NORTHEAST ENGINEERS & CONSULTANTS, INC.

# Stormwater Runoff Analysis

**Newport Beach Suites**
Assessor's Map 116NW, Lot 13
Aquidneck Avenue and Wave Avenue
Middletown, RI

**Prepared For**
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Rev. February 28, 2024

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# 1.0 PROJECT NARRATIVE

## 1.1 SITE INFORMATION

| | |
|---|---|
| City / Town: | Middletown, Rhode Island |
| Adjacent Roadways: | Aquidneck and Wave Avenue |
| Lot(s) identification: | A.P. 116NW Lot 13 |
| Zoning District: | Atlantic Beach District (ABD) |
| Current Use: | Residential |
| Site Area: | 0.32 Acres |
| FEMA Zone and Map: | Zone "AE"(14) (Panel 44005C0181J) |

## 1.2 EXISTING IMPROVEMENTS AND SITE CONDITIONS

The existing property contains two residential structures located adjacent to Wave Avenue but facing Aquidneck Avenue. A narrow, compacted gravel driveway provides access from Wave Avenue and is located between the two structures. The remainder of the Site consists of maintained grasses. The Site has remained relatively unchanged since the structures were constructed in the 1930s. Adjacent properties have been more recently developed and the Site now sits at a slightly lower elevation than the surrounding commercial properties and roadways. The Site is served by municipal water and sewer, as well as natural gas from a main in Aquidneck Avenue. Overhead wires from Wave Avenue provide electrical and communication services. No easements are known to exist.

## 1.3 PROTECTED FEATURES

There are no features protected by the state located on Site. The Site has no significant vegetation aside from the maintained grasses. The Site is not within 200 feet of a coastal feature.

## 1.4 SITE TERRAIN AND SOILS

In general, the Site slopes towards the center of the property and away from the abutting commercial properties. Due to the fact that these abutting properties have been built up over time, it does not appear as though the majority of the site drains to any external areas, with the exception being a small portion of grassed lawn that slopes towards the RIDOT right of way (Aquidneck Avenue) to the south and a small portion of lawn which slopes towards Wave Avenue. The site is relatively flat and consists almost entirely of maintained grasses. The majority of the soil types on site consist of NP (Newport Urban land complex), with a small area of UrS (Urban Land) along the south property line as designated by the USDA Natural Resource Conservation Service. These are generally type C hydrologic soils common to Aquidneck Island. Class IV soil evaluations performed on site revealed a high groundwater table located approximately twelve (12) to seventeen (17) inches below grade. Sandy soils were found below the top layer of fill. The project lies within the Town of Middletown Watershed Protection District Zone 2.

## 1.5 PROPOSED IMPROVEMENTS

The owner intends to demolish both existing structures and develop the parcel for use as an 8-unit motel structure. The lower level of the structure will feature a small parking garage and pool equipment room while the upper structure levels will contain the motel units. A small pervious paver driveway and parking area is to be located adjacent to Wave Avenue. To the south of the structure, a raised pool and wooden deck is to be constructed, surrounded by a pervious paver patio. The new structure is to be linked to the existing hotel structure to the west with a paver walkway and to the concrete sidewalk along Aquidneck Avenue with a wooden ramp. The new structure will utilize municipal water and sewer services. The overhead wires serving the property will be removed, and a new underground service will be installed. All proposed utility improvements are subject to design review by the applicable entities. The proposed structure lies within a FEMA designated "A" zone with an associated elevation of 14 (NAVD).

# 2.0 PROPOSED ALTERATIONS AND STORMWATER CONSIDERATIONS

## 2.1 STORMWATER SYSTEM OBJECTIVES

The objectives of the project stormwater system are to accomplish the following:

- **Provide water quality treatment in accordance with the Rhode Island Stormwater Design and Installation Rules (250-RICR-150-10-8), hereafter abbreviated as the "Rules".**
- **Reduce or maintain the peak rate of runoff to all design points for the 1, 2, 10, 25 and 100-Year Type III 24-hour storm events. (1, 10, 100 per the Rules, 2 and 25 per the local municipality) to the extent possible.**
- **Maintain the overall drainage patterns from the site to the extent practicable.**
- **Reduce peak runoff and total volume runoff to the abutting state roadway.**

## 2.2 QUALIFICATION OF MINIMUM STANDARDS

### 2.2.1 MINIMUM STANDARD 1: LID SITE PLANNING AND DESIGN STRATEGIES

LID design standards have been applied to the maximum extent practicable. The site is limited by high seasonal water tables and close proximity abutting structures. It is additionally limited by the fact that the existing property is situated at a lower elevation than the surrounding roadways and properties. Despite this, LID devices in conformance with the Rules have been proposed to address the mandated minimum standards.

A Stormwater Management Plan Checklist in conformance with Appendix A of the Rules has been completed and attached as Appendix H.

### 2.2.2 MINIMUM STANDARD 2: GROUNDWATER RECHARGE

Per the Rules, the stormwater system is required to provide groundwater recharge for runoff from impervious areas of the proposed development to replicate the existing subsurface hydrology. Class IV soil evaluations performed in the grassed lawn revealed a seasonal high groundwater table located approximately twelve (12) to seventeen (17) inches below the surface. Due to these elevated water tables, the pervious paver driveway strata must be lined. It is anticipated that the unlined paver patio to the rear of the structure will provide some measure of groundwater recharge, particularly during the dry seasons; however, for the purposes of this design, no infiltration has been credited. A waiver from the groundwater recharge standard is requested.

### 2.2.3 MINIMUM STANDARD 3: WATER QUALITY

Water quality for the rooftop of the proposed structure will be provided by two underground sand filters which are connected to the downspouts. The remainder of the surfaces are pervious grass and landscaping or are pervious pavers in conformance with the Rules. As there is no specific water quality volume associated with the use of pervious pavers, no volume calculations can be provided for these surfaces. It is assumed that a properly designed pervious paver system will treat an area equivalent to itself. A small portion of concrete apron has been specified for the connection to the existing roadway to ensure that municipal street sweeping would not contribute sediments to the pervious surface. Refer to Appendix F for water quality calculations.

### 2.2.4 MINIMUM STANDARD 4: CONVEYANCE AND NATURAL CHANNEL PROTECTION

Open drainage and pipe conveyance systems must be designed to provide adequate passage for flows leading to, from, and through stormwater management facilities for at least the peak from the 10-year, 24-hour Type III design storm events. The proposed pipe system is modeled in HydroCAD. No structure exceeds its flood elevation in the 10-year storm.

Protection for natural channels downstream must be supplied by providing 24-hour extended detention of the one-year, 24-hour Type III design storm event runoff volume. The Rules state that for small facilities with impervious cover less than or equal to 1 acre, this channel protection criteria can be waived. The proposed conditions buildout represents far less than 1 acre of total impervious area. It is therefore reasonable that this criterion may be waived for this development.

### 2.2.5 MINIMUM STANDARD 5: OVERBANK FLOOD PROTECTION

Downstream overbank flood protection must be provided by attenuating the post-development peak discharge rate to the pre-development levels for the 10-year and 100-year, 24-hour Type III storm events. In addition, designers must demonstrate that runoff from the site for storms up to the 100-year, 24-hour Type III design storm events actually reach proposed structural practices designed to meet this criterion.

The analysis provided in Section 3 of this report shows that the peak discharge rates for the required storm events are managed.

### 2.2.6 MINIMUM STANDARD 6: REDEVELOPMENT AND INFILL PROJECTS

The site does not qualify as a redevelopment or infill project and is not subject to reduced water quality standards. This standard does not apply.

### 2.2.7 MINIMUM STANDARD 7: POLLUTION PREVENTION

All development sites require the use of source control and pollution prevention measures to minimize the impact that the land use may have on stormwater runoff quality. These measures shall be outlined in a stormwater pollution prevention plan.

A stormwater pollution prevention plan using the template provided by RIDEM has been prepared as a separate document.

### 2.2.8 MINIMUM STANDARD 8: LAND USES WITH HIGHER POTENTIAL POLLUTANT LOADS

This land use proposed does not qualify as a "land use with higher potential pollutant load". This standard does not apply.

### 2.2.9 MINIMUM STANDARD 9: ILLICIT DISCHARGES

All illicit discharges to stormwater management systems are prohibited, including discharges from OWTS, and sub-drains and French drains near OWTS that do not meet the State's OWTS Rules.

There are three OWTS existing cesspools that support the two existing residences. These systems will be removed as part of construction. The proposed structure will be connected to the municipal sewer system. There will be no illicit discharges to any stormwater system.

### 2.2.10 MINIMUM STANDARD 10: CONSTRUCTION ACTIVITY SOIL EROSION, RUNOFF, SEDIMENTATION, AND POLLUTION PREVENTION CONTROL MEASURE REQUIREMENTS

Soil Erosion and Sedimentation Control (SESC) measures must be utilized during the construction phase as well as during land disturbing activities. Soil Erosion and Sediment control measures have been located on the site design plans (sheet C-6) and detailed (sheet C-9). Thes measures are consistent with the Rhode Island Soil Erosion Control Handbook. This minimum standard has been addressed.

### 2.2.11 MINIMUM STANDARD 11: STORMWATER MANAGEMENT SYSTEM OPERATION AND MAINTENANCE

The stormwater management system, including all structural stormwater controls and conveyance, must have an operation and maintenance plan to ensure that it continues to function as designed.

A separate stormwater operation and maintenance document has been prepared in conformance with the required sections outlined by the Rules.

## 2.3 **OVERALL STORMWATER DESIGN FUNCTION**

The stormwater system is comprised of three main components. The first component is a pair of identical subsurface sand filters each consisting of two Cultec C100HD chambers over 12 inches of ASTM C-33 sand. These sand filters treat the rooftop runoff of the structure. The second component of the system is the pervious paver patio at the rear of the structure. The pervious pavers are situated over a system of R-Tank modular plastic chambers which provide detention for collected stormwater. Overflow water from the rooftop downspouts is also routed to this R-Tank system. The R-Tank system is situated above the seasonal high groundwater and is therefore unlined. Both the R-Tank system and the sand filter underdrains discharge to a secondary R-Tank system located in the front yard under the pervious paver driveway. The second R-Tank system collects runoff from yard drains and the paver driveway above. This second R-Tank system is lined to prevent interaction with the groundwater. Stormwater discharged from this secondary system is routed to a municipal storm drain in Wave Avenue.

## 3.0 DESIGN MODELING METHODOLOGY

Runoff and routing calculations have been performed for the watershed areas affected by the proposed development under existing and proposed development conditions scenarios. Time of concentration and runoff curve number calculations have been performed using the method described in NRCS Technical Release 55 – Urban Hydrology for Small Watersheds. The TR-20 based HydroCAD modeling software has been utilized to perform the runoff and routing calculations.

Design rainfall events have been modeled using the Soil Conservation Service (SCS) Type III hydrograph for 24-hour duration storms. The rainfall depth for each return period is taken from **Section 8.6** of the Rules. This Section split the state into five regions for rainfall frequency based on county. The project site is located in the **Newport** County region. The rainfall frequency values required by the Rules and used in this drainage analysis are listed in the table below.

| Rainfall Frequency Values for **Newport County** Rhode Island with 24-Hour Storm Duration | | | | | |
|---|---|---|---|---|---|
| RIDEM *Stormwater Design and Installation Rules (250-RICR-150-10-8)* | | | | | |
| Frequency | 1-Yr | 2-Yr | 10-Yr | 25-Yr | 100-Yr |
| Inches of Rainfall | 2.8 | 3.3 | 4.9 | 6.1 | 8.6 |

The existing and proposed conditions runoff calculations were analyzed and the proposed stormwater system was sized to mitigate the peak runoff for the 1, 2, 10, 25 and 100-year 24-hour design storms. The 1, 10, and 100-year storm requirements are mandated by the Rules, while mitigation of the 2- and 25-year storms are also required by the municipality. The resulting stormwater management devices were designed to effectively capture, detain, and treat runoff from developed areas of the site.

## 3.1 ANALYSIS DESIGN POINTS AND OFF-SITE CONTRIBUTIONS

The proposed development contributes stormwater runoff to the following design points. These design points provide a direct comparison for pre-construction and post-construction runoff flows and runoff volumes.

1. Wave Avenue (and Middletown DPW drainage system).
2. Aquidneck Avenue (and RIDOT drainage system).

The following off-site areas contribute surface stormwater runoff to these design points. This runoff either drains through the project area or contributes in some manner which directly affects the design of the stormwater system and has been included in the design calculations. These areas are:

1. None.

Watershed maps for both the existing and proposed conditions can be found in Appendix B. These maps demonstrate the areas of the site which contribute to each of the design points and indicate the general pattern of surface or piped runoff flow.

## 4.0 STORMWATER RUNOFF COMPARISON

Comparison of the runoff at each design point is given below in. All of the HydroCAD modeling worksheets are attached in Appendix C and D. Due to the fact that the proposed pipe network is represented in the hydrodynamic model, no separate pipe capacity calculations are required.

**Table 4.1 Comparison of Runoff Values at the Design Point 1 (101 vs. 201)**
**(Wave Avenue and Middletown DPW drainage system)**

| Storm Return Period | Existing Conditions Peak Runoff (cfs) | Proposed Conditions Peak Runoff (cfs) | Existing Conditions Volume Runoff (af) | Proposed Conditions Volume (af) |
|---|---|---|---|---|
| 1-year | 0.01 | 0.01 | 0.001 | 0.043 |
| 2-year | 0.02 | 0.01 | 0.001 | 0.052 |
| 10-year | 0.03 | 0.02 | 0.002 | 0.078 |
| 25-year | 0.04 | 0.02 | 0.003 | 0.099 |
| 100-year | 0.36 | 0.14 | 0.012 | 0.161 |

**Table 4.2 Comparison of Runoff Values at the Design Point 2 (102 vs. 202)**
**(Aquidneck Avenue and RIDOT drainage system)**

| Storm Return Period | Existing Conditions Peak Runoff (cfs) | Proposed Conditions Peak Runoff (cfs) | Existing Conditions Volume Runoff (af) | Proposed Conditions Volume Runoff (af) |
|---|---|---|---|---|
| 1-year | 0.01 | 0.01 | 0.001 | 0.001 |
| 2-year | 0.02 | 0.02 | 0.001 | 0.001 |
| 10-year | 0.04 | 0.04 | 0.003 | 0.003 |
| 25-year | 0.06 | 0.06 | 0.004 | 0.004 |
| 100-year | 0.10 | 0.09 | 0.007 | 0.006 |

## 5.0 LIMITATIONS AND SPECIAL TERMS AND CONDITIONS

1. NE&C's evaluation was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area, and NE&C observed the degree of care and skill generally exercised by other consultants under similar circumstances and conditions. No warrantee expressed or implied is made.

2. Any additional research conducted should be reviewed by Northeast Engineers & Consultants, Inc., such that the conclusions presented herein may be modified.

3. All observations documented in this report were performed under the existing conditions at the time of the assessment.

4. This report has been prepared on the behalf of and is for the exclusive use of the Client. This report and findings contained herein shall not, in whole or in part be disseminated or conveyed to any party, nor used by any other party in whole or in part, without the written consent of NE&C.

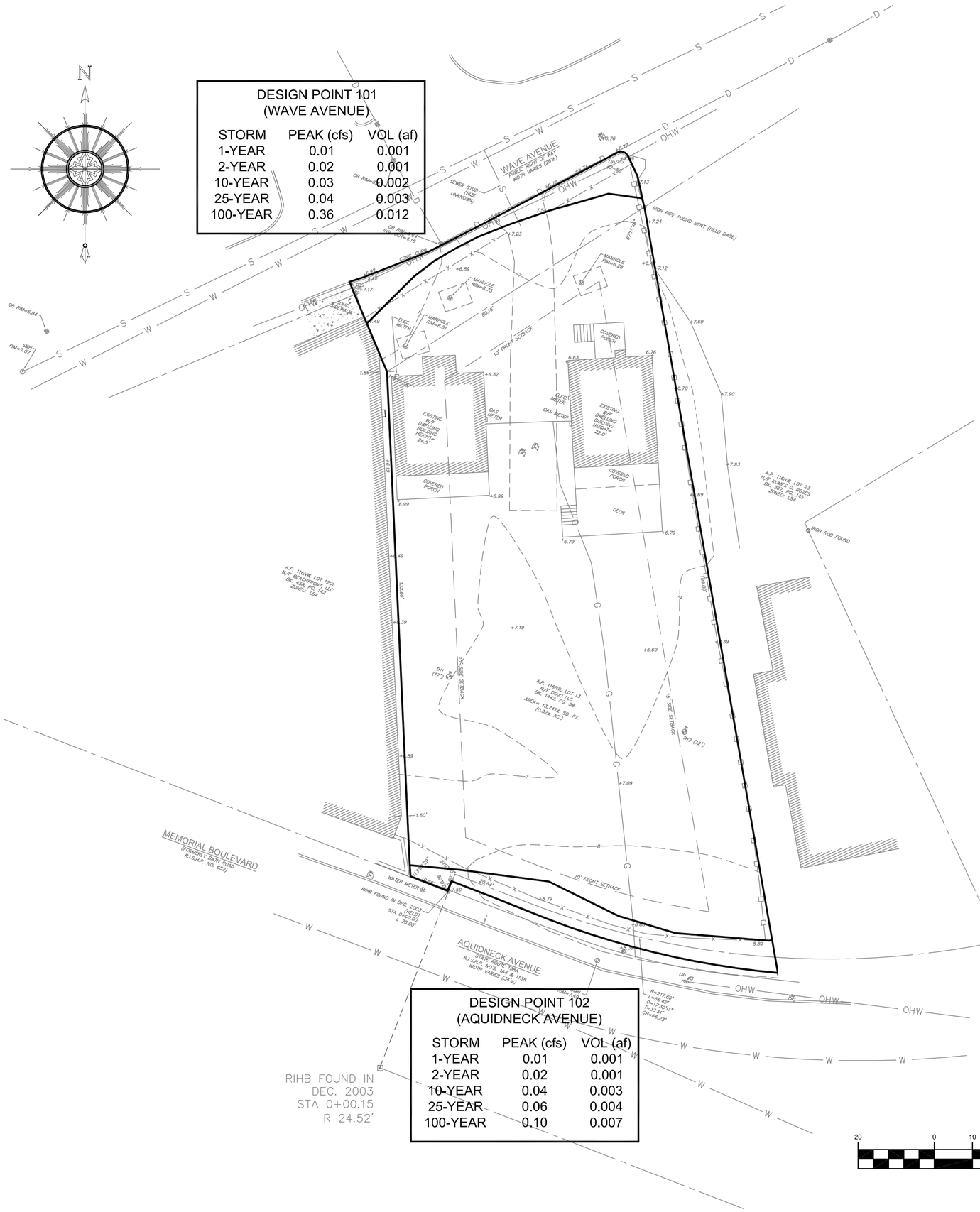
# APPENDIX A FIGURES


| Scale: NTS | Date: 21DEC23 | Designed By: | Drawn By: | Checked By: |
|---|---|---|---|---|
| Project Title: WAVE POND HOTEL LLC<br>AQUIDNECK AND WAVE AVENUES, MIDDLETOWN, RI | | Drawing Title: LOCATION MAP | | |
| Issued for: PERMITTING | | Drawing Number: F-1 | Project Number: 15018.3 | |


| Scale: NTS | Date: 21DEC23 | Designed By: | Drawn By: | Checked By: |
|---|---|---|---|---|
| Project Title: WAVE POND HOTEL LLC<br>AQUIDNECK AND WAVE AVENUES, MIDDLETOWN, RI | | Drawing Title: SOILS MAP | | |
| Issued for: PERMITTING | | Drawing Number: F-2 | Project Number: 15018.3 | |


| Scale: NTS | Date: 21DEC23 | Designed By: | Drawn By: | Checked By: |
|---|---|---|---|---|
| Project Title: WAVE POND HOTEL LLC<br>AQUIDNECK AND WAVE AVENUES, MIDDLETOWN, RI | | Drawing Title: AERIAL PHOTOGRAPH | | |
| Issued for: PERMITTING | | Drawing Number: F-3 | Project Number: 15018.3 | |

# APPENDIX B WATERSHED MAPS

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|---|---|---|
| Designed By: JJR | Drawn by: JJR | Checked by: GES |
| Scale: 1"=20' | Date: 21DEC23 | |

Project Title:

# NEWPORT BEACH SUITES
## A.P. 116NW LOT 13
AQUIDNECK AVENUE
AND WAVE AVENUE
MIDDLETOWN, RI

Client/Owner:

WAVE POND HOTEL LLC
1140 RESERVOIR AVENUE
CRANSTON, RI 02920-6320

Drawing Title:

## EXISTING WATERSHED PLAN

Drawing Number: W-1

Sheet 1 of 1

Project Number: 15018.3

Survey Index: – –

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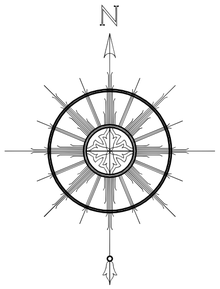


DESIGN POINT 201
TO WAVE AVENUE

| STORM | PEAK (cfs) | VOL (af) |
|---|---|---|
| 1-YEAR | 0.01 | 0.043 |
| 2-YEAR | 0.01 | 0.052 |
| 10-YEAR | 0.02 | 0.078 |
| 25-YEAR | 0.02 | 0.099 |
| 100-YEAR | 0.14 | 0.161 |




DESIGN POINT 202
TO AQUIDNECK AVENUE

| STORM | PEAK (cfs) | VOL (af) |
|---|---|---|
| 1-YEAR | 0.01 | 0.001 |
| 2-YEAR | 0.02 | 0.001 |
| 10-YEAR | 0.04 | 0.003 |
| 25-YEAR | 0.06 | 0.004 |
| 100-YEAR | 0.09 | 0.006 |

