0.00 cfs 0 cf

Subcatchment DA1B: DA1B Runoff Area=13,628 sf 16.84% Impervious Runoff Depth=0.01"
Tc=10.0 min CN=47 Runoff=0.00 cfs 15 cf

Subcatchment DA2A: DA2A Runoff Area=14,063 sf 100.00% Impervious Runoff Depth=2.42"
Tc=5.0 min CN=98 Runoff=0.85 cfs 2,836 cf

Subcatchment DA2B: DA2B Runoff Area=12,794 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=189' Tc=11.5 min CN=38 Runoff=0.00 cfs 0 cf

Subcatchment DA3: DA3 Runoff Area=14,032 sf 9.11% Impervious Runoff Depth=0.00"
Tc=10.0 min CN=41 Runoff=0.00 cfs 0 cf

Subcatchment DA4: DA4 Runoff Area=42,316 sf 86.93% Impervious Runoff Depth=1.67"
Tc=10.0 min CN=90 Runoff=1.65 cfs 5,873 cf

Subcatchment DA5: DA5 Runoff Area=1.085 ac 1.47% Impervious Runoff Depth=0.00"
Flow Length=332' Tc=11.4 min CN=35 Runoff=0.00 cfs 0 cf

Reach CD1: CURTAIN DRAIN Avg. Flow Depth=0.00' Max Vel=0.71 fps Inflow=0.00 cfs 15 cf
n=0.033 L=163.0' S=0.0166 '/' Capacity=45.63 cfs Outflow=0.00 cfs 15 cf

Pond SW-A: Stormtech MC-3500 (SWM-A) Peak Elev=85.49' Storage=591 cf Inflow=1.65 cfs 5,873 cf
Discarded=0.82 cfs 5,873 cf Primary=0.00 cfs 0 cf Outflow=0.82 cfs 5,873 cf

Pond SW-B: Bioretention Basin (SWM-B) Peak Elev=91.86' Storage=1,118 cf Inflow=0.85 cfs 2,836 cf
Discarded=0.07 cfs 2,836 cf Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.07 cfs 2,836 cf

Pond SW-C: Drywell & Basin (SWM-C) Peak Elev=89.10' Storage=0 cf Inflow=0.00 cfs 15 cf
Discarded=0.00 cfs 15 cf Secondary=0.00 cfs 0 cf Outflow=0.00 cfs 15 cf

Pond SW-D: Drywell & Basin (SWM-D) Peak Elev=91.50' Storage=0 cf Inflow=0.00 cfs 0 cf
Discarded=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.00 cfs 0 cf

Link AP: Analysis Point Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 203,599 sf Runoff Volume = 8,724 cf Average Runoff Depth = 0.51"
69.85% Pervious = 142,206 sf 30.15% Impervious = 61,393 sf

Summary for Subcatchment DA1A: DA1A

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.65"

Area (ac)	CN	Description
0.673	39	>75% Grass cover, Good, HSG A
0.549	30	Woods, Good, HSG A
0.144	98	Paved parking, HSG A
1.366	42	Weighted Average
1.222		89.46% Pervious Area
0.144		10.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	24	0.0824	0.23		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
11.7	76	0.0485	0.11		**Sheet Flow, Sheetflow** Woods: Light underbrush n= 0.400 P2= 3.43"
0.6	35	0.0368	0.96		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	22	0.0345	3.77		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.5	61	0.0100	0.70		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
1.7	99	0.0394	0.99		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	20	0.3400	4.08		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
17.4	337	Total			

Summary for Subcatchment DA1B: DA1B

Runoff = 0.00 cfs @ 21.27 hrs, Volume= 15 cf, Depth= 0.01"
Routed to Reach CD1 : CURTAIN DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.65"

Area (sf)	CN	Description
8,726	39	>75% Grass cover, Good, HSG A
2,607	30	Woods, Good, HSG A
2,295	98	Paved parking, HSG A
13,628	47	Weighted Average
11,333		83.16% Pervious Area
2,295		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2A: DA2A

Runoff = 0.85 cfs @ 12.07 hrs, Volume= 2,836 cf, Depth= 2.42"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.65"

Area (sf)	CN	Description
14,063	98	Roofs, HSG A
14,063		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2B: DA2B

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.65"

Area (sf)	CN	Description
11,225	39	>75% Grass cover, Good, HSG A
1,569	30	Woods, Good, HSG A
12,794	38	Weighted Average
12,794		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0150	0.16		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
0.9	89	0.0550	1.64		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
11.5	189	Total			

Summary for Subcatchment DA3: DA3

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Pond SW-D : Drywell & Basin (SWM-D)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.65"

Area (sf)	CN	Description
7,100	39	>75% Grass cover, Good, HSG A
5,653	30	Woods, Good, HSG A
1,279	98	Paved parking, HSG A
14,032	41	Weighted Average
12,753		90.89% Pervious Area
1,279		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA4: DA4

Runoff = 1.65 cfs @ 12.14 hrs, Volume= 5,873 cf, Depth= 1.67"
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.65"

Area (sf)	CN	Description
5,530	39	>75% Grass cover, Good, HSG A
36,786	98	Paved parking, HSG A
42,316	90	Weighted Average
5,530		13.07% Pervious Area
36,786		86.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA5: DA5

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link AP : Analysis Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.65"

Area (ac)	CN	Description
0.427	39	>75% Grass cover, Good, HSG A
0.642	30	Woods, Good, HSG A
0.016	98	Paved parking, HSG A
1.085	35	Weighted Average
1.069		98.53% Pervious Area
0.016		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	18	0.1330	0.27		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
7.5	82	0.0240	0.18		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
1.9	118	0.0220	1.04		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.2	14	0.0500	1.12		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.2	32	0.1400	2.62		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.5	68	0.2350	2.42		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
11.4	332	Total			

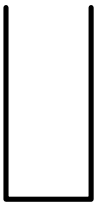
Summary for Reach CD1: CURTAIN DRAIN

Inflow Area = 13,628 sf, 16.84% Impervious, Inflow Depth = 0.01" for 1-Year event
Inflow = 0.00 cfs @ 21.27 hrs, Volume= 15 cf
Outflow = 0.00 cfs @ 21.30 hrs, Volume= 15 cf, Atten= 0%, Lag= 1.8 min
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Max. Velocity= 0.71 fps, Min. Travel Time= 3.8 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 3.8 min

Peak Storage= 0 cf @ 21.30 hrs
Average Depth at Peak Storage= 0.00' , Surface Width= 2.00'
Bank-Full Depth= 4.50' Flow Area= 9.0 sf, Capacity= 45.63 cfs

2.00' x 4.50' deep channel, n= 0.033 Riprap, 1-inch
Length= 163.0' Slope= 0.0166 '/'
Inlet Invert= 96.00', Outlet Invert= 93.30'



Stage-Area-Storage for Reach CD1: CURTAIN DRAIN

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
96.00	0.0	0
96.05	0.1	16
96.10	0.2	33
96.15	0.3	49
96.20	0.4	65
96.25	0.5	82
96.30	0.6	98
96.35	0.7	114
96.40	0.8	130
96.45	0.9	147
96.50	1.0	163
96.55	1.1	179
96.60	1.2	196
96.65	1.3	212
96.70	1.4	228
96.75	1.5	245
96.80	1.6	261
96.85	1.7	277
96.90	1.8	293
96.95	1.9	310
97.00	2.0	326
97.05	2.1	342
97.10	2.2	359
97.15	2.3	375
97.20	2.4	391
97.25	2.5	408
97.30	2.6	424
97.35	2.7	440
97.40	2.8	456
97.45	2.9	473
97.50	3.0	489
97.55	3.1	505
97.60	3.2	522
97.65	3.3	538
97.70	3.4	554
97.75	3.5	571
97.80	3.6	587
97.85	3.7	603
97.90	3.8	619
97.95	3.9	636
98.00	4.0	652
98.05	4.1	668
98.10	4.2	685
98.15	4.3	701
98.20	4.4	717
98.25	4.5	734
98.30	4.6	750
98.35	4.7	766
98.40	4.8	782
98.45	4.9	799
98.50	5.0	815
98.55	5.1	831
98.60	5.2	848
98.65	5.3	864
98.70	5.4	880
98.75	5.5	897
98.80	5.6	913
98.85	5.7	929
98.90	5.8	945
98.95	5.9	962
99.00	6.0	978
99.05	6.1	994
99.10	6.2	1,011
99.15	6.3	1,027
99.20	6.4	1,043
99.25	6.5	1,060
99.30	6.6	1,076
99.35	6.7	1,092
99.40	6.8	1,108
99.45	6.9	1,125
99.50	7.0	1,141
99.55	7.1	1,157
99.60	7.2	1,174
99.65	7.3	1,190
99.70	7.4	1,206
99.75	7.5	1,223
99.80	7.6	1,239
99.85	7.7	1,255
99.90	7.8	1,271
99.95	7.9	1,288
100.00	8.0	1,304
100.05	8.1	1,320
100.10	8.2	1,337
100.15	8.3	1,353
100.20	8.4	1,369
100.25	8.5	1,386
100.30	8.6	1,402
100.35	8.7	1,418
100.40	8.8	1,434
100.45	8.9	1,451
100.50	**9.0**	**1,467**

Summary for Pond SW-A: Stormtech MC-3500 (SWM-A)

Inflow Area = 42,316 sf, 86.93% Impervious, Inflow Depth = 1.67" for 1-Year event
Inflow = 1.65 cfs @ 12.14 hrs, Volume= 5,873 cf
Outflow = 0.82 cfs @ 12.02 hrs, Volume= 5,873 cf, Atten= 51%, Lag= 0.0 min
Discarded = 0.82 cfs @ 12.02 hrs, Volume= 5,873 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 85.49' @ 12.37 hrs Surf.Area= 1,761 sf Storage= 591 cf

Plug-Flow detention time= 3.5 min calculated for 5,872 cf (100% of inflow)
Center-of-Mass det. time= 3.5 min (821.6 - 818.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	84.70'	2,519 cf	**22.75'W x 77.40'L x 5.50'H Field A** 9,685 cf Overall - 3,388 cf Embedded = 6,297 cf x 40.0% Voids
#2A	85.45'	3,388 cf	**ADS_StormTech MC-3500 d +Cap** x 30 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 30 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		5,907 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	84.70'	**12.0" Round Outlet Pipe** L= 44.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 84.70' / 84.10' S= 0.0136 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	86.00'	**4.0" Vert. Low Flow Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	87.80'	**11.0" W x 4.0" H Vert. Upper Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	89.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Discarded	84.70'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.82 cfs @ 12.02 hrs HW=84.76' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.82 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=84.70' (Free Discharge)
└**1=Outlet Pipe** (Controls 0.00 cfs)
  ├**2=Low Flow Orifice** (Controls 0.00 cfs)
  ├**3=Upper Orifice** (Controls 0.00 cfs)
  └**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SW-A: Stormtech MC-3500 (SWM-A) - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

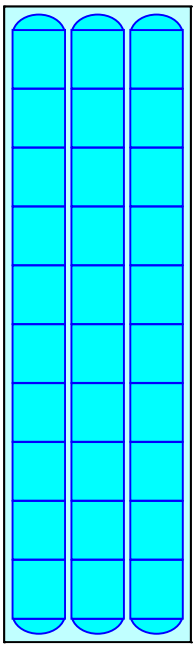
10 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 75.40' Row Length +12.0" End Stone x 2 = 77.40' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

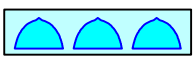
30 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 3,388.0 cf Chamber Storage

9,684.7 cf Field - 3,388.0 cf Chambers = 6,296.7 cf Stone x 40.0% Voids = 2,518.7 cf Stone Storage

Chamber Storage + Stone Storage = 5,906.6 cf = 0.136 af
Overall Storage Efficiency = 61.0%
Overall System Size = 77.40' x 22.75' x 5.50'

30 Chambers
358.7 cy Field
233.2 cy Stone





Stage-Area-Storage for Pond SW-A: Stormtech MC-3500 (SWM-A)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
84.70	**1,761**	0
84.80	1,761	70
84.90	1,761	141
85.00	1,761	211
85.10	1,761	282
85.20	1,761	352
85.30	1,761	423
85.40	1,761	493
85.50	1,761	602
85.60	1,761	750
85.70	1,761	897
85.80	1,761	1,044
85.90	1,761	1,190
86.00	1,761	1,335
86.10	1,761	1,480
86.20	1,761	1,624
86.30	1,761	1,768
86.40	1,761	1,910
86.50	1,761	2,052
86.60	1,761	2,193
86.70	1,761	2,333
86.80	1,761	2,472
86.90	1,761	2,610
87.00	1,761	2,747
87.10	1,761	2,882
87.20	1,761	3,017
87.30	1,761	3,150
87.40	1,761	3,281
87.50	1,761	3,411
87.60	1,761	3,540
87.70	1,761	3,667
87.80	1,761	3,791
87.90	1,761	3,914
88.00	1,761	4,035
88.10	1,761	4,153
88.20	1,761	4,269
88.30	1,761	4,382
88.40	1,761	4,492
88.50	1,761	4,599
88.60	1,761	4,702
88.70	1,761	4,800
88.80	1,761	4,892
88.90	1,761	4,976
89.00	1,761	5,055
89.10	1,761	5,130
89.20	1,761	5,202
89.30	1,761	5,273
89.40	1,761	5,343
89.50	1,761	5,414
89.60	1,761	5,484
89.70	1,761	5,554
89.80	1,761	5,625
89.90	1,761	5,695
90.00	1,761	5,766
90.10	1,761	5,836
90.20	1,761	**5,907**

Summary for Pond SW-B: Bioretention Basin (SWM-B)

Inflow Area = 26,857 sf, 52.36% Impervious, Inflow Depth = 1.27" for 1-Year event
Inflow = 0.85 cfs @ 12.07 hrs, Volume= 2,836 cf
Outflow = 0.07 cfs @ 12.95 hrs, Volume= 2,836 cf, Atten= 92%, Lag= 52.8 min
Discarded = 0.07 cfs @ 12.95 hrs, Volume= 2,836 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 91.86' @ 12.95 hrs Surf.Area= 1,563 sf Storage= 1,118 cf

Plug-Flow detention time= 130.4 min calculated for 2,835 cf (100% of inflow)
Center-of-Mass det. time= 130.4 min (890.0 - 759.6)

Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.00	1,031	0	0
92.00	1,649	1,340	1,340
93.00	2,324	1,987	3,327
94.00	3,055	2,690	6,016
94.10	3,132	309	6,325

Device	Routing	Invert	Outlet Devices
#1	Primary	90.00'	**12.0" Round Outlet Pipe** L= 125.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.00' / 87.00' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	93.40'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	93.60'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Discarded	91.00'	**2.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.07 cfs @ 12.95 hrs HW=91.86' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
└**1=Outlet Pipe** (Passes 0.00 cfs of 2.67 cfs potential flow)
└**2=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-B: Bioretention Basin (SWM-B)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.00	1,031	0
91.05	1,062	52
91.10	1,093	106
91.15	1,124	162
91.20	1,155	219
91.25	1,186	277
91.30	1,216	337
91.35	1,247	399
91.40	1,278	462
91.45	1,309	527
91.50	1,340	593
91.55	1,371	661
91.60	1,402	730
91.65	1,433	801
91.70	1,464	873
91.75	1,495	947
91.80	1,525	1,023
91.85	1,556	1,100
91.90	1,587	1,178
91.95	1,618	1,258
92.00	1,649	1,340
92.05	1,683	1,423
92.10	1,716	1,508
92.15	1,750	1,595
92.20	1,784	1,683
92.25	1,818	1,773
92.30	1,851	1,865
92.35	1,885	1,958
92.40	1,919	2,054
92.45	1,953	2,150
92.50	1,987	2,249
92.55	2,020	2,349
92.60	2,054	2,451
92.65	2,088	2,554
92.70	2,122	2,660
92.75	2,155	2,767
92.80	2,189	2,875
92.85	2,223	2,985
92.90	2,257	3,097
92.95	2,290	3,211
93.00	2,324	3,327
93.05	2,361	3,444
93.10	2,397	3,563
93.15	2,434	3,683
93.20	2,470	3,806
93.25	2,507	3,930
93.30	2,543	4,057
93.35	2,580	4,185
93.40	2,616	4,315
93.45	2,653	4,446
93.50	2,690	4,580
93.55	2,726	4,715
93.60	2,763	4,852
93.65	2,799	4,992
93.70	2,836	5,132
93.75	2,872	5,275
93.80	2,909	5,420
93.85	2,945	5,566
93.90	2,982	5,714
93.95	3,018	5,864
94.00	3,055	6,016
94.05	3,093	6,170
94.10	**3,132**	**6,325**

Summary for Pond SW-C: Drywell & Basin (SWM-C)

Inflow Area = 73,131 sf, 11.72% Impervious, Inflow Depth = 0.00" for 1-Year event
Inflow = 0.00 cfs @ 21.30 hrs, Volume= 15 cf
Outflow = 0.00 cfs @ 21.33 hrs, Volume= 15 cf, Atten= 0%, Lag= 1.5 min
Discarded = 0.00 cfs @ 21.33 hrs, Volume= 15 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 89.10' @ 21.33 hrs Surf.Area= 31 sf Storage= 0 cf

Plug-Flow detention time= 2.0 min calculated for 15 cf (100% of inflow)
Center-of-Mass det. time= 2.0 min (1,205.7 - 1,203.6)

Volume	Invert	Avail.Storage	Storage Description
#1	89.10'	3,214 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.10	31	0	0
90.10	44	38	38
91.10	44	44	82
92.10	44	44	126
93.00	15	27	152
93.50	564	145	297
94.00	2,107	668	965
94.30	2,623	709	1,674
94.80	3,537	1,540	3,214

Device	Routing	Invert	Outlet Devices
#1	Discarded	89.10'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	94.30'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.01 cfs @ 21.33 hrs HW=89.10' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=89.10' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-C: Drywell & Basin (SWM-C)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
89.10	31	0
89.20	32	3
89.30	34	6
89.40	35	10
89.50	36	13
89.60	38	17
89.70	39	21
89.80	40	25
89.90	41	29
90.00	43	33
90.10	44	38
90.20	44	42
90.30	44	46
90.40	44	51
90.50	44	55
90.60	44	60
90.70	44	64
90.80	44	68
90.90	44	73
91.00	44	77
91.10	44	82
91.20	44	86
91.30	44	90
91.40	44	95
91.50	44	99
91.60	44	104
91.70	44	108
91.80	44	112
91.90	44	117
92.00	44	121
92.10	44	126
92.20	41	130
92.30	38	134
92.40	34	137
92.50	31	141
92.60	28	143
92.70	25	146
92.80	21	148
92.90	18	150
93.00	15	152
93.10	125	159
93.20	235	177
93.30	344	206
93.40	454	246
93.50	564	297
93.60	873	369
93.70	1,181	471
93.80	1,490	605
93.90	1,798	769
94.00	2,107	965
94.10	2,279	1,184
94.20	2,451	1,420
94.30	2,623	1,674
94.40	2,806	1,945
94.50	2,989	2,235
94.60	3,171	2,543
94.70	3,354	2,869
94.80	**3,537**	**3,214**

Summary for Pond SW-D: Drywell & Basin (SWM-D)

Inflow Area = 14,032 sf, 9.11% Impervious, Inflow Depth = 0.00" for 1-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 91.50' @ 0.00 hrs Surf.Area= 31 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	91.50'	2,064 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	31	0	0
92.50	44	38	38
93.50	44	44	82
94.50	44	44	126
95.50	44	44	170
96.50	44	44	214
97.40	4	22	235
98.00	97	30	265
99.00	709	403	668
99.06	1,117	55	723
100.00	1,424	1,194	1,917
100.10	1,505	146	2,064

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	99.60'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.50' (Free Discharge)
1=Exfiltration (Passes 0.00 cfs of 0.01 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.50' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-D: Drywell & Basin (SWM-D)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.50	31	0
91.60	32	3
91.70	34	6
91.80	35	10
91.90	36	13
92.00	38	17
92.10	39	21
92.20	40	25
92.30	41	29
92.40	43	33
92.50	44	38
92.60	44	42
92.70	44	46
92.80	44	51
92.90	44	55
93.00	44	60
93.10	44	64
93.20	44	68
93.30	44	73
93.40	44	77
93.50	44	82
93.60	44	86
93.70	44	90
93.80	44	95
93.90	44	99
94.00	44	104
94.10	44	108
94.20	44	112
94.30	44	117
94.40	44	121
94.50	44	126
94.60	44	130
94.70	44	134
94.80	44	139
94.90	44	143
95.00	44	148
95.10	44	152
95.20	44	156
95.30	44	161
95.40	44	165
95.50	44	170
95.60	44	174
95.70	44	178
95.80	44	183
95.90	44	187
96.00	44	192
96.10	44	196
96.20	44	200
96.30	44	205
96.40	44	209
96.50	44	214
96.60	40	218
96.70	35	221
96.80	31	225
96.90	26	228
97.00	22	230
97.10	17	232
97.20	13	233
97.30	8	234
97.40	4	235
97.50	19	236
97.60	35	239
97.70	51	243
97.80	66	249
97.90	82	256
98.00	97	265
98.10	158	278
98.20	219	297
98.30	281	322
98.40	342	353
98.50	403	390
98.60	464	434
98.70	525	483
98.80	587	539
98.90	648	601
99.00	709	668
99.10	1,130	768
99.20	1,163	883
99.30	1,195	1,001
99.40	1,228	1,122
99.50	1,261	1,246
99.60	1,293	1,374
99.70	1,326	1,505
99.80	1,359	1,639
99.90	1,391	1,777
100.00	1,424	1,917
100.10	**1,505**	**2,064**

Summary for Link AP: Analysis Point

Inflow Area = 116,436 sf, 44.27% Impervious, Inflow Depth = 0.00" for 1-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA1A: DA1A Runoff Area=1.366 ac 10.54% Impervious Runoff Depth=0.02"
Flow Length=337' Tc=17.4 min CN=42 Runoff=0.00 cfs 107 cf

Subcatchment DA1B: DA1B Runoff Area=13,628 sf 16.84% Impervious Runoff Depth=0.09"
Tc=10.0 min CN=47 Runoff=0.00 cfs 104 cf

Subcatchment DA2A: DA2A Runoff Area=14,063 sf 100.00% Impervious Runoff Depth=3.09"
Tc=5.0 min CN=98 Runoff=1.08 cfs 3,618 cf

Subcatchment DA2B: DA2B Runoff Area=12,794 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=189' Tc=11.5 min CN=38 Runoff=0.00 cfs 0 cf

Subcatchment DA3: DA3 Runoff Area=14,032 sf 9.11% Impervious Runoff Depth=0.01"
Tc=10.0 min CN=41 Runoff=0.00 cfs 15 cf

Subcatchment DA4: DA4 Runoff Area=42,316 sf 86.93% Impervious Runoff Depth=2.28"
Tc=10.0 min CN=90 Runoff=2.24 cfs 8,040 cf

Subcatchment DA5: DA5 Runoff Area=1.085 ac 1.47% Impervious Runoff Depth=0.00"
Flow Length=332' Tc=11.4 min CN=35 Runoff=0.00 cfs 0 cf

Reach CD1: CURTAIN DRAIN Avg. Flow Depth=0.00' Max Vel=0.71 fps Inflow=0.00 cfs 104 cf
n=0.033 L=163.0' S=0.0166 '/' Capacity=45.63 cfs Outflow=0.00 cfs 104 cf

Pond SW-A: Stormtech MC-3500 (SWM-A) Peak Elev=85.95' Storage=1,258 cf Inflow=2.24 cfs 8,040 cf
Discarded=0.82 cfs 8,040 cf Primary=0.00 cfs 0 cf Outflow=0.82 cfs 8,040 cf

Pond SW-B: Bioretention Basin (SWM-B) Peak Elev=92.11' Storage=1,521 cf Inflow=1.08 cfs 3,618 cf
Discarded=0.08 cfs 3,618 cf Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.08 cfs 3,618 cf

