North Smithfield Fire & Rescue Service, Inc.

1470 Providence Pike • North Smithfield, RI 02896

Office of Fire Prevention

David R. Chartier
Fire Chief

Brian Gartland
Fire Marshal

Tel (401)356-4355
Fax (401) 356-0851
chartier@northsmithfieldfire.com

firemarshal@northsmithfieldfire.com

To: Grand Bank Solar

From: North Smithfield Fire Marshal

Date: December 11, 2019

Subject: Plan-Review

A plan review of your proposed on-ground solar farm located off Greenville Road in the 200 block was conducted on October 15, 2019.

At the time of our review, we found no deficiencies or violations to the Rhode Island State Fire Code. Please contact the North Smithfield Town Hall at (401) 767-2201 for a rough and final inspection of all work being done.

If you have any questions, feel free to contact me at (401)762-1135.

Respectfully,

Brian Gartland
Assistant Deputy State Fire Marshal

DiPrete Engineering

DECOMMISSIONING COST ESTIMATE - GRAND BANKS SOLAR, NORTH SMITHFIELD, RI
ECONOX RENEWABLES, INC.
DATE: 3/2/2020

	Item Description	Unit	Quantity	Unit Cost	Extended Cost	Comments
1	**Equipment Removal**					
1.1	Utility Disconnect from Grid	lump sum	1	$2,000	$2,000	Includes removal of wire, poles, transformers, appurtenances, with all equipment retained by utility.
1.2	Removal/Salvage of Inverters	lump sum	1	$2,000	$2,000	
1.3	Removal of Solar Panels	crew days	7	$1,803	$12,621	Removal crew = service truck, skid steer loader, foreman, 3 laborers, tools, misc. materials
1.4	Remove Racks/Cable Trays and Haul Steel and Aluminum Away for Salvage	crew days	4	$1,803	$7,212	Estimated total of 316 racks being removed.
1.5	Salvage of Racks and Cable Trays	ton	68	($125)	($8,438)	Assumes 135,000 lbs of racking equipment per MW. 1.0 MW x 135,000 lbs = 67.5 Tons x $125 per ton = $8437.50
1.6	Salvage - other materials	lump sum	1	$1,000	$1,000	Copper or aluminum conductors, smaller metal pieces.
			Task 1 Total (Equipment Removal)		**$16,396**	
2	**Site Restoration**					
2.1	Seeding	acres	1	$4,400	$2,200	To determine the area which is will require this seeding the following assumptions were used. The array will consist of approximately 300 pole mounts which when being removed will need to be reseeded. Assuming a generous diameter of 10' around each pole mount is disturbed during removal this will create total area of 23,550 SF or approximately half an acre.
2.2	Minor Erosion Repairs	lump sum	2	$750	$1,500	Assume minor repairs needed at access road areas, by regrading existing material.
2.3	Final As-Built Survey Map	lump sum	1	$750	$750	Assume revision of existing CAD drawing showing the final restored site.
2.4	Removal of fencing	linear foot	1,770	$1.00	$1,770	Average of commerical fence removal.
2.5	Moderate re-planting	trees	100	$30.00	$3,000	100 trees at $30 each, 3" caliper, 5 ft height
			Task 2 Total (Site Restoration)		**$9,220**	
3	**Engineering Oversight and QA/QC**					
3.1	Resident Engineer/Inspector and Engineering Project Management	days	1	$1,000	$1,000	
3.2	Final Engineer's Report (RI PE)	lump sum	1	$1,500	$1,500	
			Task 3 Total (Engineering Oversight and QA/QC)		**$2,500**	

CAPITAL COST SUBTOTAL	**$28,116**
125% BONDING AMOUNT TOTAL	**$35,144**
TOTAL CAPITAL COST ESTIMATE	**$35,144**

NOTES:

1 Costs shown above are based on conceptual design assumptiions, and are considered suitable for overall project evaluation. Actual costs are expected to vary from these conditions due to scope details, market conditons, and conditions at the time of construction.

2 Costs assume fencing to remain in place, roadways to remain in place, and all drainage components in place to control stormwater runoff.

DiPrete Engineering
David A. Russo. P.E.
RI PE License #11355

G. FINAL PLAT CHECKLIST
MINOR LAND DEVELOPMENT PROJECTS AND MINOR SUBDIVISIONS
NO PUBLIC IMPROVEMENTS

The applicant shall submit to the Administrative Officer copies of final site plans and supporting materials as indicated below:

Every submission must also be accompanied by an Application for Approval of a Minor Land Development Project or Minor Subdivision, as contained in Appendix B.

