

# STONEFIELD

## STORMWATER MANAGEMENT PLAN

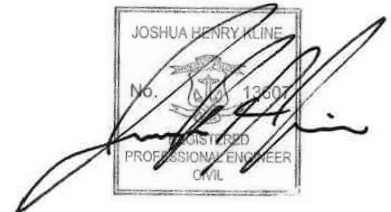
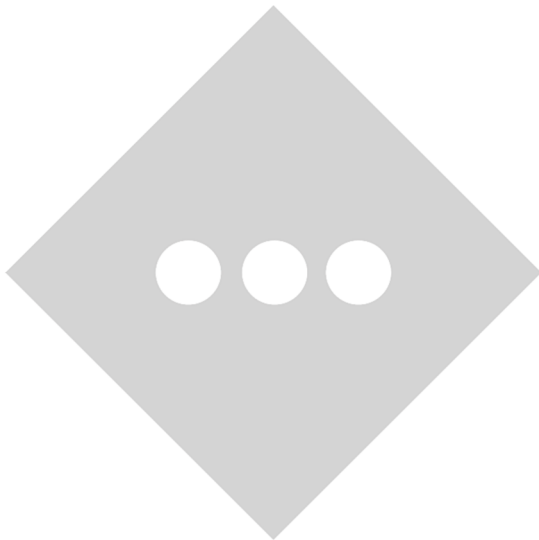
### ASHWORTH INVESTMENTS, LLC.

PROPOSED MULTI-FAMILY RESIDENTIAL PROJECT  
MAP: 32-4, LOT: 21  
2001 KINGSTOWN ROAD  
TOWN OF SOUTH KINGSTOWN  
WASHINGTON COUNTY, RHODE ISLAND

PREPARED FOR:  
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PREPARED BY:  
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56 PINE STREET  
PROVIDENCE, RHODE ISLAND

REPORT DATE:  
DECEMBER 10, 2025



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JOSH KLINE, PE  
RI PE LICENSE # 13607

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## **1.0 PROJECT DESCRIPTION**

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Ashworth Investments, LLC. is proposing to develop Assessor's Plat 32-4, Lot 21, commonly known as 2001 Kingstown Road, South Kingstown, Rhode Island to accommodate the construction of a multi-family development project with 5 proposed single family units. Additional improvements for the development include a paved private roadway that leads to each respective unit, off-street parking facilities, landscaping, utility services, lighting, stormwater management infrastructure and other associated site improvements.

The property is located within the Mixed-use (MU) zoning district of the Town of South Kingstown. The proposed development fronts Kingstown Road (Route 108) and is surrounded by single family residential lots. The site will be accessed via one (1) full movement driveway from Kingstown Road (Route 108) Refer to **APPENDIX A** for project maps of the subject site.

**The project site is 37,736 SF (0.87 acres), the extent of land disturbance is 38,655 SF (0.89 acres), and 11,700 SF (0.27 acres) of new impervious area will be created as a result of the project. The overall onsite drainage analysis area was modeled as 37,735 SF (0.87 acres).**

This Stormwater Management Plan has been prepared to analyze the drainage measures to be implemented for controlling and conveying runoff associated with the on-site improvements and has been prepared in accordance with the standards of the Town of South Kingstown, the Rhode Island Department of Environmental Management (RIDEM) Standards, and the Rhode Island Soil Erosion and Sediment Control Handbook.

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## **2.0 EXISTING CONDITIONS**

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### **EXISTING SITE DEVELOPMENT**

The project site fronts Kingstown Road (Route 108) to the West. Under existing conditions, the project site is developed with an approximately 1,681± SF single-story single-family home with associated shed and utility connections. The site is accessed via one (1) full movement driveway off Kingstown Road. The entirety of the existing structures, and associated parking area will be removed to accommodate the proposed development. An Aerial Map depicting the existing site conditions can be found in **APPENDIX A**.

### **EXISTING TOPOGRAPHY**

The high point of the project site is located to the northwest corner of the property, along Kingstown Road. Runoff sheet flows from this location overland to the southeast, ultimately discharging to 20 Zinns Drive. Grades on site generally range from 8% to 18% within the previously developed areas and decrease to 2-7% as it approaches the eastern property boundary.

**PROJECT SITE SOILS**

Soil mapping was obtained from the National Resource Conservation Service (NRCS) for the project site and immediate area. Generally, the project site is underlain with 1 major soil group: Canton-Urban land complex. Overall, the soil drains well, and runoff flows overland to 20 Zinns Drive. The table below provides a summary of soils for the project site:

**TABLE I: NRCS SOIL MAPPING RESULTS**

<b>Soil Unit Code</b>	<b>Soil Description</b>	<b>Approximate Project Coverage</b>	<b>Drainage Class</b>	<b>Hydrologic Soil Group</b>
CB	Canton-Urban	100%	Well Drained	B

Additional information regarding the NRCS soil mapping can be found in **APPENDIX B**.

A Stormwater Evaluation was performed by Ecosystem Solutions (report dated August 7, 2025), which consisted of 4 soil test pits being performed onsite. The soils onsite primarily consist of fine sandy loam ranging from depths of 0 to 36 inches below grade and gravelly cobbly sand ranging from depths of 36-96 inches below grade.

Based on the investigation, signs of seasonal high groundwater were encountered at a depth of 96 inches below existing grade in Test Pits 1 - 4. Due to the findings of the soil evaluation and the associated soil composition, it was determined that infiltration practices would be practical for this site. A design infiltration rate of 8.27 in/hr was used for test pits 1 - 2 and an infiltration rate of 1.02 in/hr in test pits 3 - 4, was utilized in the stormwater analysis based on corresponding Rawls Rate from Table 5-3 of manual. Refer to **APPENDIX B** for the full Soil Evaluation.

**WATERSHED / RECEIVING WATERS – TMDL DESIGNATION**

Under existing conditions, the site drains to groundwater, that ultimately discharges to Trib to Saugatucket Pond (State Waterbody ID: RI0010045R-07). The watershed for the development is part of the Saugatucket River (State Watershed ID: RI0010045R-05C) as defined by the United States Environmental Protection Agency for Community Waterway Mapping. Per the waterway designation provided by the United States Environmental Protection Agency and the Rhode Island Impaired Waters Report, Trib to Saugatucket Pond are identified as an impaired water for primary contact recreation and secondary contact recreation.

**EXISTING ENVIRONMENTAL INVENTORY**

Based on the effective FEMA flood insurance rate mapping (FEMA Map #44009C0184K issued April 04,2020), the entirety of the site is not located within the 100-year flood plain. The FEMA Map can be found in **APPENDIX A** of this Plan.

There are no federal (US Army Corps of Engineers) or state (RIDEM) regulated freshwater wetlands or associated buffers within the limits of the development area. Impacts to nearby freshwater wetlands are not anticipated with the proposed development. Per the RIDEM Natural Heritage Areas mapping, no records of endangered or threatened species sightings or suitable habitats are located within the vicinity of the proposed improvements.

Delineations of protected areas and additional project location maps can be found in **APPENDIX A** of this Plan.

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### **3.0 PROPOSED CONDITIONS**

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#### **PROPOSED SITE DEVELOPMENT**

The proposed development will consist of the construction of five (5), 1,178 SF single family residential dwellings. Additional improvements for the development include a paved residential roadway that leads to each respective structure, off-street parking facilities, landscaping, utility services, lighting, stormwater management infrastructure and other associated site improvements. The site will be accessed via one (1) full movement driveway off Kingstown Road. Refer to **APPENDIX A** for a Site Plan depicting the proposed project improvements.

#### **PROPOSED TOPOGRAPHY**

Project site topography and drainage patterns will generally remain similar to existing conditions, and the ultimate discharge offsite east to 20 Zinns Drive shall be maintained. Due to the significant grade change of the existing site and the need for more residentially friendly, ADA compliant grades, split-level building entrances and steps will be implemented throughout the project to make up for the change in grades.

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### **4.0 STORMWATER MANAGEMENT METHODOLOGY & PARAMETERS**

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#### **HYDROLOGIC METHODOLOGY**

The analysis program “HydroCAD” Version 10.20 by HydroCAD Software Solutions was utilized to calculate and plot the runoff hydrographs. The program incorporates the time of concentration, C values, rainfall data, and project drainage areas to calculate the runoff characteristics. The existing and proposed drainage areas have been analyzed utilizing the design rainfall amounts for Rhode Island as outlined in Table 3-1 of the Rhode Island Stormwater Design and Installation Standards (RISDIS) Manual for the project area; specifics of the rainfall distribution can be found in **APPENDIX C**. Additional key variables utilized in the analysis include:

**TABLE 2: HYDROCAD DESIGN VARIABLES**

Variable	Input	Variable	Input
Runoff Calculation Method	SCS TR-20	NRCS Rainfall Frequency Data Set	Washington County
Pervious/Impervious CN Calculations	Separate	Storm Intervals (Year Events)	1, 2, 10, 25, 100
Stage-Storage Relationship	Dynamic	Storm Duration	24 Hours
Minimum time of concentration	6 minutes	Storm Curve	Type III

Additional information regarding the hydrologic calculations can be found in **APPENDIX C**.

**HYDRAULIC METHODOLOGY**

The analysis program “HydraFlow Storm Sewers” Version 2024 by Autodesk was utilized to generate hydraulic grade lines through the proposed conveyance system model based on various pipe / junction losses and the runoff tributary to each inlet or discharge structure. Additional key variables utilized in the analysis include:

**TABLE 3: HYDRAFLOW DESIGN VARIABLES**

Variable	Input	Variable	Input
Runoff Calculation Method	Rational	Pipe Conveyance Method	Std. Step
C-value for impervious surfaces	0.95	Initial Hydraulic Grade Line	Normalized
C-value for pervious surfaces	0.35	Inlet Drainage Area Delineation	Surveyed
Minimum time of concentration	6 minutes	Inlet Geometry & Capacity	RIDOT Std.

Additional information regarding the hydraulic calculations can be found in **APPENDIX C**.

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## **5.0 STORMWATER ANALYSIS**

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**EXISTING DRAINAGE AREAS**

Under existing conditions, the project area is comprised of one (1) drainage area discharging to one (1) point of interest (POI-I). POI-I is the ultimate point of interest identified as 20 Zinns drive located off the eastern property line of the project site. POI-I, comprised of drainage area EX-I, receives runoff via sheet flow from the entirety of the project site. See below for a brief summary of existing drainage areas:

**TABLE 4: SUMMARY OF EXISTING DRAINAGE AREAS**

<b>Drainage Area</b>	<b>Description</b>	<b>Area Extents</b>	<b>Impervious Area</b>	<b>Time of Concentration</b>
EX-1 (POI-1)	Ultimate Point of Interest: Offsite East	37,735 SF	3,512 SF	15.3 Minutes

All existing drainage areas were delineated based on field surveying data. Hydrologic calculations and parameters for each drainage area can be found in **APPENDIX C**; specific drainage area delineations and land cover can be found in **APPENDIX E**.

**PROPOSED DRAINAGE AREAS**

Under proposed conditions, the general drainage patterns and ultimate points of interest will be maintained. The intent behind the proposed delineations is to reduce the amount of direct runoff to the ultimate point of interest. The diverted runoff from these drainage areas is proposed to be sent to various stormwater management features within P-1 to meet the Rhode Island Department of Environmental Management (RIDEM) and Town of South Kingstown Stormwater Management Standards as outlined in the next Report section. Area P-1C is comprised of primarily grassed cover that will bypass the subsurface systems and discharge undetained offsite east. The proposed infiltration systems have been designed to compensate for undetained discharge. The table below provides a brief summary of the proposed drainage areas analyzed:

**TABLE 5: SUMMARY OF PROPOSED DRAINAGE AREAS**

<b>Drainage Area</b>	<b>Description</b>	<b>Area Extents</b>	<b>Impervious Area</b>	<b>Time of Concentration</b>
P-1A	Proposed Discharge to Basin B-1	11,189 SF	8,933 SF	6.0 Minutes*
P-1B	Proposed Discharge to Basin B-2	7,339 SF	5,779 SF	6.0 Minutes*
P-1C	Undetained Bypass to POI-1	19,407 SF	500 SF	12.0 Minutes*
POI-1	Ultimate Point of Interest: Offsite East	<b>37,735 SF</b>	<b>15,212 SF</b>	N/A

\*The minimum time of concentration was utilized due to the high level of impervious coverage and proximity to the corresponding discharge point.

All proposed drainage areas were delineated based on the proposed grading design overlain on field survey data. Hydrologic calculations and parameters for each drainage area can be found in **APPENDIX C**; specific drainage area delineations and land cover can be found in **APPENDIX E**.

**STORMWATER MANAGEMENT DESIGN PARAMETERS**

The extent of development proposes to disturb the existing site; as such, it is subject to all Stormwater Standards as defined in the Town of South Kingstown Ordinances and the Rhode Island Stormwater Design and Installation Standards (RISDIS) Manual. See below for a summary of each design parameter and compliance requirements:

**TABLE 6: STORMWATER DESIGN STANDARDS SUMMARY**

Design Parameter	Design Target for Compliance
Standard 1: LID Site Planning and Design Strategies	Demonstrate that LID practices were used to the maximum extent practicable to reduce the runoff volume for the new development project per the RIDEM Appendix A Stormwater Management Plan Checklist.
Standard 2: Groundwater Recharge	Demonstrate through hydrologic and hydraulic analysis that the required groundwater recharge is provided in each applicable drainage area where impervious coverage is proposed and that adequate volume reductions are achieved.
Standard 3: Water Quality	Stormwater management measures shall be designed to treat the required water quality volume for the following minimum removal efficiencies: 85% of total suspended solids (TSS), 60% of pathogens, and 30% of total phosphorus (TP) of the anticipated load from existing and proposed impervious coverage onsite.
Standard 4: Conveyance and Natural Channel Protection	<p>Demonstrate that pipe conveyance systems provide adequate passage for the peak flow from the 10-year, 24-hour Type III design storm event. Demonstrate that natural channel protection is provided by a 24-hour extended detention of the one-year 24-hour Type III design storm event runoff volume.</p> <p>The project is <b>exempt</b> from conveyance and natural channel protection as the project has a peak discharge less than 2 CFS for the 1-year, 24-hour Type III design storm event without attenuation.</p>
Standard 5: Overbank Flood Protection	Demonstrate that the post-development peak discharge rate does not exceed the pre-development levels for the 10-year and 100-year, 24-hour Type III design storm events.

**PROPOSED STORMWATER MANAGEMENT CONTROLS**

The following structural BMP devices have been implemented and designed in accordance with the Rhode Island Stormwater Design and Installation Standards (RISDIS) Manual in order to meet the Rhode Island Department of Environmental Management (RIDEM) and the Town of South Kingstown’s Stormwater Management Standards:

1. **Underground Infiltration Basin B-1:** *An underground infiltration basin (B-1), comprised of 285 R-Tank HD modules, is proposed at the northwest corner of the project site, to provide quantity and quality control of stormwater runoff. The basin is designed to fully capture and infiltrate runoff from portions of the proposed motor vehicle surfaces and portions of the roofs for up to and including the 100-year storm event.*

2. **Underground Infiltration Basin B-2:** *An underground infiltration basin (B-2), comprised of 180 R-Tank single HD modules, is proposed along the northern property line, to provide quantity and quality control of stormwater runoff. The basin is designed to fully capture and infiltrate runoff from portions of the motor vehicle surface and portions of the roofs for up to and including the 100-year storm event.*

The following sections analyze the proposed on-site drainage system and demonstrate that the proposed development will provide an overall improvement from existing conditions. The proposed drainage system has been designed in accordance with RIDEM Stormwater Design and Installation Standards and meets the following criteria:

**STANDARD 1 – LID SITE PLANNING AND DESIGN STRATEGIES**

The low impact development (LID) strategies onsite were utilized to the maximum extent practicable through the use of protecting as much undisturbed open space as practical, maximizing the protection of onsite wetlands, minimizing/restoring soil compaction, providing low maintenance native vegetation and infiltrating precipitation as close as possible to the point it reaches the ground (through a series of small infiltration basins) to reduce the generation of runoff volume. A Stormwater Management Plan checklist (Appendix A) has been included in this Report as **APPENDIX F** and outlines compliance of this standard.

**STANDARD 2 – GROUNDWATER RECHARGE**

Groundwater recharge is required for the project site and has been calculated using the recharge criterion provided in Section 3.3.2 of the RISDIS Manual. The recharge criterion (Re<sub>v</sub>) is a function of the hydrologic soil group and impervious area and is calculated for each sub-watershed. Groundwater recharge is provided via Basins B-1 and B-2 for P-1. The required and proposed recharge volumes for each sub-watershed are shown below:

**TABLE 7: SUMMARY OF GROUNDWATER RECHARGE VOLUMES**

<b>Drainage Area</b>	<b>Hydrologic Soil Group (HSG)</b>	<b>Recharge Factor (F)</b>	<b>Impervious Area (SF)</b>	<b>Required Groundwater Recharge Volume (CF)</b>	<b>Proposed Groundwater Recharge Volume (CF)</b>
P-1A	B	0.35	8,933 SF	260.5 CF	1,936 CF
P-1B	B	0.35	5,779 SF	168.6 CF	1,274 CF
P-1C	B	0.35	500 SF	14.6 CF	0 CF
POI-1	--	--	15,212 SF	443.7 CF	3,210 CF

As shown in Table 7, the proposed stormwater management controls capture, and recharge adequate impervious area in accordance with RIDEM regulations. The proposed design will provide a significant improvement to groundwater recharge, and as such complies with Standard 2.

**STANDARD 3 – WATER QUALITY**

Water Quality is required for the project site and has been calculated using the water quality volume requirement provided in section 3.3.3 of the RISDIS Manual. The required water quality volume (WQ<sub>v</sub>) results in the capture and treatment of the entire runoff volume for 90% of average annual storm events. Water quality is provided via three (3) R-Tank subsurface infiltration chamber systems.

The required and proposed water quality volumes for each sub-watershed are shown below:

**TABLE 8: SUMMARY OF WATER QUALITY VOLUMES**

Drainage Area	Drainage Area (SF)	Impervious Area (SF)	Required WQ Volume (CF)	Proposed WQ Volume (CF)
P-1A	14,159 SF	8,933 SF	744.4 CF	1,936 CF
P-1B	13,120 SF	5,779 SF	481.6 CF	1,274 CF
P-1C	6,056 SF	500 SF	41.7 CF	0 CF
POI-1	37,735 SF	15,212 SF	1,267.7 CF	3,210 CF

As shown above, the proposed development has been designed to comply with Standard 3 for water quality.

**STANDARD 4 – CONVEYANCE AND NATURAL CHANNEL PROTECTION**

As the proposed project has an existing impervious surface less than 40% of the total site area the pipe conveyance system has been designed for the 10-year, 24-hour Type III design storm event and is able to safely convey runoff to the proposed stormwater management facilities without overflow or bypass in accordance with the Town of South Kingstown and RIDEM Stormwater Management Standard 4. Detailed hydraulic calculations for the conveyance system can be found in **APPENDIX C**. The table below summarizes the point of interest during the 10-year storm event:

**TABLE 9: SUMMARY OF 10-YEAR STORM**

Tributary Area	Existing Flow Rate	Proposed Flow Rate	Flow Rate Difference	Existing Volume	Proposed Volume	Volume Difference
POI-1 (EX-1/P-1)	1.07 CFS	0.53 CFS	-0.54 CFS	4,321 CF	2,013 CF	-2,308 CF

The runoff flow rate and volume directly tributary to the existing stormwater pipe conveyance system within Kingstown Road are significantly reduced under proposed conditions. As such, no adverse impacts to the existing stormwater infrastructure is anticipated.

Although the project is a new development, the natural channel protection requirement is waived as the impervious cover for the entirety of the site is 0.43 acres which is below the one acre limit and the post-development peak discharge without attenuation is 0.91 CFS which is less than the 2.0 CFS limit for the 1-year, 24-hour Type III design storm event.

**STANDARD 5 – OVERBANK FLOOD PROTECTION**

The proposed development has been designed to provide peak flow attenuation for the 10-year and 100-year 24-hour Type III design storm in accordance with the Overbank Flood Protection Standard (Standard 5) of the RISDIS. The 1-, 2-, 5-, and 25-year, 24-hour Type III design storms were also analyzed as a part of the development design. One (1) discharge point (POI-1) was analyzed for the project site, identified as the discharge offsite east to 20 Zinns Drive. Multiple sub watersheds discharging to the analysis point were utilized in the proposed conditions to account for the discharge to the proposed mitigation systems prior to ultimate outfall. Two (2) subsurface R-Tank infiltration basin systems are proposed with the development to attenuate peak stormwater runoff rates for the 1-, 2-, 10-, 25-, and 100-year, 24-hour type III design storm events. The table below summarizes the various drainage areas for each POI used for the pre vs. post peak flow analysis.

**TABLE 10: QUANTITY COMPARISON POINTS OF INTEREST**

<b>Point of Interest</b>	<b>Area Description</b>	<b>Existing Tributary Drainage Areas</b>	<b>Proposed Tributary Drainage Areas</b>
POI-1	Discharge to 20 Zinns Drive	EX-1	P-1A, P-1B, P-1C

Under post-development conditions, the runoff flow rates and volumes are reduced to below those in existing conditions. Diverted runoff from post development drainage areas are collected in the on-site stormwater management system for runoff attenuation and water quality treatment. The table below outlines the regulatory compliance parameters for runoff quantity on the project site:

**TABLE 11: STORMWATER RUNOFF QUANTITY COMPLIANCE SUMMARY – FLOW RATES**

<b>Rainfall Event</b>	<b>Existing Flow Rate</b>	<b>Proposed Flow Rate</b>	<b>Proposed % Reduction</b>
1-Year Storm	0.18 CFS	0.07 CFS	61.11%
2-Year Storm	0.35 CFS	0.16 CFS	54.29%

10-Year Storm	1.07 CFS	0.53 CFS	50.47%
25-Year Storm	1.72 CFS	0.88 CFS	48.84%
100-Year Storm	3.17 CFS	1.67 CFS	62.78%

**TABLE 12: STORMWATER RUNOFF QUANTITY COMPLIANCE SUMMARY – VOLUMES**

<b>Rainfall Event</b>	<b>Existing Volumes</b>	<b>Proposed Volume</b>	<b>Proposed % Reduction</b>
1-Year Storm	1,049 CF	447 CF	57.39%
2-Year Storm	1,684 CF	744 CF	55.82%
10-Year Storm	4,321 CF	2,013 CF	53.41%
25-Year Storm	6,718 CF	3,188 CF	52.55%
100-Year Storm	12,169 CF	5,898 CF	51.53%

The proposed subsurface infiltration systems provide sufficient flow rate attenuation to ensure that no adverse impacts are anticipated downstream of the project site. Detailed hydrologic calculations for each drainage area can be found in **APPENDIX C**.

**STANDARD 6 – REDEVELOPMENT AND INFILL PROJECTS**

The current site has 3,512 SF of existing impervious coverage which is 9.3% of the total site area. As the existing impervious surface is less than 40% of the total site area, it is subject to all Stormwater Standards as defined in the South Kingstown Ordinances and the Rhode Island Stormwater Design and Installation Standards (RISDIS) Manual.

**STANDARD 7 – POLLUTION PREVENTION**

A stormwater pollution prevention plan has been included within the Stormwater Operations & Maintenance Manual and the Soil Erosion & Sediment Control Plan, both prepared by Stonefield Engineering and Design. Any necessary easements or covenants associated with the stormwater improvements will be recorded prior to the start of construction.

**STANDARD 8 – LAND USES WITH HIGHER POTENTIAL POLLUTANT LOADS**

The proposed use for the development is Residential which is not considered a Land Use with Higher Potential Pollutant Loads (LUHPPL) by the RIDEM and therefore is exempt from Standard 8 requirements.

### **STANDARD 9 – ILLICIT DISCHARGES**

There are no known or suspected illicit discharges to or from the existing subject site or proposed use and associated stormwater management conveyance and treatment system. Per the RIDEM Stormwater Design & Installation Standards Manual, illicit discharges include but are not limited to, discharges from onsite wastewater treatment systems (OWTS), direct septic connections to storm drain systems, septic tank overflow, car wash wastewater, laundry wastewater and disposal of household or automobile products. No illicit discharges are intended to occur at the proposed development location upon installation of the stormwater management improvements in accordance with Standard 9. All discharge to the system shall be comprised solely of stormwater.

### **STANDARD 10 – CONSTRUCTION ACTIVITY EROSION, RUNOFF, SEDIMENTATION, AND POLLUTION PREVENTION CONTROL MEASURE REQUIREMENTS**

A Soil Erosion & Sediment Control Plan has been prepared by Stonefield Engineering & Design in accordance with the latest edition of THE Rhode Island Soil Erosion & Sediment Control Handbook and Section 3.3.7 of the Rhode Island Stormwater Design and Installation Standards Manual and has been included as a document supplemental to this Report. Proposed temporary measures during construction include but are not limited to stabilized construction entrances, inlet filters, and silt fencing. No land disturbance will occur until certification and permits have been obtained. Details for all proposed control measures have also been provided.

### **STANDARD 11 – STORMWATER SYSTEM OPERATION AND MAINTENANCE**

A Stormwater Operations & Maintenance Manual prepared by Stonefield Engineering & Design has been included as a document supplemental to this Report. Any necessary easements or covenants associated with the stormwater improvements will be recorded prior to the start of construction.

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## **6.0 CONCLUSIONS**

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As demonstrated in this Report, the increase in runoff flow rate generated by the proposed redevelopment will be satisfactorily mitigated by the introduction of two (2) subsurface infiltration systems and on-site stormwater conveyance system. The proposed infiltration systems and water quality unit will provide treatment to remove total suspended solids to a satisfactory regulatory level, as well as provide groundwater recharge exceeding the recharge under existing conditions.

The proposed project complies with all applicable stormwater management regulations and standards. As such, the project is not anticipated to have any adverse drainage impacts on neighboring properties, downstream watercourses, or adjoining conveyance systems.

## **7.0 REFERENCES**

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1. Rhode Island Stormwater Design and Installation Standards Manual, last amended March 2015  
<https://dem.ri.gov/sites/g/files/xkgbur861/files/pubs/regs/regs/water/swmanual15.pdf>
  2. Regulations for the Rhode Island Pollutant Discharge Elimination System  
<https://rules.sos.ri.gov/regulations/part/250-150-10-1>
  3. Rhode Island Soil Erosion & Sediment Control Handbook, last Amended 2016  
<https://dem.ri.gov/sites/g/files/xkgbur861/files/programs/bnatres/water/pdf/riesc-handbook16.pdf>
  4. Town of South Kingstown, RI Municipal Zoning Code  
[https://library.municode.com/ri/south\\_kingstown/codes/code\\_of\\_ordinances?nodeId=PTIIICOOOR\\_APXAZO](https://library.municode.com/ri/south_kingstown/codes/code_of_ordinances?nodeId=PTIIICOOOR_APXAZO)
- OR

# **APPENDIX A PROJECT FIGURES**

## **INVENTORY**

**FIGURE 1: RADIUS MAP**

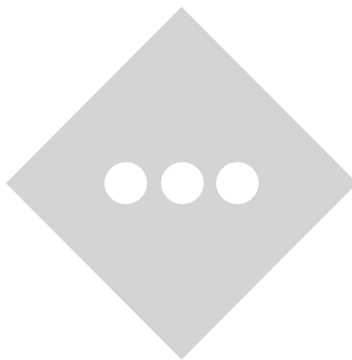
**FIGURE 2: USGS MAP**

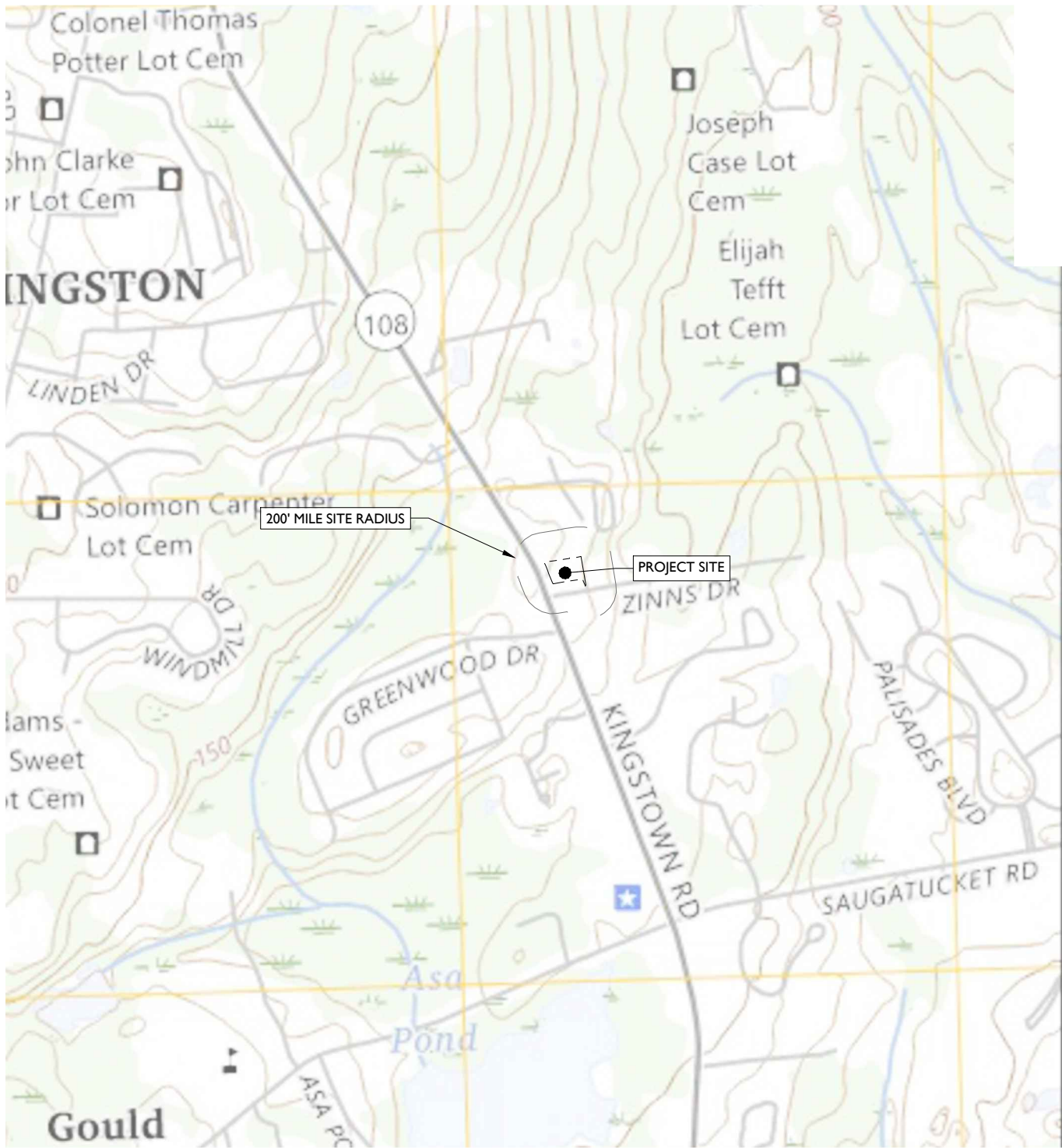
**FIGURE 3: AERIAL LOCATION MAP**

**FIGURE 4: FEMA MAP**

**FIGURE 5: SOIL SURVEY MAP**

**FIGURE 6: RIDEM GROUNDWATER CLASSIFICATION MAP**





94

93

# USGS QUAD MAP



GRAPHIC SCALE IN FEET  
1" = 1000'

SOURCE: USGS KINGSTOWN QUADRANGLE RHODE ISLAND WASHINGTON COUNTY 7.5-MINUTE SERIES

**600 NJ STATE HIGHWAY ROUTE 36  
PROPOSED MULTI-FAMILY RESIDENTIAL  
DEVELOPMENT**  
MAP 32-4, LOT 21  
2001 KINGSTOWN ROAD  
TOWN OF SOUTH KINGSTOWN, WASHINGTON COUNTY, RHODE ISLAND

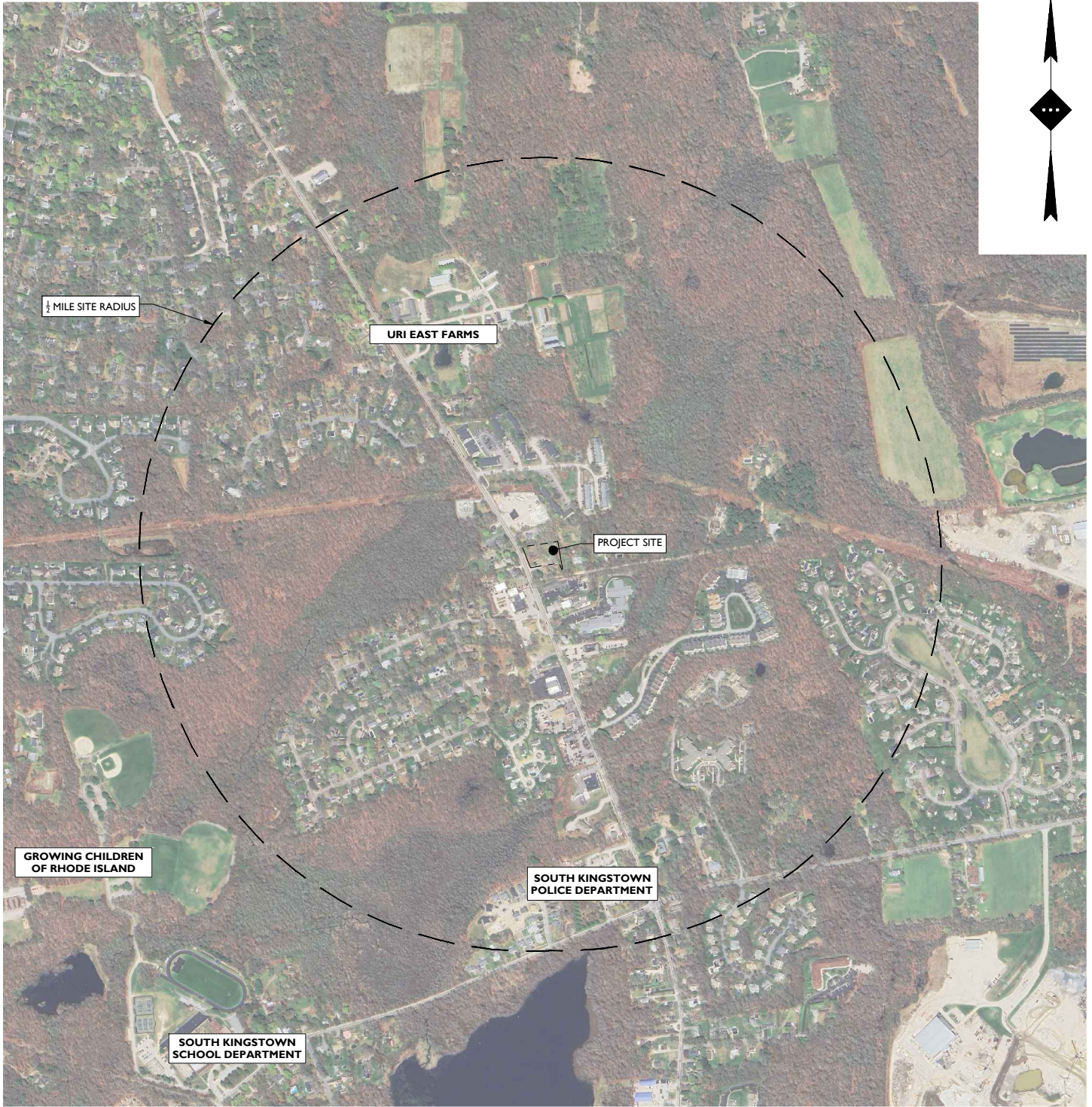
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<b>CHECKED BY:</b>	JHK
<b>DATE:</b>	10/1/2025
<b>SCALE:</b>	1" = 1000'
<b>PROJECT ID:</b>	BOS-250053



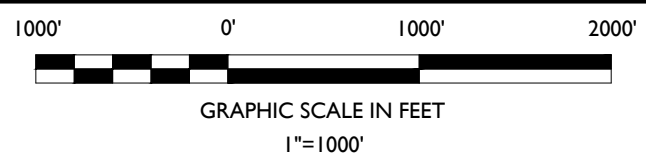
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# AERIAL MAP



SOURCE: GOOGLE EARTH DATED APRIL 23, 2025

## 2001 KINGSTOWN ROAD PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

MAP 32-4, LOT 21  
2001 KINGSTOWN ROAD  
TOWN OF SOUTH KINGSTOWN, WASHINGTON COUNTY, RHODE ISLAND

<b>DRAWN BY:</b>	NNS
<b>CHECKED BY:</b>	JHK
<b>DATE:</b>	10/1/2025
<b>SCALE:</b>	1" = 1000'
<b>PROJECT ID:</b>	BOS-250053



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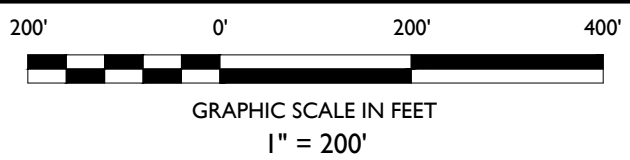
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**ZONING LEGEND:**

- (MU) - MIXED USE
- (CH) - COMMERCIAL HIGHWAY
- (R-10) - MEDIUM HIGH DENSITY RESIDENTIAL DISTRICT
- (RM) - RESIDENTIAL MULTI-HOUSEHOLD DISTRICT
- (R-20) - MEDIUM HIGH DENSITY RESIDENTIAL DISTRICT
- (R40) - MEDIUM DENSITY RESIDENTIAL DISTRICT
- (CN) - COMMERCIAL NEIGHBORHOOD



# TAX & ZONING MAP

SOURCE: SOUTH KINGSTOWN, RI ONLINE ZONING MAP

**2001 KINGSTOWN ROAD  
PROPOSED MULTI-FAMILY RESIDENTIAL  
DEVELOPMENT**  
MAP 32-4, LOT 21  
2001 KINGSTOWN ROAD  
TOWN OF SOUTH KINGSTOWN, WASHINGTON COUNTY, RHODE ISLAND

<b>DRAWN BY:</b>	NNS
<b>CHECKED BY:</b>	JHK
<b>DATE:</b>	10/1/2025
<b>SCALE:</b>	1" = 200'
<b>PROJECT ID:</b>	BOS-250053



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200' SITE RADIUS

PROJECT SITE

108

108

ROLENS DR

ZINNS DR

MISTY

RD

OD DR

OVERHILL RD

PAUL AVE

ALLISONS AVE

SOUTHWINDS DR



GRAPHIC SCALE IN FEET

1"=300'

# FEMA FLOOD MAP

SOURCE: FEMA FLOOD MAPS NUMBER 44009C0184K & 44009C0185J

**2001 KINGSTOWN ROAD  
PROPOSED MULTI-FAMILY RESIDENTIAL  
DEVELOPMENT**

MAP 32-4, LOT 21  
2001 KINGSTOWN ROAD  
TOWN OF SOUTH KINGSTOWN, WASHINGTON COUNTY, RHODE ISLAND

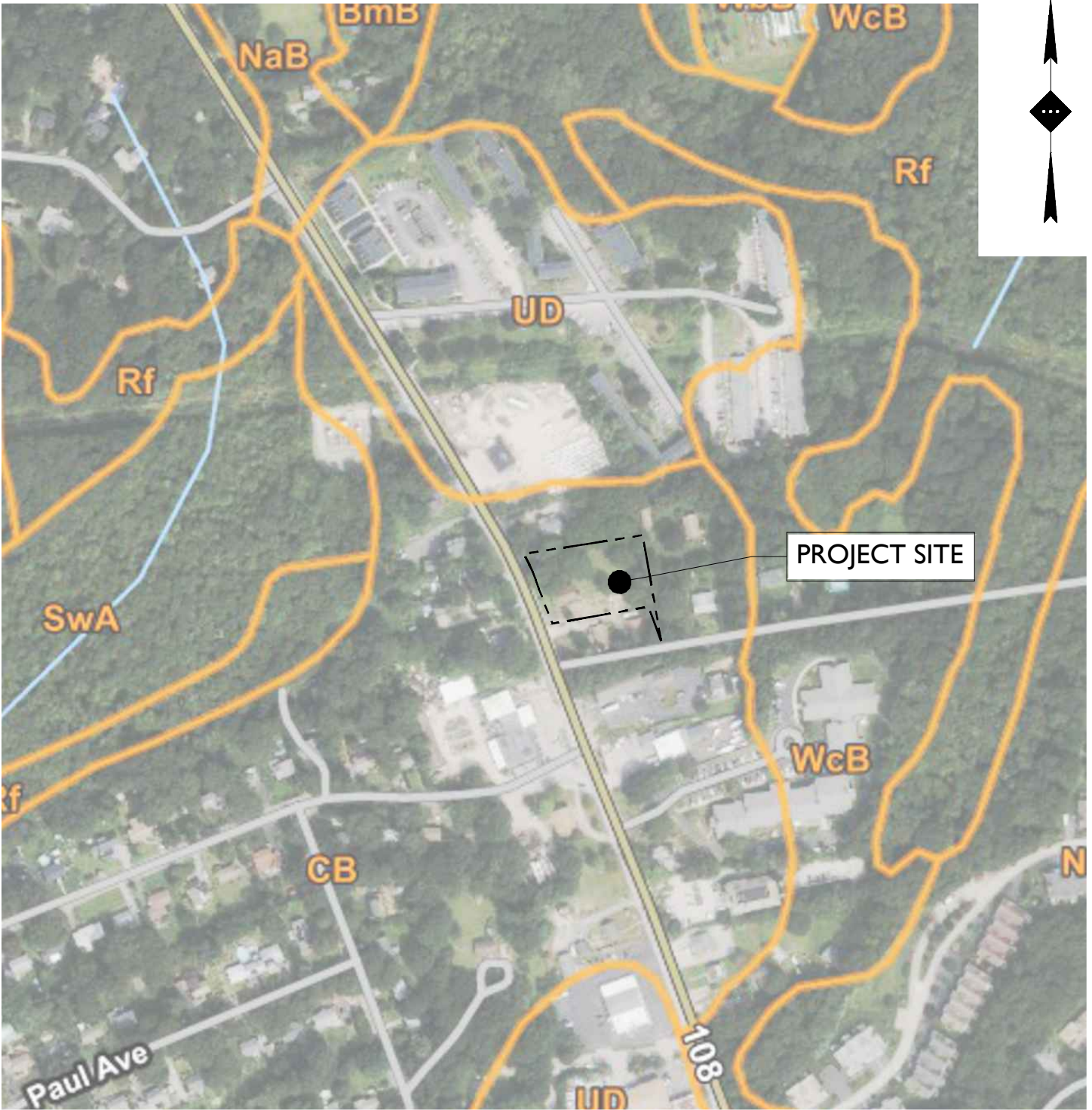
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<b>CHECKED BY:</b>	JHK
<b>DATE:</b>	10/1/2025
<b>SCALE:</b>	1" = 300'
<b>PROJECT ID:</b>	BOS-250053



