

Stormwater Runoff Analysis

“People’s Credit Union”
Assessor’s Map 57-1 Lot 92
703 Kingstown Road
South Kingstown, RI

Prepared For
People’s Credit Union
c/o Jason Straley
109 Zeta Drive
Pittsburgh, PA 15238



March 25, 2024



TABLE OF CONTENTS

1.0	PROJECT NARRATIVE.....	3
1.1	SITE INFORMATION	3
1.2	EXISTING IMPROVEMENTS AND SITE CONDITIONS	3
1.3	PROTECTED FEATURES	3
1.4	SITE TERRAIN AND SOILS.....	3
1.5	PROPOSED IMPROVEMENTS	4
2.0	PROPOSED ALTERATIONS AND STORMWATER CONSIDERATIONS	5
2.1	STORMWATER SYSTEM OBJECTIVES.....	5
2.2	REDEVELOPMENT SITE	5
2.3	MINIMUM STORMWATER MANAGEMENT STANDARDS	5
2.3.1	MINIMUM STANDARD 1: LID SITE PLANNING AND DESIGN STRATEGIES.....	5
2.3.2	MINIMUM STANDARD 2: GROUNDWATER RECHARGE.....	5
2.3.3	MINIMUM STANDARD 3: WATER QUALITY	6
2.3.4	MINIMUM STANDARD 4: CONVEYANCE AND NATURAL CHANNEL PROTECTION	6
2.3.5	MINIMUM STANDARD 5: OVERBANK FLOOD PROTECTION	6
2.3.6	MINIMUM STANDARD 6: REDEVELOPMENT AND INFILL PROJECTS.....	6
2.3.7	MINIMUM STANDARD 7: POLLUTION PREVENTION	6
2.3.8	MINIMUM STANDARD 8: LAND USES WITH HIGHER POTENTIAL POLLUTANT LOADS.....	6
2.3.9	MINIMUM STANDARD 9: ILLICIT DISCHARGES	7
2.3.10	MINIMUM STANDARD 10: SOILS EROSION AND SEDIMENT CONTROL.....	7
2.3.11	MINIMUM STANDARD 11: STORMWATER MANAGEMENT OPERATIONS AND MAINTENANCE	7
3.0	DESIGN MODELING METHODOLOGY.....	8
3.1	ANALYSIS DESIGN POINTS AND OFF-SITE CONTRIBUTIONS.....	8
4.0	STORMWATER RUNOFF COMPARISONS.....	9
4.1	SUMMARY OF STORMWATER CALCULATIONS	9
5.0	LIMITATIONS AND SPECIAL TERMS AND CONDITIONS	10



**Northeast Engineers
& Consultants, Inc.**
"A Knowledge Corporation"®

APPENDIX A FIGURES

APPENDIX B WATERSHED MAPS

APPENDIX C EXISTING CONDITIONS HYDROCAD

APPENDIX D PROPOSED CONDITIONS HYDROCAD

APPENDIX E SUPPLEMENTARY CALCULATIONS

APPENDIX F WQ STORM ANALYSIS (SPLIT PERVIOUS METHOD)

APPENDIX G SOIL EVALUATIONS

APPENDIX H RIDEM STORMWATER CHECKLIST

1.0 PROJECT NARRATIVE

1.1 SITE INFORMATION

City / Town:	South Kingstown, Rhode Island
Adjacent Roadways:	Kingstown Road (RI RT 108)
Lot(s) identification:	A.P. 57-1 Lot 92
Zoning District:	CH (Commercial Highway)
Current Use:	Commercial (vacant structure)
Site Area:	0.70 Acres
FEMA Zone and Map:	Zone "X" (Panel 44009C0293K)

1.2 EXISTING IMPROVEMENTS AND SITE CONDITIONS

The existing property contains a single 2,150+/- square foot masonry building formerly used as the restaurant and bar. The structure has been disused for a number of years. The remainder of the property is primarily occupied by paved parking areas and access travel ways. The site can be accessed from the abutting roadway via a paved two-way access on the south side of the frontage. A second two-way access is shared with an abutter on the north side of the frontage. The frontage along the state highway features a concrete sidewalk. The property is surrounded on all sides by other commercial uses. The structure is served by municipal sewer and water. Overhead electric and communication lines run along the southside of lot from which the structure is served by overhead wires. Surface drainage inlets are located at the within the parking lot. These drains connect to the state drainage system in Kingstown Road. There are no private water quality or water retentions systems located on-site.

1.3 PROTECTED FEATURES

There are no wetlands or other features protected by the state present on site. The site does not lie within any coastal or freshwater wetland jurisdiction. Minimal vegetation exists on site and landscaping is limited to grassed areas along the property boundaries and the area directly between the structure and the sidewalk.

1.4 SITE TERRAIN AND SOILS

In general, the site slopes from the east and the property lines inwards towards the drain inlets. Only a small portion of the site is sloped towards the street. The soil type on site is Ur (Urban Lane) as designated by the USDA Natural Resource Conservation Service. Class IV soil evaluations performed on site revealed a thick layer of gravelly fills with the water table established at the interface with original material below.



1.5 PROPOSED IMPROVEMENTS

The applicant intends to demolish the existing commercial structure and to construct a new banking facility in the center of the property. The parking lot and paved surfaces will be reduced and regraded to provide parking along the south side of the lot and in front of the structure. As the new structure is to have three drive through lanes, a paved access will loop the site. The existing two-way access on the south side is to be closed. The area of the existing curb cut will be loamed and seeded and the concrete sidewalk will be extended. The connection to the shared access on the north side of the frontage will also be closed leaving the abutter to be the sole user of this curb cut. A new curb cut will then be created between the two existing access points. This two-way entrance will be the only way to access the finished site. All work adjacent to and within the state right of way will be performed in accordance with RIDOT standards. The new structure will be served by existing or new services as determined by the providing entities.

As part of the parking lot construction, the two existing drain inlets will be revised and improved to drain the pavement in the same manner as in the existing conditions. A portion of the pavement at the rear of the site will drain by surface flow into a vegetated depression. A small sand filter cell will treat runoff from this portion of the parking lot. Pretreatment is provided by a grassed filter strip and pea stone diaphragm. Roof runoff will be routed to a small infiltration system consisting of ADS Stormtech chambers to be located in the front yard. Overflow runoff from this system will drain to the paved surfaces. The existing drain connections to the RIDOT system are to remain. In general, the level of site impervious surfaces will be reduced from the existing conditions thereby ensuring that there will be no increase in site runoff as a result of the development.

2.0 PROPOSED ALTERATIONS AND STORMWATER CONSIDERATIONS

2.1 STORMWATER SYSTEM OBJECTIVES

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

- **Provide water quality for stormwater runoff in accordance with the Rhode Island Stormwater Design and Installation Rules (250-RICR-150-10-8), hereafter abbreviated as the "Rules".**
- **Convey stormwater from the property to the state stormwater system consistent with the existing conditions.**
- **Maintain the overall drainage patterns from the site to the extent practicable.**
- **Minimize the peak runoff to the downstream design point.**
- **Reduce or maintain the stormwater volume to the state stormwater system**

2.2 REDEVELOPMENT SITE

As the existing site lot coverage consists of more than 40% impervious and more than 10,000 square feet of this impervious surface is to be developed, this project qualifies as a "redevelopment site" per section 8.12 of the Rules. Per this section of the Rules, only Standards, 2, 3, and 7-11 must be addressed. Specifically, recharge and stormwater quality shall be managed in accordance with one of the following techniques:

- Reduce existing impervious area by at least 50% of the redevelopment area;
- Implement other LID techniques to the maximum extent practicable to provide recharge and water quality management for at least 50% of the redevelopment area;
- Use on-site structural BMPs to provide recharge and water quality management for at least 50% of the redevelopment area; or
- Any combination of these techniques.

2.3 MINIMUM STORMWATER MANAGEMENT STANDARDS

2.3.1 MINIMUM STANDARD 1: LID SITE PLANNING AND DESIGN STRATEGIES

The proposed development utilizes LID designs conforming to the Rules. These elements are located immediately downstream of the new building and parking lot and will directly treat the generated runoff with zero interception of on-site clean runoff.

2.3.2 MINIMUM STANDARD 2: GROUNDWATER RECHARGE

This standard will be met by the infiltration chambers and the unlined sand filter. A total of **106 cubic feet** of recharge is required. Per the analysis of the water quality storm (split pervious method) a total of **392 cubic feet** of stormwater is infiltrated. Refer to Appendix F for calculations.

2.3.3 MINIMUM STANDARD 3: WATER QUALITY

This standard shall be met by the sand filter located to the rear of the parking lot and by the rooftop infiltration chambers. From the redevelopment calculations, a total of **5,102 square feet** of impervious surfaces requires water quality treatment. This equates to a total of **426** cubic feet of water quality volume. Per the HydroCAD analysis of the 1.2-inch WQ storm (split pervious method) a total of **236** cubic feet of infiltration volume is provided in the subsurface system which treats the entirety of the **2,836** square foot rooftop. The sand filter captures and treats an additional **2,270** square feet of pavement. Refer to Appendix E for complete calculations. As shown in the WQ storm analysis, the entire complement of the WQ storm volume passes through the sand filter or is infiltrated via the chambers. Refer to Appendix F for the water quality storm calculations.

2.3.4 MINIMUM STANDARD 4: CONVEYANCE AND NATURAL CHANNEL PROTECTION

This standard is not required for qualifying redevelopment sites per section 8.12 of the Rules.

2.3.5 MINIMUM STANDARD 5: OVERBANK FLOOD PROTECTION

The TR-20 HydroCAD model demonstrates that the proposed system will successfully mitigate the 100-year storm event. In these calculations, all pre-development land was characterized as "good condition" as required by this standard. An off-site component of runoff from upstream residential properties passes through the development area, which was also modeled as "good condition". The modeling also demonstrates that the structures and stormwater devices will safely pass the 100-year storm event without flooding or breaching.

2.3.6 MINIMUM STANDARD 6: REDEVELOPMENT AND INFILL PROJECTS

As stated in section 2.2 above, this project qualifies as a development project. The area of work is comprised of **0.70** acres of which **78%** is existing impervious surfaces. Only 40% is required to qualify as a redevelopment site.