Pond SW-C: Drywell & Basin (SWM-C) Peak Elev=89.12' Storage=1 cf Inflow=0.01 cfs 212 cf
Discarded=0.01 cfs 212 cf Secondary=0.00 cfs 0 cf Outflow=0.01 cfs 212 cf

Pond SW-D: Drywell & Basin (SWM-D) Peak Elev=91.50' Storage=0 cf Inflow=0.00 cfs 15 cf
Discarded=0.00 cfs 15 cf Secondary=0.00 cfs 0 cf Outflow=0.00 cfs 15 cf

Link AP: Analysis Point Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 203,599 sf Runoff Volume = 11,885 cf Average Runoff Depth = 0.70"
69.85% Pervious = 142,206 sf 30.15% Impervious = 61,393 sf

Summary for Subcatchment DA1A: DA1A

Runoff = 0.00 cfs @ 17.42 hrs, Volume= 107 cf, Depth= 0.02"
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.32"

Area (ac)	CN	Description
0.673	39	>75% Grass cover, Good, HSG A
0.549	30	Woods, Good, HSG A
0.144	98	Paved parking, HSG A
1.366	42	Weighted Average
1.222		89.46% Pervious Area
0.144		10.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	24	0.0824	0.23		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
11.7	76	0.0485	0.11		**Sheet Flow, Sheetflow** Woods: Light underbrush n= 0.400 P2= 3.43"
0.6	35	0.0368	0.96		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	22	0.0345	3.77		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.5	61	0.0100	0.70		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
1.7	99	0.0394	0.99		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	20	0.3400	4.08		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
17.4	337	Total			

Summary for Subcatchment DA1B: DA1B

Runoff = 0.00 cfs @ 14.64 hrs, Volume= 104 cf, Depth= 0.09"
Routed to Reach CD1 : CURTAIN DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.32"

Area (sf)	CN	Description
8,726	39	>75% Grass cover, Good, HSG A
2,607	30	Woods, Good, HSG A
2,295	98	Paved parking, HSG A
13,628	47	Weighted Average
11,333		83.16% Pervious Area
2,295		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2A: DA2A

Runoff = 1.08 cfs @ 12.07 hrs, Volume= 3,618 cf, Depth= 3.09"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.32"

Area (sf)	CN	Description
14,063	98	Roofs, HSG A
14,063		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2B: DA2B

Runoff = 0.00 cfs @ 24.03 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.32"

Area (sf)	CN	Description
11,225	39	>75% Grass cover, Good, HSG A
1,569	30	Woods, Good, HSG A
12,794	38	Weighted Average
12,794		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0150	0.16		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
0.9	89	0.0550	1.64		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
11.5	189	Total			

Summary for Subcatchment DA3: DA3

Runoff = 0.00 cfs @ 21.70 hrs, Volume= 15 cf, Depth= 0.01"
Routed to Pond SW-D : Drywell & Basin (SWM-D)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.32"

Area (sf)	CN	Description
7,100	39	>75% Grass cover, Good, HSG A
5,653	30	Woods, Good, HSG A
1,279	98	Paved parking, HSG A
14,032	41	Weighted Average
12,753		90.89% Pervious Area
1,279		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA4: DA4

Runoff = 2.24 cfs @ 12.14 hrs, Volume= 8,040 cf, Depth= 2.28"
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.32"

Area (sf)	CN	Description
5,530	39	>75% Grass cover, Good, HSG A
36,786	98	Paved parking, HSG A
42,316	90	Weighted Average
5,530		13.07% Pervious Area
36,786		86.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA5: DA5

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link AP : Analysis Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.32"

Area (ac)	CN	Description
0.427	39	>75% Grass cover, Good, HSG A
0.642	30	Woods, Good, HSG A
0.016	98	Paved parking, HSG A
1.085	35	Weighted Average
1.069		98.53% Pervious Area
0.016		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	18	0.1330	0.27		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
7.5	82	0.0240	0.18		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
1.9	118	0.0220	1.04		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.2	14	0.0500	1.12		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.2	32	0.1400	2.62		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.5	68	0.2350	2.42		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
11.4	332	Total			

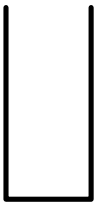
Summary for Reach CD1: CURTAIN DRAIN

Inflow Area = 13,628 sf, 16.84% Impervious, Inflow Depth = 0.09" for 2-Year event
Inflow = 0.00 cfs @ 14.64 hrs, Volume= 104 cf
Outflow = 0.00 cfs @ 14.70 hrs, Volume= 104 cf, Atten= 0%, Lag= 3.5 min
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Max. Velocity= 0.71 fps, Min. Travel Time= 3.8 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 3.8 min

Peak Storage= 1 cf @ 14.70 hrs
Average Depth at Peak Storage= 0.00' , Surface Width= 2.00'
Bank-Full Depth= 4.50' Flow Area= 9.0 sf, Capacity= 45.63 cfs

2.00' x 4.50' deep channel, n= 0.033 Riprap, 1-inch
Length= 163.0' Slope= 0.0166 '/'
Inlet Invert= 96.00', Outlet Invert= 93.30'



Stage-Area-Storage for Reach CD1: CURTAIN DRAIN

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
96.00	0.0	0
96.05	0.1	16
96.10	0.2	33
96.15	0.3	49
96.20	0.4	65
96.25	0.5	82
96.30	0.6	98
96.35	0.7	114
96.40	0.8	130
96.45	0.9	147
96.50	1.0	163
96.55	1.1	179
96.60	1.2	196
96.65	1.3	212
96.70	1.4	228
96.75	1.5	245
96.80	1.6	261
96.85	1.7	277
96.90	1.8	293
96.95	1.9	310
97.00	2.0	326
97.05	2.1	342
97.10	2.2	359
97.15	2.3	375
97.20	2.4	391
97.25	2.5	408
97.30	2.6	424
97.35	2.7	440
97.40	2.8	456
97.45	2.9	473
97.50	3.0	489
97.55	3.1	505
97.60	3.2	522
97.65	3.3	538
97.70	3.4	554
97.75	3.5	571
97.80	3.6	587
97.85	3.7	603
97.90	3.8	619
97.95	3.9	636
98.00	4.0	652
98.05	4.1	668
98.10	4.2	685
98.15	4.3	701
98.20	4.4	717
98.25	4.5	734
98.30	4.6	750
98.35	4.7	766
98.40	4.8	782
98.45	4.9	799
98.50	5.0	815
98.55	5.1	831
98.60	5.2	848
98.65	5.3	864
98.70	5.4	880
98.75	5.5	897
98.80	5.6	913
98.85	5.7	929
98.90	5.8	945
98.95	5.9	962
99.00	6.0	978
99.05	6.1	994
99.10	6.2	1,011
99.15	6.3	1,027
99.20	6.4	1,043
99.25	6.5	1,060
99.30	6.6	1,076
99.35	6.7	1,092
99.40	6.8	1,108
99.45	6.9	1,125
99.50	7.0	1,141
99.55	7.1	1,157
99.60	7.2	1,174
99.65	7.3	1,190
99.70	7.4	1,206
99.75	7.5	1,223
99.80	7.6	1,239
99.85	7.7	1,255
99.90	7.8	1,271
99.95	7.9	1,288
100.00	8.0	1,304
100.05	8.1	1,320
100.10	8.2	1,337
100.15	8.3	1,353
100.20	8.4	1,369
100.25	8.5	1,386
100.30	8.6	1,402
100.35	8.7	1,418
100.40	8.8	1,434
100.45	8.9	1,451
100.50	**9.0**	**1,467**

Summary for Pond SW-A: Stormtech MC-3500 (SWM-A)

Inflow Area = 42,316 sf, 86.93% Impervious, Inflow Depth = 2.28" for 2-Year event
Inflow = 2.24 cfs @ 12.14 hrs, Volume= 8,040 cf
Outflow = 0.82 cfs @ 11.94 hrs, Volume= 8,040 cf, Atten= 64%, Lag= 0.0 min
Discarded = 0.82 cfs @ 11.94 hrs, Volume= 8,040 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 85.95' @ 12.47 hrs Surf.Area= 1,761 sf Storage= 1,258 cf

Plug-Flow detention time= 7.4 min calculated for 8,038 cf (100% of inflow)
Center-of-Mass det. time= 7.4 min (816.6 - 809.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	84.70'	2,519 cf	**22.75'W x 77.40'L x 5.50'H Field A** 9,685 cf Overall - 3,388 cf Embedded = 6,297 cf x 40.0% Voids
#2A	85.45'	3,388 cf	**ADS_StormTech MC-3500 d +Cap** x 30 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 30 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		5,907 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	84.70'	**12.0" Round Outlet Pipe** L= 44.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 84.70' / 84.10' S= 0.0136 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	86.00'	**4.0" Vert. Low Flow Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	87.80'	**11.0" W x 4.0" H Vert. Upper Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	89.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Discarded	84.70'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.82 cfs @ 11.94 hrs HW=84.76' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.82 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=84.70' (Free Discharge)
└**1=Outlet Pipe** (Controls 0.00 cfs)
  ├**2=Low Flow Orifice** (Controls 0.00 cfs)
  ├**3=Upper Orifice** (Controls 0.00 cfs)
  └**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SW-A: Stormtech MC-3500 (SWM-A) - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

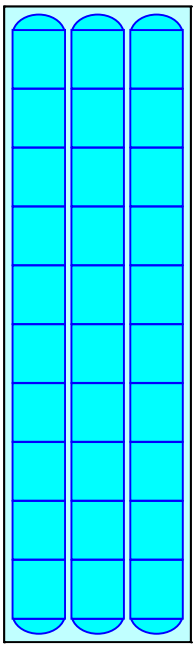
10 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 75.40' Row Length +12.0" End Stone x 2 = 77.40' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

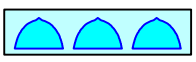
30 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 3,388.0 cf Chamber Storage

9,684.7 cf Field - 3,388.0 cf Chambers = 6,296.7 cf Stone x 40.0% Voids = 2,518.7 cf Stone Storage

Chamber Storage + Stone Storage = 5,906.6 cf = 0.136 af
Overall Storage Efficiency = 61.0%
Overall System Size = 77.40' x 22.75' x 5.50'

30 Chambers
358.7 cy Field
233.2 cy Stone





Stage-Area-Storage for Pond SW-A: Stormtech MC-3500 (SWM-A)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
84.70	**1,761**	0
84.80	1,761	70
84.90	1,761	141
85.00	1,761	211
85.10	1,761	282
85.20	1,761	352
85.30	1,761	423
85.40	1,761	493
85.50	1,761	602
85.60	1,761	750
85.70	1,761	897
85.80	1,761	1,044
85.90	1,761	1,190
86.00	1,761	1,335
86.10	1,761	1,480
86.20	1,761	1,624
86.30	1,761	1,768
86.40	1,761	1,910
86.50	1,761	2,052
86.60	1,761	2,193
86.70	1,761	2,333
86.80	1,761	2,472
86.90	1,761	2,610
87.00	1,761	2,747
87.10	1,761	2,882
87.20	1,761	3,017
87.30	1,761	3,150
87.40	1,761	3,281
87.50	1,761	3,411
87.60	1,761	3,540
87.70	1,761	3,667
87.80	1,761	3,791
87.90	1,761	3,914
88.00	1,761	4,035
88.10	1,761	4,153
88.20	1,761	4,269
88.30	1,761	4,382
88.40	1,761	4,492
88.50	1,761	4,599
88.60	1,761	4,702
88.70	1,761	4,800
88.80	1,761	4,892
88.90	1,761	4,976
89.00	1,761	5,055
89.10	1,761	5,130
89.20	1,761	5,202
89.30	1,761	5,273
89.40	1,761	5,343
89.50	1,761	5,414
89.60	1,761	5,484
89.70	1,761	5,554
89.80	1,761	5,625
89.90	1,761	5,695
90.00	1,761	5,766
90.10	1,761	5,836
90.20	1,761	**5,907**

Summary for Pond SW-B: Bioretention Basin (SWM-B)

Inflow Area = 26,857 sf, 52.36% Impervious, Inflow Depth = 1.62" for 2-Year event
Inflow = 1.08 cfs @ 12.07 hrs, Volume= 3,618 cf
Outflow = 0.08 cfs @ 13.07 hrs, Volume= 3,618 cf, Atten= 93%, Lag= 60.3 min
Discarded = 0.08 cfs @ 13.07 hrs, Volume= 3,618 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 92.11' @ 13.07 hrs Surf.Area= 1,721 sf Storage= 1,521 cf

Plug-Flow detention time= 170.7 min calculated for 3,617 cf (100% of inflow)
Center-of-Mass det. time= 170.6 min (925.4 - 754.7)

Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.00	1,031	0	0
92.00	1,649	1,340	1,340
93.00	2,324	1,987	3,327
94.00	3,055	2,690	6,016
94.10	3,132	309	6,325

Device	Routing	Invert	Outlet Devices
#1	Primary	90.00'	**12.0" Round Outlet Pipe** L= 125.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.00' / 87.00' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	93.40'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	93.60'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Discarded	91.00'	**2.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.08 cfs @ 13.07 hrs HW=92.11' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
└**1=Outlet Pipe** (Passes 0.00 cfs of 2.67 cfs potential flow)
└**2=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-B: Bioretention Basin (SWM-B)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.00	1,031	0
91.05	1,062	52
91.10	1,093	106
91.15	1,124	162
91.20	1,155	219
91.25	1,186	277
91.30	1,216	337
91.35	1,247	399
91.40	1,278	462
91.45	1,309	527
91.50	1,340	593
91.55	1,371	661
91.60	1,402	730
91.65	1,433	801
91.70	1,464	873
91.75	1,495	947
91.80	1,525	1,023
91.85	1,556	1,100
91.90	1,587	1,178
91.95	1,618	1,258
92.00	1,649	1,340
92.05	1,683	1,423
92.10	1,716	1,508
92.15	1,750	1,595
92.20	1,784	1,683
92.25	1,818	1,773
92.30	1,851	1,865
92.35	1,885	1,958
92.40	1,919	2,054
92.45	1,953	2,150
92.50	1,987	2,249
92.55	2,020	2,349
92.60	2,054	2,451
92.65	2,088	2,554
92.70	2,122	2,660
92.75	2,155	2,767
92.80	2,189	2,875
92.85	2,223	2,985
92.90	2,257	3,097
92.95	2,290	3,211
93.00	2,324	3,327
93.05	2,361	3,444
93.10	2,397	3,563
93.15	2,434	3,683
93.20	2,470	3,806
93.25	2,507	3,930
93.30	2,543	4,057
93.35	2,580	4,185
93.40	2,616	4,315
93.45	2,653	4,446
93.50	2,690	4,580
93.55	2,726	4,715
93.60	2,763	4,852
93.65	2,799	4,992
93.70	2,836	5,132
93.75	2,872	5,275
93.80	2,909	5,420
93.85	2,945	5,566
93.90	2,982	5,714
93.95	3,018	5,864
94.00	3,055	6,016
94.05	3,093	6,170
94.10	**3,132**	**6,325**

Summary for Pond SW-C: Drywell & Basin (SWM-C)

Inflow Area = 73,131 sf, 11.72% Impervious, Inflow Depth = 0.03" for 2-Year event
Inflow = 0.01 cfs @ 16.88 hrs, Volume= 212 cf
Outflow = 0.01 cfs @ 16.91 hrs, Volume= 212 cf, Atten= 0%, Lag= 2.1 min
Discarded = 0.01 cfs @ 16.91 hrs, Volume= 212 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 89.12' @ 16.91 hrs Surf.Area= 31 sf Storage= 1 cf

Plug-Flow detention time= 2.0 min calculated for 212 cf (100% of inflow)
Center-of-Mass det. time= 2.0 min (1,120.5 - 1,118.5)

Volume	Invert	Avail.Storage	Storage Description
#1	89.10'	3,214 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.10	31	0	0
90.10	44	38	38
91.10	44	44	82
92.10	44	44	126
93.00	15	27	152
93.50	564	145	297
94.00	2,107	668	965
94.30	2,623	709	1,674
94.80	3,537	1,540	3,214

Device	Routing	Invert	Outlet Devices
#1	Discarded	89.10'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	94.30'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.01 cfs @ 16.91 hrs HW=89.12' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=89.10' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-C: Drywell & Basin (SWM-C)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
89.10	31	0
89.20	32	3
89.30	34	6
89.40	35	10
89.50	36	13
89.60	38	17
89.70	39	21
89.80	40	25
89.90	41	29
90.00	43	33
90.10	44	38
90.20	44	42
90.30	44	46
90.40	44	51
90.50	44	55
90.60	44	60
90.70	44	64
90.80	44	68
90.90	44	73
91.00	44	77
91.10	44	82
91.20	44	86
91.30	44	90
91.40	44	95
91.50	44	99
91.60	44	104
91.70	44	108
91.80	44	112
91.90	44	117
92.00	44	121
92.10	44	126
92.20	41	130
92.30	38	134
92.40	34	137
92.50	31	141
92.60	28	143
92.70	25	146
92.80	21	148
92.90	18	150
93.00	15	152
93.10	125	159
93.20	235	177
93.30	344	206
93.40	454	246
93.50	564	297
93.60	873	369
93.70	1,181	471
93.80	1,490	605
93.90	1,798	769
94.00	2,107	965
94.10	2,279	1,184
94.20	2,451	1,420
94.30	2,623	1,674
94.40	2,806	1,945
94.50	2,989	2,235
94.60	3,171	2,543
94.70	3,354	2,869
94.80	**3,537**	**3,214**

Summary for Pond SW-D: Drywell & Basin (SWM-D)

Inflow Area = 14,032 sf, 9.11% Impervious, Inflow Depth = 0.01" for 2-Year event
Inflow = 0.00 cfs @ 21.70 hrs, Volume= 15 cf
Outflow = 0.00 cfs @ 21.74 hrs, Volume= 15 cf, Atten= 0%, Lag= 2.3 min
Discarded = 0.00 cfs @ 21.74 hrs, Volume= 15 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 91.50' @ 21.74 hrs Surf.Area= 31 sf Storage= 0 cf

Plug-Flow detention time= 3.0 min calculated for 15 cf (100% of inflow)
Center-of-Mass det. time= 3.0 min (1,222.7 - 1,219.6)

Volume	Invert	Avail.Storage	Storage Description
#1	91.50'	2,064 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	31	0	0
92.50	44	38	38
93.50	44	44	82
94.50	44	44	126
95.50	44	44	170
96.50	44	44	214
97.40	4	22	235
98.00	97	30	265
99.00	709	403	668
99.06	1,117	55	723
100.00	1,424	1,194	1,917
100.10	1,505	146	2,064

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	99.60'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.01 cfs @ 21.74 hrs HW=91.50' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.50' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-D: Drywell & Basin (SWM-D)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.50	31	0
91.60	32	3
91.70	34	6
91.80	35	10
91.90	36	13
92.00	38	17
92.10	39	21
92.20	40	25
92.30	41	29
92.40	43	33
92.50	44	38
92.60	44	42
92.70	44	46
92.80	44	51
92.90	44	55
93.00	44	60
93.10	44	64
93.20	44	68
93.30	44	73
93.40	44	77
93.50	44	82
93.60	44	86
93.70	44	90
93.80	44	95
93.90	44	99
94.00	44	104
94.10	44	108
94.20	44	112
94.30	44	117
94.40	44	121
94.50	44	126
94.60	44	130
94.70	44	134
94.80	44	139
94.90	44	143
95.00	44	148
95.10	44	152
95.20	44	156
95.30	44	161
95.40	44	165
95.50	44	170
95.60	44	174
95.70	44	178
95.80	44	183
95.90	44	187
96.00	44	192
96.10	44	196
96.20	44	200
96.30	44	205
96.40	44	209
96.50	44	214
96.60	40	218
96.70	35	221
96.80	31	225
96.90	26	228
97.00	22	230
97.10	17	232
97.20	13	233
97.30	8	234
97.40	4	235
97.50	19	236
97.60	35	239
97.70	51	243
97.80	66	249
97.90	82	256
98.00	97	265
98.10	158	278
98.20	219	297
98.30	281	322
98.40	342	353
98.50	403	390
98.60	464	434
98.70	525	483
98.80	587	539
98.90	648	601
99.00	709	668
99.10	1,130	768
99.20	1,163	883
99.30	1,195	1,001
99.40	1,228	1,122
99.50	1,261	1,246
99.60	1,293	1,374
99.70	1,326	1,505
99.80	1,359	1,639
99.90	1,391	1,777
100.00	1,424	1,917
100.10	**1,505**	**2,064**

Summary for Link AP: Analysis Point

Inflow Area = 116,436 sf, 44.27% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA1A: DA1A Runoff Area=1.366 ac 10.54% Impervious Runoff Depth=0.18"
Flow Length=337' Tc=17.4 min CN=42 Runoff=0.04 cfs 891 cf

Subcatchment DA1B: DA1B Runoff Area=13,628 sf 16.84% Impervious Runoff Depth=0.35"
Tc=10.0 min CN=47 Runoff=0.04 cfs 399 cf

Subcatchment DA2A: DA2A Runoff Area=14,063 sf 100.00% Impervious Runoff Depth=4.19"
Tc=5.0 min CN=98 Runoff=1.44 cfs 4,915 cf

Subcatchment DA2B: DA2B Runoff Area=12,794 sf 0.00% Impervious Runoff Depth=0.08"
Flow Length=189' Tc=11.5 min CN=38 Runoff=0.00 cfs 83 cf

Subcatchment DA3: DA3 Runoff Area=14,032 sf 9.11% Impervious Runoff Depth=0.15"
Tc=10.0 min CN=41 Runoff=0.01 cfs 177 cf

Subcatchment DA4: DA4 Runoff Area=42,316 sf 86.93% Impervious Runoff Depth=3.33"
Tc=10.0 min CN=90 Runoff=3.22 cfs 11,738 cf

Subcatchment DA5: DA5 Runoff Area=1.085 ac 1.47% Impervious Runoff Depth=0.03"
Flow Length=332' Tc=11.4 min CN=35 Runoff=0.00 cfs 105 cf

Reach CD1: CURTAIN DRAIN Avg. Flow Depth=0.03' Max Vel=0.71 fps Inflow=0.04 cfs 399 cf
n=0.033 L=163.0' S=0.0166 '/' Capacity=45.63 cfs Outflow=0.04 cfs 399 cf

Pond SW-A: Stormtech MC-3500 (SWM-A) Peak Elev=86.70' Storage=2,332 cf Inflow=3.22 cfs 11,738 cf
Discarded=0.82 cfs 11,097 cf Primary=0.31 cfs 642 cf Outflow=1.12 cfs 11,738 cf

Pond SW-B: Bioretention Basin (SWM-B) Peak Elev=92.50' Storage=2,244 cf Inflow=1.44 cfs 4,998 cf
Discarded=0.09 cfs 4,998 cf Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.09 cfs 4,998 cf

Pond SW-C: Drywell & Basin (SWM-C) Peak Elev=93.09' Storage=158 cf Inflow=0.07 cfs 1,291 cf
Discarded=0.05 cfs 1,291 cf Secondary=0.00 cfs 0 cf Outflow=0.05 cfs 1,291 cf

Pond SW-D: Drywell & Basin (SWM-D) Peak Elev=91.54' Storage=1 cf Inflow=0.01 cfs 177 cf
Discarded=0.01 cfs 177 cf Secondary=0.00 cfs 0 cf Outflow=0.01 cfs 177 cf

Link AP: Analysis Point Inflow=0.31 cfs 746 cf
Primary=0.31 cfs 746 cf

Total Runoff Area = 203,599 sf Runoff Volume = 18,309 cf Average Runoff Depth = 1.08"
69.85% Pervious = 142,206 sf 30.15% Impervious = 61,393 sf

Summary for Subcatchment DA1A: DA1A

Runoff = 0.04 cfs @ 12.68 hrs, Volume= 891 cf, Depth= 0.18"
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.43"