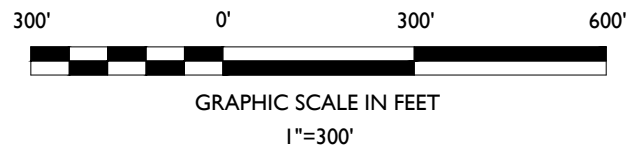
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# SOILS MAP



SOURCE: USDA: NATURAL RESOURCE CONSERVATION SERVICE RETRIEVED JULY 7, 2025

## 2001 KINGSTOWN ROAD PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

MAP 32-4, LOT 21  
2001 KINGSTOWN ROAD  
TOWN OF SOUTH KINGSTOWN, WASHINGTON COUNTY, RHODE ISLAND

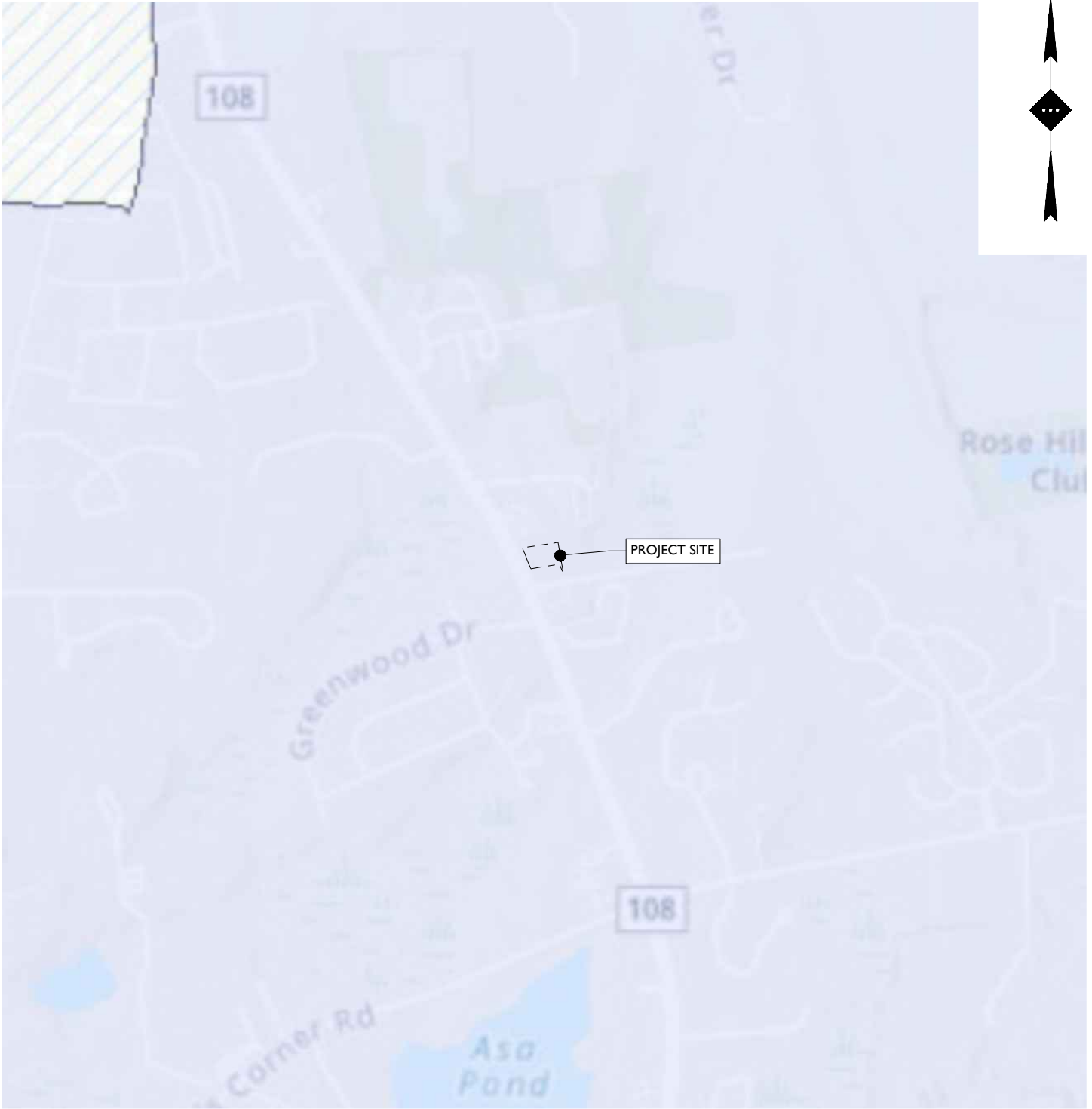
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<b>CHECKED BY:</b>	JHK
<b>DATE:</b>	10/1/2025
<b>SCALE:</b>	1" = 300'
<b>PROJECT ID:</b>	BOS-250053

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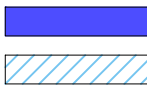
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# GROUNDWATER CLASSIFICATION MAP



GA - TO BE PROTECTED TO MAINTAIN DRINKING WATER QUALITY  
 GAA - TO BE PROTECTED TO MAINTAIN DRINKING WATER QUALITY



GRAPHIC SCALE IN FEET  
 1" = 1000'

SOURCE: RIDEM ENVIRONMENTAL RESOURCE MAP, RECEIVED OCTOBER 1, 2025

## 2001 KINGSTOWN ROAD PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

MAP 32-4, LOT 21  
 2001 KINGSTOWN ROAD  
 TOWN OF SOUTH KINGSTOWN, WASHINGTON COUNTY, RHODE ISLAND

<b>DRAWN BY:</b>	NNS
<b>CHECKED BY:</b>	JHK
<b>DATE:</b>	10/1/2025
<b>SCALE:</b>	1" = 300'
<b>PROJECT ID:</b>	BOS-250053



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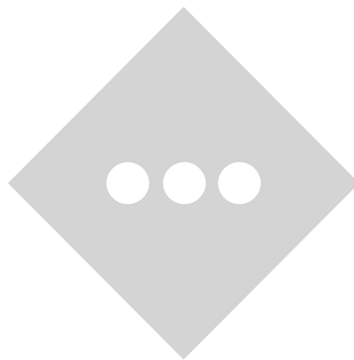
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# **APPENDIX B PROJECT SOILS**

## **INVENTORY**

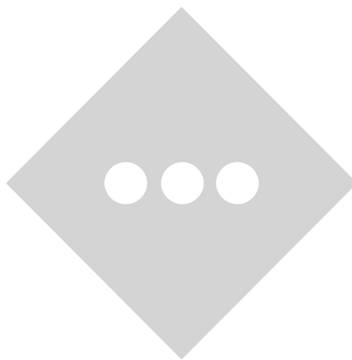
**B-1: NRCS SOILS REPORT**

**B-2: ECOSYSTEM SOLUTIONS SOIL EVALUATION**



# **APPENDIX B-I**

## **NRCS SOIL REPORT**





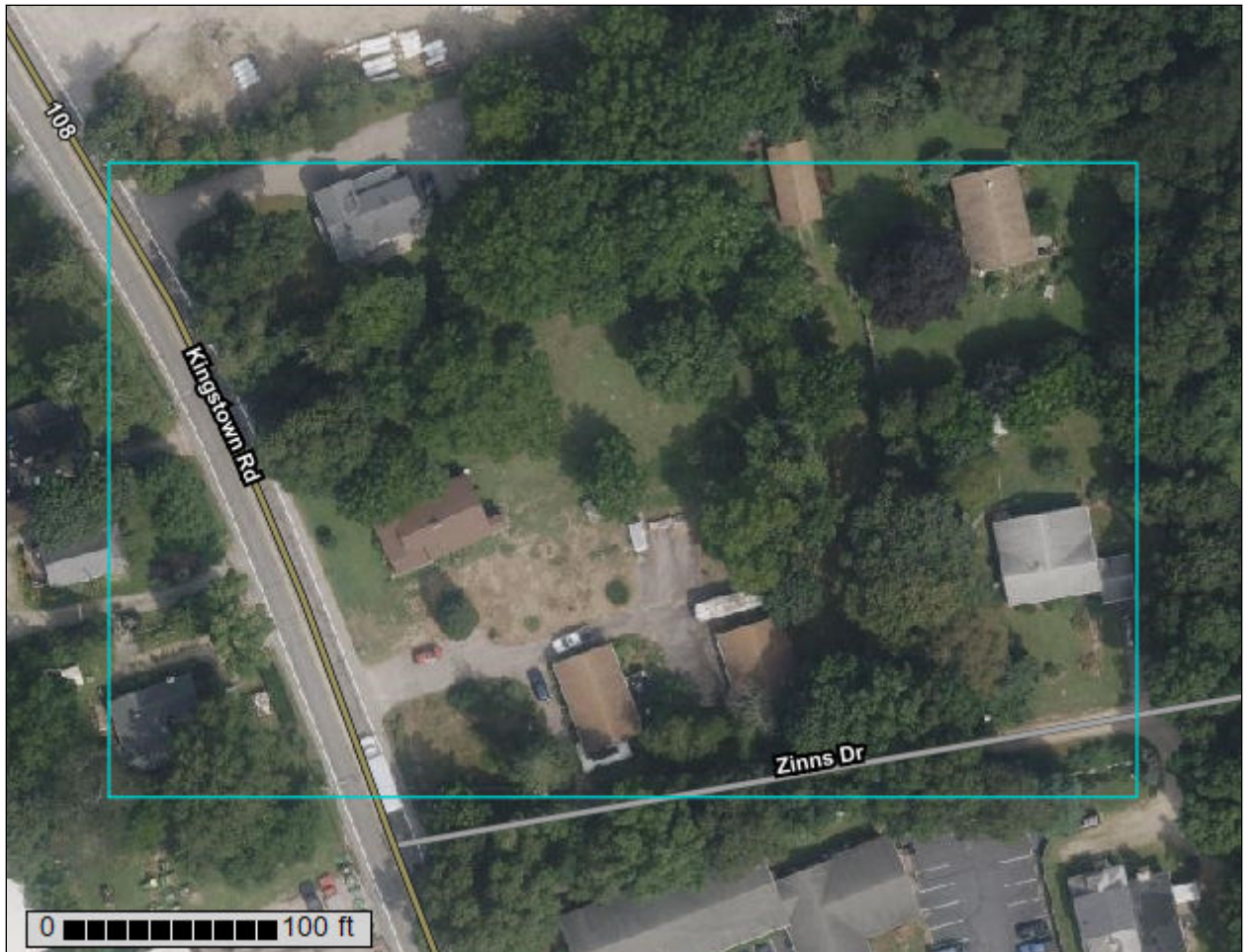
United States  
Department of  
Agriculture

**NRCS**

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties



# Preface

---

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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CB—Canton-Urban land complex.....	11
<b>References</b> .....	14

# Soil Map

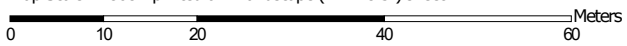
---

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report Soil Map



Map Scale: 1:808 if printed on A landscape (11" x 8.5") sheet.




Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84



### MAP LEGEND

**Area of Interest (AOI)**

 Area of Interest (AOI)




















**Soils**







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

**Special Point Features**






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


**Water Features**

 Streams and Canals

**Transportation**

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

**Background**

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties  
 Survey Area Data: Version 25, Sep 3, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 1, 2024—Jul 1, 2024

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

**MAP LEGEND**

**MAP INFORMATION**

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CB	Canton-Urban land complex	3.3	100.0%
<b>Totals for Area of Interest</b>		<b>3.3</b>	<b>100.0%</b>

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

## Custom Soil Resource Report

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties

### CB—Canton-Urban land complex

#### Map Unit Setting

*National map unit symbol:* 9ltv  
*Elevation:* 0 to 810 feet  
*Mean annual precipitation:* 44 to 50 inches  
*Mean annual air temperature:* 48 to 50 degrees F  
*Frost-free period:* 115 to 195 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Canton and similar soils:* 40 percent  
*Urban land:* 30 percent  
*Minor components:* 30 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Canton

##### Setting

*Landform:* Hills  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Coarse-loamy over sandy and gravelly melt-out till derived from granite and/or schist and/or gneiss

##### Typical profile

*Oe - 0 to 1 inches:* moderately decomposed plant material  
*A - 1 to 3 inches:* gravelly fine sandy loam  
*Bw1 - 3 to 15 inches:* gravelly loam  
*Bw2 - 15 to 24 inches:* gravelly loam  
*Bw3 - 24 to 30 inches:* gravelly loam  
*2C - 30 to 60 inches:* very gravelly loamy sand

##### Properties and qualities

*Slope:* 0 to 15 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Low (about 5.6 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2e  
*Hydrologic Soil Group:* B  
*Ecological site:* F144AY034CT - Well Drained Till Uplands  
*Hydric soil rating:* No

## Description of Urban Land

### Setting

*Parent material:* Human transported material

### Typical profile

*R - 0 to 6 inches:* variable

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8s

*Hydric soil rating:* No

## Minor Components

### Charlton

*Percent of map unit:* 6 percent

*Landform:* Hills

*Down-slope shape:* Linear

*Across-slope shape:* Convex

*Hydric soil rating:* No

### Gloucester

*Percent of map unit:* 6 percent

*Landform:* Hills

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

### Narragansett

*Percent of map unit:* 5 percent

*Landform:* Hills, till plains

*Down-slope shape:* Linear

*Across-slope shape:* Convex

*Hydric soil rating:* No

### Paxton

*Percent of map unit:* 5 percent

*Landform:* Drumlins, hills

*Down-slope shape:* Linear

*Across-slope shape:* Convex

*Hydric soil rating:* No

### Udorthents

*Percent of map unit:* 5 percent

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Hydric soil rating:* No

### Sutton

*Percent of map unit:* 3 percent

*Landform:* Depressions, drainageways

*Down-slope shape:* Linear, concave

*Across-slope shape:* Concave

*Hydric soil rating:* No

## Custom Soil Resource Report

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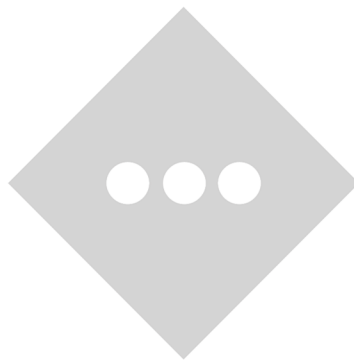
## Custom Soil Resource Report

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United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. [http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_052290.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf)

**APPENDIX B-2**  
**ECOSYSTEM SOLUTIONS SOIL EVALUATION**





STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Environmental Management
Office of Water Resources



Stormwater Evaluation Form
Part A - Soil Profile Description Application Number N/A

Property Owner: Reilly Miller
Property Location: 2001 Kingstown Road; A.P. 32-4, Lot 21; South Kingstown
Date of Test Hole: 8/7/2025
Soil Evaluator: Brandon Faneuf License Number: D4059
Weather: Sunny, 80° Shaded: Yes No Time: 9:00 am

Table with 11 columns: TP-1, Depth, Horizon Boundaries (Dist, Topo), Soil Colors (Matrix, Re-Dox Features), Re-Dox (Ab. S. Contr.), Texture, Structure, Consistence, Rawls Rate. It contains two soil profile sections, TP-1 and TP-2, with detailed data for horizons Ap, Bw, C, and 2C.

TP 1 Soil Class See below Total Depth 96" Impervious/Limiting Layer Depth - (eg) GW Seepage Depth - SHWT 96" (eg)

TP 2 Soil Class See below Total Depth 100" Impervious/Limiting Layer Depth - (eg) GW Seepage Depth - SHWT 96" (eg)

Comments: Soil class both test holes is Eolian over proglacial outwash.

Redox indicative of a false/"hanging" water table above coarse textured soils.

**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
-  Estimated gradient and direction of slope
-  Approximate direction of due north

See attached Figure 1.

Bedrock THs	
TH	Depth

1. Relief and Slope: 80°, 3%
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
9. Landscape position: Sideslope
10. Vegetation: Lawn & shade trees (black walnut)
11. Indicate approximate location of property lines and roadways
12. Additional comments, site constraints or additional information regarding site: Muni H20

**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: Brandon Feneuf Signature License # \_\_\_\_\_ Part B prepared by: Brandon Feneuf 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 \_\_\_\_\_



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Environmental Management
Office of Water Resources



Stormwater Evaluation Form
Part A - Soil Profile Description

Application Number N/A

Property Owner: Reilly Miller

Property Location: 2001 Kingstown Road; A.P. 32-4, Lot 21; South Kingstown

Date of Test Hole: 8/7/2025

Soil Evaluator: Brandon Faneuf License Number: D4059

Weather: 80°, Sunny Shaded: Yes [ ] No [x] Time: 9:00 am

Table with 11 columns: TP-3, Depth, Horizon Boundaries (Dist, Topo), Soil Colors (Matrix, Re-Dox Features), Re-Dox (Ab. S. Contr.), Texture, Structure, Consistence, Table 5-3 Inches/hr. Contains data for TP-3 and TP-4 soil profiles.

TP 3 Soil Class See below Total Depth 96" Impervious/Limiting Layer Depth - (eg) GW Seepage Depth - SHWT 96" (eg)

TP 4 Soil Class See below Total Depth 96" Impervious/Limiting Layer Depth - (eg) GW Seepage Depth - SHWT 96" (eg)

Comments: Soil becomes darker + moist at around 60" both test holes.

Soil class both test holes is Eolian over proglacial outwash. Redox is indicative of a false/"hanging" water table over coarse-textured soils.

**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
-  Estimated gradient and direction of slope
-  Approximate direction of due north

See attached Figure 1.

Bedrock THs	
TH	Depth

1. Relief and Slope: 80°, 3%
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
9. Landscape position: Sideslope
10. Vegetation: Lawn & shade trees (black walnut)
11. Indicate approximate location of property lines and roadways
12. Additional comments, site constraints or additional information regarding site: Muni H20

**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: Brandon Feneuf Signature License # \_\_\_\_\_ Part B prepared by: Brandon Feneuf 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

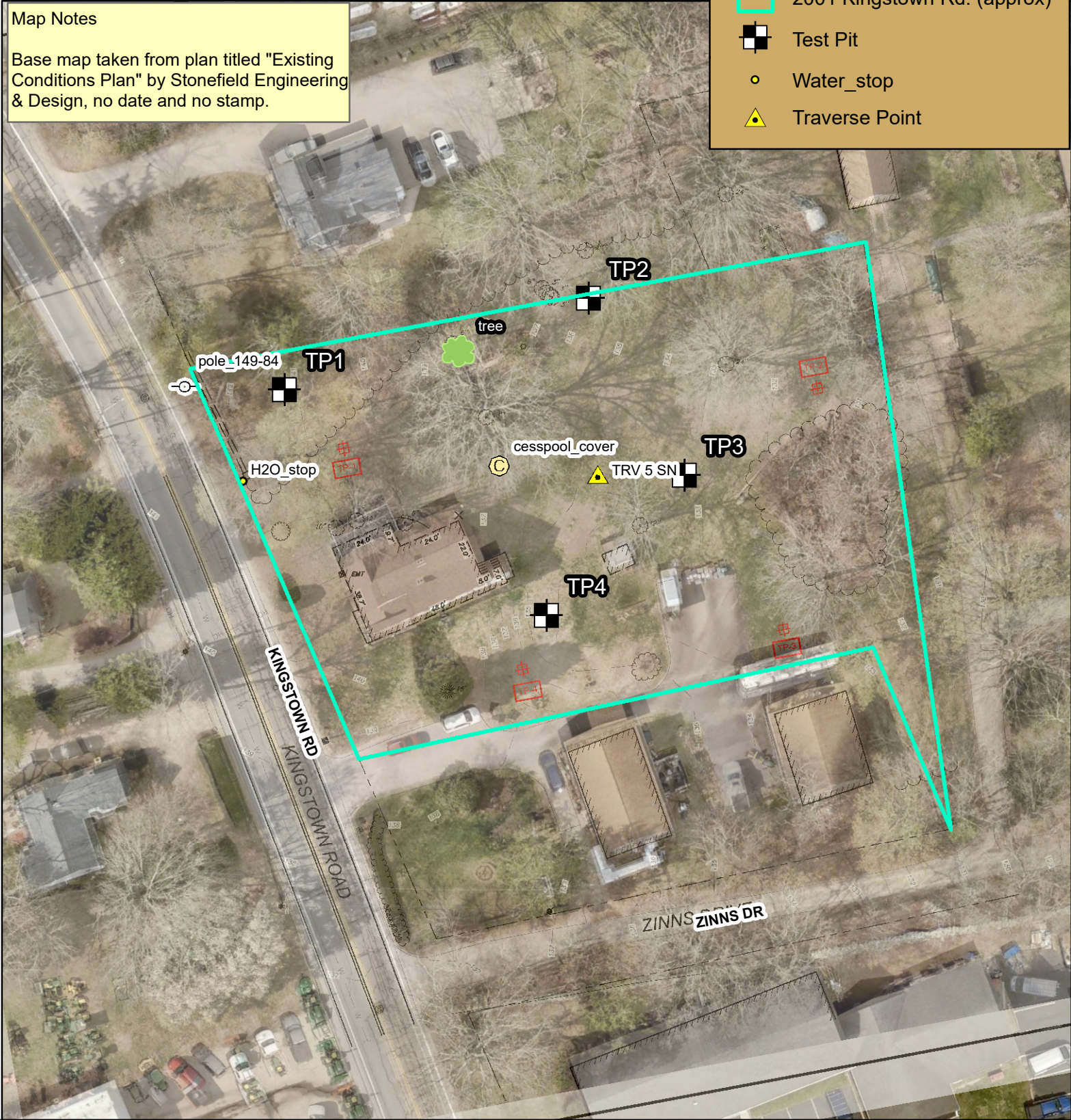
Explanation: \_\_\_\_\_


\_\_\_\_\_

Signature Authorized Agent \_\_\_\_\_ Date \_\_\_\_\_

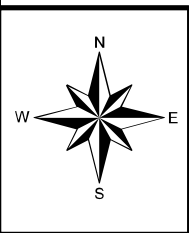
**Map Notes**  
 Base map taken from plan titled "Existing Conditions Plan" by Stonefield Engineering & Design, no date and no stamp.

 2001 Kingstown Rd. (approx)  
 Test Pit  
 Water\_stop  
 Traverse Point



 Ecosystem Solutions, Inc.  
 100 Jefferson Blvd., Suite 225, Warwick, RI 02888

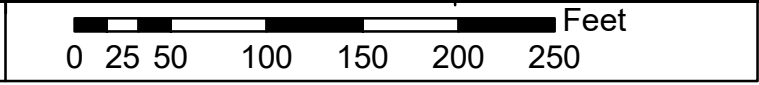
**FIGURE 1**



Test Hole Location Sketch  
 2001 Kingstown Road; A.P. 32-4, Lot 21  
 South Kingstown, Rhode Island

DATE:	09-02-2025	PROJECT #:	SE25-734
CREATED BY:	BF	SCALE:	1 inch = 50 feet

Spring 2025 Aerial Imagery



# **APPENDIX C HYDROLOGIC & HYDRAULIC CALCULATIONS**

## **INVENTORY**

**C-1: GROUNDWATER RECHARGE ( $RE_v$ ) CALCULATIONS**

**C-2: WATER QUALITY ( $WQ_v$ ) CALCULATIONS**

**C-3: HYDROCAD NODE SCHEMATIC DIAGRAM**

**C-4:  $WQ_v$  STORM EVENT HYDROGRAPHS**

**C-5: 1-YEAR STORM EVENT HYDROGRAPHS**

**C-6: 2-YEAR STORM EVENT HYDROGRAPHS**

**C-7: 10-YEAR STORM EVENT HYDROGRAPHS**

**C-8: 25-YEAR STORM EVENT HYDROGRAPHS**

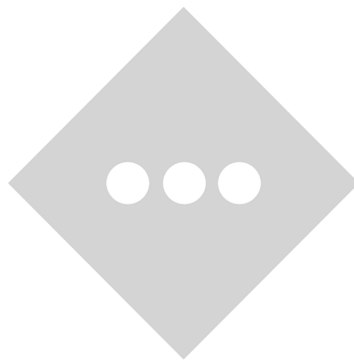
**C-9: 100-YEAR STORM EVENT HYDROGRAPHS**

**C-10: INFILTRATION BASIN STAGE-STORAGE TABLES**

**C-11: INFILTRATION BASIN STAGE-DISCHARGE TABLES**



**APPENDIX C-I**  
**GROUNDWATER RECHARGE ( $RE_v$ )**  
**CALCULATIONS**





## **PROJECTED GROUNDWATER RECHARGE CALCULATIONS**

Per the RIDEM Stormwater Manual, section 3.3.2 – Groundwater Recharge ( $Re_v$ ), the Recharge Volume ( $Re_v$ ) is contained within the  $WQ_v$  and must be achieved by disconnection of impervious areas. The Recharge Volume has been calculated per node and is analyzed as pre- vs. post- to show the groundwater recharge is improved. LID Stormwater Credit (Section 4.6) was not applied for this project due to the limited room for Qualified Pervious Areas (QPAs).

### Required Groundwater Recharge Volume ( $Re_v$ ) for Area POI-I [HSG B]

$$Re_v = \frac{(1'')(F)(I)}{12}$$

Where:  $Re_v$  = groundwater recharge volume (cf)

F = recharge factor, see Table 3-4

I = Impervious area (sf)

Type B Soils:     $F = 0.35$          $I = 15,212 \text{ sf}$

$$Re_v = \frac{(1'')(0.35)(15,212 \text{ sf})}{12}$$

$$Re_v = 443.7 \text{ CF}$$

### Recharge Volume Provided via Basins B-1, B-2, B-3 (cubic feet):

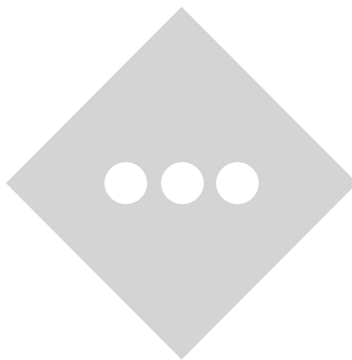
*Calculated using HydroCAD version 10.20 – 6a*

$$V_{provided} = 1,936 \text{ CF (B-1)} + 1,274 \text{ CF (B-2)}$$

$$V_{provided} = 3,210 \text{ CF}$$

# **APPENDIX C-2**

## **WATER QUALITY (WQ<sub>v</sub>) CALCULATIONS**





### **PROJECTED WATER QUALITY CALCULATIONS**

Per the RIDEM Stormwater Manual, Section 3.3.3 – Water Quality Volume ( $WQ_v$ ), the water quality volume required to be captured and treated is the entire runoff volume for 90% of the average annual storm events and is equivalent to the runoff associated with the first 1.2 inches of rainfall over the impervious surface. To ensure the majority of the pollutants onsite are captured, the Water Quality Volume ( $WQ_v$ ) must be treated.

Required Water Quality Volume ( $WQ_v$ ) (cf) for Area P-1

$$WQ_v = \frac{(1'')(I)}{12}$$

Where:  $WQ_v$  = water quality volume (cf)  
 $I$  = Impervious area (sf)

$$I = 18,913 \text{ sf}$$

$$WQ_v = \frac{(1'')(15,212 \text{ sf})}{12}$$

$$WQ_v = 1,267.7 \text{ CF}$$

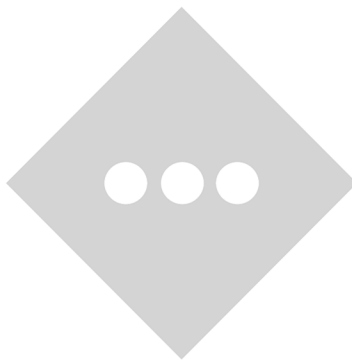
Underground Infiltration (B-1, B-2, B-3) Provided Volume (cubic feet):

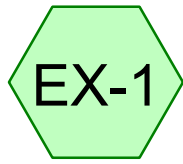
*Calculated using HydroCAD version 10.20 – 6a*

$$V_{provided} = 1,936 \text{ CF (B - 1)} + 1,274 \text{ CF (B - 2)}$$

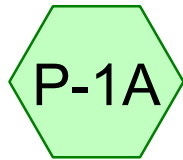
$$V_{provided} = 6,142 \text{ CF}$$

**APPENDIX C-3**  
**HYDROCAD NODE SCHEMATIC DIAGRAM**

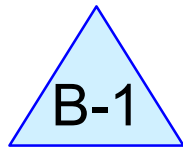




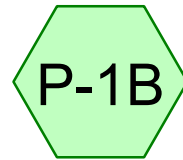
Existing Site



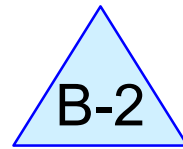
MVS/Roof to Basin



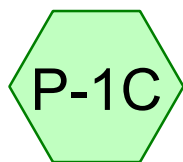
Infiltration Basin



Roof/Open Area to Basin



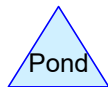
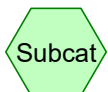
Infiltration Basin



Grass Undetained to  
POI-1



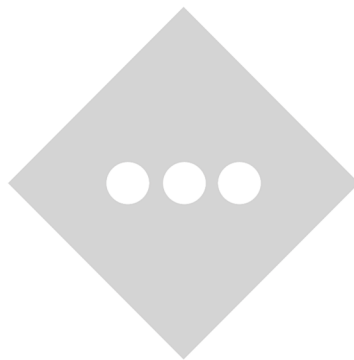
Offsite East



**Routing Diagram for HydroCAD**

Prepared by Stonefield Engineering & Design, Printed 12/9/2025  
HydroCAD® 10.20-6a s/n 06682 © 2024 HydroCAD Software Solutions LLC

**APPENDIX C-4**  
**WQ<sub>v</sub> STORM EVENT HYDROGRAPHS**



# HydroCAD

Prepared by Stonefield Engineering & Design

HydroCAD® 10.20-6a s/n 06682 © 2024 HydroCAD Software Solutions LLC

Type III 24-hr WQV Rainfall=1.20"

Printed 12/9/2025

Page 52

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>SubcatchmentEX-1: Existing Site</b>	Runoff Area=37,735 sf 9.31% Impervious Runoff Depth>0.00" Flow Length=268' Tc=15.3 min CN=64 Runoff=0.000 cfs 0 cf
<b>SubcatchmentP-1A: MVS/Roof to Basin</b>	Runoff Area=10,989 sf 81.29% Impervious Runoff Depth>0.47" Tc=6.0 min CN=91 Runoff=0.144 cfs 426 cf
<b>SubcatchmentP-1B: Roof/Open Area to</b>	Runoff Area=7,339 sf 78.74% Impervious Runoff Depth>0.42" Tc=6.0 min CN=90 Runoff=0.087 cfs 257 cf
<b>SubcatchmentP-1C: Grass Undetained to</b>	Runoff Area=19,407 sf 2.58% Impervious Runoff Depth=0.00" Flow Length=243' Tc=12.0 min CN=62 Runoff=0.000 cfs 0 cf
<b>Pond B-1: Infiltration Basin</b>	Peak Elev=133.01' Storage=0.000 af Inflow=0.144 cfs 426 cf Outflow=0.145 cfs 426 cf
<b>Pond B-2: Infiltration Basin</b>	Peak Elev=137.01' Storage=0.000 af Inflow=0.087 cfs 257 cf Outflow=0.087 cfs 257 cf
<b>Link POI-1: Offsite East</b>	Inflow=0.000 cfs 0 cf Primary=0.000 cfs 0 cf

**Total Runoff Area = 75,470 sf Runoff Volume = 683 cf Average Runoff Depth = 0.11"**  
**75.19% Pervious = 56,746 sf 24.81% Impervious = 18,724 sf**

**Summary for Subcatchment EX-1: Existing Site**

Runoff = 0.000 cfs @ 20.00 hrs, Volume= 0 cf, Depth> 0.00"

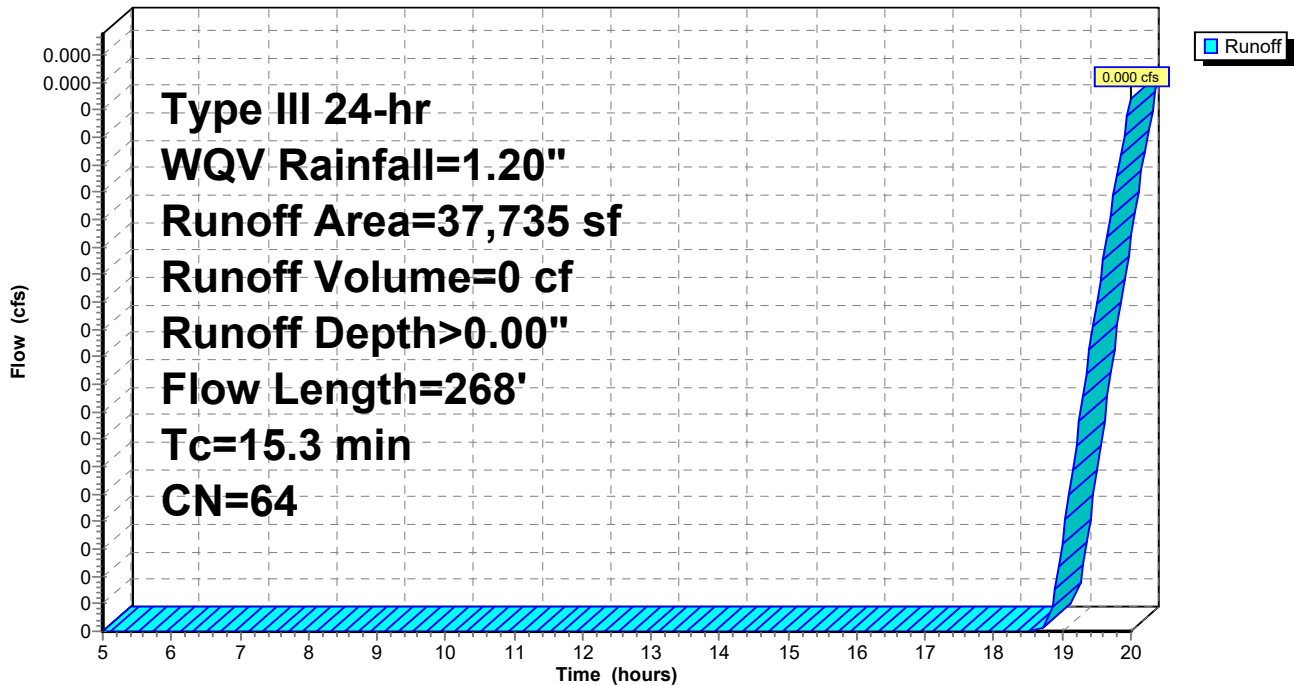
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr WQV Rainfall=1.20"

Area (sf)	CN	Description
29,051	61	>75% Grass cover, Good, HSG B
5,172	55	Woods, Good, HSG B
* 3,512	98	Impervious
37,735	64	Weighted Average
34,223		90.69% Pervious Area
3,512		9.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	78	0.0400	0.10		<b>Sheet Flow, 1A-1B</b>
					Woods: Light underbrush n= 0.400 P2= 3.30"
2.2	190	0.0430	1.45		<b>Shallow Concentrated Flow, 1B-1C</b>
					Short Grass Pasture Kv= 7.0 fps
15.3	268	Total			

**Subcatchment EX-1: Existing Site**

Hydrograph



**Summary for Subcatchment P-1A: MVS/Roof to Basin**

Runoff = 0.144 cfs @ 12.10 hrs, Volume= 426 cf, Depth> 0.47"  
 Routed to Pond B-1 : Infiltration Basin

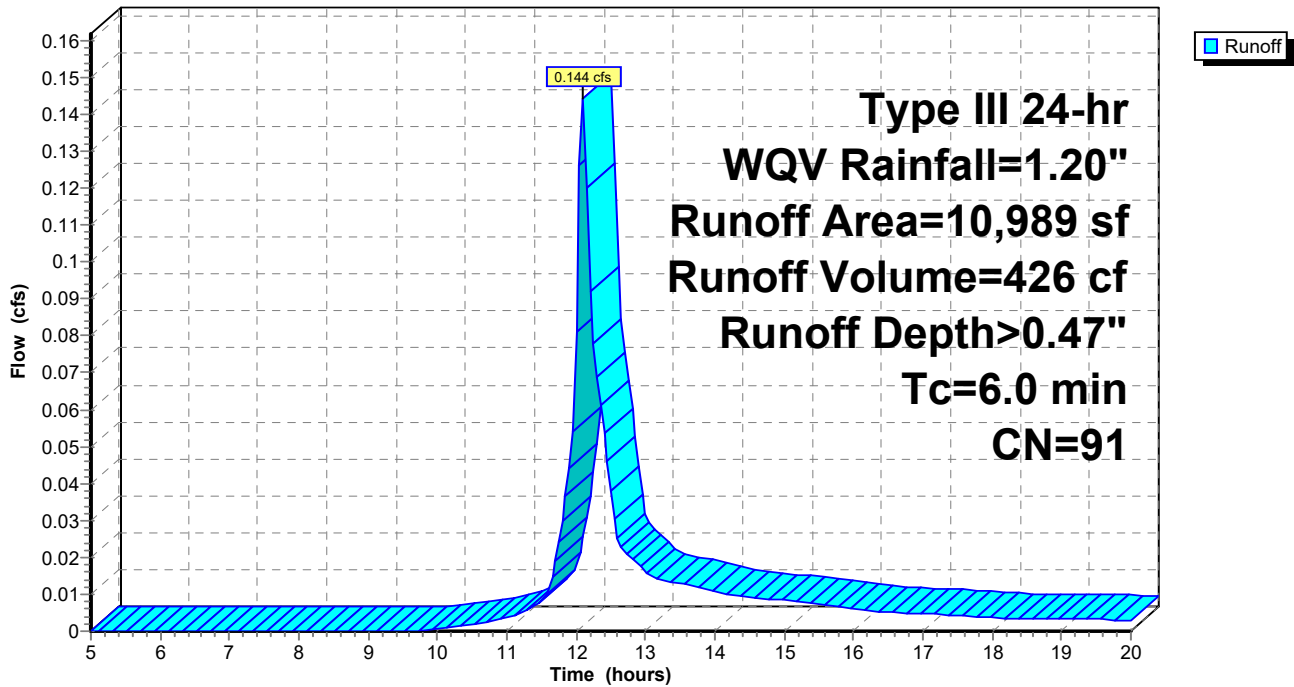
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr WQV Rainfall=1.20"

	Area (sf)	CN	Description
*	8,933	98	Impervious
	2,056	61	>75% Grass cover, Good, HSG B
	10,989	91	Weighted Average
	2,056		18.71% Pervious Area
	8,933		81.29% Impervious Area

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

**Subcatchment P-1A: MVS/Roof to Basin**

Hydrograph



**Summary for Subcatchment P-1B: Roof/Open Area to Basin**

Runoff = 0.087 cfs @ 12.10 hrs, Volume= 257 cf, Depth> 0.42"  
 Routed to Pond B-2 : Infiltration Basin