2.3.7 MINIMUM STANDARD 7: POLLUTION PREVENTION

Source controls and pollution prevention measures will be present during all phases of construction. A separate stormwater pollution prevention plan (Soil Erosion and Sediment Control Narrative) may be provided upon request. As the site is less than an acre, this is not required by RIDEM RIPDES.

2.3.8 MINIMUM STANDARD 8: LAND USES WITH HIGHER POTENTIAL POLLUTANT LOADS

The use of this property does not qualify as a LUHPPL and does not require any specific source controls, limited BMPs, or and additional state permitting.



2.3.9 MINIMUM STANDARD 9: ILLICIT DISCHARGES

Neither the using use nor any proposed uses will include any discharges considered to be "illicit" per the Rules.

2.3.10 MINIMUM STANDARD 10: SOILS EROSION AND SEDIMENT CONTROL

Soil erosion and sediment control measures will be implemented during all phases of construction. A SESC plan has been provided in the permitting plan set.

2.3.11 MINIMUM STANDARD 11: STORMWATER MANAGEMENT OPERATIONS AND MAINTENANCE

An Operations and Maintenance (O&M) Document has been prepared. This document satisfies the minimum requirements of the Rules.

3.0 DESIGN MODELING METHODOLOGY

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

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

Rainfall Frequency Values for Washington County Rhode Island with 24-Hour Storm Duration					
RIDEM Stormwater Design and Installation Rules (250-RICR-150-10-8)					
Frequency	1-Yr	2-Yr	10-Yr	25-Yr	100-Yr
Inches of Rainfall	2.8	3.3	4.9	6.1	8.5

The existing and proposed conditions runoff calculations were analyzed and the proposed stormwater system was designed to mitigate the peak runoff for the 1, 10, and 100-year 24-hour design storms. The resulting design effectively mitigates and treats runoff from newly developed areas of the site before allowing it to discharge in a non-erosive manner to downstream areas in accordance with the Rules.

3.1 ANALYSIS DESIGN POINTS AND OFF-SITE CONTRIBUTIONS

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

1. Kingstown Road (RIDOT stormwater system)

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

1. None that impact the stormwater design

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

4.0 STORMWATER RUNOFF COMPARISONS

Analysis of the existing and proposed runoff during design storms demonstrates that there will no increase in the peak runoff and total volume runoff to the downstream design points as a result of the development. Comparisons of the runoff at the design points are given below in Section 4.1. The runoff volumes given have been evaluated over a 24-hour period. All of the HydroCAD modeling worksheets are attached in Appendices C and D.

4.1 SUMMARY OF STORMWATER CALCULATIONS

Table 4.1.1 Comparison of Runoff Values at Kingstown Road (101 vs. 201)

Storm Return Period	Existing Conditions Peak Runoff (cfs)	Proposed Conditions Peak Runoff (cfs)	Existing Conditions 24-hr Volume Runoff (af)	Proposed Conditions Volume 24-hr Runoff (af)
1-year	1.71	1.26	0.124	0.094
10-year	3.27	2.80	0.247	0.210
100-year	6.90	4.90	0.461	0.416

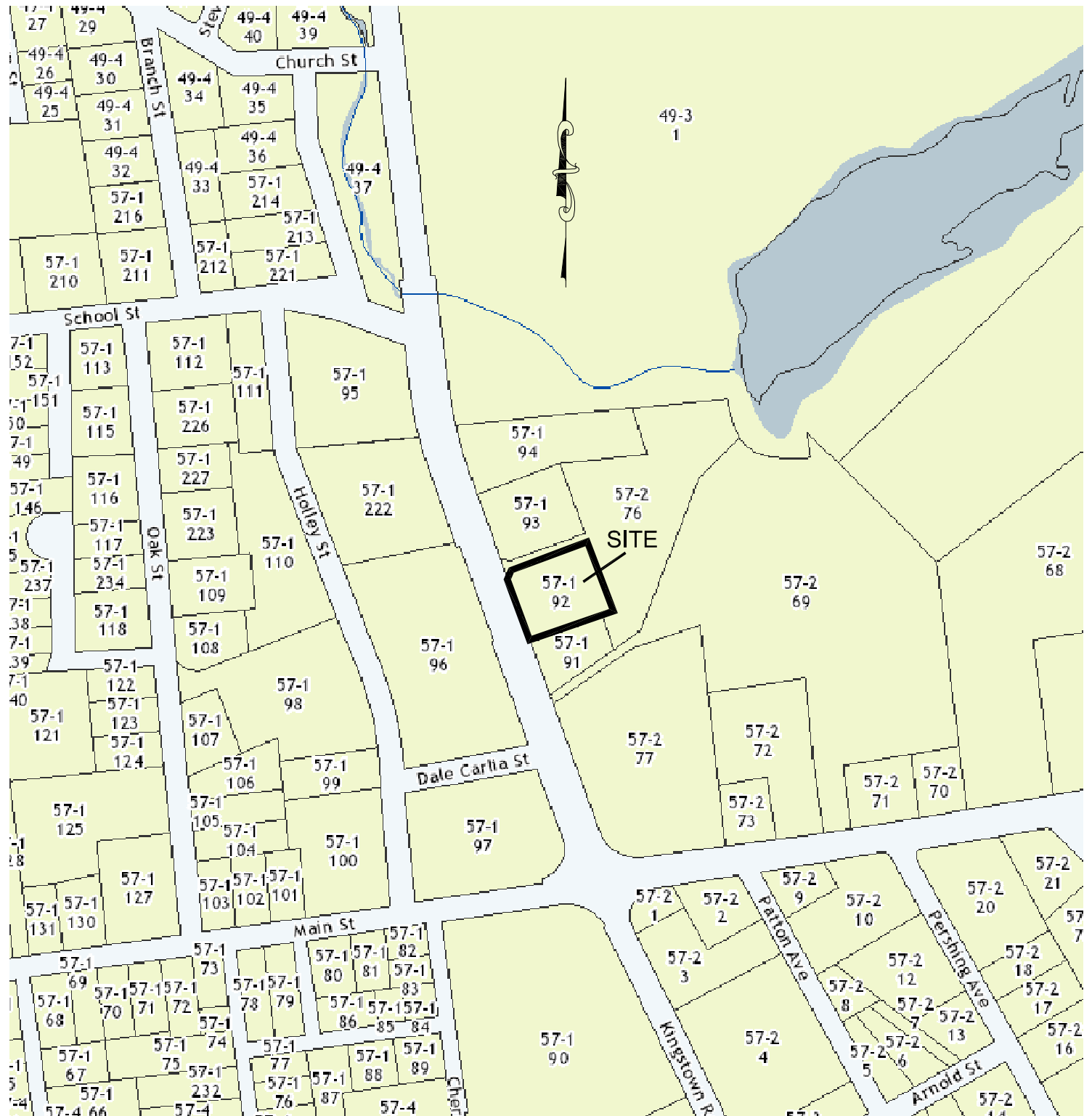


5.0 LIMITATIONS AND SPECIAL TERMS AND CONDITIONS

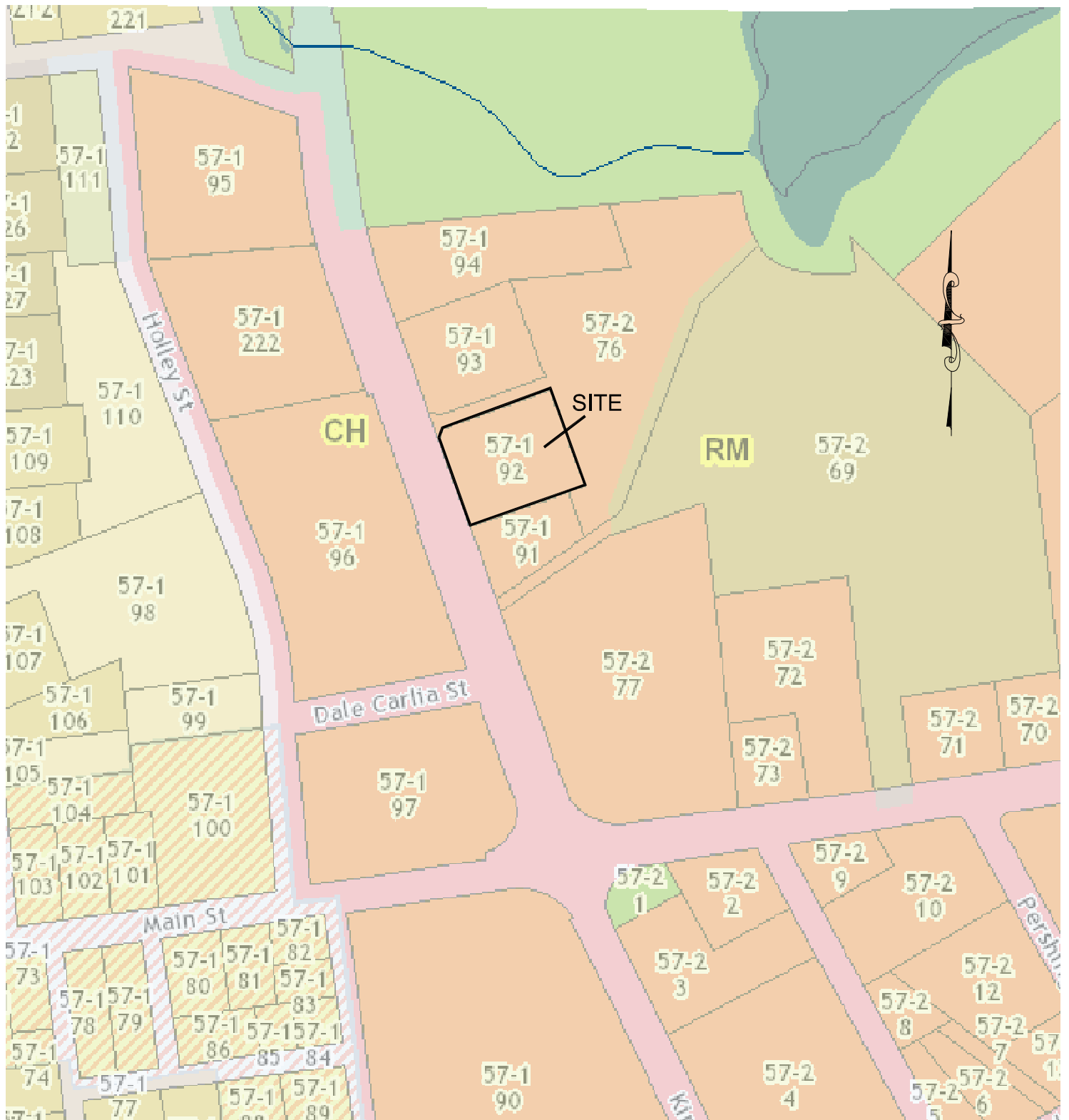
1. NE&C's evaluation was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area, and NE&C observed the degree of care and skill generally exercised by other consultants under similar circumstances and conditions. No warranty expressed or implied is made.
2. Any additional research conducted should be reviewed by Northeast Engineers & Consultants, Inc., such that the conclusions presented herein may be modified.
3. All observations documented in this report were performed under the existing conditions at the time of the assessment.
4. This report has been prepared on the behalf of and is for the exclusive use of the Client. This report and findings contained herein shall not, in whole or in part be disseminated or conveyed to any party, nor used by any other party in whole or in part, without the written consent of NE&C.