GRAPHIC SCALE

20 0 10 20 40 80

(in feet)

1 inch = 20 feet


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|---|---|---|
| Designed By: JJR | Drawn by: JJR | Checked by: GES |
| Scale: 1"=20' | Date: 21DEC23 | |

Project Title:

# NEWPORT BEACH SUITES
## A.P. 116NW LOT 13

AQUIDNECK AVENUE
AND WAVE AVENUE
MIDDLETOWN, RI

Client/Owner:

WAVE POND HOTEL LLC
1140 RESERVOIR AVENUE
CRANSTON, RI 02920-6320

Drawing Title:

## PROPOSED WATERSHED PLAN

Drawing Number: W-2

Sheet 1 of 1

Project Number: 15018.3

Survey Index: – –


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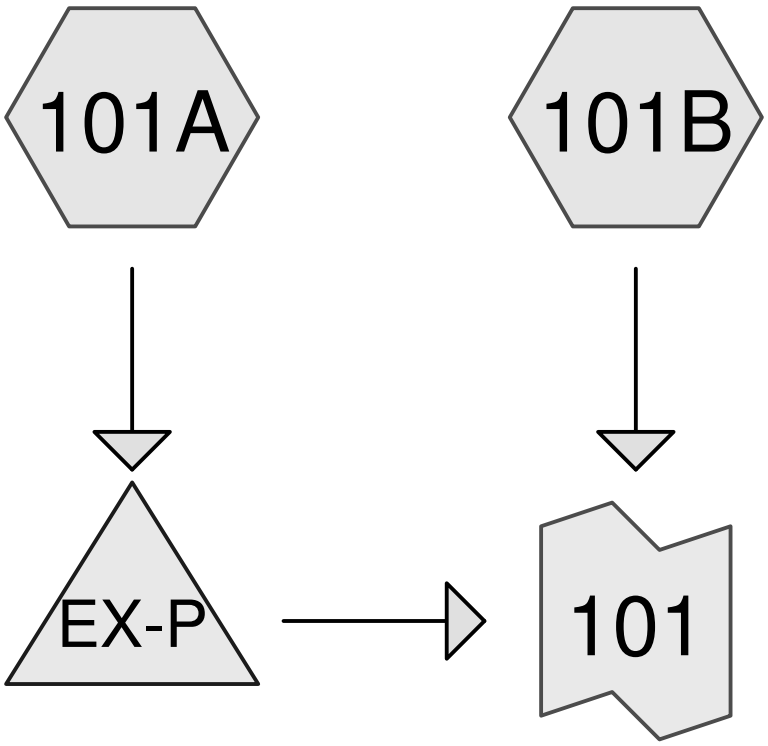
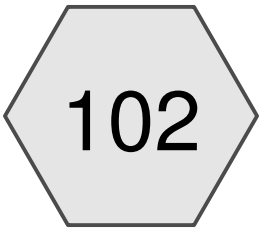
# APPENDIX C EXISTING CONDITIONS HYDROCAD




To Aquidneck Ave
(DP2)

Subcat Reach Pond Link

## Area Listing (selected nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 0.179 | 74 | >75% Grass cover, Good, HSG C (101A, 101B, 102) |
| 0.022 | 95 | Gravel Drive (101A, 101B) |
| 0.118 | 98 | Lawns, Ponding Area (101A) |
| 0.038 | 98 | Roof (101A) |
| **0.357** | **86** | **TOTAL AREA** |

## Summary for Subcatchment 101A:

Runoff = 0.63 cfs @ 12.07 hrs, Volume= 0.043 af, Depth= 1.57"
Routed to Pond EX-P : Lawns

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-year Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,650 | 98 | Roof |
| | 6,741 | 74 | >75% Grass cover, Good, HSG C |
| * | 5,147 | 98 | Lawns, Ponding Area |
| * | 898 | 95 | Gravel Drive |
| | 14,436 | 87 | Weighted Average |
| | 7,639 | 76 | 52.92% Pervious Area |
| | 6,797 | 98 | 47.08% Impervious Area |

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

## Summary for Subcatchment 101B:

Runoff = 0.01 cfs @ 12.08 hrs, Volume= 0.001 af, Depth= 0.88"
Routed to Link 101 : Wave Avenue (DP1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-year Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 410 | 74 | >75% Grass cover, Good, HSG C |
| * | 55 | 95 | Gravel Drive |
| | 465 | 76 | Weighted Average |
| | 465 | 76 | 100.00% Pervious Area |

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

## Summary for Subcatchment 102: To Aquidneck Ave (DP2)

Runoff = 0.01 cfs @ 12.08 hrs, Volume= 0.001 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-year Rainfall=2.80"

| Area (sf) | CN | Description |
|---|---|---|
| 641 | 74 | >75% Grass cover, Good, HSG C |
| 641 | 74 | 100.00% Pervious Area |

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

## Summary for Pond EX-P: Lawns

Inflow Area = 0.331 ac, 47.08% Impervious, Inflow Depth = 1.57" for 1-year event
Inflow = 0.63 cfs @ 12.07 hrs, Volume= 0.043 af
Outflow = 0.29 cfs @ 12.25 hrs, Volume= 0.043 af, Atten= 54%, Lag= 10.3 min
Discarded = 0.29 cfs @ 12.25 hrs, Volume= 0.043 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 101 : Wave Avenue (DP1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 6.49' @ 12.25 hrs Surf.Area= 1,514 sf Storage= 276 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 6.0 min ( 829.7 - 823.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6.19' | 7,661 cf | **Lawns (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.19 | 164 | 0 | 0 |
| 6.32 | 879 | 68 | 68 |
| 6.63 | 2,011 | 448 | 516 |
| 6.98 | 5,147 | 1,253 | 1,768 |
| 7.00 | 8,215 | 134 | 1,902 |
| 7.50 | 14,820 | 5,759 | 7,661 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6.89' | **127.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.48 (C= 3.10) |
| #2 | Discarded | 6.19' | **8.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.29 cfs @ 12.25 hrs HW=6.49' (Free Discharge)
**2=Exfiltration** (Exfiltration Controls 0.29 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=6.19' TW=0.00' (Dynamic Tailwater)
**1=Sharp-Crested Vee/Trap Weir** ( Controls 0.00 cfs)

## Summary for Link 101: Wave Avenue (DP1)

Inflow Area = 0.342 ac, 45.61% Impervious, Inflow Depth = 0.03" for 1-year event
Inflow = 0.01 cfs @ 12.08 hrs, Volume= 0.001 af
Primary = 0.01 cfs @ 12.08 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

## Summary for Subcatchment 101A:

Runoff = 0.81 cfs @ 12.07 hrs, Volume= 0.055 af, Depth= 2.00"
Routed to Pond EX-P : Lawns

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,650 | 98 | Roof |
| | 6,741 | 74 | >75% Grass cover, Good, HSG C |
| * | 5,147 | 98 | Lawns, Ponding Area |
| * | 898 | 95 | Gravel Drive |
| | 14,436 | 87 | Weighted Average |
| | 7,639 | 76 | 52.92% Pervious Area |
| | 6,797 | 98 | 47.08% Impervious Area |

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

## Summary for Subcatchment 101B:

Runoff = 0.02 cfs @ 12.08 hrs, Volume= 0.001 af, Depth= 1.22"
Routed to Link 101 : Wave Avenue (DP1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 410 | 74 | >75% Grass cover, Good, HSG C |
| * | 55 | 95 | Gravel Drive |
| | 465 | 76 | Weighted Average |
| | 465 | 76 | 100.00% Pervious Area |

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

## Summary for Subcatchment 102: To Aquidneck Ave (DP2)

Runoff = 0.02 cfs @ 12.08 hrs, Volume= 0.001 af, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.30"

| Area (sf) | CN | Description |
|---|---|---|
| 641 | 74 | >75% Grass cover, Good, HSG C |
| 641 | 74 | 100.00% Pervious Area |

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

## Summary for Pond EX-P: Lawns

Inflow Area = 0.331 ac, 47.08% Impervious, Inflow Depth = 2.00" for 2-year event
Inflow = 0.81 cfs @ 12.07 hrs, Volume= 0.055 af
Outflow = 0.34 cfs @ 12.27 hrs, Volume= 0.055 af, Atten= 58%, Lag= 11.9 min
Discarded = 0.34 cfs @ 12.27 hrs, Volume= 0.055 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 101 : Wave Avenue (DP1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 6.57' @ 12.27 hrs Surf.Area= 1,783 sf Storage= 397 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 7.6 min ( 824.2 - 816.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6.19' | 7,661 cf | **Lawns (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.19 | 164 | 0 | 0 |
| 6.32 | 879 | 68 | 68 |
| 6.63 | 2,011 | 448 | 516 |
| 6.98 | 5,147 | 1,253 | 1,768 |
| 7.00 | 8,215 | 134 | 1,902 |
| 7.50 | 14,820 | 5,759 | 7,661 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6.89' | **127.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.48 (C= 3.10) |
| #2 | Discarded | 6.19' | **8.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.34 cfs @ 12.27 hrs HW=6.57' (Free Discharge)
**2=Exfiltration** (Exfiltration Controls 0.34 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=6.19' TW=0.00' (Dynamic Tailwater)
**1=Sharp-Crested Vee/Trap Weir** ( Controls 0.00 cfs)

## Summary for Link 101: Wave Avenue (DP1)

Inflow Area = 0.342 ac, 45.61% Impervious, Inflow Depth = 0.04" for 2-year event
Inflow = 0.02 cfs @ 12.08 hrs, Volume= 0.001 af
Primary = 0.02 cfs @ 12.08 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

## Summary for Subcatchment 101A:

Runoff = 1.37 cfs @ 12.07 hrs, Volume= 0.096 af, Depth= 3.47"
Routed to Pond EX-P : Lawns

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,650 | 98 | Roof |
| | 6,741 | 74 | >75% Grass cover, Good, HSG C |
| * | 5,147 | 98 | Lawns, Ponding Area |
| * | 898 | 95 | Gravel Drive |
| | 14,436 | 87 | Weighted Average |
| | 7,639 | 76 | 52.92% Pervious Area |
| | 6,797 | 98 | 47.08% Impervious Area |

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

## Summary for Subcatchment 101B:

Runoff = 0.03 cfs @ 12.08 hrs, Volume= 0.002 af, Depth= 2.45"
Routed to Link 101 : Wave Avenue (DP1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 410 | 74 | >75% Grass cover, Good, HSG C |
| * | 55 | 95 | Gravel Drive |
| | 465 | 76 | Weighted Average |
| | 465 | 76 | 100.00% Pervious Area |

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

## Summary for Subcatchment 102: To Aquidneck Ave (DP2)

Runoff = 0.04 cfs @ 12.08 hrs, Volume= 0.003 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 641 | 74 | >75% Grass cover, Good, HSG C |
| | 641 | 74 | 100.00% Pervious Area |

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

## Summary for Pond EX-P: Lawns

Inflow Area = 0.331 ac, 47.08% Impervious, Inflow Depth = 3.47" for 10-year event
Inflow = 1.37 cfs @ 12.07 hrs, Volume= 0.096 af
Outflow = 0.58 cfs @ 12.26 hrs, Volume= 0.096 af, Atten= 58%, Lag= 11.5 min
Discarded = 0.58 cfs @ 12.26 hrs, Volume= 0.096 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 101 : Wave Avenue (DP1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 6.74' @ 12.26 hrs Surf.Area= 3,004 sf Storage= 794 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 10.9 min ( 812.0 - 801.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6.19' | 7,661 cf | **Lawns (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.19 | 164 | 0 | 0 |
| 6.32 | 879 | 68 | 68 |
| 6.63 | 2,011 | 448 | 516 |
| 6.98 | 5,147 | 1,253 | 1,768 |
| 7.00 | 8,215 | 134 | 1,902 |
| 7.50 | 14,820 | 5,759 | 7,661 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6.89' | **127.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.48 (C= 3.10) |
| #2 | Discarded | 6.19' | **8.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.57 cfs @ 12.26 hrs HW=6.74' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.57 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=6.19' TW=0.00' (Dynamic Tailwater)
↑—**1=Sharp-Crested Vee/Trap Weir** ( Controls 0.00 cfs)

## Summary for Link 101: Wave Avenue (DP1)

Inflow Area = 0.342 ac, 45.61% Impervious, Inflow Depth = 0.08" for 10-year event
Inflow = 0.03 cfs @ 12.08 hrs, Volume= 0.002 af
Primary = 0.03 cfs @ 12.08 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

## Summary for Subcatchment 101A:

Runoff = 1.80 cfs @ 12.07 hrs, Volume= 0.127 af, Depth= 4.61"
Routed to Pond EX-P : Lawns

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,650 | 98 | Roof |
| | 6,741 | 74 | >75% Grass cover, Good, HSG C |
| * | 5,147 | 98 | Lawns, Ponding Area |
| * | 898 | 95 | Gravel Drive |
| | 14,436 | 87 | Weighted Average |
| | 7,639 | 76 | 52.92% Pervious Area |
| | 6,797 | 98 | 47.08% Impervious Area |

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

## Summary for Subcatchment 101B:

Runoff = 0.04 cfs @ 12.07 hrs, Volume= 0.003 af, Depth= 3.47"
Routed to Link 101 : Wave Avenue (DP1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 410 | 74 | >75% Grass cover, Good, HSG C |
| * | 55 | 95 | Gravel Drive |
| | 465 | 76 | Weighted Average |
| | 465 | 76 | 100.00% Pervious Area |

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

## Summary for Subcatchment 102: To Aquidneck Ave (DP2)

Runoff = 0.06 cfs @ 12.08 hrs, Volume= 0.004 af, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 641 | 74 | >75% Grass cover, Good, HSG C |
| | 641 | 74 | 100.00% Pervious Area |

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

## Summary for Pond EX-P: Lawns

Inflow Area = 0.331 ac, 47.08% Impervious, Inflow Depth = 4.61" for 25-year event
Inflow = 1.80 cfs @ 12.07 hrs, Volume= 0.127 af
Outflow = 0.73 cfs @ 12.27 hrs, Volume= 0.127 af, Atten= 59%, Lag= 11.9 min
Discarded = 0.73 cfs @ 12.27 hrs, Volume= 0.127 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 101 : Wave Avenue (DP1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 6.83' @ 12.27 hrs Surf.Area= 3,825 sf Storage= 1,107 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 12.5 min ( 805.7 - 793.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6.19' | 7,661 cf | **Lawns (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.19 | 164 | 0 | 0 |
| 6.32 | 879 | 68 | 68 |
| 6.63 | 2,011 | 448 | 516 |
| 6.98 | 5,147 | 1,253 | 1,768 |
| 7.00 | 8,215 | 134 | 1,902 |
| 7.50 | 14,820 | 5,759 | 7,661 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6.89' | **127.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.48 (C= 3.10) |
| #2 | Discarded | 6.19' | **8.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.73 cfs @ 12.27 hrs HW=6.83' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.73 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=6.19' TW=0.00' (Dynamic Tailwater)
↑—**1=Sharp-Crested Vee/Trap Weir** ( Controls 0.00 cfs)

## Summary for Link 101: Wave Avenue (DP1)

Inflow Area = 0.342 ac, 45.61% Impervious, Inflow Depth = 0.11" for 25-year event
Inflow = 0.04 cfs @ 12.07 hrs, Volume= 0.003 af
Primary = 0.04 cfs @ 12.07 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

## Summary for Subcatchment 101A:

Runoff = 2.69 cfs @ 12.07 hrs, Volume= 0.194 af, Depth= 7.03"
Routed to Pond EX-P : Lawns

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,650 | 98 | Roof |
| | 6,741 | 74 | >75% Grass cover, Good, HSG C |
| * | 5,147 | 98 | Lawns, Ponding Area |
| * | 898 | 95 | Gravel Drive |
| | 14,436 | 87 | Weighted Average |
| | 7,639 | 76 | 52.92% Pervious Area |
| | 6,797 | 98 | 47.08% Impervious Area |

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

## Summary for Subcatchment 101B:

Runoff = 0.07 cfs @ 12.07 hrs, Volume= 0.005 af, Depth= 5.71"
Routed to Link 101 : Wave Avenue (DP1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 410 | 74 | >75% Grass cover, Good, HSG C |
| * | 55 | 95 | Gravel Drive |
| | 465 | 76 | Weighted Average |
| | 465 | 76 | 100.00% Pervious Area |

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

## Summary for Subcatchment 102: To Aquidneck Ave (DP2)

Runoff = 0.10 cfs @ 12.07 hrs, Volume= 0.007 af, Depth= 5.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 641 | 74 | >75% Grass cover, Good, HSG C |
| | 641 | 74 | 100.00% Pervious Area |

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

## Summary for Pond EX-P: Lawns

Inflow Area = 0.331 ac, 47.08% Impervious, Inflow Depth = 7.03" for 100-year event
Inflow = 2.69 cfs @ 12.07 hrs, Volume= 0.194 af
Outflow = 1.28 cfs @ 12.21 hrs, Volume= 0.194 af, Atten= 52%, Lag= 8.4 min
Discarded = 0.96 cfs @ 12.21 hrs, Volume= 0.187 af
Primary = 0.32 cfs @ 12.21 hrs, Volume= 0.007 af
Routed to Link 101 : Wave Avenue (DP1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 6.96' @ 12.21 hrs Surf.Area= 5,008 sf Storage= 1,690 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 14.2 min ( 796.0 - 781.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6.19' | 7,661 cf | **Lawns (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.19 | 164 | 0 | 0 |
| 6.32 | 879 | 68 | 68 |
| 6.63 | 2,011 | 448 | 516 |
| 6.98 | 5,147 | 1,253 | 1,768 |
| 7.00 | 8,215 | 134 | 1,902 |
| 7.50 | 14,820 | 5,759 | 7,661 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6.89' | **127.0 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.48 (C= 3.10) |
| #2 | Discarded | 6.19' | **8.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.96 cfs @ 12.21 hrs HW=6.96' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.96 cfs)

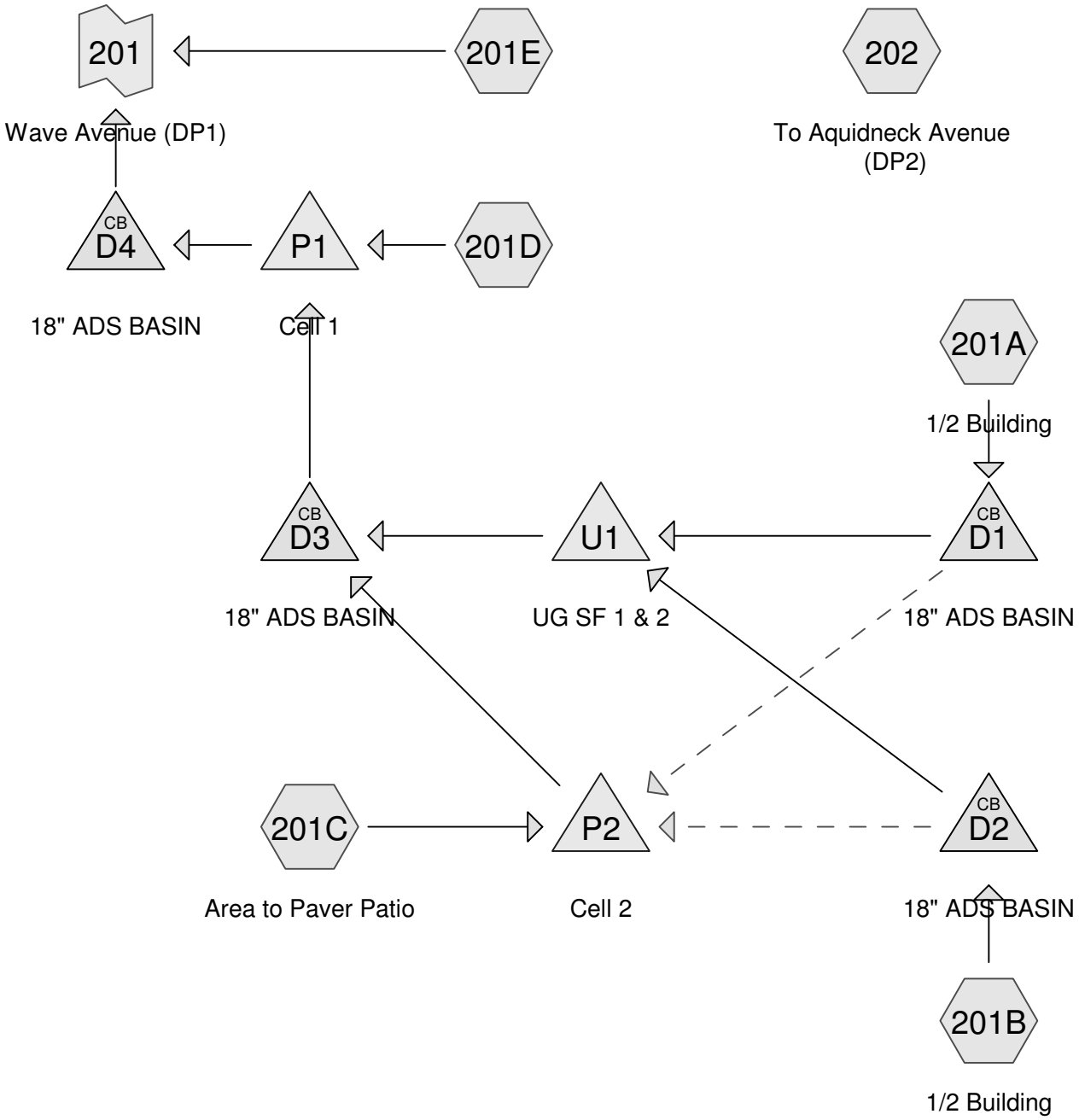
**Primary OutFlow** Max=0.32 cfs @ 12.21 hrs HW=6.96' TW=0.00' (Dynamic Tailwater)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.32 cfs @ 0.84 fps)