Area (ac)	CN	Description
0.673	39	>75% Grass cover, Good, HSG A
0.549	30	Woods, Good, HSG A
0.144	98	Paved parking, HSG A
1.366	42	Weighted Average
1.222		89.46% Pervious Area
0.144		10.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	24	0.0824	0.23		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
11.7	76	0.0485	0.11		**Sheet Flow, Sheetflow** Woods: Light underbrush n= 0.400 P2= 3.43"
0.6	35	0.0368	0.96		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	22	0.0345	3.77		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.5	61	0.0100	0.70		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
1.7	99	0.0394	0.99		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	20	0.3400	4.08		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
17.4	337	Total			

Summary for Subcatchment DA1B: DA1B

Runoff = 0.04 cfs @ 12.39 hrs, Volume= 399 cf, Depth= 0.35"
Routed to Reach CD1 : CURTAIN DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.43"

Area (sf)	CN	Description
8,726	39	>75% Grass cover, Good, HSG A
2,607	30	Woods, Good, HSG A
2,295	98	Paved parking, HSG A
13,628	47	Weighted Average
11,333		83.16% Pervious Area
2,295		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2A: DA2A

Runoff = 1.44 cfs @ 12.07 hrs, Volume= 4,915 cf, Depth= 4.19"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.43"

Area (sf)	CN	Description
14,063	98	Roofs, HSG A
14,063		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2B: DA2B

Runoff = 0.00 cfs @ 15.15 hrs, Volume= 83 cf, Depth= 0.08"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.43"

Area (sf)	CN	Description
11,225	39	>75% Grass cover, Good, HSG A
1,569	30	Woods, Good, HSG A
12,794	38	Weighted Average
12,794		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0150	0.16		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
0.9	89	0.0550	1.64		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
11.5	189	Total			

Summary for Subcatchment DA3: DA3

Runoff = 0.01 cfs @ 13.72 hrs, Volume= 177 cf, Depth= 0.15"
Routed to Pond SW-D : Drywell & Basin (SWM-D)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.43"

Area (sf)	CN	Description
7,100	39	>75% Grass cover, Good, HSG A
5,653	30	Woods, Good, HSG A
1,279	98	Paved parking, HSG A
14,032	41	Weighted Average
12,753		90.89% Pervious Area
1,279		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA4: DA4

Runoff = 3.22 cfs @ 12.14 hrs, Volume= 11,738 cf, Depth= 3.33"
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.43"

Area (sf)	CN	Description
5,530	39	>75% Grass cover, Good, HSG A
36,786	98	Paved parking, HSG A
42,316	90	Weighted Average
5,530		13.07% Pervious Area
36,786		86.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA5: DA5

Runoff = 0.00 cfs @ 20.85 hrs, Volume= 105 cf, Depth= 0.03"
Routed to Link AP : Analysis Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.43"

Area (ac)	CN	Description
0.427	39	>75% Grass cover, Good, HSG A
0.642	30	Woods, Good, HSG A
0.016	98	Paved parking, HSG A
1.085	35	Weighted Average
1.069		98.53% Pervious Area
0.016		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	18	0.1330	0.27		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
7.5	82	0.0240	0.18		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
1.9	118	0.0220	1.04		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.2	14	0.0500	1.12		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.2	32	0.1400	2.62		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.5	68	0.2350	2.42		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
11.4	332	Total			

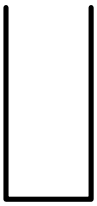
Summary for Reach CD1: CURTAIN DRAIN

Inflow Area = 13,628 sf, 16.84% Impervious, Inflow Depth = 0.35" for 5-Year event
Inflow = 0.04 cfs @ 12.39 hrs, Volume= 399 cf
Outflow = 0.04 cfs @ 12.46 hrs, Volume= 399 cf, Atten= 4%, Lag= 3.9 min
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Max. Velocity= 0.71 fps, Min. Travel Time= 3.8 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 3.8 min

Peak Storage= 10 cf @ 12.46 hrs
Average Depth at Peak Storage= 0.03' , Surface Width= 2.00'
Bank-Full Depth= 4.50' Flow Area= 9.0 sf, Capacity= 45.63 cfs

2.00' x 4.50' deep channel, n= 0.033 Riprap, 1-inch
Length= 163.0' Slope= 0.0166 '/'
Inlet Invert= 96.00', Outlet Invert= 93.30'



Stage-Area-Storage for Reach CD1: CURTAIN DRAIN

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
96.00	0.0	0
96.05	0.1	16
96.10	0.2	33
96.15	0.3	49
96.20	0.4	65
96.25	0.5	82
96.30	0.6	98
96.35	0.7	114
96.40	0.8	130
96.45	0.9	147
96.50	1.0	163
96.55	1.1	179
96.60	1.2	196
96.65	1.3	212
96.70	1.4	228
96.75	1.5	245
96.80	1.6	261
96.85	1.7	277
96.90	1.8	293
96.95	1.9	310
97.00	2.0	326
97.05	2.1	342
97.10	2.2	359
97.15	2.3	375
97.20	2.4	391
97.25	2.5	408
97.30	2.6	424
97.35	2.7	440
97.40	2.8	456
97.45	2.9	473
97.50	3.0	489
97.55	3.1	505
97.60	3.2	522
97.65	3.3	538
97.70	3.4	554
97.75	3.5	571
97.80	3.6	587
97.85	3.7	603
97.90	3.8	619
97.95	3.9	636
98.00	4.0	652
98.05	4.1	668
98.10	4.2	685
98.15	4.3	701
98.20	4.4	717
98.25	4.5	734
98.30	4.6	750
98.35	4.7	766
98.40	4.8	782
98.45	4.9	799
98.50	5.0	815
98.55	5.1	831
98.60	5.2	848
98.65	5.3	864
98.70	5.4	880
98.75	5.5	897
98.80	5.6	913
98.85	5.7	929
98.90	5.8	945
98.95	5.9	962
99.00	6.0	978
99.05	6.1	994
99.10	6.2	1,011
99.15	6.3	1,027
99.20	6.4	1,043
99.25	6.5	1,060
99.30	6.6	1,076
99.35	6.7	1,092
99.40	6.8	1,108
99.45	6.9	1,125
99.50	7.0	1,141
99.55	7.1	1,157
99.60	7.2	1,174
99.65	7.3	1,190
99.70	7.4	1,206
99.75	7.5	1,223
99.80	7.6	1,239
99.85	7.7	1,255
99.90	7.8	1,271
99.95	7.9	1,288
100.00	8.0	1,304
100.05	8.1	1,320
100.10	8.2	1,337
100.15	8.3	1,353
100.20	8.4	1,369
100.25	8.5	1,386
100.30	8.6	1,402
100.35	8.7	1,418
100.40	8.8	1,434
100.45	8.9	1,451
100.50	**9.0**	**1,467**

Summary for Pond SW-A: Stormtech MC-3500 (SWM-A)

Inflow Area = 42,316 sf, 86.93% Impervious, Inflow Depth = 3.33" for 5-Year event
Inflow = 3.22 cfs @ 12.14 hrs, Volume= 11,738 cf
Outflow = 1.12 cfs @ 12.47 hrs, Volume= 11,738 cf, Atten= 65%, Lag= 20.2 min
Discarded = 0.82 cfs @ 11.82 hrs, Volume= 11,097 cf
Primary = 0.31 cfs @ 12.47 hrs, Volume= 642 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 86.70' @ 12.47 hrs Surf.Area= 1,761 sf Storage= 2,332 cf

Plug-Flow detention time= 12.6 min calculated for 11,735 cf (100% of inflow)
Center-of-Mass det. time= 12.6 min (811.2 - 798.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	84.70'	2,519 cf	**22.75'W x 77.40'L x 5.50'H Field A** 9,685 cf Overall - 3,388 cf Embedded = 6,297 cf x 40.0% Voids
#2A	85.45'	3,388 cf	**ADS_StormTech MC-3500 d +Cap** x 30 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 30 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		5,907 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	84.70'	**12.0" Round Outlet Pipe** L= 44.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 84.70' / 84.10' S= 0.0136 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	86.00'	**4.0" Vert. Low Flow Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	87.80'	**11.0" W x 4.0" H Vert. Upper Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	89.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Discarded	84.70'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.82 cfs @ 11.82 hrs HW=84.76' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.82 cfs)

Primary OutFlow Max=0.31 cfs @ 12.47 hrs HW=86.70' (Free Discharge)
└**1=Outlet Pipe** (Passes 0.31 cfs of 4.63 cfs potential flow)
  ├**2=Low Flow Orifice** (Orifice Controls 0.31 cfs @ 3.51 fps)
  ├**3=Upper Orifice** (Controls 0.00 cfs)
  └**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SW-A: Stormtech MC-3500 (SWM-A) - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

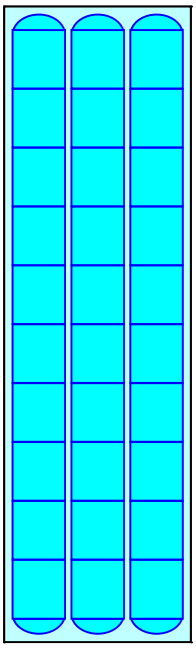
10 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 75.40' Row Length +12.0" End Stone x 2 = 77.40' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

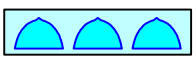
30 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 3,388.0 cf Chamber Storage

9,684.7 cf Field - 3,388.0 cf Chambers = 6,296.7 cf Stone x 40.0% Voids = 2,518.7 cf Stone Storage

Chamber Storage + Stone Storage = 5,906.6 cf = 0.136 af
Overall Storage Efficiency = 61.0%
Overall System Size = 77.40' x 22.75' x 5.50'

30 Chambers
358.7 cy Field
233.2 cy Stone





Stage-Area-Storage for Pond SW-A: Stormtech MC-3500 (SWM-A)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
84.70	**1,761**	0
84.80	1,761	70
84.90	1,761	141
85.00	1,761	211
85.10	1,761	282
85.20	1,761	352
85.30	1,761	423
85.40	1,761	493
85.50	1,761	602
85.60	1,761	750
85.70	1,761	897
85.80	1,761	1,044
85.90	1,761	1,190
86.00	1,761	1,335
86.10	1,761	1,480
86.20	1,761	1,624
86.30	1,761	1,768
86.40	1,761	1,910
86.50	1,761	2,052
86.60	1,761	2,193
86.70	1,761	2,333
86.80	1,761	2,472
86.90	1,761	2,610
87.00	1,761	2,747
87.10	1,761	2,882
87.20	1,761	3,017
87.30	1,761	3,150
87.40	1,761	3,281
87.50	1,761	3,411
87.60	1,761	3,540
87.70	1,761	3,667
87.80	1,761	3,791
87.90	1,761	3,914
88.00	1,761	4,035
88.10	1,761	4,153
88.20	1,761	4,269
88.30	1,761	4,382
88.40	1,761	4,492
88.50	1,761	4,599
88.60	1,761	4,702
88.70	1,761	4,800
88.80	1,761	4,892
88.90	1,761	4,976
89.00	1,761	5,055
89.10	1,761	5,130
89.20	1,761	5,202
89.30	1,761	5,273
89.40	1,761	5,343
89.50	1,761	5,414
89.60	1,761	5,484
89.70	1,761	5,554
89.80	1,761	5,625
89.90	1,761	5,695
90.00	1,761	5,766
90.10	1,761	5,836
90.20	1,761	**5,907**

Summary for Pond SW-B: Bioretention Basin (SWM-B)

Inflow Area = 26,857 sf, 52.36% Impervious, Inflow Depth = 2.23" for 5-Year event
Inflow = 1.44 cfs @ 12.07 hrs, Volume= 4,998 cf
Outflow = 0.09 cfs @ 13.50 hrs, Volume= 4,998 cf, Atten= 94%, Lag= 86.0 min
Discarded = 0.09 cfs @ 13.50 hrs, Volume= 4,998 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 92.50' @ 13.50 hrs Surf.Area= 1,985 sf Storage= 2,244 cf

Plug-Flow detention time= 236.0 min calculated for 4,997 cf (100% of inflow)
Center-of-Mass det. time= 236.0 min (990.8 - 754.8)

Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.00	1,031	0	0
92.00	1,649	1,340	1,340
93.00	2,324	1,987	3,327
94.00	3,055	2,690	6,016
94.10	3,132	309	6,325

Device	Routing	Invert	Outlet Devices
#1	Primary	90.00'	**12.0" Round Outlet Pipe** L= 125.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.00' / 87.00' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	93.40'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	93.60'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Discarded	91.00'	**2.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.09 cfs @ 13.50 hrs HW=92.50' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
└**1=Outlet Pipe** (Passes 0.00 cfs of 2.67 cfs potential flow)
└**2=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-B: Bioretention Basin (SWM-B)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.00	1,031	0
91.05	1,062	52
91.10	1,093	106
91.15	1,124	162
91.20	1,155	219
91.25	1,186	277
91.30	1,216	337
91.35	1,247	399
91.40	1,278	462
91.45	1,309	527
91.50	1,340	593
91.55	1,371	661
91.60	1,402	730
91.65	1,433	801
91.70	1,464	873
91.75	1,495	947
91.80	1,525	1,023
91.85	1,556	1,100
91.90	1,587	1,178
91.95	1,618	1,258
92.00	1,649	1,340
92.05	1,683	1,423
92.10	1,716	1,508
92.15	1,750	1,595
92.20	1,784	1,683
92.25	1,818	1,773
92.30	1,851	1,865
92.35	1,885	1,958
92.40	1,919	2,054
92.45	1,953	2,150
92.50	1,987	2,249
92.55	2,020	2,349
92.60	2,054	2,451
92.65	2,088	2,554
92.70	2,122	2,660
92.75	2,155	2,767
92.80	2,189	2,875
92.85	2,223	2,985
92.90	2,257	3,097
92.95	2,290	3,211
93.00	2,324	3,327
93.05	2,361	3,444
93.10	2,397	3,563
93.15	2,434	3,683
93.20	2,470	3,806
93.25	2,507	3,930
93.30	2,543	4,057
93.35	2,580	4,185
93.40	2,616	4,315
93.45	2,653	4,446
93.50	2,690	4,580
93.55	2,726	4,715
93.60	2,763	4,852
93.65	2,799	4,992
93.70	2,836	5,132
93.75	2,872	5,275
93.80	2,909	5,420
93.85	2,945	5,566
93.90	2,982	5,714
93.95	3,018	5,864
94.00	3,055	6,016
94.05	3,093	6,170
94.10	**3,132**	**6,325**

Summary for Pond SW-C: Drywell & Basin (SWM-C)

Inflow Area = 73,131 sf, 11.72% Impervious, Inflow Depth = 0.21" for 5-Year event
Inflow = 0.07 cfs @ 12.58 hrs, Volume= 1,291 cf
Outflow = 0.05 cfs @ 13.61 hrs, Volume= 1,291 cf, Atten= 29%, Lag= 61.6 min
Discarded = 0.05 cfs @ 13.61 hrs, Volume= 1,291 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 93.09' @ 13.61 hrs Surf.Area= 111 sf Storage= 158 cf

Plug-Flow detention time= 91.1 min calculated for 1,291 cf (100% of inflow)
Center-of-Mass det. time= 91.1 min (1,093.0 - 1,001.8)

Volume	Invert	Avail.Storage	Storage Description
#1	89.10'	3,214 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.10	31	0	0
90.10	44	38	38
91.10	44	44	82
92.10	44	44	126
93.00	15	27	152
93.50	564	145	297
94.00	2,107	668	965
94.30	2,623	709	1,674
94.80	3,537	1,540	3,214

Device	Routing	Invert	Outlet Devices
#1	Discarded	89.10'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	94.30'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.05 cfs @ 13.61 hrs HW=93.09' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.05 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=89.10' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-C: Drywell & Basin (SWM-C)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
89.10	31	0
89.20	32	3
89.30	34	6
89.40	35	10
89.50	36	13
89.60	38	17
89.70	39	21
89.80	40	25
89.90	41	29
90.00	43	33
90.10	44	38
90.20	44	42
90.30	44	46
90.40	44	51
90.50	44	55
90.60	44	60
90.70	44	64
90.80	44	68
90.90	44	73
91.00	44	77
91.10	44	82
91.20	44	86
91.30	44	90
91.40	44	95
91.50	44	99
91.60	44	104
91.70	44	108
91.80	44	112
91.90	44	117
92.00	44	121
92.10	44	126
92.20	41	130
92.30	38	134
92.40	34	137
92.50	31	141
92.60	28	143
92.70	25	146
92.80	21	148
92.90	18	150
93.00	15	152
93.10	125	159
93.20	235	177
93.30	344	206
93.40	454	246
93.50	564	297
93.60	873	369
93.70	1,181	471
93.80	1,490	605
93.90	1,798	769
94.00	2,107	965
94.10	2,279	1,184
94.20	2,451	1,420
94.30	2,623	1,674
94.40	2,806	1,945
94.50	2,989	2,235
94.60	3,171	2,543
94.70	3,354	2,869
94.80	**3,537**	**3,214**

Summary for Pond SW-D: Drywell & Basin (SWM-D)

Inflow Area = 14,032 sf, 9.11% Impervious, Inflow Depth = 0.15" for 5-Year event
Inflow = 0.01 cfs @ 13.72 hrs, Volume= 177 cf
Outflow = 0.01 cfs @ 13.77 hrs, Volume= 177 cf, Atten= 0%, Lag= 3.1 min
Discarded = 0.01 cfs @ 13.77 hrs, Volume= 177 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 91.54' @ 13.77 hrs Surf.Area= 32 sf Storage= 1 cf

Plug-Flow detention time= 3.0 min calculated for 177 cf (100% of inflow)
Center-of-Mass det. time= 3.0 min (1,031.1 - 1,028.0)

Volume	Invert	Avail.Storage	Storage Description
#1	91.50'	2,064 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	31	0	0
92.50	44	38	38
93.50	44	44	82
94.50	44	44	126
95.50	44	44	170
96.50	44	44	214
97.40	4	22	235
98.00	97	30	265
99.00	709	403	668
99.06	1,117	55	723
100.00	1,424	1,194	1,917
100.10	1,505	146	2,064

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	99.60'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.01 cfs @ 13.77 hrs HW=91.54' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.50' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-D: Drywell & Basin (SWM-D)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.50	31	0
91.60	32	3
91.70	34	6
91.80	35	10
91.90	36	13
92.00	38	17
92.10	39	21
92.20	40	25
92.30	41	29
92.40	43	33
92.50	44	38
92.60	44	42
92.70	44	46
92.80	44	51
92.90	44	55
93.00	44	60
93.10	44	64
93.20	44	68
93.30	44	73
93.40	44	77
93.50	44	82
93.60	44	86
93.70	44	90
93.80	44	95
93.90	44	99
94.00	44	104
94.10	44	108
94.20	44	112
94.30	44	117
94.40	44	121
94.50	44	126
94.60	44	130
94.70	44	134
94.80	44	139
94.90	44	143
95.00	44	148
95.10	44	152
95.20	44	156
95.30	44	161
95.40	44	165
95.50	44	170
95.60	44	174
95.70	44	178
95.80	44	183
95.90	44	187
96.00	44	192
96.10	44	196
96.20	44	200
96.30	44	205
96.40	44	209
96.50	44	214
96.60	40	218
96.70	35	221
96.80	31	225
96.90	26	228
97.00	22	230
97.10	17	232
97.20	13	233
97.30	8	234
97.40	4	235
97.50	19	236
97.60	35	239
97.70	51	243
97.80	66	249
97.90	82	256
98.00	97	265
98.10	158	278
98.20	219	297
98.30	281	322
98.40	342	353
98.50	403	390
98.60	464	434
98.70	525	483
98.80	587	539
98.90	648	601
99.00	709	668
99.10	1,130	768
99.20	1,163	883
99.30	1,195	1,001
99.40	1,228	1,122
99.50	1,261	1,246
99.60	1,293	1,374
99.70	1,326	1,505
99.80	1,359	1,639
99.90	1,391	1,777
100.00	1,424	1,917
100.10	**1,505**	**2,064**

Summary for Link AP: Analysis Point

Inflow Area = 116,436 sf, 44.27% Impervious, Inflow Depth = 0.08" for 5-Year event
Inflow = 0.31 cfs @ 12.47 hrs, Volume= 746 cf
Primary = 0.31 cfs @ 12.47 hrs, Volume= 746 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA1A: DA1A Runoff Area=1.366 ac 10.54% Impervious Runoff Depth=0.41"
Flow Length=337' Tc=17.4 min CN=42 Runoff=0.20 cfs 2,026 cf

Subcatchment DA1B: DA1B Runoff Area=13,628 sf 16.84% Impervious Runoff Depth=0.67"
Tc=10.0 min CN=47 Runoff=0.12 cfs 757 cf

Subcatchment DA2A: DA2A Runoff Area=14,063 sf 100.00% Impervious Runoff Depth=5.11"
Tc=5.0 min CN=98 Runoff=1.75 cfs 5,992 cf

Subcatchment DA2B: DA2B Runoff Area=12,794 sf 0.00% Impervious Runoff Depth=0.24"
Flow Length=189' Tc=11.5 min CN=38 Runoff=0.01 cfs 252 cf

Subcatchment DA3: DA3 Runoff Area=14,032 sf 9.11% Impervious Runoff Depth=0.36"
Tc=10.0 min CN=41 Runoff=0.04 cfs 424 cf

Subcatchment DA4: DA4 Runoff Area=42,316 sf 86.93% Impervious Runoff Depth=4.21"
Tc=10.0 min CN=90 Runoff=4.03 cfs 14,862 cf

Subcatchment DA5: DA5 Runoff Area=1.085 ac 1.47% Impervious Runoff Depth=0.13"
Flow Length=332' Tc=11.4 min CN=35 Runoff=0.02 cfs 521 cf

Reach CD1: CURTAIN DRAIN Avg. Flow Depth=0.06' Max Vel=0.93 fps Inflow=0.12 cfs 757 cf
n=0.033 L=163.0' S=0.0166 '/' Capacity=45.63 cfs Outflow=0.12 cfs 757 cf

Pond SW-A: Stormtech MC-3500 (SWM-A) Peak Elev=87.41' Storage=3,298 cf Inflow=4.03 cfs 14,862 cf
Discarded=0.82 cfs 13,384 cf Primary=0.47 cfs 1,477 cf Outflow=1.28 cfs 14,862 cf

Pond SW-B: Bioretention Basin (SWM-B) Peak Elev=92.83' Storage=2,933 cf Inflow=1.75 cfs 6,244 cf
Discarded=0.10 cfs 6,244 cf Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.10 cfs 6,244 cf

Pond SW-C: Drywell & Basin (SWM-C) Peak Elev=93.41' Storage=253 cf Inflow=0.29 cfs 2,782 cf
Discarded=0.22 cfs 2,782 cf Secondary=0.00 cfs 0 cf Outflow=0.22 cfs 2,782 cf

Pond SW-D: Drywell & Basin (SWM-D) Peak Elev=92.40' Storage=33 cf Inflow=0.04 cfs 424 cf
Discarded=0.02 cfs 424 cf Secondary=0.00 cfs 0 cf Outflow=0.02 cfs 424 cf

Link AP: Analysis Point Inflow=0.47 cfs 1,999 cf
Primary=0.47 cfs 1,999 cf

Total Runoff Area = 203,599 sf Runoff Volume = 24,833 cf Average Runoff Depth = 1.46"
69.85% Pervious = 142,206 sf 30.15% Impervious = 61,393 sf

Summary for Subcatchment DA1A: DA1A

Runoff = 0.20 cfs @ 12.51 hrs, Volume= 2,026 cf, Depth= 0.41"
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.35"

Area (ac)	CN	Description
0.673	39	>75% Grass cover, Good, HSG A
0.549	30	Woods, Good, HSG A
0.144	98	Paved parking, HSG A
1.366	42	Weighted Average
1.222		89.46% Pervious Area
0.144		10.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	24	0.0824	0.23		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
11.7	76	0.0485	0.11		**Sheet Flow, Sheetflow** Woods: Light underbrush n= 0.400 P2= 3.43"
0.6	35	0.0368	0.96		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	22	0.0345	3.77		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.5	61	0.0100	0.70		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
1.7	99	0.0394	0.99		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	20	0.3400	4.08		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
17.4	337	Total			

Summary for Subcatchment DA1B: DA1B

Runoff = 0.12 cfs @ 12.21 hrs, Volume= 757 cf, Depth= 0.67"
Routed to Reach CD1 : CURTAIN DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.35"