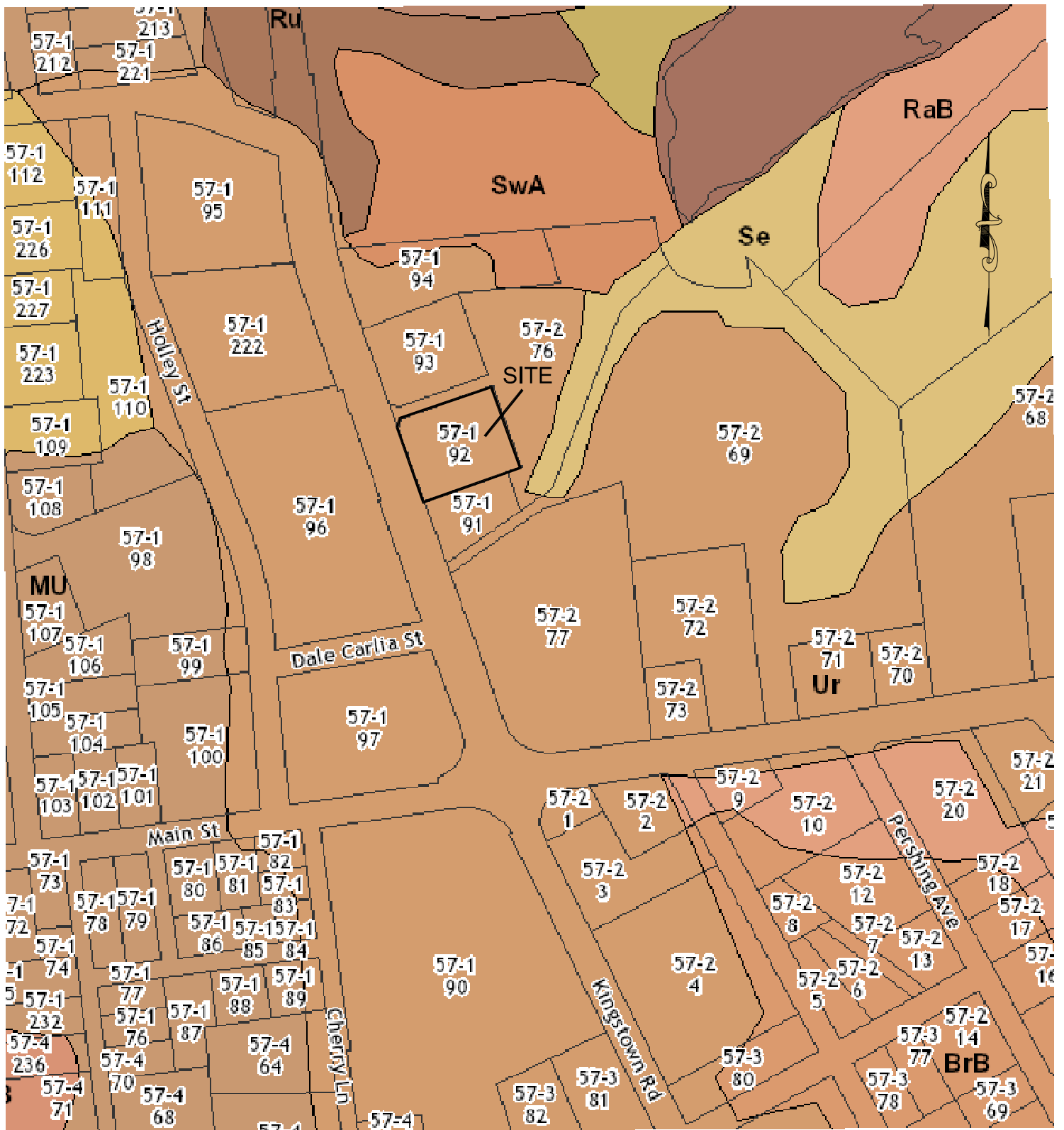
APPENDIX A FIGURES



Scale:	NTS	Date:	25MAR24	Designed By:	JJR	Drawn By:	JJR	Checked By:	GES
Project Title:					Drawing Title:				
<p align="center">PEOPLE'S CREDIT UNION 702 KINGSTOWN ROAD, S. KINGSTOWN</p>					<p align="center">LOCUS MAP</p>				
Issued for:					Drawing Number:		Project Number:		
<p align="center">PERMITTING</p>					<p align="center">FIG 1</p>		<p align="center">20078.1</p>		



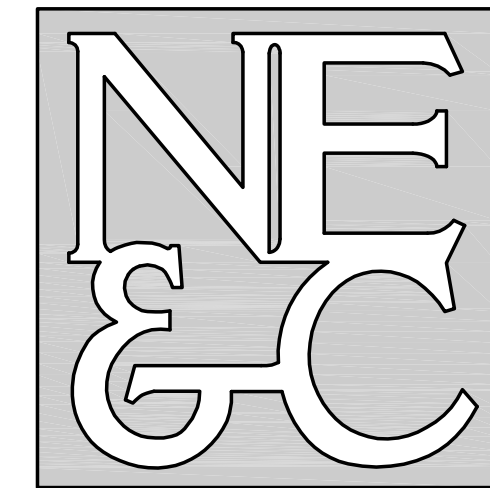
Scale:	NTS	Date:	25MAR24	Designed By:	JJR	Drawn By:	JJR	Checked By:	GES
Project Title:				Drawing Title:					
PEOPLE'S CREDIT UNION 703 KINGSTOWN ROAD, S. KINGSTOWN				ZONING MAP					
Issued for:				Drawing Number:		Project Number:			
PERMITTING				FIG 2		20078.1			



Scale:	NTS	Date:	25MAR24	Designed By:	JJR	Drawn By:	JJR	Checked By:	GES
Project Title:					Drawing Title:				
PEOPLE'S CREDIT UNION 703 KINGSTOWN ROAD, S. KINGSTOWN					SOILS MAP				
Issued for:			Drawing Number:		Project Number:				
PERMITTING			FIG 3		20078.1				



APPENDIX B WATERSHED MAPS



A KNOWLEDGE CORPORATION®

6 VALLEY ROAD MIDDLETOWN RHODE ISLAND 02842
PHONE (401) 849-0810 FAX (401) 846-4169
WWW.NORTHEASTENGINEERS.COM

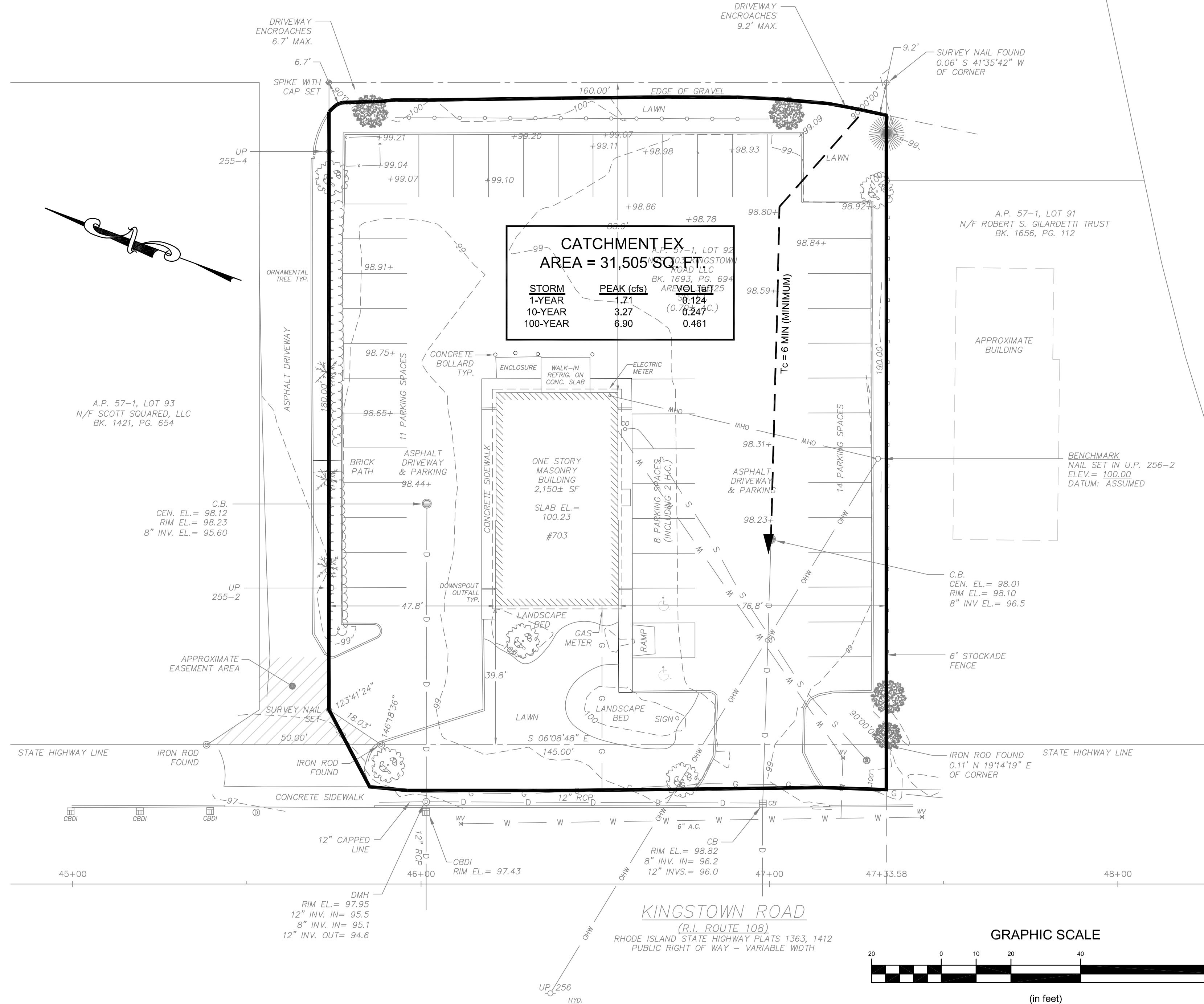
SITE/CIVIL
LAND PLANNING
WATERFRONT
SURVEYING
GEOTECHNICAL
ENVIRONMENTAL
TRANSPORTATION
STRUCTURAL