## Summary for Link 101: Wave Avenue (DP1)

Inflow Area = 0.342 ac, 45.61% Impervious, Inflow Depth = 0.43" for 100-year event
Inflow = 0.36 cfs @ 12.20 hrs, Volume= 0.012 af
Primary = 0.36 cfs @ 12.20 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

# APPENDIX D PROPOSED CONDITIONS HYDROCAD




Subcat Reach Pond Link

**Routing Diagram for 15018_2023-12-15 REVISED DESIGN**
Prepared by Northeast Engineers & Consultants, Inc., Printed 12/21/2023
HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

## Area Listing (selected nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 0.195 | 98 | 98% capture (201C, 201D) |
| 0.097 | 74 | >75% Grass cover, Good, HSG C (201C, 201D, 202) |
| 0.001 | 98 | Concrete walk (202) |
| 0.003 | 98 | Pavement (201E) |
| 0.001 | 98 | Retaining wall (202) |
| 0.056 | 98 | Roof (201A, 201B) |
| 0.003 | 70 | Wood stairs with 12" stone below (202) |
| **0.356** | **91** | **TOTAL AREA** |

## Summary for Subcatchment 201A: 1/2 Building

Runoff = 0.08 cfs @ 12.07 hrs, Volume= 0.006 af, Depth= 2.57"
Routed to Pond D1 : 18" ADS BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-year Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,212 | 98 | Roof |
| | 1,212 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 201B: 1/2 Building

Runoff = 0.08 cfs @ 12.07 hrs, Volume= 0.006 af, Depth= 2.57"
Routed to Pond D2 : 18" ADS BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-year Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,212 | 98 | Roof |
| | 1,212 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 201C: Area to Paver Patio

Runoff = 0.38 cfs @ 12.07 hrs, Volume= 0.026 af, Depth= 1.89"
Routed to Pond P2 : Cell 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-year Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5,245 | 98 | 98% capture |
| | 2,100 | 74 | >75% Grass cover, Good, HSG C |
| | 7,345 | 91 | Weighted Average |
| | 2,100 | 74 | 28.59% Pervious Area |
| | 5,245 | 98 | 71.41% Impervious Area |

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

## Summary for Subcatchment 201D:

Runoff = 0.24 cfs @ 12.07 hrs, Volume= 0.017 af, Depth= 1.72"
Routed to Pond P1 : Cell 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-year Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,239 | 98 | 98% capture |
| | 1,800 | 74 | >75% Grass cover, Good, HSG C |
| | 5,039 | 89 | Weighted Average |
| | 1,800 | 74 | 35.72% Pervious Area |
| | 3,239 | 98 | 64.28% Impervious Area |

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

## Summary for Subcatchment 201E:

Runoff = 0.01 cfs @ 12.07 hrs, Volume= 0.001 af, Depth= 2.57"
Routed to Link 201 : Wave Avenue (DP1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-year Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 123 | 98 | Pavement |
| | 123 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 202: To Aquidneck Avenue (DP2)

Runoff = 0.01 cfs @ 12.08 hrs, Volume= 0.001 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-year Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 337 | 74 | >75% Grass cover, Good, HSG C |
| * | 30 | 98 | Retaining wall |
| * | 150 | 70 | Wood stairs with 12" stone below |
| * | 56 | 98 | Concrete walk |
| | 573 | 77 | Weighted Average |
| | 487 | 73 | 84.99% Pervious Area |
| | 86 | 98 | 15.01% Impervious Area |

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

## Summary for Pond D1: 18" ADS BASIN

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 2.57" for 1-year event
Inflow = 0.08 cfs @ 12.07 hrs, Volume= 0.006 af
Outflow = 0.08 cfs @ 12.07 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min
Primary = 0.08 cfs @ 12.07 hrs, Volume= 0.005 af
Routed to Pond U1 : UG SF 1 & 2
Secondary = 0.04 cfs @ 12.18 hrs, Volume= 0.001 af
Routed to Pond P2 : Cell 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

Peak Elev= 8.81' @ 12.18 hrs
Flood Elev= 10.50'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 8.34' | **4.0" Round 4" PVC To chambers** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.34' / 8.21' S= 0.0260 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |
| #2 | Secondary | 8.67' | **4.0" Round 4" PVC to R-tanks** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.67' / 8.50' S= 0.0340 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.08 cfs @ 12.07 hrs HW=8.53' TW=8.29' (Dynamic Tailwater)
**1=4" PVC To chambers** (Inlet Controls 0.08 cfs @ 1.49 fps)

**Secondary OutFlow** Max=0.04 cfs @ 12.18 hrs HW=8.81' TW=6.23' (Dynamic Tailwater)
**2=4" PVC to R-tanks** (Inlet Controls 0.04 cfs @ 1.25 fps)

## Summary for Pond D2: 18" ADS BASIN

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 2.57" for 1-year event
Inflow = 0.08 cfs @ 12.07 hrs, Volume= 0.006 af
Outflow = 0.08 cfs @ 12.07 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min
Primary = 0.08 cfs @ 12.07 hrs, Volume= 0.005 af
Routed to Pond U1 : UG SF 1 & 2
Secondary = 0.04 cfs @ 12.18 hrs, Volume= 0.001 af
Routed to Pond P2 : Cell 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 8.81' @ 12.18 hrs
Flood Elev= 10.50'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 8.34' | **4.0" Round 4" PVC To chambers** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.34' / 8.21' S= 0.0260 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |
| #2 | Secondary | 8.67' | **4.0" Round 4" PVC to R-tanks** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.67' / 8.50' S= 0.0340 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.08 cfs @ 12.07 hrs HW=8.53' TW=8.29' (Dynamic Tailwater)
**1=4" PVC To chambers** (Inlet Controls 0.08 cfs @ 1.49 fps)

**Secondary OutFlow** Max=0.04 cfs @ 12.18 hrs HW=8.81' TW=6.23' (Dynamic Tailwater)
**2=4" PVC to R-tanks** (Inlet Controls 0.04 cfs @ 1.25 fps)

## Summary for Pond D3: 18" ADS BASIN

Inflow Area = 0.224 ac, 78.50% Impervious, Inflow Depth > 1.96" for 1-year event
Inflow = 0.01 cfs @ 13.69 hrs, Volume= 0.037 af
Outflow = 0.01 cfs @ 13.69 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min
Primary = 0.01 cfs @ 13.69 hrs, Volume= 0.037 af
Routed to Pond P1 : Cell 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 5.59' @ 18.84 hrs
Flood Elev= 10.00'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 5.50' | **4.0" Round 4" PVC TO CELL 1** L= 50.0' Ke= 0.500<br>Inlet / Outlet Invert= 5.50' / 5.00' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.01 cfs @ 13.69 hrs HW=5.58' TW=5.20' (Dynamic Tailwater)
**1=4" PVC TO CELL 1** (Outlet Controls 0.01 cfs @ 1.36 fps)

## Summary for Pond D4: 18" ADS BASIN

Inflow Area = 0.340 ac, 73.66% Impervious, Inflow Depth > 1.51" for 1-year event
Inflow = 0.01 cfs @ 24.06 hrs, Volume= 0.043 af
Outflow = 0.01 cfs @ 24.06 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min
Primary = 0.01 cfs @ 24.06 hrs, Volume= 0.043 af
Routed to Link 201 : Wave Avenue (DP1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 4.81' @ 24.06 hrs
Flood Elev= 7.40'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 4.75' | **4.0" Round 4" PVC TO STREET DRAIN** L= 20.0' Ke= 0.500<br>Inlet / Outlet Invert= 4.75' / 4.65' S= 0.0050 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.01 cfs @ 24.06 hrs HW=4.81' TW=0.00' (Dynamic Tailwater)
**1=4" PVC TO STREET DRAIN** (Barrel Controls 0.01 cfs @ 0.95 fps)

## Summary for Pond P1: Cell 1

Inflow Area = 0.340 ac, 73.66% Impervious, Inflow Depth > 1.88" for 1-year event
Inflow = 0.25 cfs @ 12.07 hrs, Volume= 0.053 af
Outflow = 0.01 cfs @ 24.06 hrs, Volume= 0.043 af, Atten= 97%, Lag= 719.1 min
Primary = 0.01 cfs @ 24.06 hrs, Volume= 0.043 af
Routed to Pond D4 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 5.44' @ 24.06 hrs Surf.Area= 2,195 sf Storage= 1,134 cf
Flood Elev= 7.00' Surf.Area= 3,895 sf Storage= 2,729 cf

Plug-Flow detention time= 2,590.7 min calculated for 0.043 af (80% of inflow)
Center-of-Mass det. time= 1,804.0 min ( 3,900.0 - 2,096.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 4.83' | 2,023 cf | **R-Tanks (Prismatic)** Listed below (Recalc)<br>2,129 cf Overall x 95.0% Voids |
| #2 | 6.00' | 561 cf | **Paver stones (Prismatic)** Listed below (Recalc)<br>1,700 cf Overall x 33.0% Voids |
| #3 | 4.83' | 145 cf | **Crushed Stone (Prismatic)** Listed below (Recalc)<br>439 cf Overall x 33.0% Voids |
| | | 2,729 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 4.83 | 1,820 | 0 | 0 |
| 6.00 | 1,820 | 2,129 | 2,129 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.00 | 1,700 | 0 | 0 |
| 7.00 | 1,700 | 1,700 | 1,700 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 4.83 | 375 | 0 | 0 |
| 6.00 | 375 | 439 | 439 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #0 | Primary | 7.00' | **Automatic Storage Overflow** (Discharged without head) |
| #1 | Primary | 4.83' | **0.5" Vert. 4" PVC WITH 0.5" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 5.40' | **1.0" Vert. 4" PVC WITH 1" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.01 cfs @ 24.06 hrs HW=5.44' TW=4.81' (Dynamic Tailwater)
↑—**1=4" PVC WITH 0.5" ORIFICE PLATE** (Orifice Controls 0.01 cfs @ 3.70 fps)
└—**2=4" PVC WITH 1" ORIFICE PLATE** (Orifice Controls 0.00 cfs @ 0.70 fps)

## Summary for Pond P2: Cell 2

Inflow Area = 0.169 ac, 71.41% Impervious, Inflow Depth = 2.00" for 1-year event
Inflow = 0.38 cfs @ 12.07 hrs, Volume= 0.028 af
Outflow = 0.00 cfs @ 22.74 hrs, Volume= 0.026 af, Atten= 99%, Lag= 640.1 min
Primary = 0.00 cfs @ 22.74 hrs, Volume= 0.026 af
Routed to Pond D3 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 6.47' @ 22.74 hrs Surf.Area= 2,326 sf Storage= 1,036 cf
Flood Elev= 10.00' Surf.Area= 4,652 sf Storage= 5,685 cf

Plug-Flow detention time= 2,596.0 min calculated for 0.026 af (94% of inflow)
Center-of-Mass det. time= 2,563.6 min ( 3,366.4 - 802.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6.00' | 4,795 cf | **R-Tanks (LD Single + Mini) (Prismatic)** Listed below (Recalc)<br>5,047 cf Overall x 95.0% Voids |
| #2 | 8.17' | 890 cf | **Stone and Paver media (Prismatic)** Listed below (Recalc)<br>2,698 cf Overall x 33.0% Voids |
| | | 5,685 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.00 | 2,326 | 0 | 0 |
| 8.17 | 2,326 | 5,047 | 5,047 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 8.17 | 2,326 | 0 | 0 |
| 9.33 | 2,326 | 2,698 | 2,698 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6.00' | **0.5" Vert. 4" PVC WTH 0.5" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 7.70' | **4.0" Vert. 4" PVC OUTLET** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.00 cfs @ 22.74 hrs HW=6.47' TW=5.57' (Dynamic Tailwater)
↑—**1=4" PVC WTH 0.5" ORIFICE PLATE** (Orifice Controls 0.00 cfs @ 3.22 fps)
└—**2=4" PVC OUTLET** ( Controls 0.00 cfs)

## Summary for Pond U1: UG SF 1 & 2

Inflow Area = 0.056 ac,100.00% Impervious, Inflow Depth = 2.21" for 1-year event
Inflow = 0.16 cfs @ 12.07 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 12.18 hrs, Volume= 0.010 af, Atten= 93%, Lag= 6.3 min
Primary = 0.01 cfs @ 12.18 hrs, Volume= 0.010 af
Routed to Pond D3 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 8.81' @ 12.18 hrs Surf.Area= 322 sf Storage= 161 cf
Flood Elev= 10.00' Surf.Area= 322 sf Storage= 185 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 127.7 min ( 888.5 - 760.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 7.67' | 69 cf | **15.00'W x 10.00'L x 1.54'H Field A**<br>231 cf Overall - 60 cf Embedded = 172 cf x 40.0% Voids |
| #2A | 7.67' | 60 cf | **Cultec C-100HD** x 4 Inside #1<br>Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf<br>Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap<br>Row Length Adjustment= +0.50' x 1.86 sf x 4 rows |
| #3 | 6.67' | 57 cf | **Sand Media (Prismatic)** Listed below (Recalc) x 2<br>172 cf Overall x 33.0% Voids |
| | | 185 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.67 | 86 | 0 | 0 |
| 7.67 | 86 | 86 | 86 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 6.67' | **8.270 in/hr Filtration Through Media over Surface area** |
| #2 | Primary | 6.00' | **0.5" Vert. 4" Underdrain with 1/2" orifice** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.01 cfs @ 12.18 hrs HW=8.81' TW=5.58' (Dynamic Tailwater)
↑—**2=4" Underdrain with 1/2" orifice** (Orifice Controls 0.01 cfs @ 8.04 fps)
↑—**1=Filtration Through Media** (Passes 0.01 cfs of 0.06 cfs potential flow)

## Summary for Link 201: Wave Avenue (DP1)

Inflow Area = 0.343 ac, 73.88% Impervious, Inflow Depth > 1.52" for 1-year event
Inflow = 0.01 cfs @ 12.07 hrs, Volume= 0.043 af
Primary = 0.01 cfs @ 12.07 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

## Summary for Subcatchment 201A: 1/2 Building

Runoff = 0.09 cfs @ 12.07 hrs, Volume= 0.007 af, Depth= 3.07"
Routed to Pond D1 : 18" ADS BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,212 | 98 | Roof |
| | 1,212 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 201B: 1/2 Building

Runoff = 0.09 cfs @ 12.07 hrs, Volume= 0.007 af, Depth= 3.07"
Routed to Pond D2 : 18" ADS BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,212 | 98 | Roof |
| | 1,212 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 201C: Area to Paver Patio

Runoff = 0.47 cfs @ 12.07 hrs, Volume= 0.033 af, Depth= 2.35"
Routed to Pond P2 : Cell 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5,245 | 98 | 98% capture |
| | 2,100 | 74 | >75% Grass cover, Good, HSG C |
| | 7,345 | 91 | Weighted Average |
| | 2,100 | 74 | 28.59% Pervious Area |
| | 5,245 | 98 | 71.41% Impervious Area |

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

## Summary for Subcatchment 201D:

Runoff = 0.30 cfs @ 12.07 hrs, Volume= 0.021 af, Depth= 2.17"
Routed to Pond P1 : Cell 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,239 | 98 | 98% capture |
| | 1,800 | 74 | >75% Grass cover, Good, HSG C |
| | 5,039 | 89 | Weighted Average |
| | 1,800 | 74 | 35.72% Pervious Area |
| | 3,239 | 98 | 64.28% Impervious Area |

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

## Summary for Subcatchment 201E:

Runoff = 0.01 cfs @ 12.07 hrs, Volume= 0.001 af, Depth= 3.07"
Routed to Link 201 : Wave Avenue (DP1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 123 | 98 | Pavement |
| | 123 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 202: To Aquidneck Avenue (DP2)

Runoff = 0.02 cfs @ 12.08 hrs, Volume= 0.001 af, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 337 | 74 | >75% Grass cover, Good, HSG C |
| * | 30 | 98 | Retaining wall |
| * | 150 | 70 | Wood stairs with 12" stone below |
| * | 56 | 98 | Concrete walk |
| | 573 | 77 | Weighted Average |
| | 487 | 73 | 84.99% Pervious Area |
| | 86 | 98 | 15.01% Impervious Area |

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

## Summary for Pond D1: 18" ADS BASIN

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 3.07" for 2-year event
Inflow = 0.09 cfs @ 12.07 hrs, Volume= 0.007 af
Outflow = 0.09 cfs @ 12.07 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min
Primary = 0.09 cfs @ 12.07 hrs, Volume= 0.006 af
Routed to Pond U1 : UG SF 1 & 2
Secondary = 0.08 cfs @ 12.11 hrs, Volume= 0.002 af
Routed to Pond P2 : Cell 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

Peak Elev= 8.87' @ 12.11 hrs
Flood Elev= 10.50'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 8.34' | **4.0" Round 4" PVC To chambers** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.34' / 8.21' S= 0.0260 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |
| #2 | Secondary | 8.67' | **4.0" Round 4" PVC to R-tanks** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.67' / 8.50' S= 0.0340 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.00 cfs @ 12.07 hrs HW=8.63' TW=8.65' (Dynamic Tailwater)
**1=4" PVC To chambers** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.08 cfs @ 12.11 hrs HW=8.87' TW=6.26' (Dynamic Tailwater)
**2=4" PVC to R-tanks** (Inlet Controls 0.08 cfs @ 1.51 fps)

## Summary for Pond D2: 18" ADS BASIN

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 3.07" for 2-year event
Inflow = 0.09 cfs @ 12.07 hrs, Volume= 0.007 af
Outflow = 0.09 cfs @ 12.07 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min
Primary = 0.09 cfs @ 12.07 hrs, Volume= 0.006 af
Routed to Pond U1 : UG SF 1 & 2
Secondary = 0.08 cfs @ 12.11 hrs, Volume= 0.002 af
Routed to Pond P2 : Cell 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 8.87' @ 12.11 hrs
Flood Elev= 10.50'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 8.34' | **4.0" Round 4" PVC To chambers** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.34' / 8.21' S= 0.0260 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |
| #2 | Secondary | 8.67' | **4.0" Round 4" PVC to R-tanks** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.67' / 8.50' S= 0.0340 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.00 cfs @ 12.07 hrs HW=8.63' TW=8.65' (Dynamic Tailwater)
**1=4" PVC To chambers** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.08 cfs @ 12.11 hrs HW=8.87' TW=6.26' (Dynamic Tailwater)
**2=4" PVC to R-tanks** (Inlet Controls 0.08 cfs @ 1.51 fps)

## Summary for Pond D3: 18" ADS BASIN

Inflow Area = 0.224 ac, 78.50% Impervious, Inflow Depth > 2.35" for 2-year event
Inflow = 0.02 cfs @ 14.00 hrs, Volume= 0.044 af
Outflow = 0.02 cfs @ 14.00 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min
Primary = 0.02 cfs @ 14.00 hrs, Volume= 0.044 af
Routed to Pond P1 : Cell 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 5.60' @ 19.43 hrs
Flood Elev= 10.00'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 5.50' | **4.0" Round 4" PVC TO CELL 1** L= 50.0' Ke= 0.500<br>Inlet / Outlet Invert= 5.50' / 5.00' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.02 cfs @ 14.00 hrs HW=5.59' TW=5.30' (Dynamic Tailwater)
**1=4" PVC TO CELL 1** (Outlet Controls 0.02 cfs @ 1.24 fps)

## Summary for Pond D4: 18" ADS BASIN

Inflow Area = 0.340 ac, 73.66% Impervious, Inflow Depth > 1.80" for 2-year event
Inflow = 0.01 cfs @ 22.81 hrs, Volume= 0.051 af
Outflow = 0.01 cfs @ 22.81 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min
Primary = 0.01 cfs @ 22.81 hrs, Volume= 0.051 af
Routed to Link 201 : Wave Avenue (DP1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 4.83' @ 22.81 hrs
Flood Elev= 7.40'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 4.75' | **4.0" Round 4" PVC TO STREET DRAIN** L= 20.0' Ke= 0.500<br>Inlet / Outlet Invert= 4.75' / 4.65' S= 0.0050 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.01 cfs @ 22.81 hrs HW=4.83' TW=0.00' (Dynamic Tailwater)
**1=4" PVC TO STREET DRAIN** (Barrel Controls 0.01 cfs @ 1.12 fps)

## Summary for Pond P1: Cell 1

Inflow Area = 0.340 ac, 73.66% Impervious, Inflow Depth > 2.29" for 2-year event
Inflow = 0.32 cfs @ 12.07 hrs, Volume= 0.065 af
Outflow = 0.01 cfs @ 22.81 hrs, Volume= 0.051 af, Atten= 96%, Lag= 644.3 min
Primary = 0.01 cfs @ 22.81 hrs, Volume= 0.051 af
Routed to Pond D4 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 5.51' @ 22.81 hrs Surf.Area= 2,195 sf Storage= 1,261 cf
Flood Elev= 7.00' Surf.Area= 3,895 sf Storage= 2,729 cf

Plug-Flow detention time= 2,365.1 min calculated for 0.051 af (78% of inflow)
Center-of-Mass det. time= 1,486.3 min ( 3,678.2 - 2,191.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 4.83' | 2,023 cf | **R-Tanks (Prismatic)** Listed below (Recalc)<br>2,129 cf Overall x 95.0% Voids |
| #2 | 6.00' | 561 cf | **Paver stones (Prismatic)** Listed below (Recalc)<br>1,700 cf Overall x 33.0% Voids |
| #3 | 4.83' | 145 cf | **Crushed Stone (Prismatic)** Listed below (Recalc)<br>439 cf Overall x 33.0% Voids |
| | | 2,729 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 4.83 | 1,820 | 0 | 0 |
| 6.00 | 1,820 | 2,129 | 2,129 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.00 | 1,700 | 0 | 0 |
| 7.00 | 1,700 | 1,700 | 1,700 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 4.83 | 375 | 0 | 0 |
| 6.00 | 375 | 439 | 439 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #0 | Primary | 7.00' | **Automatic Storage Overflow** (Discharged without head) |
| #1 | Primary | 4.83' | **0.5" Vert. 4" PVC WITH 0.5" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 5.40' | **1.0" Vert. 4" PVC WITH 1" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.01 cfs @ 22.81 hrs HW=5.51' TW=4.83' (Dynamic Tailwater)
↑—**1=4" PVC WITH 0.5" ORIFICE PLATE** (Orifice Controls 0.01 cfs @ 3.91 fps)
└—**2=4" PVC WITH 1" ORIFICE PLATE** (Orifice Controls 0.01 cfs @ 1.26 fps)