A. Plat Plans to be Recorded – Two (2) copies of the final plat plan on mylar, plus three (3) blueline or photocopies, drawn to a scale of 1'=40'. The scale and number of plans may be modified with the permission of the Administrative Officer. In addition twelve (12) blueline or photocopies of all plans and supporting materials shall also be submitted. Each sheet shall be no larger than 24" x 36", and a sufficient number of sheets shall be included to clearly show all of the information required. Sheets shall be numbered sequentially (e.g., sheet 1 of 3, 2 of 3, etc.). All plan sheets and related documents must be provided in portable document format (PDF) files as well. The following information shall be shown on the plans:

1. X Name and location of the proposed subdivision
2. X Notation that the subdivision is located in the Town of North Smithfield, RI
3. X Name and address of property owner and applicant
4. X Name, address and telephone number of engineer and/or land surveyor
5. X Date of plan preparation, with revision date(s) (if any)
6. X Graphic scale and true north arrow. Legend to explain any graphic representations or symbols on the plan.
7. X Inset locus map at 1"=2000' exact or approximate scale so labeled.
8. X Plat and lot number(s) of the land being subdivided
9. X Zoning district(s) of the parcel being subdivided (If more than one district, zoning boundary lines must be shown)
10. X Perimeter boundary lines of the subdivision, in heavy shaded line drawn so as to distinguish them from other property lines
11. X Location and dimensions of existing property lines, easements and rights-of-way within or immediately adjacent to the parcel being subdivided
12. X Location, width and names of proposed and existing streets within and immediately adjacent to the parcel being subdivided
13. X Names of abutting property owners and property owners immediately across any adjacent streets
14. NA Location of proposed permanent bounds
15. NA Location of all interior lot lines and street lines with accurate dimensions indicated
16. NA Location and number of all proposed lots, with accurate areas indicated
17. X Location and notation of type of proposed easement(s) or existing easement(s) to remain (if any) with accurate dimensions and areas indicated
18. X Notation of special conditions of approval imposed by the Planning Board (if any)
19. NA Notation of any permits and agreements with state and federal reviewing agencies (if any)
20. X Certification (stamp) by a Registered Land Surveyor that all interior and perimeter lot lines and streets lines of the land being subdivided have been designed to conform to the survey requirements of these Regulations and are certified as being correct

21. _X__Rectangular box showing zoning district(s), dimensional requirements for each district, and the minimum dimensions actually provided.

B. Supporting Materials

1._X__ Administrative (Filing) Fee: Section 8-10

2._X__Two original signed copies of all legal documents describing the property including propose easements and rights-of-way, dedications, restrictions, or other required legal documents

3._X__ Certification of the Tax Collector that all Town taxes due on the land have been paid to date and that there are no outstanding tax liens on the land

Specify: _____

_____

_____

_____

4._X__ Written confirmation from the RI Department of Environmental Management pursuant to the RIDEM Rules and Regulation Governing the Enforcement of the Freshwater Wetlands Act, and any subsequent amendments thereto, that plans of the proposed subdivision, including any required off-site construction, have been reviewed and indicating that the Wetlands Act either does not apply to the proposed site alteration or that approval has been granted for the proposed site alteration.

5._NA_ In lieu of item 4 above, an affidavit signed by a qualified professional (a wetlands biologist, a Registered Professional Engineer or a Registered Landscape Architect) stating that there are no freshwater wetlands present on or within 200 feet of the property being subdivided.

6._X__ A Physical Alteration Permit (PAP) issued by the State Department of Transportation for any connection to our construction work within a State highway or other right-of-way (if necessary)