N/F RSP REALTY, LLC
BK. 1269, PG. 751

A.P. 57-1, LOT 91
N/F ROBERT S. GILARDETTI TRUST
BK. 1656, PG. 112

A.P. 57-1, LOT 93
N/F SCOTT SQUARED, LLC
BK. 1421, PG. 654

CATCHMENT EX		
AREA = 31,505 SQ. FT.		
STORM	PEAK (cfs)	VOL (af)
1-YEAR	1.71	0.124
10-YEAR	3.27	(0.247 C.)
100-YEAR	6.90	0.461



No.	Revision	Date	App.

Designed By: JJR Drawn by: JJR Checked by: GES
Scale: 1"=20' Date: 25MAR24

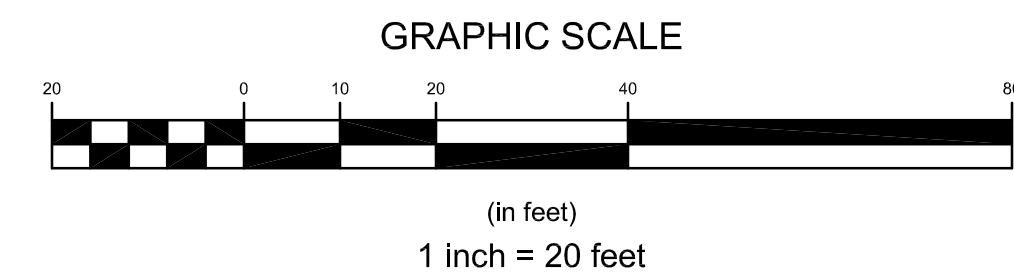
Project Title:
**A.P. 57-1 LOT 92
703 KINGSTOWN ROAD
SOUTH KINGSTOWN
RHODE ISLAND**

Client/Owner:
PEOPLE'S CREDIT UNION
C/O JASON STRALEY
109 ZETA DRIVE
PITTSBURGH, PA 15238

Drawing Title:
**EXISTING
WATERSHED PLAN**

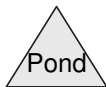
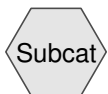
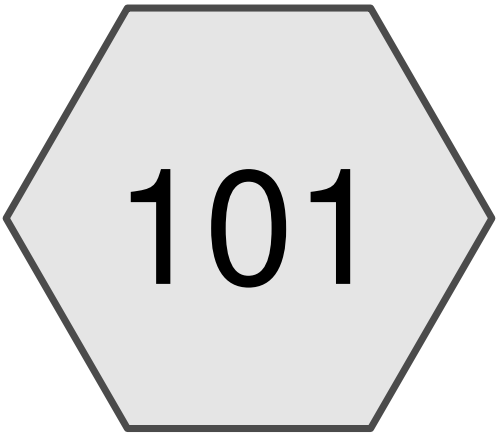
Drawing Number: W-1
Sheet 1 of 1
Project Number: 20078.1
Survey Index: - -

OWNERSHIP AND USE OF DOCUMENTS: DRAWINGS AND SPECIFICATIONS, AS INSTRUMENTS OF PROFESSIONAL SERVICE, ARE AND SHALL REMAIN THE PROPERTY OF THE ENGINEER. THESE DOCUMENTS ARE NOT TO BE USED, IN WHOLE OR PART, FOR ANY OTHER PROJECTS OR PURPOSES, OR BY ANY OTHER PARTIES, THAN THOSE PROPERLY AUTHORIZED BY CONTRACT, WITHOUT THE EXPRESS AUTHORIZATION OF THE ENGINEER.





APPENDIX C EXISTING CONDITIONS HYDROCAD



20078.0 2024-03-21

Prepared by Northeast Engineers & Consultants, Inc.
 HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.162	74	>75% Grass cover, Good, HSG C (101)
0.562	98	Pavement and Rooftop (101)
0.723	93	TOTAL AREA

20078.0 2024-03-21

Prepared by Northeast Engineers & Consultants, Inc.
HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

PCU: 703 Kingstown Road - Existing Conditions
Type III 24-hr 1-YEAR Rainfall=2.80"

Printed 3/25/2024
Page 3

Summary for Subcatchment 101:

Runoff = 1.71 cfs @ 12.09 hrs, Volume= 0.124 af, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

Area (sf)	CN	Description
7,043	74	>75% Grass cover, Good, HSG C
24,462	98	Pavement and Rooftop
31,505	93	Weighted Average
7,043	74	22.36% Pervious Area
24,462	98	77.64% Impervious Area

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

Summary for Subcatchment 101:

Runoff = 3.27 cfs @ 12.08 hrs, Volume= 0.247 af, Depth> 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YEAR Rainfall=4.90"

Area (sf)	CN	Description
7,043	74	>75% Grass cover, Good, HSG C
24,462	98	Pavement and Rooftop
31,505	93	Weighted Average
7,043	74	22.36% Pervious Area
24,462	98	77.64% Impervious Area

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

Summary for Subcatchment 101:

Runoff = 5.90 cfs @ 12.08 hrs, Volume= 0.461 af, Depth> 7.65"

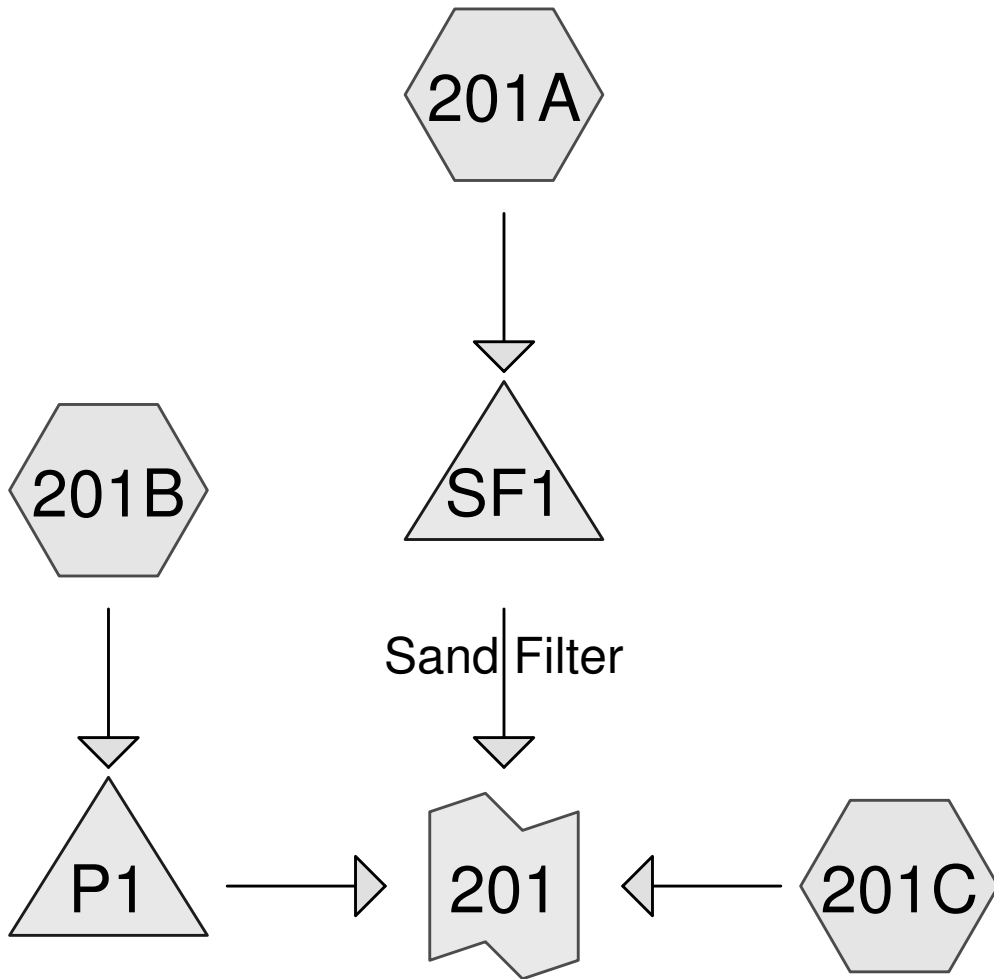
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YEAR Rainfall=8.50"

Area (sf)	CN	Description
7,043	74	>75% Grass cover, Good, HSG C
24,462	98	Pavement and Rooftop
31,505	93	Weighted Average
7,043	74	22.36% Pervious Area
24,462	98	77.64% Impervious Area

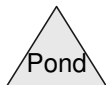
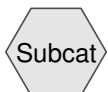
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Minimum



APPENDIX D PROPOSED CONDITIONS HYDROCAD



Stormtech Chambers



20078.0 2024-03-21

Prepared by Northeast Engineers & Consultants, Inc.
HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.234	74	>75% Grass cover, Good, HSG C (201A, 201C)
0.037	98	Infiltration Area (201A)
0.052	98	Pavement (201A)
0.335	98	Pavement and Canopy (201C)
0.065	98	Rooftop (201B)
0.723	90	TOTAL AREA