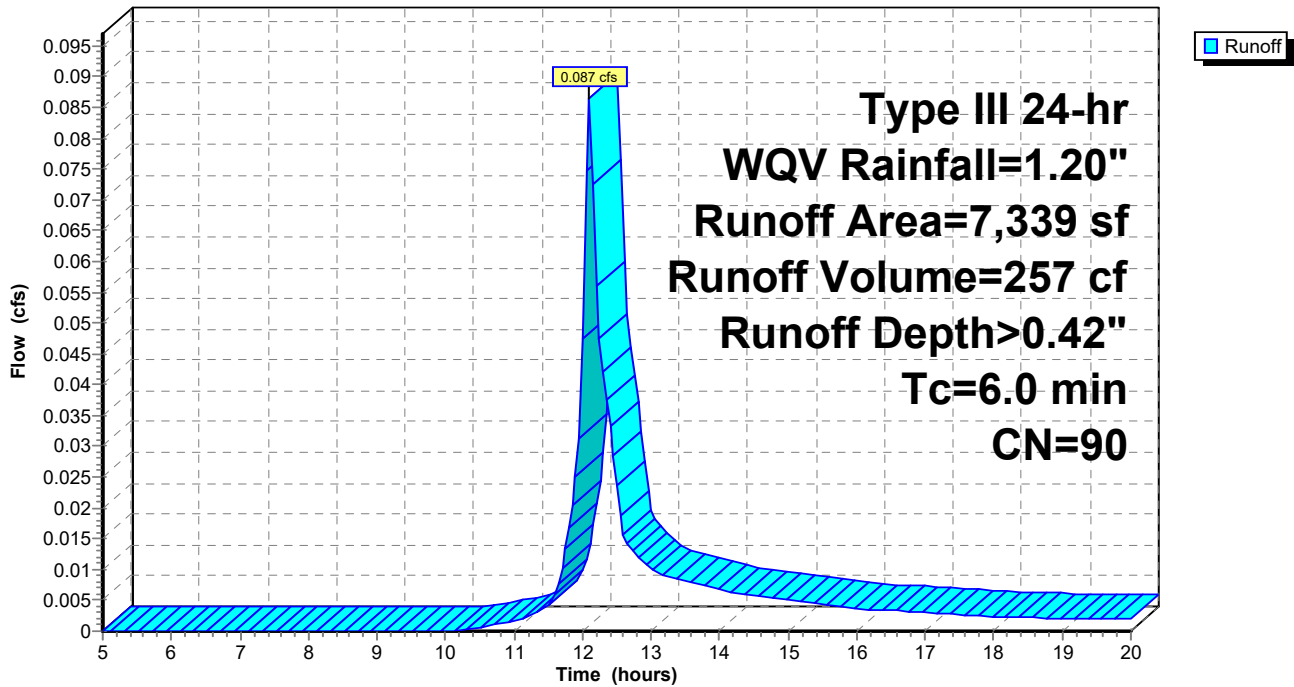
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr WQV Rainfall=1.20"

	Area (sf)	CN	Description
*	5,779	98	Impervious
	1,560	61	>75% Grass cover, Good, HSG B
	7,339	90	Weighted Average
	1,560		21.26% Pervious Area
	5,779		78.74% Impervious Area

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

**Subcatchment P-1B: Roof/Open Area to Basin**

Hydrograph



**Summary for Subcatchment P-1C: Grass Undetained to POI-1**

Runoff = 0.000 cfs @ 5.00 hrs, Volume= 0 cf, Depth= 0.00"  
 Routed to Link POI-1 : Offsite East

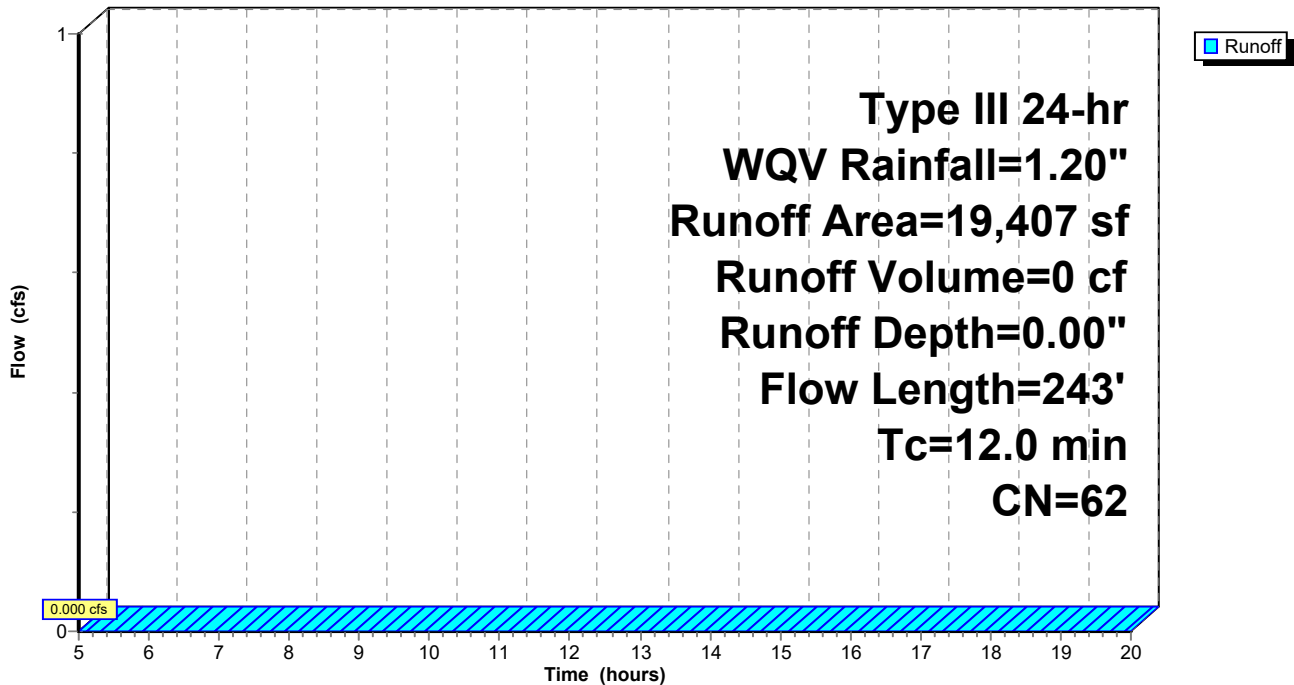
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr WQV Rainfall=1.20"

Area (sf)	CN	Description
18,907	61	>75% Grass cover, Good, HSG B
* 500	98	Impervious
19,407	62	Weighted Average
18,907		97.42% Pervious Area
500		2.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0350	0.15		<b>Sheet Flow, 1A-1B</b>
					Grass: Dense n= 0.240 P2= 3.30"
0.8	143	0.0380	2.92		<b>Shallow Concentrated Flow, 1B-1C</b>
					Grassed Waterway Kv= 15.0 fps
12.0	243	Total			

**Subcatchment P-1C: Grass Undetained to POI-1**

Hydrograph



**Summary for Pond B-1: Infiltration Basin**

Inflow Area = 10,989 sf, 81.29% Impervious, Inflow Depth > 0.47" for WQV event  
 Inflow = 0.144 cfs @ 12.10 hrs, Volume= 426 cf  
 Outflow = 0.145 cfs @ 12.10 hrs, Volume= 426 cf, Atten= 0%, Lag= 0.4 min  
 Discarded = 0.145 cfs @ 12.10 hrs, Volume= 426 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 133.01' @ 12.10 hrs Surf.Area= 0.026 ac Storage= 0.000 af

Plug-Flow detention time= 0.3 min calculated for 426 cf (100% of inflow)  
 Center-of-Mass det. time= 0.3 min ( 806.1 - 805.8 )

Volume	Invert	Avail.Storage	Storage Description
#1A	133.00'	0.017 af	<b>23.69'W x 48.57'L x 2.69'H Field A</b> 0.071 af Overall - 0.029 af Embedded = 0.042 af x 40.0% Voids
#2A	133.25'	0.028 af	<b>Ferguson R-Tank HD 1 x 285 Inside #1</b> Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 285 Chambers in 15 Rows
		0.044 af	Total Available Storage

Storage Group A created with Chamber Wizard

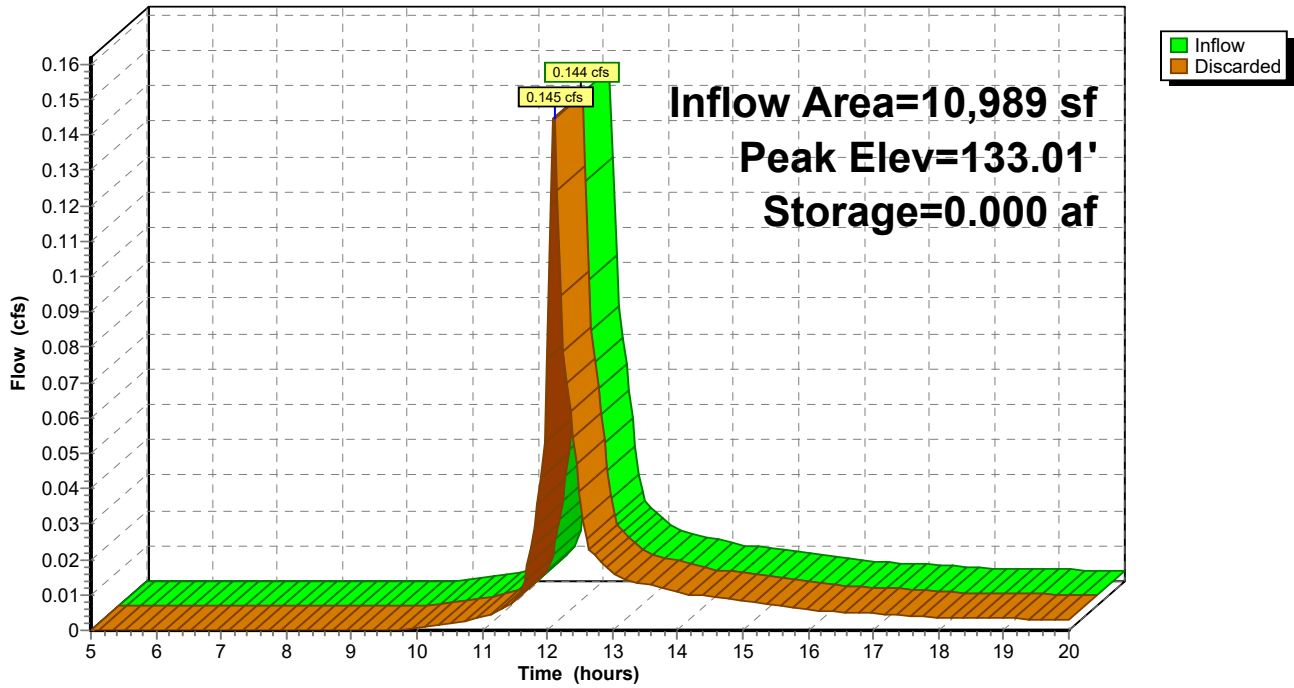
Device	Routing	Invert	Outlet Devices
#1	Discarded	133.00'	<b>8.270 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 130.00' Phase-In= 0.01'

**Discarded OutFlow** Max=0.144 cfs @ 12.10 hrs HW=133.01' (Free Discharge)

↑ **1=Exfiltration** ( Controls 0.144 cfs)

### Pond B-1: Infiltration Basin

Hydrograph



**Summary for Pond B-2: Infiltration Basin**

Inflow Area = 7,339 sf, 78.74% Impervious, Inflow Depth > 0.42" for WQV event  
 Inflow = 0.087 cfs @ 12.10 hrs, Volume= 257 cf  
 Outflow = 0.087 cfs @ 12.10 hrs, Volume= 257 cf, Atten= 0%, Lag= 0.4 min  
 Discarded = 0.087 cfs @ 12.10 hrs, Volume= 257 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 137.01' @ 12.10 hrs Surf.Area= 0.018 ac Storage= 0.000 af

Plug-Flow detention time= 0.3 min calculated for 256 cf (100% of inflow)  
 Center-of-Mass det. time= 0.3 min ( 811.0 - 810.7 )

Volume	Invert	Avail.Storage	Storage Description
#1A	137.00'	0.012 af	<b>19.75'W x 39.19'L x 2.69'H Field A</b> 0.048 af Overall - 0.018 af Embedded = 0.029 af x 40.0% Voids
#2A	137.25'	0.017 af	<b>Ferguson R-Tank HD 1 x 180 Inside #1</b> Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 180 Chambers in 12 Rows
		0.029 af	Total Available Storage

Storage Group A created with Chamber Wizard

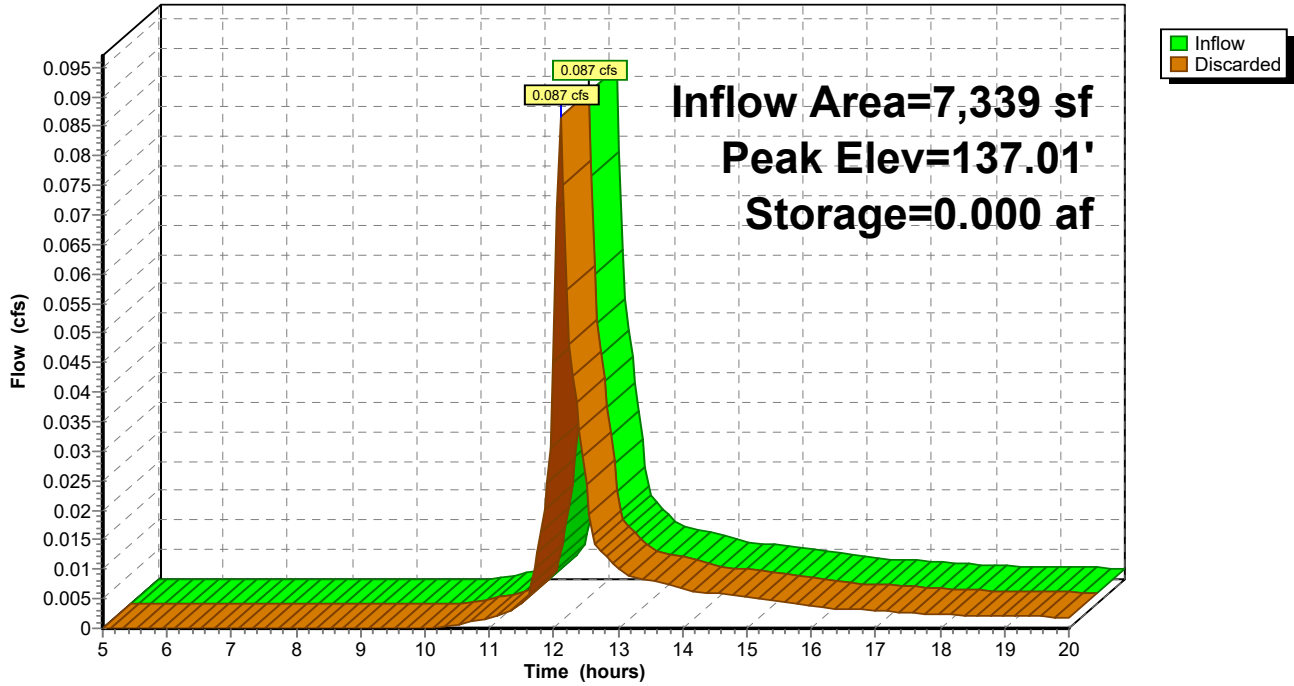
Device	Routing	Invert	Outlet Devices
#1	Discarded	137.00'	<b>8.270 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 133.00' Phase-In= 0.01'

**Discarded OutFlow** Max=0.086 cfs @ 12.10 hrs HW=137.01' (Free Discharge)

↑**1=Exfiltration** ( Controls 0.086 cfs)

### Pond B-2: Infiltration Basin

Hydrograph



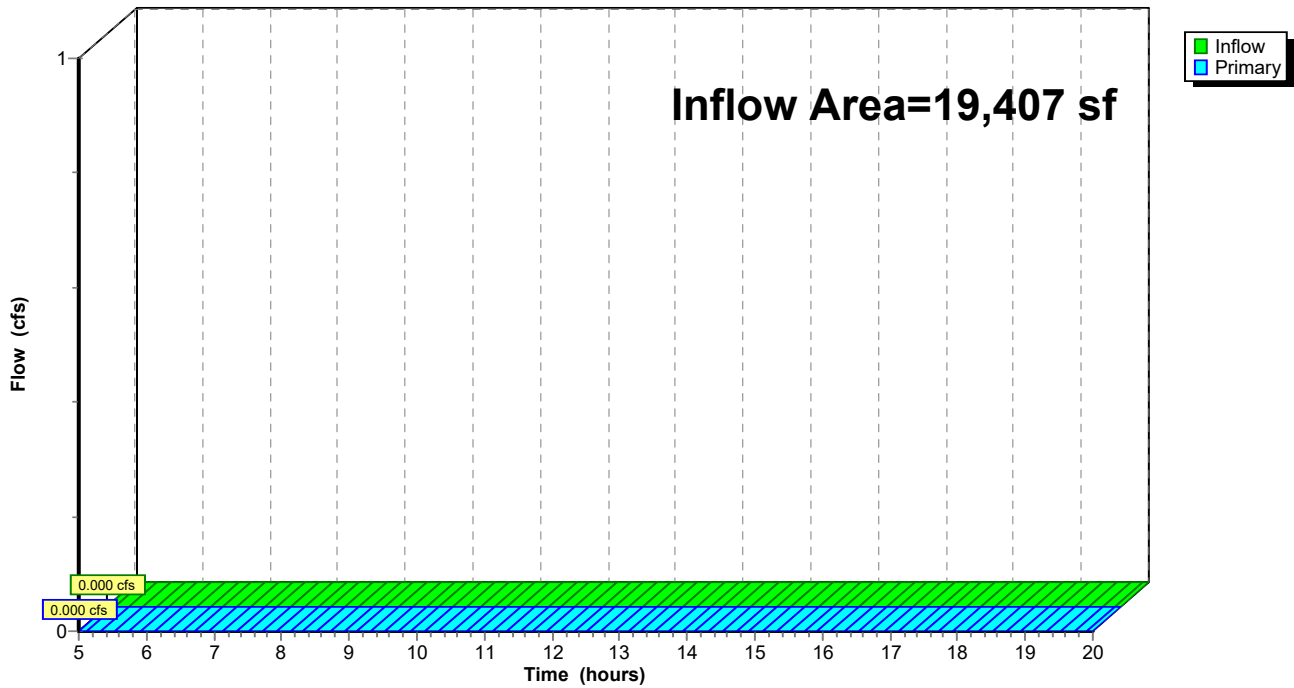
### Summary for Link POI-1: Offsite East

Inflow Area = 19,407 sf, 2.58% Impervious, Inflow Depth = 0.00" for WQV event  
Inflow = 0.000 cfs @ 5.00 hrs, Volume= 0 cf  
Primary = 0.000 cfs @ 5.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

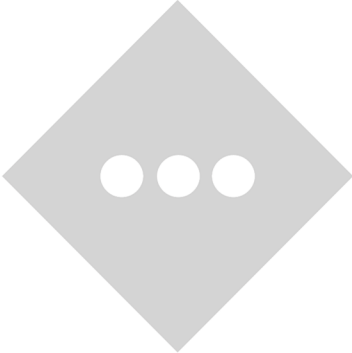
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Link POI-1: Offsite East

Hydrograph



**APPENDIX C-5**  
**I-YEAR STORM EVENT HYDROGRAPHS**



# HydroCAD

Prepared by Stonefield Engineering & Design

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Type III 24-hr 1-Year Rainfall=2.80"

Printed 12/9/2025

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentEX-1: Existing Site**      Runoff Area=37,735 sf   9.31% Impervious   Runoff Depth>0.33"  
Flow Length=268'   Tc=15.3 min   CN=64   Runoff=0.184 cfs   1,049 cf

**SubcatchmentP-1A: MVS/Roof to Basin**      Runoff Area=10,989 sf   81.29% Impervious   Runoff Depth>1.77"  
Tc=6.0 min   CN=91   Runoff=0.540 cfs   1,623 cf

**SubcatchmentP-1B: Roof/Open Area to**      Runoff Area=7,339 sf   78.74% Impervious   Runoff Depth>1.69"  
Tc=6.0 min   CN=90   Runoff=0.346 cfs   1,034 cf

**SubcatchmentP-1C: Grass Undetained to**      Runoff Area=19,407 sf   2.58% Impervious   Runoff Depth>0.28"  
Flow Length=243'   Tc=12.0 min   CN=62   Runoff=0.073 cfs   447 cf

**Pond B-1: Infiltration Basin**      Peak Elev=133.31'   Storage=0.004 af   Inflow=0.540 cfs   1,623 cf  
Outflow=0.252 cfs   1,623 cf

**Pond B-2: Infiltration Basin**      Peak Elev=137.30'   Storage=0.002 af   Inflow=0.346 cfs   1,034 cf  
Outflow=0.166 cfs   1,033 cf

**Link POI-1: Offsite East**      Inflow=0.073 cfs   447 cf  
Primary=0.073 cfs   447 cf

**Total Runoff Area = 75,470 sf   Runoff Volume = 4,153 cf   Average Runoff Depth = 0.66"**  
**75.19% Pervious = 56,746 sf   24.81% Impervious = 18,724 sf**

**Summary for Subcatchment EX-1: Existing Site**

Runoff = 0.184 cfs @ 12.31 hrs, Volume= 1,049 cf, Depth> 0.33"

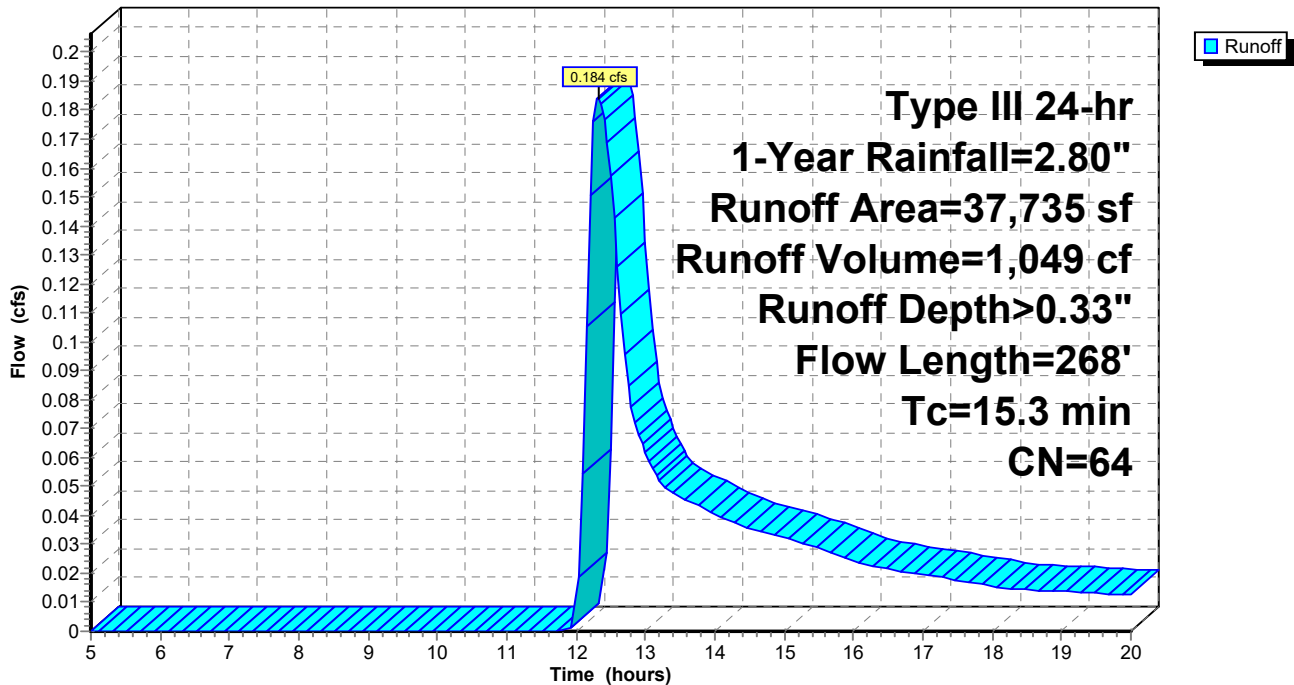
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 1-Year Rainfall=2.80"

Area (sf)	CN	Description
29,051	61	>75% Grass cover, Good, HSG B
5,172	55	Woods, Good, HSG B
* 3,512	98	Impervious
37,735	64	Weighted Average
34,223		90.69% Pervious Area
3,512		9.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	78	0.0400	0.10		<b>Sheet Flow, 1A-1B</b>
					Woods: Light underbrush n= 0.400 P2= 3.30"
2.2	190	0.0430	1.45		<b>Shallow Concentrated Flow, 1B-1C</b>
					Short Grass Pasture Kv= 7.0 fps
15.3	268	Total			

**Subcatchment EX-1: Existing Site**

Hydrograph



**Summary for Subcatchment P-1A: MVS/Roof to Basin**

Runoff = 0.540 cfs @ 12.09 hrs, Volume= 1,623 cf, Depth> 1.77"  
 Routed to Pond B-1 : Infiltration Basin

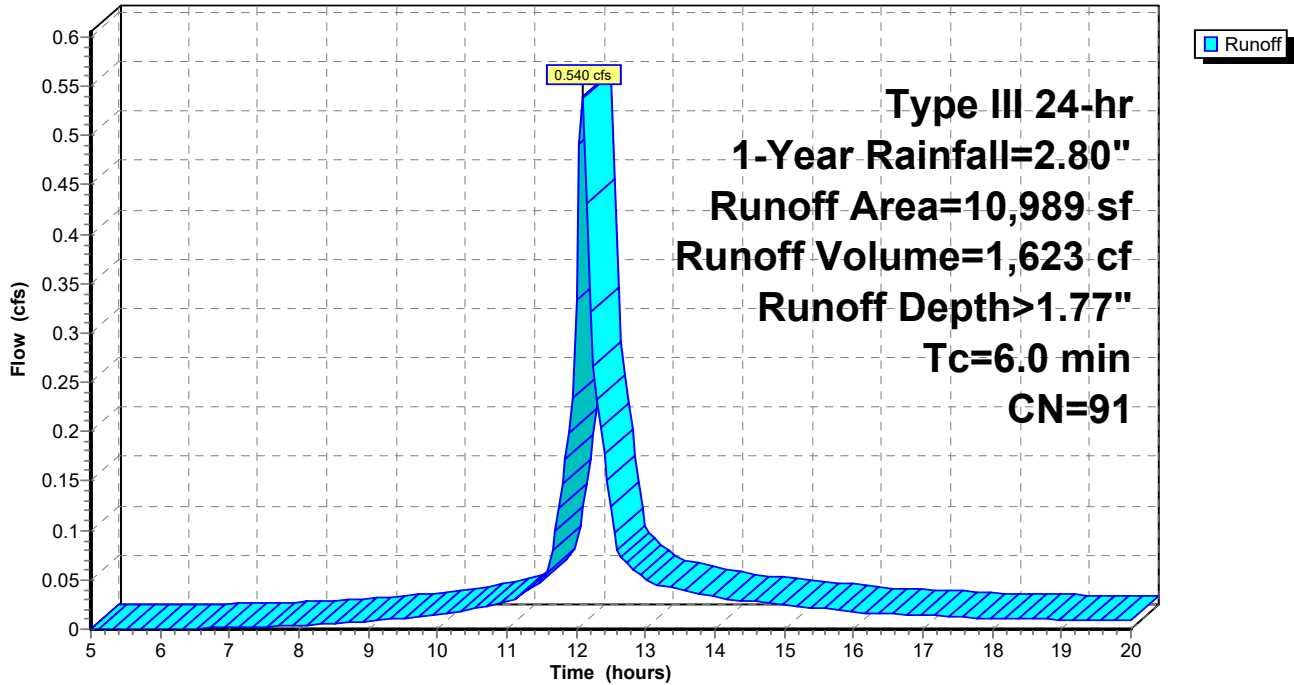
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 1-Year Rainfall=2.80"

	Area (sf)	CN	Description
*	8,933	98	Impervious
	2,056	61	>75% Grass cover, Good, HSG B
	10,989	91	Weighted Average
	2,056		18.71% Pervious Area
	8,933		81.29% Impervious Area

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

**Subcatchment P-1A: MVS/Roof to Basin**

Hydrograph



**Summary for Subcatchment P-1B: Roof/Open Area to Basin**

Runoff = 0.346 cfs @ 12.09 hrs, Volume= 1,034 cf, Depth> 1.69"  
 Routed to Pond B-2 : Infiltration Basin

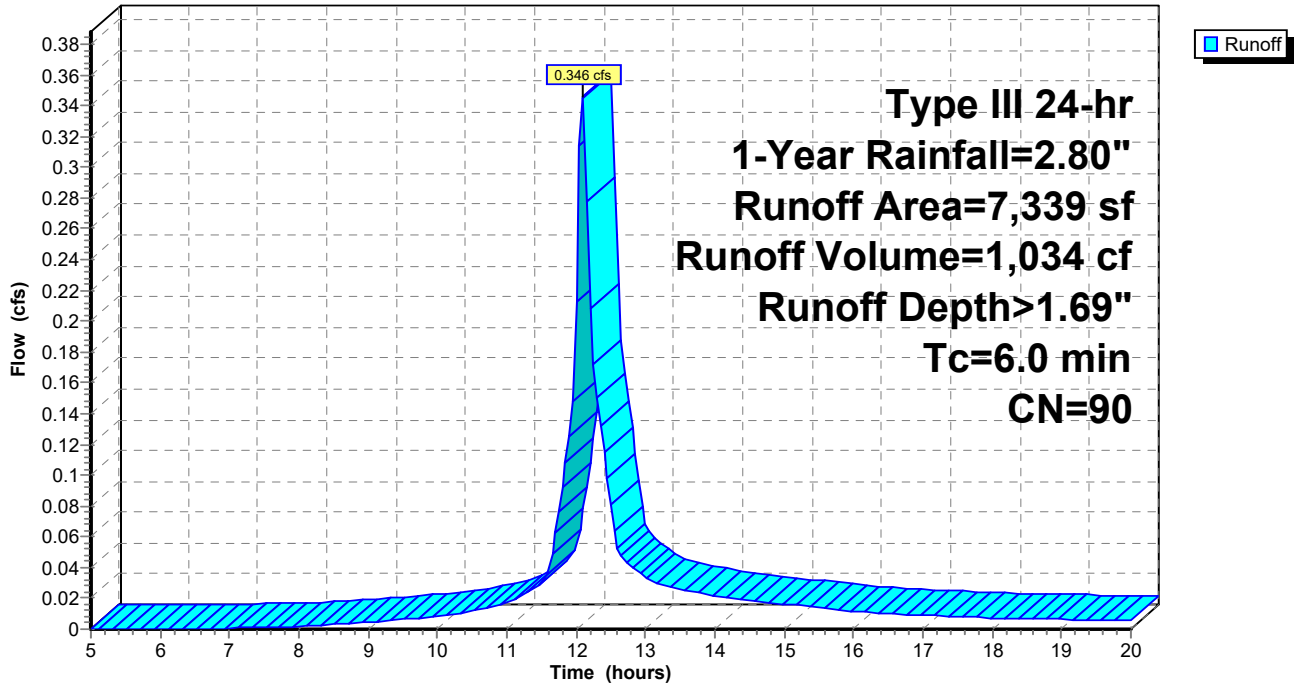
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 1-Year Rainfall=2.80"

	Area (sf)	CN	Description
*	5,779	98	Impervious
	1,560	61	>75% Grass cover, Good, HSG B
	7,339	90	Weighted Average
	1,560		21.26% Pervious Area
	5,779		78.74% Impervious Area

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

**Subcatchment P-1B: Roof/Open Area to Basin**

Hydrograph



**Summary for Subcatchment P-1C: Grass Undetained to POI-1**

Runoff = 0.073 cfs @ 12.31 hrs, Volume= 447 cf, Depth> 0.28"  
 Routed to Link POI-1 : Offsite East

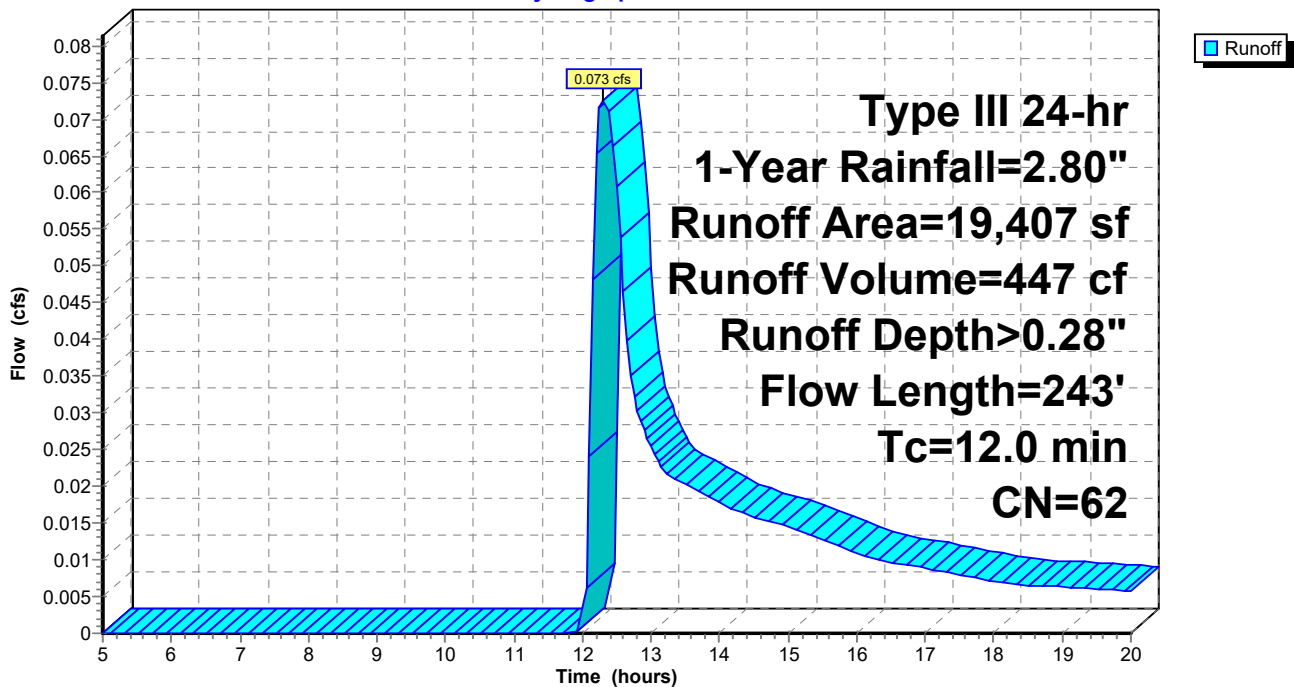
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 1-Year Rainfall=2.80"

Area (sf)	CN	Description
18,907	61	>75% Grass cover, Good, HSG B
* 500	98	Impervious
19,407	62	Weighted Average
18,907		97.42% Pervious Area
500		2.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0350	0.15		<b>Sheet Flow, 1A-1B</b>
					Grass: Dense n= 0.240 P2= 3.30"
0.8	143	0.0380	2.92		<b>Shallow Concentrated Flow, 1B-1C</b>
					Grassed Waterway Kv= 15.0 fps
12.0	243	Total			

**Subcatchment P-1C: Grass Undetained to POI-1**

Hydrograph



**Summary for Pond B-1: Infiltration Basin**

Inflow Area = 10,989 sf, 81.29% Impervious, Inflow Depth > 1.77" for 1-Year event  
 Inflow = 0.540 cfs @ 12.09 hrs, Volume= 1,623 cf  
 Outflow = 0.252 cfs @ 12.27 hrs, Volume= 1,623 cf, Atten= 53%, Lag= 10.9 min  
 Discarded = 0.252 cfs @ 12.27 hrs, Volume= 1,623 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 133.31' @ 12.27 hrs Surf.Area= 0.026 ac Storage= 0.004 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 3.2 min ( 778.3 - 775.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	133.00'	0.017 af	<b>23.69'W x 48.57'L x 2.69'H Field A</b> 0.071 af Overall - 0.029 af Embedded = 0.042 af x 40.0% Voids
#2A	133.25'	0.028 af	<b>Ferguson R-Tank HD 1 x 285 Inside #1</b> Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 285 Chambers in 15 Rows
		0.044 af	Total Available Storage

Storage Group A created with Chamber Wizard

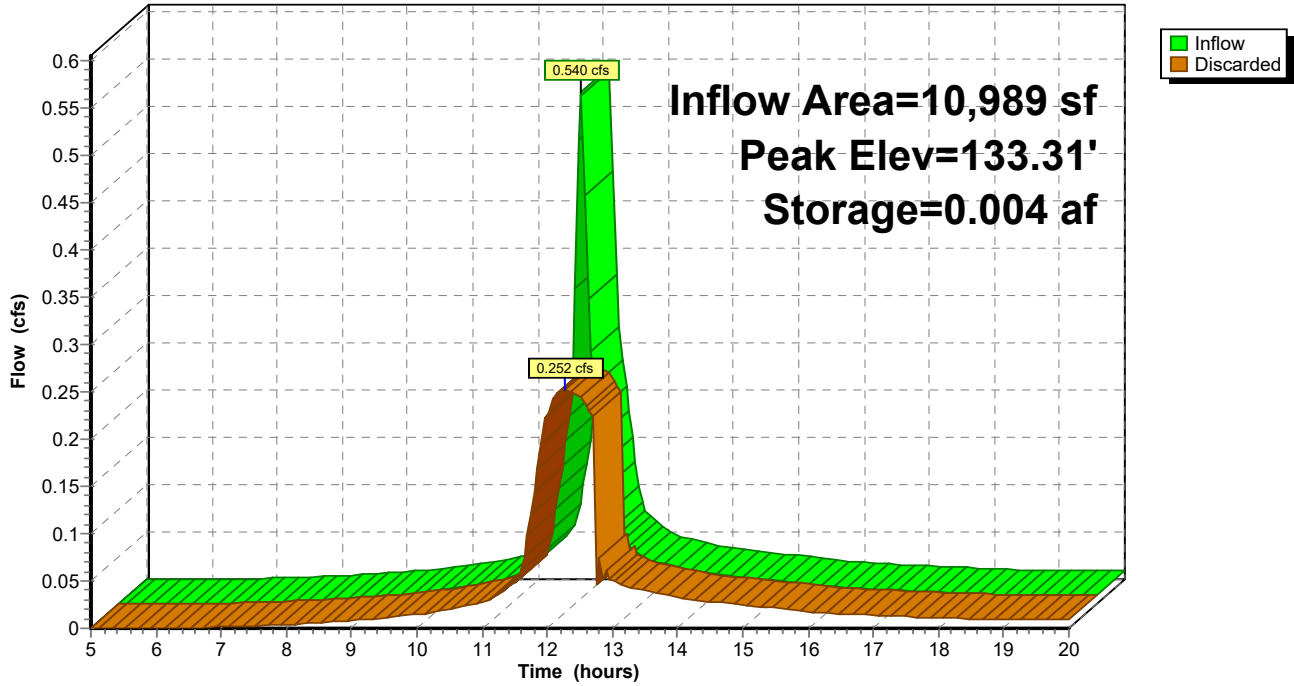
Device	Routing	Invert	Outlet Devices
#1	Discarded	133.00'	<b>8.270 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 130.00' Phase-In= 0.01'

**Discarded OutFlow** Max=0.252 cfs @ 12.27 hrs HW=133.31' (Free Discharge)

↑**1=Exfiltration** ( Controls 0.252 cfs)

### Pond B-1: Infiltration Basin

Hydrograph



**Summary for Pond B-2: Infiltration Basin**

Inflow Area = 7,339 sf, 78.74% Impervious, Inflow Depth > 1.69" for 1-Year event  
 Inflow = 0.346 cfs @ 12.09 hrs, Volume= 1,034 cf  
 Outflow = 0.166 cfs @ 12.27 hrs, Volume= 1,033 cf, Atten= 52%, Lag= 10.5 min  
 Discarded = 0.166 cfs @ 12.27 hrs, Volume= 1,033 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 137.30' @ 12.27 hrs Surf.Area= 0.018 ac Storage= 0.002 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 2.9 min ( 781.9 - 779.0 )

Volume	Invert	Avail.Storage	Storage Description
#1A	137.00'	0.012 af	<b>19.75'W x 39.19'L x 2.69'H Field A</b> 0.048 af Overall - 0.018 af Embedded = 0.029 af x 40.0% Voids
#2A	137.25'	0.017 af	<b>Ferguson R-Tank HD 1 x 180 Inside #1</b> Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 180 Chambers in 12 Rows
		0.029 af	Total Available Storage

Storage Group A created with Chamber Wizard

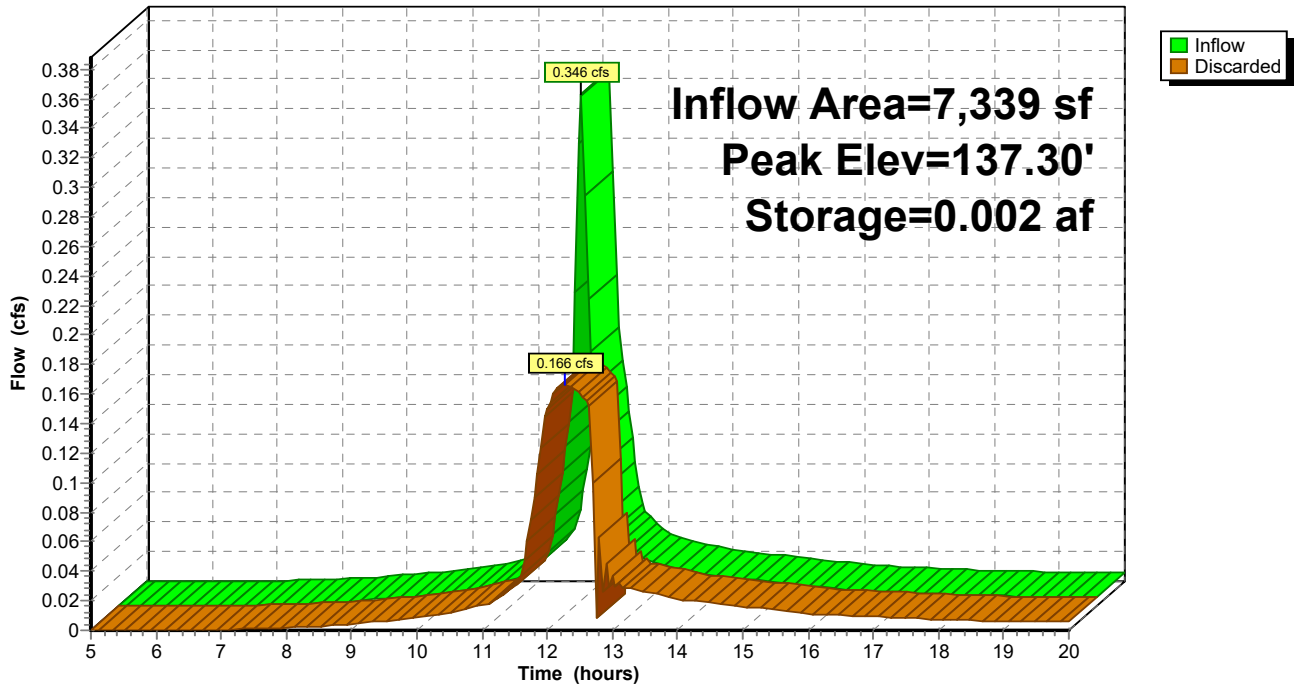
Device	Routing	Invert	Outlet Devices
#1	Discarded	137.00'	<b>8.270 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 133.00' Phase-In= 0.01'