## Summary for Pond P2: Cell 2

Inflow Area = 0.169 ac, 71.41% Impervious, Inflow Depth = 2.57" for 2-year event
Inflow = 0.60 cfs @ 12.10 hrs, Volume= 0.036 af
Outflow = 0.01 cfs @ 23.14 hrs, Volume= 0.033 af, Atten= 99%, Lag= 662.1 min
Primary = 0.01 cfs @ 23.14 hrs, Volume= 0.033 af
Routed to Pond D3 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 6.61' @ 23.14 hrs Surf.Area= 2,326 sf Storage= 1,351 cf
Flood Elev= 10.00' Surf.Area= 4,652 sf Storage= 5,685 cf

Plug-Flow detention time= 2,769.0 min calculated for 0.033 af (91% of inflow)
Center-of-Mass det. time= 2,724.0 min ( 3,519.3 - 795.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6.00' | 4,795 cf | **R-Tanks (LD Single + Mini) (Prismatic)** Listed below (Recalc)<br>5,047 cf Overall x 95.0% Voids |
| #2 | 8.17' | 890 cf | **Stone and Paver media (Prismatic)** Listed below (Recalc)<br>2,698 cf Overall x 33.0% Voids |
| | | 5,685 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.00 | 2,326 | 0 | 0 |
| 8.17 | 2,326 | 5,047 | 5,047 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 8.17 | 2,326 | 0 | 0 |
| 9.33 | 2,326 | 2,698 | 2,698 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6.00' | **0.5" Vert. 4" PVC WTH 0.5" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 7.70' | **4.0" Vert. 4" PVC OUTLET** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.01 cfs @ 23.14 hrs HW=6.61' TW=5.58' (Dynamic Tailwater)
↑—**1=4" PVC WTH 0.5" ORIFICE PLATE** (Orifice Controls 0.01 cfs @ 3.70 fps)
└—**2=4" PVC OUTLET** ( Controls 0.00 cfs)

## Summary for Pond U1: UG SF 1 & 2

Inflow Area = 0.056 ac,100.00% Impervious, Inflow Depth = 2.41" for 2-year event
Inflow = 0.19 cfs @ 12.07 hrs, Volume= 0.011 af
Outflow = 0.01 cfs @ 12.10 hrs, Volume= 0.011 af, Atten= 94%, Lag= 2.3 min
Primary = 0.01 cfs @ 12.10 hrs, Volume= 0.011 af
Routed to Pond D3 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 8.89' @ 12.10 hrs Surf.Area= 322 sf Storage= 166 cf
Flood Elev= 10.00' Surf.Area= 322 sf Storage= 185 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 131.4 min ( 890.2 - 758.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 7.67' | 69 cf | **15.00'W x 10.00'L x 1.54'H Field A**<br>231 cf Overall - 60 cf Embedded = 172 cf x 40.0% Voids |
| #2A | 7.67' | 60 cf | **Cultec C-100HD** x 4 Inside #1<br>Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf<br>Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap<br>Row Length Adjustment= +0.50' x 1.86 sf x 4 rows |
| #3 | 6.67' | 57 cf | **Sand Media (Prismatic)** Listed below (Recalc) x 2<br>172 cf Overall x 33.0% Voids |
| | | 185 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.67 | 86 | 0 | 0 |
| 7.67 | 86 | 86 | 86 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 6.67' | **8.270 in/hr Filtration Through Media over Surface area** |
| #2 | Primary | 6.00' | **0.5" Vert. 4" Underdrain with 1/2" orifice** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.01 cfs @ 12.10 hrs HW=8.89' TW=5.58' (Dynamic Tailwater)
↑—**2=4" Underdrain with 1/2" orifice** (Orifice Controls 0.01 cfs @ 8.15 fps)
↑—**1=Filtration Through Media** (Passes 0.01 cfs of 0.06 cfs potential flow)

## Summary for Link 201: Wave Avenue (DP1)

Inflow Area = 0.343 ac, 73.88% Impervious, Inflow Depth > 1.81" for 2-year event
Inflow = 0.01 cfs @ 12.07 hrs, Volume= 0.052 af
Primary = 0.01 cfs @ 12.07 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

## Summary for Subcatchment 201A: 1/2 Building

Runoff = 0.14 cfs @ 12.07 hrs, Volume= 0.011 af, Depth= 4.66"
Routed to Pond D1 : 18" ADS BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,212 | 98 | Roof |
| | 1,212 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 201B: 1/2 Building

Runoff = 0.14 cfs @ 12.07 hrs, Volume= 0.011 af, Depth= 4.66"
Routed to Pond D2 : 18" ADS BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,212 | 98 | Roof |
| | 1,212 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 201C: Area to Paver Patio

Runoff = 0.76 cfs @ 12.07 hrs, Volume= 0.055 af, Depth= 3.89"
Routed to Pond P2 : Cell 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5,245 | 98 | 98% capture |
| | 2,100 | 74 | >75% Grass cover, Good, HSG C |
| | 7,345 | 91 | Weighted Average |
| | 2,100 | 74 | 28.59% Pervious Area |
| | 5,245 | 98 | 71.41% Impervious Area |

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

## Summary for Subcatchment 201D:

Runoff = 0.50 cfs @ 12.07 hrs, Volume= 0.035 af, Depth= 3.68"
Routed to Pond P1 : Cell 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,239 | 98 | 98% capture |
| | 1,800 | 74 | >75% Grass cover, Good, HSG C |
| | 5,039 | 89 | Weighted Average |
| | 1,800 | 74 | 35.72% Pervious Area |
| | 3,239 | 98 | 64.28% Impervious Area |

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

## Summary for Subcatchment 201E:

Runoff = 0.01 cfs @ 12.07 hrs, Volume= 0.001 af, Depth= 4.66"
Routed to Link 201 : Wave Avenue (DP1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 123 | 98 | Pavement |
| | 123 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 202: To Aquidneck Avenue (DP2)

Runoff = 0.04 cfs @ 12.08 hrs, Volume= 0.003 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 337 | 74 | >75% Grass cover, Good, HSG C |
| * | 30 | 98 | Retaining wall |
| * | 150 | 70 | Wood stairs with 12" stone below |
| * | 56 | 98 | Concrete walk |
| | 573 | 77 | Weighted Average |
| | 487 | 73 | 84.99% Pervious Area |
| | 86 | 98 | 15.01% Impervious Area |

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

## Summary for Pond D1: 18" ADS BASIN

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 4.66" for 10-year event
Inflow = 0.14 cfs @ 12.07 hrs, Volume= 0.011 af
Outflow = 0.14 cfs @ 12.07 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Primary = 0.05 cfs @ 11.88 hrs, Volume= 0.007 af
Routed to Pond U1 : UG SF 1 & 2
Secondary = 0.13 cfs @ 12.08 hrs, Volume= 0.004 af
Routed to Pond P2 : Cell 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

Peak Elev= 8.94' @ 12.08 hrs
Flood Elev= 10.50'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 8.34' | **4.0" Round 4" PVC To chambers** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.34' / 8.21' S= 0.0260 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |
| #2 | Secondary | 8.67' | **4.0" Round 4" PVC to R-tanks** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.67' / 8.50' S= 0.0340 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.00 cfs @ 11.88 hrs HW=8.65' TW=8.69' (Dynamic Tailwater)
**1=4" PVC To chambers** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.13 cfs @ 12.08 hrs HW=8.94' TW=6.48' (Dynamic Tailwater)
**2=4" PVC to R-tanks** (Inlet Controls 0.13 cfs @ 1.77 fps)

## Summary for Pond D2: 18" ADS BASIN

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 4.66" for 10-year event
Inflow = 0.14 cfs @ 12.07 hrs, Volume= 0.011 af
Outflow = 0.14 cfs @ 12.07 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Primary = 0.05 cfs @ 11.88 hrs, Volume= 0.007 af
Routed to Pond U1 : UG SF 1 & 2
Secondary = 0.13 cfs @ 12.08 hrs, Volume= 0.004 af
Routed to Pond P2 : Cell 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 8.94' @ 12.08 hrs
Flood Elev= 10.50'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 8.34' | **4.0" Round 4" PVC To chambers** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.34' / 8.21' S= 0.0260 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |
| #2 | Secondary | 8.67' | **4.0" Round 4" PVC to R-tanks** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.67' / 8.50' S= 0.0340 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.00 cfs @ 11.88 hrs HW=8.65' TW=8.69' (Dynamic Tailwater)
**1=4" PVC To chambers** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.13 cfs @ 12.08 hrs HW=8.94' TW=6.48' (Dynamic Tailwater)
**2=4" PVC to R-tanks** (Inlet Controls 0.13 cfs @ 1.77 fps)

## Summary for Pond D3: 18" ADS BASIN

Inflow Area = 0.224 ac, 78.50% Impervious, Inflow Depth > 3.40" for 10-year event
Inflow = 0.02 cfs @ 15.26 hrs, Volume= 0.063 af
Outflow = 0.02 cfs @ 15.26 hrs, Volume= 0.063 af, Atten= 0%, Lag= 0.0 min
Primary = 0.02 cfs @ 15.26 hrs, Volume= 0.063 af
Routed to Pond P1 : Cell 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 5.73' @ 21.98 hrs
Flood Elev= 10.00'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 5.50' | **4.0" Round 4" PVC TO CELL 1** L= 50.0' Ke= 0.500<br>Inlet / Outlet Invert= 5.50' / 5.00' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.02 cfs @ 15.26 hrs HW=5.67' TW=5.63' (Dynamic Tailwater)
**1=4" PVC TO CELL 1** (Outlet Controls 0.02 cfs @ 0.57 fps)

## Summary for Pond D4: 18" ADS BASIN

Inflow Area = 0.340 ac, 73.66% Impervious, Inflow Depth > 2.73" for 10-year event
Inflow = 0.02 cfs @ 22.33 hrs, Volume= 0.077 af
Outflow = 0.02 cfs @ 22.33 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.0 min
Primary = 0.02 cfs @ 22.33 hrs, Volume= 0.077 af
Routed to Link 201 : Wave Avenue (DP1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 4.85' @ 22.33 hrs
Flood Elev= 7.40'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 4.75' | **4.0" Round 4" PVC TO STREET DRAIN** L= 20.0' Ke= 0.500<br>Inlet / Outlet Invert= 4.75' / 4.65' S= 0.0050 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.02 cfs @ 22.33 hrs HW=4.85' TW=0.00' (Dynamic Tailwater)
**1=4" PVC TO STREET DRAIN** (Barrel Controls 0.02 cfs @ 1.27 fps)

## Summary for Pond P1: Cell 1

Inflow Area = 0.340 ac, 73.66% Impervious, Inflow Depth > 3.49" for 10-year event
Inflow = 0.52 cfs @ 12.07 hrs, Volume= 0.099 af
Outflow = 0.02 cfs @ 22.33 hrs, Volume= 0.077 af, Atten= 96%, Lag= 615.4 min
Primary = 0.02 cfs @ 22.33 hrs, Volume= 0.077 af
Routed to Pond D4 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 5.72' @ 22.33 hrs Surf.Area= 2,195 sf Storage= 1,646 cf
Flood Elev= 7.00' Surf.Area= 3,895 sf Storage= 2,729 cf

Plug-Flow detention time= 1,849.7 min calculated for 0.077 af (78% of inflow)
Center-of-Mass det. time= 906.9 min ( 3,197.4 - 2,290.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 4.83' | 2,023 cf | **R-Tanks (Prismatic)** Listed below (Recalc)<br>2,129 cf Overall x 95.0% Voids |
| #2 | 6.00' | 561 cf | **Paver stones (Prismatic)** Listed below (Recalc)<br>1,700 cf Overall x 33.0% Voids |
| #3 | 4.83' | 145 cf | **Crushed Stone (Prismatic)** Listed below (Recalc)<br>439 cf Overall x 33.0% Voids |
| | | 2,729 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 4.83 | 1,820 | 0 | 0 |
| 6.00 | 1,820 | 2,129 | 2,129 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.00 | 1,700 | 0 | 0 |
| 7.00 | 1,700 | 1,700 | 1,700 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 4.83 | 375 | 0 | 0 |
| 6.00 | 375 | 439 | 439 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #0 | Primary | 7.00' | **Automatic Storage Overflow** (Discharged without head) |
| #1 | Primary | 4.83' | **0.5" Vert. 4" PVC WITH 0.5" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 5.40' | **1.0" Vert. 4" PVC WITH 1" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.02 cfs @ 22.33 hrs HW=5.72' TW=4.85' (Dynamic Tailwater)
↑—**1=4" PVC WITH 0.5" ORIFICE PLATE** (Orifice Controls 0.01 cfs @ 4.48 fps)
└—**2=4" PVC WITH 1" ORIFICE PLATE** (Orifice Controls 0.01 cfs @ 2.53 fps)

## Summary for Pond P2: Cell 2

Inflow Area = 0.169 ac, 71.41% Impervious, Inflow Depth = 4.46" for 10-year event
Inflow = 1.03 cfs @ 12.07 hrs, Volume= 0.063 af
Outflow = 0.01 cfs @ 24.02 hrs, Volume= 0.050 af, Atten= 99%, Lag= 716.7 min
Primary = 0.01 cfs @ 24.02 hrs, Volume= 0.050 af
Routed to Pond D3 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 7.09' @ 24.02 hrs Surf.Area= 2,326 sf Storage= 2,418 cf
Flood Elev= 10.00' Surf.Area= 4,652 sf Storage= 5,685 cf

Plug-Flow detention time= 3,024.6 min calculated for 0.050 af (80% of inflow)
Center-of-Mass det. time= 2,954.4 min ( 3,735.0 - 780.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6.00' | 4,795 cf | **R-Tanks (LD Single + Mini) (Prismatic)** Listed below (Recalc)<br>5,047 cf Overall x 95.0% Voids |
| #2 | 8.17' | 890 cf | **Stone and Paver media (Prismatic)** Listed below (Recalc)<br>2,698 cf Overall x 33.0% Voids |
| | | 5,685 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.00 | 2,326 | 0 | 0 |
| 8.17 | 2,326 | 5,047 | 5,047 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 8.17 | 2,326 | 0 | 0 |
| 9.33 | 2,326 | 2,698 | 2,698 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6.00' | **0.5" Vert. 4" PVC WTH 0.5" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 7.70' | **4.0" Vert. 4" PVC OUTLET** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.01 cfs @ 24.02 hrs HW=7.09' TW=5.72' (Dynamic Tailwater)
↑—**1=4" PVC WTH 0.5" ORIFICE PLATE** (Orifice Controls 0.01 cfs @ 4.99 fps)
└—**2=4" PVC OUTLET** ( Controls 0.00 cfs)

## Summary for Pond U1: UG SF 1 & 2

Inflow Area = 0.056 ac,100.00% Impervious, Inflow Depth = 2.93" for 10-year event
Inflow = 0.11 cfs @ 11.88 hrs, Volume= 0.014 af
Outflow = 0.01 cfs @ 12.07 hrs, Volume= 0.014 af, Atten= 89%, Lag= 11.7 min
Primary = 0.01 cfs @ 12.07 hrs, Volume= 0.014 af
Routed to Pond D3 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 8.94' @ 12.07 hrs Surf.Area= 322 sf Storage= 169 cf
Flood Elev= 10.00' Surf.Area= 322 sf Storage= 185 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 142.6 min ( 894.3 - 751.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 7.67' | 69 cf | **15.00'W x 10.00'L x 1.54'H Field A**<br>231 cf Overall - 60 cf Embedded = 172 cf x 40.0% Voids |
| #2A | 7.67' | 60 cf | **Cultec C-100HD** x 4 Inside #1<br>Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf<br>Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap<br>Row Length Adjustment= +0.50' x 1.86 sf x 4 rows |
| #3 | 6.67' | 57 cf | **Sand Media (Prismatic)** Listed below (Recalc) x 2<br>172 cf Overall x 33.0% Voids |
| | | 185 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.67 | 86 | 0 | 0 |
| 7.67 | 86 | 86 | 86 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 6.67' | **8.270 in/hr Filtration Through Media over Surface area** |
| #2 | Primary | 6.00' | **0.5" Vert. 4" Underdrain with 1/2" orifice** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.01 cfs @ 12.07 hrs HW=8.94' TW=5.58' (Dynamic Tailwater)
↑—**2=4" Underdrain with 1/2" orifice** (Orifice Controls 0.01 cfs @ 8.23 fps)
↑—**1=Filtration Through Media** (Passes 0.01 cfs of 0.06 cfs potential flow)

## Summary for Link 201: Wave Avenue (DP1)

Inflow Area = 0.343 ac, 73.88% Impervious, Inflow Depth > 2.75" for 10-year event
Inflow = 0.02 cfs @ 22.14 hrs, Volume= 0.078 af
Primary = 0.02 cfs @ 22.14 hrs, Volume= 0.078 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

## Summary for Subcatchment 201A: 1/2 Building

Runoff = 0.17 cfs @ 12.07 hrs, Volume= 0.014 af, Depth= 5.86"
Routed to Pond D1 : 18" ADS BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,212 | 98 | Roof |
| | 1,212 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 201B: 1/2 Building

Runoff = 0.17 cfs @ 12.07 hrs, Volume= 0.014 af, Depth= 5.86"
Routed to Pond D2 : 18" ADS BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,212 | 98 | Roof |
| | 1,212 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 201C: Area to Paver Patio

Runoff = 0.98 cfs @ 12.07 hrs, Volume= 0.071 af, Depth= 5.06"
Routed to Pond P2 : Cell 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5,245 | 98 | 98% capture |
| | 2,100 | 74 | >75% Grass cover, Good, HSG C |
| | 7,345 | 91 | Weighted Average |
| | 2,100 | 74 | 28.59% Pervious Area |
| | 5,245 | 98 | 71.41% Impervious Area |

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

## Summary for Subcatchment 201D:

Runoff = 0.65 cfs @ 12.07 hrs, Volume= 0.047 af, Depth= 4.83"
Routed to Pond P1 : Cell 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,239 | 98 | 98% capture |
| | 1,800 | 74 | >75% Grass cover, Good, HSG C |
| | 5,039 | 89 | Weighted Average |
| | 1,800 | 74 | 35.72% Pervious Area |
| | 3,239 | 98 | 64.28% Impervious Area |

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

## Summary for Subcatchment 201E:

Runoff = 0.02 cfs @ 12.07 hrs, Volume= 0.001 af, Depth= 5.86"
Routed to Link 201 : Wave Avenue (DP1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 123 | 98 | Pavement |
| | 123 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 202: To Aquidneck Avenue (DP2)

Runoff = 0.06 cfs @ 12.07 hrs, Volume= 0.004 af, Depth= 3.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 337 | 74 | >75% Grass cover, Good, HSG C |
| * | 30 | 98 | Retaining wall |
| * | 150 | 70 | Wood stairs with 12" stone below |
| * | 56 | 98 | Concrete walk |
| | 573 | 77 | Weighted Average |
| | 487 | 73 | 84.99% Pervious Area |
| | 86 | 98 | 15.01% Impervious Area |

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

## Summary for Pond D1: 18" ADS BASIN

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 5.86" for 25-year event
Inflow = 0.17 cfs @ 12.07 hrs, Volume= 0.014 af
Outflow = 0.17 cfs @ 12.07 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min
Primary = 0.04 cfs @ 11.70 hrs, Volume= 0.008 af
Routed to Pond U1 : UG SF 1 & 2
Secondary = 0.17 cfs @ 12.08 hrs, Volume= 0.006 af
Routed to Pond P2 : Cell 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

Peak Elev= 8.99' @ 12.08 hrs
Flood Elev= 10.50'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 8.34' | **4.0" Round 4" PVC To chambers** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.34' / 8.21' S= 0.0260 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |
| #2 | Secondary | 8.67' | **4.0" Round 4" PVC to R-tanks** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.67' / 8.50' S= 0.0340 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.00 cfs @ 11.70 hrs HW=8.67' TW=8.70' (Dynamic Tailwater)
↑—**1=4" PVC To chambers** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.17 cfs @ 12.08 hrs HW=8.99' TW=6.67' (Dynamic Tailwater)
↑—**2=4" PVC to R-tanks** (Inlet Controls 0.17 cfs @ 1.93 fps)

## Summary for Pond D2: 18" ADS BASIN

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 5.86" for 25-year event
Inflow = 0.17 cfs @ 12.07 hrs, Volume= 0.014 af
Outflow = 0.17 cfs @ 12.07 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min
Primary = 0.04 cfs @ 11.70 hrs, Volume= 0.008 af
Routed to Pond U1 : UG SF 1 & 2
Secondary = 0.17 cfs @ 12.08 hrs, Volume= 0.006 af
Routed to Pond P2 : Cell 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 8.99' @ 12.08 hrs
Flood Elev= 10.50'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 8.34' | **4.0" Round 4" PVC To chambers** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.34' / 8.21' S= 0.0260 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |
| #2 | Secondary | 8.67' | **4.0" Round 4" PVC to R-tanks** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.67' / 8.50' S= 0.0340 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.00 cfs @ 11.70 hrs HW=8.67' TW=8.70' (Dynamic Tailwater)
↑—**1=4" PVC To chambers** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.17 cfs @ 12.08 hrs HW=8.99' TW=6.67' (Dynamic Tailwater)
↑—**2=4" PVC to R-tanks** (Inlet Controls 0.17 cfs @ 1.93 fps)