20078.0 2024-03-21

Prepared by Northeast Engineers & Consultants, Inc.
 HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 201A:

Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af, Depth> 1.64"
 Routed to Pond SF1 : Sand Filter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	1,600	98	Infiltration Area
*	2,270	98	Pavement
	2,763	74	>75% Grass cover, Good, HSG C
	6,633	88	Weighted Average
	2,763	74	41.66% Pervious Area
	3,870	98	58.34% Impervious Area

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

Summary for Subcatchment 201B:

Runoff = 0.18 cfs @ 12.08 hrs, Volume= 0.014 af, Depth> 2.57"
 Routed to Pond P1 : Stormtech Chambers

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	2,836	98	Rooftop
	2,836	98	100.00% Impervious Area

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

Summary for Subcatchment 201C:

Runoff = 1.06 cfs @ 12.09 hrs, Volume= 0.076 af, Depth> 1.80"
 Routed to Link 201 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	14,603	98	Pavement and Canopy
	7,433	74	>75% Grass cover, Good, HSG C
	22,036	90	Weighted Average
	7,433	74	33.73% Pervious Area
	14,603	98	66.27% Impervious Area

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

20078.0 2024-03-21

Prepared by Northeast Engineers & Consultants, Inc.
 HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

Summary for Pond P1: Stormtech Chambers

Inflow Area = 0.065 ac, 100.00% Impervious, Inflow Depth > 2.57" for 1-YEAR event
 Inflow = 0.18 cfs @ 12.08 hrs, Volume= 0.014 af
 Outflow = 0.12 cfs @ 12.18 hrs, Volume= 0.010 af, Atten= 34%, Lag= 6.0 min
 Discarded = 0.00 cfs @ 9.12 hrs, Volume= 0.007 af
 Primary = 0.11 cfs @ 12.18 hrs, Volume= 0.003 af
 Routed to Link 201 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 98.33' @ 12.17 hrs Surf.Area= 201 sf Storage= 214 cf
 Flood Elev= 99.25' Surf.Area= 201 sf Storage= 214 cf

Plug-Flow detention time= 179.5 min calculated for 0.010 af (75% of inflow)
 Center-of-Mass det. time= 94.0 min (852.7 - 758.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	96.00'	125 cf	8.17'W x 24.56'L x 2.33'H Field A 468 cf Overall - 88 cf Embedded = 380 cf x 33.0% Voids
#2A	96.50'	88 cf	ADS_StormTech SC-310 +Cap x 6 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 6 Chambers in 2 Rows
		214 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	98.33'	Automatic Storage Overflow (Discharged without head)
#1	Discarded	96.00'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.00 cfs @ 9.12 hrs HW=96.03' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 12.18 hrs HW=98.33' TW=0.00' (Dynamic Tailwater)

Summary for Pond SF1: Sand Filter

Inflow Area = 0.152 ac, 58.34% Impervious, Inflow Depth > 1.64" for 1-YEAR event
 Inflow = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af
 Outflow = 0.23 cfs @ 12.15 hrs, Volume= 0.021 af, Atten= 23%, Lag= 4.0 min
 Discarded = 0.00 cfs @ 10.25 hrs, Volume= 0.006 af
 Primary = 0.22 cfs @ 12.15 hrs, Volume= 0.015 af
 Routed to Link 201 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.12' @ 12.15 hrs Surf.Area= 200 sf Storage= 52 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 3.7 min (823.6 - 820.0)

Volume	Invert	Avail.Storage	Storage Description
#1	98.25'	888 cf	Depression (Prismatic) Listed below (Recalc)
#2	96.33'	127 cf	Media (Prismatic) Listed below (Recalc) 384 cf Overall x 33.0% Voids
		1,014 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.25	1,600	0	0
98.75	1,950	888	888

20078.0 2024-03-21

Prepared by Northeast Engineers & Consultants, Inc.
 HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.33	200	0	0
98.25	200	384	384

Device	Routing	Invert	Outlet Devices
#1	Discarded	96.33'	1.020 in/hr Exfiltration over Surface area
#2	Primary	96.33'	4.0" Round 4" UNDERDRAIN L= 105.0' Ke= 0.500 Inlet / Outlet Invert= 96.33' / 95.80' S= 0.0050 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf

Discarded OutFlow Max=0.00 cfs @ 10.25 hrs HW=96.35' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.22 cfs @ 12.15 hrs HW=97.12' TW=0.00' (Dynamic Tailwater)
 ↑**2=4" UNDERDRAIN** (Barrel Controls 0.22 cfs @ 2.52 fps)

Summary for Link 201:

Inflow Area = 0.723 ac, 67.64% Impervious, Inflow Depth > 1.56" for 1-YEAR event
 Inflow = 1.26 cfs @ 12.09 hrs, Volume= 0.094 af
 Primary = 1.26 cfs @ 12.09 hrs, Volume= 0.094 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

20078.0 2024-03-21

Prepared by Northeast Engineers & Consultants, Inc.
 HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 201A:

Runoff = 0.62 cfs @ 12.09 hrs, Volume= 0.045 af, Depth> 3.57"
 Routed to Pond SF1 : Sand Filter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	1,600	98	Infiltration Area
*	2,270	98	Pavement
	2,763	74	>75% Grass cover, Good, HSG C
	6,633	88	Weighted Average
	2,763	74	41.66% Pervious Area
	3,870	98	58.34% Impervious Area

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

Summary for Subcatchment 201B:

Runoff = 0.31 cfs @ 12.08 hrs, Volume= 0.025 af, Depth> 4.66"
 Routed to Pond P1 : Stormtech Chambers

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	2,836	98	Rooftop
	2,836	98	100.00% Impervious Area

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

Summary for Subcatchment 201C:

Runoff = 2.17 cfs @ 12.09 hrs, Volume= 0.159 af, Depth> 3.78"
 Routed to Link 201 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	14,603	98	Pavement and Canopy
	7,433	74	>75% Grass cover, Good, HSG C
	22,036	90	Weighted Average
	7,433	74	33.73% Pervious Area
	14,603	98	66.27% Impervious Area

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

20078.0 2024-03-21

Prepared by Northeast Engineers & Consultants, Inc.
 HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

Summary for Pond P1: Stormtech Chambers

Inflow Area = 0.065 ac, 100.00% Impervious, Inflow Depth > 4.66" for 10-YEAR event
 Inflow = 0.31 cfs @ 12.08 hrs, Volume= 0.025 af
 Outflow = 0.31 cfs @ 12.09 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.3 min
 Discarded = 0.00 cfs @ 7.05 hrs, Volume= 0.008 af
 Primary = 0.31 cfs @ 12.09 hrs, Volume= 0.013 af
 Routed to Link 201 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 98.33' @ 11.84 hrs Surf.Area= 201 sf Storage= 214 cf
 Flood Elev= 99.25' Surf.Area= 201 sf Storage= 214 cf

Plug-Flow detention time= 110.0 min calculated for 0.021 af (82% of inflow)
 Center-of-Mass det. time= 38.5 min (786.3 - 747.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	96.00'	125 cf	8.17'W x 24.56'L x 2.33'H Field A 468 cf Overall - 88 cf Embedded = 380 cf x 33.0% Voids
#2A	96.50'	88 cf	ADS_StormTech SC-310 +Cap x 6 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 6 Chambers in 2 Rows
		214 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	98.33'	Automatic Storage Overflow (Discharged without head)
#1	Discarded	96.00'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.00 cfs @ 7.05 hrs HW=96.03' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=98.33' TW=0.00' (Dynamic Tailwater)

Summary for Pond SF1: Sand Filter

Inflow Area = 0.152 ac, 58.34% Impervious, Inflow Depth > 3.57" for 10-YEAR event
 Inflow = 0.62 cfs @ 12.09 hrs, Volume= 0.045 af
 Outflow = 0.37 cfs @ 12.19 hrs, Volume= 0.045 af, Atten= 41%, Lag= 6.5 min
 Discarded = 0.04 cfs @ 12.19 hrs, Volume= 0.008 af
 Primary = 0.33 cfs @ 12.19 hrs, Volume= 0.038 af
 Routed to Link 201 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 98.29' @ 12.19 hrs Surf.Area= 1,826 sf Storage= 188 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 4.3 min (802.2 - 798.0)

Volume	Invert	Avail.Storage	Storage Description
#1	98.25'	888 cf	Depression (Prismatic) Listed below (Recalc)
#2	96.33'	127 cf	Media (Prismatic) Listed below (Recalc)
		384 cf Overall x 33.0% Voids	
		1,014 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.25	1,600	0	0
98.75	1,950	888	888

20078.0 2024-03-21

Prepared by Northeast Engineers & Consultants, Inc.
 HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.33	200	0	0
98.25	200	384	384

Device	Routing	Invert	Outlet Devices
#1	Discarded	96.33'	1.020 in/hr Exfiltration over Surface area
#2	Primary	96.33'	4.0" Round 4" UNDERDRAIN L= 105.0' Ke= 0.500 Inlet / Outlet Invert= 96.33' / 95.80' S= 0.0050 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf

Discarded OutFlow Max=0.04 cfs @ 12.19 hrs HW=98.29' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.33 cfs @ 12.19 hrs HW=98.29' TW=0.00' (Dynamic Tailwater)
 ↑**2=4" UNDERDRAIN** (Barrel Controls 0.33 cfs @ 3.74 fps)

Summary for Link 201:

Inflow Area = 0.723 ac, 67.64% Impervious, Inflow Depth > 3.48" for 10-YEAR event
 Inflow = 2.80 cfs @ 12.09 hrs, Volume= 0.210 af
 Primary = 2.80 cfs @ 12.09 hrs, Volume= 0.210 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

20078.0 2024-03-21

Prepared by Northeast Engineers & Consultants, Inc.
 HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 201A:

Runoff = 1.19 cfs @ 12.08 hrs, Volume= 0.089 af, Depth> 7.05"
 Routed to Pond SF1 : Sand Filter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YEAR Rainfall=8.50"