Area (sf)	CN	Description
8,726	39	>75% Grass cover, Good, HSG A
2,607	30	Woods, Good, HSG A
2,295	98	Paved parking, HSG A
13,628	47	Weighted Average
11,333		83.16% Pervious Area
2,295		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2A: DA2A

Runoff = 1.75 cfs @ 12.07 hrs, Volume= 5,992 cf, Depth= 5.11"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.35"

Area (sf)	CN	Description
14,063	98	Roofs, HSG A
14,063		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2B: DA2B

Runoff = 0.01 cfs @ 12.54 hrs, Volume= 252 cf, Depth= 0.24"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.35"

Area (sf)	CN	Description
11,225	39	>75% Grass cover, Good, HSG A
1,569	30	Woods, Good, HSG A
12,794	38	Weighted Average
12,794		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0150	0.16		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
0.9	89	0.0550	1.64		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
11.5	189	Total			

Summary for Subcatchment DA3: DA3

Runoff = 0.04 cfs @ 12.43 hrs, Volume= 424 cf, Depth= 0.36"
Routed to Pond SW-D : Drywell & Basin (SWM-D)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.35"

Area (sf)	CN	Description
7,100	39	>75% Grass cover, Good, HSG A
5,653	30	Woods, Good, HSG A
1,279	98	Paved parking, HSG A
14,032	41	Weighted Average
12,753		90.89% Pervious Area
1,279		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA4: DA4

Runoff = 4.03 cfs @ 12.14 hrs, Volume= 14,862 cf, Depth= 4.21"
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.35"

Area (sf)	CN	Description
5,530	39	>75% Grass cover, Good, HSG A
36,786	98	Paved parking, HSG A
42,316	90	Weighted Average
5,530		13.07% Pervious Area
36,786		86.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA5: DA5

Runoff = 0.02 cfs @ 14.78 hrs, Volume= 521 cf, Depth= 0.13"
Routed to Link AP : Analysis Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=5.35"

Area (ac)	CN	Description
0.427	39	>75% Grass cover, Good, HSG A
0.642	30	Woods, Good, HSG A
0.016	98	Paved parking, HSG A
1.085	35	Weighted Average
1.069		98.53% Pervious Area
0.016		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	18	0.1330	0.27		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
7.5	82	0.0240	0.18		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
1.9	118	0.0220	1.04		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.2	14	0.0500	1.12		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.2	32	0.1400	2.62		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.5	68	0.2350	2.42		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
11.4	332	Total			

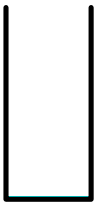
Summary for Reach CD1: CURTAIN DRAIN

Inflow Area = 13,628 sf, 16.84% Impervious, Inflow Depth = 0.67" for 10-Year event
Inflow = 0.12 cfs @ 12.21 hrs, Volume= 757 cf
Outflow = 0.12 cfs @ 12.26 hrs, Volume= 757 cf, Atten= 3%, Lag= 3.4 min
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Max. Velocity= 0.93 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 0.72 fps, Avg. Travel Time= 3.8 min

Peak Storage= 20 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.06' , Surface Width= 2.00'
Bank-Full Depth= 4.50' Flow Area= 9.0 sf, Capacity= 45.63 cfs

2.00' x 4.50' deep channel, n= 0.033 Riprap, 1-inch
Length= 163.0' Slope= 0.0166 '/'
Inlet Invert= 96.00', Outlet Invert= 93.30'



Stage-Area-Storage for Reach CD1: CURTAIN DRAIN

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
96.00	0.0	0
96.05	0.1	16
96.10	0.2	33
96.15	0.3	49
96.20	0.4	65
96.25	0.5	82
96.30	0.6	98
96.35	0.7	114
96.40	0.8	130
96.45	0.9	147
96.50	1.0	163
96.55	1.1	179
96.60	1.2	196
96.65	1.3	212
96.70	1.4	228
96.75	1.5	245
96.80	1.6	261
96.85	1.7	277
96.90	1.8	293
96.95	1.9	310
97.00	2.0	326
97.05	2.1	342
97.10	2.2	359
97.15	2.3	375
97.20	2.4	391
97.25	2.5	408
97.30	2.6	424
97.35	2.7	440
97.40	2.8	456
97.45	2.9	473
97.50	3.0	489
97.55	3.1	505
97.60	3.2	522
97.65	3.3	538
97.70	3.4	554
97.75	3.5	571
97.80	3.6	587
97.85	3.7	603
97.90	3.8	619
97.95	3.9	636
98.00	4.0	652
98.05	4.1	668
98.10	4.2	685
98.15	4.3	701
98.20	4.4	717
98.25	4.5	734
98.30	4.6	750
98.35	4.7	766
98.40	4.8	782
98.45	4.9	799
98.50	5.0	815
98.55	5.1	831
98.60	5.2	848
98.65	5.3	864
98.70	5.4	880
98.75	5.5	897
98.80	5.6	913
98.85	5.7	929
98.90	5.8	945
98.95	5.9	962
99.00	6.0	978
99.05	6.1	994
99.10	6.2	1,011
99.15	6.3	1,027
99.20	6.4	1,043
99.25	6.5	1,060
99.30	6.6	1,076
99.35	6.7	1,092
99.40	6.8	1,108
99.45	6.9	1,125
99.50	7.0	1,141
99.55	7.1	1,157
99.60	7.2	1,174
99.65	7.3	1,190
99.70	7.4	1,206
99.75	7.5	1,223
99.80	7.6	1,239
99.85	7.7	1,255
99.90	7.8	1,271
99.95	7.9	1,288
100.00	8.0	1,304
100.05	8.1	1,320
100.10	8.2	1,337
100.15	8.3	1,353
100.20	8.4	1,369
100.25	8.5	1,386
100.30	8.6	1,402
100.35	8.7	1,418
100.40	8.8	1,434
100.45	8.9	1,451
100.50	**9.0**	**1,467**

Summary for Pond SW-A: Stormtech MC-3500 (SWM-A)

Inflow Area = 42,316 sf, 86.93% Impervious, Inflow Depth = 4.21" for 10-Year event
Inflow = 4.03 cfs @ 12.14 hrs, Volume= 14,862 cf
Outflow = 1.28 cfs @ 12.50 hrs, Volume= 14,862 cf, Atten= 68%, Lag= 21.6 min
Discarded = 0.82 cfs @ 11.76 hrs, Volume= 13,384 cf
Primary = 0.47 cfs @ 12.50 hrs, Volume= 1,477 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 87.41' @ 12.50 hrs Surf.Area= 1,761 sf Storage= 3,298 cf

Plug-Flow detention time= 16.3 min calculated for 14,858 cf (100% of inflow)
Center-of-Mass det. time= 16.3 min (808.5 - 792.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	84.70'	2,519 cf	**22.75'W x 77.40'L x 5.50'H Field A** 9,685 cf Overall - 3,388 cf Embedded = 6,297 cf x 40.0% Voids
#2A	85.45'	3,388 cf	**ADS_StormTech MC-3500 d +Cap** x 30 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 30 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		5,907 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	84.70'	**12.0" Round Outlet Pipe** L= 44.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 84.70' / 84.10' S= 0.0136 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	86.00'	**4.0" Vert. Low Flow Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	87.80'	**11.0" W x 4.0" H Vert. Upper Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	89.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Discarded	84.70'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.82 cfs @ 11.76 hrs HW=84.76' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.82 cfs)

Primary OutFlow Max=0.47 cfs @ 12.50 hrs HW=87.41' (Free Discharge)
└**1=Outlet Pipe** (Passes 0.47 cfs of 5.63 cfs potential flow)
  ├**2=Low Flow Orifice** (Orifice Controls 0.47 cfs @ 5.37 fps)
  ├**3=Upper Orifice** (Controls 0.00 cfs)
  └**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SW-A: Stormtech MC-3500 (SWM-A) - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

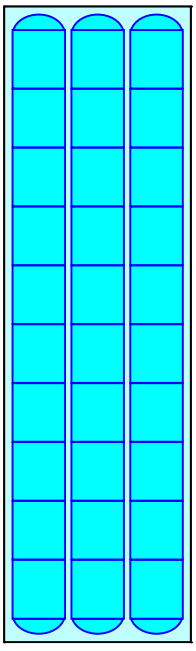
10 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 75.40' Row Length +12.0" End Stone x 2 = 77.40' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

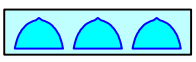
30 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 3,388.0 cf Chamber Storage

9,684.7 cf Field - 3,388.0 cf Chambers = 6,296.7 cf Stone x 40.0% Voids = 2,518.7 cf Stone Storage

Chamber Storage + Stone Storage = 5,906.6 cf = 0.136 af
Overall Storage Efficiency = 61.0%
Overall System Size = 77.40' x 22.75' x 5.50'

30 Chambers
358.7 cy Field
233.2 cy Stone





Stage-Area-Storage for Pond SW-A: Stormtech MC-3500 (SWM-A)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
84.70	**1,761**	0
84.80	1,761	70
84.90	1,761	141
85.00	1,761	211
85.10	1,761	282
85.20	1,761	352
85.30	1,761	423
85.40	1,761	493
85.50	1,761	602
85.60	1,761	750
85.70	1,761	897
85.80	1,761	1,044
85.90	1,761	1,190
86.00	1,761	1,335
86.10	1,761	1,480
86.20	1,761	1,624
86.30	1,761	1,768
86.40	1,761	1,910
86.50	1,761	2,052
86.60	1,761	2,193
86.70	1,761	2,333
86.80	1,761	2,472
86.90	1,761	2,610
87.00	1,761	2,747
87.10	1,761	2,882
87.20	1,761	3,017
87.30	1,761	3,150
87.40	1,761	3,281
87.50	1,761	3,411
87.60	1,761	3,540
87.70	1,761	3,667
87.80	1,761	3,791
87.90	1,761	3,914
88.00	1,761	4,035
88.10	1,761	4,153
88.20	1,761	4,269
88.30	1,761	4,382
88.40	1,761	4,492
88.50	1,761	4,599
88.60	1,761	4,702
88.70	1,761	4,800
88.80	1,761	4,892
88.90	1,761	4,976
89.00	1,761	5,055
89.10	1,761	5,130
89.20	1,761	5,202
89.30	1,761	5,273
89.40	1,761	5,343
89.50	1,761	5,414
89.60	1,761	5,484
89.70	1,761	5,554
89.80	1,761	5,625
89.90	1,761	5,695
90.00	1,761	5,766
90.10	1,761	5,836
90.20	1,761	**5,907**

Summary for Pond SW-B: Bioretention Basin (SWM-B)

Inflow Area = 26,857 sf, 52.36% Impervious, Inflow Depth = 2.79" for 10-Year event
Inflow = 1.75 cfs @ 12.07 hrs, Volume= 6,244 cf
Outflow = 0.10 cfs @ 13.91 hrs, Volume= 6,244 cf, Atten= 94%, Lag= 110.1 min
Discarded = 0.10 cfs @ 13.91 hrs, Volume= 6,244 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 92.83' @ 13.91 hrs Surf.Area= 2,207 sf Storage= 2,933 cf

Plug-Flow detention time= 289.8 min calculated for 6,242 cf (100% of inflow)
Center-of-Mass det. time= 289.8 min (1,046.3 - 756.5)

Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.00	1,031	0	0
92.00	1,649	1,340	1,340
93.00	2,324	1,987	3,327
94.00	3,055	2,690	6,016
94.10	3,132	309	6,325

Device	Routing	Invert	Outlet Devices
#1	Primary	90.00'	**12.0" Round Outlet Pipe** L= 125.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.00' / 87.00' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	93.40'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	93.60'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Discarded	91.00'	**2.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.10 cfs @ 13.91 hrs HW=92.83' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
└**1=Outlet Pipe** (Passes 0.00 cfs of 2.67 cfs potential flow)
└**2=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-B: Bioretention Basin (SWM-B)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.00	1,031	0
91.05	1,062	52
91.10	1,093	106
91.15	1,124	162
91.20	1,155	219
91.25	1,186	277
91.30	1,216	337
91.35	1,247	399
91.40	1,278	462
91.45	1,309	527
91.50	1,340	593
91.55	1,371	661
91.60	1,402	730
91.65	1,433	801
91.70	1,464	873
91.75	1,495	947
91.80	1,525	1,023
91.85	1,556	1,100
91.90	1,587	1,178
91.95	1,618	1,258
92.00	1,649	1,340
92.05	1,683	1,423
92.10	1,716	1,508
92.15	1,750	1,595
92.20	1,784	1,683
92.25	1,818	1,773
92.30	1,851	1,865
92.35	1,885	1,958
92.40	1,919	2,054
92.45	1,953	2,150
92.50	1,987	2,249
92.55	2,020	2,349
92.60	2,054	2,451
92.65	2,088	2,554
92.70	2,122	2,660
92.75	2,155	2,767
92.80	2,189	2,875
92.85	2,223	2,985
92.90	2,257	3,097
92.95	2,290	3,211
93.00	2,324	3,327
93.05	2,361	3,444
93.10	2,397	3,563
93.15	2,434	3,683
93.20	2,470	3,806
93.25	2,507	3,930
93.30	2,543	4,057
93.35	2,580	4,185
93.40	2,616	4,315
93.45	2,653	4,446
93.50	2,690	4,580
93.55	2,726	4,715
93.60	2,763	4,852
93.65	2,799	4,992
93.70	2,836	5,132
93.75	2,872	5,275
93.80	2,909	5,420
93.85	2,945	5,566
93.90	2,982	5,714
93.95	3,018	5,864
94.00	3,055	6,016
94.05	3,093	6,170
94.10	**3,132**	**6,325**

Summary for Pond SW-C: Drywell & Basin (SWM-C)

Inflow Area = 73,131 sf, 11.72% Impervious, Inflow Depth = 0.46" for 10-Year event
Inflow = 0.29 cfs @ 12.47 hrs, Volume= 2,782 cf
Outflow = 0.22 cfs @ 12.68 hrs, Volume= 2,782 cf, Atten= 25%, Lag= 12.6 min
Discarded = 0.22 cfs @ 12.68 hrs, Volume= 2,782 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 93.41' @ 12.68 hrs Surf.Area= 471 sf Storage= 253 cf

Plug-Flow detention time= 46.8 min calculated for 2,782 cf (100% of inflow)
Center-of-Mass det. time= 46.8 min (1,004.3 - 957.5)

Volume	Invert	Avail.Storage	Storage Description
#1	89.10'	3,214 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.10	31	0	0
90.10	44	38	38
91.10	44	44	82
92.10	44	44	126
93.00	15	27	152
93.50	564	145	297
94.00	2,107	668	965
94.30	2,623	709	1,674
94.80	3,537	1,540	3,214

Device	Routing	Invert	Outlet Devices
#1	Discarded	89.10'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	94.30'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.22 cfs @ 12.68 hrs HW=93.41' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.22 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=89.10' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-C: Drywell & Basin (SWM-C)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
89.10	31	0
89.20	32	3
89.30	34	6
89.40	35	10
89.50	36	13
89.60	38	17
89.70	39	21
89.80	40	25
89.90	41	29
90.00	43	33
90.10	44	38
90.20	44	42
90.30	44	46
90.40	44	51
90.50	44	55
90.60	44	60
90.70	44	64
90.80	44	68
90.90	44	73
91.00	44	77
91.10	44	82
91.20	44	86
91.30	44	90
91.40	44	95
91.50	44	99
91.60	44	104
91.70	44	108
91.80	44	112
91.90	44	117
92.00	44	121
92.10	44	126
92.20	41	130
92.30	38	134
92.40	34	137
92.50	31	141
92.60	28	143
92.70	25	146
92.80	21	148
92.90	18	150
93.00	15	152
93.10	125	159
93.20	235	177
93.30	344	206
93.40	454	246
93.50	564	297
93.60	873	369
93.70	1,181	471
93.80	1,490	605
93.90	1,798	769
94.00	2,107	965
94.10	2,279	1,184
94.20	2,451	1,420
94.30	2,623	1,674
94.40	2,806	1,945
94.50	2,989	2,235
94.60	3,171	2,543
94.70	3,354	2,869
94.80	**3,537**	**3,214**

Summary for Pond SW-D: Drywell & Basin (SWM-D)

Inflow Area = 14,032 sf, 9.11% Impervious, Inflow Depth = 0.36" for 10-Year event
Inflow = 0.04 cfs @ 12.43 hrs, Volume= 424 cf
Outflow = 0.02 cfs @ 13.03 hrs, Volume= 424 cf, Atten= 52%, Lag= 36.0 min
Discarded = 0.02 cfs @ 13.03 hrs, Volume= 424 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 92.40' @ 13.03 hrs Surf.Area= 43 sf Storage= 33 cf

Plug-Flow detention time= 12.1 min calculated for 424 cf (100% of inflow)
Center-of-Mass det. time= 12.1 min (982.5 - 970.4)

Volume	Invert	Avail.Storage	Storage Description
#1	91.50'	2,064 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	31	0	0
92.50	44	38	38
93.50	44	44	82
94.50	44	44	126
95.50	44	44	170
96.50	44	44	214
97.40	4	22	235
98.00	97	30	265
99.00	709	403	668
99.06	1,117	55	723
100.00	1,424	1,194	1,917
100.10	1,505	146	2,064

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	99.60'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.02 cfs @ 13.03 hrs HW=92.40' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-D: Drywell & Basin (SWM-D)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.50	31	0
91.60	32	3
91.70	34	6
91.80	35	10
91.90	36	13
92.00	38	17
92.10	39	21
92.20	40	25
92.30	41	29
92.40	43	33
92.50	44	38
92.60	44	42
92.70	44	46
92.80	44	51
92.90	44	55
93.00	44	60
93.10	44	64
93.20	44	68
93.30	44	73
93.40	44	77
93.50	44	82
93.60	44	86
93.70	44	90
93.80	44	95
93.90	44	99
94.00	44	104
94.10	44	108
94.20	44	112
94.30	44	117
94.40	44	121
94.50	44	126
94.60	44	130
94.70	44	134
94.80	44	139
94.90	44	143
95.00	44	148
95.10	44	152
95.20	44	156
95.30	44	161
95.40	44	165
95.50	44	170
95.60	44	174
95.70	44	178
95.80	44	183
95.90	44	187
96.00	44	192
96.10	44	196
96.20	44	200
96.30	44	205
96.40	44	209
96.50	44	214
96.60	40	218
96.70	35	221
96.80	31	225
96.90	26	228
97.00	22	230
97.10	17	232
97.20	13	233
97.30	8	234
97.40	4	235
97.50	19	236
97.60	35	239
97.70	51	243
97.80	66	249
97.90	82	256
98.00	97	265
98.10	158	278
98.20	219	297
98.30	281	322
98.40	342	353
98.50	403	390
98.60	464	434
98.70	525	483
98.80	587	539
98.90	648	601
99.00	709	668
99.10	1,130	768
99.20	1,163	883
99.30	1,195	1,001
99.40	1,228	1,122
99.50	1,261	1,246
99.60	1,293	1,374
99.70	1,326	1,505
99.80	1,359	1,639
99.90	1,391	1,777
100.00	1,424	1,917
100.10	**1,505**	**2,064**

Summary for Link AP: Analysis Point

Inflow Area = 116,436 sf, 44.27% Impervious, Inflow Depth = 0.21" for 10-Year event
Inflow = 0.47 cfs @ 12.50 hrs, Volume= 1,999 cf
Primary = 0.47 cfs @ 12.50 hrs, Volume= 1,999 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA1A: DA1A Runoff Area=1.366 ac 10.54% Impervious Runoff Depth=0.84"
Flow Length=337' Tc=17.4 min CN=42 Runoff=0.58 cfs 4,158 cf

Subcatchment DA1B: DA1B Runoff Area=13,628 sf 16.84% Impervious Runoff Depth=1.21"
Tc=10.0 min CN=47 Runoff=0.30 cfs 1,378 cf

Subcatchment DA2A: DA2A Runoff Area=14,063 sf 100.00% Impervious Runoff Depth=6.37"
Tc=5.0 min CN=98 Runoff=2.16 cfs 7,467 cf

Subcatchment DA2B: DA2B Runoff Area=12,794 sf 0.00% Impervious Runoff Depth=0.57"
Flow Length=189' Tc=11.5 min CN=38 Runoff=0.07 cfs 607 cf

Subcatchment DA3: DA3 Runoff Area=14,032 sf 9.11% Impervious Runoff Depth=0.77"
Tc=10.0 min CN=41 Runoff=0.13 cfs 899 cf

Subcatchment DA4: DA4 Runoff Area=42,316 sf 86.93% Impervious Runoff Depth=5.44"
Tc=10.0 min CN=90 Runoff=5.14 cfs 19,188 cf

Subcatchment DA5: DA5 Runoff Area=1.085 ac 1.47% Impervious Runoff Depth=0.39"
Flow Length=332' Tc=11.4 min CN=35 Runoff=0.13 cfs 1,538 cf

Reach CD1: CURTAIN DRAIN Avg. Flow Depth=0.11' Max Vel=1.28 fps Inflow=0.30 cfs 1,378 cf
n=0.033 L=163.0' S=0.0166 '/' Capacity=45.63 cfs Outflow=0.29 cfs 1,378 cf

Pond SW-A: Stormtech MC-3500 (SWM-A) Peak Elev=88.23' Storage=4,298 cf Inflow=5.14 cfs 19,188 cf
Discarded=0.82 cfs 16,083 cf Primary=1.34 cfs 3,105 cf Outflow=2.15 cfs 19,188 cf

Pond SW-B: Bioretention Basin (SWM-B) Peak Elev=93.28' Storage=4,015 cf Inflow=2.16 cfs 8,074 cf
Discarded=0.12 cfs 8,074 cf Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.12 cfs 8,074 cf

Pond SW-C: Drywell & Basin (SWM-C) Peak Elev=93.76' Storage=548 cf Inflow=0.80 cfs 5,536 cf
Discarded=0.63 cfs 5,536 cf Secondary=0.00 cfs 0 cf Outflow=0.63 cfs 5,536 cf

Pond SW-D: Drywell & Basin (SWM-D) Peak Elev=97.83' Storage=251 cf Inflow=0.13 cfs 899 cf
Discarded=0.03 cfs 899 cf Secondary=0.00 cfs 0 cf Outflow=0.03 cfs 899 cf

Link AP: Analysis Point Inflow=1.46 cfs 4,644 cf
Primary=1.46 cfs 4,644 cf

Total Runoff Area = 203,599 sf Runoff Volume = 35,235 cf Average Runoff Depth = 2.08"
69.85% Pervious = 142,206 sf 30.15% Impervious = 61,393 sf

Summary for Subcatchment DA1A: DA1A

Runoff = 0.58 cfs @ 12.37 hrs, Volume= 4,158 cf, Depth= 0.84"
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.61"

Area (ac)	CN	Description
0.673	39	>75% Grass cover, Good, HSG A
0.549	30	Woods, Good, HSG A
0.144	98	Paved parking, HSG A
1.366	42	Weighted Average
1.222		89.46% Pervious Area
0.144		10.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	24	0.0824	0.23		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
11.7	76	0.0485	0.11		**Sheet Flow, Sheetflow** Woods: Light underbrush n= 0.400 P2= 3.43"
0.6	35	0.0368	0.96		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	22	0.0345	3.77		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.5	61	0.0100	0.70		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
1.7	99	0.0394	0.99		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	20	0.3400	4.08		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
17.4	337	Total			

Summary for Subcatchment DA1B: DA1B

Runoff = 0.30 cfs @ 12.17 hrs, Volume= 1,378 cf, Depth= 1.21"
Routed to Reach CD1 : CURTAIN DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.61"

Area (sf)	CN	Description
8,726	39	>75% Grass cover, Good, HSG A
2,607	30	Woods, Good, HSG A
2,295	98	Paved parking, HSG A
13,628	47	Weighted Average
11,333		83.16% Pervious Area
2,295		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2A: DA2A

Runoff = 2.16 cfs @ 12.07 hrs, Volume= 7,467 cf, Depth= 6.37"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.61"