## Summary for Pond D3: 18" ADS BASIN

Inflow Area = 0.224 ac, 78.50% Impervious, Inflow Depth > 4.05" for 25-year event
Inflow = 0.02 cfs @ 15.82 hrs, Volume= 0.076 af
Outflow = 0.02 cfs @ 15.82 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min
Primary = 0.02 cfs @ 15.82 hrs, Volume= 0.076 af
Routed to Pond P1 : Cell 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 5.91' @ 21.32 hrs
Flood Elev= 10.00'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 5.50' | **4.0" Round 4" PVC TO CELL 1** L= 50.0' Ke= 0.500<br>Inlet / Outlet Invert= 5.50' / 5.00' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.02 cfs @ 15.82 hrs HW=5.86' TW=5.85' (Dynamic Tailwater)
↑—**1=4" PVC TO CELL 1** (Outlet Controls 0.02 cfs @ 0.24 fps)

## Summary for Pond D4: 18" ADS BASIN

Inflow Area = 0.340 ac, 73.66% Impervious, Inflow Depth > 3.46" for 25-year event
Inflow = 0.02 cfs @ 21.37 hrs, Volume= 0.098 af
Outflow = 0.02 cfs @ 21.37 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.0 min
Primary = 0.02 cfs @ 21.37 hrs, Volume= 0.098 af
Routed to Link 201 : Wave Avenue (DP1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 4.87' @ 21.37 hrs
Flood Elev= 7.40'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 4.75' | **4.0" Round 4" PVC TO STREET DRAIN** L= 20.0' Ke= 0.500<br>Inlet / Outlet Invert= 4.75' / 4.65' S= 0.0050 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.02 cfs @ 21.37 hrs HW=4.87' TW=0.00' (Dynamic Tailwater)
**1=4" PVC TO STREET DRAIN** (Barrel Controls 0.02 cfs @ 1.35 fps)

## Summary for Pond P1: Cell 1

Inflow Area = 0.340 ac, 73.66% Impervious, Inflow Depth > 4.32" for 25-year event
Inflow = 0.67 cfs @ 12.07 hrs, Volume= 0.122 af
Outflow = 0.02 cfs @ 21.37 hrs, Volume= 0.098 af, Atten= 96%, Lag= 558.2 min
Primary = 0.02 cfs @ 21.37 hrs, Volume= 0.098 af
Routed to Pond D4 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 5.91' @ 21.37 hrs Surf.Area= 2,195 sf Storage= 1,996 cf
Flood Elev= 7.00' Surf.Area= 3,895 sf Storage= 2,729 cf

Plug-Flow detention time= 1,651.4 min calculated for 0.098 af (80% of inflow)
Center-of-Mass det. time= 761.8 min ( 3,060.2 - 2,298.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 4.83' | 2,023 cf | **R-Tanks (Prismatic)** Listed below (Recalc)<br>2,129 cf Overall x 95.0% Voids |
| #2 | 6.00' | 561 cf | **Paver stones (Prismatic)** Listed below (Recalc)<br>1,700 cf Overall x 33.0% Voids |
| #3 | 4.83' | 145 cf | **Crushed Stone (Prismatic)** Listed below (Recalc)<br>439 cf Overall x 33.0% Voids |
| | | 2,729 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 4.83 | 1,820 | 0 | 0 |
| 6.00 | 1,820 | 2,129 | 2,129 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.00 | 1,700 | 0 | 0 |
| 7.00 | 1,700 | 1,700 | 1,700 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 4.83 | 375 | 0 | 0 |
| 6.00 | 375 | 439 | 439 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #0 | Primary | 7.00' | **Automatic Storage Overflow** (Discharged without head) |
| #1 | Primary | 4.83' | **0.5" Vert. 4" PVC WITH 0.5" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 5.40' | **1.0" Vert. 4" PVC WITH 1" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.02 cfs @ 21.37 hrs HW=5.91' TW=4.87' (Dynamic Tailwater)
↑—**1=4" PVC WITH 0.5" ORIFICE PLATE** (Orifice Controls 0.01 cfs @ 4.91 fps)
└—**2=4" PVC WITH 1" ORIFICE PLATE** (Orifice Controls 0.02 cfs @ 3.29 fps)

## Summary for Pond P2: Cell 2

Inflow Area = 0.169 ac, 71.41% Impervious, Inflow Depth = 5.92" for 25-year event
Inflow = 1.31 cfs @ 12.07 hrs, Volume= 0.083 af
Outflow = 0.01 cfs @ 24.04 hrs, Volume= 0.061 af, Atten= 99%, Lag= 717.7 min
Primary = 0.01 cfs @ 24.04 hrs, Volume= 0.061 af
Routed to Pond D3 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 7.47' @ 24.04 hrs Surf.Area= 2,326 sf Storage= 3,255 cf
Flood Elev= 10.00' Surf.Area= 4,652 sf Storage= 5,685 cf

Plug-Flow detention time= 3,111.2 min calculated for 0.061 af (73% of inflow)
Center-of-Mass det. time= 3,032.9 min ( 3,806.9 - 774.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6.00' | 4,795 cf | **R-Tanks (LD Single + Mini) (Prismatic)** Listed below (Recalc)<br>5,047 cf Overall x 95.0% Voids |
| #2 | 8.17' | 890 cf | **Stone and Paver media (Prismatic)** Listed below (Recalc)<br>2,698 cf Overall x 33.0% Voids |
| | | 5,685 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.00 | 2,326 | 0 | 0 |
| 8.17 | 2,326 | 5,047 | 5,047 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 8.17 | 2,326 | 0 | 0 |
| 9.33 | 2,326 | 2,698 | 2,698 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6.00' | **0.5" Vert. 4" PVC WTH 0.5" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 7.70' | **4.0" Vert. 4" PVC OUTLET** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.01 cfs @ 24.04 hrs HW=7.47' TW=5.90' (Dynamic Tailwater)
↑—**1=4" PVC WTH 0.5" ORIFICE PLATE** (Orifice Controls 0.01 cfs @ 5.80 fps)
└—**2=4" PVC OUTLET** ( Controls 0.00 cfs)

## Summary for Pond U1: UG SF 1 & 2

Inflow Area = 0.056 ac,100.00% Impervious, Inflow Depth = 3.25" for 25-year event
Inflow = 0.08 cfs @ 11.70 hrs, Volume= 0.015 af
Outflow = 0.01 cfs @ 12.08 hrs, Volume= 0.015 af, Atten= 85%, Lag= 22.6 min
Primary = 0.01 cfs @ 12.08 hrs, Volume= 0.015 af
Routed to Pond D3 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 8.99' @ 12.08 hrs Surf.Area= 322 sf Storage= 172 cf
Flood Elev= 10.00' Surf.Area= 322 sf Storage= 185 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 150.1 min ( 896.2 - 746.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 7.67' | 69 cf | **15.00'W x 10.00'L x 1.54'H Field A**<br>231 cf Overall - 60 cf Embedded = 172 cf x 40.0% Voids |
| #2A | 7.67' | 60 cf | **Cultec C-100HD** x 4 Inside #1<br>Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf<br>Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap<br>Row Length Adjustment= +0.50' x 1.86 sf x 4 rows |
| #3 | 6.67' | 57 cf | **Sand Media (Prismatic)** Listed below (Recalc) x 2<br>172 cf Overall x 33.0% Voids |
| | | 185 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.67 | 86 | 0 | 0 |
| 7.67 | 86 | 86 | 86 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 6.67' | **8.270 in/hr Filtration Through Media over Surface area** |
| #2 | Primary | 6.00' | **0.5" Vert. 4" Underdrain with 1/2" orifice** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.01 cfs @ 12.08 hrs HW=8.99' TW=5.60' (Dynamic Tailwater)
↑—**2=4" Underdrain with 1/2" orifice** (Orifice Controls 0.01 cfs @ 8.30 fps)
↑—**1=Filtration Through Media** (Passes 0.01 cfs of 0.06 cfs potential flow)

## Summary for Link 201: Wave Avenue (DP1)

Inflow Area = 0.343 ac, 73.88% Impervious, Inflow Depth > 3.48" for 25-year event
Inflow = 0.02 cfs @ 20.97 hrs, Volume= 0.099 af
Primary = 0.02 cfs @ 20.97 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

## Summary for Subcatchment 201A: 1/2 Building

Runoff = 0.24 cfs @ 12.07 hrs, Volume= 0.019 af, Depth= 8.36"
Routed to Pond D1 : 18" ADS BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,212 | 98 | Roof |
| | 1,212 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 201B: 1/2 Building

Runoff = 0.24 cfs @ 12.07 hrs, Volume= 0.019 af, Depth= 8.36"
Routed to Pond D2 : 18" ADS BASIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,212 | 98 | Roof |
| | 1,212 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 201C: Area to Paver Patio

Runoff = 1.42 cfs @ 12.07 hrs, Volume= 0.106 af, Depth= 7.52"
Routed to Pond P2 : Cell 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5,245 | 98 | 98% capture |
| | 2,100 | 74 | >75% Grass cover, Good, HSG C |
| | 7,345 | 91 | Weighted Average |
| | 2,100 | 74 | 28.59% Pervious Area |
| | 5,245 | 98 | 71.41% Impervious Area |

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

## Summary for Subcatchment 201D:

Runoff = 0.96 cfs @ 12.07 hrs, Volume= 0.070 af, Depth= 7.28"
Routed to Pond P1 : Cell 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,239 | 98 | 98% capture |
| | 1,800 | 74 | >75% Grass cover, Good, HSG C |
| | 5,039 | 89 | Weighted Average |
| | 1,800 | 74 | 35.72% Pervious Area |
| | 3,239 | 98 | 64.28% Impervious Area |

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

## Summary for Subcatchment 201E:

Runoff = 0.02 cfs @ 12.07 hrs, Volume= 0.002 af, Depth= 8.36"
Routed to Link 201 : Wave Avenue (DP1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 123 | 98 | Pavement |
| | 123 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 202: To Aquidneck Avenue (DP2)

Runoff = 0.09 cfs @ 12.07 hrs, Volume= 0.006 af, Depth= 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 337 | 74 | >75% Grass cover, Good, HSG C |
| * | 30 | 98 | Retaining wall |
| * | 150 | 70 | Wood stairs with 12" stone below |
| * | 56 | 98 | Concrete walk |
| | 573 | 77 | Weighted Average |
| | 487 | 73 | 84.99% Pervious Area |
| | 86 | 98 | 15.01% Impervious Area |

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

## Summary for Pond D1: 18" ADS BASIN

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 8.36" for 100-year event
Inflow = 0.24 cfs @ 12.07 hrs, Volume= 0.019 af
Outflow = 0.24 cfs @ 12.07 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min
Primary = 0.03 cfs @ 12.04 hrs, Volume= 0.008 af
Routed to Pond U1 : UG SF 1 & 2
Secondary = 0.24 cfs @ 12.09 hrs, Volume= 0.011 af
Routed to Pond P2 : Cell 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

Peak Elev= 9.15' @ 12.09 hrs
Flood Elev= 10.50'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 8.34' | **4.0" Round 4" PVC To chambers** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.34' / 8.21' S= 0.0260 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |
| #2 | Secondary | 8.67' | **4.0" Round 4" PVC to R-tanks** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.67' / 8.50' S= 0.0340 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.00 cfs @ 12.04 hrs HW=9.04' TW=9.06' (Dynamic Tailwater)
**1=4" PVC To chambers** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.23 cfs @ 12.09 hrs HW=9.15' TW=7.10' (Dynamic Tailwater)
**2=4" PVC to R-tanks** (Inlet Controls 0.23 cfs @ 2.69 fps)

## Summary for Pond D2: 18" ADS BASIN

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 8.36" for 100-year event
Inflow = 0.24 cfs @ 12.07 hrs, Volume= 0.019 af
Outflow = 0.24 cfs @ 12.07 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min
Primary = 0.03 cfs @ 12.04 hrs, Volume= 0.008 af
Routed to Pond U1 : UG SF 1 & 2
Secondary = 0.24 cfs @ 12.09 hrs, Volume= 0.011 af
Routed to Pond P2 : Cell 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 9.15' @ 12.09 hrs
Flood Elev= 10.50'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 8.34' | **4.0" Round 4" PVC To chambers** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.34' / 8.21' S= 0.0260 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |
| #2 | Secondary | 8.67' | **4.0" Round 4" PVC to R-tanks** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.67' / 8.50' S= 0.0340 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.00 cfs @ 12.04 hrs HW=9.04' TW=9.06' (Dynamic Tailwater)
**1=4" PVC To chambers** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.23 cfs @ 12.09 hrs HW=9.15' TW=7.10' (Dynamic Tailwater)
**2=4" PVC to R-tanks** (Inlet Controls 0.23 cfs @ 2.69 fps)

## Summary for Pond D3: 18" ADS BASIN

Inflow Area = 0.224 ac, 78.50% Impervious, Inflow Depth > 6.09" for 100-year event
Inflow = 0.09 cfs @ 14.39 hrs, Volume= 0.114 af
Outflow = 0.09 cfs @ 14.39 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.0 min
Primary = 0.09 cfs @ 14.39 hrs, Volume= 0.114 af
Routed to Pond P1 : Cell 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 7.09' @ 14.39 hrs
Flood Elev= 10.00'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 5.50' | **4.0" Round 4" PVC TO CELL 1** L= 50.0' Ke= 0.500<br>Inlet / Outlet Invert= 5.50' / 5.00' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.09 cfs @ 14.39 hrs HW=7.09' TW=7.00' (Dynamic Tailwater)
**1=4" PVC TO CELL 1** (Outlet Controls 0.09 cfs @ 1.00 fps)

## Summary for Pond D4: 18" ADS BASIN

Inflow Area = 0.340 ac, 73.66% Impervious, Inflow Depth > 5.61" for 100-year event
Inflow = 0.13 cfs @ 14.07 hrs, Volume= 0.159 af
Outflow = 0.13 cfs @ 14.07 hrs, Volume= 0.159 af, Atten= 0%, Lag= 0.0 min
Primary = 0.13 cfs @ 14.07 hrs, Volume= 0.159 af
Routed to Link 201 : Wave Avenue (DP1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 5.06' @ 14.07 hrs
Flood Elev= 7.40'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 4.75' | **4.0" Round 4" PVC TO STREET DRAIN** L= 20.0' Ke= 0.500<br>Inlet / Outlet Invert= 4.75' / 4.65' S= 0.0050 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.13 cfs @ 14.07 hrs HW=5.06' TW=0.00' (Dynamic Tailwater)
**1=4" PVC TO STREET DRAIN** (Barrel Controls 0.13 cfs @ 2.04 fps)

## Summary for Pond P1: Cell 1

Inflow Area = 0.340 ac, 73.66% Impervious, Inflow Depth > 6.50" for 100-year event
Inflow = 0.98 cfs @ 12.07 hrs, Volume= 0.184 af
Outflow = 0.13 cfs @ 14.07 hrs, Volume= 0.159 af, Atten= 86%, Lag= 119.9 min
Primary = 0.13 cfs @ 14.07 hrs, Volume= 0.159 af
Routed to Pond D4 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 7.00' @ 14.06 hrs Surf.Area= 3,895 sf Storage= 2,729 cf
Flood Elev= 7.00' Surf.Area= 3,895 sf Storage= 2,729 cf

Plug-Flow detention time= 1,236.3 min calculated for 0.159 af (86% of inflow)
Center-of-Mass det. time= 590.1 min ( 2,544.9 - 1,954.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 4.83' | 2,023 cf | **R-Tanks (Prismatic)** Listed below (Recalc)<br>2,129 cf Overall x 95.0% Voids |
| #2 | 6.00' | 561 cf | **Paver stones (Prismatic)** Listed below (Recalc)<br>1,700 cf Overall x 33.0% Voids |
| #3 | 4.83' | 145 cf | **Crushed Stone (Prismatic)** Listed below (Recalc)<br>439 cf Overall x 33.0% Voids |
| | | 2,729 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 4.83 | 1,820 | 0 | 0 |
| 6.00 | 1,820 | 2,129 | 2,129 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.00 | 1,700 | 0 | 0 |
| 7.00 | 1,700 | 1,700 | 1,700 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 4.83 | 375 | 0 | 0 |
| 6.00 | 375 | 439 | 439 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #0 | Primary | 7.00' | **Automatic Storage Overflow** (Discharged without head) |
| #1 | Primary | 4.83' | **0.5" Vert. 4" PVC WITH 0.5" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 5.40' | **1.0" Vert. 4" PVC WITH 1" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.04 cfs @ 14.07 hrs HW=7.00' TW=5.06' (Dynamic Tailwater)
↑—**1=4" PVC WITH 0.5" ORIFICE PLATE** (Orifice Controls 0.01 cfs @ 6.70 fps)
└—**2=4" PVC WITH 1" ORIFICE PLATE** (Orifice Controls 0.03 cfs @ 6.01 fps)

## Summary for Pond P2: Cell 2

Inflow Area = 0.169 ac, 71.41% Impervious, Inflow Depth = 9.08" for 100-year event
Inflow = 1.88 cfs @ 12.08 hrs, Volume= 0.128 af
Outflow = 0.08 cfs @ 14.39 hrs, Volume= 0.097 af, Atten= 96%, Lag= 138.9 min
Primary = 0.08 cfs @ 14.39 hrs, Volume= 0.097 af
Routed to Pond D3 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 7.89' @ 14.39 hrs Surf.Area= 2,326 sf Storage= 4,166 cf
Flood Elev= 10.00' Surf.Area= 4,652 sf Storage= 5,685 cf

Plug-Flow detention time= 2,292.9 min calculated for 0.097 af (76% of inflow)
Center-of-Mass det. time= 2,218.7 min ( 2,984.6 - 766.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6.00' | 4,795 cf | **R-Tanks (LD Single + Mini) (Prismatic)** Listed below (Recalc)<br>5,047 cf Overall x 95.0% Voids |
| #2 | 8.17' | 890 cf | **Stone and Paver media (Prismatic)** Listed below (Recalc)<br>2,698 cf Overall x 33.0% Voids |
| | | 5,685 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.00 | 2,326 | 0 | 0 |
| 8.17 | 2,326 | 5,047 | 5,047 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 8.17 | 2,326 | 0 | 0 |
| 9.33 | 2,326 | 2,698 | 2,698 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6.00' | **0.5" Vert. 4" PVC WTH 0.5" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 7.70' | **4.0" Vert. 4" PVC OUTLET** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.08 cfs @ 14.39 hrs HW=7.89' TW=7.09' (Dynamic Tailwater)
↑—**1=4" PVC WTH 0.5" ORIFICE PLATE** (Orifice Controls 0.01 cfs @ 4.31 fps)
└—**2=4" PVC OUTLET** (Orifice Controls 0.07 cfs @ 1.47 fps)

## Summary for Pond U1: UG SF 1 & 2

Inflow Area = 0.056 ac,100.00% Impervious, Inflow Depth = 3.62" for 100-year event
Inflow = 0.06 cfs @ 12.04 hrs, Volume= 0.017 af
Outflow = 0.01 cfs @ 12.08 hrs, Volume= 0.017 af, Atten= 81%, Lag= 2.8 min
Primary = 0.01 cfs @ 12.08 hrs, Volume= 0.017 af
Routed to Pond D3 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 9.15' @ 12.08 hrs Surf.Area= 322 sf Storage= 181 cf
Flood Elev= 10.00' Surf.Area= 322 sf Storage= 185 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 198.8 min ( 926.7 - 727.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 7.67' | 69 cf | **15.00'W x 10.00'L x 1.54'H Field A**<br>231 cf Overall - 60 cf Embedded = 172 cf x 40.0% Voids |
| #2A | 7.67' | 60 cf | **Cultec C-100HD** x 4 Inside #1<br>Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf<br>Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap<br>Row Length Adjustment= +0.50' x 1.86 sf x 4 rows |
| #3 | 6.67' | 57 cf | **Sand Media (Prismatic)** Listed below (Recalc) x 2<br>172 cf Overall x 33.0% Voids |
| | | 185 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.67 | 86 | 0 | 0 |
| 7.67 | 86 | 86 | 86 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 6.67' | **8.270 in/hr Filtration Through Media over Surface area** |
| #2 | Primary | 6.00' | **0.5" Vert. 4" Underdrain with 1/2" orifice** C= 0.600 Limited to weir flow at low heads |