	Area (sf)	CN	Description
*	1,600	98	Infiltration Area
*	2,270	98	Pavement
	2,763	74	>75% Grass cover, Good, HSG C
	6,633	88	Weighted Average
	2,763	74	41.66% Pervious Area
	3,870	98	58.34% Impervious Area

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

Summary for Subcatchment 201B:

Runoff = 0.54 cfs @ 12.08 hrs, Volume= 0.045 af, Depth> 8.25"
 Routed to Pond P1 : Stormtech Chambers

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YEAR Rainfall=8.50"

	Area (sf)	CN	Description
*	2,836	98	Rooftop
	2,836	98	100.00% Impervious Area

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

Summary for Subcatchment 201C:

Runoff = 4.03 cfs @ 12.08 hrs, Volume= 0.307 af, Depth> 7.29"
 Routed to Link 201 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-YEAR Rainfall=8.50"

	Area (sf)	CN	Description
*	14,603	98	Pavement and Canopy
	7,433	74	>75% Grass cover, Good, HSG C
	22,036	90	Weighted Average
	7,433	74	33.73% Pervious Area
	14,603	98	66.27% Impervious Area

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

20078.0 2024-03-21

Prepared by Northeast Engineers & Consultants, Inc.
 HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

Summary for Pond P1: Stormtech Chambers

Inflow Area = 0.065 ac, 100.00% Impervious, Inflow Depth > 8.25" for 100-YEAR event
 Inflow = 0.54 cfs @ 12.08 hrs, Volume= 0.045 af
 Outflow = 0.54 cfs @ 12.09 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.3 min
 Discarded = 0.00 cfs @ 3.75 hrs, Volume= 0.009 af
 Primary = 0.54 cfs @ 12.09 hrs, Volume= 0.031 af
 Routed to Link 201 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 98.33' @ 10.46 hrs Surf.Area= 201 sf Storage= 214 cf
 Flood Elev= 99.25' Surf.Area= 201 sf Storage= 214 cf

Plug-Flow detention time= 81.7 min calculated for 0.040 af (89% of inflow)
 Center-of-Mass det. time= 28.4 min (768.4 - 739.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	96.00'	125 cf	8.17'W x 24.56'L x 2.33'H Field A 468 cf Overall - 88 cf Embedded = 380 cf x 33.0% Voids
#2A	96.50'	88 cf	ADS_StormTech SC-310 +Cap x 6 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 6 Chambers in 2 Rows
		214 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	98.33'	Automatic Storage Overflow (Discharged without head)
#1	Discarded	96.00'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.00 cfs @ 3.75 hrs HW=96.03' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=98.33' TW=0.00' (Dynamic Tailwater)

Summary for Pond SF1: Sand Filter

Inflow Area = 0.152 ac, 58.34% Impervious, Inflow Depth > 7.05" for 100-YEAR event
 Inflow = 1.19 cfs @ 12.08 hrs, Volume= 0.089 af
 Outflow = 0.39 cfs @ 12.37 hrs, Volume= 0.089 af, Atten= 67%, Lag= 17.1 min
 Discarded = 0.05 cfs @ 12.37 hrs, Volume= 0.012 af
 Primary = 0.35 cfs @ 12.37 hrs, Volume= 0.078 af
 Routed to Link 201 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 98.57' @ 12.37 hrs Surf.Area= 2,025 sf Storage= 678 cf

Plug-Flow detention time= 10.4 min calculated for 0.089 af (100% of inflow)
 Center-of-Mass det. time= 9.7 min (789.4 - 779.6)

Volume	Invert	Avail.Storage	Storage Description
#1	98.25'	888 cf	Depression (Prismatic) Listed below (Recalc)
#2	96.33'	127 cf	Media (Prismatic) Listed below (Recalc) 384 cf Overall x 33.0% Voids
		1,014 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.25	1,600	0	0
98.75	1,950	888	888

20078.0 2024-03-21

Prepared by Northeast Engineers & Consultants, Inc.
 HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.33	200	0	0
98.25	200	384	384

Device	Routing	Invert	Outlet Devices
#1	Discarded	96.33'	1.020 in/hr Exfiltration over Surface area
#2	Primary	96.33'	4.0" Round 4" UNDERDRAIN L= 105.0' Ke= 0.500 Inlet / Outlet Invert= 96.33' / 95.80' S= 0.0050 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf

Discarded OutFlow Max=0.05 cfs @ 12.37 hrs HW=98.57' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.35 cfs @ 12.37 hrs HW=98.57' TW=0.00' (Dynamic Tailwater)
 ↑**2=4" UNDERDRAIN** (Barrel Controls 0.35 cfs @ 3.98 fps)

Summary for Link 201:

Inflow Area = 0.723 ac, 67.64% Impervious, Inflow Depth > 6.91" for 100-YEAR event
 Inflow = 4.90 cfs @ 12.08 hrs, Volume= 0.416 af
 Primary = 4.90 cfs @ 12.08 hrs, Volume= 0.416 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs



APPENDIX E SUPPLEMENTARY CALCULATIONS



Redevelopment Area Calculations

Project: 20078.1 Peoples Credit Union, South Kingstown RI

Redevelopment Water Quality Credit Calculation (RIDEM Minimum Standard 6):

Total Site Area (TSA) =	31,505	sf		
Jurisdictional Wetlands (JW) =	0	sf		
Conservation Land (CL) =	0	sf		
Site Size (TSA-JW-CL) =	31,505	sf		
Existing Impervious =	24,462	sf	% Impervious =	78%
Proposed Impervious =	19,709	sf	% Impervious =	63%

Redeveloped Impervious (DI) =	19,709	sf
Net New Pervious Area (NIP) =	4,753	sf

**Remaining Stormwater
Treatment Area (STA) =**

$$(DI \times 50\%) - (NIP) = STA = 5,102 \text{ sf}$$

Results:

The area requiring water quality treatment is equal to STA. The volume of water quality treatment required is equal to one inch over this area.



Infiltration System (P1)

Project: 20078.1 Peoples Credit Union, South Kingstown RI

Impervious Area*: 5,102 sf

Water Recharge Volume Calculations:

HSG	Recharge Factor (F)
A	0.60
B	0.35
C	0.25
D	0.10

Impervious Area: 5,102 sf F = 0.25

$$WRec_v = (\text{Impervious Area}) / 12 \times F$$

$$WRec_v = 106 \text{ cf}$$

Volume of Infiltration for a WQ storm**: 392 cf

* Taken from the redevelopment calculations.

** Volume as shown in the HydroCAD analysis for the WQ storm (24-hr)



APPENDIX F WQ STORM ANALYSIS (SPLIT PERVIOUS METHOD)

20078.0 2024-03-21

Prepared by Northeast Engineers & Consultants, Inc.
HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 201A:

Runoff = 0.10 cfs @ 12.08 hrs, Volume= 0.008 af, Depth> 0.60"
Routed to Pond SF1 : Sand Filter

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

	Area (sf)	CN	Description
*	1,600	98	Infiltration Area
*	2,270	98	Pavement
	2,763	74	>75% Grass cover, Good, HSG C
	6,633	88	Weighted Average
	2,763	74	41.66% Pervious Area
	3,870	98	58.34% Impervious Area

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

Summary for Subcatchment 201B:

Runoff = 0.07 cfs @ 12.08 hrs, Volume= 0.005 af, Depth> 0.98"
Routed to Pond P1 : Stormtech Chambers

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

	Area (sf)	CN	Description
*	2,836	98	Rooftop
	2,836	98	100.00% Impervious Area

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

Summary for Subcatchment 201C:

Runoff = 0.37 cfs @ 12.08 hrs, Volume= 0.028 af, Depth> 0.67"
Routed to Link 201 :

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

	Area (sf)	CN	Description
*	14,603	98	Pavement and Canopy
	7,433	74	>75% Grass cover, Good, HSG C
	22,036	90	Weighted Average
	7,433	74	33.73% Pervious Area
	14,603	98	66.27% Impervious Area

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

20078.0 2024-03-21

Prepared by Northeast Engineers & Consultants, Inc.
 HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

Summary for Pond P1: Stormtech Chambers

Inflow Area = 0.065 ac, 100.00% Impervious, Inflow Depth > 0.98" for WQ event
 Inflow = 0.07 cfs @ 12.08 hrs, Volume= 0.005 af
 Outflow = 0.00 cfs @ 11.47 hrs, Volume= 0.005 af, Atten= 93%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 11.47 hrs, Volume= 0.005 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 201 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.99' @ 13.54 hrs Surf.Area= 201 sf Storage= 97 cf
 Flood Elev= 99.25' Surf.Area= 201 sf Storage= 214 cf

Plug-Flow detention time= 168.6 min calculated for 0.005 af (100% of inflow)
 Center-of-Mass det. time= 168.3 min (949.7 - 781.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	96.00'	125 cf	8.17'W x 24.56'L x 2.33'H Field A 468 cf Overall - 88 cf Embedded = 380 cf x 33.0% Voids
#2A	96.50'	88 cf	ADS_StormTech SC-310 +Cap x 6 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 6 Chambers in 2 Rows
		214 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	98.33'	Automatic Storage Overflow (Discharged without head)
#1	Discarded	96.00'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.00 cfs @ 11.47 hrs HW=96.03' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=96.00' TW=0.00' (Dynamic Tailwater)

Summary for Pond SF1: Sand Filter

Inflow Area = 0.152 ac, 58.34% Impervious, Inflow Depth > 0.60" for WQ event
 Inflow = 0.10 cfs @ 12.08 hrs, Volume= 0.008 af
 Outflow = 0.09 cfs @ 12.11 hrs, Volume= 0.008 af, Atten= 5%, Lag= 1.6 min
 Discarded = 0.00 cfs @ 11.15 hrs, Volume= 0.004 af
 Primary = 0.09 cfs @ 12.11 hrs, Volume= 0.004 af
 Routed to Link 201 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 96.56' @ 12.11 hrs Surf.Area= 200 sf Storage= 15 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 2.9 min (793.1 - 790.2)

Volume	Invert	Avail.Storage	Storage Description
#1	98.25'	888 cf	Depression (Prismatic) Listed below (Recalc)
#2	96.33'	127 cf	Media (Prismatic) Listed below (Recalc)
		384 cf Overall x 33.0% Voids	
		1,014 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.25	1,600	0	0
98.75	1,950	888	888