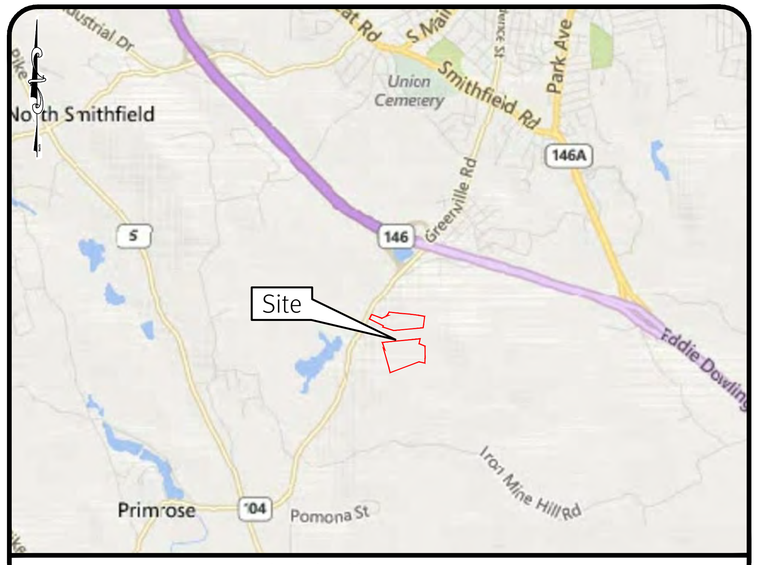
7._X__ Rhode Island Pollution Discharge Elimination System (RIPDES) permit (if required)

Final Submission

Grand Banks Solar

North Smithfield, Rhode Island 02896

Assessor's Plat 12 Lots 156 & 156-A



Location Map Scale: 1"=2000'

Sheet Index

SESC / O&M

The Soil Erosion and Sediment Control Plan (SESC) and Operations and Maintenance Plan (O&M) are required documents with this plan set and must be maintained by the contractor and owner on site.

RIDOT

The Proposed Improvements Will Not Increase the Rate of Stormwater Runoff Onto the State Highway. All Work Within the State Right of Way Must Conform to the RI Standard Specifications, Details, and Addendums.

DiPrete Engineering
Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-464-6026 www.diprete-eng.com
Boston • Providence • Newport

DAVID A. RUSSO
No. 14365
REGISTERED PROFESSIONAL ENGINEER
CIVIL

No.	Date	Description	By:
4	03-02-2020	Final Submission	J.A.R.
3	02-28-2020	Response to RIDOT Comments	J.A.R.
2	09-30-2019	RIDOT Preliminary Determination Submission	J.A.R.
1	09-25-2019	Preliminary Plan Submission	M.A.H.

Drawn By: M.A.H. Design By: D.A.R.