**Discarded OutFlow** Max=0.166 cfs @ 12.27 hrs HW=137.29' (Free Discharge)

↑ **1=Exfiltration** ( Controls 0.166 cfs)

### Pond B-2: Infiltration Basin

Hydrograph



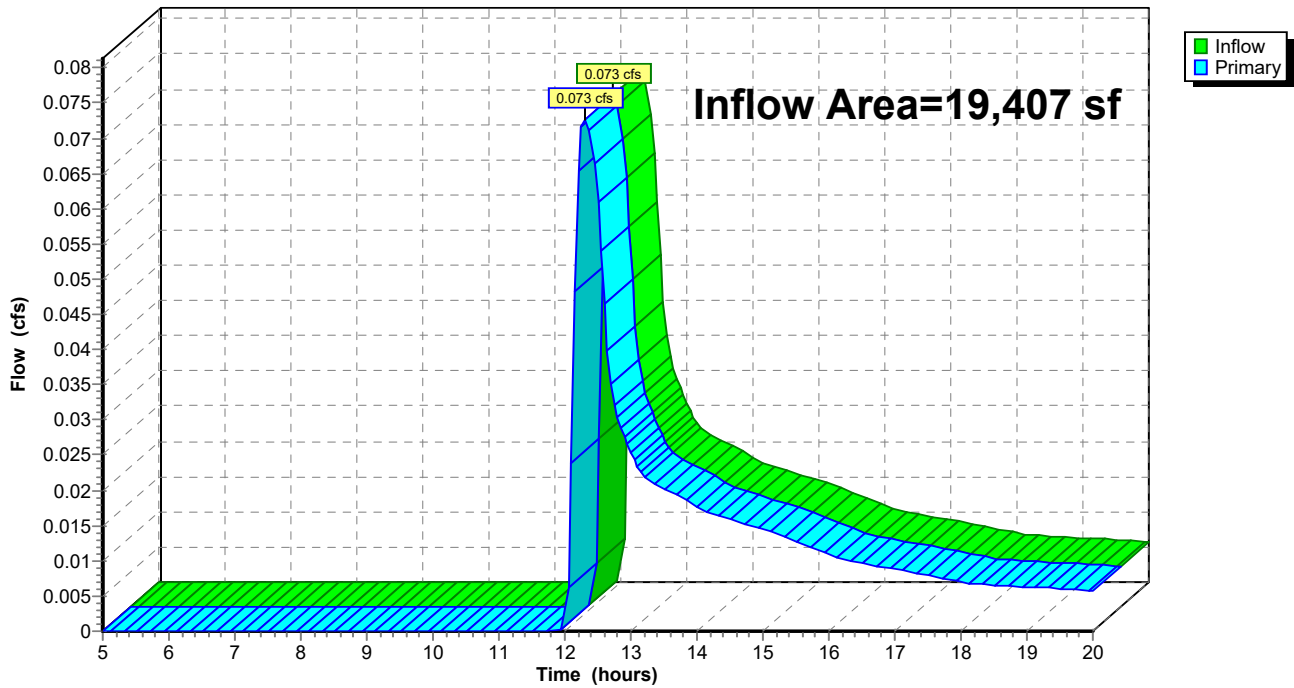
### Summary for Link POI-1: Offsite East

Inflow Area = 19,407 sf, 2.58% Impervious, Inflow Depth > 0.28" for 1-Year event  
Inflow = 0.073 cfs @ 12.31 hrs, Volume= 447 cf  
Primary = 0.073 cfs @ 12.31 hrs, Volume= 447 cf, Atten= 0%, Lag= 0.0 min

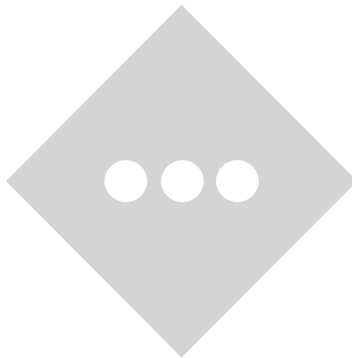
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Link POI-1: Offsite East

Hydrograph



**APPENDIX C-6**  
**2-YEAR STORM EVENT HYDROGRAPHS**



# HydroCAD

Prepared by Stonefield Engineering & Design

HydroCAD® 10.20-6a s/n 06682 © 2024 HydroCAD Software Solutions LLC

Type III 24-hr 2-Year Rainfall=3.30"

Printed 12/9/2025

Page 12

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentEX-1: Existing Site** Runoff Area=37,735 sf 9.31% Impervious Runoff Depth>0.54"  
Flow Length=268' Tc=15.3 min CN=64 Runoff=0.352 cfs 1,684 cf

**SubcatchmentP-1A: MVS/Roof to Basin** Runoff Area=10,989 sf 81.29% Impervious Runoff Depth>2.22"  
Tc=6.0 min CN=91 Runoff=0.668 cfs 2,030 cf

**SubcatchmentP-1B: Roof/Open Area to** Runoff Area=7,339 sf 78.74% Impervious Runoff Depth>2.13"  
Tc=6.0 min CN=90 Runoff=0.432 cfs 1,301 cf

**SubcatchmentP-1C: Grass Undetained to** Runoff Area=19,407 sf 2.58% Impervious Runoff Depth>0.46"  
Flow Length=243' Tc=12.0 min CN=62 Runoff=0.155 cfs 744 cf

**Pond B-1: Infiltration Basin** Peak Elev=133.43' Storage=0.007 af Inflow=0.668 cfs 2,030 cf  
Outflow=0.264 cfs 2,029 cf

**Pond B-2: Infiltration Basin** Peak Elev=137.41' Storage=0.004 af Inflow=0.432 cfs 1,301 cf  
Outflow=0.173 cfs 1,301 cf

**Link POI-1: Offsite East** Inflow=0.155 cfs 744 cf  
Primary=0.155 cfs 744 cf

**Total Runoff Area = 75,470 sf Runoff Volume = 5,759 cf Average Runoff Depth = 0.92"**  
**75.19% Pervious = 56,746 sf 24.81% Impervious = 18,724 sf**

**Summary for Subcatchment EX-1: Existing Site**

Runoff = 0.352 cfs @ 12.27 hrs, Volume= 1,684 cf, Depth> 0.54"

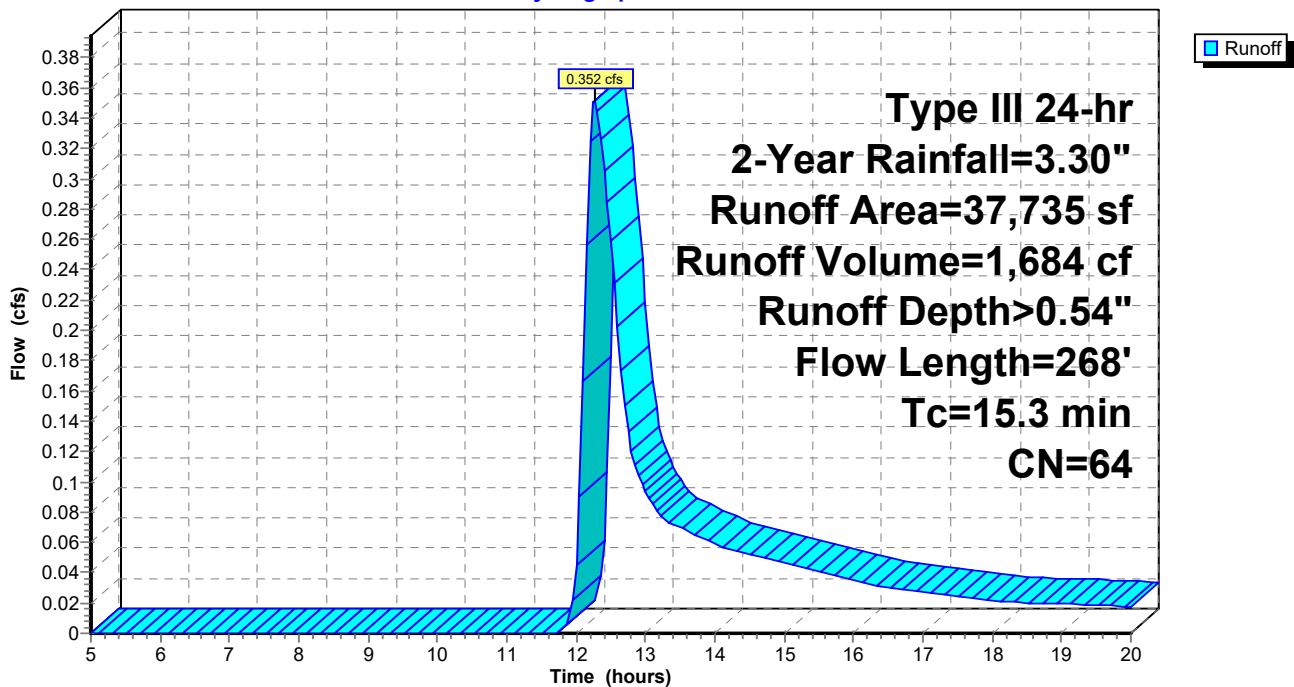
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-Year Rainfall=3.30"

Area (sf)	CN	Description
29,051	61	>75% Grass cover, Good, HSG B
5,172	55	Woods, Good, HSG B
* 3,512	98	Impervious
37,735	64	Weighted Average
34,223		90.69% Pervious Area
3,512		9.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	78	0.0400	0.10		<b>Sheet Flow, 1A-1B</b>
					Woods: Light underbrush n= 0.400 P2= 3.30"
2.2	190	0.0430	1.45		<b>Shallow Concentrated Flow, 1B-1C</b>
					Short Grass Pasture Kv= 7.0 fps
15.3	268	Total			

**Subcatchment EX-1: Existing Site**

Hydrograph



**Summary for Subcatchment P-1A: MVS/Roof to Basin**

Runoff = 0.668 cfs @ 12.09 hrs, Volume= 2,030 cf, Depth> 2.22"  
 Routed to Pond B-1 : Infiltration Basin

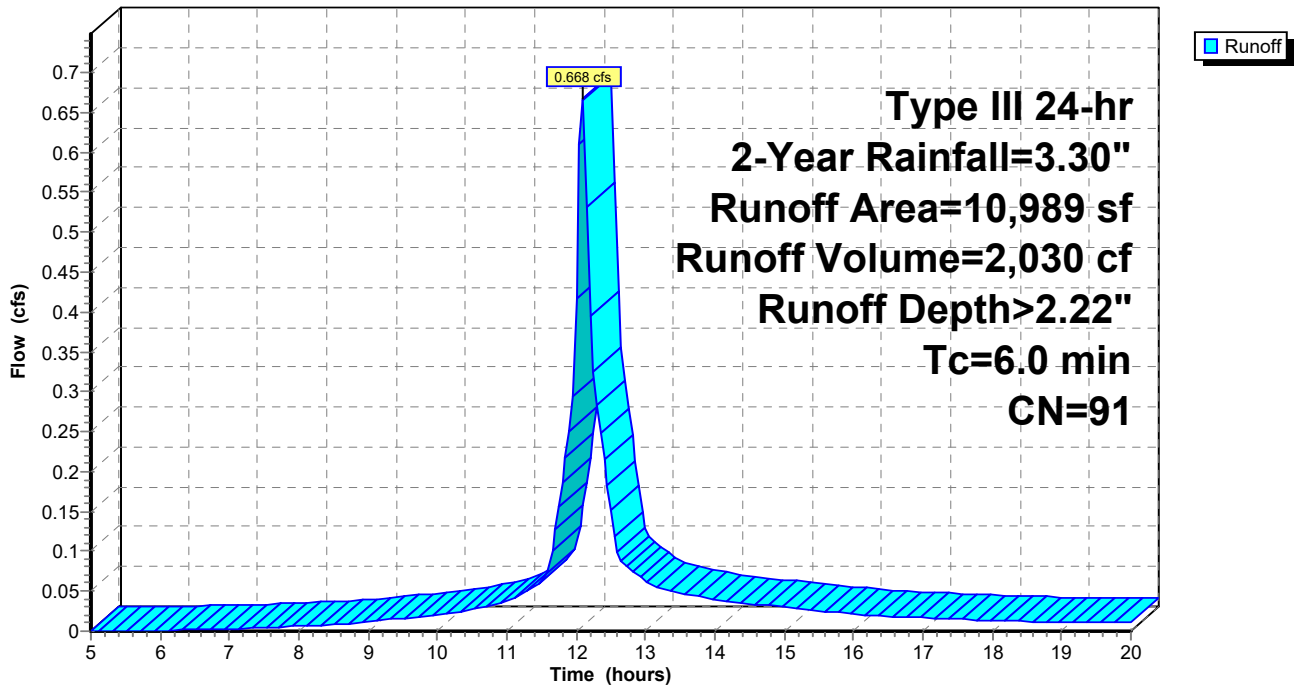
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2-Year Rainfall=3.30"

	Area (sf)	CN	Description
*	8,933	98	Impervious
	2,056	61	>75% Grass cover, Good, HSG B
	10,989	91	Weighted Average
	2,056		18.71% Pervious Area
	8,933		81.29% Impervious Area

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

**Subcatchment P-1A: MVS/Roof to Basin**

Hydrograph



**Summary for Subcatchment P-1B: Roof/Open Area to Basin**

Runoff = 0.432 cfs @ 12.09 hrs, Volume= 1,301 cf, Depth> 2.13"  
 Routed to Pond B-2 : Infiltration Basin

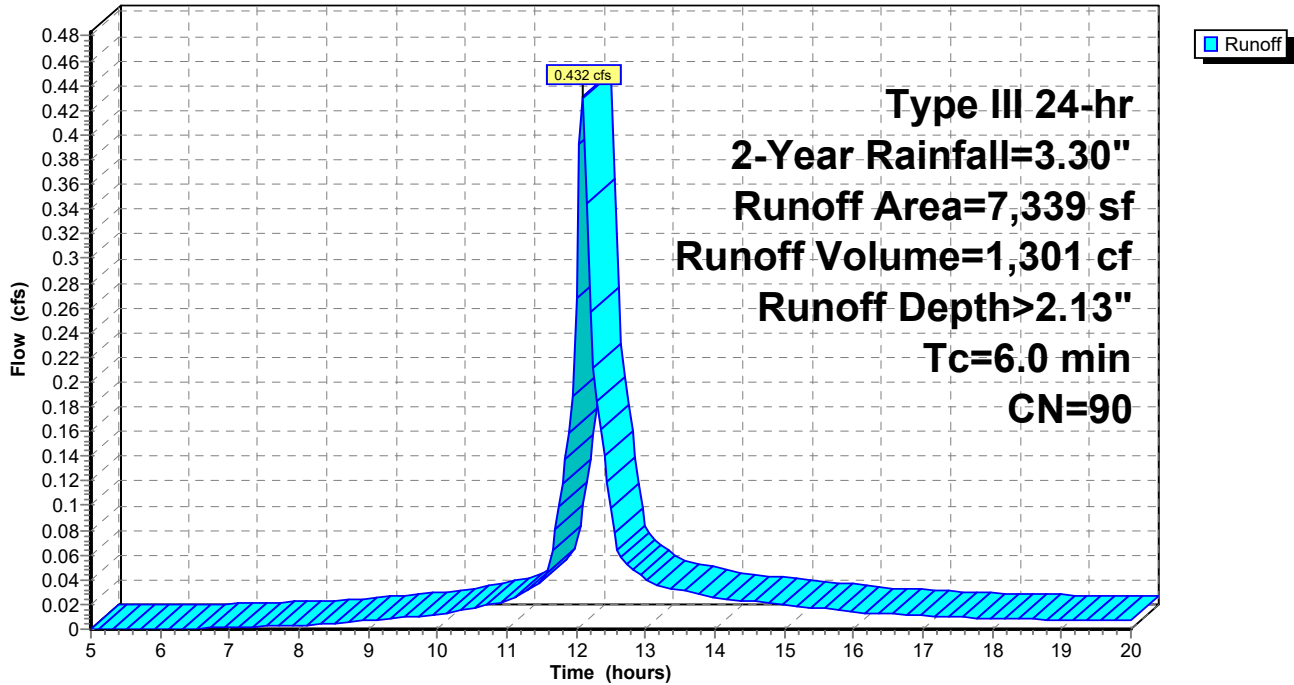
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2-Year Rainfall=3.30"

	Area (sf)	CN	Description
*	5,779	98	Impervious
	1,560	61	>75% Grass cover, Good, HSG B
	7,339	90	Weighted Average
	1,560		21.26% Pervious Area
	5,779		78.74% Impervious Area

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

**Subcatchment P-1B: Roof/Open Area to Basin**

Hydrograph



**Summary for Subcatchment P-1C: Grass Undetained to POI-1**

Runoff = 0.155 cfs @ 12.22 hrs, Volume= 744 cf, Depth> 0.46"  
 Routed to Link POI-1 : Offsite East

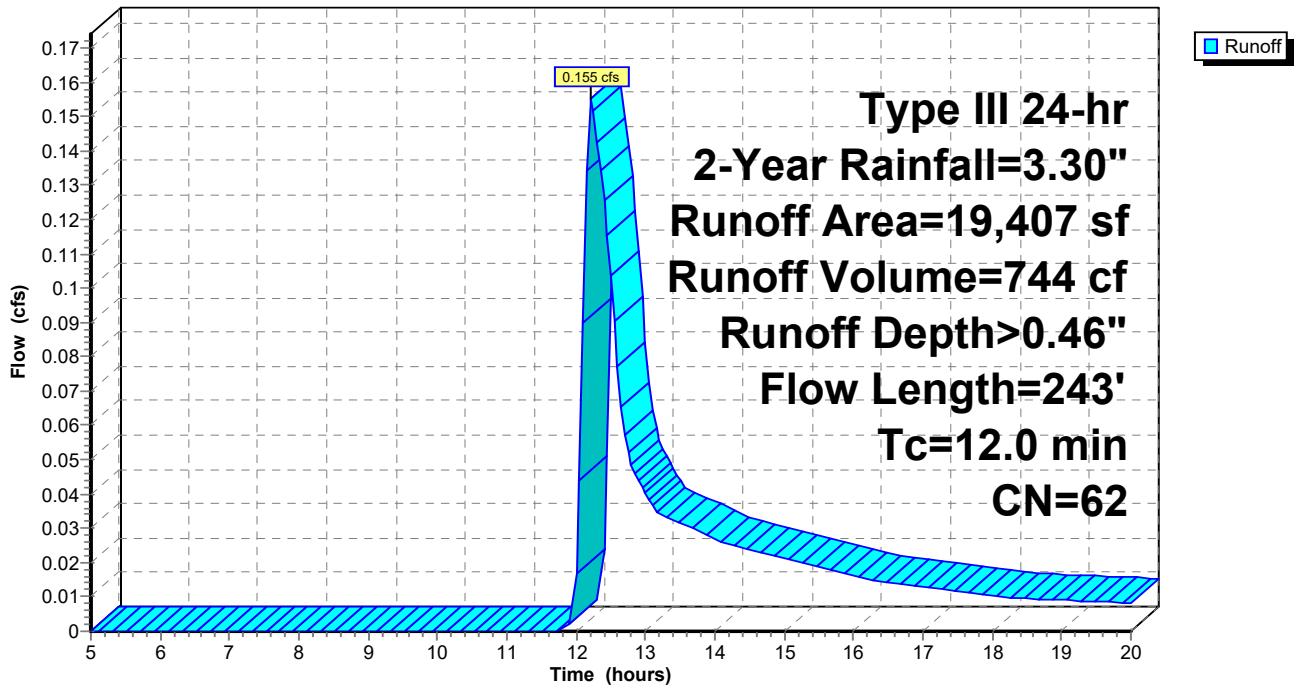
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2-Year Rainfall=3.30"

Area (sf)	CN	Description
18,907	61	>75% Grass cover, Good, HSG B
* 500	98	Impervious
19,407	62	Weighted Average
18,907		97.42% Pervious Area
500		2.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0350	0.15		<b>Sheet Flow, 1A-1B</b>
					Grass: Dense n= 0.240 P2= 3.30"
0.8	143	0.0380	2.92		<b>Shallow Concentrated Flow, 1B-1C</b>
					Grassed Waterway Kv= 15.0 fps
12.0	243	Total			

**Subcatchment P-1C: Grass Undetained to POI-1**

Hydrograph



**Summary for Pond B-1: Infiltration Basin**

Inflow Area = 10,989 sf, 81.29% Impervious, Inflow Depth > 2.22" for 2-Year event  
 Inflow = 0.668 cfs @ 12.09 hrs, Volume= 2,030 cf  
 Outflow = 0.264 cfs @ 12.33 hrs, Volume= 2,029 cf, Atten= 60%, Lag= 14.2 min  
 Discarded = 0.264 cfs @ 12.33 hrs, Volume= 2,029 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 133.43' @ 12.33 hrs Surf.Area= 0.026 ac Storage= 0.007 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 5.2 min ( 775.0 - 769.8 )

Volume	Invert	Avail.Storage	Storage Description
#1A	133.00'	0.017 af	<b>23.69'W x 48.57'L x 2.69'H Field A</b> 0.071 af Overall - 0.029 af Embedded = 0.042 af x 40.0% Voids
#2A	133.25'	0.028 af	<b>Ferguson R-Tank HD 1 x 285 Inside #1</b> Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 285 Chambers in 15 Rows
		0.044 af	Total Available Storage

Storage Group A created with Chamber Wizard

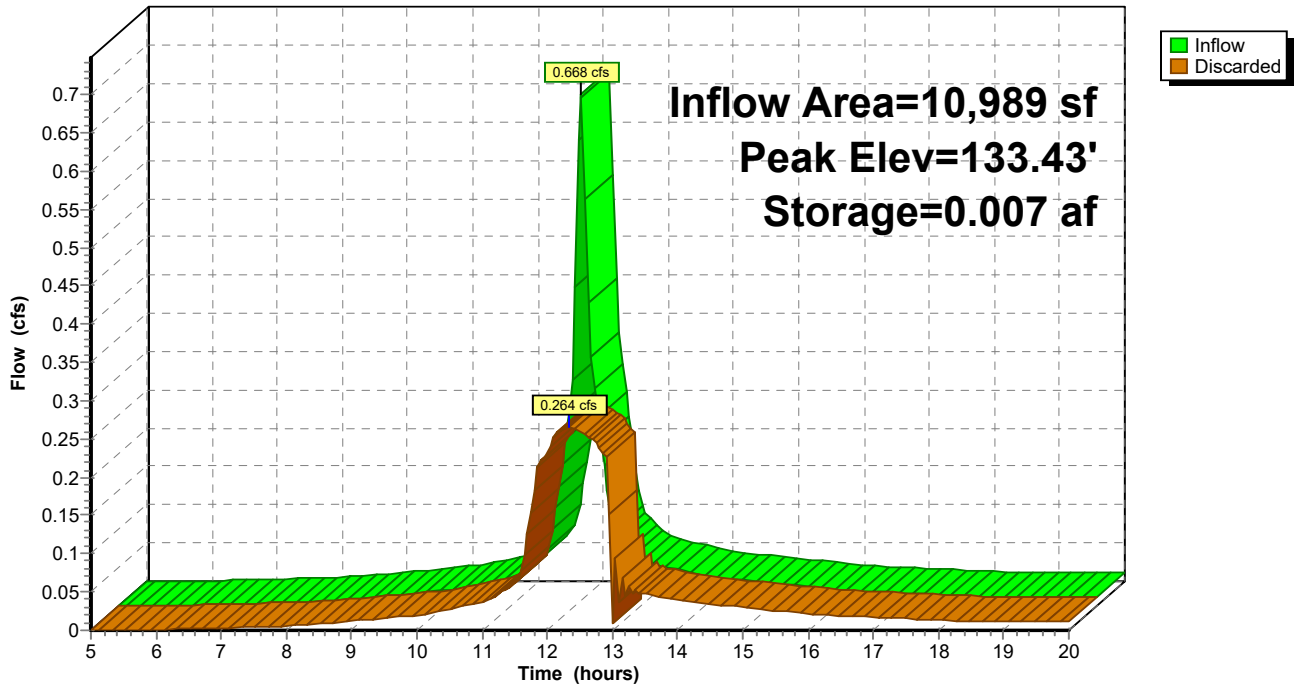
Device	Routing	Invert	Outlet Devices
#1	Discarded	133.00'	<b>8.270 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 130.00' Phase-In= 0.01'

**Discarded OutFlow** Max=0.264 cfs @ 12.33 hrs HW=133.43' (Free Discharge)

↑ **1=Exfiltration** ( Controls 0.264 cfs)

### Pond B-1: Infiltration Basin

Hydrograph



**Summary for Pond B-2: Infiltration Basin**

Inflow Area = 7,339 sf, 78.74% Impervious, Inflow Depth > 2.13" for 2-Year event  
 Inflow = 0.432 cfs @ 12.09 hrs, Volume= 1,301 cf  
 Outflow = 0.173 cfs @ 12.32 hrs, Volume= 1,301 cf, Atten= 60%, Lag= 14.1 min  
 Discarded = 0.173 cfs @ 12.32 hrs, Volume= 1,301 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 137.41' @ 12.32 hrs Surf.Area= 0.018 ac Storage= 0.004 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 5.0 min ( 778.5 - 773.6 )

Volume	Invert	Avail.Storage	Storage Description
#1A	137.00'	0.012 af	<b>19.75"W x 39.19'L x 2.69'H Field A</b> 0.048 af Overall - 0.018 af Embedded = 0.029 af x 40.0% Voids
#2A	137.25'	0.017 af	<b>Ferguson R-Tank HD 1 x 180 Inside #1</b> Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 180 Chambers in 12 Rows
		0.029 af	Total Available Storage

Storage Group A created with Chamber Wizard

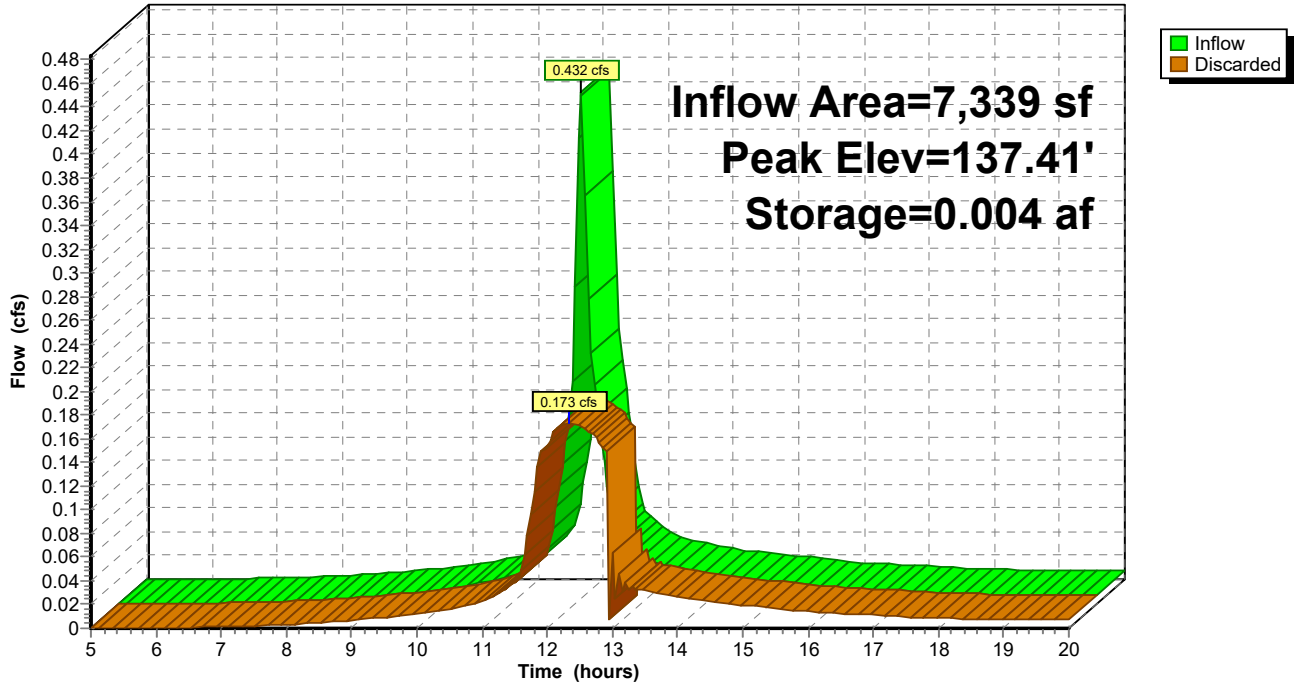
Device	Routing	Invert	Outlet Devices
#1	Discarded	137.00'	<b>8.270 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 133.00' Phase-In= 0.01'

**Discarded OutFlow** Max=0.173 cfs @ 12.32 hrs HW=137.41' (Free Discharge)

↑**1=Exfiltration** ( Controls 0.173 cfs)

### Pond B-2: Infiltration Basin

Hydrograph



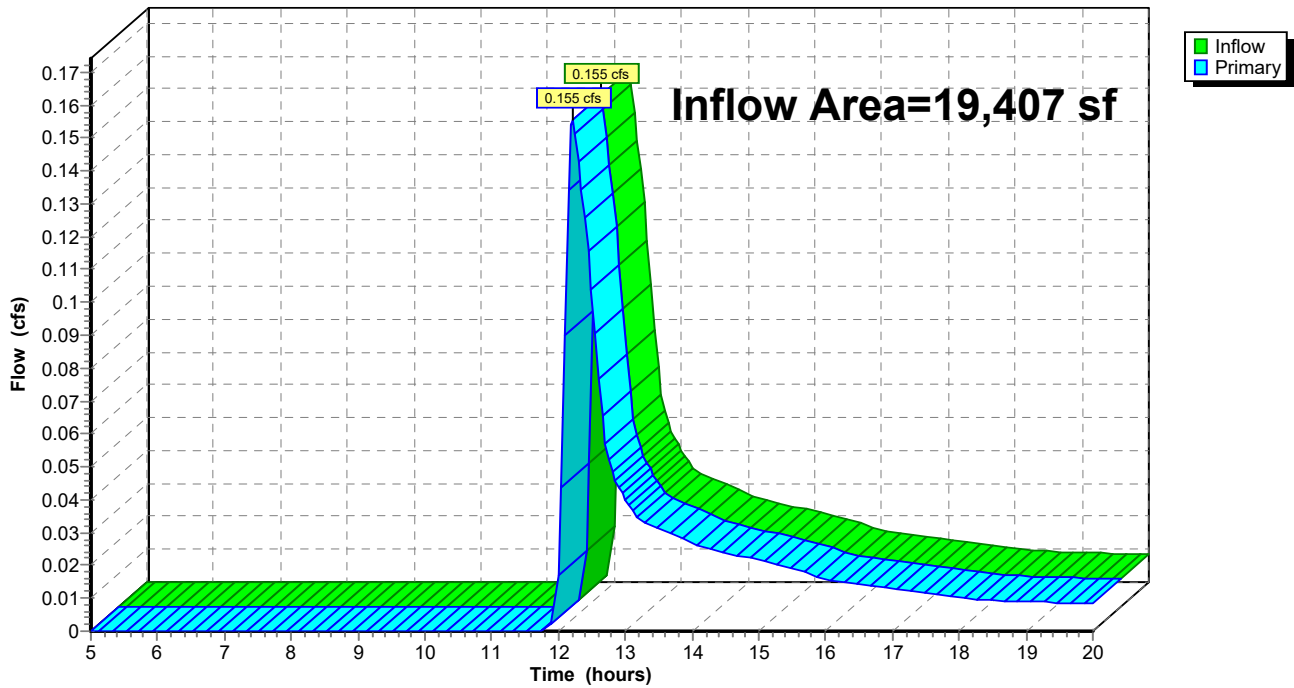
### Summary for Link POI-1: Offsite East

Inflow Area = 19,407 sf, 2.58% Impervious, Inflow Depth > 0.46" for 2-Year event  
Inflow = 0.155 cfs @ 12.22 hrs, Volume= 744 cf  
Primary = 0.155 cfs @ 12.22 hrs, Volume= 744 cf, Atten= 0%, Lag= 0.0 min

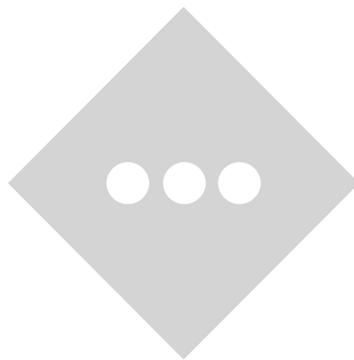
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Link POI-1: Offsite East

Hydrograph



**APPENDIX C-7**  
**10-YEAR STORM EVENT HYDROGRAPHS**



**HydroCAD**

Prepared by Stonefield Engineering &amp; Design

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*Type III 24-hr 10-Year Rainfall=4.90"*

Printed 12/9/2025

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentEX-1: Existing Site** Runoff Area=37,735 sf 9.31% Impervious Runoff Depth>1.37"  
 Flow Length=268' Tc=15.3 min CN=64 Runoff=1.066 cfs 4,321 cf

**SubcatchmentP-1A: MVS/Roof to Basin** Runoff Area=10,989 sf 81.29% Impervious Runoff Depth>3.67"  
 Tc=6.0 min CN=91 Runoff=1.077 cfs 3,363 cf

**SubcatchmentP-1B: Roof/Open Area to** Runoff Area=7,339 sf 78.74% Impervious Runoff Depth>3.57"  
 Tc=6.0 min CN=90 Runoff=0.705 cfs 2,184 cf

**SubcatchmentP-1C: Grass Undetained to** Runoff Area=19,407 sf 2.58% Impervious Runoff Depth>1.24"  
 Flow Length=243' Tc=12.0 min CN=62 Runoff=0.530 cfs 2,013 cf

**Pond B-1: Infiltration Basin** Peak Elev=133.89' Storage=0.017 af Inflow=1.077 cfs 3,363 cf  
 Outflow=0.314 cfs 3,362 cf

**Pond B-2: Infiltration Basin** Peak Elev=137.89' Storage=0.011 af Inflow=0.705 cfs 2,184 cf  
 Outflow=0.203 cfs 2,184 cf

**Link POI-1: Offsite East** Inflow=0.530 cfs 2,013 cf  
 Primary=0.530 cfs 2,013 cf

**Total Runoff Area = 75,470 sf Runoff Volume = 11,880 cf Average Runoff Depth = 1.89"**  
**75.19% Pervious = 56,746 sf 24.81% Impervious = 18,724 sf**

**Summary for Subcatchment EX-1: Existing Site**

Runoff = 1.066 cfs @ 12.23 hrs, Volume= 4,321 cf, Depth> 1.37"

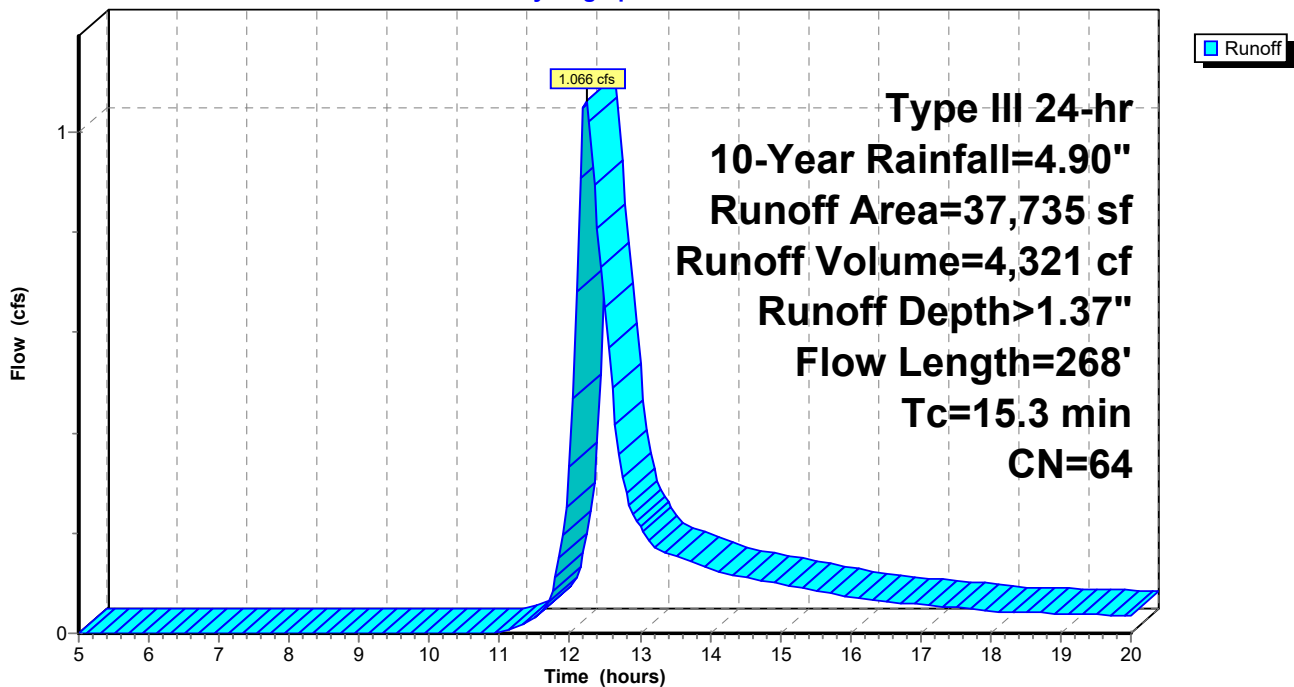
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
29,051	61	>75% Grass cover, Good, HSG B
5,172	55	Woods, Good, HSG B
* 3,512	98	Impervious
37,735	64	Weighted Average
34,223		90.69% Pervious Area
3,512		9.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	78	0.0400	0.10		<b>Sheet Flow, 1A-1B</b>
					Woods: Light underbrush n= 0.400 P2= 3.30"
2.2	190	0.0430	1.45		<b>Shallow Concentrated Flow, 1B-1C</b>
					Short Grass Pasture Kv= 7.0 fps
15.3	268	Total			

**Subcatchment EX-1: Existing Site**

Hydrograph



**Summary for Subcatchment P-1A: MVS/Roof to Basin**

Runoff = 1.077 cfs @ 12.09 hrs, Volume= 3,363 cf, Depth> 3.67"  
 Routed to Pond B-1 : Infiltration Basin

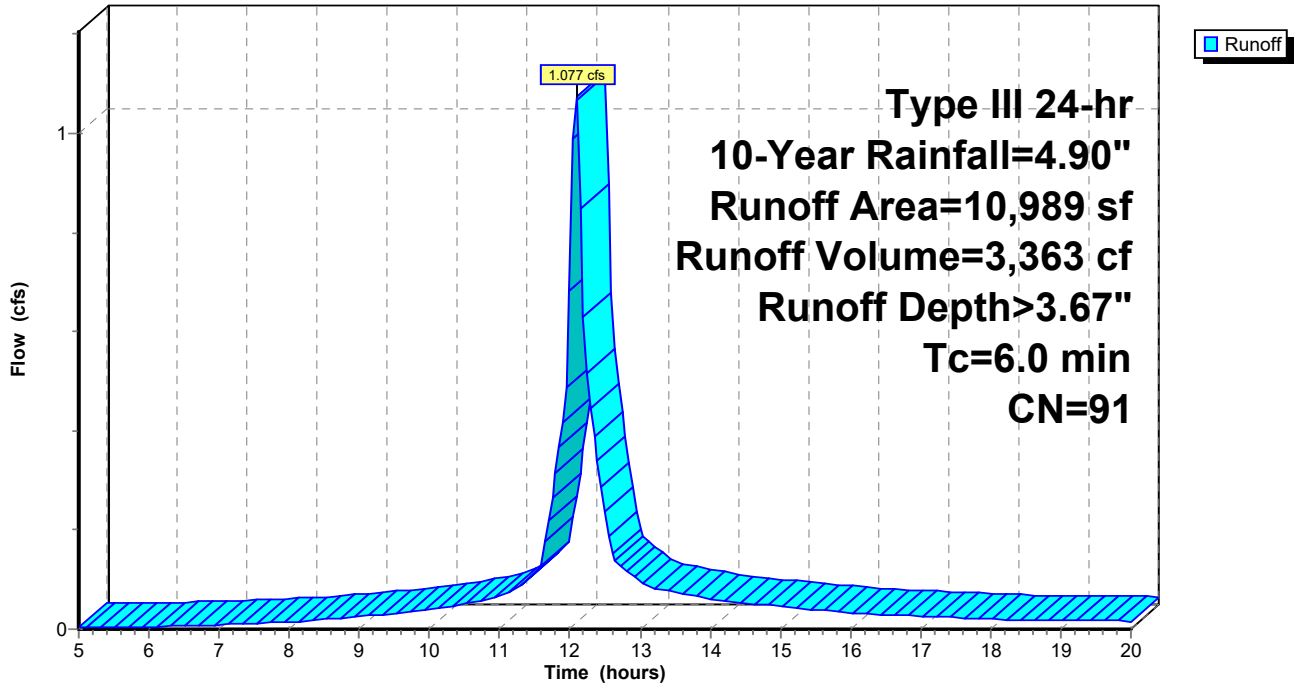
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 10-Year Rainfall=4.90"