20078.0 2024-03-21

Prepared by Northeast Engineers & Consultants, Inc.
 HydroCAD® 10.10-6a s/n 04733 © 2020 HydroCAD Software Solutions LLC

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.33	200	0	0
98.25	200	384	384

Device	Routing	Invert	Outlet Devices
#1	Discarded	96.33'	1.020 in/hr Exfiltration over Surface area
#2	Primary	96.33'	4.0" Round 4" UNDERDRAIN L= 105.0' Ke= 0.500 Inlet / Outlet Invert= 96.33' / 95.80' S= 0.0050 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf

Discarded OutFlow Max=0.00 cfs @ 11.15 hrs HW=96.35' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.09 cfs @ 12.11 hrs HW=96.56' TW=0.00' (Dynamic Tailwater)

↑**2=4" UNDERDRAIN** (Barrel Controls 0.09 cfs @ 1.96 fps)

Summary for Link 201:

Inflow Area = 0.723 ac, 67.64% Impervious, Inflow Depth > 0.53" for WQ event
 Inflow = 0.45 cfs @ 12.09 hrs, Volume= 0.032 af
 Primary = 0.45 cfs @ 12.09 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs



APPENDIX G SOIL EVALUATIONS



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

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



Site Evaluation Form
Part A - Soil Profile Description Application Number DRAINAGE ONLY

Property Owner: 703 Kingstown Road LLC
Property Location: 703 Kingstown Road (A.P. 57-1, Lot 92), South Kingstown, Rhode Island
Date of Test Hole: November 3, 2023
Soil Evaluator: Amber K. Hardy, M.S. License Number: D4098
Weather: Sunny, 55° Shaded: Yes No Time: 10:00 am

Table with 11 columns: TH 1 Horizon, Depth, Horizon Boundaries (Dist, Topo), Soil Colors (Matrix, Re-Dox Features), Re-Dox (Ab. S. Contr.), Texture, Structure, Consistence, Soil Category. Contains data for TH 1 and TH 2 horizons.

TH 1 Soil Class B Total Depth 96 Impervious/Limiting Layer Depth none (og) GW Seepage Depth 85 e.g. SHWT 0 (og)

TH 2 Soil Class B Total Depth 96 Impervious/Limiting Layer Depth none (og) GW Seepage Depth 72 e.g. SHWT 0 (og)

Comments: TH2 had Oa material at the buried surface, on one side of the hole, about 12" thick.

Part B





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

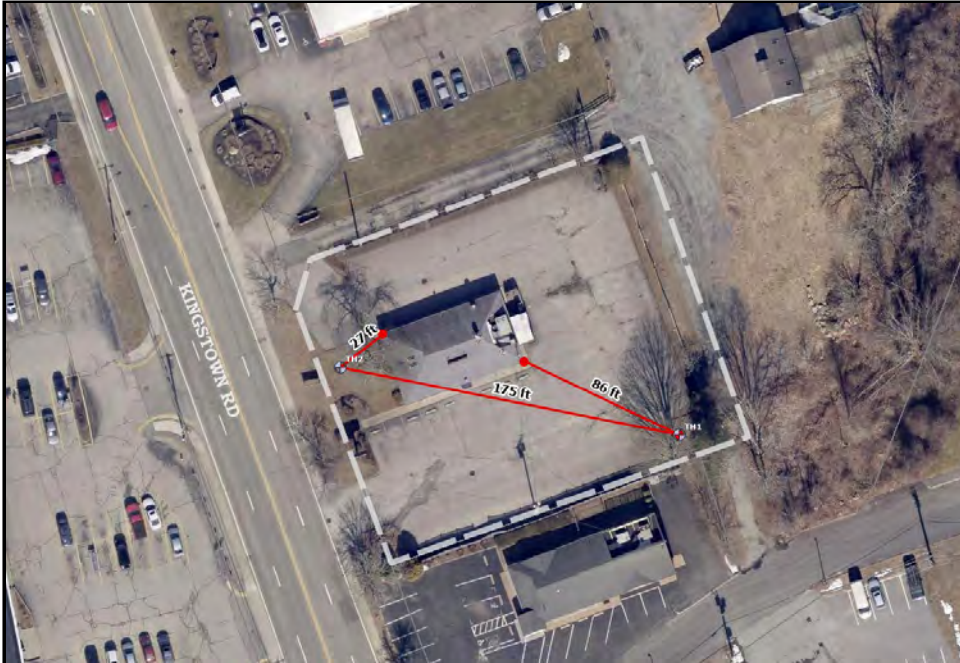
Please use the area below to locate:

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



Bedrock THs	
TH	Depth

1. Relief and Slope: 0 - 3% (graded)
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 6.42? 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: Backslope
10. Vegetation: Business site in a built area. Holes dug in the small unpaved grassed areas.
11. Indicate approximate location of property lines and roadways.
12. Additional comments, site constraints or additional information regarding site: _____

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: *Subwarsky* Signature License #D4098 Part B prepared by: *Subwarsky* Signature License # D4098

DO NOT WRITE IN THIS SPACE

Witnessed Soil Evaluation Decision: Concur Inconclusive Disclaim
Unwitnessed Soil Evaluations Decision: Accept Inconclusive Disclaim

Wet Season Determination required Additional Field Review Required

Explanation: _____

Signature Authorized Agent _____ Date _____



APPENDIX H RIDEM STORMWATER CHECKLIST

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

PROJECT NAME: Peoples Credit Union, 703 Kingstown Road	(RIDEM USE ONLY)
TOWN: South Kingstown RI	STW/WQC File #:
BRIEF PROJECT DESCRIPTION: Redevelopment of a commercial property for a 2,850 +/- sq. ft. banking facility	Date Received:

Stormwater Management Plan (SMP) Elements – Minimum Standards

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

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

PART 1. PROJECT AND SITE INFORMATION

PROJECT TYPE (Check all that apply)

<input type="checkbox"/> Residential	<input checked="" 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 checked="" type="checkbox"/> Other (specify): Redevelopment				

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"/> Groundwater	<input type="checkbox"/> Surface Water	<input checked="" type="checkbox"/> MS4
<input type="checkbox"/> GAA	<input type="checkbox"/> Isolated Wetland	<input checked="" 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: Indian Run Brook	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater <input type="checkbox"/> Unassessed
<input checked="" type="checkbox"/> Waterbody ID: RI0010045R-02	<input type="checkbox"/> 4 th order stream of pond 50 acres or more
<input checked="" type="checkbox"/> TMDL for: Fecal Coliform, Copper, Zinc	<input type="checkbox"/> Watershed of flood prone river (e.g., Pocasset River)
<input checked="" 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: Fecal coliform, copper, zinc	<input type="checkbox"/> Contributes to shellfishing grounds

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

PROJECT HISTORY		
<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 #:	
FLOODPLAIN & FLOODWAY See Guidance Pertaining to Floodplain and Floodways		
<input checked="" type="checkbox"/> Riverine 100-year floodplain: FEMA FLOODPLAIN FIRMETTE has been reviewed and the 100-year floodplain is on site		
<input checked="" type="checkbox"/> Delineated from FEMA Maps		
NOTE: Per Rule 250-RICR-150-10-8-1.1(B)(5)(d)(3), provide volumetric floodplain compensation calculations for cut and fill/displacement calculated by qualified professional		
<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		

CRMC JURISDICTION
<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

LUHPPL IDENTIFICATION - MINIMUM STANDARD 8:		
1. OFFICE OF Land Revitalization and Sustainable Materials Management (OLRSMM)		
<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))		RIDEM CONTACT:
<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 RIDEM Environmental Resources Map as one of the following regulated facilities		SITE ID#:
<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		
Note: 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.		
2. PER MINIMUM STANDARD 8 of RICR 8.14.C.1-6 "LUHPPLS," THE SITE IS/HAS:		
<input type="checkbox"/> Industrial Site with RIPDES MSGP, except where No Exposure Certification exists. http://www.dem.ri.gov/programs/water/permits/ripdes/stormwater/status.php		
<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	
3. STORMWATER INDUSTRIAL PERMITTING		
<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 THE MULTI-SECTOR GENERAL PERMIT (MSGP) UNDER RULE 31(B)15 OF THE RIPDES REGULATIONS.	MSGP permit #
<input type="checkbox"/>	Additional stormwater treatment is required by the MSGP Explain:	

REDEVELOPMENT STANDARD – MINIMUM STANDARD 6		
<input checked="" type="checkbox"/> Pre-Construction Impervious Area		
<input checked="" type="checkbox"/>	Total Pre-Construction Impervious Area (TIA): 0.55 acres	
<input checked="" type="checkbox"/>	Total Site Area (TSA) 0.70	
<input checked="" type="checkbox"/>	Jurisdictional Wetlands (JW) 0.00 acres	
<input checked="" type="checkbox"/>	Conservation Land (CL) 0.00 acres	
<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) = 0.70 acres	
<input checked="" type="checkbox"/>	(TIA) / (SS) = 0.78	<input checked="" type="checkbox"/> (TIA) / (SS) >0.4?
<input checked="" type="checkbox"/> YES, Redevelopment		

PART 2. LOW IMPACT DEVELOPMENT ASSESSMENT – MINIMUM STANDARD 1

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

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

A) PRESERVATION OF UNDISTURBED AREAS, BUFFERS, AND FLOODPLAINS

- Sensitive resource areas and site constraints are identified (required)
- Local development regulations have been reviewed (required)
- All vegetated buffers and coastal and freshwater wetlands will be protected during and after construction
- Conservation Development or another site design technique has been incorporated to protect open space and pre-development hydrology. **Note:** If Conservation Development has been used, check box and skip to Subpart C
- As much natural vegetation and pre-development hydrology as possible has been maintained