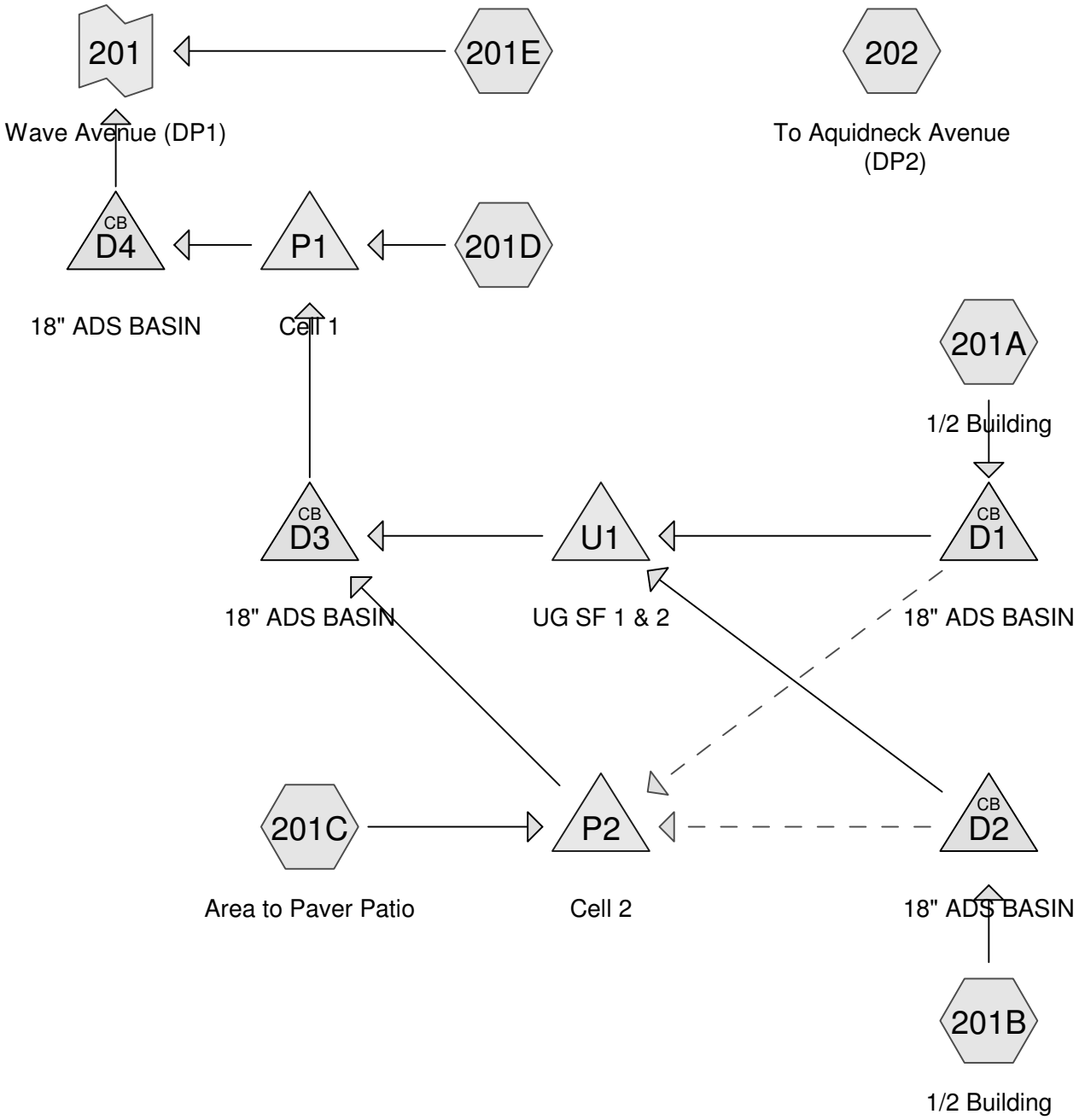
**Primary OutFlow** Max=0.01 cfs @ 12.08 hrs HW=9.15' TW=5.69' (Dynamic Tailwater)
↑—**2=4" Underdrain with 1/2" orifice** (Orifice Controls 0.01 cfs @ 8.52 fps)
↑—**1=Filtration Through Media** (Passes 0.01 cfs of 0.06 cfs potential flow)

## Summary for Link 201: Wave Avenue (DP1)

Inflow Area = 0.343 ac, 73.88% Impervious, Inflow Depth > 5.64" for 100-year event
Inflow = 0.14 cfs @ 14.07 hrs, Volume= 0.161 af
Primary = 0.14 cfs @ 14.07 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

# APPENDIX E WQ STORM (SPLIT PERVIOUS METHOD)




Subcat Reach Pond Link

**Routing Diagram for 15018_2023-12-15 REVISED DESIGN**
Prepared by Northeast Engineers & Consultants, Inc., Printed 12/21/2023
HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

## Summary for Subcatchment 201A: 1/2 Building

Runoff = 0.03 cfs @ 12.07 hrs, Volume= 0.002 af, Depth= 0.99"
Routed to Pond D1 : 18" ADS BASIN

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,212 | 98 | Roof |
| | 1,212 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 201B: 1/2 Building

Runoff = 0.03 cfs @ 12.07 hrs, Volume= 0.002 af, Depth= 0.99"
Routed to Pond D2 : 18" ADS BASIN

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,212 | 98 | Roof |
| | 1,212 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 201C: Area to Paver Patio

Runoff = 0.14 cfs @ 12.07 hrs, Volume= 0.010 af, Depth= 0.72"
Routed to Pond P2 : Cell 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5,245 | 98 | 98% capture |
| | 2,100 | 74 | >75% Grass cover, Good, HSG C |
| | 7,345 | 91 | Weighted Average |
| | 2,100 | 74 | 28.59% Pervious Area |
| | 5,245 | 98 | 71.41% Impervious Area |

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

## Summary for Subcatchment 201D:

Runoff = 0.08 cfs @ 12.07 hrs, Volume= 0.006 af, Depth= 0.66"
Routed to Pond P1 : Cell 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,239 | 98 | 98% capture |
| | 1,800 | 74 | >75% Grass cover, Good, HSG C |
| | 5,039 | 89 | Weighted Average |
| | 1,800 | 74 | 35.72% Pervious Area |
| | 3,239 | 98 | 64.28% Impervious Area |

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

## Summary for Subcatchment 201E:

Runoff = 0.00 cfs @ 12.07 hrs, Volume= 0.000 af, Depth= 0.99"
Routed to Link 201 : Wave Avenue (DP1)

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 123 | 98 | Pavement |
| | 123 | 98 | 100.00% Impervious Area |

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

## Summary for Subcatchment 202: To Aquidneck Avenue (DP2)

Runoff = 0.00 cfs @ 12.07 hrs, Volume= 0.000 af, Depth= 0.19"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 337 | 74 | >75% Grass cover, Good, HSG C |
| * | 30 | 98 | Retaining wall |
| * | 150 | 70 | Wood stairs with 12" stone below |
| * | 56 | 98 | Concrete walk |
| | 573 | 77 | Weighted Average |
| | 487 | 73 | 84.99% Pervious Area |
| | 86 | 98 | 15.01% Impervious Area |

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

## Summary for Pond D1: 18" ADS BASIN

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 0.99" for WQ event
Inflow = 0.03 cfs @ 12.07 hrs, Volume= 0.002 af
Outflow = 0.03 cfs @ 12.07 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min
Primary = 0.03 cfs @ 12.07 hrs, Volume= 0.002 af
Routed to Pond U1 : UG SF 1 & 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond P2 : Cell 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

Peak Elev= 8.46' @ 12.07 hrs
Flood Elev= 10.50'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 8.34' | **4.0" Round 4" PVC To chambers** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.34' / 8.21' S= 0.0260 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |
| #2 | Secondary | 8.67' | **4.0" Round 4" PVC to R-tanks** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.67' / 8.50' S= 0.0340 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.03 cfs @ 12.07 hrs HW=8.46' TW=7.25' (Dynamic Tailwater)
**1=4" PVC To chambers** (Inlet Controls 0.03 cfs @ 1.16 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=8.34' TW=6.00' (Dynamic Tailwater)
**2=4" PVC to R-tanks** ( Controls 0.00 cfs)

## Summary for Pond D2: 18" ADS BASIN

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 0.99" for WQ event
Inflow = 0.03 cfs @ 12.07 hrs, Volume= 0.002 af
Outflow = 0.03 cfs @ 12.07 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min
Primary = 0.03 cfs @ 12.07 hrs, Volume= 0.002 af
Routed to Pond U1 : UG SF 1 & 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond P2 : Cell 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 8.46' @ 12.07 hrs
Flood Elev= 10.50'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 8.34' | **4.0" Round 4" PVC To chambers** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.34' / 8.21' S= 0.0260 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |
| #2 | Secondary | 8.67' | **4.0" Round 4" PVC to R-tanks** L= 5.0' Ke= 0.500<br>Inlet / Outlet Invert= 8.67' / 8.50' S= 0.0340 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.03 cfs @ 12.07 hrs HW=8.46' TW=7.25' (Dynamic Tailwater)
**1=4" PVC To chambers** (Inlet Controls 0.03 cfs @ 1.16 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=8.34' TW=6.00' (Dynamic Tailwater)
**2=4" PVC to R-tanks** ( Controls 0.00 cfs)

## Summary for Pond D3: 18" ADS BASIN

Inflow Area = 0.224 ac, 78.50% Impervious, Inflow Depth > 0.76" for WQ event
Inflow = 0.01 cfs @ 12.82 hrs, Volume= 0.014 af
Outflow = 0.01 cfs @ 12.82 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min
Primary = 0.01 cfs @ 12.82 hrs, Volume= 0.014 af
Routed to Pond P1 : Cell 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 5.57' @ 12.82 hrs
Flood Elev= 10.00'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 5.50' | **4.0" Round 4" PVC TO CELL 1** L= 50.0' Ke= 0.500<br>Inlet / Outlet Invert= 5.50' / 5.00' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.01 cfs @ 12.82 hrs HW=5.57' TW=4.97' (Dynamic Tailwater)
**1=4" PVC TO CELL 1** (Inlet Controls 0.01 cfs @ 0.88 fps)

## Summary for Pond D4: 18" ADS BASIN

Inflow Area = 0.340 ac, 73.66% Impervious, Inflow Depth > 0.69" for WQ event
Inflow = 0.00 cfs @ 24.07 hrs, Volume= 0.020 af
Outflow = 0.00 cfs @ 24.07 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 24.07 hrs, Volume= 0.020 af
Routed to Link 201 : Wave Avenue (DP1)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 4.79' @ 24.07 hrs
Flood Elev= 7.40'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 4.75' | **4.0" Round 4" PVC TO STREET DRAIN** L= 20.0' Ke= 0.500<br>Inlet / Outlet Invert= 4.75' / 4.65' S= 0.0050 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.00 cfs @ 24.07 hrs HW=4.79' TW=0.00' (Dynamic Tailwater)
**1=4" PVC TO STREET DRAIN** (Barrel Controls 0.00 cfs @ 0.76 fps)

## Summary for Pond P1: Cell 1

Inflow Area = 0.340 ac, 73.66% Impervious, Inflow Depth > 0.73" for WQ event
Inflow = 0.09 cfs @ 12.07 hrs, Volume= 0.021 af
Outflow = 0.00 cfs @ 24.07 hrs, Volume= 0.020 af, Atten= 97%, Lag= 720.0 min
Primary = 0.00 cfs @ 24.07 hrs, Volume= 0.020 af
Routed to Pond D4 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 5.07' @ 24.07 hrs Surf.Area= 2,195 sf Storage= 451 cf
Flood Elev= 7.00' Surf.Area= 3,895 sf Storage= 2,729 cf

Plug-Flow detention time= 1,928.4 min calculated for 0.020 af (95% of inflow)
Center-of-Mass det. time= 1,736.6 min ( 3,364.1 - 1,627.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 4.83' | 2,023 cf | **R-Tanks (Prismatic)** Listed below (Recalc)<br>2,129 cf Overall x 95.0% Voids |
| #2 | 6.00' | 561 cf | **Paver stones (Prismatic)** Listed below (Recalc)<br>1,700 cf Overall x 33.0% Voids |
| #3 | 4.83' | 145 cf | **Crushed Stone (Prismatic)** Listed below (Recalc)<br>439 cf Overall x 33.0% Voids |
| | | 2,729 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 4.83 | 1,820 | 0 | 0 |
| 6.00 | 1,820 | 2,129 | 2,129 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.00 | 1,700 | 0 | 0 |
| 7.00 | 1,700 | 1,700 | 1,700 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 4.83 | 375 | 0 | 0 |
| 6.00 | 375 | 439 | 439 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #0 | Primary | 7.00' | **Automatic Storage Overflow** (Discharged without head) |
| #1 | Primary | 4.83' | **0.5" Vert. 4" PVC WITH 0.5" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 5.40' | **1.0" Vert. 4" PVC WITH 1" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.00 cfs @ 24.07 hrs HW=5.07' TW=4.79' (Dynamic Tailwater)
↑—**1=4" PVC WITH 0.5" ORIFICE PLATE** (Orifice Controls 0.00 cfs @ 2.27 fps)
└—**2=4" PVC WITH 1" ORIFICE PLATE** ( Controls 0.00 cfs)

## Summary for Pond P2: Cell 2

Inflow Area = 0.169 ac, 71.41% Impervious, Inflow Depth = 0.72" for WQ event
Inflow = 0.14 cfs @ 12.07 hrs, Volume= 0.010 af
Outflow = 0.00 cfs @ 18.25 hrs, Volume= 0.010 af, Atten= 98%, Lag= 370.9 min
Primary = 0.00 cfs @ 18.25 hrs, Volume= 0.010 af
Routed to Pond D3 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 6.16' @ 18.25 hrs Surf.Area= 2,326 sf Storage= 346 cf
Flood Elev= 10.00' Surf.Area= 4,652 sf Storage= 5,685 cf

Plug-Flow detention time= 1,793.1 min calculated for 0.010 af (95% of inflow)
Center-of-Mass det. time= 1,765.7 min ( 2,551.9 - 786.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6.00' | 4,795 cf | **R-Tanks (LD Single + Mini) (Prismatic)** Listed below (Recalc)<br>5,047 cf Overall x 95.0% Voids |
| #2 | 8.17' | 890 cf | **Stone and Paver media (Prismatic)** Listed below (Recalc)<br>2,698 cf Overall x 33.0% Voids |
| | | 5,685 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.00 | 2,326 | 0 | 0 |
| 8.17 | 2,326 | 5,047 | 5,047 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 8.17 | 2,326 | 0 | 0 |
| 9.33 | 2,326 | 2,698 | 2,698 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6.00' | **0.5" Vert. 4" PVC WTH 0.5" ORIFICE PLATE** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 7.70' | **4.0" Vert. 4" PVC OUTLET** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.00 cfs @ 18.25 hrs HW=6.16' TW=5.54' (Dynamic Tailwater)
↑—**1=4" PVC WTH 0.5" ORIFICE PLATE** (Orifice Controls 0.00 cfs @ 1.77 fps)
└—**2=4" PVC OUTLET** ( Controls 0.00 cfs)

## Summary for Pond U1: UG SF 1 & 2

Inflow Area = 0.056 ac,100.00% Impervious, Inflow Depth = 0.99" for WQ event
Inflow = 0.06 cfs @ 12.07 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 12.57 hrs, Volume= 0.005 af, Atten= 86%, Lag= 29.9 min
Primary = 0.01 cfs @ 12.57 hrs, Volume= 0.005 af
Routed to Pond D3 : 18" ADS BASIN

Routing by Dyn-Stor-Ind method, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs
Peak Elev= 7.74' @ 12.57 hrs Surf.Area= 322 sf Storage= 65 cf
Flood Elev= 10.00' Surf.Area= 322 sf Storage= 185 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 54.5 min ( 835.6 - 781.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 7.67' | 69 cf | **15.00'W x 10.00'L x 1.54'H Field A**<br>231 cf Overall - 60 cf Embedded = 172 cf x 40.0% Voids |
| #2A | 7.67' | 60 cf | **Cultec C-100HD** x 4 Inside #1<br>Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf<br>Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap<br>Row Length Adjustment= +0.50' x 1.86 sf x 4 rows |
| #3 | 6.67' | 57 cf | **Sand Media (Prismatic)** Listed below (Recalc) x 2<br>172 cf Overall x 33.0% Voids |
| | | 185 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6.67 | 86 | 0 | 0 |
| 7.67 | 86 | 86 | 86 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 6.67' | **8.270 in/hr Filtration Through Media over Surface area** |
| #2 | Primary | 6.00' | **0.5" Vert. 4" Underdrain with 1/2" orifice** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.01 cfs @ 12.57 hrs HW=7.74' TW=5.57' (Dynamic Tailwater)
↑**2=4" Underdrain with 1/2" orifice** (Orifice Controls 0.01 cfs @ 6.32 fps)
↑**1=Filtration Through Media** (Passes 0.01 cfs of 0.06 cfs potential flow)

## Summary for Link 201: Wave Avenue (DP1)

Inflow Area = 0.343 ac, 73.88% Impervious, Inflow Depth > 0.69" for WQ event
Inflow = 0.00 cfs @ 12.07 hrs, Volume= 0.020 af
Primary = 0.00 cfs @ 12.07 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-128.00 hrs, dt= 0.01 hrs

# APPENDIX F SUPPLEMENTARY CALCULATIONS

Northeast Engineers & Consultants, Inc.
A Knowledge Corporation®

6 Valley Road, Middletown, RI 02842
www.northeastengineers.com

# Subsurface Sand Filters

**Project: 15018.3 Newport Beach Suites**

## Water Quality Volume Calculation (RIDEM Minimum Standard 3):

| | | | | | |
|---|---|---|---|---|---|
| Hotel: | 2,554 | | | | |
| Pavement: | 0 | | **Min. $WQ_R$:** | 43 | cf |
| Total Area: | 2,554 | sf | **$WQ_R$:** | 213 | cf |
| Total Disturbed Area: | 2,554 | sf | **$WQ_{R75\%}$:** | **160** | cf |

| | | | |
|---|---|---|---|
| **A =** | Surface area of filter bed ($ft^2$) | 172 | $ft^2$ |
| **$d_f$ =** | Filter bed depth (ft) | 1 | ft |
| **$V_R$=** | media void ratio | 33% | |

Storage Volume in Media:

| | | | | | | |
|---|---|---|---|---|---|---|
| 172 | X | 1 | X | 33% | = | **57 cf** |

## Total System Volume Calculation:

Per 250-RICR-150-10-8.23, the storage volume of the system must accommodate 75% of the WQ volume (including pretreatment). The total provided area is this area, plus the storage in the system under the outlet.

| | | | |
|---|---|---|---|
| **$V_M$ =** | storage volume in media | 57 | cf |
| **A =** | Surface area of filter bed ($ft^2$) | 172 | $ft^2$ |
| **$d_M$ =** | depth of loam | 0.00 | ft |
| **$h_o$ =** | storage height below outlet | 0.66 | ft |
| **$V_{FB}$ =** | Volume of pretreatment | 0 | cf |

Total Storage provided by this BMP:

**$WQ_V$ =** $V_M + (A \times d_M \times V_R) + (A \times h_o) + V_{FB}$ = **170** cf

## Minimum Area Calculation:

**$t_f$ =** 1.00 days

The minimum area of the filter, according to 250-RICR-150-10-8.23, is calculated using the following equation:

$$A_R = (WQ_V) \times (d_f) / [(k) \times (h_f + d_f) \times (t_f)]$$

Where,

| | | | |
|---|---|---|---|
| **$WQ_V$ =** | Total Required Water Quality Volume | 213 | cf |
| **$d_f$ =** | Filter bed depth (ft) | 1 | ft |
| **k =** | Coefficient of permeability of filter media (ft/day) | 3.5 | ft/day |
| **$h_f$ =** | Average height of water above surface of media | 0.33 | ft |
| **$t_f$ =** | Design filter bed drain time (days) | 1.00 | |

Therefore, the minimum surface areas is:

**$A_R$ = 46 sf**

**A = 172 sf** Area is greater and therefore satisfactory.

# APPENDIX G SOIL EVALUATIONS

# STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment System Program

**Site Evaluation Form**
**Part A – Soil Profile Description** Application Number FOR INFILTRATION

Property Owner: DOJO LLC
Property Location: 38 PURGATORY ROAD - AP 116NW LOT 13 - MIDDLETOWN
Date of Test Hole: NOVEMBER 9, 2017
Soil Evaluator: DAVID KAVON License Number: D4052
Weather: Shaded: Yes ☐ No ☐ Time:

| TH 1 Horizon | Depth | Horizon Boundaries | | Soil Colors | | Re-Dox | | | Texture | Structure | Consistence | Soil Category |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dist | Topo | Matrix | Re-Dox Features | Ab. | S. | Contr. | | | | |
| HTM | 17-0 | a | s | — | — | — | — | — | MOSTLY SAND | 0 m | vfr | — |
| C1 | 26 | a | s | 2.5Y 4/3 | 2.5Y 4/4 | c | 3 | d/f | S | 0 sg | l | 1 |
| C2 | 55 | a | s | 2.5Y 4/3 | 10YR 3/6 | | | | S | 0 sg | l | 1 |
| Cg | 94+ | — | — | 5Y 4/1 | — | — | — | — | S | 0 sg | l | 1 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| TH 2 Horizon | Depth | Horizon Boundaries | | Soil Colors | | Re-Dox | | | Texture | Structure | Consistence | Soil Category |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dist | Topo | Matrix | Re-Dox Features | Ab. | S. | Contr. | | | | |
| Ap | 7 | a | s | 2.5Y 3/1 | — | — | — | — | LS | 0 m | vfr | 1 |
| C1 | 12 | a | s | 2.5Y 4/2 | — | — | — | — | S | 0 sg | l | 1 |
| C2 | 70 | a | s | 2.5Y 4/2 | 10YR 4/4 | m | 2 | p | S | 0 sg | l | 1 |
| Cg | 94+ | — | — | 5Y 4/1 | — | — | — | — | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

TH 1 Soil Class E Total Depth 94" Impervious/Limiting Layer Depth N/R (og) GW Seepage Depth 36 SHWT 0 (og)
TH 2 Soil Class E Total Depth 94" Impervious/Limiting Layer Depth N/R (og) GW Seepage Depth 39 SHWT 12" (og)