Cover Sheet

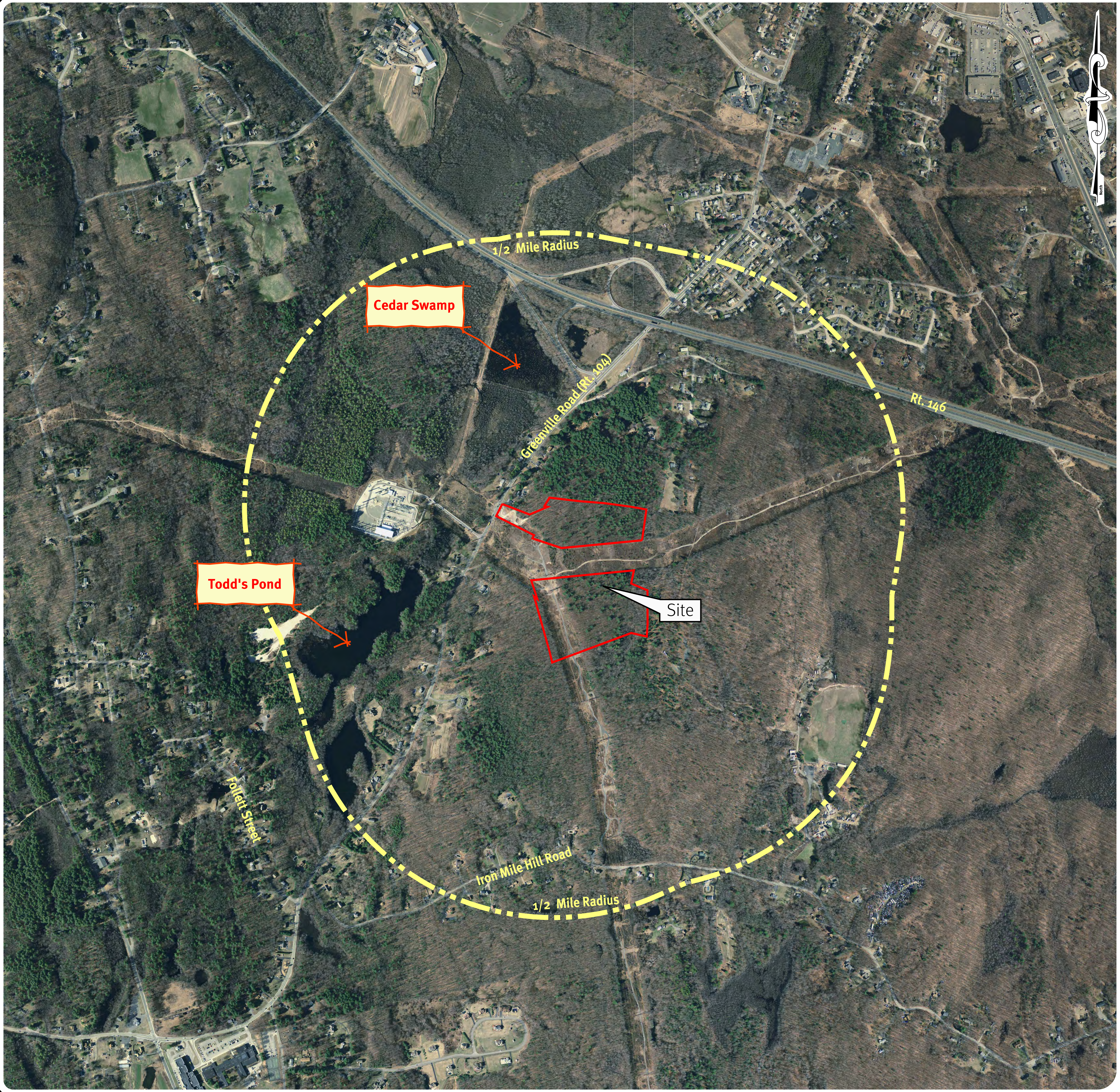
Grand Banks Solar

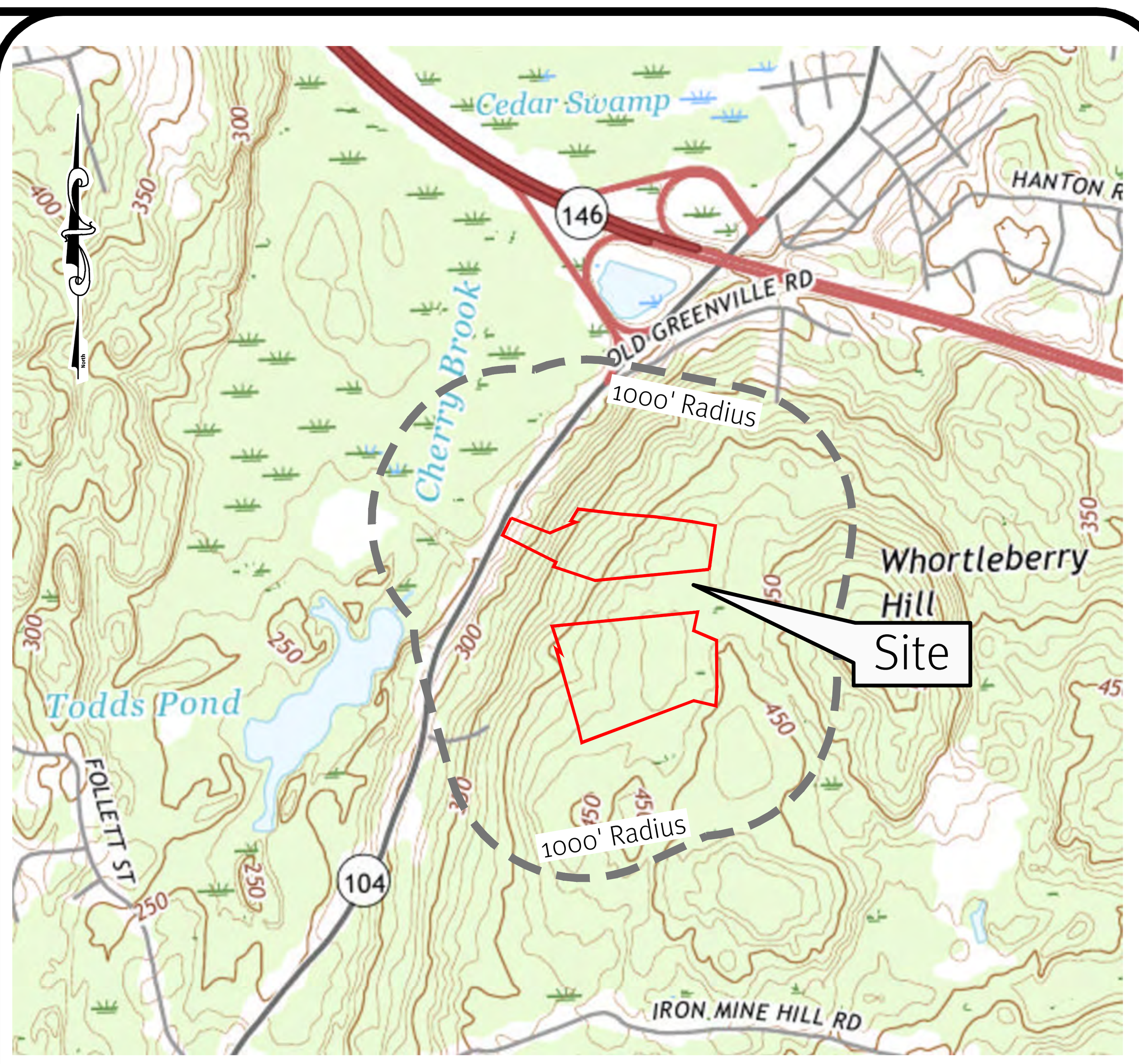
Assessor's Plat 12 Lots 156 & 156A
North Smithfield, Rhode Island 02896