	Area (sf)	CN	Description
*	8,933	98	Impervious
	2,056	61	>75% Grass cover, Good, HSG B
	10,989	91	Weighted Average
	2,056		18.71% Pervious Area
	8,933		81.29% Impervious Area

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

**Subcatchment P-1A: MVS/Roof to Basin**

Hydrograph



**Summary for Subcatchment P-1B: Roof/Open Area to Basin**

Runoff = 0.705 cfs @ 12.09 hrs, Volume= 2,184 cf, Depth> 3.57"  
 Routed to Pond B-2 : Infiltration Basin

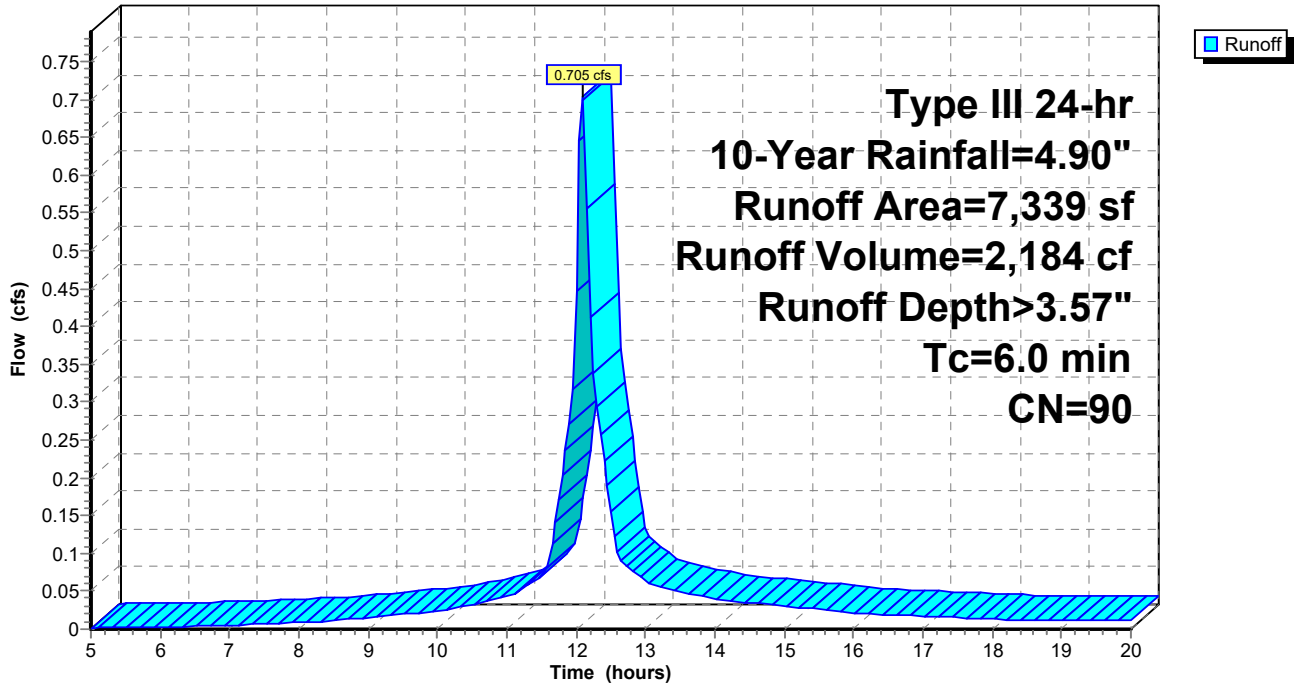
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 10-Year Rainfall=4.90"

	Area (sf)	CN	Description
*	5,779	98	Impervious
	1,560	61	>75% Grass cover, Good, HSG B
	7,339	90	Weighted Average
	1,560		21.26% Pervious Area
	5,779		78.74% Impervious Area

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

**Subcatchment P-1B: Roof/Open Area to Basin**

Hydrograph



**Summary for Subcatchment P-1C: Grass Undetained to POI-1**

Runoff = 0.530 cfs @ 12.19 hrs, Volume= 2,013 cf, Depth> 1.24"  
 Routed to Link POI-1 : Offsite East

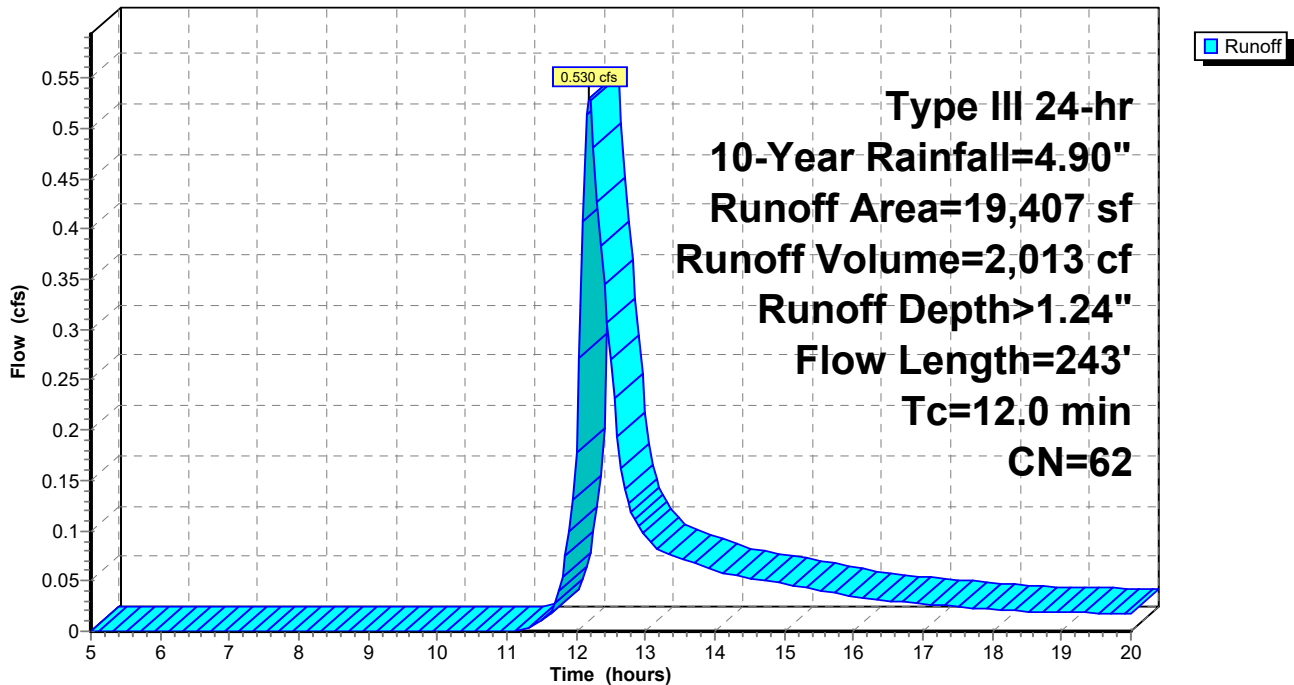
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
18,907	61	>75% Grass cover, Good, HSG B
* 500	98	Impervious
19,407	62	Weighted Average
18,907		97.42% Pervious Area
500		2.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0350	0.15		<b>Sheet Flow, 1A-1B</b>
					Grass: Dense n= 0.240 P2= 3.30"
0.8	143	0.0380	2.92		<b>Shallow Concentrated Flow, 1B-1C</b>
					Grassed Waterway Kv= 15.0 fps
12.0	243	Total			

**Subcatchment P-1C: Grass Undetained to POI-1**

Hydrograph



**Summary for Pond B-1: Infiltration Basin**

Inflow Area = 10,989 sf, 81.29% Impervious, Inflow Depth > 3.67" for 10-Year event  
 Inflow = 1.077 cfs @ 12.09 hrs, Volume= 3,363 cf  
 Outflow = 0.314 cfs @ 12.42 hrs, Volume= 3,362 cf, Atten= 71%, Lag= 20.2 min  
 Discarded = 0.314 cfs @ 12.42 hrs, Volume= 3,362 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 133.89' @ 12.42 hrs Surf.Area= 0.026 ac Storage= 0.017 af

Plug-Flow detention time= 13.1 min calculated for 3,351 cf (100% of inflow)  
 Center-of-Mass det. time= 13.1 min ( 771.3 - 758.3 )

Volume	Invert	Avail.Storage	Storage Description
#1A	133.00'	0.017 af	<b>23.69'W x 48.57'L x 2.69'H Field A</b> 0.071 af Overall - 0.029 af Embedded = 0.042 af x 40.0% Voids
#2A	133.25'	0.028 af	<b>Ferguson R-Tank HD 1 x 285 Inside #1</b> Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 285 Chambers in 15 Rows
		0.044 af	Total Available Storage

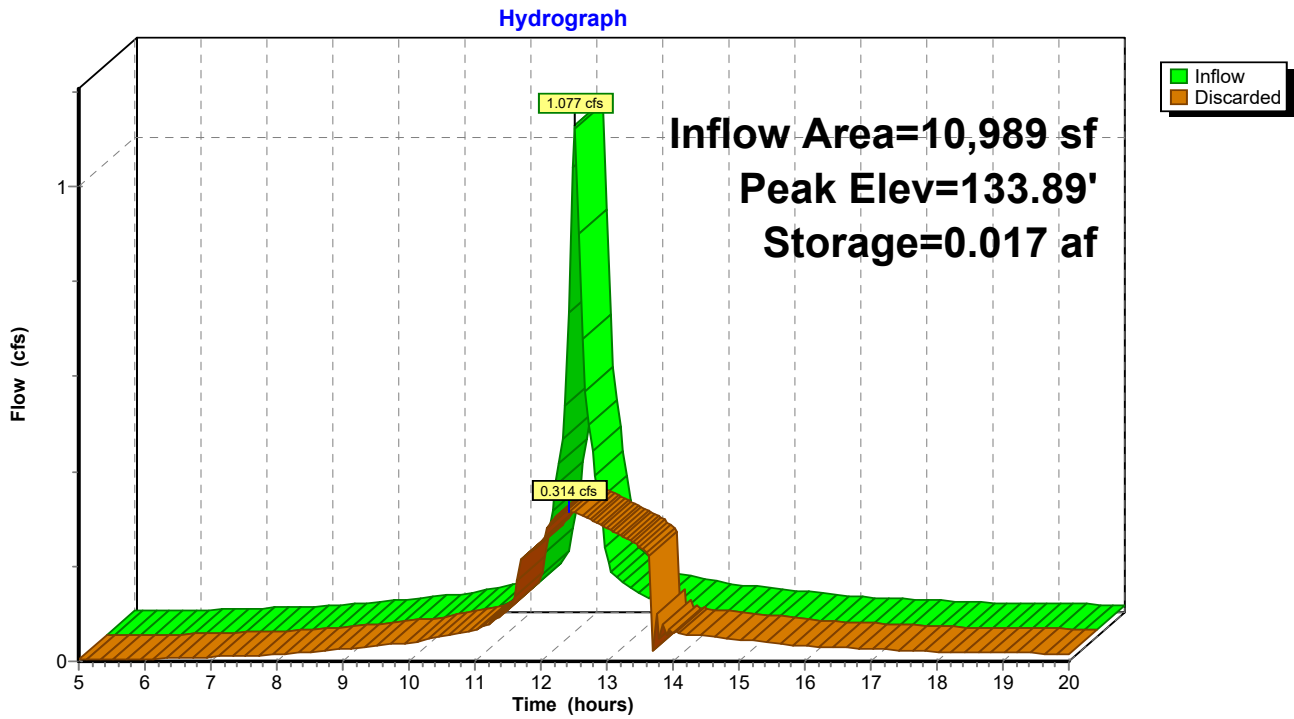
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	133.00'	<b>8.270 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 130.00' Phase-In= 0.01'

**Discarded OutFlow** Max=0.313 cfs @ 12.42 hrs HW=133.89' (Free Discharge)

↑ **1=Exfiltration** ( Controls 0.313 cfs)

### Pond B-1: Infiltration Basin



**Summary for Pond B-2: Infiltration Basin**

Inflow Area = 7,339 sf, 78.74% Impervious, Inflow Depth > 3.57" for 10-Year event  
 Inflow = 0.705 cfs @ 12.09 hrs, Volume= 2,184 cf  
 Outflow = 0.203 cfs @ 12.43 hrs, Volume= 2,184 cf, Atten= 71%, Lag= 20.5 min  
 Discarded = 0.203 cfs @ 12.43 hrs, Volume= 2,184 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 137.89' @ 12.43 hrs Surf.Area= 0.018 ac Storage= 0.011 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 13.1 min ( 774.5 - 761.4 )

Volume	Invert	Avail.Storage	Storage Description
#1A	137.00'	0.012 af	<b>19.75'W x 39.19'L x 2.69'H Field A</b> 0.048 af Overall - 0.018 af Embedded = 0.029 af x 40.0% Voids
#2A	137.25'	0.017 af	<b>Ferguson R-Tank HD 1 x 180 Inside #1</b> Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 180 Chambers in 12 Rows
		0.029 af	Total Available Storage

Storage Group A created with Chamber Wizard

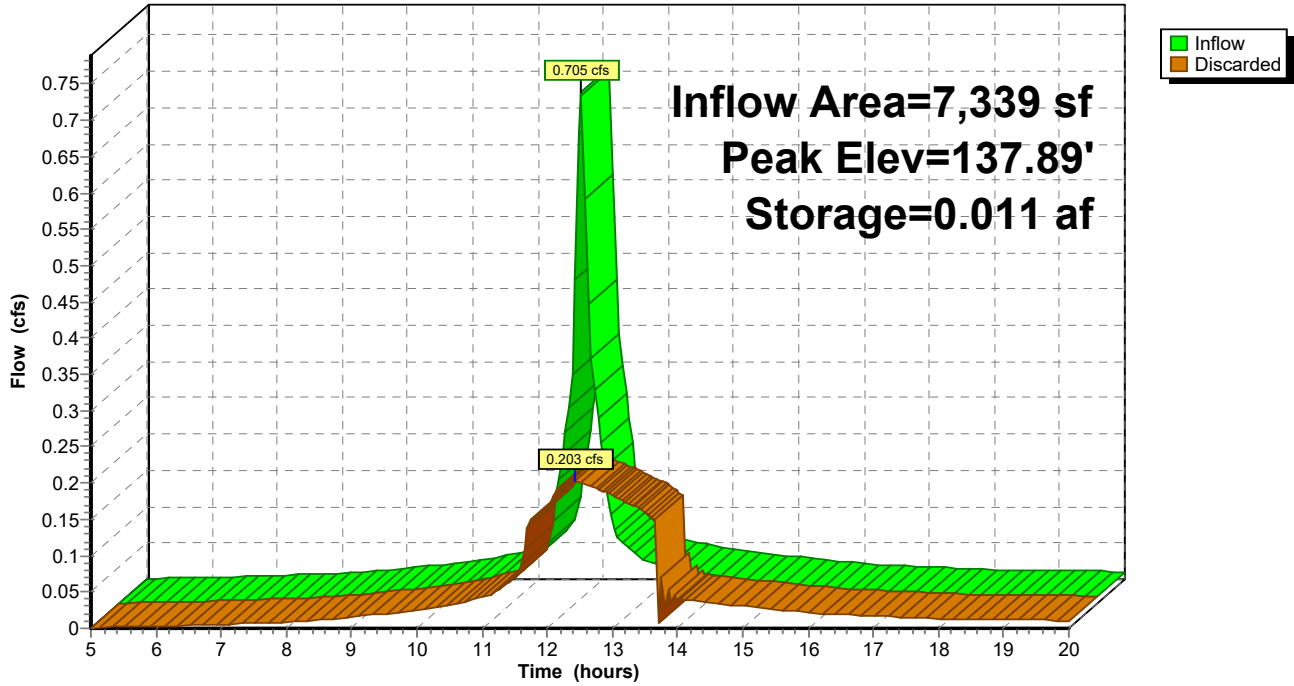
Device	Routing	Invert	Outlet Devices
#1	Discarded	137.00'	<b>8.270 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 133.00' Phase-In= 0.01'

**Discarded OutFlow** Max=0.203 cfs @ 12.43 hrs HW=137.89' (Free Discharge)

↑**1=Exfiltration** ( Controls 0.203 cfs)

### Pond B-2: Infiltration Basin

Hydrograph



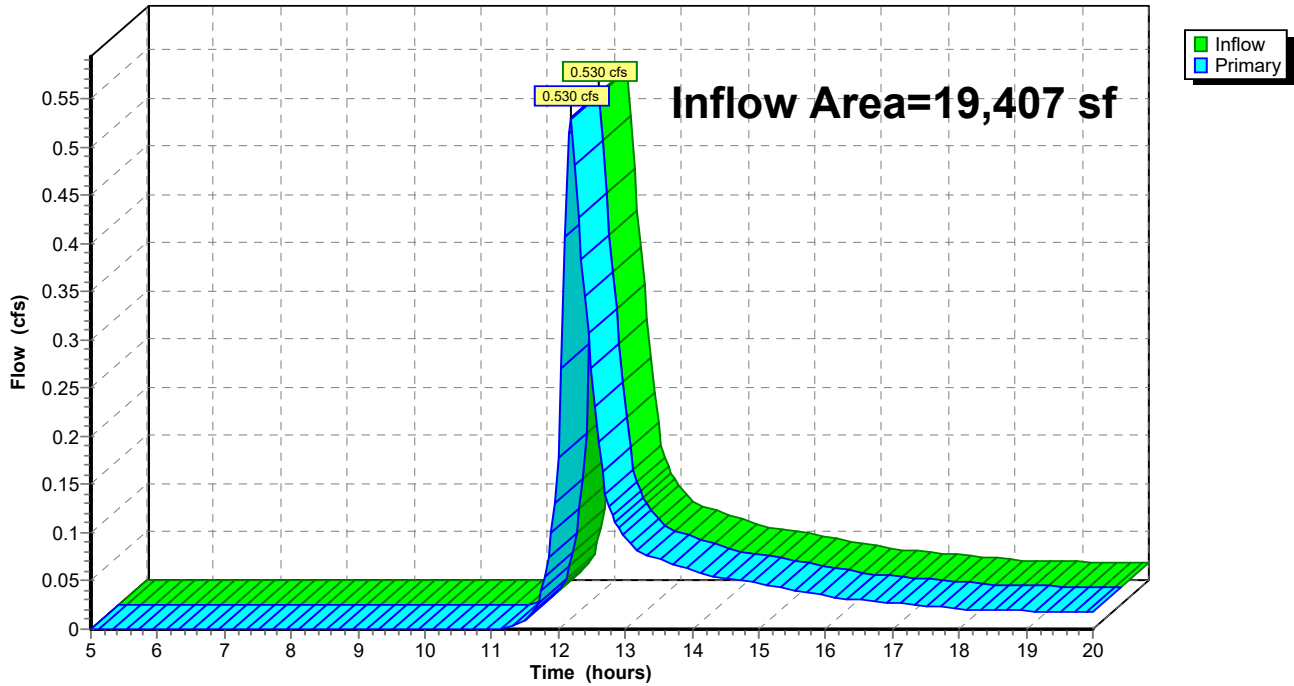
### Summary for Link POI-1: Offsite East

Inflow Area = 19,407 sf, 2.58% Impervious, Inflow Depth > 1.24" for 10-Year event  
Inflow = 0.530 cfs @ 12.19 hrs, Volume= 2,013 cf  
Primary = 0.530 cfs @ 12.19 hrs, Volume= 2,013 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Link POI-1: Offsite East

Hydrograph



**APPENDIX C-8**  
**25-YEAR STORM EVENT HYDROGRAPHS**



# HydroCAD

Prepared by Stonefield Engineering & Design

HydroCAD® 10.20-6a s/n 06682 © 2024 HydroCAD Software Solutions LLC

Type III 24-hr 25-Year Rainfall=6.10"

Printed 12/9/2025

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentEX-1: Existing Site**      Runoff Area=37,735 sf   9.31% Impervious   Runoff Depth>2.14"  
Flow Length=268'   Tc=15.3 min   CN=64   Runoff=1.720 cfs   6,718 cf

**SubcatchmentP-1A: MVS/Roof to Basin**      Runoff Area=10,989 sf   81.29% Impervious   Runoff Depth>4.78"  
Tc=6.0 min   CN=91   Runoff=1.380 cfs   4,374 cf

**SubcatchmentP-1B: Roof/Open Area to**      Runoff Area=7,339 sf   78.74% Impervious   Runoff Depth>4.67"  
Tc=6.0 min   CN=90   Runoff=0.908 cfs   2,857 cf

**SubcatchmentP-1C: Grass Undetained to**      Runoff Area=19,407 sf   2.58% Impervious   Runoff Depth>1.97"  
Flow Length=243'   Tc=12.0 min   CN=62   Runoff=0.875 cfs   3,188 cf

**Pond B-1: Infiltration Basin**      Peak Elev=134.27'   Storage=0.025 af   Inflow=1.380 cfs   4,374 cf  
Outflow=0.355 cfs   4,373 cf

**Pond B-2: Infiltration Basin**      Peak Elev=138.28'   Storage=0.016 af   Inflow=0.908 cfs   2,857 cf  
Outflow=0.229 cfs   2,858 cf

**Link POI-1: Offsite East**      Inflow=0.875 cfs   3,188 cf  
Primary=0.875 cfs   3,188 cf

**Total Runoff Area = 75,470 sf   Runoff Volume = 17,138 cf   Average Runoff Depth = 2.72"**  
**75.19% Pervious = 56,746 sf   24.81% Impervious = 18,724 sf**

**Summary for Subcatchment EX-1: Existing Site**

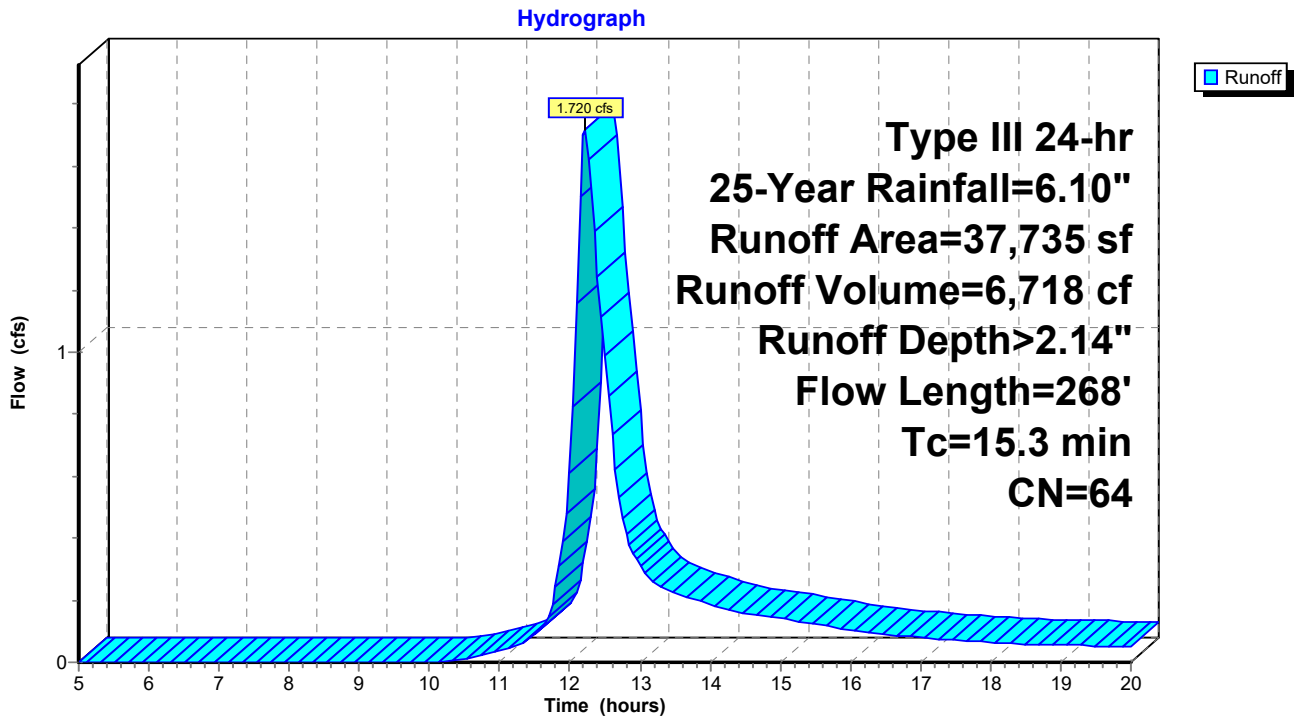
Runoff = 1.720 cfs @ 12.22 hrs, Volume= 6,718 cf, Depth> 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Rainfall=6.10"

Area (sf)	CN	Description
29,051	61	>75% Grass cover, Good, HSG B
5,172	55	Woods, Good, HSG B
* 3,512	98	Impervious
37,735	64	Weighted Average
34,223		90.69% Pervious Area
3,512		9.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	78	0.0400	0.10		<b>Sheet Flow, 1A-1B</b>
					Woods: Light underbrush n= 0.400 P2= 3.30"
2.2	190	0.0430	1.45		<b>Shallow Concentrated Flow, 1B-1C</b>
					Short Grass Pasture Kv= 7.0 fps
15.3	268	Total			

**Subcatchment EX-1: Existing Site**



**Summary for Subcatchment P-1A: MVS/Roof to Basin**

Runoff = 1.380 cfs @ 12.09 hrs, Volume= 4,374 cf, Depth> 4.78"  
 Routed to Pond B-1 : Infiltration Basin

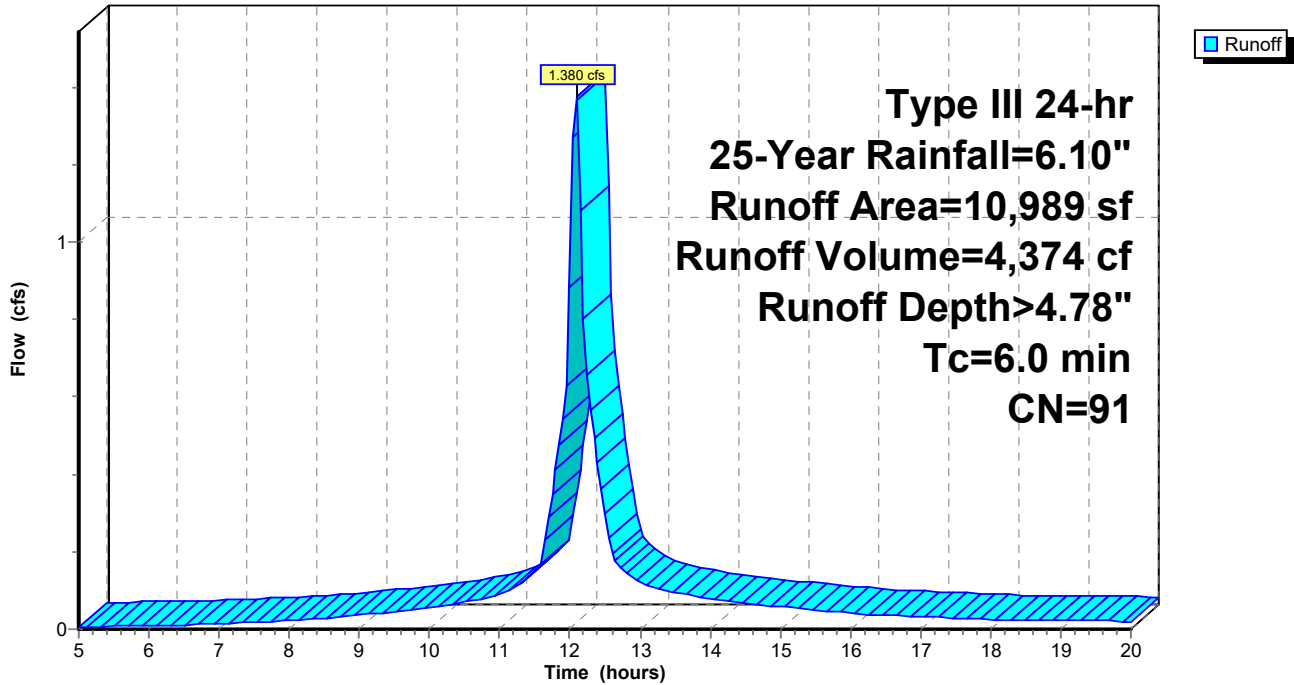
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Rainfall=6.10"

	Area (sf)	CN	Description
*	8,933	98	Impervious
	2,056	61	>75% Grass cover, Good, HSG B
	10,989	91	Weighted Average
	2,056		18.71% Pervious Area
	8,933		81.29% Impervious Area

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

**Subcatchment P-1A: MVS/Roof to Basin**

Hydrograph



**Summary for Subcatchment P-1B: Roof/Open Area to Basin**

Runoff = 0.908 cfs @ 12.09 hrs, Volume= 2,857 cf, Depth> 4.67"  
 Routed to Pond B-2 : Infiltration Basin

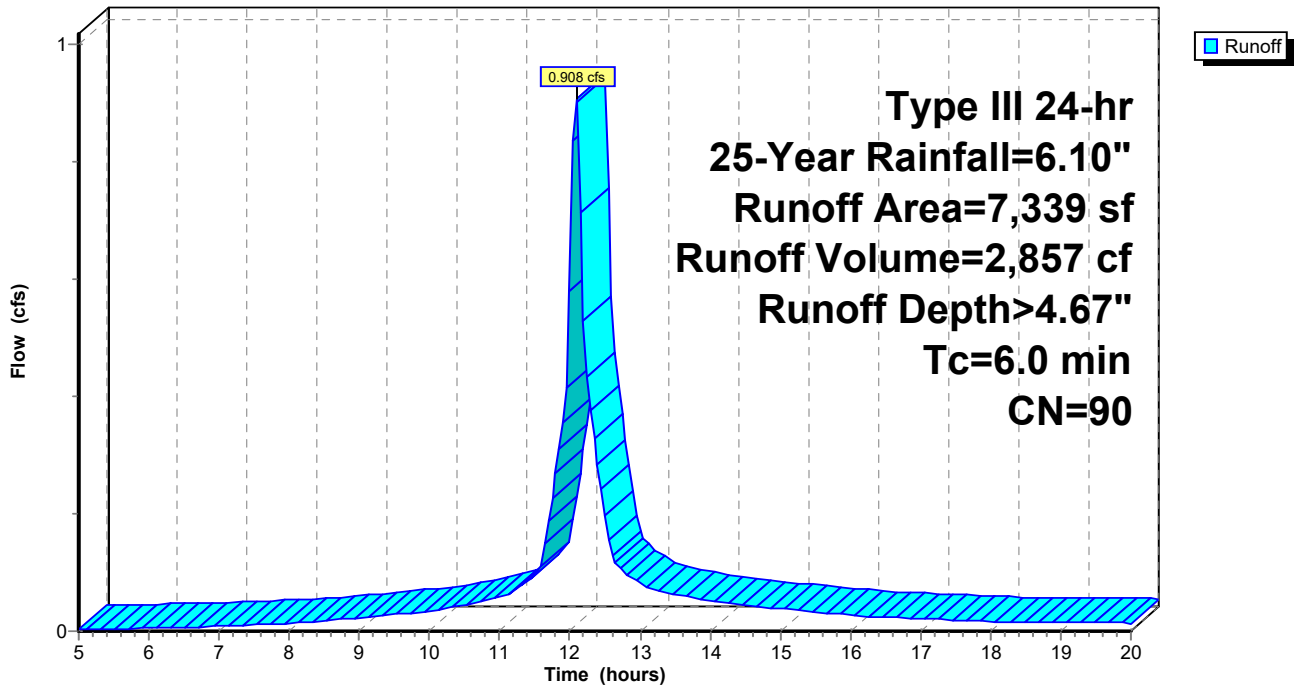
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Rainfall=6.10"

	Area (sf)	CN	Description
*	5,779	98	Impervious
	1,560	61	>75% Grass cover, Good, HSG B
	7,339	90	Weighted Average
	1,560		21.26% Pervious Area
	5,779		78.74% Impervious Area

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

**Subcatchment P-1B: Roof/Open Area to Basin**

Hydrograph



**Summary for Subcatchment P-1C: Grass Undetained to POI-1**

Runoff = 0.875 cfs @ 12.18 hrs, Volume= 3,188 cf, Depth> 1.97"  
 Routed to Link POI-1 : Offsite East

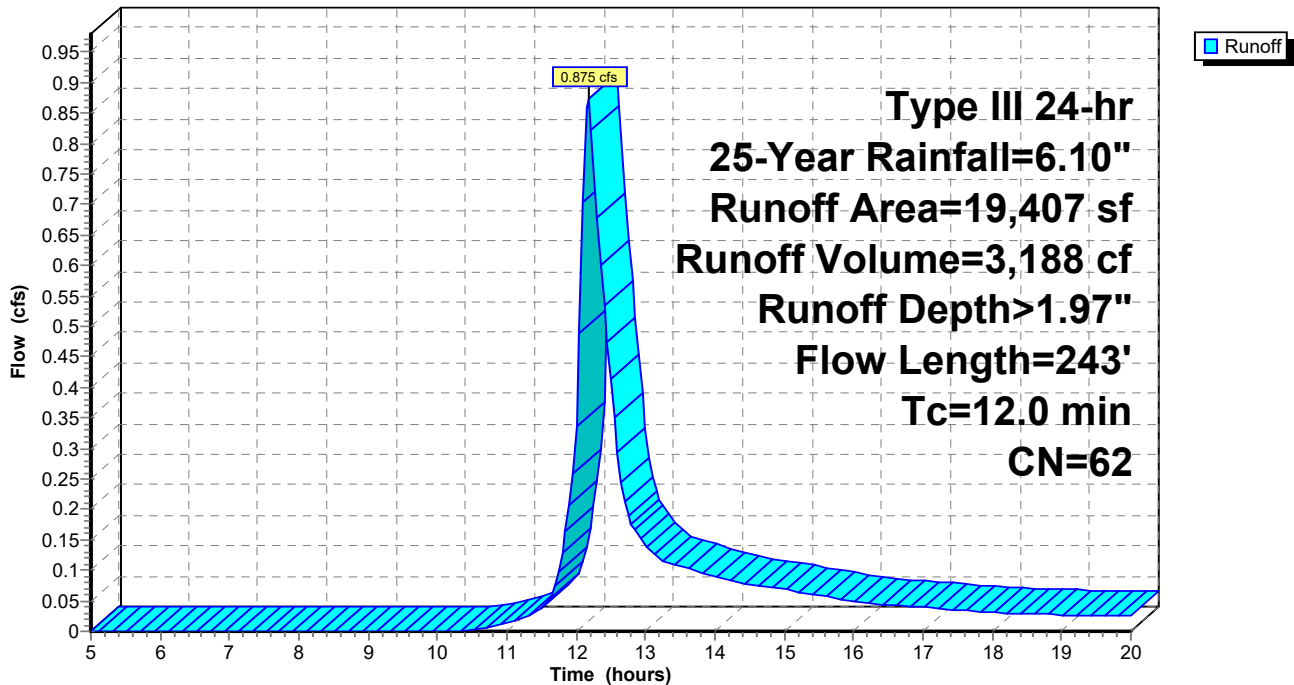
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-Year Rainfall=6.10"

Area (sf)	CN	Description
18,907	61	>75% Grass cover, Good, HSG B
* 500	98	Impervious
19,407	62	Weighted Average
18,907		97.42% Pervious Area
500		2.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0350	0.15		<b>Sheet Flow, 1A-1B</b>
					Grass: Dense n= 0.240 P2= 3.30"
0.8	143	0.0380	2.92		<b>Shallow Concentrated Flow, 1B-1C</b>
					Grassed Waterway Kv= 15.0 fps
12.0	243	Total			

**Subcatchment P-1C: Grass Undetained to POI-1**

Hydrograph



**Summary for Pond B-1: Infiltration Basin**

Inflow Area = 10,989 sf, 81.29% Impervious, Inflow Depth > 4.78" for 25-Year event  
 Inflow = 1.380 cfs @ 12.09 hrs, Volume= 4,374 cf  
 Outflow = 0.355 cfs @ 12.46 hrs, Volume= 4,373 cf, Atten= 74%, Lag= 22.2 min  
 Discarded = 0.355 cfs @ 12.46 hrs, Volume= 4,373 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 134.27' @ 12.46 hrs Surf.Area= 0.026 ac Storage= 0.025 af

Plug-Flow detention time= 18.9 min calculated for 4,359 cf (100% of inflow)  
 Center-of-Mass det. time= 18.8 min ( 771.8 - 753.0 )

Volume	Invert	Avail.Storage	Storage Description
#1A	133.00'	0.017 af	<b>23.69'W x 48.57'L x 2.69'H Field A</b> 0.071 af Overall - 0.029 af Embedded = 0.042 af x 40.0% Voids
#2A	133.25'	0.028 af	<b>Ferguson R-Tank HD 1 x 285 Inside #1</b> Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 285 Chambers in 15 Rows
		0.044 af	Total Available Storage

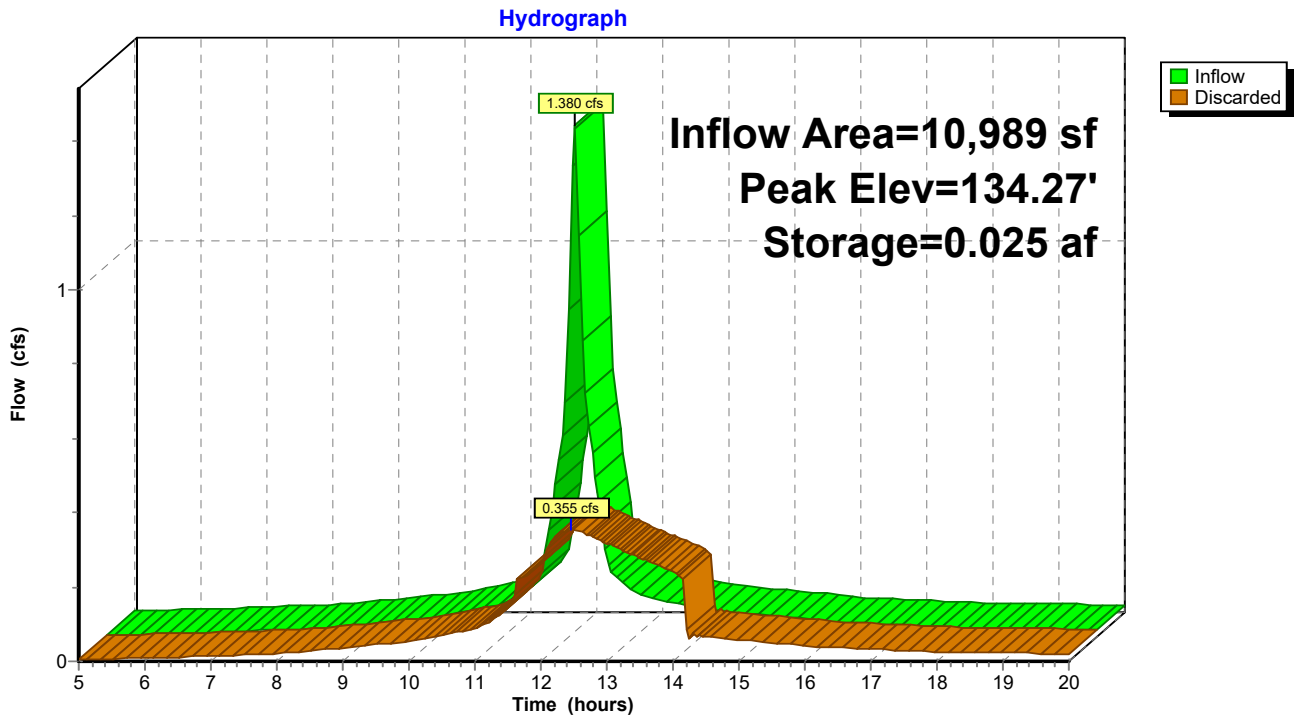
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	133.00'	<b>8.270 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 130.00' Phase-In= 0.01'

**Discarded OutFlow** Max=0.355 cfs @ 12.46 hrs HW=134.27' (Free Discharge)

↑**1=Exfiltration** ( Controls 0.355 cfs)

### Pond B-1: Infiltration Basin



**Summary for Pond B-2: Infiltration Basin**

Inflow Area = 7,339 sf, 78.74% Impervious, Inflow Depth > 4.67" for 25-Year event  
 Inflow = 0.908 cfs @ 12.09 hrs, Volume= 2,857 cf  
 Outflow = 0.229 cfs @ 12.46 hrs, Volume= 2,858 cf, Atten= 75%, Lag= 22.6 min  
 Discarded = 0.229 cfs @ 12.46 hrs, Volume= 2,858 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 138.28' @ 12.46 hrs Surf.Area= 0.018 ac Storage= 0.016 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 19.3 min ( 775.0 - 755.7 )