Area (sf)	CN	Description
14,063	98	Roofs, HSG A
14,063		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2B: DA2B

Runoff = 0.07 cfs @ 12.40 hrs, Volume= 607 cf, Depth= 0.57"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.61"

Area (sf)	CN	Description
11,225	39	>75% Grass cover, Good, HSG A
1,569	30	Woods, Good, HSG A
12,794	38	Weighted Average
12,794		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0150	0.16		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
0.9	89	0.0550	1.64		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
11.5	189	Total			

Summary for Subcatchment DA3: DA3

Runoff = 0.13 cfs @ 12.23 hrs, Volume= 899 cf, Depth= 0.77"
Routed to Pond SW-D : Drywell & Basin (SWM-D)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.61"

Area (sf)	CN	Description
7,100	39	>75% Grass cover, Good, HSG A
5,653	30	Woods, Good, HSG A
1,279	98	Paved parking, HSG A
14,032	41	Weighted Average
12,753		90.89% Pervious Area
1,279		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA4: DA4

Runoff = 5.14 cfs @ 12.13 hrs, Volume= 19,188 cf, Depth= 5.44"
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.61"

Area (sf)	CN	Description
5,530	39	>75% Grass cover, Good, HSG A
36,786	98	Paved parking, HSG A
42,316	90	Weighted Average
5,530		13.07% Pervious Area
36,786		86.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA5: DA5

Runoff = 0.13 cfs @ 12.48 hrs, Volume= 1,538 cf, Depth= 0.39"
Routed to Link AP : Analysis Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.61"

Area (ac)	CN	Description
0.427	39	>75% Grass cover, Good, HSG A
0.642	30	Woods, Good, HSG A
0.016	98	Paved parking, HSG A
1.085	35	Weighted Average
1.069		98.53% Pervious Area
0.016		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	18	0.1330	0.27		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
7.5	82	0.0240	0.18		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
1.9	118	0.0220	1.04		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.2	14	0.0500	1.12		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.2	32	0.1400	2.62		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.5	68	0.2350	2.42		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
11.4	332	Total			

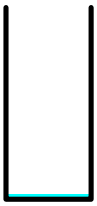
Summary for Reach CD1: CURTAIN DRAIN

Inflow Area = 13,628 sf, 16.84% Impervious, Inflow Depth = 1.21" for 25-Year event
Inflow = 0.30 cfs @ 12.17 hrs, Volume= 1,378 cf
Outflow = 0.29 cfs @ 12.20 hrs, Volume= 1,378 cf, Atten= 2%, Lag= 1.6 min
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Max. Velocity= 1.28 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 0.73 fps, Avg. Travel Time= 3.7 min

Peak Storage= 37 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.11' , Surface Width= 2.00'
Bank-Full Depth= 4.50' Flow Area= 9.0 sf, Capacity= 45.63 cfs

2.00' x 4.50' deep channel, n= 0.033 Riprap, 1-inch
Length= 163.0' Slope= 0.0166 '/'
Inlet Invert= 96.00', Outlet Invert= 93.30'



Stage-Area-Storage for Reach CD1: CURTAIN DRAIN

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
96.00	0.0	0
96.05	0.1	16
96.10	0.2	33
96.15	0.3	49
96.20	0.4	65
96.25	0.5	82
96.30	0.6	98
96.35	0.7	114
96.40	0.8	130
96.45	0.9	147
96.50	1.0	163
96.55	1.1	179
96.60	1.2	196
96.65	1.3	212
96.70	1.4	228
96.75	1.5	245
96.80	1.6	261
96.85	1.7	277
96.90	1.8	293
96.95	1.9	310
97.00	2.0	326
97.05	2.1	342
97.10	2.2	359
97.15	2.3	375
97.20	2.4	391
97.25	2.5	408
97.30	2.6	424
97.35	2.7	440
97.40	2.8	456
97.45	2.9	473
97.50	3.0	489
97.55	3.1	505
97.60	3.2	522
97.65	3.3	538
97.70	3.4	554
97.75	3.5	571
97.80	3.6	587
97.85	3.7	603
97.90	3.8	619
97.95	3.9	636
98.00	4.0	652
98.05	4.1	668
98.10	4.2	685
98.15	4.3	701
98.20	4.4	717
98.25	4.5	734
98.30	4.6	750
98.35	4.7	766
98.40	4.8	782
98.45	4.9	799
98.50	5.0	815
98.55	5.1	831
98.60	5.2	848
98.65	5.3	864
98.70	5.4	880
98.75	5.5	897
98.80	5.6	913
98.85	5.7	929
98.90	5.8	945
98.95	5.9	962
99.00	6.0	978
99.05	6.1	994
99.10	6.2	1,011
99.15	6.3	1,027
99.20	6.4	1,043
99.25	6.5	1,060
99.30	6.6	1,076
99.35	6.7	1,092
99.40	6.8	1,108
99.45	6.9	1,125
99.50	7.0	1,141
99.55	7.1	1,157
99.60	7.2	1,174
99.65	7.3	1,190
99.70	7.4	1,206
99.75	7.5	1,223
99.80	7.6	1,239
99.85	7.7	1,255
99.90	7.8	1,271
99.95	7.9	1,288
100.00	8.0	1,304
100.05	8.1	1,320
100.10	8.2	1,337
100.15	8.3	1,353
100.20	8.4	1,369
100.25	8.5	1,386
100.30	8.6	1,402
100.35	8.7	1,418
100.40	8.8	1,434
100.45	8.9	1,451
100.50	**9.0**	**1,467**

Summary for Pond SW-A: Stormtech MC-3500 (SWM-A)

Inflow Area = 42,316 sf, 86.93% Impervious, Inflow Depth = 5.44" for 25-Year event
Inflow = 5.14 cfs @ 12.13 hrs, Volume= 19,188 cf
Outflow = 2.15 cfs @ 12.41 hrs, Volume= 19,188 cf, Atten= 58%, Lag= 16.3 min
Discarded = 0.82 cfs @ 11.68 hrs, Volume= 16,083 cf
Primary = 1.34 cfs @ 12.41 hrs, Volume= 3,105 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 88.23' @ 12.41 hrs Surf.Area= 1,761 sf Storage= 4,298 cf

Plug-Flow detention time= 18.5 min calculated for 19,183 cf (100% of inflow)
Center-of-Mass det. time= 18.5 min (803.8 - 785.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	84.70'	2,519 cf	**22.75'W x 77.40'L x 5.50'H Field A** 9,685 cf Overall - 3,388 cf Embedded = 6,297 cf x 40.0% Voids
#2A	85.45'	3,388 cf	**ADS_StormTech MC-3500 d +Cap** x 30 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 30 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		5,907 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	84.70'	**12.0" Round Outlet Pipe** L= 44.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 84.70' / 84.10' S= 0.0136 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	86.00'	**4.0" Vert. Low Flow Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	87.80'	**11.0" W x 4.0" H Vert. Upper Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	89.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Discarded	84.70'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.82 cfs @ 11.68 hrs HW=84.76' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.82 cfs)

Primary OutFlow Max=1.34 cfs @ 12.41 hrs HW=88.22' (Free Discharge)
└**1=Outlet Pipe** (Passes 1.34 cfs of 6.58 cfs potential flow)
  ├**2=Low Flow Orifice** (Orifice Controls 0.60 cfs @ 6.91 fps)
  ├**3=Upper Orifice** (Orifice Controls 0.73 cfs @ 2.40 fps)
  └**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SW-A: Stormtech MC-3500 (SWM-A) - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

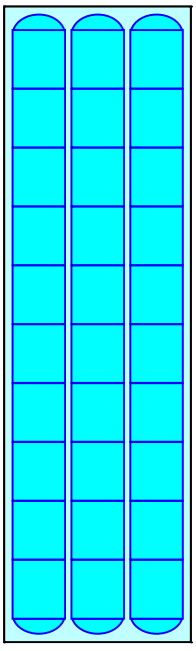
10 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 75.40' Row Length +12.0" End Stone x 2 = 77.40' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

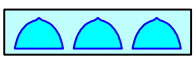
30 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 3,388.0 cf Chamber Storage

9,684.7 cf Field - 3,388.0 cf Chambers = 6,296.7 cf Stone x 40.0% Voids = 2,518.7 cf Stone Storage

Chamber Storage + Stone Storage = 5,906.6 cf = 0.136 af
Overall Storage Efficiency = 61.0%
Overall System Size = 77.40' x 22.75' x 5.50'

30 Chambers
358.7 cy Field
233.2 cy Stone





Stage-Area-Storage for Pond SW-A: Stormtech MC-3500 (SWM-A)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
84.70	**1,761**	0
84.80	1,761	70
84.90	1,761	141
85.00	1,761	211
85.10	1,761	282
85.20	1,761	352
85.30	1,761	423
85.40	1,761	493
85.50	1,761	602
85.60	1,761	750
85.70	1,761	897
85.80	1,761	1,044
85.90	1,761	1,190
86.00	1,761	1,335
86.10	1,761	1,480
86.20	1,761	1,624
86.30	1,761	1,768
86.40	1,761	1,910
86.50	1,761	2,052
86.60	1,761	2,193
86.70	1,761	2,333
86.80	1,761	2,472
86.90	1,761	2,610
87.00	1,761	2,747
87.10	1,761	2,882
87.20	1,761	3,017
87.30	1,761	3,150
87.40	1,761	3,281
87.50	1,761	3,411
87.60	1,761	3,540
87.70	1,761	3,667
87.80	1,761	3,791
87.90	1,761	3,914
88.00	1,761	4,035
88.10	1,761	4,153
88.20	1,761	4,269
88.30	1,761	4,382
88.40	1,761	4,492
88.50	1,761	4,599
88.60	1,761	4,702
88.70	1,761	4,800
88.80	1,761	4,892
88.90	1,761	4,976
89.00	1,761	5,055
89.10	1,761	5,130
89.20	1,761	5,202
89.30	1,761	5,273
89.40	1,761	5,343
89.50	1,761	5,414
89.60	1,761	5,484
89.70	1,761	5,554
89.80	1,761	5,625
89.90	1,761	5,695
90.00	1,761	5,766
90.10	1,761	5,836
90.20	1,761	**5,907**

Summary for Pond SW-B: Bioretention Basin (SWM-B)

Inflow Area = 26,857 sf, 52.36% Impervious, Inflow Depth = 3.61" for 25-Year event
Inflow = 2.16 cfs @ 12.07 hrs, Volume= 8,074 cf
Outflow = 0.12 cfs @ 14.41 hrs, Volume= 8,074 cf, Atten= 95%, Lag= 140.2 min
Discarded = 0.12 cfs @ 14.41 hrs, Volume= 8,074 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 93.28' @ 14.41 hrs Surf.Area= 2,531 sf Storage= 4,015 cf

Plug-Flow detention time= 360.3 min calculated for 8,074 cf (100% of inflow)
Center-of-Mass det. time= 360.2 min (1,118.9 - 758.7)

Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.00	1,031	0	0
92.00	1,649	1,340	1,340
93.00	2,324	1,987	3,327
94.00	3,055	2,690	6,016
94.10	3,132	309	6,325

Device	Routing	Invert	Outlet Devices
#1	Primary	90.00'	**12.0" Round Outlet Pipe** L= 125.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.00' / 87.00' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	93.40'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	93.60'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Discarded	91.00'	**2.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.12 cfs @ 14.41 hrs HW=93.28' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
└**1=Outlet Pipe** (Passes 0.00 cfs of 2.67 cfs potential flow)
└**2=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-B: Bioretention Basin (SWM-B)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.00	1,031	0
91.05	1,062	52
91.10	1,093	106
91.15	1,124	162
91.20	1,155	219
91.25	1,186	277
91.30	1,216	337
91.35	1,247	399
91.40	1,278	462
91.45	1,309	527
91.50	1,340	593
91.55	1,371	661
91.60	1,402	730
91.65	1,433	801
91.70	1,464	873
91.75	1,495	947
91.80	1,525	1,023
91.85	1,556	1,100
91.90	1,587	1,178
91.95	1,618	1,258
92.00	1,649	1,340
92.05	1,683	1,423
92.10	1,716	1,508
92.15	1,750	1,595
92.20	1,784	1,683
92.25	1,818	1,773
92.30	1,851	1,865
92.35	1,885	1,958
92.40	1,919	2,054
92.45	1,953	2,150
92.50	1,987	2,249
92.55	2,020	2,349
92.60	2,054	2,451
92.65	2,088	2,554
92.70	2,122	2,660
92.75	2,155	2,767
92.80	2,189	2,875
92.85	2,223	2,985
92.90	2,257	3,097
92.95	2,290	3,211
93.00	2,324	3,327
93.05	2,361	3,444
93.10	2,397	3,563
93.15	2,434	3,683
93.20	2,470	3,806
93.25	2,507	3,930
93.30	2,543	4,057
93.35	2,580	4,185
93.40	2,616	4,315
93.45	2,653	4,446
93.50	2,690	4,580
93.55	2,726	4,715
93.60	2,763	4,852
93.65	2,799	4,992
93.70	2,836	5,132
93.75	2,872	5,275
93.80	2,909	5,420
93.85	2,945	5,566
93.90	2,982	5,714
93.95	3,018	5,864
94.00	3,055	6,016
94.05	3,093	6,170
94.10	**3,132**	**6,325**

Summary for Pond SW-C: Drywell & Basin (SWM-C)

Inflow Area = 73,131 sf, 11.72% Impervious, Inflow Depth = 0.91" for 25-Year event
Inflow = 0.80 cfs @ 12.33 hrs, Volume= 5,536 cf
Outflow = 0.63 cfs @ 12.56 hrs, Volume= 5,536 cf, Atten= 21%, Lag= 14.1 min
Discarded = 0.63 cfs @ 12.56 hrs, Volume= 5,536 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 93.76' @ 12.56 hrs Surf.Area= 1,367 sf Storage= 548 cf

Plug-Flow detention time= 28.2 min calculated for 5,535 cf (100% of inflow)
Center-of-Mass det. time= 28.3 min (952.8 - 924.5)

Volume	Invert	Avail.Storage	Storage Description
#1	89.10'	3,214 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.10	31	0	0
90.10	44	38	38
91.10	44	44	82
92.10	44	44	126
93.00	15	27	152
93.50	564	145	297
94.00	2,107	668	965
94.30	2,623	709	1,674
94.80	3,537	1,540	3,214

Device	Routing	Invert	Outlet Devices
#1	Discarded	89.10'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	94.30'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.63 cfs @ 12.56 hrs HW=93.76' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.63 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=89.10' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-C: Drywell & Basin (SWM-C)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
89.10	31	0
89.20	32	3
89.30	34	6
89.40	35	10
89.50	36	13
89.60	38	17
89.70	39	21
89.80	40	25
89.90	41	29
90.00	43	33
90.10	44	38
90.20	44	42
90.30	44	46
90.40	44	51
90.50	44	55
90.60	44	60
90.70	44	64
90.80	44	68
90.90	44	73
91.00	44	77
91.10	44	82
91.20	44	86
91.30	44	90
91.40	44	95
91.50	44	99
91.60	44	104
91.70	44	108
91.80	44	112
91.90	44	117
92.00	44	121
92.10	44	126
92.20	41	130
92.30	38	134
92.40	34	137
92.50	31	141
92.60	28	143
92.70	25	146
92.80	21	148
92.90	18	150
93.00	15	152
93.10	125	159
93.20	235	177
93.30	344	206
93.40	454	246
93.50	564	297
93.60	873	369
93.70	1,181	471
93.80	1,490	605
93.90	1,798	769
94.00	2,107	965
94.10	2,279	1,184
94.20	2,451	1,420
94.30	2,623	1,674
94.40	2,806	1,945
94.50	2,989	2,235
94.60	3,171	2,543
94.70	3,354	2,869
94.80	**3,537**	**3,214**

Summary for Pond SW-D: Drywell & Basin (SWM-D)

Inflow Area = 14,032 sf, 9.11% Impervious, Inflow Depth = 0.77" for 25-Year event
Inflow = 0.13 cfs @ 12.23 hrs, Volume= 899 cf
Outflow = 0.03 cfs @ 13.79 hrs, Volume= 899 cf, Atten= 75%, Lag= 94.0 min
Discarded = 0.03 cfs @ 13.79 hrs, Volume= 899 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 97.83' @ 13.79 hrs Surf.Area= 70 sf Storage= 251 cf

Plug-Flow detention time= 216.9 min calculated for 898 cf (100% of inflow)
Center-of-Mass det. time= 216.9 min (1,147.4 - 930.5)

Volume	Invert	Avail.Storage	Storage Description
#1	91.50'	2,064 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	31	0	0
92.50	44	38	38
93.50	44	44	82
94.50	44	44	126
95.50	44	44	170
96.50	44	44	214
97.40	4	22	235
98.00	97	30	265
99.00	709	403	668
99.06	1,117	55	723
100.00	1,424	1,194	1,917
100.10	1,505	146	2,064

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	99.60'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.03 cfs @ 13.79 hrs HW=97.83' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-D: Drywell & Basin (SWM-D)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.50	31	0
91.60	32	3
91.70	34	6
91.80	35	10
91.90	36	13
92.00	38	17
92.10	39	21
92.20	40	25
92.30	41	29
92.40	43	33
92.50	44	38
92.60	44	42
92.70	44	46
92.80	44	51
92.90	44	55
93.00	44	60
93.10	44	64
93.20	44	68
93.30	44	73
93.40	44	77
93.50	44	82
93.60	44	86
93.70	44	90
93.80	44	95
93.90	44	99
94.00	44	104
94.10	44	108
94.20	44	112
94.30	44	117
94.40	44	121
94.50	44	126
94.60	44	130
94.70	44	134
94.80	44	139
94.90	44	143
95.00	44	148
95.10	44	152
95.20	44	156
95.30	44	161
95.40	44	165
95.50	44	170
95.60	44	174
95.70	44	178
95.80	44	183
95.90	44	187
96.00	44	192
96.10	44	196
96.20	44	200
96.30	44	205
96.40	44	209
96.50	44	214
96.60	40	218
96.70	35	221
96.80	31	225
96.90	26	228
97.00	22	230
97.10	17	232
97.20	13	233
97.30	8	234
97.40	4	235
97.50	19	236
97.60	35	239
97.70	51	243
97.80	66	249
97.90	82	256
98.00	97	265
98.10	158	278
98.20	219	297
98.30	281	322
98.40	342	353
98.50	403	390
98.60	464	434
98.70	525	483
98.80	587	539
98.90	648	601
99.00	709	668
99.10	1,130	768
99.20	1,163	883
99.30	1,195	1,001
99.40	1,228	1,122
99.50	1,261	1,246
99.60	1,293	1,374
99.70	1,326	1,505
99.80	1,359	1,639
99.90	1,391	1,777
100.00	1,424	1,917
100.10	**1,505**	**2,064**

Summary for Link AP: Analysis Point

Inflow Area = 116,436 sf, 44.27% Impervious, Inflow Depth = 0.48" for 25-Year event
Inflow = 1.46 cfs @ 12.41 hrs, Volume= 4,644 cf
Primary = 1.46 cfs @ 12.41 hrs, Volume= 4,644 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA1A: DA1A Runoff Area=1.366 ac 10.54% Impervious Runoff Depth=1.22"
Flow Length=337' Tc=17.4 min CN=42 Runoff=1.00 cfs 6,068 cf

Subcatchment DA1B: DA1B Runoff Area=13,628 sf 16.84% Impervious Runoff Depth=1.68"
Tc=10.0 min CN=47 Runoff=0.45 cfs 1,909 cf

Subcatchment DA2A: DA2A Runoff Area=14,063 sf 100.00% Impervious Runoff Depth=7.29"
Tc=5.0 min CN=98 Runoff=2.46 cfs 8,544 cf

Subcatchment DA2B: DA2B Runoff Area=12,794 sf 0.00% Impervious Runoff Depth=0.88"
Flow Length=189' Tc=11.5 min CN=38 Runoff=0.14 cfs 943 cf

Subcatchment DA3: DA3 Runoff Area=14,032 sf 9.11% Impervious Runoff Depth=1.14"
Tc=10.0 min CN=41 Runoff=0.25 cfs 1,329 cf

Subcatchment DA4: DA4 Runoff Area=42,316 sf 86.93% Impervious Runoff Depth=6.34"
Tc=10.0 min CN=90 Runoff=5.94 cfs 22,369 cf

Subcatchment DA5: DA5 Runoff Area=1.085 ac 1.47% Impervious Runoff Depth=0.65"
Flow Length=332' Tc=11.4 min CN=35 Runoff=0.30 cfs 2,561 cf

Reach CD1: CURTAIN DRAIN Avg. Flow Depth=0.15' Max Vel=1.49 fps Inflow=0.45 cfs 1,909 cf
n=0.033 L=163.0' S=0.0166 '/' Capacity=45.63 cfs Outflow=0.44 cfs 1,909 cf

Pond SW-A: Stormtech MC-3500 (SWM-A) Peak Elev=88.71' Storage=4,810 cf Inflow=5.94 cfs 22,369 cf
Discarded=0.82 cfs 17,819 cf Primary=1.94 cfs 4,550 cf Outflow=2.75 cfs 22,369 cf

Pond SW-B: Bioretention Basin (SWM-B) Peak Elev=93.43' Storage=4,405 cf Inflow=2.49 cfs 9,487 cf
Discarded=0.12 cfs 8,865 cf Primary=0.18 cfs 622 cf Secondary=0.00 cfs 0 cf Outflow=0.30 cfs 9,487 cf

Pond SW-C: Drywell & Basin (SWM-C) Peak Elev=93.99' Storage=934 cf Inflow=1.35 cfs 7,977 cf
Discarded=0.95 cfs 7,977 cf Secondary=0.00 cfs 0 cf Outflow=0.95 cfs 7,977 cf

Pond SW-D: Drywell & Basin (SWM-D) Peak Elev=98.20' Storage=298 cf Inflow=0.25 cfs 1,329 cf
Discarded=0.10 cfs 1,329 cf Secondary=0.00 cfs 0 cf Outflow=0.10 cfs 1,329 cf

Link AP: Analysis Point Inflow=2.23 cfs 7,733 cf
Primary=2.23 cfs 7,733 cf

Total Runoff Area = 203,599 sf Runoff Volume = 43,723 cf Average Runoff Depth = 2.58"
69.85% Pervious = 142,206 sf 30.15% Impervious = 61,393 sf

Summary for Subcatchment DA1A: DA1A

Runoff = 1.00 cfs @ 12.32 hrs, Volume= 6,068 cf, Depth= 1.22"
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.53"

Area (ac)	CN	Description
0.673	39	>75% Grass cover, Good, HSG A
0.549	30	Woods, Good, HSG A
0.144	98	Paved parking, HSG A
1.366	42	Weighted Average
1.222		89.46% Pervious Area
0.144		10.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	24	0.0824	0.23		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
11.7	76	0.0485	0.11		**Sheet Flow, Sheetflow** Woods: Light underbrush n= 0.400 P2= 3.43"
0.6	35	0.0368	0.96		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	22	0.0345	3.77		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.5	61	0.0100	0.70		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
1.7	99	0.0394	0.99		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	20	0.3400	4.08		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
17.4	337	Total			

Summary for Subcatchment DA1B: DA1B

Runoff = 0.45 cfs @ 12.16 hrs, Volume= 1,909 cf, Depth= 1.68"
Routed to Reach CD1 : CURTAIN DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.53"

Area (sf)	CN	Description
8,726	39	>75% Grass cover, Good, HSG A
2,607	30	Woods, Good, HSG A
2,295	98	Paved parking, HSG A
13,628	47	Weighted Average
11,333		83.16% Pervious Area
2,295		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2A: DA2A

Runoff = 2.46 cfs @ 12.07 hrs, Volume= 8,544 cf, Depth= 7.29"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.53"

Area (sf)	CN	Description
14,063	98	Roofs, HSG A
14,063		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2B: DA2B

Runoff = 0.14 cfs @ 12.27 hrs, Volume= 943 cf, Depth= 0.88"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.53"