Applicant
Econox Renewables, Inc.
48 Waterfield Road, P.O. Box 808
Winchester, MA 01890

SHEET 1 OF 8

z:\dem\arl\projects\2612-005 grand banks solar\autocad drawings\2612-005-cvsh.dwg Plotted: 3/2/2020





USGS Map Scale: 1"=1000'

Photo Obtained from the RIGIS 2014 database.

Scale: 1"=500'
0 250' 500' 1000'

DiPrete Engineering

Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-464-6006 www.diprete-eng.com

Boston • Providence • Newport

DAVID A. RUSSO
No. 11355
REGISTERED PROFESSIONAL ENGINEER CIVIL
3-2-20

This plan set must not be used for construction purposes unless stamped 'Issued for Construction' and stamped by a registered Professional Engineer of DiPrete Engineering.

DiPrete Engineering only warrants plans on a DiPrete Engineering title block stamped by registered Professional Engineer of DiPrete Engineering. DiPrete Engineering does not warrant plans by any other party.

The contractor is responsible for all of the means, methods, safety precautions and requirements, and OSHA conformance in the implementation of this plan and design.

Existing utilities shown on this plan are approximate only. DiPrete Engineering assumes no responsibility for damages incurred due to locations of existing utilities.

No.	Date	Description	By:
4	03-02-2020	Final Submission	J.A.R.
3	02-18-2020	Response to RIDOT Comments	J.A.R.
2	01-13-2020	RIDOT PAP Submission	J.A.R.
1	09-30-2019	RIDEM Preliminary Determination Submission	J.A.R.
0	03-06-2019	Preliminary Plan Submission	M.A.H.

Drawn By: M.A.H. Design By: D.A.R.

Aerial Half-Mile Radius and USGS Map

Grand Banks Solar

Assessor's Plat 12 Lots 156 & 156A
North Smithfield, Rhode Island 02896

Applicant
Econox Renewables, Inc.
48 Waterfield Road, P.O. Box 808
Winchester, MA 01890

SHEET 2 OF 8

z:\demain\projects\2612-005 grand banks solar\autocad drawings\2612-005-cvar.dwg Plotted: 3/2/2020

General Notes:

1. THE SITE IS LOCATED ON THE TOWN OF NORTH SMITHFIELD, RHODE ISLAND ASSESSOR'S PLAT 12 LOTS 156 AND 156-A.
2. AP 12 LOT 156 IS APPROXIMATELY 11.6 ACRES AND AP 12 LOT 156-A IS APPROXIMATELY 18.92 ACRES. BOTH LOTS ARE ZONED RURAL RESIDENTIAL (RR) (ALSO KNOWN AS RA AND RA-65 IN ZONING ORDINANCE).
3. THE OWNER OF AP 12 LOTS 156 AND 156-A IS: GRAND BANKS COMMERCE PARK LLC.
   PO BOX 663
   SLATERSVILLE, RI 02876
4. THIS SITE IS LOCATED IN FEMA FLOOD ZONE X UNSHADED. ZONE X UNSHADED ARE AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN. REFERENCE FEMA FLOOD INSURANCE RATE MAP 44007C0160G, REVISED MARCH 2, 2009.
5. THIS PLAN IS SUBSTANTIALLY CORRECT IN ACCORDANCE WITH A CLASS IV STANDARD AS ADOPTED BY THE RHODE ISLAND BOARD OF REGISTRATION FOR PROFESSIONAL LAND SURVEYORS. THIS PLAN IS NOT TO BE CONSTRUED AS AN ACCURATE BOUNDARY SURVEY AND MAY BE SUBJECT TO SUCH CHANGES AS AN ACCURATE BOUNDARY SURVEY MAY DISCLOSE.
6. THE SITE IS WITHIN A:
   NATURAL HERITAGE AREA (RIDEM)
   THE SITE IS NOT WITHIN A:
   GROUNDWATER PROTECTION OVERLAY DISTRICT (TOWN)
7. THE SITE DOES NOT CONTAIN ANY HISTORICALLY SIGNIFICANT SITES OR STRUCTURES; STATE OR LOCAL HISTORIC SITES, DISTRICTS, CEMETERIES OR LANDSCAPES; ARCHAEOLOGICALLY SIGNIFICANT SITES; OR STATE DESIGNATED SCENIC AREAS. THIS WAS DETERMINED THROUGH FILE REVIEW AND IS CORRECT TO THE BEST OF OUR BELIEF.
8. WETLAND AREAS PROVIDED BY RIDEM ENVIRONMENTAL RESOURCE MAP.

Plan Reference:

THIS PLAN HAS BEEN COMPILED FROM PLAN ENTITLED: "GARY EZOVSKI, AP 12 LOT 156A, GREENVILLE ROAD, OWNERD BY: GRAND BANKS COMMERCE PARK, LLC, NORTH SMITHFIELD, RHODE ISLAND, EXISTING CONDITIONS" BY NATIONAL SURVEYORS-DEVELOPERS, INC., WOONSOCKET, RI
DATED 11-12-2018
SCALE 1" 60'

Lidar Note:

CONTOUR DATA SHOWN ON THIS PLAN CONFORMS TO A T-4 TOPOGRAPHICAL SURVEY STANDARD AS ADOPTED BY THE RHODE ISLAND BOARD OF REGISTRATION FOR PROFESSIONAL LAND SURVEYORS; SAID DATA IS BASED ON ELEVATION INFORMATION THAT WAS COLLECTED WITH AIRBORNE LIDAR TECHNOLOGY FOR THE ENTIRE AREA OF RHODE ISLAND BETWEEN APRIL 22 AND MAY 6, 2011 AS PART OF THE NORTHEAST LIDAR PROJECT. THIS DATA'S POSITIONAL ACCURACY AND RELIABILITY HAS NOT BEEN VERIFIED BY DIPRETE ENGINEERING AND IS SUBJECT TO CHANGES AN AUTHORITATIVE FIELD SURVEY MAY DISCLOSE.

Abbreviations:

EXISTING	EX
PROPOSED	PR
TYPICAL	TYP
ASSESSOR'S PLAT	AP
NOW OR FORMERLY	N/F

Existing Legend:

(NOT ALL ITEMS SHOWN WILL APPEAR ON PLANS)

PROPERTY LINE
ASSESSOR LINE
SETBACK
MINOR CONTOUR LINE
MAJOR CONTOUR LINE
TREELINE
WETLAND EDGE AND FLAG
WETLAND HATCH
50' PERIMETER WETLAND
100' RIVERBANK WETLAND
STREAM
SOIL LINE AND DESIGNATION
STONE WALL
OVERHEAD ELECTRIC WIRE

Soil Information:

(REFERENCE: WEBSOIL SURVEY OF RHODE ISLAND, U.S.D.A. SOIL CONSERVATION SERVICE)

SOIL NAME	DESCRIPTION
CeC	CANTON AND CHARLTON FINE SANDY LOAMS, VERY ROCKY, 3 TO 15 PERCENT SLOPES
ChB	CANTON AND CHARLTON VERY STONY FINE SANDY LOAMS, 3 TO 8 PERCENT SLOPES
ChD	CANTON AND CHARLTON VERY STONY FINE SANDY LOAMS, 15 TO 25 PERCENT SLOPES
Rf	RIDGEBURY, WHITMAN, AND LEICESTER EXTREMELY STONY FINE SANDY LOAMS

Scale: 1"=100'
0 50' 100' 200'

DiPrete Engineering
Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-464-6046 www.diprete-eng.com
Boston • Providence • Newport

DAVID A. RUSSO
No. 14355
REGISTERED PROFESSIONAL ENGINEER
CIVIL

No.	Date	Description	By
6	03-02-2020	Final Submission	A.R.
5	02-18-2020	Response to RIDOT Comments	A.R.
4	09-12-2019	RIDOT Preliminary Submission	A.R.
3	09-12-2019	RIEDA Preliminary Determination Submission	A.R.
2	03-26-2019	Preliminary Plan Submission	M.A.H.
1	03-05-2019	Preliminary Plan Submission	M.A.H.