Volume	Invert	Avail.Storage	Storage Description
#1A	137.00'	0.012 af	<b>19.75'W x 39.19'L x 2.69'H Field A</b> 0.048 af Overall - 0.018 af Embedded = 0.029 af x 40.0% Voids
#2A	137.25'	0.017 af	<b>Ferguson R-Tank HD 1 x 180</b> Inside #1 Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 180 Chambers in 12 Rows
		0.029 af	Total Available Storage

Storage Group A created with Chamber Wizard

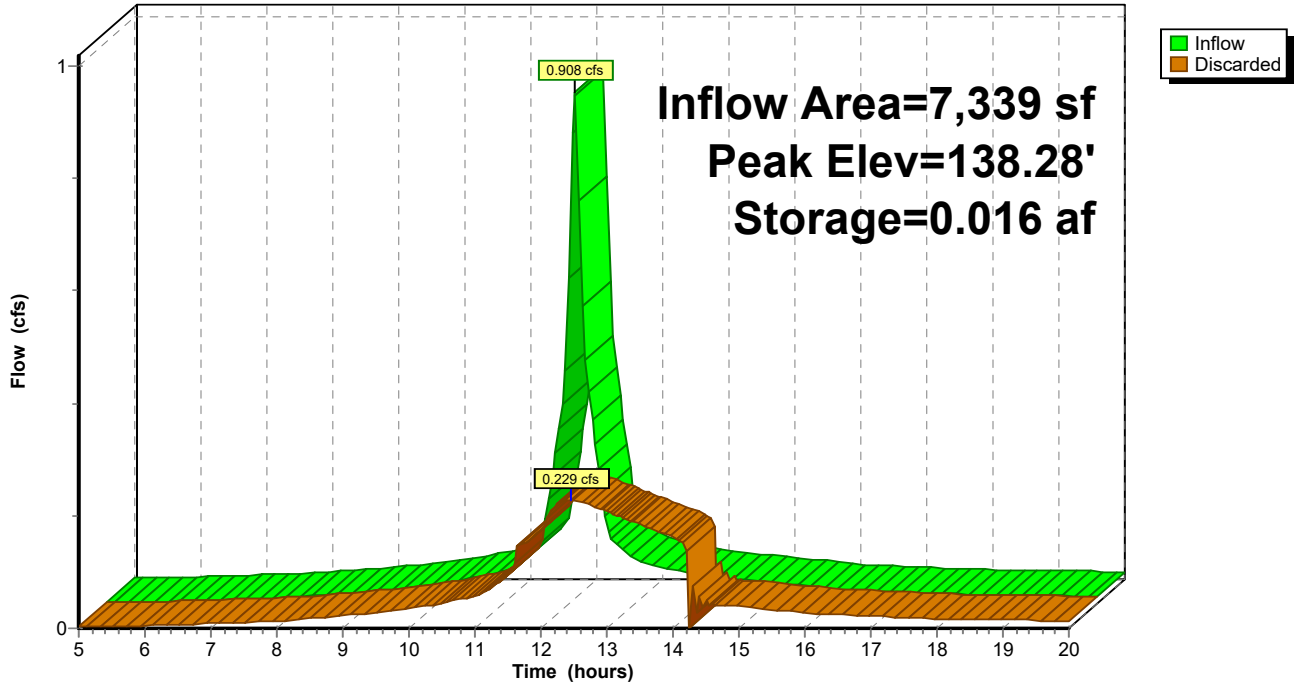
Device	Routing	Invert	Outlet Devices
#1	Discarded	137.00'	<b>8.270 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 133.00' Phase-In= 0.01'

**Discarded OutFlow** Max=0.228 cfs @ 12.46 hrs HW=138.28' (Free Discharge)

↑**1=Exfiltration** ( Controls 0.228 cfs)

### Pond B-2: Infiltration Basin

Hydrograph



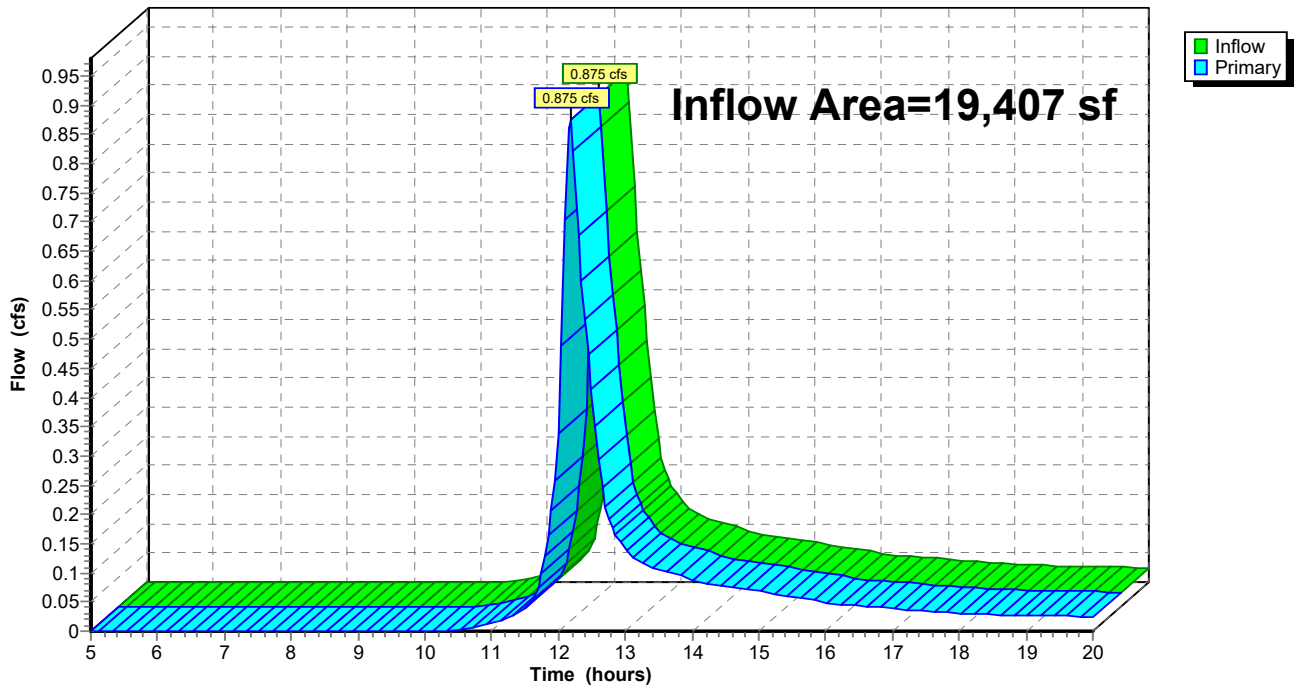
### Summary for Link POI-1: Offsite East

Inflow Area = 19,407 sf, 2.58% Impervious, Inflow Depth > 1.97" for 25-Year event  
Inflow = 0.875 cfs @ 12.18 hrs, Volume= 3,188 cf  
Primary = 0.875 cfs @ 12.18 hrs, Volume= 3,188 cf, Atten= 0%, Lag= 0.0 min

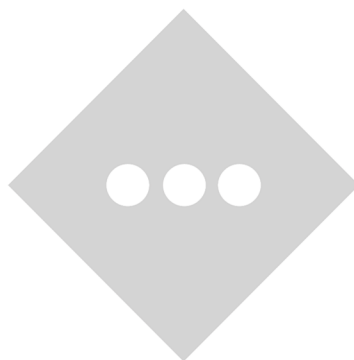
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Link POI-1: Offsite East

Hydrograph



**APPENDIX C-9**  
**100-YEAR STORM EVENT HYDROGRAPHS**



# HydroCAD

Prepared by Stonefield Engineering & Design

HydroCAD® 10.20-6a s/n 06682 © 2024 HydroCAD Software Solutions LLC

Type III 24-hr 100-Year Rainfall=8.50"

Printed 12/9/2025

Page 42

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentEX-1: Existing Site** Runoff Area=37,735 sf 9.31% Impervious Runoff Depth>3.87"  
Flow Length=268' Tc=15.3 min CN=64 Runoff=3.165 cfs 12,169 cf

**SubcatchmentP-1A: MVS/Roof to Basin** Runoff Area=10,989 sf 81.29% Impervious Runoff Depth>6.99"  
Tc=6.0 min CN=91 Runoff=1.981 cfs 6,403 cf

**SubcatchmentP-1B: Roof/Open Area to** Runoff Area=7,339 sf 78.74% Impervious Runoff Depth>6.89"  
Tc=6.0 min CN=90 Runoff=1.311 cfs 4,211 cf

**SubcatchmentP-1C: Grass Undetained to** Runoff Area=19,407 sf 2.58% Impervious Runoff Depth>3.65"  
Flow Length=243' Tc=12.0 min CN=62 Runoff=1.670 cfs 5,898 cf

**Pond B-1: Infiltration Basin** Peak Elev=135.35' Storage=0.041 af Inflow=1.981 cfs 6,403 cf  
Outflow=0.478 cfs 6,402 cf

**Pond B-2: Infiltration Basin** Peak Elev=139.42' Storage=0.027 af Inflow=1.311 cfs 4,211 cf  
Outflow=0.306 cfs 4,211 cf

**Link POI-1: Offsite East** Inflow=1.670 cfs 5,898 cf  
Primary=1.670 cfs 5,898 cf

**Total Runoff Area = 75,470 sf Runoff Volume = 28,681 cf Average Runoff Depth = 4.56"**  
**75.19% Pervious = 56,746 sf 24.81% Impervious = 18,724 sf**

**Summary for Subcatchment EX-1: Existing Site**

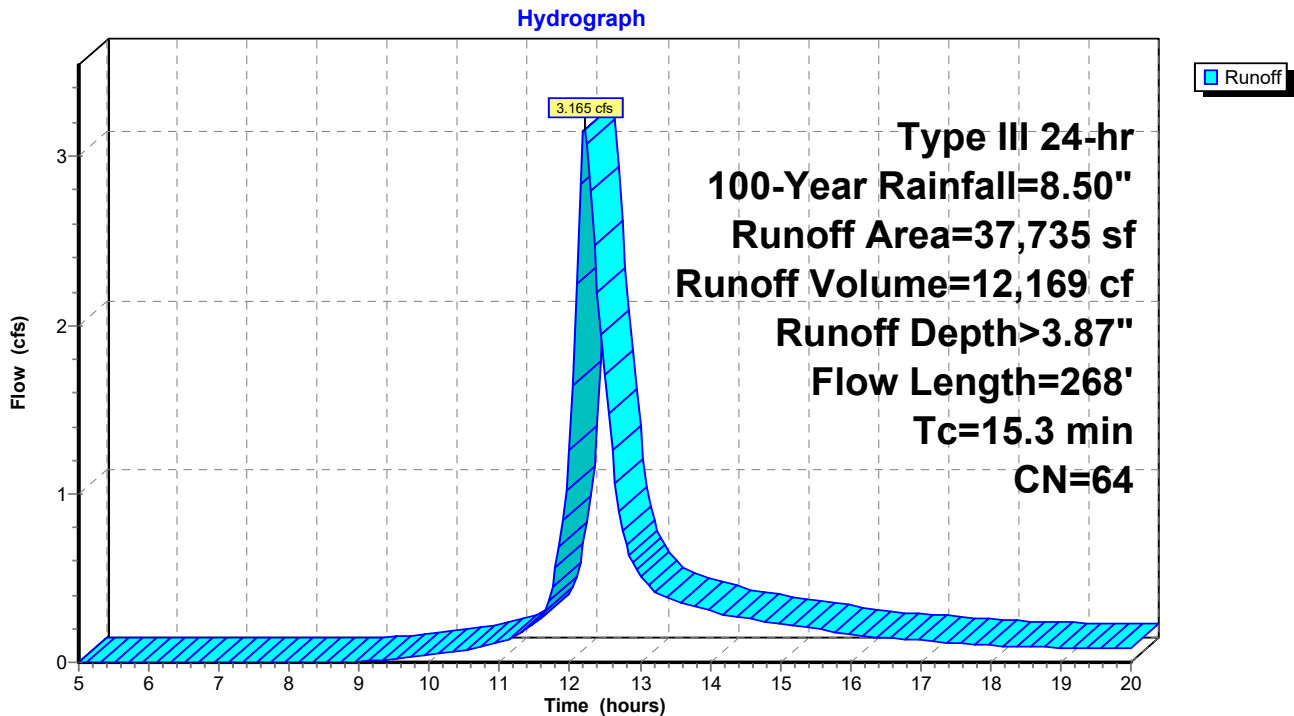
Runoff = 3.165 cfs @ 12.22 hrs, Volume= 12,169 cf, Depth> 3.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-Year Rainfall=8.50"

Area (sf)	CN	Description
29,051	61	>75% Grass cover, Good, HSG B
5,172	55	Woods, Good, HSG B
* 3,512	98	Impervious
37,735	64	Weighted Average
34,223		90.69% Pervious Area
3,512		9.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	78	0.0400	0.10		<b>Sheet Flow, 1A-1B</b> Woods: Light underbrush n= 0.400 P2= 3.30"
2.2	190	0.0430	1.45		<b>Shallow Concentrated Flow, 1B-1C</b> Short Grass Pasture Kv= 7.0 fps
15.3	268	Total			

**Subcatchment EX-1: Existing Site**



**Summary for Subcatchment P-1A: MVS/Roof to Basin**

Runoff = 1.981 cfs @ 12.09 hrs, Volume= 6,403 cf, Depth> 6.99"  
 Routed to Pond B-1 : Infiltration Basin

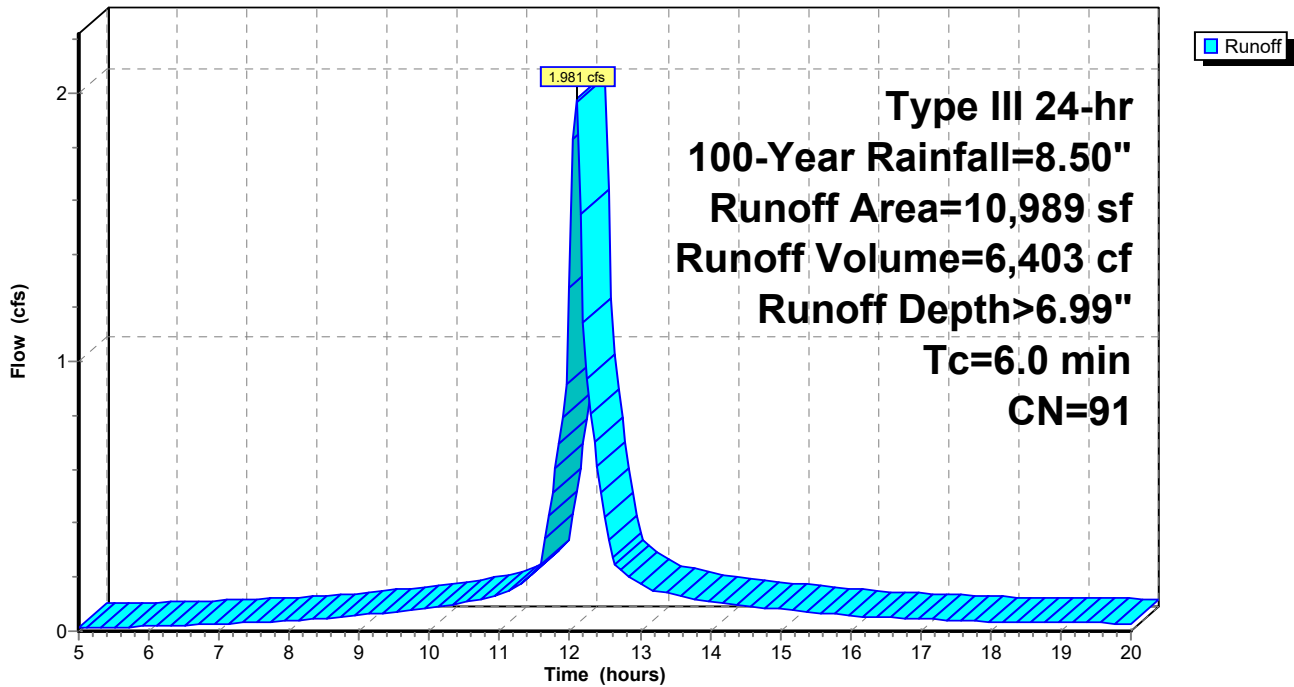
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 100-Year Rainfall=8.50"

	Area (sf)	CN	Description
*	8,933	98	Impervious
	2,056	61	>75% Grass cover, Good, HSG B
	10,989	91	Weighted Average
	2,056		18.71% Pervious Area
	8,933		81.29% Impervious Area

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

**Subcatchment P-1A: MVS/Roof to Basin**

Hydrograph



**Summary for Subcatchment P-1B: Roof/Open Area to Basin**

Runoff = 1.311 cfs @ 12.09 hrs, Volume= 4,211 cf, Depth> 6.89"  
 Routed to Pond B-2 : Infiltration Basin

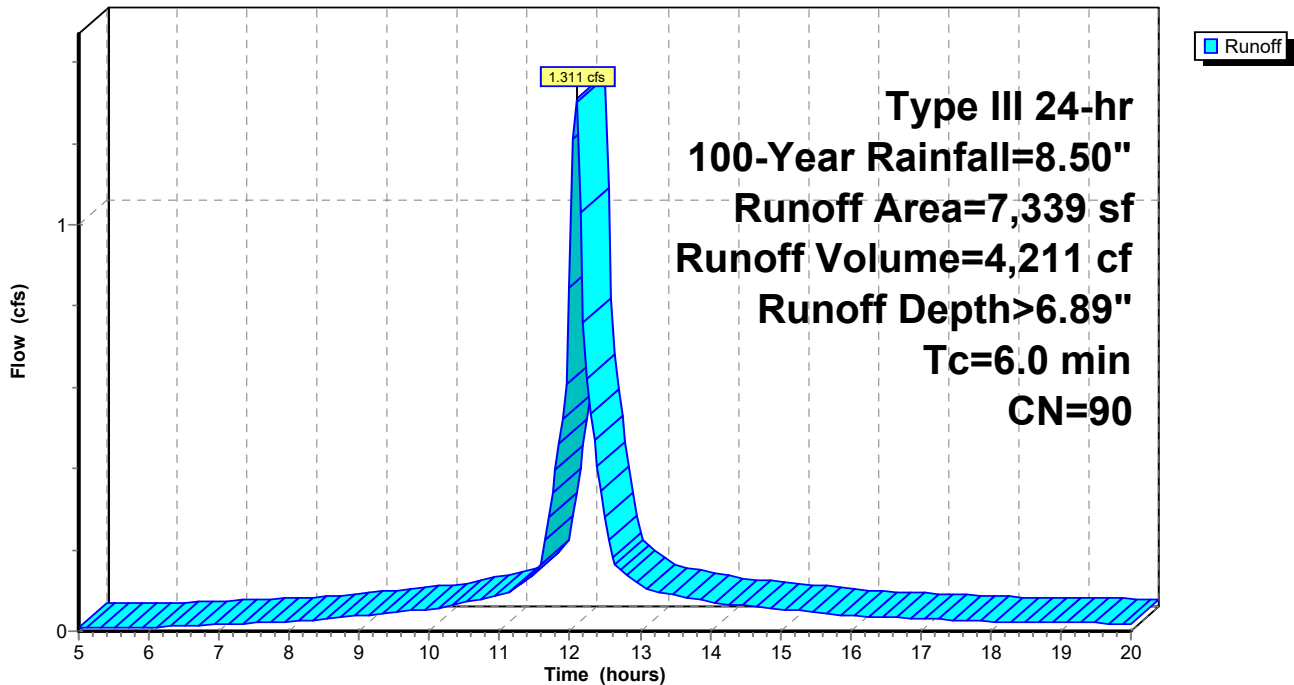
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 100-Year Rainfall=8.50"

	Area (sf)	CN	Description
*	5,779	98	Impervious
	1,560	61	>75% Grass cover, Good, HSG B
	7,339	90	Weighted Average
	1,560		21.26% Pervious Area
	5,779		78.74% Impervious Area

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

**Subcatchment P-1B: Roof/Open Area to Basin**

Hydrograph



**Summary for Subcatchment P-1C: Grass Undetained to POI-1**

Runoff = 1.670 cfs @ 12.17 hrs, Volume= 5,898 cf, Depth> 3.65"  
 Routed to Link POI-1 : Offsite East

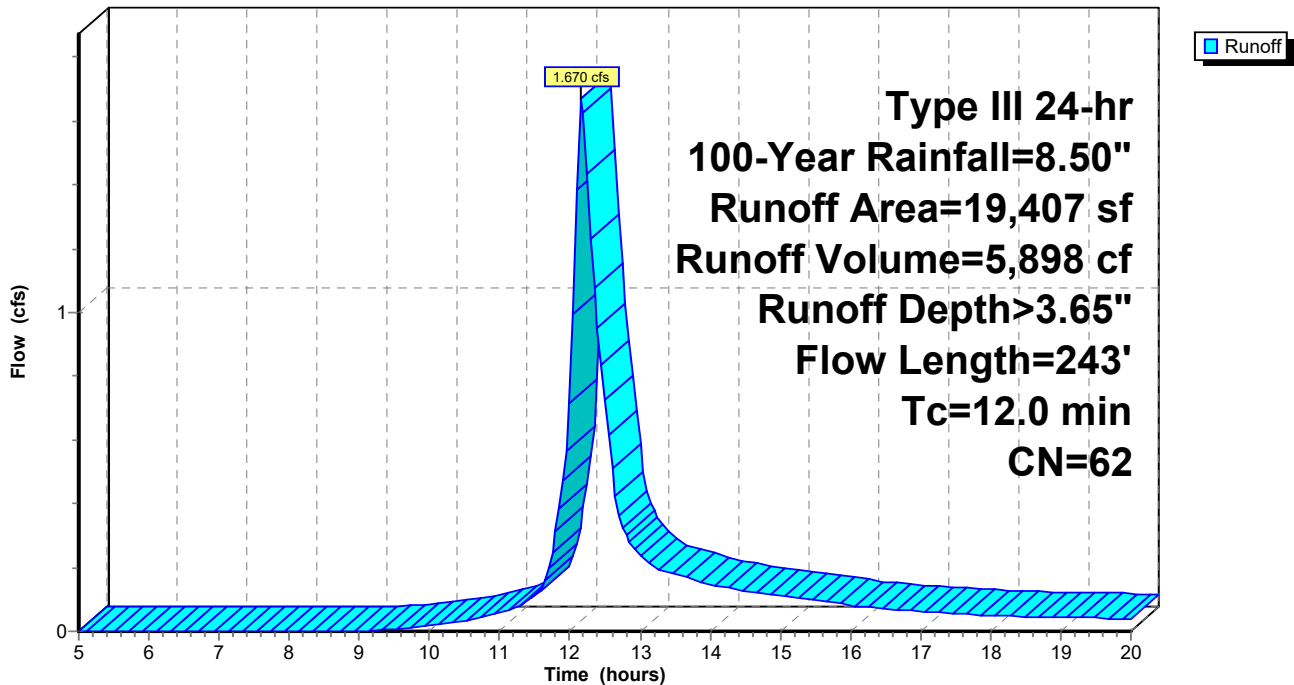
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 100-Year Rainfall=8.50"

Area (sf)	CN	Description
18,907	61	>75% Grass cover, Good, HSG B
* 500	98	Impervious
19,407	62	Weighted Average
18,907		97.42% Pervious Area
500		2.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0350	0.15		<b>Sheet Flow, 1A-1B</b>
					Grass: Dense n= 0.240 P2= 3.30"
0.8	143	0.0380	2.92		<b>Shallow Concentrated Flow, 1B-1C</b>
					Grassed Waterway Kv= 15.0 fps
12.0	243	Total			

**Subcatchment P-1C: Grass Undetained to POI-1**

Hydrograph



**Summary for Pond B-1: Infiltration Basin**

Inflow Area = 10,989 sf, 81.29% Impervious, Inflow Depth > 6.99" for 100-Year event  
 Inflow = 1.981 cfs @ 12.09 hrs, Volume= 6,403 cf  
 Outflow = 0.478 cfs @ 12.47 hrs, Volume= 6,402 cf, Atten= 76%, Lag= 23.0 min  
 Discarded = 0.478 cfs @ 12.47 hrs, Volume= 6,402 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 135.35' @ 12.47 hrs Surf.Area= 0.026 ac Storage= 0.041 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 27.7 min ( 774.3 - 746.6 )

Volume	Invert	Avail.Storage	Storage Description
#1A	133.00'	0.017 af	<b>23.69'W x 48.57'L x 2.69'H Field A</b> 0.071 af Overall - 0.029 af Embedded = 0.042 af x 40.0% Voids
#2A	133.25'	0.028 af	<b>Ferguson R-Tank HD 1 x 285 Inside #1</b> Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 285 Chambers in 15 Rows
		0.044 af	Total Available Storage

Storage Group A created with Chamber Wizard

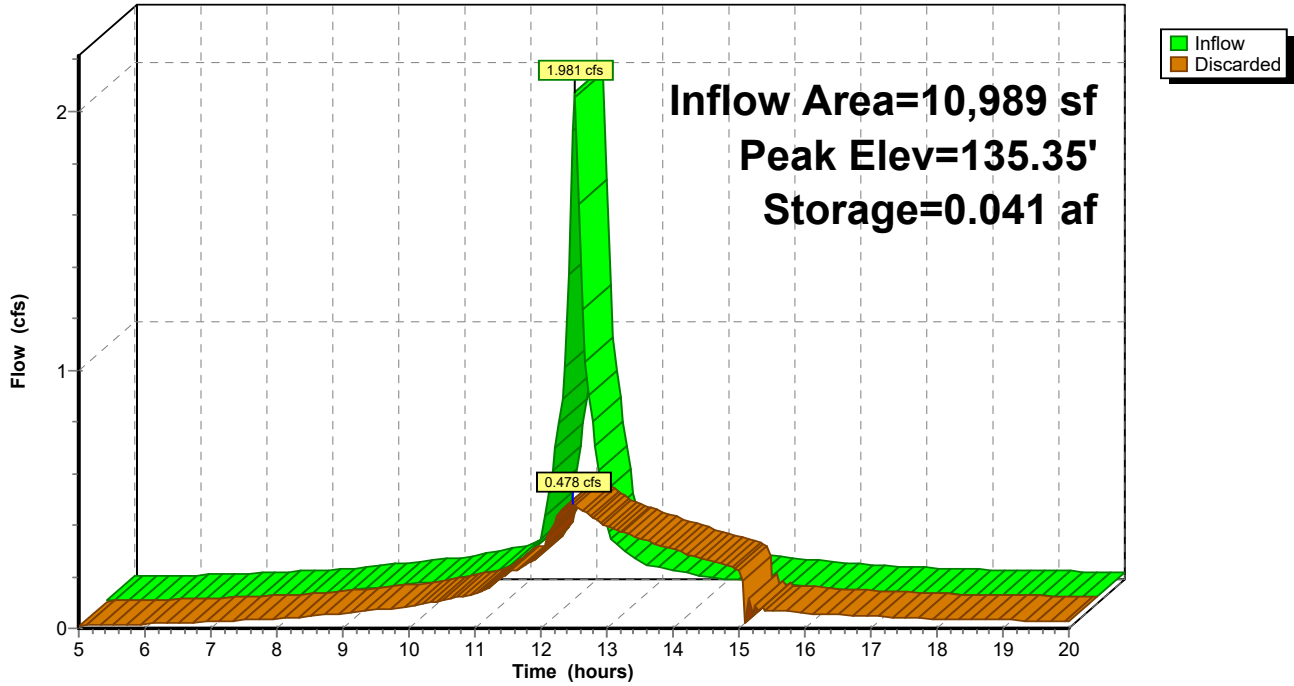
Device	Routing	Invert	Outlet Devices
#1	Discarded	133.00'	<b>8.270 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 130.00' Phase-In= 0.01'

**Discarded OutFlow** Max=0.478 cfs @ 12.47 hrs HW=135.35' (Free Discharge)

↑**1=Exfiltration** ( Controls 0.478 cfs)

### Pond B-1: Infiltration Basin

Hydrograph



**Summary for Pond B-2: Infiltration Basin**

Inflow Area = 7,339 sf, 78.74% Impervious, Inflow Depth > 6.89" for 100-Year event  
 Inflow = 1.311 cfs @ 12.09 hrs, Volume= 4,211 cf  
 Outflow = 0.306 cfs @ 12.48 hrs, Volume= 4,211 cf, Atten= 77%, Lag= 23.6 min  
 Discarded = 0.306 cfs @ 12.48 hrs, Volume= 4,211 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 139.42' @ 12.48 hrs Surf.Area= 0.018 ac Storage= 0.027 af

Plug-Flow detention time= 29.1 min calculated for 4,211 cf (100% of inflow)  
 Center-of-Mass det. time= 29.0 min ( 777.7 - 748.7 )

Volume	Invert	Avail.Storage	Storage Description
#1A	137.00'	0.012 af	<b>19.75'W x 39.19'L x 2.69'H Field A</b> 0.048 af Overall - 0.018 af Embedded = 0.029 af x 40.0% Voids
#2A	137.25'	0.017 af	<b>Ferguson R-Tank HD 1 x 180 Inside #1</b> Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 180 Chambers in 12 Rows
		0.029 af	Total Available Storage

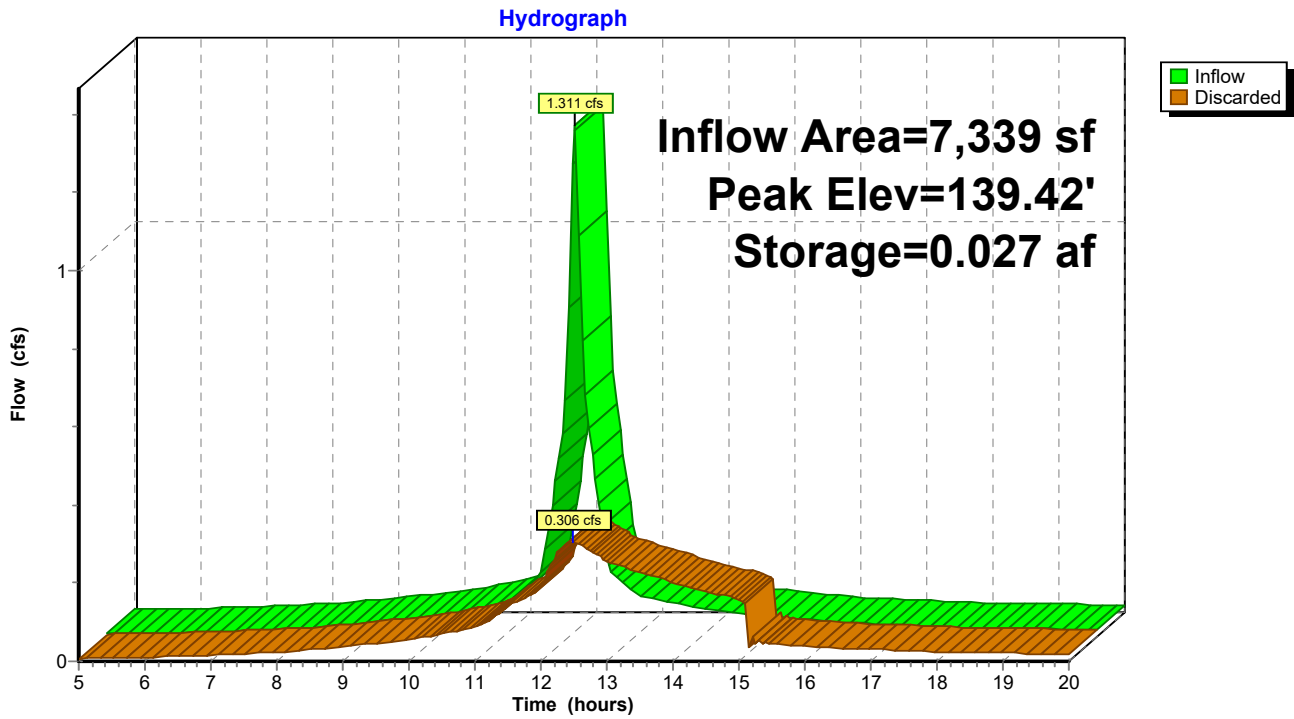
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	137.00'	<b>8.270 in/hr Exfiltration over Wetted area</b> Conductivity to Groundwater Elevation = 133.00' Phase-In= 0.01'

**Discarded OutFlow** Max=0.306 cfs @ 12.48 hrs HW=139.42' (Free Discharge)

↑**1=Exfiltration** ( Controls 0.306 cfs)

### Pond B-2: Infiltration Basin



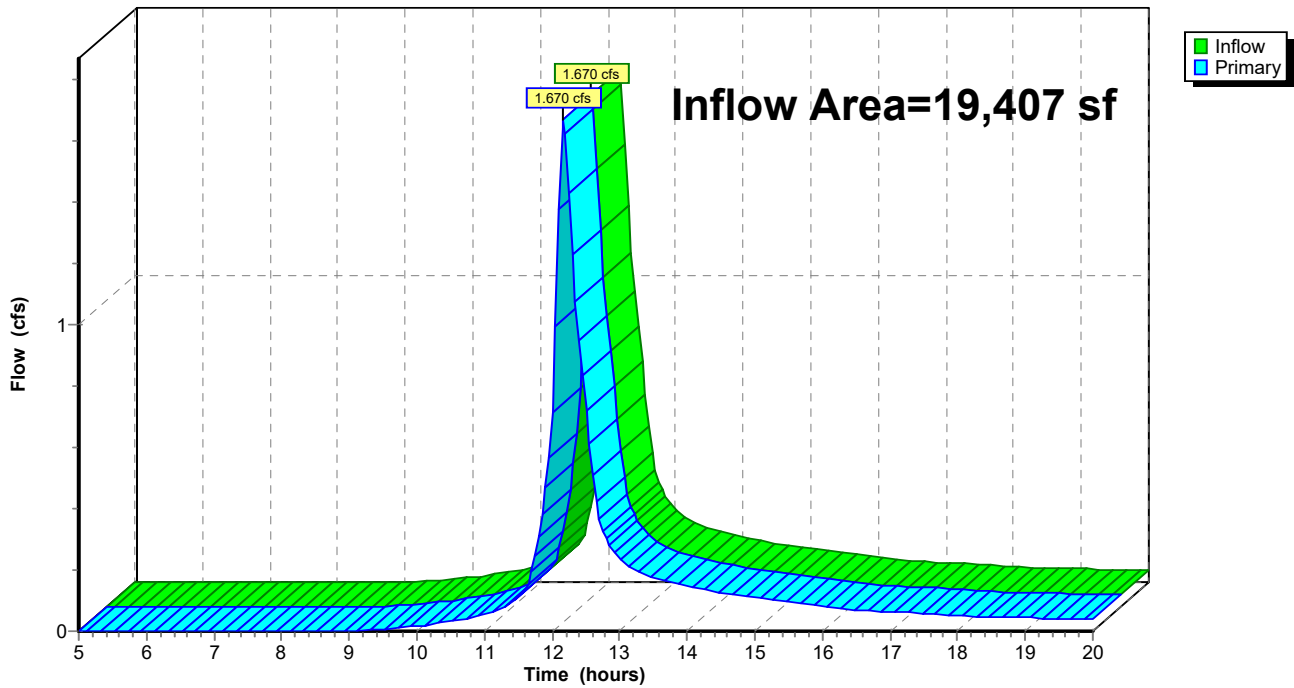
### Summary for Link POI-1: Offsite East

Inflow Area = 19,407 sf, 2.58% Impervious, Inflow Depth > 3.65" for 100-Year event  
Inflow = 1.670 cfs @ 12.17 hrs, Volume= 5,898 cf  
Primary = 1.670 cfs @ 12.17 hrs, Volume= 5,898 cf, Atten= 0%, Lag= 0.0 min

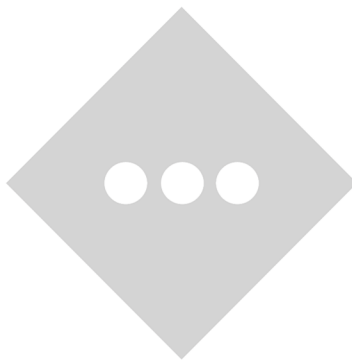
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Link POI-1: Offsite East

Hydrograph



**APPENDIX C-10**  
**INFILTRATION BASIN STAGE-STORAGE**  
**TABLES**



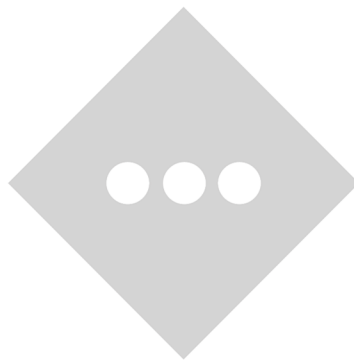
**Stage-Area-Storage for Pond B-1: Infiltration Basin**

Elevation (feet)	Wetted (acres)	Storage (acre-feet)	Elevation (feet)	Wetted (acres)	Storage (acre-feet)
133.00	0.026	0.000	135.60	0.035	0.043
133.05	0.027	0.001	135.65	<b>0.035</b>	<b>0.044</b>
133.10	0.027	0.001			
133.15	0.027	0.002			
133.20	0.027	0.002			
133.25	0.027	0.003			
133.30	0.027	0.004			
133.35	0.028	0.005			
133.40	0.028	0.006			
133.45	0.028	0.007			
133.50	0.028	0.008			
133.55	0.028	0.009			
133.60	0.028	0.010			
133.65	0.029	0.011			
133.70	0.029	0.012			
133.75	0.029	0.013			
133.80	0.029	0.015			
133.85	0.029	0.016			
133.90	0.029	0.017			
133.95	0.030	0.018			
134.00	0.030	0.019			
134.05	0.030	0.020			
134.10	0.030	0.021			
134.15	0.030	0.022			
134.20	0.030	0.023			
134.25	0.031	0.024			
134.30	0.031	0.025			
134.35	0.031	0.026			
134.40	0.031	0.028			
134.45	0.031	0.029			
134.50	0.031	0.030			
134.55	0.032	0.031			
134.60	0.032	0.032			
134.65	0.032	0.033			
134.70	0.032	0.034			
134.75	0.032	0.034			
134.80	0.032	0.035			
134.85	0.033	0.036			
134.90	0.033	0.036			
134.95	0.033	0.037			
135.00	0.033	0.037			
135.05	0.033	0.038			
135.10	0.033	0.038			
135.15	0.034	0.039			
135.20	0.034	0.039			
135.25	0.034	0.040			
135.30	0.034	0.040			
135.35	0.034	0.041			
135.40	0.034	0.041			
135.45	0.035	0.042			
135.50	0.035	0.042			
135.55	0.035	0.043			

**Stage-Area-Storage for Pond B-2: Infiltration Basin**

Elevation (feet)	Wetted (acres)	Storage (acre-feet)	Elevation (feet)	Wetted (acres)	Storage (acre-feet)
137.00	0.018	0.000	139.60	0.025	0.029
137.05	0.018	0.000	139.65	<b>0.025</b>	<b>0.029</b>
137.10	0.018	0.001			
137.15	0.018	0.001			
137.20	0.018	0.001			
137.25	0.018	0.002			
137.30	0.019	0.002			
137.35	0.019	0.003			
137.40	0.019	0.004			
137.45	0.019	0.005			
137.50	0.019	0.005			
137.55	0.019	0.006			
137.60	0.019	0.007			
137.65	0.020	0.007			
137.70	0.020	0.008			
137.75	0.020	0.009			
137.80	0.020	0.010			
137.85	0.020	0.010			
137.90	0.020	0.011			
137.95	0.020	0.012			
138.00	0.020	0.012			
138.05	0.021	0.013			
138.10	0.021	0.014			
138.15	0.021	0.014			
138.20	0.021	0.015			
138.25	0.021	0.016			
138.30	0.021	0.017			
138.35	0.021	0.017			
138.40	0.022	0.018			
138.45	0.022	0.019			
138.50	0.022	0.019			
138.55	0.022	0.020			
138.60	0.022	0.021			
138.65	0.022	0.022			
138.70	0.022	0.022			
138.75	0.023	0.023			
138.80	0.023	0.023			
138.85	0.023	0.023			
138.90	0.023	0.024			
138.95	0.023	0.024			
139.00	0.023	0.024			
139.05	0.023	0.025			
139.10	0.023	0.025			
139.15	0.024	0.025			
139.20	0.024	0.026			
139.25	0.024	0.026			
139.30	0.024	0.026			
139.35	0.024	0.027			
139.40	0.024	0.027			
139.45	0.024	0.028			
139.50	0.025	0.028			
139.55	0.025	0.028			