Comments: SHWT IN TH #1 MAY BE WITHIN THE HTM HORIZON

Revised 1/31/14

## Part B

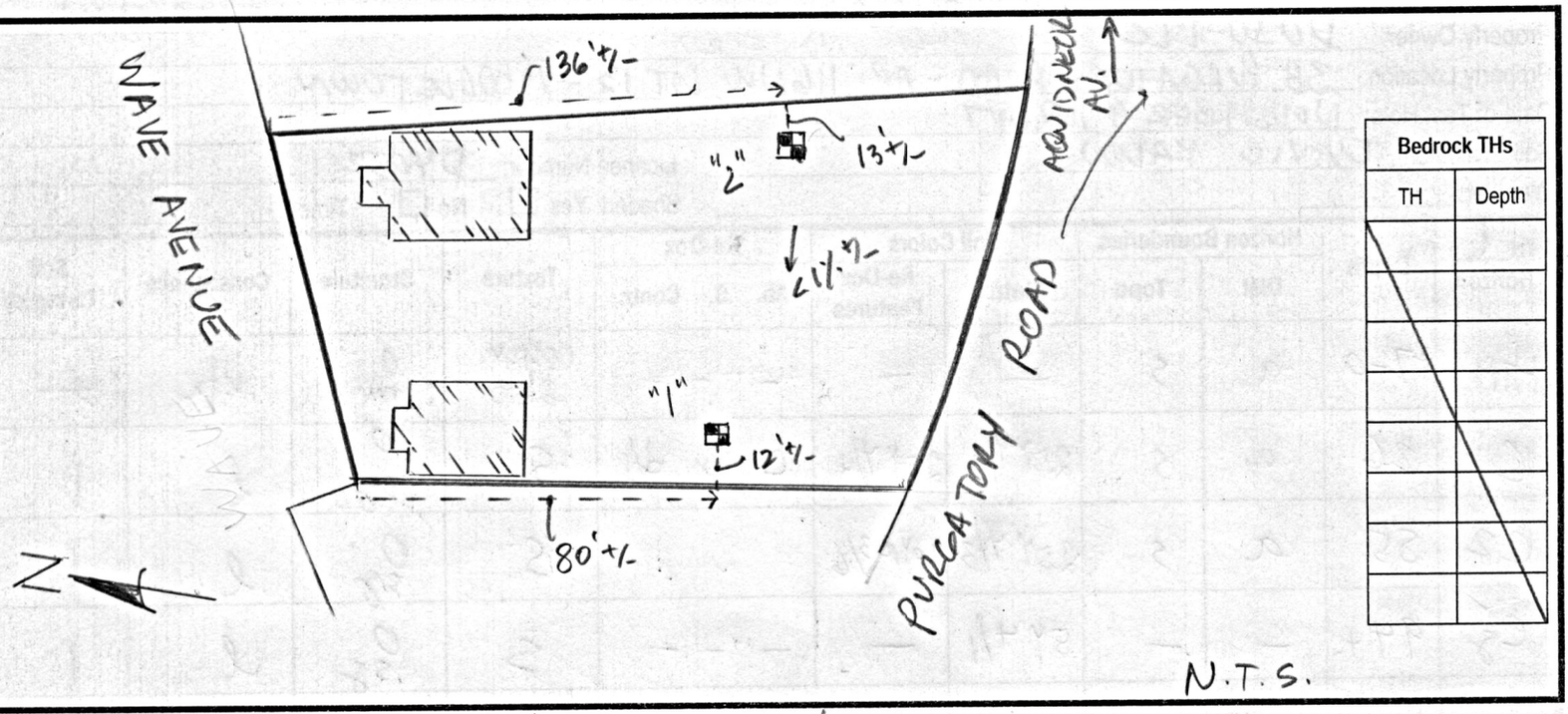
**Site Evaluation** – to be completed by Soil Evaluator or Class II or III Designer

**Please use the area below to locate:**

1. Test holes and bedrock test holes,
2. Approximate direction of due north,
3. Offsets from all test holes to fixed points such as street, utility pole, or other permanent, marked object.*

***OFFSETS MUST BE SHOWN**

**Key:**
- Approximate location of test holes
- Approximate location of bedrock test holes
- x% → Estimated gradient and direction of slope
- N → Approximate direction of due north




| Bedrock THs | |
|---|---|
| TH | Depth |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

1. Relief and Slope: MICRO-RELIEF: 2'+/- SLOPE: 0-1%
2. Presence of any watercourse, wetlands or surface water bodies, within 200 feet of test holes? If yes, locate on above sketch. NO ☑ YES ☐
3. Restrictive Layer or Bedrock within 4' below original ground within 25 feet of test hole? Provide all test hole locations & depths above. NO ☑ YES ☐
4. Presence of existing or proposed private drinking water wells within 200 feet of test holes? If yes, locate on above sketch. NO ☑ YES ☐
5. Public drinking water wells within 500 feet of test holes? If yes, locate on above sketch. NO ☑ YES ☐
6. Is site within the watershed of a public drinking water reservoir or other critical area defined in Rule 38? NO ☑ YES ☐
7. Has soil been excavated from or fill deposited on site? If yes, locate on above sketch. NO ☐ YES ☑
8. Site's potential for flooding or ponding: NONE ☐ SLIGHT ☐ MODERATE ☐ SEVERE ☑ AE 14-15
9. Landscape position: N/A
10. Vegetation: MOWED LAWNS
11. Indicate approximate location of property lines and roadways.
12. Additional comments, site constraints or additional information regarding site: NONE

**Certification**

The undersigned hereby certifies that all information on this application and accompanying forms, submittals and sketches are true and accurate and that I have been authorized by the owner(s) to conduct these necessary field investigations and submit this request.

Part A prepared by: _____ (Signature) _____ (License #)

Part B prepared by: _____ (Signature) _____ (License #)

**DO NOT WRITE IN THIS SPACE**

**Witnessed Soil Evaluation Decision:** Concur ☐ Inconclusive ☐ Disclaim ☐

**Unwitnessed Soil Evaluations Decision:** Accept ☐ Inconclusive ☐ Disclaim ☐

**Wet Season Determination required** ☐ **Additional Field Review Required** ☐

Explanation: _____

_____ (Signature Authorized Agent) _____ (Date)

# APPENDIX H STORMWATER MANAGEMENT CHECKLIST (RIDEM "APPENDIX A")

# APPENDIX A: STORMWATER MANAGEMENT PLAN CHECKLIST AND LID PLANNING REPORT – STORMWATER DESIGN SUMMARY

| | |
|---|---|
| **PROJECT NAME**<br>**Newport Beach Suites (Wave Pond Hotel LLC)** | **(RIDEM USE ONLY)**<br>**STW/WQC File #:**<br>**Date Received:** |
| **TOWN**<br>**Middletown RI** | |
| **BRIEF PROJECT DESCRIPTION:**<br>Construction of a 4-unit motel and associated improvements on an existing residential property. | |

## Stormwater Management Plan (SMP) Elements – Minimum Standards

**When submitting a SMP,[1] submit four separately bound documents**: Appendix A Checklist; Stormwater Site Planning, Analysis and Design Report with Plan Set/Drawings; Soil Erosion and Sediment Control (SESC) Plan, and Post Construction Operations and Maintenance (O&M) Plan. Please refer to Suggestions to Promote Brevity.

Note: **All stormwater construction projects must create a Stormwater Management Plan (SMP). However, not every element listed below is required per the RIDEM Stormwater Rules and the RIPDES Construction General Permit (CGP). This checklist will help identify the required elements to be submitted with an Application for Stormwater Construction Permit & Water Quality Certification.**

## PART 1. PROJECT AND SITE INFORMATION

**PROJECT TYPE** (Check all that apply)

| | | | | |
|---|---|---|---|---|
| ☐ Residential | ☒ Commercial | ☐ Federal | ☐ Retrofit | ☐ Restoration |
| ☐ Road | ☐ Utility | ☐ Fill | ☐ Dredge | ☐ Mine |
| ☐ Other (specify): | | | | |

**SITE INFORMATION**

☒ Vicinity Map

**INITIAL DISCHARGE LOCATION(S):** The WQv discharges to: (You may choose more than one answer if several discharge points are associated with the project.)

| ☐ **Groundwater** | ☐ **Surface Water** | ☒ **MS4** |
|---|---|---|
| ☐ GAA | ☐ Isolated Wetland | ☐ RIDOT |
| ☐ GA | ☐ Named Waterbody | ☐ RIDOT Alteration Permit is Approved |
| ☐ GB | ☐ Unnamed Waterbody Connected to Named Waterbody | ☒ Town |
| | | ☐ Other (specify): |

**ULTIMATE RECEIVING WATERBODY LOCATION(S):** Include pertinent information that applies to both $WQ_v$ and flow from larger storm events including overflows. Choose all that apply, and repeat table for each waterbody.

| | | | |
|---|---|---|---|
| ☒ Groundwater or Disconnected Wetland | ☐ SRWP | | |
| ☒ Waterbody Name: Easton Pond Moat | ☐ Coldwater | ☒ Warmwater | ☐ Unassessed |
| ☒ Waterbody ID: None. Adjacent to RI0007035L-04 | ☐ 4th order stream of pond 50 acres or more | | |
| ☒ TMDL for: Moat has no TMDL drains to Ocean | ☐ Watershed of flood prone river (e.g., Pocasset River) | | |
| ☐ Contributes to a priority outfall listed in the TMDL | ☐ Contributes stormwater to a public beach | | |
| ☒ 303(d) list – Impairment(s) for: | ☐ Contributes to shellfishing grounds | | |

[1] Applications for a Construction General Permit that do not require any other permits from RIDEM and will disturb less than 5 acres over the entire course of the project do not need to submit a SMP. The Appendix A checklist must still be submitted.

| **PROJECT HISTORY** | | |
|---|---|---|
| ☐ RIDEM Pre- Application Meeting | Meeting Date: | ☐ Minutes Attached |
| ☐ Municipal Master Plan Approval | Approval Date: | ☐ Minutes Attached |
| ☐ Subdivision Suitability Required | Approval #: | |
| ☐ Previous Enforcement Action has been taken on the property | Enforcement #: | |

| **FLOODPLAIN & FLOODWAY See** Guidance Pertaining to Floodplain and Floodways | |
|---|---|
| ☒ Riverine 100-year floodplain: **FEMA FLOODPLAIN FIRMETTE** has been reviewed and the 100-year floodplain is on site | |
| ☒ Delineated from FEMA Maps | |
| NOTE: Per Rule 250-RICR-150-10-8-1.1(B)(5)(d)(3), provide volumetric floodplain compensation calculations for cut and fill/displacement calculated by qualified professional | |
| ☒ Calculated by Professional Engineer | |
| ☒ Calculations are provided for cut vs. fill/displacement volumes proposed within the 100-year floodplain | Amount of Fill (CY): 9,500 CF<br>Amount of Cut (CY): 2,300 + 8,151 (storage) = 10,451 CF |
| ☐ Restrictions or modifications are proposed to the flow path or velocities in a floodway | |
| ☐ Floodplain storage capacity is impacted | |
| ☐ Project area is not within 100-year floodplain as defined by RIDEM | |

| **CRMC JURISDICTION** |
|---|
| ☒ CRMC Assent required |
| ☐ Property subject to a Special Area Management Plan (SAMP). If so, specify which SAMP: |
| ☐ Sea level rise mitigation has been designed into this project |

| **LUHPPL IDENTIFICATION - MINIMUM STANDARD 8:** | | | |
|---|---|---|---|
| **1. OFFICE OF Land Revitalization and Sustainable Materials Management (OLRSMM)** | | | |
| | ☐ Known or suspected releases of HAZARDOUS MATERIAL are present at the site (Hazardous Material is defined in Rule 1.4(A)(33) of 250-140-30-1 of the RIDEM Rules and Regulations for Investigation and Remediation of Hazardous Materials (the Remediation Regulations)) | | **RIDEM CONTACT:** |
| | ☐ Known or suspected releases of PETROLEUM PRODUCT are present at the site (Petroleum Product as defined in Rule 1.5(A)(84) of 250-140-25-1 of the RIDEM Rules and Regulations for Underground Storage Facilities Used for Regulated Substances and Hazardous Materials) | | |
| | ☐ This site is identified on the RIDEM Environmental Resources Map as one of the following regulated facilities | | **SITE ID#:** |
| | | ☐ CERCLIS/Superfund (NPL) | |
| | | ☐ State Hazardous Waste Site (SHWS) | |
| | | ☐ Environmental Land Usage Restriction (ELUR) | |
| | | ☐ Leaking Underground Storage Tank (LUST) | |
| | | ☐ Closed Landfill | |
| Note: If any boxes in 1 above are checked, the applicant must contact the RIDEM OLRSMM Project Manager associated with the Site to determine if subsurface infiltration of stormwater is allowable for the project. Indicate if the infiltration corresponds to "Red," "Yellow" or "Green" as described in Section 3.2.8 of the RISDISM Guidance (Subsurface Contamination Guidance). Also, note and reference approval in PART 3, Minimum Standard 2: Groundwater Recharge/Infiltration. | | | |
| **2. PER MINIMUM STANDARD 8 of RICR 8.14.C.1-6 "LUHPPLS," THE SITE IS/HAS:** | | | |
| | ☐ Industrial Site with RIPDES MSGP, except where No Exposure Certification exists. http://www.dem.ri.gov/programs/water/permits/ripdes/stormwater/status.php | | |
| | ☐ Auto Fueling Facility (e.g., gas station) | | |
| | ☐ Exterior Vehicles Service, Maintenance, or Equipment Cleaning Area | | |

| | | |
|---|---|---|
| | ☐ Road Salt Storage and Loading Areas (exposed to rainwater) | |
| | ☐ Outdoor Storage and Loading/Unloading of Hazardous Substances | |
| **3.** | **STORMWATER INDUSTRIAL PERMITTING** | |
| | ☐ The site is associated with existing or proposed activities that are considered Land Uses with Higher Potential Pollutant Loads (LUHPPLS) (see RICR 8.14.C) | Activities:<br>Sector: |
| | ☐ Construction is proposed on a site that is subject to THE MULTI-SECTOR GENERAL PERMIT (MSGP) UNDER RULE 31(B)15 OF THE RIPDES REGULATIONS. | MSGP permit # |
| | ☐ Additional stormwater treatment is required by the MSGP<br>Explain: | |

| **REDEVELOPMENT STANDARD – MINIMUM STANDARD 6** | | |
|---|---|---|
| ☒ Pre Construction Impervious Area | | |
| | ☒ Total Pre-Construction Impervious Area (**TIA**) = 0.06 Acres | |
| | ☒ Total Site Area (**TSA**) = 0.32Acres | |
| | ☒ Jurisdictional Wetlands (**JW**) = 0.0 Acres | |
| | ☒ Conservation Land (**CL**) = 0.0 Acres | |
| ☒ Calculate the Site Size (defined as contiguous properties under same ownership) | | |
| | ☒ Site Size (**SS**) = (**TSA**) – (**JW**) – (**CL**) = 0.32 | |
| | ☒ (**TIA**) / (**SS**) = 18.8% | ☒ (**TIA**) / (**SS**) >**0.4**? No. |
| ☐ YES, Redevelopment | | |

## PART 2. LOW IMPACT DEVELOPMENT ASSESSMENT – MINIMUM STANDARD 1

(NOT REQUIRED FOR REDEVELOPMENT OR RETROFITS)
This section may be deleted if not required.

**Note:** A written description must be provided specifying why each method is not being used or is not applicable at the Site. Appropriate answers may include:

- Town requires … (state the specific local requirement)
- Meets Town's dimensional requirement of …
- Not practical for site because …
- Applying for waiver/variance to achieve this (pending/approved/denied)
- Applying for wavier/variance to seek relief from this (pending/approved/denied)

| *A) PRESERVATION OF UNDISTURBED AREAS, BUFFERS, AND FLOODPLAINS* | **IF NOT IMPLEMENTED, EXPLAIN HERE** |
|---|---|
| ☒ Sensitive resource areas and site constraints are identified (required)<br>☒ Local development regulations have been reviewed (required)<br>☒ All vegetated buffers and coastal and freshwater wetlands will be protected during and after construction<br>☐ Conservation Development or another site design technique has been incorporated to protect open space and pre-development hydrology. **Note:** If Conservation Development has been used, check box and skip to Subpart C<br>☐ As much natural vegetation and pre-development hydrology as possible has been maintained | ***No features on site require protection or preservation. Minimal existing site vegetation.*** |

| | |
|---|---|
| ***B) LOCATE DEVELOPMENT IN LESS SENSITIVE AREAS AND WORK WITH THE NATURAL LANDSCAPE CONDITIONS, HYDROLOGY, AND SOILS***<br>☒ Development sites and building envelopes have been appropriately distanced from wetlands and waterbodies<br>☐ Development and stormwater systems have been located in areas with greatest infiltration capacity (e.g., soil groups A and B)<br>☐ Plans show measures to prevent soil compaction in areas designated as Qualified Pervious Areas (QPA's)<br>☐ Development sites and building envelopes have been positioned outside of floodplains<br>☒ Site design positions buildings, roadways and parking areas in a manner that avoids impacts to surface water features<br>☒ Development sites and building envelopes have been located to minimize impacts to steep slopes (≥15%)<br>☐ Other (describe): | ***There are no type A or B soils on site. There are no areas that could qualify as QPAs on the property. There are no floodplains in site or in the immediate vicinity.***<br><br>***Proposed development runoff directed into the ground to the maximum extent possible.***<br><br>***No significant steep slopes are present on site.*** |
| ***C) MINIMIZE CLEARING AND GRADING***<br>☐ Site clearing has been restricted to minimum area needed for building footprints, development activities, construction access, and safety.<br>☐ Site has been designed to position buildings, roadways, and parking areas in a manner that minimizes grading (cut and fill quantities)<br>☐ Protection for stands of trees and individual trees and their root zones to be preserved has been specified, and such protection extends at least to the tree canopy drip line(s)<br>☐ Plan notes specify that public trees removed or damaged during construction shall be replaced with equivalent | ***Site is previously disturbed. Minimization of clearing not applicable.*** |
| ***D) REDUCE IMPERVIOUS COVER***<br>☐ Reduced roadway widths (≤22 feet for ADT ≤ 400; ≤ 26 feet for ADT 400 - 2,000)<br>☒ Reduced driveway areas (length minimized via reduced ROW width (≤ 45 ft.) and/or reduced (or absolute minimum) front yard setback; width minimized to ≤ 9 ft. wide one lane; ≤ 18 ft. wide two lanes; shared driveways; pervious surface)<br>☐ Reduced building footprint: Explain approach:<br>☐ Reduced sidewalk area (≤ 4 ft. wide; one side of the street; unpaved path; pervious surface)<br>☐ Reduced cul-de-sacs (radius < 45 ft; vegetated island; alternative turn-around)<br>☐ Reduced parking lot area: Explain approach<br>☒ Use of pervious surfaces for driveways, sidewalks, parking areas/overflow parking areas, etc.<br>☐ Minimized impervious surfaces (project meets or is less than maximum specified by Zoning Ordinance)<br>☒ Other (describe): | ***Pervious pavers utilized.*** |
| ***E) DISCONNECT IMPERVIOUS AREA***<br>☐ Impervious surfaces have been disconnected, and runoff has been diverted to QPAs to the maximum extent possible<br>☐ Residential street edges allow side-of-the-road drainage into vegetated open swales<br>☐ Parking lot landscaping breaks up impervious expanse AND accepts runoff<br>☐ Other (describe): | ***No areas on site qualify as QPAs*** |
| ***F) MITIGATE RUNOFF AT THE POINT OF GENERATION***<br>☐ Small-scale BMPs have been designated to treat runoff as close as possible to the source | ***Subsurface BMPs designed to directly capture rooftop runoff.*** |

| | |
|---|---|
| ***G) PROVIDE LOW-MAINTENANCE NATIVE VEGETATION***<br>☒ Low-maintenance landscaping has been proposed using native species and cultivars<br>☐ Plantings of native trees and shrubs in areas previously cleared of native vegetation are shown on site plan<br>☒ Lawn areas have been limited/minimized, and yards have been kept undisturbed to the maximum extent practicable on residential lots | |
| ***H) RESTORE STREAMS/WETLANDS***<br>☐ Historic drainage patterns have been restored by removing closed drainage systems, daylighting buried streams, and/or restoring degraded stream channels and/or wetlands<br>☐ Removal of invasive species<br>☐ Other | ***Not Applicable.*** |

## PART 3. SUMMARY OF REMAINING STANDARDS

| GROUNDWATER RECHARGE – MINIMUM STANDARD 2 | | |
|---|---|---|
| **YES** | **NO** | |
| ☐ | ☒ | The project has been designed to meet the groundwater recharge standard. |
| ☐ | ☐ | If "No," the justification for groundwater recharge criterion waiver has been explained in the Narrative (e.g., threat of groundwater contamination or physical limitation), if applicable (see RICR 8.8.D); |
| ☒ | ☐ | Your waiver request has been explained in the Narrative, if applicable. |
| ☐ | ☒ | Is this site identified as a Regulated Facility in Part 1, Minimum Standard 8: LUHPPL Identification? |
| ☐ | ☐ | If "Yes," has approval for infiltration by the OLRSMM Site Project Manager, per Part 1, Minimum Standard 8, been requested? |

**TABLE 2-1: Summary of Recharge (see RISDISM Section 3.3.2)**

| Design Point | Impervious Area Treated (sq ft) | Total $Re_v$ Required (cu ft) | LID Stormwater Credits (see RISDISM Section 4.6.1) Portion of $Re_v$ directed to a QPA (cu ft) | Recharge Required by Remaining BMPs (cu ft) | Recharge Provided by BMPs (cu ft) |
|---|---|---|---|---|---|
| DP-1: | | | | | |
| DP-2: | | | | | |
| DP-3: | | | | | |
| DP-4: | | | | | |
| **TOTALS**: | | | | | |

Notes:
1. Only BMPs listed in RISDISM Table 3-5 "List of BMPs Acceptable for Recharge" may be used to meet the recharge requirement.
2. Recharge requirement must be satisfied for each waterbody ID.