Drawn By: M.A.H. Design By: D.A.R.

Existing Analysis Plan

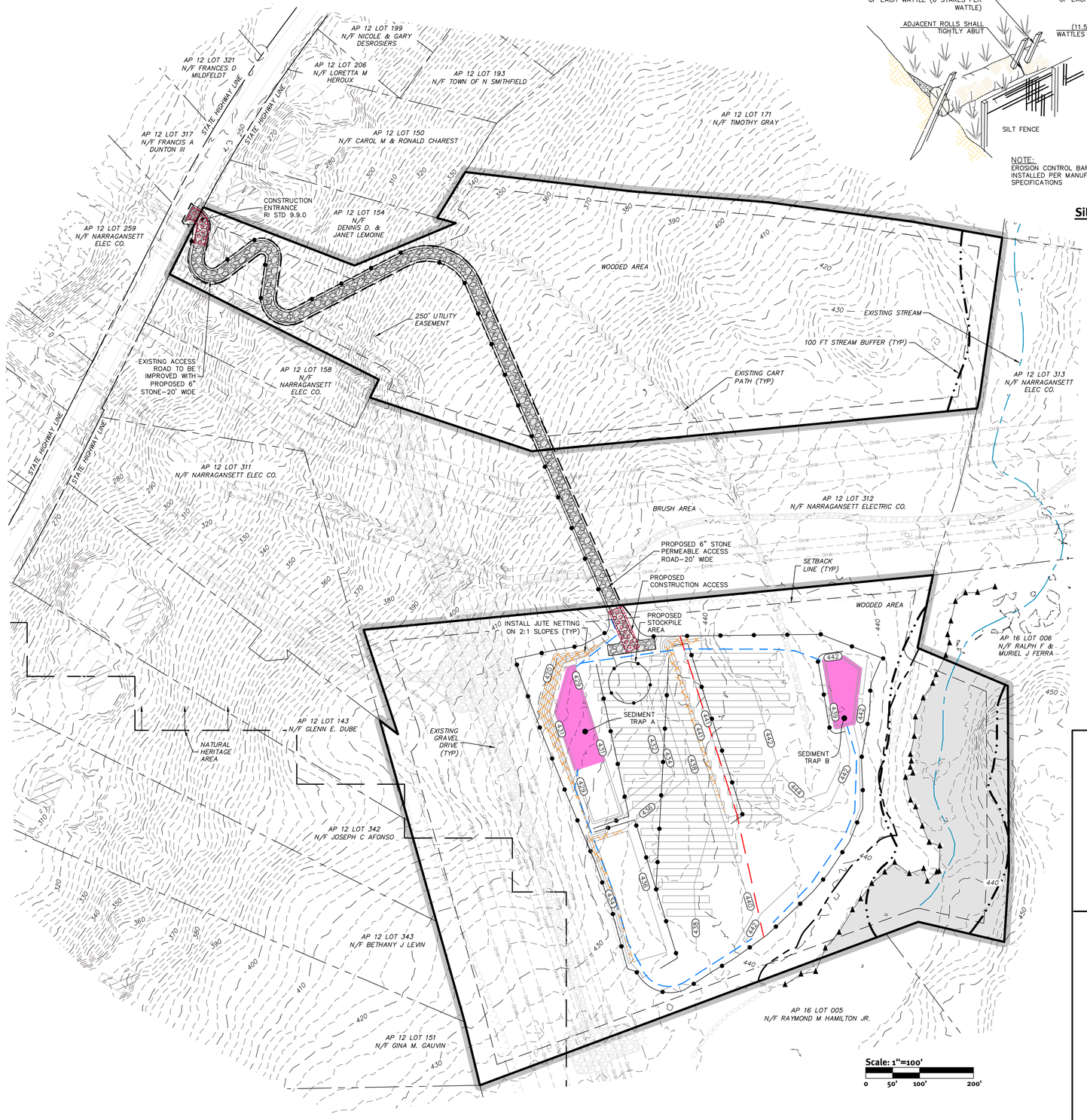
Grand Banks Solar

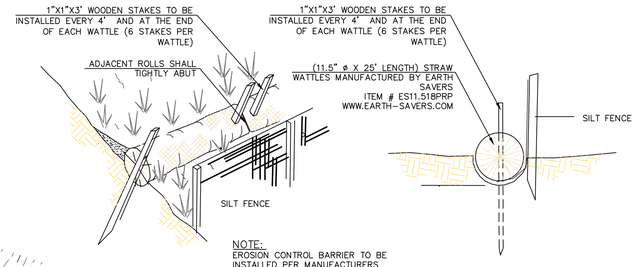
Assessor's Plat 12 Lots 156 & 156A
North Smithfield, Rhode Island 02896

Applicant
Econox Renewables, Inc.
48 Waterfield Road, P.O. Box 808
Winchester, MA 01890

SHEET 3 OF 8

z:\domain\projects\2612-005 grand banks solar\autocad drawings\2612-005-plan.dwg Plotted: 3/2/2020





Silt Fence/Straw Wattle Sediment Barrier

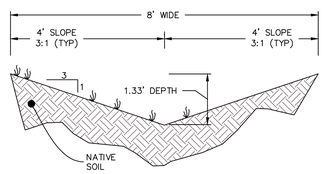
NOT TO SCALE

Erosion Control Notes:

1. ALL EROSION CONTROL, TEMPORARY SWALES, TEMPORARY SEDIMENT TRAPS, ETC. SHALL BE INSTALLED PER THE RHODE ISLAND SOIL EROSION AND SEDIMENTATION CONTROL LATEST EDITION AND THE SOIL EROSION SEDIMENTATION CONTROL (SESC) PLAN BY DIPRETE ENGINEERING, LATEST REVISION.
2. SEE SECTION 2.2 OF THE SESC PLAN BY DIPRETE ENGINEERING, LATEST REVISION, FOR PROJECT PHASING & SEQUENCE OF CONSTRUCTION ACTIVITY.
3. CONSTRUCTION STORAGE AREAS MAY BE RELOCATED WITH APPROVAL FROM THE ENGINEER OF RECORD AND THE GENERAL CONTRACTOR.