Area (sf)	CN	Description
11,225	39	>75% Grass cover, Good, HSG A
1,569	30	Woods, Good, HSG A
12,794	38	Weighted Average
12,794		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0150	0.16		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
0.9	89	0.0550	1.64		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
11.5	189	Total			

Summary for Subcatchment DA3: DA3

Runoff = 0.25 cfs @ 12.18 hrs, Volume= 1,329 cf, Depth= 1.14"
Routed to Pond SW-D : Drywell & Basin (SWM-D)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.53"

Area (sf)	CN	Description
7,100	39	>75% Grass cover, Good, HSG A
5,653	30	Woods, Good, HSG A
1,279	98	Paved parking, HSG A
14,032	41	Weighted Average
12,753		90.89% Pervious Area
1,279		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA4: DA4

Runoff = 5.94 cfs @ 12.13 hrs, Volume= 22,369 cf, Depth= 6.34"
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.53"

Area (sf)	CN	Description
5,530	39	>75% Grass cover, Good, HSG A
36,786	98	Paved parking, HSG A
42,316	90	Weighted Average
5,530		13.07% Pervious Area
36,786		86.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA5: DA5

Runoff = 0.30 cfs @ 12.40 hrs, Volume= 2,561 cf, Depth= 0.65"
Routed to Link AP : Analysis Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.53"

Area (ac)	CN	Description
0.427	39	>75% Grass cover, Good, HSG A
0.642	30	Woods, Good, HSG A
0.016	98	Paved parking, HSG A
1.085	35	Weighted Average
1.069		98.53% Pervious Area
0.016		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	18	0.1330	0.27		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
7.5	82	0.0240	0.18		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
1.9	118	0.0220	1.04		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.2	14	0.0500	1.12		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.2	32	0.1400	2.62		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.5	68	0.2350	2.42		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
11.4	332	Total			

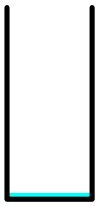
Summary for Reach CD1: CURTAIN DRAIN

Inflow Area = 13,628 sf, 16.84% Impervious, Inflow Depth = 1.68" for 50-Year event
Inflow = 0.45 cfs @ 12.16 hrs, Volume= 1,909 cf
Outflow = 0.44 cfs @ 12.18 hrs, Volume= 1,909 cf, Atten= 2%, Lag= 1.3 min
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Max. Velocity= 1.49 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.75 fps, Avg. Travel Time= 3.6 min

Peak Storage= 48 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.15' , Surface Width= 2.00'
Bank-Full Depth= 4.50' Flow Area= 9.0 sf, Capacity= 45.63 cfs

2.00' x 4.50' deep channel, n= 0.033 Riprap, 1-inch
Length= 163.0' Slope= 0.0166 '/'
Inlet Invert= 96.00', Outlet Invert= 93.30'



Stage-Area-Storage for Reach CD1: CURTAIN DRAIN

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
96.00	0.0	0
96.05	0.1	16
96.10	0.2	33
96.15	0.3	49
96.20	0.4	65
96.25	0.5	82
96.30	0.6	98
96.35	0.7	114
96.40	0.8	130
96.45	0.9	147
96.50	1.0	163
96.55	1.1	179
96.60	1.2	196
96.65	1.3	212
96.70	1.4	228
96.75	1.5	245
96.80	1.6	261
96.85	1.7	277
96.90	1.8	293
96.95	1.9	310
97.00	2.0	326
97.05	2.1	342
97.10	2.2	359
97.15	2.3	375
97.20	2.4	391
97.25	2.5	408
97.30	2.6	424
97.35	2.7	440
97.40	2.8	456
97.45	2.9	473
97.50	3.0	489
97.55	3.1	505
97.60	3.2	522
97.65	3.3	538
97.70	3.4	554
97.75	3.5	571
97.80	3.6	587
97.85	3.7	603
97.90	3.8	619
97.95	3.9	636
98.00	4.0	652
98.05	4.1	668
98.10	4.2	685
98.15	4.3	701
98.20	4.4	717
98.25	4.5	734
98.30	4.6	750
98.35	4.7	766
98.40	4.8	782
98.45	4.9	799
98.50	5.0	815
98.55	5.1	831
98.60	5.2	848
98.65	5.3	864
98.70	5.4	880
98.75	5.5	897
98.80	5.6	913
98.85	5.7	929
98.90	5.8	945
98.95	5.9	962
99.00	6.0	978
99.05	6.1	994
99.10	6.2	1,011
99.15	6.3	1,027
99.20	6.4	1,043
99.25	6.5	1,060
99.30	6.6	1,076
99.35	6.7	1,092
99.40	6.8	1,108
99.45	6.9	1,125
99.50	7.0	1,141
99.55	7.1	1,157
99.60	7.2	1,174
99.65	7.3	1,190
99.70	7.4	1,206
99.75	7.5	1,223
99.80	7.6	1,239
99.85	7.7	1,255
99.90	7.8	1,271
99.95	7.9	1,288
100.00	8.0	1,304
100.05	8.1	1,320
100.10	8.2	1,337
100.15	8.3	1,353
100.20	8.4	1,369
100.25	8.5	1,386
100.30	8.6	1,402
100.35	8.7	1,418
100.40	8.8	1,434
100.45	8.9	1,451
100.50	**9.0**	**1,467**

Summary for Pond SW-A: Stormtech MC-3500 (SWM-A)

Inflow Area = 42,316 sf, 86.93% Impervious, Inflow Depth = 6.34" for 50-Year event
Inflow = 5.94 cfs @ 12.13 hrs, Volume= 22,369 cf
Outflow = 2.75 cfs @ 12.37 hrs, Volume= 22,369 cf, Atten= 54%, Lag= 14.1 min
Discarded = 0.82 cfs @ 11.64 hrs, Volume= 17,819 cf
Primary = 1.94 cfs @ 12.37 hrs, Volume= 4,550 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 88.71' @ 12.37 hrs Surf.Area= 1,761 sf Storage= 4,810 cf

Plug-Flow detention time= 18.2 min calculated for 22,362 cf (100% of inflow)
Center-of-Mass det. time= 18.2 min (799.6 - 781.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	84.70'	2,519 cf	**22.75'W x 77.40'L x 5.50'H Field A** 9,685 cf Overall - 3,388 cf Embedded = 6,297 cf x 40.0% Voids
#2A	85.45'	3,388 cf	**ADS_StormTech MC-3500 d +Cap** x 30 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 30 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		5,907 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	84.70'	**12.0" Round Outlet Pipe** L= 44.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 84.70' / 84.10' S= 0.0136 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	86.00'	**4.0" Vert. Low Flow Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	87.80'	**11.0" W x 4.0" H Vert. Upper Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	89.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Discarded	84.70'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.82 cfs @ 11.64 hrs HW=84.76' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.82 cfs)

Primary OutFlow Max=1.93 cfs @ 12.37 hrs HW=88.71' (Free Discharge)
└**1=Outlet Pipe** (Passes 1.93 cfs of 7.08 cfs potential flow)
  ├**2=Low Flow Orifice** (Orifice Controls 0.67 cfs @ 7.68 fps)
  ├**3=Upper Orifice** (Orifice Controls 1.26 cfs @ 4.14 fps)
  └**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SW-A: Stormtech MC-3500 (SWM-A) - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

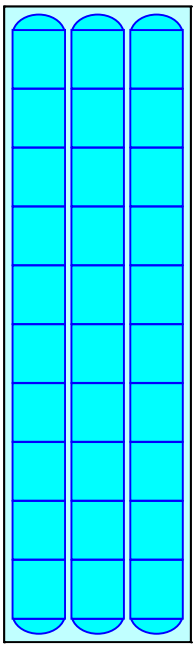
10 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 75.40' Row Length +12.0" End Stone x 2 = 77.40' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

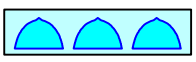
30 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 3,388.0 cf Chamber Storage

9,684.7 cf Field - 3,388.0 cf Chambers = 6,296.7 cf Stone x 40.0% Voids = 2,518.7 cf Stone Storage

Chamber Storage + Stone Storage = 5,906.6 cf = 0.136 af
Overall Storage Efficiency = 61.0%
Overall System Size = 77.40' x 22.75' x 5.50'

30 Chambers
358.7 cy Field
233.2 cy Stone





Stage-Area-Storage for Pond SW-A: Stormtech MC-3500 (SWM-A)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
84.70	**1,761**	0
84.80	1,761	70
84.90	1,761	141
85.00	1,761	211
85.10	1,761	282
85.20	1,761	352
85.30	1,761	423
85.40	1,761	493
85.50	1,761	602
85.60	1,761	750
85.70	1,761	897
85.80	1,761	1,044
85.90	1,761	1,190
86.00	1,761	1,335
86.10	1,761	1,480
86.20	1,761	1,624
86.30	1,761	1,768
86.40	1,761	1,910
86.50	1,761	2,052
86.60	1,761	2,193
86.70	1,761	2,333
86.80	1,761	2,472
86.90	1,761	2,610
87.00	1,761	2,747
87.10	1,761	2,882
87.20	1,761	3,017
87.30	1,761	3,150
87.40	1,761	3,281
87.50	1,761	3,411
87.60	1,761	3,540
87.70	1,761	3,667
87.80	1,761	3,791
87.90	1,761	3,914
88.00	1,761	4,035
88.10	1,761	4,153
88.20	1,761	4,269
88.30	1,761	4,382
88.40	1,761	4,492
88.50	1,761	4,599
88.60	1,761	4,702
88.70	1,761	4,800
88.80	1,761	4,892
88.90	1,761	4,976
89.00	1,761	5,055
89.10	1,761	5,130
89.20	1,761	5,202
89.30	1,761	5,273
89.40	1,761	5,343
89.50	1,761	5,414
89.60	1,761	5,484
89.70	1,761	5,554
89.80	1,761	5,625
89.90	1,761	5,695
90.00	1,761	5,766
90.10	1,761	5,836
90.20	1,761	**5,907**

Summary for Pond SW-B: Bioretention Basin (SWM-B)

Inflow Area = 26,857 sf, 52.36% Impervious, Inflow Depth = 4.24" for 50-Year event
Inflow = 2.49 cfs @ 12.07 hrs, Volume= 9,487 cf
Outflow = 0.30 cfs @ 12.77 hrs, Volume= 9,487 cf, Atten= 88%, Lag= 42.1 min
Discarded = 0.12 cfs @ 12.77 hrs, Volume= 8,865 cf
Primary = 0.18 cfs @ 12.77 hrs, Volume= 622 cf
Routed to Link AP : Analysis Point
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 93.43' @ 12.77 hrs Surf.Area= 2,642 sf Storage= 4,405 cf

Plug-Flow detention time= 358.3 min calculated for 9,484 cf (100% of inflow)
Center-of-Mass det. time= 358.4 min (1,118.3 - 760.0)

Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.00	1,031	0	0
92.00	1,649	1,340	1,340
93.00	2,324	1,987	3,327
94.00	3,055	2,690	6,016
94.10	3,132	309	6,325

Device	Routing	Invert	Outlet Devices
#1	Primary	90.00'	**12.0" Round Outlet Pipe** L= 125.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.00' / 87.00' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	93.40'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	93.60'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Discarded	91.00'	**2.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.12 cfs @ 12.77 hrs HW=93.43' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.17 cfs @ 12.77 hrs HW=93.43' (Free Discharge)
└**1=Outlet Pipe** (Passes 0.17 cfs of 6.48 cfs potential flow)
└**2=Grate** (Weir Controls 0.17 cfs @ 0.61 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-B: Bioretention Basin (SWM-B)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.00	1,031	0
91.05	1,062	52
91.10	1,093	106
91.15	1,124	162
91.20	1,155	219
91.25	1,186	277
91.30	1,216	337
91.35	1,247	399
91.40	1,278	462
91.45	1,309	527
91.50	1,340	593
91.55	1,371	661
91.60	1,402	730
91.65	1,433	801
91.70	1,464	873
91.75	1,495	947
91.80	1,525	1,023
91.85	1,556	1,100
91.90	1,587	1,178
91.95	1,618	1,258
92.00	1,649	1,340
92.05	1,683	1,423
92.10	1,716	1,508
92.15	1,750	1,595
92.20	1,784	1,683
92.25	1,818	1,773
92.30	1,851	1,865
92.35	1,885	1,958
92.40	1,919	2,054
92.45	1,953	2,150
92.50	1,987	2,249
92.55	2,020	2,349
92.60	2,054	2,451
92.65	2,088	2,554
92.70	2,122	2,660
92.75	2,155	2,767
92.80	2,189	2,875
92.85	2,223	2,985
92.90	2,257	3,097
92.95	2,290	3,211
93.00	2,324	3,327
93.05	2,361	3,444
93.10	2,397	3,563
93.15	2,434	3,683
93.20	2,470	3,806
93.25	2,507	3,930
93.30	2,543	4,057
93.35	2,580	4,185
93.40	2,616	4,315
93.45	2,653	4,446
93.50	2,690	4,580
93.55	2,726	4,715
93.60	2,763	4,852
93.65	2,799	4,992
93.70	2,836	5,132
93.75	2,872	5,275
93.80	2,909	5,420
93.85	2,945	5,566
93.90	2,982	5,714
93.95	3,018	5,864
94.00	3,055	6,016
94.05	3,093	6,170
94.10	**3,132**	**6,325**

Summary for Pond SW-C: Drywell & Basin (SWM-C)

Inflow Area = 73,131 sf, 11.72% Impervious, Inflow Depth = 1.31" for 50-Year event
Inflow = 1.35 cfs @ 12.29 hrs, Volume= 7,977 cf
Outflow = 0.95 cfs @ 12.56 hrs, Volume= 7,977 cf, Atten= 29%, Lag= 16.4 min
Discarded = 0.95 cfs @ 12.56 hrs, Volume= 7,977 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 93.99' @ 12.56 hrs Surf.Area= 2,061 sf Storage= 934 cf

Plug-Flow detention time= 23.4 min calculated for 7,975 cf (100% of inflow)
Center-of-Mass det. time= 23.5 min (932.9 - 909.4)

Volume	Invert	Avail.Storage	Storage Description
#1	89.10'	3,214 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.10	31	0	0
90.10	44	38	38
91.10	44	44	82
92.10	44	44	126
93.00	15	27	152
93.50	564	145	297
94.00	2,107	668	965
94.30	2,623	709	1,674
94.80	3,537	1,540	3,214

Device	Routing	Invert	Outlet Devices
#1	Discarded	89.10'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	94.30'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.95 cfs @ 12.56 hrs HW=93.99' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.95 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=89.10' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-C: Drywell & Basin (SWM-C)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
89.10	31	0
89.20	32	3
89.30	34	6
89.40	35	10
89.50	36	13
89.60	38	17
89.70	39	21
89.80	40	25
89.90	41	29
90.00	43	33
90.10	44	38
90.20	44	42
90.30	44	46
90.40	44	51
90.50	44	55
90.60	44	60
90.70	44	64
90.80	44	68
90.90	44	73
91.00	44	77
91.10	44	82
91.20	44	86
91.30	44	90
91.40	44	95
91.50	44	99
91.60	44	104
91.70	44	108
91.80	44	112
91.90	44	117
92.00	44	121
92.10	44	126
92.20	41	130
92.30	38	134
92.40	34	137
92.50	31	141
92.60	28	143
92.70	25	146
92.80	21	148
92.90	18	150
93.00	15	152
93.10	125	159
93.20	235	177
93.30	344	206
93.40	454	246
93.50	564	297
93.60	873	369
93.70	1,181	471
93.80	1,490	605
93.90	1,798	769
94.00	2,107	965
94.10	2,279	1,184
94.20	2,451	1,420
94.30	2,623	1,674
94.40	2,806	1,945
94.50	2,989	2,235
94.60	3,171	2,543
94.70	3,354	2,869
94.80	**3,537**	**3,214**

Summary for Pond SW-D: Drywell & Basin (SWM-D)

Inflow Area = 14,032 sf, 9.11% Impervious, Inflow Depth = 1.14" for 50-Year event
Inflow = 0.25 cfs @ 12.18 hrs, Volume= 1,329 cf
Outflow = 0.10 cfs @ 12.61 hrs, Volume= 1,329 cf, Atten= 59%, Lag= 25.9 min
Discarded = 0.10 cfs @ 12.61 hrs, Volume= 1,329 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 98.20' @ 12.61 hrs Surf.Area= 221 sf Storage= 298 cf

Plug-Flow detention time= 153.6 min calculated for 1,329 cf (100% of inflow)
Center-of-Mass det. time= 153.6 min (1,066.5 - 912.9)

Volume	Invert	Avail.Storage	Storage Description
#1	91.50'	2,064 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	31	0	0
92.50	44	38	38
93.50	44	44	82
94.50	44	44	126
95.50	44	44	170
96.50	44	44	214
97.40	4	22	235
98.00	97	30	265
99.00	709	403	668
99.06	1,117	55	723
100.00	1,424	1,194	1,917
100.10	1,505	146	2,064

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	99.60'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.10 cfs @ 12.61 hrs HW=98.20' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-D: Drywell & Basin (SWM-D)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.50	31	0
91.60	32	3
91.70	34	6
91.80	35	10
91.90	36	13
92.00	38	17
92.10	39	21
92.20	40	25
92.30	41	29
92.40	43	33
92.50	44	38
92.60	44	42
92.70	44	46
92.80	44	51
92.90	44	55
93.00	44	60
93.10	44	64
93.20	44	68
93.30	44	73
93.40	44	77
93.50	44	82
93.60	44	86
93.70	44	90
93.80	44	95
93.90	44	99
94.00	44	104
94.10	44	108
94.20	44	112
94.30	44	117
94.40	44	121
94.50	44	126
94.60	44	130
94.70	44	134
94.80	44	139
94.90	44	143
95.00	44	148
95.10	44	152
95.20	44	156
95.30	44	161
95.40	44	165
95.50	44	170
95.60	44	174
95.70	44	178
95.80	44	183
95.90	44	187
96.00	44	192
96.10	44	196
96.20	44	200
96.30	44	205
96.40	44	209
96.50	44	214
96.60	40	218
96.70	35	221
96.80	31	225
96.90	26	228
97.00	22	230
97.10	17	232
97.20	13	233
97.30	8	234
97.40	4	235
97.50	19	236
97.60	35	239
97.70	51	243
97.80	66	249
97.90	82	256
98.00	97	265
98.10	158	278
98.20	219	297
98.30	281	322
98.40	342	353
98.50	403	390
98.60	464	434
98.70	525	483
98.80	587	539
98.90	648	601
99.00	709	668
99.10	1,130	768
99.20	1,163	883
99.30	1,195	1,001
99.40	1,228	1,122
99.50	1,261	1,246
99.60	1,293	1,374
99.70	1,326	1,505
99.80	1,359	1,639
99.90	1,391	1,777
100.00	1,424	1,917
100.10	**1,505**	**2,064**

Summary for Link AP: Analysis Point

Inflow Area = 116,436 sf, 44.27% Impervious, Inflow Depth = 0.80" for 50-Year event
Inflow = 2.23 cfs @ 12.37 hrs, Volume= 7,733 cf
Primary = 2.23 cfs @ 12.37 hrs, Volume= 7,733 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA1A: DA1A Runoff Area=1.366 ac 10.54% Impervious Runoff Depth=1.71"
Flow Length=337' Tc=17.4 min CN=42 Runoff=1.57 cfs 8,502 cf

Subcatchment DA1B: DA1B Runoff Area=13,628 sf 16.84% Impervious Runoff Depth=2.26"
Tc=10.0 min CN=47 Runoff=0.65 cfs 2,568 cf

Subcatchment DA2A: DA2A Runoff Area=14,063 sf 100.00% Impervious Runoff Depth=8.32"
Tc=5.0 min CN=98 Runoff=2.80 cfs 9,750 cf

Subcatchment DA2B: DA2B Runoff Area=12,794 sf 0.00% Impervious Runoff Depth=1.30"
Flow Length=189' Tc=11.5 min CN=38 Runoff=0.25 cfs 1,384 cf

Subcatchment DA3: DA3 Runoff Area=14,032 sf 9.11% Impervious Runoff Depth=1.61"
Tc=10.0 min CN=41 Runoff=0.41 cfs 1,881 cf

Subcatchment DA4: DA4 Runoff Area=42,316 sf 86.93% Impervious Runoff Depth=7.36"
Tc=10.0 min CN=90 Runoff=6.83 cfs 25,944 cf

Subcatchment DA5: DA5 Runoff Area=1.085 ac 1.47% Impervious Runoff Depth=1.00"
Flow Length=332' Tc=11.4 min CN=35 Runoff=0.56 cfs 3,949 cf

Reach CD1: CURTAIN DRAIN Avg. Flow Depth=0.19' Max Vel=1.70 fps Inflow=0.65 cfs 2,568 cf
n=0.033 L=163.0' S=0.0166 '/' Capacity=45.63 cfs Outflow=0.64 cfs 2,568 cf

Pond SW-A: Stormtech MC-3500 (SWM-A) Peak Elev=89.19' Storage=5,196 cf Inflow=6.83 cfs 25,944 cf
Discarded=0.82 cfs 19,698 cf Primary=3.44 cfs 6,247 cf Outflow=4.26 cfs 25,944 cf

Pond SW-B: Bioretention Basin (SWM-B) Peak Elev=93.50' Storage=4,576 cf Inflow=2.90 cfs 11,134 cf
Discarded=0.12 cfs 9,318 cf Primary=0.82 cfs 1,817 cf Secondary=0.00 cfs 0 cf Outflow=0.94 cfs 11,134 cf

Pond SW-C: Drywell & Basin (SWM-C) Peak Elev=94.29' Storage=1,656 cf Inflow=2.08 cfs 11,069 cf
Discarded=1.21 cfs 11,069 cf Secondary=0.00 cfs 0 cf Outflow=1.21 cfs 11,069 cf

Pond SW-D: Drywell & Basin (SWM-D) Peak Elev=98.51' Storage=393 cf Inflow=0.41 cfs 1,881 cf
Discarded=0.19 cfs 1,881 cf Secondary=0.00 cfs 0 cf Outflow=0.19 cfs 1,881 cf

Link AP: Analysis Point Inflow=4.22 cfs 12,013 cf
Primary=4.22 cfs 12,013 cf

Total Runoff Area = 203,599 sf Runoff Volume = 53,978 cf Average Runoff Depth = 3.18"
69.85% Pervious = 142,206 sf 30.15% Impervious = 61,393 sf

Summary for Subcatchment DA1A: DA1A

Runoff = 1.57 cfs @ 12.29 hrs, Volume= 8,502 cf, Depth= 1.71"
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.56"

Area (ac)	CN	Description
0.673	39	>75% Grass cover, Good, HSG A
0.549	30	Woods, Good, HSG A
0.144	98	Paved parking, HSG A
1.366	42	Weighted Average
1.222		89.46% Pervious Area
0.144		10.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	24	0.0824	0.23		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
11.7	76	0.0485	0.11		**Sheet Flow, Sheetflow** Woods: Light underbrush n= 0.400 P2= 3.43"
0.6	35	0.0368	0.96		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	22	0.0345	3.77		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.5	61	0.0100	0.70		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
1.7	99	0.0394	0.99		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	20	0.3400	4.08		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
17.4	337	Total			

Summary for Subcatchment DA1B: DA1B

Runoff = 0.65 cfs @ 12.16 hrs, Volume= 2,568 cf, Depth= 2.26"
Routed to Reach CD1 : CURTAIN DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.56"

Area (sf)	CN	Description
8,726	39	>75% Grass cover, Good, HSG A
2,607	30	Woods, Good, HSG A
2,295	98	Paved parking, HSG A
13,628	47	Weighted Average
11,333		83.16% Pervious Area
2,295		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2A: DA2A

Runoff = 2.80 cfs @ 12.07 hrs, Volume= 9,750 cf, Depth= 8.32"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.56"

Area (sf)	CN	Description
14,063	98	Roofs, HSG A
14,063		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2B: DA2B

Runoff = 0.25 cfs @ 12.21 hrs, Volume= 1,384 cf, Depth= 1.30"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.56"