**APPENDIX C-11**  
**INFILTRATION BASIN STAGE-DISCHARGE**  
**TABLES**



**Stage-Discharge for Pond B-1: Infiltration Basin**

Elevation (feet)	Discarded (cfs)	Elevation (feet)	Discarded (cfs)	Elevation (feet)	Discarded (cfs)
133.00	0.000	134.04	0.330	135.08	0.447
133.02	0.222	134.06	0.332	135.10	0.449
133.04	0.224	134.08	0.334	135.12	0.451
133.06	0.226	134.10	0.336	135.14	0.454
133.08	0.228	134.12	0.338	135.16	0.456
133.10	0.230	134.14	0.341	135.18	0.458
133.12	0.232	134.16	0.343	135.20	0.461
133.14	0.234	134.18	0.345	135.22	0.463
133.16	0.236	134.20	0.347	135.24	0.465
133.18	0.239	134.22	0.349	135.26	0.468
133.20	0.241	134.24	0.352	135.28	0.470
133.22	0.243	134.26	0.354	135.30	0.472
133.24	0.245	134.28	0.356	135.32	0.475
133.26	0.247	134.30	0.358	135.34	0.477
133.28	0.249	134.32	0.361	135.36	0.479
133.30	0.251	134.34	0.363	135.38	0.482
133.32	0.253	134.36	0.365	135.40	0.484
133.34	0.255	134.38	0.367	135.42	0.486
133.36	0.257	134.40	0.369	135.44	0.489
133.38	0.259	134.42	0.372	135.46	0.491
133.40	0.261	134.44	0.374	135.48	0.493
133.42	0.263	134.46	0.376	135.50	0.496
133.44	0.265	134.48	0.378	135.52	0.498
133.46	0.268	134.50	0.381	135.54	0.500
133.48	0.270	134.52	0.383	135.56	0.503
133.50	0.272	134.54	0.385	135.58	0.505
133.52	0.274	134.56	0.387	135.60	0.507
133.54	0.276	134.58	0.390	135.62	0.510
133.56	0.278	134.60	0.392	135.64	0.512
133.58	0.280	134.62	0.394	135.66	0.515
133.60	0.282	134.64	0.396	135.68	<b>0.517</b>
133.62	0.284	134.66	0.399		
133.64	0.287	134.68	0.401		
133.66	0.289	134.70	0.403		
133.68	0.291	134.72	0.405		
133.70	0.293	134.74	0.408		
133.72	0.295	134.76	0.410		
133.74	0.297	134.78	0.412		
133.76	0.299	134.80	0.415		
133.78	0.302	134.82	0.417		
133.80	0.304	134.84	0.419		
133.82	0.306	134.86	0.421		
133.84	0.308	134.88	0.424		
133.86	0.310	134.90	0.426		
133.88	0.312	134.92	0.428		
133.90	0.314	134.94	0.431		
133.92	0.317	134.96	0.433		
133.94	0.319	134.98	0.435		
133.96	0.321	135.00	0.437		
133.98	0.323	135.02	0.440		
134.00	0.325	135.04	0.442		
134.02	0.328	135.06	0.444		

**Stage-Discharge for Pond B-2: Infiltration Basin**

Elevation (feet)	Discarded (cfs)	Elevation (feet)	Discarded (cfs)	Elevation (feet)	Discarded (cfs)
137.00	0.000	138.04	0.213	139.08	0.282
137.02	0.149	138.06	0.214	139.10	0.284
137.04	0.151	138.08	0.215	139.12	0.285
137.06	0.152	138.10	0.217	139.14	0.287
137.08	0.153	138.12	0.218	139.16	0.288
137.10	0.154	138.14	0.219	139.18	0.289
137.12	0.155	138.16	0.221	139.20	0.291
137.14	0.157	138.18	0.222	139.22	0.292
137.16	0.158	138.20	0.223	139.24	0.294
137.18	0.159	138.22	0.225	139.26	0.295
137.20	0.160	138.24	0.226	139.28	0.296
137.22	0.161	138.26	0.227	139.30	0.298
137.24	0.163	138.28	0.229	139.32	0.299
137.26	0.164	138.30	0.230	139.34	0.301
137.28	0.165	138.32	0.231	139.36	0.302
137.30	0.166	138.34	0.232	139.38	0.303
137.32	0.167	138.36	0.234	139.40	0.305
137.34	0.169	138.38	0.235	139.42	0.306
137.36	0.170	138.40	0.236	139.44	0.308
137.38	0.171	138.42	0.238	139.46	0.309
137.40	0.172	138.44	0.239	139.48	0.310
137.42	0.174	138.46	0.240	139.50	0.312
137.44	0.175	138.48	0.242	139.52	0.313
137.46	0.176	138.50	0.243	139.54	0.315
137.48	0.177	138.52	0.244	139.56	0.316
137.50	0.179	138.54	0.246	139.58	0.317
137.52	0.180	138.56	0.247	139.60	0.319
137.54	0.181	138.58	0.248	139.62	0.320
137.56	0.182	138.60	0.250	139.64	0.322
137.58	0.184	138.62	0.251	139.66	0.323
137.60	0.185	138.64	0.252	139.68	<b>0.324</b>
137.62	0.186	138.66	0.254		
137.64	0.187	138.68	0.255		
137.66	0.189	138.70	0.257		
137.68	0.190	138.72	0.258		
137.70	0.191	138.74	0.259		
137.72	0.192	138.76	0.261		
137.74	0.194	138.78	0.262		
137.76	0.195	138.80	0.263		
137.78	0.196	138.82	0.265		
137.80	0.197	138.84	0.266		
137.82	0.199	138.86	0.267		
137.84	0.200	138.88	0.269		
137.86	0.201	138.90	0.270		
137.88	0.203	138.92	0.271		
137.90	0.204	138.94	0.273		
137.92	0.205	138.96	0.274		
137.94	0.206	138.98	0.276		
137.96	0.208	139.00	0.277		
137.98	0.209	139.02	0.278		
138.00	0.210	139.04	0.280		
138.02	0.212	139.06	0.281		

# **APPENDIX D**

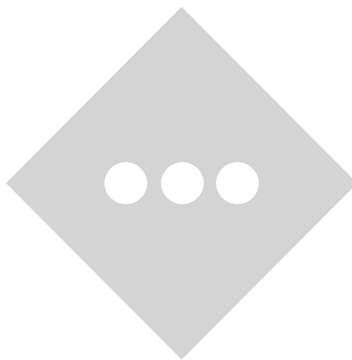
## **SITE PLAN SHEETS**

### **INVENTORY**

**FIGURE 1: SITE PLAN**

**FIGURE 2: STORMWATER MANAGEMENT PLAN**

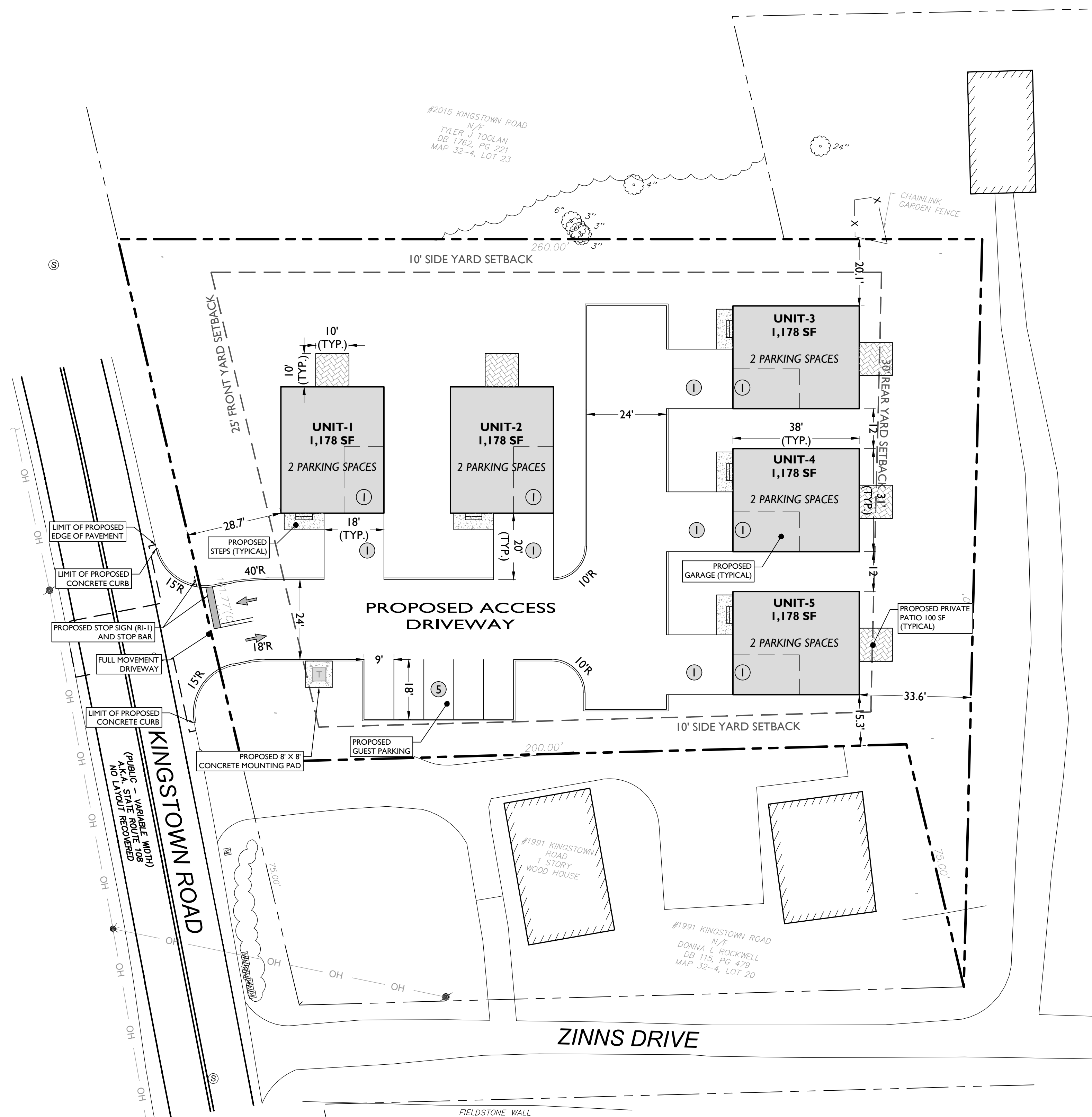
**FIGURE 3: SOIL EROSION & SEDIMENT CONTROL PLANS**



LAND USE AND ZONING			
MAP 32-4, LOT 21			
MIXED USE (MU)			
PROPOSED USE	PERMITTED USE		
MULTI-HOUSEHOLD LAND DEVELOPMENT PROJECTS	REQUIRED	EXISTING	PROPOSED
ZONING REQUIREMENT	REQUIRED	EXISTING	PROPOSED
MINIMUM LOT AREA	30,000 SF*	37,736 SF	NO CHANGE
MINIMUM LOT WIDTH	150 FT	159 FT	159 FT
MINIMUM LOT DEPTH	90 FT	200 FT	200 FT
MAXIMUM BUILDING COVERAGE	30%	6%	15.6%
MAXIMUM BUILDING HEIGHT	35 FT	35 FT	< 35 FT
MINIMUM FRONT YARD SETBACK	25 FT	13 FT	28.7 FT
MINIMUM SIDE YARD SETBACK	10 FT	56 FT	15.3 FT
MINIMUM REAR YARD SETBACK	30 FT	151 FT	33.6 FT

(\*) 15,000 SF FOR THE FIRST 2 D.U.'S + 5,000 SF PER EACH ADD'L D.U. 15,000 SF + 3 UNITS (5,000 SF) = 30,000 SF

OFF-STREET PARKING REQUIREMENTS		
CODE SECTION	REQUIRED	PROPOSED
§ 711. A.	REQUIRED PARKING: 2 SPACES PER DWELLING UNIT (2 SPACES X 5 UNITS) = 10 SPACES	15 SPACES



SYMBOL	DESCRIPTION
---	PROPERTY LINE
- - -	SETBACK LINE
- · - · -	SAWCUT LINE
=====	PROPOSED CURB
○	PROPOSED SIGNS / BOLLARDS
▒	PROPOSED BUILDING
▨	PROPOSED CONCRETE
▩	PROPOSED PATIO

**GENERAL NOTES**

- THE CONTRACTOR SHALL VERIFY AND FAMILIARIZE THEMSELVES WITH THE EXISTING SITE CONDITIONS AND THE PROPOSED SCOPE OF WORK (INCLUDING DIMENSIONS, LAYOUT, ETC.) PRIOR TO INITIATING THE IMPROVEMENTS IDENTIFIED WITHIN THESE DOCUMENTS. SHOULD ANY DISCREPANCY BE FOUND BETWEEN THE EXISTING SITE CONDITIONS AND THE PROPOSED WORK, THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC PRIOR TO THE START OF CONSTRUCTION.
- THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND ENSURE THAT ALL REQUIRED APPROVALS HAVE BEEN OBTAINED PRIOR TO THE START OF CONSTRUCTION. COPIES OF ALL REQUIRED PERMITS AND APPROVALS SHALL BE KEPT ON SITE AT ALL TIMES DURING CONSTRUCTION.
- ALL CONTRACTORS WILL TO THE FULLEST EXTENT PERMITTED BY LAW, INDEMNIFY AND HOLD HARMLESS STONEFIELD ENGINEERING & DESIGN, LLC AND ITS SUB-CONSULTANTS FROM AND AGAINST ANY DAMAGES AND LIABILITIES INCLUDING ATTORNEYS' FEES ARISING OUT OF CLAIMS BY EMPLOYEES OF THE CONTRACTOR IN ADDITION TO CLAIMS CONNECTED TO THE PROJECT AS A RESULT OF NOT CARRYING THE PROPER INSURANCE FOR WORKERS COMPENSATION, LIABILITY INSURANCE, AND LIMITS OF COMMERCIAL GENERAL LIABILITY INSURANCE.
- THE CONTRACTOR SHALL NOT DEVIATE FROM THE PROPOSED IMPROVEMENTS IDENTIFIED WITHIN THIS PLAN SET UNLESS APPROVAL IS PROVIDED IN WRITING BY STONEFIELD ENGINEERING & DESIGN, LLC.
- THE CONTRACTOR IS RESPONSIBLE TO DETERMINE THE MEANS AND METHODS OF CONSTRUCTION.
- THE CONTRACTOR SHALL NOT PERFORM ANY WORK OR CAUSE DISTURBANCE ON A PRIVATE PROPERTY NOT CONTROLLED BY THE PERSON OR ENTITY WHO HAS AUTHORIZED THE WORK WITHOUT PRIOR WRITTEN CONSENT FROM THE OWNER OF THE PRIVATE PROPERTY.
- THE CONTRACTOR IS RESPONSIBLE TO RESTORE ANY DAMAGED OR UNDERMINED STRUCTURE OR SITE FEATURE THAT IS IDENTIFIED TO REMAIN ON THE PLAN SET. ALL REPAIRS SHALL USE NEW MATERIALS TO RESTORE THE FEATURE TO ITS EXISTING CONDITION AT THE CONTRACTORS EXPENSE.
- CONTRACTOR IS RESPONSIBLE TO PROVIDE THE APPROPRIATE SHOP DRAWINGS, PRODUCT DATA, AND OTHER REQUIRED SUBMITTALS FOR REVIEW. STONEFIELD ENGINEERING & DESIGN, LLC WILL REVIEW THE SUBMITTALS IN ACCORDANCE WITH THE DESIGN INTENT AS REFLECTED WITHIN THE PLAN SET.
- THE CONTRACTOR IS RESPONSIBLE FOR TRAFFIC CONTROL IN ACCORDANCE WITH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.
- THE CONTRACTOR IS REQUIRED TO PERFORM ALL WORK IN THE PUBLIC RIGHT-OF-WAY IN ACCORDANCE WITH THE APPROPRIATE GOVERNING AUTHORITY AND SHALL BE RESPONSIBLE FOR THE PROCUREMENT OF STREET OPENING PERMITS.
- THE CONTRACTOR IS REQUIRED TO RETAIN AN OSHA CERTIFIED SAFETY INSPECTOR TO BE PRESENT ON SITE AT ALL TIMES DURING CONSTRUCTION & DEMOLITION ACTIVITIES.
- SHOULD AN EMPLOYEE OF STONEFIELD ENGINEERING & DESIGN, LLC BE PRESENT ON SITE AT ANY TIME DURING CONSTRUCTION, IT DOES NOT RELIEVE THE CONTRACTOR OF ANY OF THE RESPONSIBILITIES AND REQUIREMENTS LISTED IN THE NOTES WITHIN THIS PLAN SET.

NOT APPROVED FOR CONSTRUCTION

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Princeton, NJ · Tampa, FL · Birmingham, MI  
www.stonefielddesign.com

56 Pine Street, Providence, Rhode Island  
Phone 617.203.2076

**PLAN SET CLASSIFICATION**

**PROPOSED MULTI-HOUSEHOLD LAND DEVELOPMENT PROJECT**

BLOCK 32-4, LOT 21  
100' WIDE FRONT YARD  
TOWN OF SOUTH KINGSTOWN  
WASHINGTON COUNTY, RHODE ISLAND

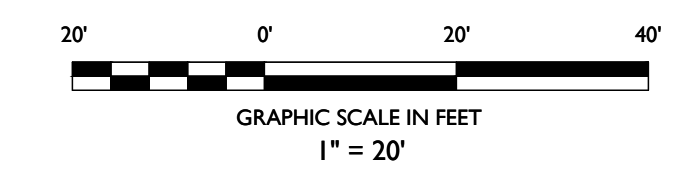
JOSHUA H. KLINE, P.E.  
RHODE ISLAND LICENSE No. 13607  
LICENSED PROFESSIONAL ENGINEER

**STONEFIELD**  
engineering & design

SCALE: 1" = 20' PROJECT ID: BOS-250053

TITLE: **SITE PLAN**

DRAWING: **C-5**



Z:\KINGSTOWN\20250525\250053\250053\RELEVY MILLER - 2025 KINGSTOWN ROAD, SOUTH KINGSTOWN, RHODE ISLAND\KINGSTOWN SITE PLAN

**EXCAVATION & UTILITY VERIFICATION NOTE:**  
PRIOR TO THE START OF CONSTRUCTION (RECOMMENDED 30 DAYS PRIOR) THE CONTRACTOR SHALL PERFORM EXPLORATORY TEST PITS AT LOCATIONS OF UTILITY / DRAINAGE CROSSINGS OR CONNECTIONS WITH EXISTING UTILITY OR STORMWATER INFRASTRUCTURE. THE CONTRACTOR IS RESPONSIBLE TO OBTAIN ANY NECESSARY ROAD OPENING PERMITS TO PERFORM SAID EXPLORATORY WORK. SHOULD A CONFLICT BE DISCOVERED WITH THE INFORMATION CONTAINED WITHIN THESE PLANS THE CONTRACTOR SHALL IMMEDIATELY NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC IN WRITING.

**SANITARY / STORMWATER CONSTRUCTION NOTE:**  
THE CONTRACTOR SHALL START CONSTRUCTION OF ALL GRAVITY SANITARY AND STORMWATER INFRASTRUCTURE AT THE DOWNSTREAM CONNECTION POINT (E.G. LOWEST INVERT) AND WORK UP-GRADE.

SYMBOL	DESCRIPTION
	PROPERTY LINE
	PROPOSED GRADING CONTOUR
	PROPOSED GRADING RIDGELINE
	PROPOSED STORMWATER STRUCTURES
	PROPOSED STORMWATER PIPING
	PROPOSED UNDERGROUND OUTLET STRUCTURE

**DRAINAGE AND UTILITY NOTES**

- THE CONTRACTOR TO PERFORM A TEST PIT PRIOR TO CONSTRUCTION (RECOMMEND 30 DAYS PRIOR) AT LOCATIONS OF EXISTING UTILITY CROSSINGS FOR STORMWATER IMPROVEMENTS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC IN WRITING. CONTRACTOR SHALL START CONSTRUCTION OF STORM LINES AT THE LOWEST INVERT AND WORK UP-GRADE.
- THE CONTRACTOR IS REQUIRED TO CALL THE APPROPRIATE AUTHORITY FOR NOTICE OF CONSTRUCTION EXCAVATION AND UTILITY MARK OUT PRIOR TO THE START OF CONSTRUCTION IN ACCORDANCE WITH STATE LAW. CONTRACTOR IS REQUIRED TO CONFIRM THE HORIZONTAL AND VERTICAL LOCATION OF UTILITIES IN THE FIELD. SHOULD A DISCREPANCY EXIST BETWEEN THE FIELD LOCATION OF A UTILITY AND THE LOCATION SHOWN ON THE PLAN SET OR SURVEY, THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC IMMEDIATELY IN WRITING.
- THE CONTRACTOR IS RESPONSIBLE TO MAINTAIN A RECORD OF THE AS-BUILT LOCATIONS OF ALL PROPOSED UNDERGROUND INFRASTRUCTURE. THE CONTRACTOR SHALL NOTE ANY DISCREPANCIES BETWEEN THE AS-BUILT LOCATIONS AND THE LOCATIONS DEPICTED WITHIN THE PLAN SET. THIS RECORD SHALL BE PROVIDED TO THE OWNER FOLLOWING COMPLETION OF WORK.

**EXCAVATION, SOIL PREPARATION, AND DEWATERING NOTES**

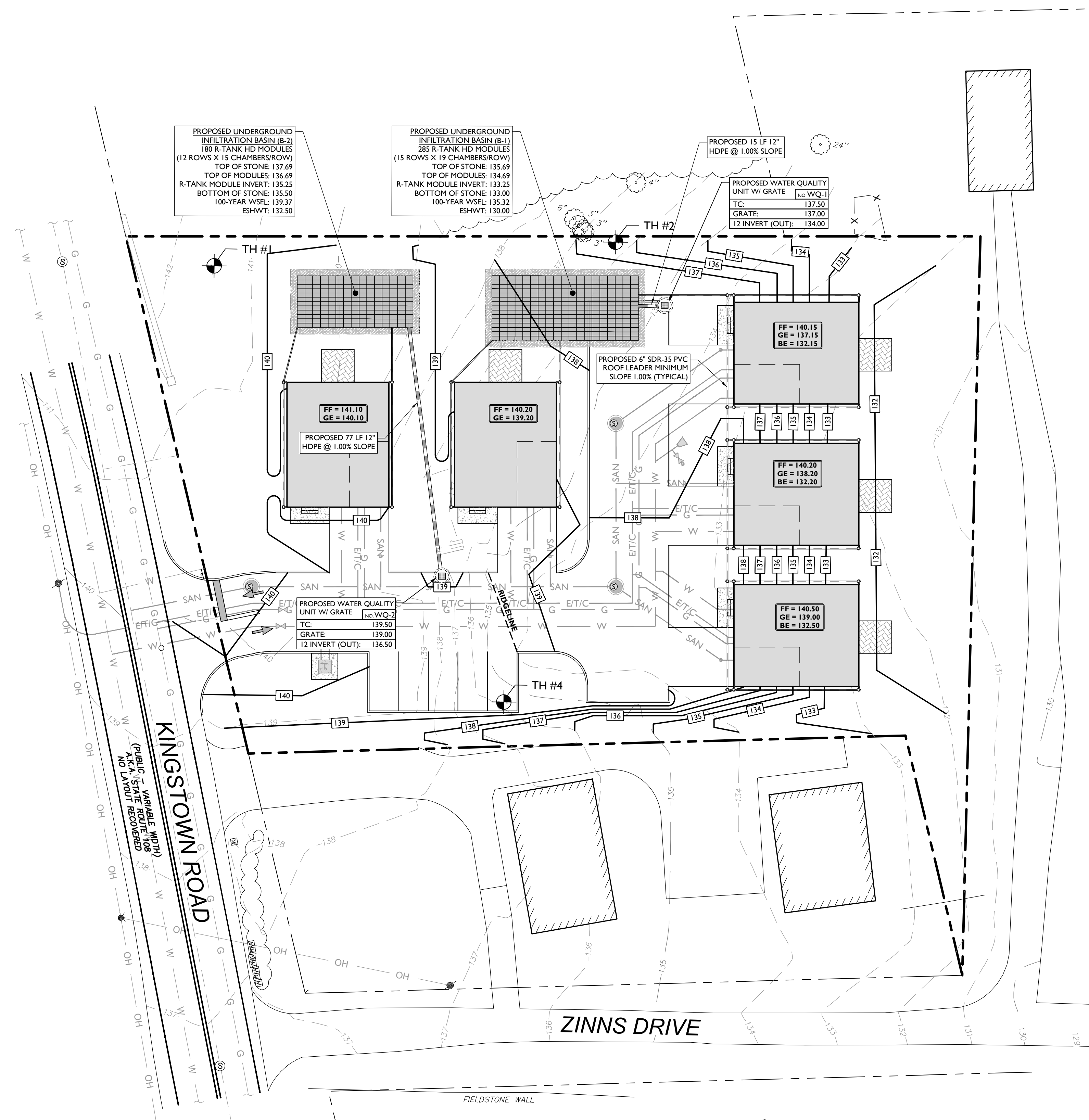
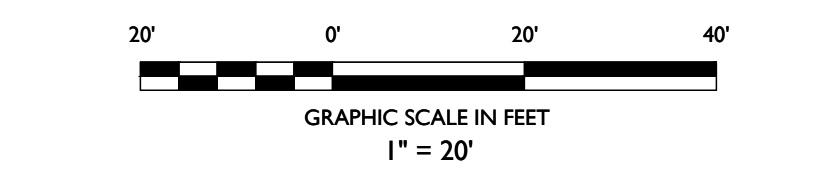
- THE CONTRACTOR IS REQUIRED TO REVIEW THE REFERENCED GEOTECHNICAL DOCUMENTS PRIOR TO CONSTRUCTION. THESE DOCUMENTS SHALL BE CONSIDERED A PART OF THE PLAN SET.
- THE CONTRACTOR IS REQUIRED TO PREPARE SUBGRADE SOILS BENEATH ALL PROPOSED IMPROVEMENTS AND BACKFILL ALL EXCAVATIONS IN ACCORDANCE WITH RECOMMENDATIONS BY THE GEOTECHNICAL ENGINEER OF RECORD.
- THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING SHORING FOR ALL EXCAVATIONS AS REQUIRED. CONTRACTOR SHALL HAVE THE SHORING DESIGN PREPARED BY A QUALIFIED PROFESSIONAL SHORING DESIGNER. THESE DESIGNS SHALL BE SUBMITTED TO STONEFIELD ENGINEERING & DESIGN, LLC, AND THE OWNER PRIOR TO THE START OF CONSTRUCTION.
- THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL OPEN EXCAVATIONS ARE PERFORMED AND PROTECTED IN ACCORDANCE WITH THE LATEST OSHA REGULATIONS.
- THE CONTRACTOR IS RESPONSIBLE FOR ANY DEWATERING DESIGN AND OPERATIONS, AS REQUIRED, TO CONSTRUCT THE PROPOSED IMPROVEMENTS. THE CONTRACTOR SHALL OBTAIN ANY REQUIRED PERMITS FOR DEWATERING OPERATIONS AND GROUNDWATER DISPOSAL.

**STORMWATER INFILTRATION BMP CONSTRUCTION NOTES**

- PRIOR TO THE START OF CONSTRUCTION, ANY AREA DESIGNATED TO BE USED FOR AN INFILTRATION BMP (E.G. BASIN, RETENTION AREA, ETC.) SHALL BE FENCED OFF AND SHALL NOT BE UTILIZED AS STORAGE FOR CONSTRUCTION EQUIPMENT OR AS A STOCKPILE AREA FOR CONSTRUCTION MATERIALS. NO ACTIVITY SHALL BE PERMITTED WITHIN THE INFILTRATION BASIN AREA UNLESS RELATED TO THE CONSTRUCTION OF THE INFILTRATION BASIN. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY ALL SUBCONTRACTORS OF BASIN AREA RESTRICTIONS.
- THE CONTRACTOR SHALL MAKE EVERY EFFORT, WHERE PRACTICAL, TO AVOID SUBGRADE SOIL COMPACTION IN THE AREAS DESIGNATED TO BE USED FOR AN INFILTRATION BMP.
- ALL EXCAVATION WITHIN THE LIMITS OF ANY INFILTRATION BMP SHALL BE PERFORMED WITH THE LIGHTEST PRACTICAL EXCAVATION EQUIPMENT. ALL EXCAVATION EQUIPMENT SHALL BE PLACED OUTSIDE THE LIMITS OF THE BASIN WHERE FEASIBLE. THE USE OF LIGHT-WEIGHT, RUBBER-TIRED EQUIPMENT (LESS THAN 8 PSI APPLIED TO THE GROUND SURFACE) IS RECOMMENDED WITHIN THE BASIN LIMITS.
- THE SEQUENCE OF SITE CONSTRUCTION SHALL BE COORDINATED WITH BASIN CONSTRUCTION TO ADHERE TO SEQUENCING LIMITATIONS.
- DURING THE FINAL GRADING OF AN INFILTRATION BASIN, THE BOTTOM OF THE BASIN SHALL BE DEEPLY TILLED WITH A ROTARY TILLER OR DISC HARROW AND THEN SMOOTHED OUT WITH A LEVELING DRAW OR EQUIVALENT GRADING EQUIPMENT. ALL GRADING EQUIPMENT SHALL BE LOCATED OUTSIDE OF THE BASIN BOTTOM WHERE FEASIBLE.
- FOLLOWING CONSTRUCTION OF AN INFILTRATION BASIN, SOIL INFILTRATION TESTING BY A LICENSED GEOTECHNICAL ENGINEER IS REQUIRED TO CERTIFY COMPLIANCE WITH THE DESIGN INFILTRATION RATES. IF THE FIELD INFILTRATION RATES ARE LOWER THAN THE RATE USED DURING DESIGN, THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC IN WRITING IMMEDIATELY TO DETERMINE THE APPROPRIATE COURSE OF ACTION.
- THE CONTRACTOR SHALL NOTIFY THE MUNICIPALITY TO DETERMINE IF WITNESS TESTING IS REQUIRED DURING INFILTRATION BASIN EXCAVATION AND/OR SOIL INFILTRATION TESTING.

**STORMWATER UNDERGROUND BMP CONSTRUCTION NOTES**

- THE CONTRACTOR SHALL INSTALL AND BACKFILL THE UNDERGROUND BMP IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
- UNDERGROUND BASINS SHALL UTILIZE A STONE BACKFILL WITH A MINIMUM VOID RATIO OF 40%.
- NO CONSTRUCTION LOADING OVER UNDERGROUND BASINS IS PERMITTED UNTIL BACKFILL IS COMPLETE PER THE MANUFACTURER'S SPECIFICATIONS. NO VEHICLES SHALL BE STAGED OR OPERATE FROM A FIXED POSITION OVER THE BASIN.



NO.	DATE	ISSUE	BY	DESCRIPTION
00	12/08/2023	ISSUE	AJD	FOR MUNICIPAL SUBMISSION

NOT APPROVED FOR CONSTRUCTION

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Phone 617.203.2076

**PLAN SET CLASSIFICATION**

**PROPOSED MULTI-HOUSEHOLD LAND DEVELOPMENT PROJECT**

BLOCK 32.4, LOT 71  
1000' x 1000' (APPROXIMATE)  
TOWN OF SOUTH KINGSTOWN  
WASHINGTON COUNTY, RHODE ISLAND

JOSHUA H. KLINE, P.E.  
RHODE ISLAND LICENSE No. 13607  
LICENSED PROFESSIONAL ENGINEER

**STONEFIELD**  
engineering & design

SCALE: 1" = 20' PROJECT ID: BOS-250053

TITLE:  
**STORMWATER MANAGEMENT PLAN**

DRAWING:  
**C-7**

- STABILIZATION SPECIFICATIONS:**
- I.A. TEMPORARY SEEDING AND MULCHING:  
GROUND LIMESTONE - APPLIED UNIFORMLY ACCORDING TO SOIL TEST RECOMMENDATIONS.  
FERTILIZER - APPLY 1 LBS./1,000 SF OF 10-20-10 OR EQUIVALENT WITH 50% WATER INSOLUBLE NITROGEN (UNLESS A SOIL TEST INDICATES OTHERWISE WORKED INTO THE SOIL A MINIMUM OF 4").  
SEED - PERENNIAL RYEGRASS 100 LBS./ACRE (2.3 LBS./1,000 SF) OR OTHER APPROVED SEEDS; PLANT BETWEEN MARCH 1 AND MAY 15 OR BETWEEN AUGUST 15 AND OCTOBER 1.  
MULCH - UNROTTED STRAW OR HAY AT A RATE OF 70 TO 90 LBS./1,000 SF APPLIED TO ACHIEVE 95% SOIL SURFACE COVERAGE. MULCH SHALL BE ANCHORED BY APPROVED METHODS (I.E. PEG AND TWINE, MULCH NETTING, OR LIQUID MULCH BINDER).
- I.B. PERMANENT SEEDING AND MULCHING:  
TOPSOIL - UNIFORM APPLICATION TO A DEPTH OF 5" (UNSETTLED).  
GROUND LIMESTONE - APPLIED UNIFORMLY ACCORDING TO SOIL TEST RECOMMENDATIONS.  
FERTILIZER - APPLY 1 LBS./1,000 SF OF 10-10-10 OR EQUIVALENT WITH 50% WATER INSOLUBLE NITROGEN (UNLESS A SOIL TEST INDICATES OTHERWISE WORKED INTO THE SOIL A MINIMUM OF 4").  
SEED - TURF TYPE TALL FESCUE (BLEND OF 3 CULTIVARS) 350 LBS./ACRE (8 LBS./1,000 SF) OR OTHER APPROVED SEEDS; PLANT BETWEEN MARCH 1 AND OCTOBER 1 (SUMMER SEEDINGS REQUIRE IRRIGATION).  
MULCH - UNROTTED STRAW OR HAY AT A RATE OF 70 TO 90 LBS./1,000 SF APPLIED TO ACHIEVE 95% SOIL SURFACE COVERAGE. MULCH SHALL BE ANCHORED BY APPROVED METHODS (I.E. PEG AND TWINE, MULCH NETTING, OR LIQUID MULCH BINDER).

- DUST CONTROL NOTES**
- MULCHES - SEE STANDARD OF STABILIZATION WITH MULCHES ONLY, PG. 5-1
  - VEGETATIVE COVER - SEE STANDARD FOR TEMPORARY VEGETATIVE COVER, PG. 7-1; PERMANENT VEGETATIVE COVER FOR SOIL STABILIZATION, PG. 4-1 AND PERMANENT STABILIZATION WITH SO2, PG. 6-1
  - SPRAY ON ADHESIVES - ON MINERAL SOILS (NOT EFFECTIVE ON MUCK SOILS); KEEP TRAFFIC OFF THESE AREAS.
  - TILLAGE - TO ROUGHEN SURFACE AND BRING CLODS TO THE SURFACE. THIS IS A TEMPORARY EMERGENCY MEASURE WHICH SHOULD BE USED BEFORE SOIL BLOWING STARTS. BEGIN PLOWING ON WINDWARD SIDE OF SITE. CHISEL-TYPE PLOWS SPACED ABOUT 12 INCHES APART AND SPRING-TOOTHED HARROWS ARE EXAMPLES OF EQUIPMENT WHICH MAY PRODUCE THE DESIRED EFFECT.
  - SPRINKLING - SITE IS SPRINKLED UNTIL THE SURFACE IS WET.
  - BARRIERS - SOLID BOARD FENCES, SNOW FENCES, BURLAP FENCES, CRATE WALLS, BALES OF HAY AND SIMILAR MATERIAL CAN BE USED TO CONTROL AIR CURRENTS AND SOIL BLOWING.
  - CALCIUM CHLORIDE - SHALL BE IN THE FORM OF LOOSE DRY GRANULES OR FLAKES FINE ENOUGH TO FEED THROUGH COMMONLY USED SPREADERS AT A RATE THAT WILL KEEP SURFACE MOIST BUT NOT CAUSE POLLUTION OR PLANT DAMAGE. IF USED ON STEEPER SLOPES, THEN USE OTHER PRACTICES TO PREVENT WASHING INTO STREAMS OR ACCUMULATION AROUND PLANTS.
  - STONE - COVER SURFACE WITH CRUSHED STONE OR COARSE GRAVEL.

- SEQUENCE OF CONSTRUCTION**
- INSTALL CONSTRUCTION ENTRANCE AND SILT FENCE (2 DAYS).
  - DEMOLISH EXISTING STRUCTURES, PAVEMENT, AND GRAVEL (7 DAYS).
  - ROUGH GRADING AND TEMPORARY SEEDING (21 DAYS).
  - BUILDING CONSTRUCTION AND SITE IMPROVEMENTS (120 DAYS).
  - LANDSCAPING IMPROVEMENTS AND FINAL SEEDING (7 DAYS).
  - REMOVE SOIL EROSION MEASURES (1 DAY).
- TOTAL ESTIMATED TIME = 8 MONTHS
- NOTE: TIME DURATIONS ARE APPROXIMATE AND ARE INTENDED TO ACT AS A GENERAL GUIDE TO THE CONSTRUCTION TIMELINE. ALL DURATIONS ARE SUBJECT TO CHANGE BY CONTRACTOR. CONTRACTOR SHALL SUBMIT CONSTRUCTION SCHEDULE TO TOWNSHIP AND ENGINEER. CONTRACTOR SHALL PHASE CONSTRUCTION ACCORDINGLY.

**SOIL CHARACTERISTICS CHART**

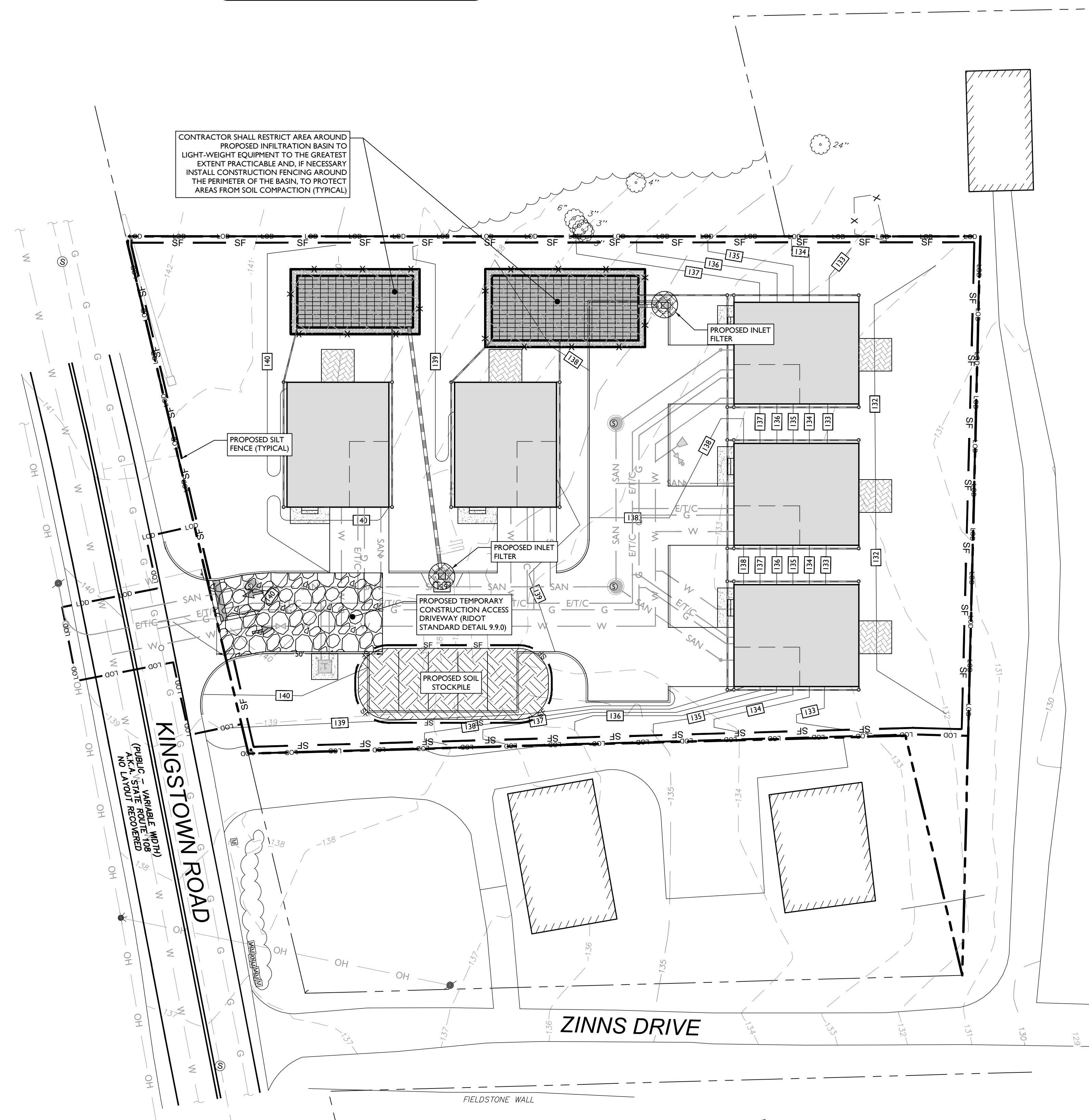
TYPE OF SOIL	CANTON-URBAN LAND COMPLEX (CB)
PERCENT OF SITE COVERAGE	100%
HYDROLOGIC SOIL GROUP	B
SOIL PERMEABILITY	0.57 IN / HR TO 5.95 IN / HR
DEPTH TO WATER TABLE	96 INCHES

**SYMBOL DESCRIPTION**

	PROPERTY BOUNDARY
	ADJACENT PROPERTY BOUNDARY
	LOD
	PROPOSED SILT FENCE
	PROPOSED TREE PROTECTION FENCE
	PROPOSED STOCKPILE & EQUIPMENT STORAGE
	PROPOSED STABILIZED CONSTRUCTION ENTRANCE
	PROPOSED INLET PROTECTION FILTER

- SOIL EROSION AND SEDIMENT CONTROL NOTES**
- THE CONTRACTOR IS RESPONSIBLE FOR SOIL EROSION AND SEDIMENT CONTROL IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REQUIREMENTS.
  - THE CONTRACTOR IS RESPONSIBLE FOR DUST CONTROL IN COMPLIANCE WITH LOCAL, STATE, AND FEDERAL AIR QUALITY STANDARDS.
  - THE CONTRACTOR IS RESPONSIBLE TO INSPECT ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES WEEKLY AND AFTER A PRECIPITATION EVENT GREATER THAN 1 INCH. THE CONTRACTOR SHALL MAINTAIN AN INSPECTION LOG ON SITE AND DOCUMENT CORRECTIVE ACTION TAKEN THROUGHOUT THE COURSE OF CONSTRUCTION AS REQUIRED.