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

<p>B) LOCATE DEVELOPMENT IN LESS SENSITIVE AREAS AND WORK WITH THE NATURAL LANDSCAPE CONDITIONS, HYDROLOGY, AND SOILS</p> <ul style="list-style-type: none"> <input type="checkbox"/> Development sites and building envelopes have been appropriately distanced from wetlands and waterbodies <input type="checkbox"/> Development and stormwater systems have been located in areas with greatest infiltration capacity (e.g., soil groups A and B) <input type="checkbox"/> Plans show measures to prevent soil compaction in areas designated as Qualified Pervious Areas (QPA's) <input checked="" type="checkbox"/> Development sites and building envelopes have been positioned outside of floodplains <input checked="" type="checkbox"/> Site design positions buildings, roadways and parking areas in a manner that avoids impacts to surface water features <input checked="" type="checkbox"/> Development sites and building envelopes have been located to minimize impacts to steep slopes ($\geq 15\%$) <input type="checkbox"/> Other (describe): 	<p>No type A or B soils located on site.</p> <p>No steep slopes are present on site.</p>
<p>C) MINIMIZE CLEARING AND GRADING</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Site clearing has been restricted to <u>minimum area needed</u> for building footprints, development activities, construction access, and safety. <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) <input 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) <input type="checkbox"/> Plan notes specify that public trees removed or damaged during construction shall be replaced with equivalent 	
<p>D) REDUCE IMPERVIOUS COVER</p> <ul style="list-style-type: none"> <input type="checkbox"/> Reduced roadway widths (≤ 22 feet for ADT ≤ 400; ≤ 26 feet for ADT 400 - 2,000) <input type="checkbox"/> Reduced driveway areas (length minimized via reduced ROW width (≤ 45 ft.) and/or reduced (or absolute minimum) front yard setback; width minimized to ≤ 9 ft. wide one lane; ≤ 18 ft. wide two lanes; shared driveways; pervious surface) <input type="checkbox"/> Reduced building footprint: Explain approach: <input type="checkbox"/> Reduced sidewalk area (≤ 4 ft. wide; one side of the street; unpaved path; pervious surface) <input type="checkbox"/> Reduced cul-de-sacs (radius < 45 ft; vegetated island; alternative turn-around) <input type="checkbox"/> Reduced parking lot area: Explain approach <input type="checkbox"/> Use of pervious surfaces for driveways, sidewalks, parking areas/overflow parking areas, etc. <input checked="" type="checkbox"/> Minimized impervious surfaces (project meets or is less than maximum specified by Zoning Ordinance) <input type="checkbox"/> Other (describe): 	<p>Project proposes a reduction in impervious cover</p>
<p>E) DISCONNECT IMPERVIOUS AREA</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Impervious surfaces have been disconnected, and runoff has been diverted to QPAs to the maximum extent possible <input type="checkbox"/> Residential street edges allow side-of-the-road drainage into vegetated open swales <input type="checkbox"/> Parking lot landscaping breaks up impervious expanse AND accepts runoff <input type="checkbox"/> Other (describe): 	
<p>F) MITIGATE RUNOFF AT THE POINT OF GENERATION</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Small-scale BMPs have been designated to treat runoff as close as possible to the source 	

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

<p>G) PROVIDE LOW-MAINTENANCE NATIVE VEGETATION</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Low-maintenance landscaping has been proposed using native species and cultivars <input type="checkbox"/> Plantings of native trees and shrubs in areas previously cleared of native vegetation are shown on site plan <input checked="" type="checkbox"/> Lawn areas have been limited/minimized, and yards have been kept undisturbed to the maximum extent practicable on residential lots 	
<p>H) RESTORE STREAMS/WETLANDS</p> <ul style="list-style-type: none"> <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 <input type="checkbox"/> Removal of invasive species <input type="checkbox"/> Other 	N/A

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)

Design Point	Impervious Area Treated (sq ft)	Total Re _v 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 _v directed to a QPA (cu ft)		
DP-1: Kingstown Road	5,102	106	0	106	392
DP-2:					
DP-3:					
DP-4:					
TOTALS:					

Notes:

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

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

Stormwater Report: Appendix E “Supplementary Calculations”

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 checked="" 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 type="checkbox"/>	<input checked="" 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.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	RICR 8.36. A Pollutant Loading Analysis is needed and has been completed.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	The Water Quality Guidance Document (Water Quality Goals and Pollutant Loading Analysis Guidance for Discharges to Impaired Waters) has been followed as applicable.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	BMPs are proposed that are on the approved technology list . If “Yes,” please provide all required worksheets from the manufacturer.
<input type="checkbox"/>	<input checked="" 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	Impervious area treated (sf)	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)		
Kingstown Road (bldg)	2,836	236	0	238	236
Kingstown Road (pave)	2,270	189	0	189	198
TOTALS:				427	434
Notes:					
1. Only BMPs listed in RICR 8.20 and 8.25 or the Approved Technologies List of BMPs is Acceptable for Water Quality treatment.					
2. For each Design Point, the Water Quality Volume Standard must be met for each Waterbody ID.					
<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.): Stormwater Report: Appendix E “Supplementary Calculations”				

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 checked="" type="checkbox"/> The project is a small facility with impervious cover of less than or equal to 1 acre. <input 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 checked="" type="checkbox"/>	<input type="checkbox"/>	Conveyance and natural channel protection for the site have been met. If “No,” explain why:

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

OVERBANK FLOOD PROTECTION (RICR 8.11) AND OTHER POTENTIAL HIGH FLOWS – MINIMUM STANDARD 5		
YES	NO	
<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 checked="" type="checkbox"/>	<input type="checkbox"/>	Does the project flow to an MS4 system or subject to other stormwater requirements? If "Yes," indicate as follows:
		<input checked="" type="checkbox"/> RIDOT <input type="checkbox"/> Other (specify):
<p>Note: The project could be approved by RIDEM but not meet RIDOT or Town standards. RIDOT's regulations indicate that post-volumes must be less than pre-volumes for the 10-yr storm at the design point entering the RIDOT system. If you have not already received approval for the discharge to an MS4, please explain below your strategy to comply with RIDEM and the MS4.</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):
YES	NO	
<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 checked="" type="checkbox"/>	<input type="checkbox"/>	Do off-site areas contribute to the sub-watersheds and design points? If "Yes,"
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Are the areas modeled as "present condition" for both pre- and post-development analysis?
<input checked="" 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 checked="" type="checkbox"/>	<input type="checkbox"/>	Calculate the following:
		<input checked="" type="checkbox"/> Area of disturbance within the sub-watershed (areas) 0.70 acres
		<input checked="" type="checkbox"/> Impervious cover (%) 63%
<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)
Kingstown Rd.	0.62	0.45	1.71	1.26	3.27	2.80	6.90	4.90
TOTALS:								

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

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

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

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 _v (af)	WQ _v (af)	CP _v (Y/N / NA)	Overbank Flood Reduction (Y/N/NA)		Yes/No	Technical Justification (Design Report page number)	Distance Provided
P1	201B	Infiltration	N/A	0.005	0.005	N	N	NA	Y		
SF-1	201A	Sand Filter	Y	0.004	0.005	N	N	NA	Y		
		TOTALS:									

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

Table 5.3 Summary of Soils to Evaluate Each BMP									
DP #	BMP ID	BMP Type (e.g., bioretention, tree filter)	Soils Analysis for Each BMP						
			Test Pit ID# and Ground Elevation		SHWT Elevation (ft)	Bottom of Practice Elevation* (ft)	Separation Distance Provided (ft)	Hydrologic Soil Group (A, B, C, D)	Exfiltration Rate Applied (in/hr)
			Primary	Secondary					
201B	P1	Infiltration	TH#2		93.50	96.50	3	C	1.02
201A	Sf1	Sand Filter	TH#1		92.50	98.25	5.75	C	1.02
		TOTALS:							

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

LAND USES WITH HIGHER POTENTIAL POLLUTANTS LOADS (LUHPPLs) – MINIMUM STANDARD 8			
YES	NO	N/A	
<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.).

ILLICIT DISCHARGES – MINIMUM STANDARD 9			
Illicit discharges are defined as unpermitted discharges to Waters of the State that do not consist entirely of stormwater or uncontaminated groundwater, except for certain discharges identified in the RIPDES Phase II Stormwater General Permit.			
YES	NO	N/A	
<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)?

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

SOIL EROSION AND SEDIMENT CONTROL (SESC) – MINIMUM STANDARD 10		
YES	NO	N/A
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" 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 separately-bound document based upon the SESC Template? 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	

STORMWATER MANAGEMENT SYSTEM OPERATION, MAINTENANCE, AND POLLUTION PREVENTION PLAN – MINIMUM STANDARDS 7 AND 9		
Operation and Maintenance Section		
YES	NO	
<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 separately-bound Operation and Maintenance Plan for the site and for all of the BMPs, and does it address each element of RICR 8.17 and RISDISM Appendix C and E?
<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:

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

<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.
Pollution Prevention Section		
<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 type="checkbox"/>	<input checked="" 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:
<input type="checkbox"/>	<input checked="" 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

Existing and Proposed Subwatershed Mapping (REQUIRED)		
YES	NO	
<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 type="checkbox"/>	<input checked="" 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: Amber K. Hardy
	<input type="checkbox"/>	RI-registered P.E. Name:

Subwatershed and Impervious Area Summary				
Subwatershed (area to each design point)	First Receiving Water ID or MS4	Area Disturbed (ac)	Existing Impervious (ac)	Proposed Impervious (ac)
DP-1: Kingstown Rd.	RI0010045R-02	0.70	0.55	0.44
DP-2:				
DP-3:				
TOTALS:		0.70	0.55	0.44

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

Site Construction Plans (Indicate that the following applicable specifications are provided)		
YES	NO	
<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"> ▶ freshwater and coastal wetlands, including lakes and ponds ▶ coastal shoreline features 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"> ▶ 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; ▶ Design water surface elevations (applicable storms); ▶ Structural details of outlet structures, embankments, spillways, stilling basins, grade-control structures, conveyance channels, etc.; ▶ Existing and proposed structural elevations (e.g., inverts of pipes, manholes, etc.); ▶ 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; ▶ Planting plans for structural stormwater BMPs, including species, size, planting methods, and maintenance requirements of proposed planting
<input type="checkbox"/>	<input checked="" 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"> ▶ Existing and proposed utilities (e.g., water, sewer, gas, electric) and easements; ▶ 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.); ▶ Cross sections of roadways, with edge details such as curbs and sidewalks; ▶ Location and dimensions of channel modifications, such as bridge or culvert crossings
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations, cross sections, and profiles of all stream or wetland crossings and their method of stabilization