Area (sf)	CN	Description
11,225	39	>75% Grass cover, Good, HSG A
1,569	30	Woods, Good, HSG A
12,794	38	Weighted Average
12,794		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0150	0.16		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
0.9	89	0.0550	1.64		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
11.5	189	Total			

Summary for Subcatchment DA3: DA3

Runoff = 0.41 cfs @ 12.17 hrs, Volume= 1,881 cf, Depth= 1.61"
Routed to Pond SW-D : Drywell & Basin (SWM-D)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.56"

Area (sf)	CN	Description
7,100	39	>75% Grass cover, Good, HSG A
5,653	30	Woods, Good, HSG A
1,279	98	Paved parking, HSG A
14,032	41	Weighted Average
12,753		90.89% Pervious Area
1,279		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA4: DA4

Runoff = 6.83 cfs @ 12.13 hrs, Volume= 25,944 cf, Depth= 7.36"
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.56"

Area (sf)	CN	Description
5,530	39	>75% Grass cover, Good, HSG A
36,786	98	Paved parking, HSG A
42,316	90	Weighted Average
5,530		13.07% Pervious Area
36,786		86.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA5: DA5

Runoff = 0.56 cfs @ 12.27 hrs, Volume= 3,949 cf, Depth= 1.00"
Routed to Link AP : Analysis Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.56"

Area (ac)	CN	Description
0.427	39	>75% Grass cover, Good, HSG A
0.642	30	Woods, Good, HSG A
0.016	98	Paved parking, HSG A
1.085	35	Weighted Average
1.069		98.53% Pervious Area
0.016		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	18	0.1330	0.27		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
7.5	82	0.0240	0.18		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
1.9	118	0.0220	1.04		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.2	14	0.0500	1.12		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.2	32	0.1400	2.62		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.5	68	0.2350	2.42		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
11.4	332	Total			

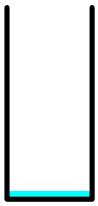
Summary for Reach CD1: CURTAIN DRAIN

Inflow Area = 13,628 sf, 16.84% Impervious, Inflow Depth = 2.26" for 100-Year event
Inflow = 0.65 cfs @ 12.16 hrs, Volume= 2,568 cf
Outflow = 0.64 cfs @ 12.17 hrs, Volume= 2,568 cf, Atten= 1%, Lag= 1.1 min
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Max. Velocity= 1.70 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 0.76 fps, Avg. Travel Time= 3.6 min

Peak Storage= 61 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.19' , Surface Width= 2.00'
Bank-Full Depth= 4.50' Flow Area= 9.0 sf, Capacity= 45.63 cfs

2.00' x 4.50' deep channel, n= 0.033 Riprap, 1-inch
Length= 163.0' Slope= 0.0166 '/'
Inlet Invert= 96.00', Outlet Invert= 93.30'



Summary for Subcatchment DA1B: DA1B

Runoff = 0.45 cfs @ 12.16 hrs, Volume= 1,909 cf, Depth= 1.68"
Routed to Reach CD1 : CURTAIN DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.53"

Area (sf)	CN	Description
8,726	39	>75% Grass cover, Good, HSG A
2,607	30	Woods, Good, HSG A
2,295	98	Paved parking, HSG A
13,628	47	Weighted Average
11,333		83.16% Pervious Area
2,295		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2A: DA2A

Runoff = 2.46 cfs @ 12.07 hrs, Volume= 8,544 cf, Depth= 7.29"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.53"

Area (sf)	CN	Description
14,063	98	Roofs, HSG A
14,063		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2B: DA2B

Runoff = 0.14 cfs @ 12.27 hrs, Volume= 943 cf, Depth= 0.88"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.53"

Area (sf)	CN	Description
11,225	39	>75% Grass cover, Good, HSG A
1,569	30	Woods, Good, HSG A
12,794	38	Weighted Average
12,794		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0150	0.16		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
0.9	89	0.0550	1.64		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
11.5	189	Total			

Summary for Pond SW-B: Bioretention Basin (SWM-B)

Inflow Area = 26,857 sf, 52.36% Impervious, Inflow Depth = 4.24" for 50-Year event
Inflow = 2.49 cfs @ 12.07 hrs, Volume= 9,487 cf
Outflow = 0.30 cfs @ 12.77 hrs, Volume= 9,487 cf, Atten= 88%, Lag= 42.1 min
Discarded = 0.12 cfs @ 12.77 hrs, Volume= 8,865 cf
Primary = 0.18 cfs @ 12.77 hrs, Volume= 622 cf
Routed to Link AP : Analysis Point
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 93.43' @ 12.77 hrs Surf.Area= 2,642 sf Storage= 4,405 cf

Plug-Flow detention time= 358.3 min calculated for 9,484 cf (100% of inflow)
Center-of-Mass det. time= 358.4 min (1,118.3 - 760.0)

Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.00	1,031	0	0
92.00	1,649	1,340	1,340
93.00	2,324	1,987	3,327
94.00	3,055	2,690	6,016
94.10	3,132	309	6,325

Device	Routing	Invert	Outlet Devices
#1	Primary	90.00'	**12.0" Round Outlet Pipe** L= 125.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.00' / 87.00' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	93.40'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	93.60'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Discarded	91.00'	**2.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.12 cfs @ 12.77 hrs HW=93.43' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.17 cfs @ 12.77 hrs HW=93.43' (Free Discharge)
└**1=Outlet Pipe** (Passes 0.17 cfs of 6.48 cfs potential flow)
└**2=Grate** (Weir Controls 0.17 cfs @ 0.61 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-B: Bioretention Basin (SWM-B)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.00	1,031	0
91.05	1,062	52
91.10	1,093	106
91.15	1,124	162
91.20	1,155	219
91.25	1,186	277
91.30	1,216	337
91.35	1,247	399
91.40	1,278	462
91.45	1,309	527
91.50	1,340	593
91.55	1,371	661
91.60	1,402	730
91.65	1,433	801
91.70	1,464	873
91.75	1,495	947
91.80	1,525	1,023
91.85	1,556	1,100
91.90	1,587	1,178
91.95	1,618	1,258
92.00	1,649	1,340
92.05	1,683	1,423
92.10	1,716	1,508
92.15	1,750	1,595
92.20	1,784	1,683
92.25	1,818	1,773
92.30	1,851	1,865
92.35	1,885	1,958
92.40	1,919	2,054
92.45	1,953	2,150
92.50	1,987	2,249
92.55	2,020	2,349
92.60	2,054	2,451
92.65	2,088	2,554
92.70	2,122	2,660
92.75	2,155	2,767
92.80	2,189	2,875
92.85	2,223	2,985
92.90	2,257	3,097
92.95	2,290	3,211
93.00	2,324	3,327
93.05	2,361	3,444
93.10	2,397	3,563
93.15	2,434	3,683
93.20	2,470	3,806
93.25	2,507	3,930
93.30	2,543	4,057
93.35	2,580	4,185
93.40	2,616	4,315
93.45	2,653	4,446
93.50	2,690	4,580
93.55	2,726	4,715
93.60	2,763	4,852
93.65	2,799	4,992
93.70	2,836	5,132
93.75	2,872	5,275
93.80	2,909	5,420
93.85	2,945	5,566
93.90	2,982	5,714
93.95	3,018	5,864
94.00	3,055	6,016
94.05	3,093	6,170
94.10	**3,132**	**6,325**

Summary for Pond SW-C: Drywell & Basin (SWM-C)

Inflow Area = 73,131 sf, 11.72% Impervious, Inflow Depth = 1.31" for 50-Year event
Inflow = 1.35 cfs @ 12.29 hrs, Volume= 7,977 cf
Outflow = 0.95 cfs @ 12.56 hrs, Volume= 7,977 cf, Atten= 29%, Lag= 16.4 min
Discarded = 0.95 cfs @ 12.56 hrs, Volume= 7,977 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 93.99' @ 12.56 hrs Surf.Area= 2,061 sf Storage= 934 cf

Plug-Flow detention time= 23.4 min calculated for 7,975 cf (100% of inflow)
Center-of-Mass det. time= 23.5 min (932.9 - 909.4)

Volume	Invert	Avail.Storage	Storage Description
#1	89.10'	3,214 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.10	31	0	0
90.10	44	38	38
91.10	44	44	82
92.10	44	44	126
93.00	15	27	152
93.50	564	145	297
94.00	2,107	668	965
94.30	2,623	709	1,674
94.80	3,537	1,540	3,214

Device	Routing	Invert	Outlet Devices
#1	Discarded	89.10'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	94.30'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.95 cfs @ 12.56 hrs HW=93.99' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.95 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=89.10' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-C: Drywell & Basin (SWM-C)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
89.10	31	0
89.20	32	3
89.30	34	6
89.40	35	10
89.50	36	13
89.60	38	17
89.70	39	21
89.80	40	25
89.90	41	29
90.00	43	33
90.10	44	38
90.20	44	42
90.30	44	46
90.40	44	51
90.50	44	55
90.60	44	60
90.70	44	64
90.80	44	68
90.90	44	73
91.00	44	77
91.10	44	82
91.20	44	86
91.30	44	90
91.40	44	95
91.50	44	99
91.60	44	104
91.70	44	108
91.80	44	112
91.90	44	117
92.00	44	121
92.10	44	126
92.20	41	130
92.30	38	134
92.40	34	137
92.50	31	141
92.60	28	143
92.70	25	146
92.80	21	148
92.90	18	150
93.00	15	152
93.10	125	159
93.20	235	177
93.30	344	206
93.40	454	246
93.50	564	297
93.60	873	369
93.70	1,181	471
93.80	1,490	605
93.90	1,798	769
94.00	2,107	965
94.10	2,279	1,184
94.20	2,451	1,420
94.30	2,623	1,674
94.40	2,806	1,945
94.50	2,989	2,235
94.60	3,171	2,543
94.70	3,354	2,869
94.80	**3,537**	**3,214**

Summary for Pond SW-D: Drywell & Basin (SWM-D)

Inflow Area = 14,032 sf, 9.11% Impervious, Inflow Depth = 1.14" for 50-Year event
Inflow = 0.25 cfs @ 12.18 hrs, Volume= 1,329 cf
Outflow = 0.10 cfs @ 12.61 hrs, Volume= 1,329 cf, Atten= 59%, Lag= 25.9 min
Discarded = 0.10 cfs @ 12.61 hrs, Volume= 1,329 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 98.20' @ 12.61 hrs Surf.Area= 221 sf Storage= 298 cf

Plug-Flow detention time= 153.6 min calculated for 1,329 cf (100% of inflow)
Center-of-Mass det. time= 153.6 min (1,066.5 - 912.9)

Volume	Invert	Avail.Storage	Storage Description
#1	91.50'	2,064 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	31	0	0
92.50	44	38	38
93.50	44	44	82
94.50	44	44	126
95.50	44	44	170
96.50	44	44	214
97.40	4	22	235
98.00	97	30	265
99.00	709	403	668
99.06	1,117	55	723
100.00	1,424	1,194	1,917
100.10	1,505	146	2,064

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	99.60'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.10 cfs @ 12.61 hrs HW=98.20' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-D: Drywell & Basin (SWM-D)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.50	31	0
91.60	32	3
91.70	34	6
91.80	35	10
91.90	36	13
92.00	38	17
92.10	39	21
92.20	40	25
92.30	41	29
92.40	43	33
92.50	44	38
92.60	44	42
92.70	44	46
92.80	44	51
92.90	44	55
93.00	44	60
93.10	44	64
93.20	44	68
93.30	44	73
93.40	44	77
93.50	44	82
93.60	44	86
93.70	44	90
93.80	44	95
93.90	44	99
94.00	44	104
94.10	44	108
94.20	44	112
94.30	44	117
94.40	44	121
94.50	44	126
94.60	44	130
94.70	44	134
94.80	44	139
94.90	44	143
95.00	44	148
95.10	44	152
95.20	44	156
95.30	44	161
95.40	44	165
95.50	44	170
95.60	44	174
95.70	44	178
95.80	44	183
95.90	44	187
96.00	44	192
96.10	44	196
96.20	44	200
96.30	44	205
96.40	44	209
96.50	44	214
96.60	40	218
96.70	35	221
96.80	31	225
96.90	26	228
97.00	22	230
97.10	17	232
97.20	13	233
97.30	8	234
97.40	4	235
97.50	19	236
97.60	35	239
97.70	51	243
97.80	66	249
97.90	82	256
98.00	97	265
98.10	158	278
98.20	219	297
98.30	281	322
98.40	342	353
98.50	403	390
98.60	464	434
98.70	525	483
98.80	587	539
98.90	648	601
99.00	709	668
99.10	1,130	768
99.20	1,163	883
99.30	1,195	1,001
99.40	1,228	1,122
99.50	1,261	1,246
99.60	1,293	1,374
99.70	1,326	1,505
99.80	1,359	1,639
99.90	1,391	1,777
100.00	1,424	1,917
100.10	**1,505**	**2,064**

Summary for Link AP: Analysis Point

Inflow Area = 116,436 sf, 44.27% Impervious, Inflow Depth = 0.80" for 50-Year event
Inflow = 2.23 cfs @ 12.37 hrs, Volume= 7,733 cf
Primary = 2.23 cfs @ 12.37 hrs, Volume= 7,733 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA1A: DA1A Runoff Area=1.366 ac 10.54% Impervious Runoff Depth=1.71"
Flow Length=337' Tc=17.4 min CN=42 Runoff=1.57 cfs 8,502 cf

Subcatchment DA1B: DA1B Runoff Area=13,628 sf 16.84% Impervious Runoff Depth=2.26"
Tc=10.0 min CN=47 Runoff=0.65 cfs 2,568 cf

Subcatchment DA2A: DA2A Runoff Area=14,063 sf 100.00% Impervious Runoff Depth=8.32"
Tc=5.0 min CN=98 Runoff=2.80 cfs 9,750 cf

Subcatchment DA2B: DA2B Runoff Area=12,794 sf 0.00% Impervious Runoff Depth=1.30"
Flow Length=189' Tc=11.5 min CN=38 Runoff=0.25 cfs 1,384 cf

Subcatchment DA3: DA3 Runoff Area=14,032 sf 9.11% Impervious Runoff Depth=1.61"
Tc=10.0 min CN=41 Runoff=0.41 cfs 1,881 cf

Subcatchment DA4: DA4 Runoff Area=42,316 sf 86.93% Impervious Runoff Depth=7.36"
Tc=10.0 min CN=90 Runoff=6.83 cfs 25,944 cf

Subcatchment DA5: DA5 Runoff Area=1.085 ac 1.47% Impervious Runoff Depth=1.00"
Flow Length=332' Tc=11.4 min CN=35 Runoff=0.56 cfs 3,949 cf

Reach CD1: CURTAIN DRAIN Avg. Flow Depth=0.19' Max Vel=1.70 fps Inflow=0.65 cfs 2,568 cf
n=0.033 L=163.0' S=0.0166 '/' Capacity=45.63 cfs Outflow=0.64 cfs 2,568 cf

Pond SW-A: Stormtech MC-3500 (SWM-A) Peak Elev=89.19' Storage=5,196 cf Inflow=6.83 cfs 25,944 cf
Discarded=0.82 cfs 19,698 cf Primary=3.44 cfs 6,247 cf Outflow=4.26 cfs 25,944 cf

Pond SW-B: Bioretention Basin (SWM-B) Peak Elev=93.50' Storage=4,576 cf Inflow=2.90 cfs 11,134 cf
Discarded=0.12 cfs 9,318 cf Primary=0.82 cfs 1,817 cf Secondary=0.00 cfs 0 cf Outflow=0.94 cfs 11,134 cf

Pond SW-C: Drywell & Basin (SWM-C) Peak Elev=94.29' Storage=1,656 cf Inflow=2.08 cfs 11,069 cf
Discarded=1.21 cfs 11,069 cf Secondary=0.00 cfs 0 cf Outflow=1.21 cfs 11,069 cf

Pond SW-D: Drywell & Basin (SWM-D) Peak Elev=98.51' Storage=393 cf Inflow=0.41 cfs 1,881 cf
Discarded=0.19 cfs 1,881 cf Secondary=0.00 cfs 0 cf Outflow=0.19 cfs 1,881 cf

Link AP: Analysis Point Inflow=4.22 cfs 12,013 cf
Primary=4.22 cfs 12,013 cf

Total Runoff Area = 203,599 sf Runoff Volume = 53,978 cf Average Runoff Depth = 3.18"
69.85% Pervious = 142,206 sf 30.15% Impervious = 61,393 sf

Summary for Subcatchment DA1A: DA1A

Runoff = 1.57 cfs @ 12.29 hrs, Volume= 8,502 cf, Depth= 1.71"
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.56"

Area (ac)	CN	Description
0.673	39	>75% Grass cover, Good, HSG A
0.549	30	Woods, Good, HSG A
0.144	98	Paved parking, HSG A
1.366	42	Weighted Average
1.222		89.46% Pervious Area
0.144		10.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	24	0.0824	0.23		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
11.7	76	0.0485	0.11		**Sheet Flow, Sheetflow** Woods: Light underbrush n= 0.400 P2= 3.43"
0.6	35	0.0368	0.96		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	22	0.0345	3.77		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.5	61	0.0100	0.70		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
1.7	99	0.0394	0.99		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	20	0.3400	4.08		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
17.4	337	Total			

Summary for Subcatchment DA1B: DA1B

Runoff = 0.65 cfs @ 12.16 hrs, Volume= 2,568 cf, Depth= 2.26"
Routed to Reach CD1 : CURTAIN DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.56"

Area (sf)	CN	Description
8,726	39	>75% Grass cover, Good, HSG A
2,607	30	Woods, Good, HSG A
2,295	98	Paved parking, HSG A
13,628	47	Weighted Average
11,333		83.16% Pervious Area
2,295		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2A: DA2A

Runoff = 2.80 cfs @ 12.07 hrs, Volume= 9,750 cf, Depth= 8.32"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.56"

Area (sf)	CN	Description
14,063	98	Roofs, HSG A
14,063		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA2B: DA2B

Runoff = 0.25 cfs @ 12.21 hrs, Volume= 1,384 cf, Depth= 1.30"
Routed to Pond SW-B : Bioretention Basin (SWM-B)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.56"

Area (sf)	CN	Description
11,225	39	>75% Grass cover, Good, HSG A
1,569	30	Woods, Good, HSG A
12,794	38	Weighted Average
12,794		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0150	0.16		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
0.9	89	0.0550	1.64		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
11.5	189	Total			

Summary for Subcatchment DA3: DA3

Runoff = 0.41 cfs @ 12.17 hrs, Volume= 1,881 cf, Depth= 1.61"
Routed to Pond SW-D : Drywell & Basin (SWM-D)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.56"

Area (sf)	CN	Description
7,100	39	>75% Grass cover, Good, HSG A
5,653	30	Woods, Good, HSG A
1,279	98	Paved parking, HSG A
14,032	41	Weighted Average
12,753		90.89% Pervious Area
1,279		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA4: DA4

Runoff = 6.83 cfs @ 12.13 hrs, Volume= 25,944 cf, Depth= 7.36"
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.56"

Area (sf)	CN	Description
5,530	39	>75% Grass cover, Good, HSG A
36,786	98	Paved parking, HSG A
42,316	90	Weighted Average
5,530		13.07% Pervious Area
36,786		86.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, Direct Entry**

Summary for Subcatchment DA5: DA5

Runoff = 0.56 cfs @ 12.27 hrs, Volume= 3,949 cf, Depth= 1.00"
Routed to Link AP : Analysis Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.56"

Area (ac)	CN	Description
0.427	39	>75% Grass cover, Good, HSG A
0.642	30	Woods, Good, HSG A
0.016	98	Paved parking, HSG A
1.085	35	Weighted Average
1.069		98.53% Pervious Area
0.016		1.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	18	0.1330	0.27		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
7.5	82	0.0240	0.18		**Sheet Flow, Sheetflow** Grass: Short n= 0.150 P2= 3.43"
1.9	118	0.0220	1.04		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.2	14	0.0500	1.12		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.2	32	0.1400	2.62		**Shallow Concentrated Flow, Shallow** Short Grass Pasture Kv= 7.0 fps
0.5	68	0.2350	2.42		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
11.4	332	Total			

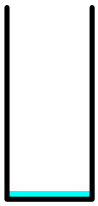
Summary for Reach CD1: CURTAIN DRAIN

Inflow Area = 13,628 sf, 16.84% Impervious, Inflow Depth = 2.26" for 100-Year event
Inflow = 0.65 cfs @ 12.16 hrs, Volume= 2,568 cf
Outflow = 0.64 cfs @ 12.17 hrs, Volume= 2,568 cf, Atten= 1%, Lag= 1.1 min
Routed to Pond SW-C : Drywell & Basin (SWM-C)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Max. Velocity= 1.70 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 0.76 fps, Avg. Travel Time= 3.6 min

Peak Storage= 61 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.19' , Surface Width= 2.00'
Bank-Full Depth= 4.50' Flow Area= 9.0 sf, Capacity= 45.63 cfs

2.00' x 4.50' deep channel, n= 0.033 Riprap, 1-inch
Length= 163.0' Slope= 0.0166 '/'
Inlet Invert= 96.00', Outlet Invert= 93.30'



Stage-Area-Storage for Reach CD1: CURTAIN DRAIN

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
96.00	0.0	0
96.05	0.1	16
96.10	0.2	33
96.15	0.3	49
96.20	0.4	65
96.25	0.5	82
96.30	0.6	98
96.35	0.7	114
96.40	0.8	130
96.45	0.9	147
96.50	1.0	163
96.55	1.1	179
96.60	1.2	196
96.65	1.3	212
96.70	1.4	228
96.75	1.5	245
96.80	1.6	261
96.85	1.7	277
96.90	1.8	293
96.95	1.9	310
97.00	2.0	326
97.05	2.1	342
97.10	2.2	359
97.15	2.3	375
97.20	2.4	391
97.25	2.5	408
97.30	2.6	424
97.35	2.7	440
97.40	2.8	456
97.45	2.9	473
97.50	3.0	489
97.55	3.1	505
97.60	3.2	522
97.65	3.3	538
97.70	3.4	554
97.75	3.5	571
97.80	3.6	587
97.85	3.7	603
97.90	3.8	619
97.95	3.9	636
98.00	4.0	652
98.05	4.1	668
98.10	4.2	685
98.15	4.3	701
98.20	4.4	717
98.25	4.5	734
98.30	4.6	750
98.35	4.7	766
98.40	4.8	782
98.45	4.9	799
98.50	5.0	815
98.55	5.1	831
98.60	5.2	848
98.65	5.3	864
98.70	5.4	880
98.75	5.5	897
98.80	5.6	913
98.85	5.7	929
98.90	5.8	945
98.95	5.9	962
99.00	6.0	978
99.05	6.1	994
99.10	6.2	1,011
99.15	6.3	1,027
99.20	6.4	1,043
99.25	6.5	1,060
99.30	6.6	1,076
99.35	6.7	1,092
99.40	6.8	1,108
99.45	6.9	1,125
99.50	7.0	1,141
99.55	7.1	1,157
99.60	7.2	1,174
99.65	7.3	1,190
99.70	7.4	1,206
99.75	7.5	1,223
99.80	7.6	1,239
99.85	7.7	1,255
99.90	7.8	1,271
99.95	7.9	1,288
100.00	8.0	1,304
100.05	8.1	1,320
100.10	8.2	1,337
100.15	8.3	1,353
100.20	8.4	1,369
100.25	8.5	1,386
100.30	8.6	1,402
100.35	8.7	1,418
100.40	8.8	1,434
100.45	8.9	1,451
100.50	**9.0**	**1,467**

Summary for Pond SW-A: Stormtech MC-3500 (SWM-A)

Inflow Area = 42,316 sf, 86.93% Impervious, Inflow Depth = 7.36" for 100-Year event
Inflow = 6.83 cfs @ 12.13 hrs, Volume= 25,944 cf
Outflow = 4.26 cfs @ 12.28 hrs, Volume= 25,944 cf, Atten= 38%, Lag= 8.7 min
Discarded = 0.82 cfs @ 11.56 hrs, Volume= 19,698 cf
Primary = 3.44 cfs @ 12.28 hrs, Volume= 6,247 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 89.19' @ 12.28 hrs Surf.Area= 1,761 sf Storage= 5,196 cf