- SEDIMENT EROSION AND SEDIMENT CONTROL PLAN (SESC) NOTES:**
- THE INSTALLATION OF TEMPORARY EROSION, RUNOFF, SEDIMENT, AND POLLUTION PREVENTION CONTROL MEASURES SHALL BE COMPLETED BY THE TIME EACH PHASE OF EARTH-DISTURBANCE HAS BEGUN. ALL STORMWATER CONTROL MEASURES MUST BE INSTALLED IN ACCORDANCE WITH GOOD JUDGMENT, INCLUDING APPLICABLE DESIGN AND MANUFACTURER SPECIFICATIONS. INSTALLATION TECHNIQUES AND MAINTENANCE REQUIREMENTS SHALL BE ACCORDANCE WITH THE MANUFACTURER SPECIFICATIONS AND THE RI SESC HANDBOOK.
- ANTICIPATING WEATHER EVENTS  
CARE SHALL BE TAKEN TO THE BEST OF THE OPERATOR'S ABILITY TO AVOID DISTURBING LARGE AREAS PRIOR TO ANTICIPATED PRECIPITATION EVENTS. WEATHER FORECASTS MUST BE ROUTINELY CHECKED, AND IN THE CASE OF AN EXPECTED PRECIPITATION EVENT OF OVER 0.25-INCHES OVER A 24-HOUR PERIOD, IT IS HIGHLY RECOMMENDED THAT ALL CONTROL MEASURES SHOULD BE EVALUATED AND MAINTAINED AS NECESSARY, PRIOR TO THE WEATHER EVENT. IN THE CASE OF AN EXTREME WEATHER FORECAST (GREATER THAN ONE-INCH OF RAIN OVER A 24-HOUR PERIOD), ADDITIONAL EROSION/SEDIMENT CONTROLS MAY NEED TO BE INSTALLED.
- MINIMUM INSPECTION FREQUENCY REQUIREMENTS:  
ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED BY OR UNDER THE SUPERVISION OF THE OWNER AND OPERATOR AT LEAST ONCE EVERY SEVEN (7) CALENDAR DAYS AND WITHIN TWENTY-FOUR (24) HOURS AFTER ANY STORM EVENT, WHICH GENERATES AT LEAST 0.25 INCHES OF RAINFALL PER TWENTY-FOUR (24) HOUR PERIOD AND/OR AFTER A SIGNIFICANT AMOUNT OF RUNOFF OR SNOWMELT.
- ALL AREAS THAT HAVE BEEN CLEARED, GRADED, OR EXCAVATED AND WHERE PERMANENT STABILIZATION HAS NOT BEEN ACHIEVED.
  - ALL STORMWATER EROSION, RUNOFF, AND SEDIMENT CONTROL MEASURES (INCLUDING POLLUTION PREVENTION CONTROL MEASURES) INSTALLED AT THE SITE.
  - CONSTRUCTION MATERIAL, UNSTABILIZED SOIL STOCKPILES, WASTE, BORROW, OR EQUIPMENT STORAGE, AND MAINTENANCE AREAS THAT ARE COVERED BY THIS PERMIT AND ARE EXPOSED TO PRECIPITATION.
  - ALL AREAS WHERE STORMWATER TYPICALLY FLOWS WITHIN THE SITE, INCLUDING TEMPORARY DRAINAGE WAYS DESIGNED TO DIVERT, CONVEY, AND/OR TREAT STORMWATER.
  - ALL POINTS OF DISCHARGE FROM THE SITE.
  - ALL LOCATIONS WHERE TEMPORARY SOIL STABILIZATION MEASURES HAVE BEEN IMPLEMENTED.
  - ALL LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE.
- MAINTENANCE REQUIREMENTS:  
MAINTENANCE PROCEDURES FOR EROSION AND SEDIMENTATION CONTROLS AND STORMWATER MANAGEMENT STRUCTURES/FACILITIES SHALL BE IN ACCORDANCE WITH THE RI SESC HANDBOOK. SITE OWNERS AND OPERATORS MUST ENSURE THAT ALL EROSION, RUNOFF, SEDIMENT, AND POLLUTION PREVENTION CONTROLS REMAIN IN EFFECTIVE OPERATING CONDITION AND ARE PROTECTED FROM ACTIVITIES THAT WOULD REDUCE THEIR EFFECTIVENESS. EROSION, RUNOFF, SEDIMENTATION, AND POLLUTION PREVENTION CONTROL MEASURES MUST BE MAINTAINED THROUGHOUT THE COURSE OF THE PROJECT.



FOR MUNICIPAL SUBMISSION	DATE	BY
	12/08/2023	
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Phone 617.203.2076

**PLAN SET CLASSIFICATION**

**PROPOSED MULTI-HOUSEHOLD LAND DEVELOPMENT PROJECT**

BLOCK 32.4, LOT 71  
1000 WEST WASHINGTON ROAD (STATE ROUTE 108)  
TOWN OF SOUTH KINGSTOWN  
WASHINGTON COUNTY, RHODE ISLAND

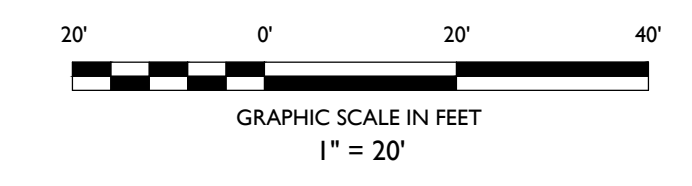
JOSHUA H. KLINE, P.E.  
RHODE ISLAND LICENSE No. 13607  
LICENSED PROFESSIONAL ENGINEER

**STONEFIELD**  
engineering & design

SCALE: 1" = 20' PROJECT ID: BOS-250053

TITLE:  
**SOIL EROSION AND SEDIMENT CONTROL PLANS**

DRAWING:  
**C-9**



Z:\BOSTON\BOS250053\BOS250053-1003 HELLY MILLER - 2001 KINGSTOWN ROAD, SOUTH KINGSTOWN, RHODE ISLAND\LOT71\DWG\BOS250053.DWG



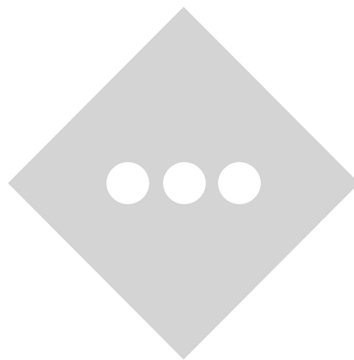
# **APPENDIX E**

## **DRAINAGE AREA MAPS**

### **INVENTORY**

**SHEET 1 OF 2: EXISTING DRAINAGE AREA MAP**

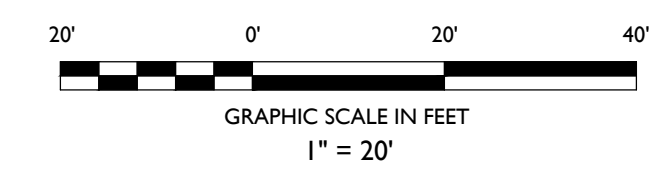
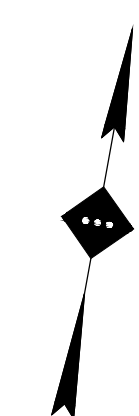
**SHEET 2 OF 2: PROPOSED DRAINAGE AREA MAP**



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SYMBOL	DESCRIPTION
---	PROPERTY LINE
- - -	SOIL CLASSIFICATION AREA
---	EXISTING DRAINAGE AREA
▽▽▽	EXISTING PERVIOUS AREA
+++++	EXISTING WOODED AREA



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Phone 617.203.2076

**PLAN SET CLASSIFICATION**

**PROPOSED MULTI-FAMILY  
RESIDENTIAL DEVELOPMENT**

BLOCK 32.4, LOT 71  
SOUTH KINGSTOWN ROAD, STATE ROUTE 108  
TOWN OF SOUTH KINGSTOWN  
WASHINGTON COUNTY, RHODE ISLAND

JOSHUA H. KLINE, P.E.  
RHODE ISLAND LICENSE No. 13607  
LICENSED PROFESSIONAL ENGINEER

**STONEFIELD**  
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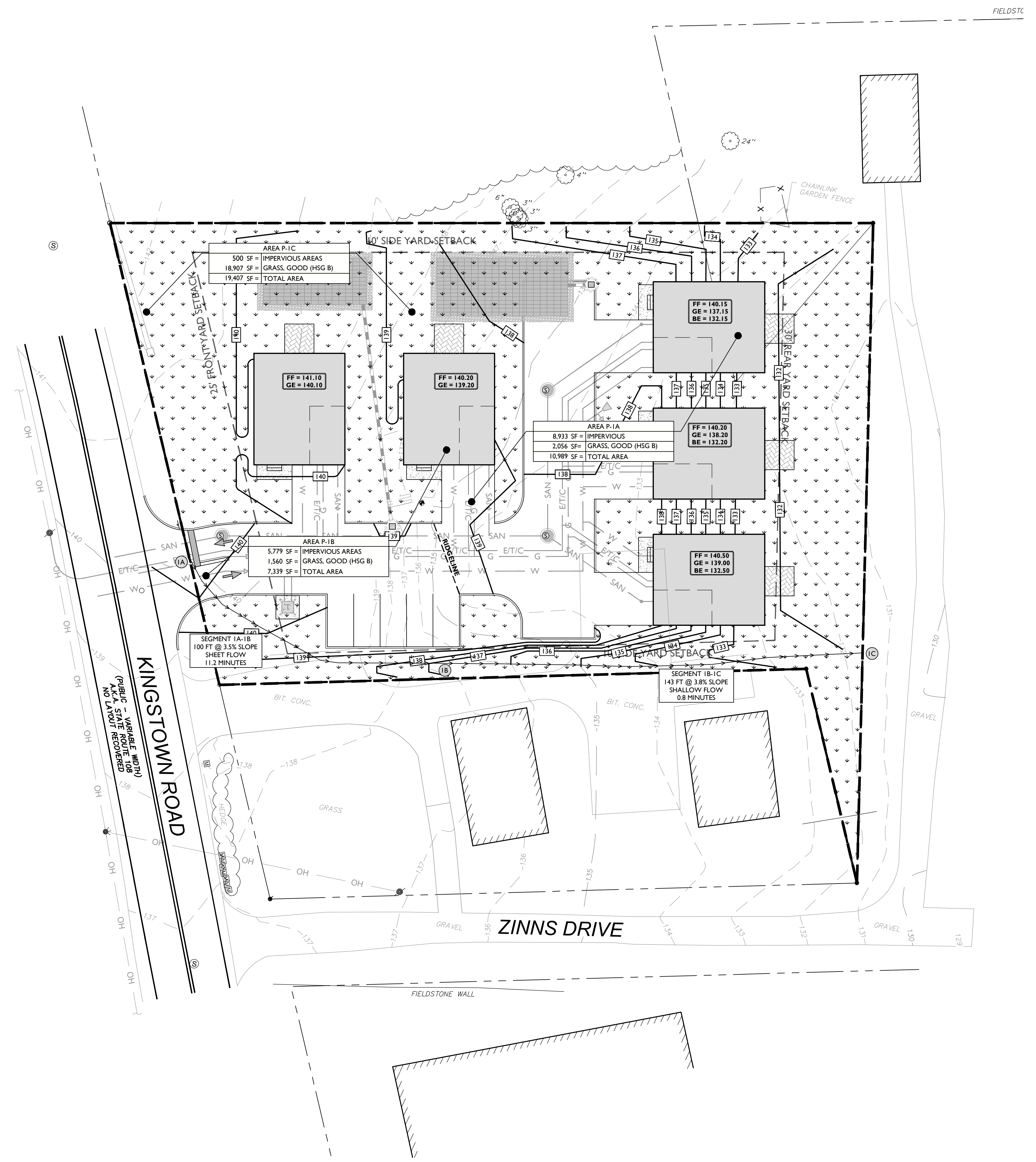
SCALE: 1" = 20' PROJECT ID: BOS-250053

TITLE:  
**EXISTING DRAINAGE  
AREA MAP**

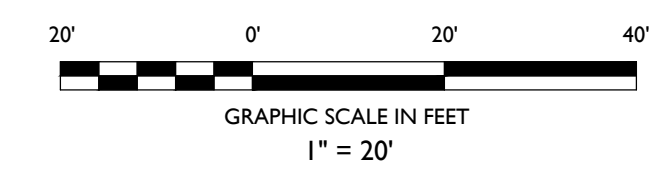
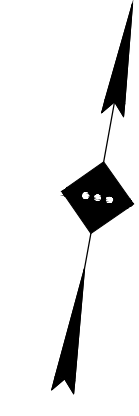
DRAWING:

**1 OF 2**

Z:\BOSTON\BOS25005\BOS25005\RELEVY\RELEVY - 2001 KINGSTOWN ROAD, SOUTH KINGSTOWN, RHODE ISLAND\DRAINAGE AREA\HWS\BS-013\_DRAINAGE AREA.HWS.DWG



SYMBOL	DESCRIPTION
	PROPERTY LINE
	PROPOSED DRAINAGE AREA
	PROPOSED PERVIOUS AREA



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PLAN SET CLASSIFICATION

**PROPOSED MULTI-FAMILY  
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BLOCK 32.4, LOT 71  
SOUTH KINGSTOWN ROAD (STATE ROUTE 108)  
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JOSHUA H. KLINE, P.E.  
RHODE ISLAND LICENSE No. 13607  
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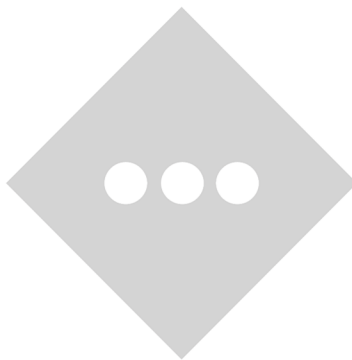
**STONEFIELD**  
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SCALE: 1" = 20' PROJECT ID: BOS-250053

TITLE:  
**PROPOSED DRAINAGE  
AREA MAP**

DRAWING:

**APPENDIX F**  
**RIDEM APPENDIX A STORMWATER**  
**MANAGEMENT PLAN CHECKLIST**



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

<b>PROJECT NAME</b> Kingstown Road Residential Development	<b>(RIDEM USE ONLY)</b>
<b>TOWN</b> South Kingstown	STW/WQC File #:
<b>BRIEF PROJECT DESCRIPTION:</b> Proposed five (5) single family residential dwellings.	Date Received:

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

When submitting a SMP,<sup>1</sup> 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)

<input checked="" type="checkbox"/> Residential	<input type="checkbox"/> Commercial	<input type="checkbox"/> Federal	<input type="checkbox"/> Retrofit	<input type="checkbox"/> Restoration
<input type="checkbox"/> Road	<input type="checkbox"/> Utility	<input type="checkbox"/> Fill	<input type="checkbox"/> Dredge	<input type="checkbox"/> Mine
<input type="checkbox"/> 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.)

<input checked="" type="checkbox"/> <b>Groundwater</b>	<input type="checkbox"/> <b>Surface Water</b>	<input type="checkbox"/> <b>MS4</b>
<input type="checkbox"/> GAA	<input type="checkbox"/> Isolated Wetland	<input type="checkbox"/> RIDOT
<input checked="" type="checkbox"/> GA	<input type="checkbox"/> Named Waterbody	<input type="checkbox"/> RIDOT Alteration Permit is Approved
<input type="checkbox"/> GB	<input type="checkbox"/> Unnamed Waterbody Connected to Named Waterbody	<input type="checkbox"/> Town
<input type="checkbox"/> Other (specify):		

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

<input checked="" type="checkbox"/> Groundwater or Disconnected Wetland	<input type="checkbox"/> SRWP
<input checked="" type="checkbox"/> Waterbody Name: Trib to Saugatucket Pond	<input type="checkbox"/> Coldwater <input type="checkbox"/> Warmwater <input type="checkbox"/> Unassessed
<input checked="" type="checkbox"/> Waterbody ID: R10010045R-07	<input type="checkbox"/> 4 <sup>th</sup> order stream of pond 50 acres or more
<input type="checkbox"/> TMDL for:	<input type="checkbox"/> Watershed of flood prone river (e.g., Pocasset River)
<input type="checkbox"/> Contributes to a priority outfall listed in the TMDL	<input type="checkbox"/> Contributes stormwater to a public beach
<input checked="" type="checkbox"/> 303(d) list – Impairment(s) for: Primary and Secondary contact recreation	<input type="checkbox"/> Contributes to shellfishing grounds

<sup>1</sup> 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.

<b>PROJECT HISTORY</b>		
<input type="checkbox"/> RIDEM Pre- Application Meeting	Meeting Date:	<input type="checkbox"/> Minutes Attached
<input type="checkbox"/> Municipal Master Plan Approval	Approval Date:	<input type="checkbox"/> Minutes Attached
<input type="checkbox"/> Subdivision Suitability Required	Approval #:	
<input type="checkbox"/> Previous Enforcement Action has been taken on the property	Enforcement #:	
<b>FLOODPLAIN &amp; FLOODWAY See <a href="#">Guidance Pertaining to Floodplain and Floodways</a></b>		
<input type="checkbox"/> Riverine 100-year floodplain: <b>FEMA FLOODPLAIN FIRMETTE</b> has been reviewed and the 100-year floodplain is on site		
<input type="checkbox"/> Delineated from FEMA Maps		
<b>NOTE:</b> 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		
<input type="checkbox"/> Calculated by Professional Engineer		
<input type="checkbox"/> Calculations are provided for cut vs. fill/displacement volumes proposed within the 100-year floodplain	Amount of Fill (CY):	
	Amount of Cut (CY):	
<input type="checkbox"/> Restrictions or modifications are proposed to the flow path or velocities in a floodway		
<input type="checkbox"/> Floodplain storage capacity is impacted		
<input checked="" type="checkbox"/> Project area is not within 100-year floodplain as defined by RIDEM		

<b>CRMC JURISDICTION</b>
<input type="checkbox"/> CRMC Assent required
<input type="checkbox"/> Property subject to a Special Area Management Plan (SAMP). If so, specify which SAMP:
<input type="checkbox"/> Sea level rise mitigation has been designed into this project

<b>LUHPPL IDENTIFICATION - MINIMUM STANDARD 8:</b>		
<b>1. OFFICE OF Land Revitalization and Sustainable Materials Management (OLRSMM)</b>		
<input type="checkbox"/> 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))		<b>RIDEM CONTACT:</b>
<input type="checkbox"/> 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)		
<input type="checkbox"/> This site is identified on the <a href="#">RIDEM Environmental Resources Map</a> as one of the following regulated facilities		<b>SITE ID#:</b>
<input type="checkbox"/> CERCLIS/Superfund (NPL)		
<input type="checkbox"/> State Hazardous Waste Site (SHWS)		
<input type="checkbox"/> Environmental Land Usage Restriction (ELUR)		
<input type="checkbox"/> Leaking Underground Storage Tank (LUST)		
<input type="checkbox"/> Closed Landfill		
<b>Note:</b> If any boxes in 1 above are checked, the applicant must contact the RIDEM OLRSM 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.		
<b>2. PER MINIMUM STANDARD 8 of RICR 8.14.C.1-6 "LUHPPLS," THE SITE IS/HAS:</b>		
<input type="checkbox"/> Industrial Site with RIPDES MSGP, except where No Exposure Certification exists. <a href="http://www.dem.ri.gov/programs/water/permits/ripdes/stormwater/status.php">http://www.dem.ri.gov/programs/water/permits/ripdes/stormwater/status.php</a>		
<input type="checkbox"/> Auto Fueling Facility (e.g., gas station)		
<input type="checkbox"/> Exterior Vehicles Service, Maintenance, or Equipment Cleaning Area		

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

<input type="checkbox"/>	Road Salt Storage and Loading Areas (exposed to rainwater)	
<input type="checkbox"/>	Outdoor Storage and Loading/Unloading of Hazardous Substances	
<b>3. STORMWATER INDUSTRIAL PERMITTING</b>		
<input type="checkbox"/>	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: Sector:
<input type="checkbox"/>	Construction is proposed on a site that is subject to <a href="#">THE MULTI-SECTOR GENERAL PERMIT (MSGP) UNDER RULE 31(B)15 OF THE RIPDES REGULATIONS.</a>	MSGP permit #
<input type="checkbox"/>	Additional stormwater treatment is required by the MSGP Explain:	

<b>REDEVELOPMENT STANDARD – MINIMUM STANDARD 6</b>		
<input checked="" type="checkbox"/> Pre Construction Impervious Area		
<input checked="" type="checkbox"/>	Total Pre-Construction Impervious Area (TIA) = 3,512 SF	
<input checked="" type="checkbox"/>	Total Site Area (TSA) = 37,736 SF	
<input type="checkbox"/>	Jurisdictional Wetlands (JW)	
<input type="checkbox"/>	Conservation Land (CL)	
<input checked="" type="checkbox"/> Calculate the Site Size (defined as contiguous properties under same ownership)		
<input checked="" type="checkbox"/>	Site Size (SS) = (TSA) – (JW) – (CL) = 37,736 SF	
<input checked="" type="checkbox"/>	(TIA) / (SS) = 0.093	<input type="checkbox"/> (TIA) / (SS) >0.4?
<input type="checkbox"/> 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)

<p><b>A) PRESERVATION OF UNDISTURBED AREAS, BUFFERS, AND FLOODPLAINS</b></p> <p><input type="checkbox"/> Sensitive resource areas and site constraints are identified (required)</p> <p><input checked="" type="checkbox"/> Local development regulations have been reviewed (required)</p> <p><input type="checkbox"/> All vegetated buffers and coastal and freshwater wetlands will be protected during and after construction</p> <p><input type="checkbox"/> Conservation Development or another site design technique has been incorporated to protect open space and pre-development hydrology. <b>Note:</b> If Conservation Development has been used, check box and skip to Subpart C</p> <p><input checked="" type="checkbox"/> As much natural vegetation and pre-development hydrology as possible has been maintained</p>	<p>No resource areas located on or in the immediate vicinity of the project site.</p>
--	---

<p><b>B) LOCATE DEVELOPMENT IN LESS SENSITIVE AREAS AND WORK WITH THE NATURAL LANDSCAPE CONDITIONS, HYDROLOGY, AND SOILS</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Development sites and building envelopes have been appropriately distanced from wetlands and waterbodies</li> <li><input checked="" type="checkbox"/> Development and stormwater systems have been located in areas with greatest infiltration capacity (e.g., soil groups A and B)</li> <li><input checked="" type="checkbox"/> Plans show measures to prevent soil compaction in areas designated as Qualified Pervious Areas (QPA's)</li> <li><input checked="" type="checkbox"/> Development sites and building envelopes have been positioned outside of floodplains</li> <li><input checked="" type="checkbox"/> Site design positions buildings, roadways and parking areas in a manner that avoids impacts to surface water features</li> <li><input checked="" type="checkbox"/> Development sites and building envelopes have been located to minimize impacts to steep slopes (<math>\geq 15\%</math>)</li> <li><input type="checkbox"/> Other (describe):</li> </ul>	
<p><b>C) MINIMIZE CLEARING AND GRADING</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Site clearing has been restricted to <u>minimum area needed</u> for building footprints, development activities, construction access, and safety.</li> <li><input checked="" type="checkbox"/> Site has been designed to position buildings, roadways, and parking areas in a manner that minimizes grading (cut and fill quantities)</li> <li><input checked="" type="checkbox"/> 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)</li> <li><input checked="" type="checkbox"/> Plan notes specify that public trees removed or damaged during construction shall be replaced with equivalent</li> </ul>	
<p><b>D) REDUCE IMPERVIOUS COVER</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Reduced roadway widths (<math>\leq 22</math> feet for ADT <math>\leq 400</math>; <math>\leq 26</math> feet for ADT 400 - 2,000)</li> <li><input type="checkbox"/> Reduced driveway areas (length minimized via reduced ROW width (<math>\leq 45</math> ft.) and/or reduced (or absolute minimum) front yard setback; width minimized to <math>\leq 9</math> ft. wide one lane; <math>\leq 18</math> ft. wide two lanes; shared driveways; pervious surface)</li> <li><input type="checkbox"/> Reduced building footprint: Explain approach:</li>   <li><input checked="" type="checkbox"/> Reduced sidewalk area (<math>\leq 4</math> ft. wide; one side of the street; unpaved path; pervious surface)</li> <li><input type="checkbox"/> Reduced cul-de-sacs (radius <math>&lt; 45</math> ft; vegetated island; alternative turn-around)</li> <li><input type="checkbox"/> Reduced parking lot area: Explain approach</li> <li><input type="checkbox"/> Use of pervious surfaces for driveways, sidewalks, parking areas/overflow parking areas, etc.</li> <li><input checked="" type="checkbox"/> Minimized impervious surfaces (project meets or is less than maximum specified by Zoning Ordinance)</li> <li><input type="checkbox"/> Other (describe):</li> </ul>	
<p><b>E) DISCONNECT IMPERVIOUS AREA</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Impervious surfaces have been disconnected, and runoff has been diverted to QPAs to the maximum extent possible</li> <li><input type="checkbox"/> Residential street edges allow side-of-the-road drainage into vegetated open swales</li> <li><input type="checkbox"/> Parking lot landscaping breaks up impervious expanse AND accepts runoff</li> <li><input type="checkbox"/> Other (describe):</li> </ul>	
<p><b>F) MITIGATE RUNOFF AT THE POINT OF GENERATION</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Small-scale BMPs have been designated to treat runoff as close as possible to the source</li> </ul>	

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

<p><b>G) PROVIDE LOW-MAINTENANCE NATIVE VEGETATION</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Low-maintenance landscaping has been proposed using native species and cultivars</li> <li><input checked="" type="checkbox"/> Plantings of native trees and shrubs in areas previously cleared of native vegetation are shown on site plan</li> <li><input checked="" type="checkbox"/> Lawn areas have been limited/minimized, and yards have been kept undisturbed to the maximum extent practicable on residential lots</li> </ul>	
<p><b>H) RESTORE STREAMS/WETLANDS</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Historic drainage patterns have been restored by removing closed drainage systems, daylighting buried streams, and/or restoring degraded stream channels and/or wetlands</li> <li><input type="checkbox"/> Removal of invasive species</li> <li><input type="checkbox"/> Other</li> </ul>	No streams or wetlands located onsite.

**PART 3. SUMMARY OF REMAINING STANDARDS**

GROUNDWATER RECHARGE – MINIMUM STANDARD 2		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project has been designed to meet the groundwater recharge standard.
<input type="checkbox"/>	<input type="checkbox"/>	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);
<input type="checkbox"/>	<input type="checkbox"/>	Your waiver request has been explained in the Narrative, if applicable.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is this site identified as a Regulated Facility in Part 1, Minimum Standard 8: LUHPPL Identification?
<input type="checkbox"/>	<input type="checkbox"/>	If “Yes,” has approval for infiltration by the OLRSM Site Project Manager, per Part 1, Minimum Standard 8, been requested?

**TABLE 2-1: Summary of Recharge (see RISDISM Section 3.3.2)**  
(Add or Subtract Rows as Necessary)

Design Point	Impervious Area Treated (sq ft)	Total Re <sub>v</sub> Required (cu ft)	LID Stormwater Credits (see RISDISM Section 4.6.1)	Recharge Required by Remaining BMPs (cu ft)	Recharge Provided by BMPs (cu ft)
			Portion of Re <sub>v</sub> directed to a QPA (cu ft)		
DP-1:	15,212	443.7	0	443.7	3,210
DP-2:					
DP-3:					
DP-4:					
<b>TOTALS:</b>	15,212	443.7	0	443.7	3,210

- Notes:
- Only BMPs listed in RISDISM Table 3-5 “List of BMPs Acceptable for Recharge” may be used to meet the recharge requirement.
  - 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.):

Refer to Appendix C of the provided stormwater report

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

WATER QUALITY – MINIMUM STANDARD 3		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Does this project meet or exceed the required water quality volume WQv (see RICR 8.9.E-I)?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Is the proposed final impervious cover greater than 20% of the disturbed area (see RICR 8.9.E-I)?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	If “Yes,” either the Modified Curve Number Method or the Split Pervious/Impervious method in Hydro-CAD was used to calculate WQv; or,
<input checked="" type="checkbox"/>	<input type="checkbox"/>	If “Yes,” either TR-55 or TR-20 was used to calculate WQv; and,
<input type="checkbox"/>	<input type="checkbox"/>	If “No,” the project meets the minimum WQv of 0.2 watershed inches over the entire disturbed area.
<input type="checkbox"/>	<input type="checkbox"/>	Not Applicable
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Does this project meet or exceed the ability to treat required water quality flow WQf (see RICR 8.9.I.1-3)?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Does this project propose an increase of impervious cover to a receiving water body with impairments? 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. Contech CDS water quality units and infiltration basins proposed for water quality requirements.
<input type="checkbox"/>	<input type="checkbox"/>	RICR 8.36. A Pollutant Loading Analysis is needed and has been completed.
<input type="checkbox"/>	<input type="checkbox"/>	The Water Quality Guidance Document ( <a href="#">Water Quality Goals and Pollutant Loading Analysis Guidance for Discharges to Impaired Waters</a> ) has been followed as applicable.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	BMPs are proposed that are on the <a href="#">approved technology list</a> . If “Yes,” please provide all required worksheets from the manufacturer.
<input type="checkbox"/>	<input type="checkbox"/>	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. 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 WQv Required (cu ft)	LID Stormwater Credits (see RICR 8.18)	Water Quality Treatment Remaining (cu ft)	Water Quality Provided by BMPs (cu ft)
			WQv directed to a QPA (cu ft)		
DP-1:	15,212	1,267.7	0	1,267.7	3,210
DP-2:					
DP-3:					
DP-4:					
<b>TOTALS:</b>	15,212	1,267.7	0	1,267.7	3,210
<b>Notes:</b>					
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.					
<input checked="" type="checkbox"/> YES	This project has met the setback requirements for each BMP.				
<input type="checkbox"/> NO	If “No,” please explain:				
<input checked="" type="checkbox"/>	Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.): Refer to Appendix C of the provided stormwater report				

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

CONVEYANCE AND NATURAL CHANNEL PROTECTION (RICR 8.10) – MINIMUM STANDARD 4		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Is this standard waived? If “Yes,” please indicate one or more of the reasons below:
		<input type="checkbox"/> 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. <input type="checkbox"/> The project is a small facility with impervious cover of less than or equal to 1 acre. <input checked="" type="checkbox"/> 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). ( <u>Note</u> : LID design strategies can greatly reduce the peak discharge rate).
<input type="checkbox"/>	<input type="checkbox"/>	Conveyance and natural channel protection for the site have been met. 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:					
<b>TOTALS:</b>					
<u>Note</u> : The Channel Protection Volume Standard must be met in each waterbody ID.					
<input type="checkbox"/> YES <input type="checkbox"/> 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).				
<input type="checkbox"/> YES <input type="checkbox"/> NO	Do additional design restrictions apply resulting from any discharge to cold-water fisheries; If “Yes,” please indicate restrictions and solutions below.				
<input type="checkbox"/> 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.).					

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

<b>OVERBANK FLOOD PROTECTION (RICR 8.11) AND OTHER POTENTIAL HIGH FLOWS – MINIMUM STANDARD 5</b>		
<b>YES</b>	<b>NO</b>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is this standard waived? If yes, please indicate one or more of the reasons below:
		<input type="checkbox"/> 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. <input type="checkbox"/> 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).
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Does the project flow to an MS4 system or subject to other stormwater requirements? If "Yes," indicate as follows:
		<input type="checkbox"/> RIDOT <input type="checkbox"/> Other (specify):
<p><b>Note:</b> The project could be approved by RIDEM but not meet RIDOT or Town standards. RIDOT's regulations indicate that post-volumes must be <b>less</b> 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.</p>		
		Indicate below which model was used for your analysis. <input type="checkbox"/> TR-55 <input type="checkbox"/> TR-20 <input checked="" type="checkbox"/> HydroCAD <input type="checkbox"/> Bentley/Haestad <input type="checkbox"/> Intellisolve <input type="checkbox"/> Other (Specify):
<b>YES</b>	<b>NO</b>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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.):
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Do off-site areas contribute to the sub-watersheds and design points? If "Yes,"
<input type="checkbox"/>	<input type="checkbox"/>	Are the areas modeled as "present condition" for both pre- and post-development analysis?
<input type="checkbox"/>	<input type="checkbox"/>	Are the off-site areas shown on the subwatershed maps?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Does the drainage design confirm safe passage of the 100-year flow through the site for off-site runoff?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is a Downstream Analysis required (see RICR 8.11.E.1)?
<input type="checkbox"/>	<input type="checkbox"/>	Calculate the following:
		<input checked="" type="checkbox"/> Area of disturbance within the sub-watershed (areas) = 38,655 SF
		<input checked="" type="checkbox"/> Impervious cover (%) = 15,212 SF (Proposed) = 39.4%
<input type="checkbox"/>	<input checked="" type="checkbox"/>	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)?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Does this project meet the overbank flood protection standard?

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

**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:	0.00	0.00	0.18	0.07	1.07	0.53	3.17	1.67
DP-2:								
DP-3:								
DP-4:								
<b>TOTALS:</b>	0.00	0.00	0.18	0.07	1.07	0.53	3.17	1.67

\*\* 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.	See Appendix C of the stormwater report
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.	See Appendix C of the stormwater report
Final sizing calculations for structural stormwater BMPs, including contributing drainage area, storage, and outlet configuration.	See Appendix C of the stormwater report
Stage-storage, inflow and outflow hydrographs for storage facilities (e.g., detention, retention, or infiltration facilities).	See Appendix C-10 and C-11 of the stormwater report

**Table 5-2 Summary of Best Management Practices**

BMP ID	DP #	BMP Type (e.g., bioretention, tree filter)	BMP Functions					Bypass Type External (E) Internal (I) or NA	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 <sub>v</sub> (CF)	WQ <sub>v</sub> (CF)	CP <sub>v</sub> (Y/N/NA)	Overbank Flood Reduction (Y/N/NA)		Yes/No	Technical Justification (Design Report page number)	Distance Provided
B-1	POI-1	UIC	Y	1,936	1,936	NA	Y	NA	Y	NA	10FT
B-2	POI-1	UIC	Y	1,274	1,274	NA	Y	NA	Y	NA	10FT
		<b>TOTALS:</b>		3,210	3,210						

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

<b>Table 5.3 Summary of Soils to Evaluate Each BMP</b>									
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					
POI-1	B-1	UIC	TP-2	138.0 FT	130.0	133.0	3	B	8.27
POI-1	B-2	UIC	TP-1	140.5 FT	132.5	135.5	3	B	8.27
		<b>TOTALS:</b>							

\* 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

<b>LAND USES WITH HIGHER POTENTIAL POLLUTANTS LOADS (LUHPPLs) – MINIMUM STANDARD 8</b>			
YES	NO	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Describe any LUHPPLs identified in Part 1, Minimum Standard 8, Section 2. If not applicable, continue to Minimum Standard 9.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Are these activities already covered under an MSGP? If “No,” please explain if you have applied for an MSGP or intend to do so?
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	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:
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	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.).

<b>ILLICIT DISCHARGES – MINIMUM STANDARD 9</b>			
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	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have you checked for illicit discharges?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Have any been found and/or corrected? If “Yes,” please identify.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Does your report explain preventative measures that keep non-stormwater discharges out of the Waters of the State (during and after construction)?

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<b>SOIL EROSION AND SEDIMENT CONTROL (SESC) – MINIMUM STANDARD 10</b>		
<b>YES</b>	<b>NO</b>	<b>N/A</b>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<p>Have you included a Soil Erosion and Sediment Control Plan Set and/or Complete Construction Plan Set?</p> <p>Have you provided a <b>separately-bound</b> document based upon the <a href="#">SESC Template</a>? If yes, proceed to Minimum Standard 11 (the following items can be assumed to be addressed).</p> <p>If “No,” include a document with your submittal that addresses the following elements of an SESC Plan:</p>
		<input type="checkbox"/> Soil Erosion and Sediment Control Plan Project Narrative, including a description of how the fifteen (15) Performance Criteria have been met:
		<input type="checkbox"/> Provide Natural Buffers and Maintain Existing Vegetation
		<input type="checkbox"/> Minimize Area of Disturbance
		<input type="checkbox"/> Minimize the Disturbance of Steep Slopes
		<input type="checkbox"/> Preserve Topsoil
		<input type="checkbox"/> Stabilize Soils
		<input type="checkbox"/> Protect Storm Drain Inlets
		<input type="checkbox"/> Protect Storm Drain Outlets
		<input type="checkbox"/> Establish Temporary Controls for the Protection of Post-Construction Stormwater Control Measures
		<input type="checkbox"/> Establish Perimeter Controls and Sediment Barriers
		<input type="checkbox"/> Divert or Manage Run-On from Up-Gradient Areas
		<input type="checkbox"/> Properly Design Constructed Stormwater Conveyance Channels
		<input type="checkbox"/> Retain Sediment On-Site
		<input type="checkbox"/> Control Temporary Increases in Stormwater Velocity, Volume, and Peak Flows
		<input type="checkbox"/> Apply Construction Activity Pollution Prevention Control Measures
		<input type="checkbox"/> Install, Inspect, and Maintain Control Measures and Take Corrective Actions
		<input type="checkbox"/> Qualified SESC Plan Preparer’s Information and Certification
		<input type="checkbox"/> 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
		<input type="checkbox"/> Description of Control Measures, such as Temporary Sediment Trapping and Conveyance Practices, including design calculations and supporting documentation, as required

<b>STORMWATER MANAGEMENT SYSTEM OPERATION, MAINTENANCE, AND POLLUTION PREVENTION PLAN – MINIMUM STANDARDS 7 AND 9</b>		
<b>Operation and Maintenance Section</b>		
<b>YES</b>	<b>NO</b>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Have you minimized all sources of pollutant contact with stormwater runoff, to the maximum extent practicable?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Have you provided a <b>separately-bound</b> 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?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lawn, Garden, and Landscape Management meet the requirements of RISDISM Section G.7? If “No,” why not?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Is the property owner or homeowner’s association responsible for the stormwater maintenance of all BMP’s? 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.).
<input type="checkbox"/>	<input checked="" type="checkbox"/>	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). If “Yes,” have you obtained them? Or please explain your plan to obtain them:

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<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is stormwater being directed from public areas to private property? If "Yes," note the following: <u>Note:</u> 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.
<b>Pollution Prevention Section</b>		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Designated snow stockpile locations?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Trash racks to prevent floatables, trash, and debris from discharging to Waters of the State?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Asphalt-only based sealants?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Pet waste stations? ( <u>Note:</u> 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).
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Regular sweeping? Please describe: Refer to attached operations and maintenance manual for more details.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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).
<input type="checkbox"/>	<input checked="" type="checkbox"/>	A prohibition of phosphate-based fertilizers? ( <u>Note:</u> 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**

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

<b>Subwatershed and Impervious Area Summary</b>				
<b>Subwatershed (area to each design point)</b>	<b>First Receiving Water ID or MS4</b>	<b>Area Disturbed (units)</b>	<b>Existing Impervious (units)</b>	<b>Proposed Impervious (units)</b>
<b>DP-1:</b>	R10010045R-07	37,735 SF	3,512 SF	15,212 SF
<b>DP-2:</b>				
<b>DP-3:</b>				
<b>DP-4:</b>				
<b>TOTALS:</b>				

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<b>Site Construction Plans (Indicate that the following applicable specifications are provided)</b>		
<b>YES</b>	<b>NO</b>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Existing and proposed plans (scale not greater than 1" = 40') with North arrow
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Existing and proposed site topography (with 1 or 2-foot contours); 10-foot contours accepted for off-site areas
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Boundaries of existing predominant vegetation and proposed limits of clearing
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Site Location clarification
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Location and field-verified boundaries of resource protection areas such as: <ul style="list-style-type: none"> <li>▶ freshwater and coastal wetlands, including lakes and ponds</li> <li>▶ coastal shoreline features</li> </ul> Perennial and intermittent streams, in addition to Areas Subject to Storm Flowage (ASSFs)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	All required setbacks (e.g., buffers, water-supply wells, septic systems)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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: <ul style="list-style-type: none"> <li>▶ 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;</li> <li>▶ Design water surface elevations (applicable storms);</li> <li>▶ Structural details of outlet structures, embankments, spillways, stilling basins, grade-control structures, conveyance channels, etc.;</li> <li>▶ Existing and proposed structural elevations (e.g., inverts of pipes, manholes, etc.);</li> <li>▶ 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;</li> <li>▶ Planting plans for structural stormwater BMPs, including species, size, planting methods, and maintenance requirements of proposed planting</li> </ul>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Logs of borings and/or test pit investigations along with supporting soils/geotechnical report and corresponding water tables
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Mapping of any OLRSM-approv ed remedial actions/systems (including ELURs)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Location of existing and proposed roads, buildings, and other structures including limits of disturbance; <ul style="list-style-type: none"> <li>▶ Existing and proposed utilities (e.g., water, sewer, gas, electric) and easements;</li> <li>▶ 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.);</li> <li>▶ Cross sections of roadways, with edge details such as curbs and sidewalks;</li> <li>▶ Location and dimensions of channel modifications, such as bridge or culvert crossings</li> </ul>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations, cross sections, and profiles of all stream or wetland crossings and their method of stabilization