☐ Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.):

| WATER QUALITY – MINIMUM STANDARD 3 | | |
|---|---|---|
| **YES** | **NO** | |
| ☒ | ☐ | Does this project meet or exceed the required water quality volume WQv (see RICR 8.9.E-I)? |
| ☒ | ☐ | Is the proposed final impervious cover greater than 20% of the disturbed area (see RICR 8.9.E-I)? |
| ☒ | ☐ | If "Yes," either the Modified Curve Number Method or the Split Pervious/Impervious method in Hydro-CAD was used to calculate WQv; or, |
| ☐ | ☐ | If "Yes," either TR-55 or TR-20 was used to calculate WQv; and, |
| ☐ | ☐ | If "No," the project meets the minimum WQv of 0.2 watershed inches over the entire disturbed area. |
| ☐ | ☐ | Not Applicable |
| ☒ | ☐ | Does this project meet or exceed the ability to treat required water quality flow WQf (see RICR 8.9.I.1-3)? |
| ☐ | ☒ | Does this project propose an increase of impervious cover to a receiving water body with impairments?<br>If "Yes," please indicate below the method that was used to address the water quality requirements of no further degradation to a low-quality water. |
| ☐ | ☒ | RICR 8.36. A Pollutant Loading Analysis is needed and has been completed. |
| ☒ | ☐ | The Water Quality Guidance Document (Water Quality Goals and Pollutant Loading Analysis Guidance for Discharges to Impaired Waters) has been followed as applicable. |
| ☒ | ☐ | BMPs are proposed that are on the approved technology list . If "Yes," please provide all required worksheets from the manufacturer. |
| ☐ | ☒ | Additional pollutant-specific requirements and/or pollutant removal efficiencies are applicable to the site as the result of a TMDL, SAMP, or other watershed-specific requirements.<br>If "Yes," please describe: |

**TABLE 3-1: Summary of Water Quality** (see RICR 8.9)

| **Design Point and WB ID** | **Impervious area treated (sq ft)** | **Total $WQ_v$ Required (cu ft)** | **LID Stormwater Credits** (see RICR 8.18) **WQv directed to a QPA (cu ft)** | **Water Quality Treatment Remaining (cu ft)** | **Water Quality Provided by BMPs (cu ft)** |
|---|---|---|---|---|---|
| DP-1: Wave Ave | 2,554 | 213 | 0 | 213 | 213 |
| DP-2: | | | | | |
| DP-3: | | | | | |
| DP-4: | | | | | |
| **TOTALS**: | | | | | |

Notes:
1. Only BMPs listed in RICR 8.20 and 8.25 or the Approved Technologies List of BMPs is Acceptable for Water Quality treatment.
2. For each Design Point, the Water Quality Volume Standard must be met for each Waterbody ID.

| | |
|---|---|
| ☐ YES<br>☐ NO | This project has met the setback requirements for each BMP.<br>If "No," please explain: |

☐ Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.): **Section 2.2.3, Stormwater Report Appendix F**

| CONVEYANCE AND NATURAL CHANNEL PROTECTION (RICR 8.10) – MINIMUM STANDARD 4 | | |
|---|---|---|
| **YES** | **NO** | |
| ☒ | ☐ | Is this standard waived? If "Yes," please indicate one or more of the reasons below: |
| | | ☐ The project directs discharge to a large river (i.e., 4th-order stream or larger. See RISDISM Appendix I for State-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters.<br>☒ The project is a small facility with impervious cover of less than or equal to 1 acre.<br>☐ The project has a post-development peak discharge rate from the facility that is less than 2 cfs for the 1-year, 24-hour Type III design storm event (prior to any attenuation). (Note: LID design strategies can greatly reduce the peak discharge rate). |
| ☐ | ☒ | Conveyance and natural channel protection for the site have been met.<br>If "No,' explain why: |

| TABLE 4-1: Summary of Channel Protection Volumes (see RICR 8.10) | | | | | |
|---|---|---|---|---|---|
| **Design Point** | **Receiving Water Body Name** | **Coldwater Fishery? (Y/N)** | **Total CPv Required (cu ft)** | **Total CPv Provided (cu ft)** | **Average Release Rate Modeled in the 1-yr storm (cfs)** |
| DP-1: | | | | | |
| DP-2: | | | | | |
| DP-3: | | | | | |
| DP-4: | | | | | |
| **TOTALS**: | | | | | |
| Note: The Channel Protection Volume Standard must be met in each waterbody ID. | | | | | |
| ☐ YES<br>☐ NO | The CPv is released at roughly a uniform rate over a 24-hour duration (see examples of sizing calculations in Appendix D of the RISDISM). | | | | |
| ☐ YES<br>☐ NO | Do additional design restrictions apply resulting from any discharge to cold-water fisheries;<br>If "Yes," please indicate restrictions and solutions below. | | | | |
| ☐ Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.). | | | | | |

| **OVERBANK FLOOD PROTECTION (RICR 8.11) AND OTHER POTENTIAL HIGH FLOWS – MINIMUM STANDARD 5** | | | |
|---|---|---|---|
| **YES** | **NO** | | |
| ☐ | ☒ | Is this standard waived? If yes, please indicate one or more of the reasons below: | |
| | | ☐ | The project directs discharge to a large river (i.e., 4th-order stream or larger. See Appendix I for state-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters. |
| | | ☐ | A Downstream Analysis (see RICR 8.11.D and E) indicates that peak discharge control would not be beneficial or would exacerbate peak flows in a downstream tributary of a particular site (e.g., through coincident peaks). |
| ☒ | ☐ | Does the project flow to an MS4 system or subject to other stormwater requirements? If "Yes," indicate as follows: | |
| | | ☒ | RIDOT |
| | | ☒ | Other (specify): Town of Middletown storm drain |
| Note: The project could be approved by RIDEM but not meet RIDOT or Town standards. RIDOT's regulations indicate that post-volumes must be **less** than pre-volumes for the 10-yr storm at the design point entering the RIDOT system. If you have not already received approval for the discharge to an MS4, please explain below your strategy to comply with RIDEM and the MS4. | | | |
| | | Indicate below which model was used for your analysis.<br>☐ TR-55 ☒ TR-20 ☐ HydroCAD ☐ Bentley/Haestad ☐ Intellisolve<br>☐ Other (Specify): | |
| **YES** | **NO** | | |
| ☒ | ☐ | Does the drainage design demonstrate that flows from the 100-year storm event through a BMP will safely manage and convey the 100-year storm? If "No," please explain briefly below and reference where in the application further documentation can be found (i.e., name of report/document, page numbers, appendices, etc.): | |
| ☐ | ☒ | Do off-site areas contribute to the sub-watersheds and design points? If "Yes," | |
| ☐ | ☐ | Are the areas modeled as "present condition" for both pre- and post-development analysis? | |
| ☐ | ☐ | Are the off-site areas shown on the subwatershed maps? | |
| ☒ | ☐ | Does the drainage design confirm safe passage of the 100-year flow through the site for off-site runoff? | |
| ☐ | ☒ | Is a Downstream Analysis required (see RICR 8.11.E.1)? | |
| ☒ | ☐ | Calculate the following: | |
| | | ☒ | Area of disturbance within the sub-watershed (areas) 0.32 Acres |
| | | ☒ | Impervious cover (%) 70% (including pervious pavers) |
| ☐ | ☒ | Is a dam breach analysis required (earthen embankments over six (6) feet in height, or a capacity of 15 acre-feet or more, and contributes to a significant or high hazard dam)? | |
| ☒ | ☐ | Does this project meet the overbank flood protection standard? | |

| Table 5-1 Hydraulic Analysis Summary | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Subwatershed (Design Point)** | **1.2" Peak Flow** (cfs) ** | | **1-yr Peak Flow** (cfs) | | **10-yr Peak Flow** (cfs) | | **100-yr Peak Flow** (cfs) | |
| | Pre (cfs) | Post (cfs) | Pre (cfs) | Post (cfs) | Pre (cfs) | Post (cfs) | Pre (cfs) | Post (cfs) |
| DP-1: Wave Ave | 0.00 | 0.00 | 0.01 | 0.01 | 0.03 | 0.02 | 0.36 | 0.14 |
| DP-2: Aquidneck | 0.00 | 0.00 | 0.01 | 0.01 | 0.04 | 0.04 | 0.10 | 0.09 |
| DP-3: | | | | | | | | |
| DP-4: | | | | | | | | |
| **TOTALS**: | | | | | | | | |

** Utilize modified curve number method or split pervious /impervious method in HydroCAD.

Note: The hydraulic analysis must demonstrate no impact to each individual subwatershed DP unless each DP discharges to the same wetland or water resource.

| **Indicate as follows where the pertinent calculations and/or information for the items above are provided** | **Name of report/document, page numbers, appendices, etc.** |
|---|---|
| Existing conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, and water surface elevations showing methodologies used and supporting calculations. | Stormwater Report; Appendix C |
| Proposed conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, water surface elevations, and routing showing the methodologies used and supporting calculations. | Stormwater Report; Appendix D |
| Final sizing calculations for structural stormwater BMPs, including contributing drainage area, storage, and outlet configuration. | Stormwater Report; Appendix D |
| Stage-storage, inflow and outflow hydrographs for storage facilities (e.g., detention, retention, or infiltration facilities). | Stormwater Report; Appendix D |

| Table 5-2 Summary of Best Management Practices | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **BMP ID** | **DP #** | **BMP Type** (e.g., bioretention, tree filter) | **BMP Functions** | | | | | **Bypass Type** | **Horizontal Setback Criteria are met per RICR 8.21.B.10, 8.22.D.11, and 8.35.B.4** | | |
| | | | Pre-Treatment (Y/N/ NA) | $Re_v$ | $WQ_v$ | $CP_v$ (Y/N/ NA) | Overbank Flood Reduction (Y/N/NA) | External (E) Internal (I) or NA | Yes/ No | Technical Justification (Design Report page number) | Distance Provided |
| 1 | 1 | UG Sand Filters | N | 0 | 213 | N | N | NA | Y | (lined) | N/A |
| 2 | 1 | Pervious Paver Patio | N | 0 | 0 | N | N | NA | Y | | NA |
| 3 | 1 | Pervious Paver Driveway | N | 0 | 0 | N | NA | NA | Y | (liend) | NA |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | **TOTALS**: | | | | | | | | | |

| Table 5.3 Summary of Soils to Evaluate Each BMP | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **DP #** | **BMP ID** | **BMP Type** (e.g., bioretention, tree filter) | **Soils Analysis for Each BMP** | | | | | | |
| | | | Test Pit ID# and Ground Elevation | | SHWT Elevation (ft) | Bottom of Practice Elevation* (ft) | Separation Distance Provided (ft) | Hydrologic Soil Group (A, B, C, D) | Exfiltration Rate Applied (in/hr) |
| | | | Primary | Secondary | | | | | |
| 1 | 1 | UG Sand Filer | | | | | N/A | B | 0 (lined) |
| 1 | 2 | Pervious Paver Patio | 1 | 2 | 6 | 6 | 0 | B | 0 |
| 1 | 3 | Pervious Paver Driveway | | | | | N/A | B | 0 (lined) |
| | | **TOTALS**: | | | | | | | |

* For underground infiltration systems (UICs) bottom equals bottom of stone, for surface infiltration basins bottom equals bottom of basin, for filters bottom equals interface of storage and top of filter layer

| LAND USES WITH HIGHER POTENTIAL POLLUTANTS LOADS (LUHPPLs) – MINIMUM STANDARD 8 | | | |
|---|---|---|---|
| **YES** | **NO** | **N/A** | |
| ☐ | ☒ | ☐ | Describe any LUHPPLs identified in Part 1, Minimum Standard 8, Section 2. If not applicable, continue to Minimum Standard 9. |
| ☐ | ☒ | ☐ | Are these activities already covered under an MSGP? If "No," please explain if you have applied for an MSGP or intend to do so? |
| ☐ | ☒ | ☐ | List the specific BMPs that are proposed for this project that receive stormwater from LUHPPL drainage areas. These BMP types must be listed in RISDISM Table 3-3, "Acceptable BMPs for Use at LUHPPLs." Please list BMPs: |
| ☐ | ☒ | ☐ | Additional BMPs, or additional pretreatment BMP's if any, that meet RIPDES MSGP requirements; Please list BMPs: |
| | | | Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.). |

| ILLICIT DISCHARGES – MINIMUM STANDARD 9 | | | |
|---|---|---|---|
| Illicit discharges are defined as unpermitted discharges to Waters of the State that do not consist entirely of stormwater or uncontaminated groundwater, except for certain discharges identified in the RIPDES Phase II Stormwater General Permit. | | | |
| **YES** | **NO** | **N/A** | |
| ☒ | ☐ | ☐ | Have you checked for illicit discharges? |
| ☐ | ☒ | ☐ | Have any been found and/or corrected? If "Yes," please identify. |
| ☒ | ☐ | ☐ | Does your report explain preventative measures that keep non-stormwater discharges out of the Waters of the State (during and after construction)? |

| SOIL EROSION AND SEDIMENT CONTROL (SESC) – MINIMUM STANDARD 10 | | | | |
|---|---|---|---|---|
| **YES** | **NO** | **N/A** | | |
| ☒ | ☐ | ☐ | Have you included a Soil Erosion and Sediment Control Plan Set and/or Complete Construction Plan Set? | |
| ☒ | ☐ | ☐ | Have you provided a **separately-bound** document based upon the SESC Template? If yes, proceed to Minimum Standard 11 (the following items can be assumed to be addressed). | |
| | | | If "No," include a document with your submittal that addresses the following elements of an SESC Plan: | |
| | | | ☐ | Soil Erosion and Sediment Control Plan Project Narrative, including a description of how the fifteen (15) Performance Criteria have been met: |
| | | | ☐ | Provide Natural Buffers and Maintain Existing Vegetation |
| | | | ☐ | Minimize Area of Disturbance |
| | | | ☐ | Minimize the Disturbance of Steep Slopes |
| | | | ☐ | Preserve Topsoil |
| | | | ☐ | Stabilize Soils |
| | | | ☐ | Protect Storm Drain Inlets |
| | | | ☐ | Protect Storm Drain Outlets |
| | | | ☐ | Establish Temporary Controls for the Protection of Post-Construction Stormwater Control Measures |
| | | | ☐ | Establish Perimeter Controls and Sediment Barriers |
| | | | ☐ | Divert or Manage Run-On from Up-Gradient Areas |
| | | | ☐ | Properly Design Constructed Stormwater Conveyance Channels |
| | | | ☐ | Retain Sediment On-Site |
| | | | ☐ | Control Temporary Increases in Stormwater Velocity, Volume, and Peak Flows |
| | | | ☐ | Apply Construction Activity Pollution Prevention Control Measures |
| | | | ☐ | Install, Inspect, and Maintain Control Measures and Take Corrective Actions |
| | | | ☐ | Qualified SESC Plan Preparer's Information and Certification |
| | | | ☐ | Operator's Information and Certification; if not known at the time of application, the Operator must certify the SESC Plan upon selection and prior to initiating site activities |
| | | | ☐ | Description of Control Measures, such as Temporary Sediment Trapping and Conveyance Practices, including design calculations and supporting documentation, as required |

| STORMWATER MANAGEMENT SYSTEM OPERATION, MAINTENANCE, AND POLLUTION PREVENTION PLAN – MINIMUM STANDARDS 7 AND 9 | | |
|---|---|---|
| **Operation and Maintenance Section** | | |
| **YES** | **NO** | |
| ☒ | ☐ | Have you minimized all sources of pollutant contact with stormwater runoff, to the maximum extent practicable? |
| ☒ | ☐ | Have you provided a **separately-bound** Operation and Maintenance Plan for the site and for all of the BMPs, and does it address each element of RICR 8.17 and RISDISM Appendix C and E? |
| ☒ | ☐ | Lawn, Garden, and Landscape Management meet the requirements of RISDISM Section G.7? If "No," why not? |
| ☒ | ☐ | Is the property owner or homeowner's association responsible for the stormwater maintenance of all BMP's?<br>If "No," you must provide a legally binding and enforceable maintenance agreement (see RISDISM Appendix E, page 26) that identifies the entity that will be responsible for maintenance of the stormwater. Indicate where this agreement can be found in your report (i.e., name of report/document, page numbers, appendices, etc.). |
| ☐ | ☒ | Do you anticipate that you will need legal agreements related to the stormwater structures? (e.g. off-site easements, deed restrictions, covenants, or ELUR per the Remediation Regulations).<br>If "Yes," have you obtained them? Or please explain your plan to obtain them: |

| | | |
|---|---|---|
| ☐ | ☒ | Is stormwater being directed from public areas to private property? If "Yes," note the following:<br>Note: This is not allowed unless a funding mechanism is in place to provide the finances for the long-term maintenance of the BMP and drainage, or a funding mechanism is demonstrated that can guarantee the long-term maintenance of a stormwater BMP by an individual homeowner. |
| **Pollution Prevention Section** | | |
| ☐ | ☒ | Designated snow stockpile locations? |
| ☐ | ☒ | Trash racks to prevent floatables, trash, and debris from discharging to Waters of the State? |
| ☐ | ☒ | Asphalt-only based sealants? |
| ☐ | ☒ | Pet waste stations? (Note: If a receiving water has a bacterial impairment, and the project involves housing units, then this could be an important part of your pollution prevention plan). |
| ☒ | ☐ | Regular sweeping? Please describe: (Refer to O&M for maintenance of pervious pavement and R-Tank systems |
| ☐ | ☒ | De-icing specifications, in accordance with RISDISM Appendix G. (NOTE: If the groundwater is GAA, or this area contributes to a drinking water supply, then this could be an important part of your pollution prevention plan). |
| ☒ | ☐ | A prohibition of phosphate-based fertilizers? (Note: If the site discharges to a phosphorus impaired waterbody, then this could be an important part of your pollution prevention plan). |

## PART 4. SUBWATERSHED MAPPING AND SITE-PLAN DETAILS

| **Existing and Proposed Subwatershed Mapping (REQUIRED)** | | | |
|---|---|---|---|
| **YES** | **NO** | | |
| ☒ | ☐ | | Existing and proposed drainage area delineations |
| ☒ | ☐ | | Locations of all streams and drainage swales |
| ☒ | ☐ | | Drainage flow paths, mapped according to the DEM *Guidance for Preparation of Drainage Area Maps* (included in RISDISM Appendix K) |
| ☒ | ☐ | | Complete drainage area boundaries; include off-site areas in both mapping and analyses, as applicable |
| ☒ | ☐ | | Logs of borings and/or test pit investigations along with supporting soils/geotechnical report |
| ☒ | ☐ | | Mapped seasonal high-water-table test pit locations |
| ☒ | ☐ | | Mapped locations of the site-specific borings and/or test pits and soils information from the test pits at the locations of the BMPs |
| ☒ | ☐ | | Mapped locations of the BMPs, with the BMPs consistently identified on the Site Construction Plans |
| ☒ | ☐ | | Mapped bedrock outcrops adjacent to any infiltration BMP |
| ☒ | ☐ | | Soils were logged by a: |
| | | ☒ | DEM-licensed Class IV soil evaluator<br>Name: David Kalen |
| | | ☐ | RI-registered P.E.<br>Name: |

| **Subwatershed and Impervious Area Summary** | | | | |
|---|---|---|---|---|
| **Subwatershed (area to each design point)** | **First Receiving Water ID or MS4** | **Area Disturbed (acres)** | **Existing Impervious (acres)** | **Proposed Impervious (acres)** |
| **DP-1: Wave Avenue** | Middletown Storm Drain | 0.35 | 0.06 | 0.22 |
| **DP-2:** | RIDOT | 0.007 | 0.0 | 0.01 |
| **TOTALS:** | | | | |

| Site Construction Plans (Indicate that the following applicable specifications are provided) | | |
|---|---|---|
| **YES** | **NO** | |
| ☒ | ☐ | Existing and proposed plans (scale not greater than 1" = 40') with North arrow |
| ☒ | ☐ | Existing and proposed site topography (with 1 or 2-foot contours); 10-foot contours accepted for off-site areas |
| ☒ | ☐ | Boundaries of existing predominant vegetation and proposed limits of clearing |
| ☒ | ☐ | Site Location clarification |
| ☒ | ☐ | Location and field-verified boundaries of resource protection areas such as:<br>▸ freshwater and coastal wetlands, including lakes and ponds<br>▸ coastal shoreline features<br>Perennial and intermittent streams, in addition to Areas Subject to Storm Flowage (ASSFs) |
| ☒ | ☐ | All required setbacks (e.g., buffers, water-supply wells, septic systems) |
| ☒ | ☐ | Representative cross-section and profile drawings, and notes and details of structural stormwater management practices and conveyances (i.e., storm drains, open channels, swales, etc.), which include:<br>▸ Location and size of the stormwater treatment practices (type of practice, depth, area). Stormwater treatment practices (BMPs) must have labels that correspond to RISDISM Table 5-2;<br>▸ Design water surface elevations (applicable storms);<br>▸ Structural details of outlet structures, embankments, spillways, stilling basins, grade-control structures, conveyance channels, etc.;<br>▸ Existing and proposed structural elevations (e.g., inverts of pipes, manholes, etc.);<br>▸ Location of floodplain and, if applicable, floodway limits and relationship of site to upstream and downstream properties or drainage that could be affected by work in the floodplain;<br>▸ Planting plans for structural stormwater BMPs, including species, size, planting methods, and maintenance requirements of proposed planting |
| ☒ | ☐ | Logs of borings and/or test pit investigations along with supporting soils/geotechnical report and corresponding water tables |
| ☐ | ☒ | Mapping of any OLRSMM-approved remedial actions/systems (including ELURs) |
| ☒ | ☐ | Location of existing and proposed roads, buildings, and other structures including limits of disturbance;<br>▸ Existing and proposed utilities (e.g., water, sewer, gas, electric) and easements;<br>▸ Location of existing and proposed conveyance systems, such as grass channels, swales, and storm drains, and location(s) of final discharge point(s) (wetland, waterbody, etc.);<br>▸ Cross sections of roadways, with edge details such as curbs and sidewalks;<br>▸ Location and dimensions of channel modifications, such as bridge or culvert crossings |
| ☐ | ☒ | Locations, cross sections, and profiles of all stream or wetland crossings and their method of stabilization |