Plug-Flow detention time= 17.8 min calculated for 25,937 cf (100% of inflow)
Center-of-Mass det. time= 17.8 min (795.4 - 777.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	84.70'	2,519 cf	**22.75'W x 77.40'L x 5.50'H Field A** 9,685 cf Overall - 3,388 cf Embedded = 6,297 cf x 40.0% Voids
#2A	85.45'	3,388 cf	**ADS_StormTech MC-3500 d +Cap** x 30 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 30 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		5,907 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	84.70'	**12.0" Round Outlet Pipe** L= 44.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 84.70' / 84.10' S= 0.0136 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	86.00'	**4.0" Vert. Low Flow Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	87.80'	**11.0" W x 4.0" H Vert. Upper Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	89.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Discarded	84.70'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.82 cfs @ 11.56 hrs HW=84.76' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.82 cfs)

Primary OutFlow Max=3.44 cfs @ 12.28 hrs HW=89.19' (Free Discharge)
└**1=Outlet Pipe** (Passes 3.44 cfs of 7.55 cfs potential flow)
  ├**2=Low Flow Orifice** (Orifice Controls 0.73 cfs @ 8.37 fps)
  ├**3=Upper Orifice** (Orifice Controls 1.63 cfs @ 5.32 fps)
  └**4=Sharp-Crested Rectangular Weir** (Weir Controls 1.08 cfs @ 1.43 fps)

Pond SW-A: Stormtech MC-3500 (SWM-A) - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

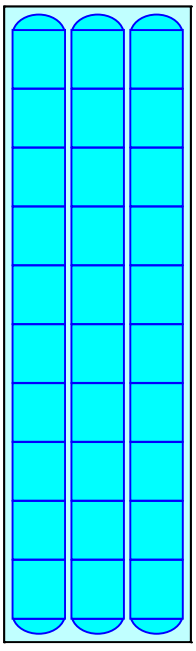
10 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 75.40' Row Length +12.0" End Stone x 2 = 77.40' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

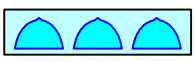
30 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 3,388.0 cf Chamber Storage

9,684.7 cf Field - 3,388.0 cf Chambers = 6,296.7 cf Stone x 40.0% Voids = 2,518.7 cf Stone Storage

Chamber Storage + Stone Storage = 5,906.6 cf = 0.136 af
Overall Storage Efficiency = 61.0%
Overall System Size = 77.40' x 22.75' x 5.50'

30 Chambers
358.7 cy Field
233.2 cy Stone





Stage-Area-Storage for Pond SW-A: Stormtech MC-3500 (SWM-A)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
84.70	**1,761**	0
84.80	1,761	70
84.90	1,761	141
85.00	1,761	211
85.10	1,761	282
85.20	1,761	352
85.30	1,761	423
85.40	1,761	493
85.50	1,761	602
85.60	1,761	750
85.70	1,761	897
85.80	1,761	1,044
85.90	1,761	1,190
86.00	1,761	1,335
86.10	1,761	1,480
86.20	1,761	1,624
86.30	1,761	1,768
86.40	1,761	1,910
86.50	1,761	2,052
86.60	1,761	2,193
86.70	1,761	2,333
86.80	1,761	2,472
86.90	1,761	2,610
87.00	1,761	2,747
87.10	1,761	2,882
87.20	1,761	3,017
87.30	1,761	3,150
87.40	1,761	3,281
87.50	1,761	3,411
87.60	1,761	3,540
87.70	1,761	3,667
87.80	1,761	3,791
87.90	1,761	3,914
88.00	1,761	4,035
88.10	1,761	4,153
88.20	1,761	4,269
88.30	1,761	4,382
88.40	1,761	4,492
88.50	1,761	4,599
88.60	1,761	4,702
88.70	1,761	4,800
88.80	1,761	4,892
88.90	1,761	4,976
89.00	1,761	5,055
89.10	1,761	5,130
89.20	1,761	5,202
89.30	1,761	5,273
89.40	1,761	5,343
89.50	1,761	5,414
89.60	1,761	5,484
89.70	1,761	5,554
89.80	1,761	5,625
89.90	1,761	5,695
90.00	1,761	5,766
90.10	1,761	5,836
90.20	1,761	**5,907**

Summary for Pond SW-B: Bioretention Basin (SWM-B)

Inflow Area = 26,857 sf, 52.36% Impervious, Inflow Depth = 4.97" for 100-Year event
Inflow = 2.90 cfs @ 12.07 hrs, Volume= 11,134 cf
Outflow = 0.94 cfs @ 12.41 hrs, Volume= 11,134 cf, Atten= 67%, Lag= 20.2 min
Discarded = 0.12 cfs @ 12.41 hrs, Volume= 9,318 cf
Primary = 0.82 cfs @ 12.41 hrs, Volume= 1,817 cf
Routed to Link AP : Analysis Point
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 93.50' @ 12.41 hrs Surf.Area= 2,689 sf Storage= 4,576 cf

Plug-Flow detention time= 326.5 min calculated for 11,131 cf (100% of inflow)
Center-of-Mass det. time= 326.6 min (1,087.8 - 761.2)

Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.00	1,031	0	0
92.00	1,649	1,340	1,340
93.00	2,324	1,987	3,327
94.00	3,055	2,690	6,016
94.10	3,132	309	6,325

Device	Routing	Invert	Outlet Devices
#1	Primary	90.00'	**12.0" Round Outlet Pipe** L= 125.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.00' / 87.00' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	93.40'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	93.60'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#4	Discarded	91.00'	**2.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.12 cfs @ 12.41 hrs HW=93.50' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.81 cfs @ 12.41 hrs HW=93.50' (Free Discharge)
└**1=Outlet Pipe** (Passes 0.81 cfs of 6.55 cfs potential flow)
└**2=Grate** (Weir Controls 0.81 cfs @ 1.03 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-B: Bioretention Basin (SWM-B)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.00	1,031	0
91.05	1,062	52
91.10	1,093	106
91.15	1,124	162
91.20	1,155	219
91.25	1,186	277
91.30	1,216	337
91.35	1,247	399
91.40	1,278	462
91.45	1,309	527
91.50	1,340	593
91.55	1,371	661
91.60	1,402	730
91.65	1,433	801
91.70	1,464	873
91.75	1,495	947
91.80	1,525	1,023
91.85	1,556	1,100
91.90	1,587	1,178
91.95	1,618	1,258
92.00	1,649	1,340
92.05	1,683	1,423
92.10	1,716	1,508
92.15	1,750	1,595
92.20	1,784	1,683
92.25	1,818	1,773
92.30	1,851	1,865
92.35	1,885	1,958
92.40	1,919	2,054
92.45	1,953	2,150
92.50	1,987	2,249
92.55	2,020	2,349
92.60	2,054	2,451
92.65	2,088	2,554
92.70	2,122	2,660
92.75	2,155	2,767
92.80	2,189	2,875
92.85	2,223	2,985
92.90	2,257	3,097
92.95	2,290	3,211
93.00	2,324	3,327
93.05	2,361	3,444
93.10	2,397	3,563
93.15	2,434	3,683
93.20	2,470	3,806
93.25	2,507	3,930
93.30	2,543	4,057
93.35	2,580	4,185
93.40	2,616	4,315
93.45	2,653	4,446
93.50	2,690	4,580
93.55	2,726	4,715
93.60	2,763	4,852
93.65	2,799	4,992
93.70	2,836	5,132
93.75	2,872	5,275
93.80	2,909	5,420
93.85	2,945	5,566
93.90	2,982	5,714
93.95	3,018	5,864
94.00	3,055	6,016
94.05	3,093	6,170
94.10	**3,132**	**6,325**

Summary for Pond SW-C: Drywell & Basin (SWM-C)

Inflow Area = 73,131 sf, 11.72% Impervious, Inflow Depth = 1.82" for 100-Year event
Inflow = 2.08 cfs @ 12.26 hrs, Volume= 11,069 cf
Outflow = 1.21 cfs @ 12.60 hrs, Volume= 11,069 cf, Atten= 42%, Lag= 20.2 min
Discarded = 1.21 cfs @ 12.60 hrs, Volume= 11,069 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond SW-A : Stormtech MC-3500 (SWM-A)

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 94.29' @ 12.60 hrs Surf.Area= 2,611 sf Storage= 1,656 cf

Plug-Flow detention time= 22.0 min calculated for 11,066 cf (100% of inflow)
Center-of-Mass det. time= 22.0 min (919.1 - 897.1)

Volume	Invert	Avail.Storage	Storage Description
#1	89.10'	3,214 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
89.10	31	0	0
90.10	44	38	38
91.10	44	44	82
92.10	44	44	126
93.00	15	27	152
93.50	564	145	297
94.00	2,107	668	965
94.30	2,623	709	1,674
94.80	3,537	1,540	3,214

Device	Routing	Invert	Outlet Devices
#1	Discarded	89.10'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	94.30'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=1.21 cfs @ 12.60 hrs HW=94.29' (Free Discharge)
1=Exfiltration (Exfiltration Controls 1.21 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=89.10' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Stage-Area-Storage for Pond SW-C: Drywell & Basin (SWM-C)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
89.10	31	0
89.20	32	3
89.30	34	6
89.40	35	10
89.50	36	13
89.60	38	17
89.70	39	21
89.80	40	25
89.90	41	29
90.00	43	33
90.10	44	38
90.20	44	42
90.30	44	46
90.40	44	51
90.50	44	55
90.60	44	60
90.70	44	64
90.80	44	68
90.90	44	73
91.00	44	77
91.10	44	82
91.20	44	86
91.30	44	90
91.40	44	95
91.50	44	99
91.60	44	104
91.70	44	108
91.80	44	112
91.90	44	117
92.00	44	121
92.10	44	126
92.20	41	130
92.30	38	134
92.40	34	137
92.50	31	141
92.60	28	143
92.70	25	146
92.80	21	148
92.90	18	150
93.00	15	152
93.10	125	159
93.20	235	177
93.30	344	206
93.40	454	246
93.50	564	297
93.60	873	369
93.70	1,181	471
93.80	1,490	605
93.90	1,798	769
94.00	2,107	965
94.10	2,279	1,184
94.20	2,451	1,420
94.30	2,623	1,674
94.40	2,806	1,945
94.50	2,989	2,235
94.60	3,171	2,543
94.70	3,354	2,869
94.80	**3,537**	**3,214**

Summary for Pond SW-D: Drywell & Basin (SWM-D)

Inflow Area = 14,032 sf, 9.11% Impervious, Inflow Depth = 1.61" for 100-Year event
Inflow = 0.41 cfs @ 12.17 hrs, Volume= 1,881 cf
Outflow = 0.19 cfs @ 12.54 hrs, Volume= 1,881 cf, Atten= 54%, Lag= 22.3 min
Discarded = 0.19 cfs @ 12.54 hrs, Volume= 1,881 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP : Analysis Point

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 98.51' @ 12.54 hrs Surf.Area= 407 sf Storage= 393 cf

Plug-Flow detention time= 113.1 min calculated for 1,880 cf (100% of inflow)
Center-of-Mass det. time= 113.1 min (1,012.1 - 899.0)

Volume	Invert	Avail.Storage	Storage Description
#1	91.50'	2,064 cf	**Drywell & Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	31	0	0
92.50	44	38	38
93.50	44	44	82
94.50	44	44	126
95.50	44	44	170
96.50	44	44	214
97.40	4	22	235
98.00	97	30	265
99.00	709	403	668
99.06	1,117	55	723
100.00	1,424	1,194	1,917
100.10	1,505	146	2,064

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	**20.000 in/hr Exfiltration over Surface area**
#2	Secondary	99.60'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.19 cfs @ 12.54 hrs HW=98.51' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.19 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.50' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

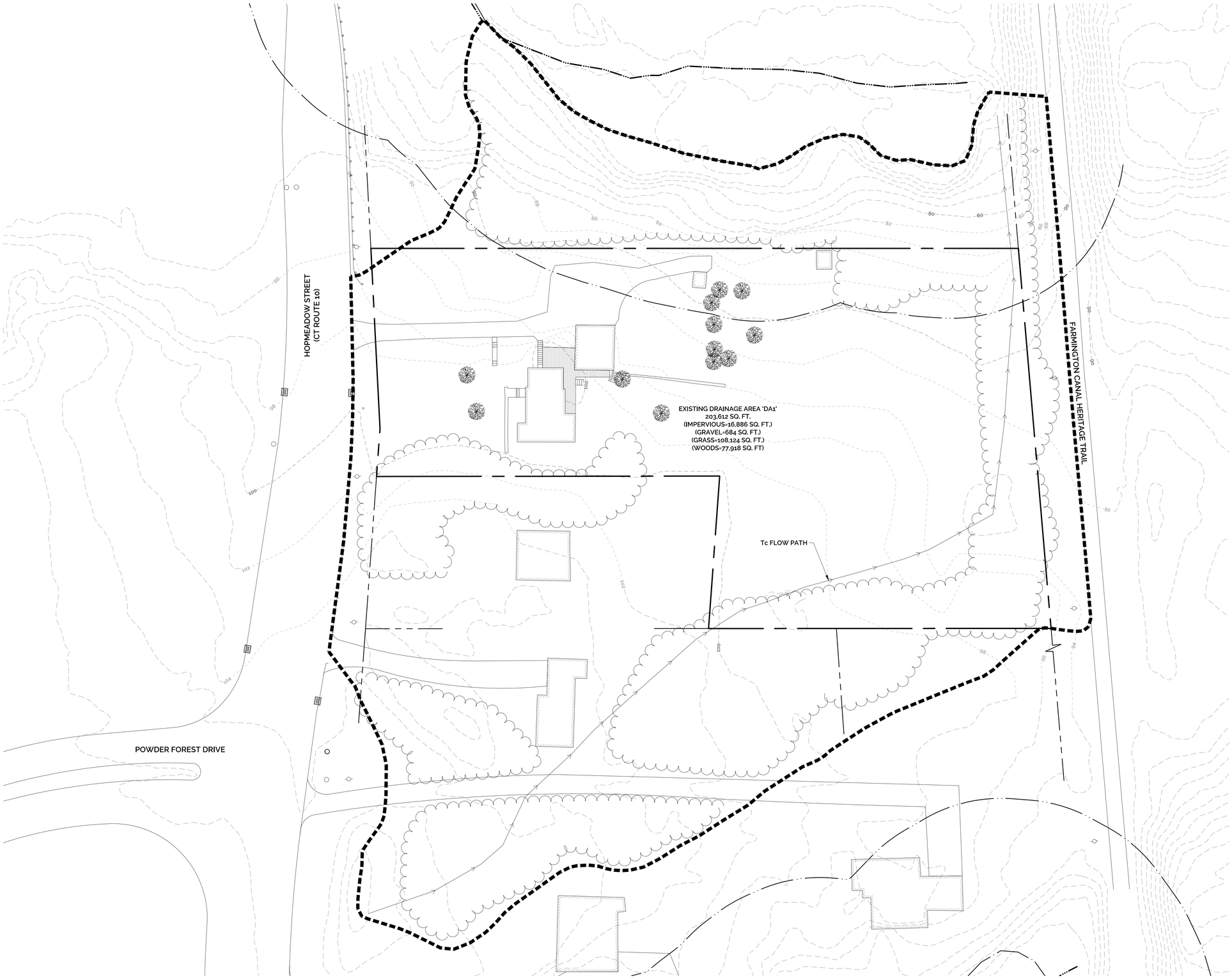
Stage-Area-Storage for Pond SW-D: Drywell & Basin (SWM-D)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.50	31	0
91.60	32	3
91.70	34	6
91.80	35	10
91.90	36	13
92.00	38	17
92.10	39	21
92.20	40	25
92.30	41	29
92.40	43	33
92.50	44	38
92.60	44	42
92.70	44	46
92.80	44	51
92.90	44	55
93.00	44	60
93.10	44	64
93.20	44	68
93.30	44	73
93.40	44	77
93.50	44	82
93.60	44	86
93.70	44	90
93.80	44	95
93.90	44	99
94.00	44	104
94.10	44	108
94.20	44	112
94.30	44	117
94.40	44	121
94.50	44	126
94.60	44	130
94.70	44	134
94.80	44	139
94.90	44	143
95.00	44	148
95.10	44	152
95.20	44	156
95.30	44	161
95.40	44	165
95.50	44	170
95.60	44	174
95.70	44	178
95.80	44	183
95.90	44	187
96.00	44	192
96.10	44	196
96.20	44	200
96.30	44	205
96.40	44	209
96.50	44	214
96.60	40	218
96.70	35	221
96.80	31	225
96.90	26	228
97.00	22	230
97.10	17	232
97.20	13	233
97.30	8	234
97.40	4	235
97.50	19	236
97.60	35	239
97.70	51	243
97.80	66	249
97.90	82	256
98.00	97	265
98.10	158	278
98.20	219	297
98.30	281	322
98.40	342	353
98.50	403	390
98.60	464	434
98.70	525	483
98.80	587	539
98.90	648	601
99.00	709	668
99.10	1,130	768
99.20	1,163	883
99.30	1,195	1,001
99.40	1,228	1,122
99.50	1,261	1,246
99.60	1,293	1,374
99.70	1,326	1,505
99.80	1,359	1,639
99.90	1,391	1,777
100.00	1,424	1,917
100.10	**1,505**	**2,064**

Summary for Link AP: Analysis Point

Inflow Area = 116,436 sf, 44.27% Impervious, Inflow Depth = 1.24" for 100-Year event
Inflow = 4.22 cfs @ 12.30 hrs, Volume= 12,013 cf
Primary = 4.22 cfs @ 12.30 hrs, Volume= 12,013 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs



H+H ENGINEERING ASSOCIATES
232 Greenmanville Avenue
Suite 201
Mystic, CT 06355
860-980-8008 (O); 413-579-4488 (M)
www.hh-engineers.com

STAMP

REV.	DESCRIPTION OF REVISION	DATE	APPR.

PRE-DEVELOPMENT DRAINAGE AREA MAP

VESSEL MULTI-FAMILY HOUSING
PROPERTY ADDRESS
446 HOPMEADOW STREET, SIMSBURY, CT 06089
PREPARED FOR:
VESSEL TECHNOLOGIES, INC.
46 WEST 55TH STREET, NEW YORK, NY 10019

N W E S

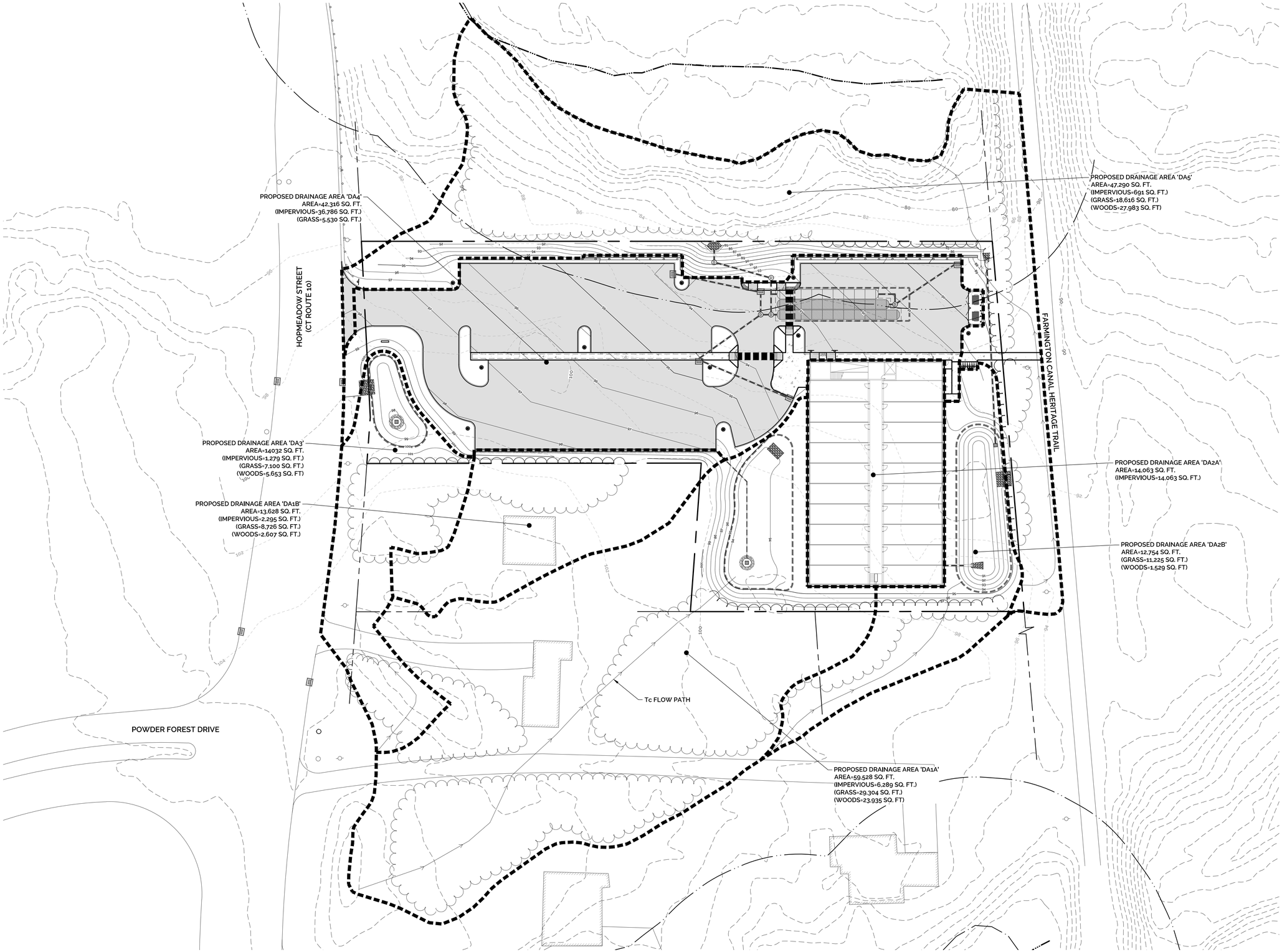
30 15 0 30
SCALE IN FEET

PROJECT NO.	SCALE:
2022-0013	1" = 30'
DRAWN BY: SMM	DATE: 12/15/2022
CHECKED BY: SMM	DATE: 12/15/2022

DRAWING
FIGURE 3

SHEET NUMBER: 1 OF 1

Z:\SHARED\HH ENGINEERING ASSOCIATES\PROJECTS\2022\2022-0013 - VESSEL - 446 HOPMEADOW ST, SIMSBURY\DWGS\DRAINAGE\EXISTING DRAINAGE.DWG Tab: DA MAP - EXISTING Saved: 12/14/2022 11:39 PM Plotted: 12/14/2022 11:39 PM



H+H ENGINEERING ASSOCIATES
232 Greenmanville Avenue
Suite 201
Mystic, CT 06355
860-980-8008 (O); 413-579-4488 (M)
www.hh-engineers.com

STAMP

REV.	DESCRIPTION OF REVISION	DATE	APPR.

POST-DEVELOPMENT DRAINAGE AREA MAP

VESSEL MULTI-FAMILY HOUSING
PROPERTY ADDRESS:
446 HOPMEADOW STREET, SIMSBURY, CT 06089
PREPARED FOR:
VESSEL TECHNOLOGIES, INC.
46 WEST 55TH STREET, NEW YORK, NY 10019

N W E S

30 15 0 30
SCALE IN FEET

PROJECT NO.	SCALE:
2022-0013	1" = 30'
DRAWN BY: SMM	DATE: 12/16/2022
CHECKED BY: SMM	DATE: 12/16/2022

DRAWING
FIGURE 4

SHEET NUMBER: 1 OF 1

Z:\SHARED\HH ENGINEERING ASSOCIATES\PROJECTS\2022\2022-0013 - VESSEL - 446 HOPMEADOW ST, SIMSBURY\DWGS\DRAINAGE\PROPOSED DRAINAGE.DWG Tab: DA MAP - PROPOSED Saved: 12/14/2022 11:29 PM Plotted: 12/14/2022 11:29 PM