4. CONTRACTOR SHALL STABILIZE AREAS PER THE SESC PLAN. AREAS MAY BE STABILIZED WITH SEEDING, STONE, JUTE MESH, SOILTAC, OR APPROVED EQUAL.
5. CLEARING AND GRUBBING IS NOT TO EXTEND BEYOND THE LIMIT OF DISTURBANCE.
6. THE SITE CONTRACTOR IS RESPONSIBLE FOR ALL SOIL EROSION (SILT FENCE, STRAW WATTLE, RIDOT STD 9.2.0, OR APPROVED EQUAL) AND SEDIMENT CONTROL ON SITE. THE SITE CONTRACTOR IS TO NOTIFY THE CIVIL ENGINEER, TOWN OF GLOCESTER, AND RI DEPARTMENT OF ENVIRONMENTAL MANAGEMENT AT LEAST 72 HOURS PRIOR TO THE START OF CONSTRUCTION.
7. STOCKPILE AND CONCRETE WASHOUT LOCATIONS TO BE DETERMINED BY CIVIL ENGINEER, AND SITE CONTRACTOR PRIOR TO CONSTRUCTION. NO STOCKPILING OF MATERIAL TO BE LOCATED IN RIGHT OF WAY AND NO OPEN TRENCHES ARE TO BE LEFT OVERNIGHT. ALL EXCESS SOIL, TREES, ROCKS, BOULDERS, AND OTHER REFUSE, SHALL BE DISCARDED OFF SITE AS DIRECTED BY THE OWNER. IF CONCRETE TRUCKS ARE WASHED OUT ON SITE, ALL WASHOUT MUST BE COMPLETED IN THE DESIGNATED CONCRETE WASHOUT AREA.
8. SITE CONTRACTOR SHALL BE RESPONSIBLE FOR DUST CONTROL. DUST CONTROL TREATMENTS SHALL BE APPLIED AS NECESSARY TO CONTROL AND REDUCE THE AMOUNT OF DUST THAT MAY CAUSE OFF SITE DAMAGE, BE A HEALTH HAZARD TO HUMANS, WILDLIFE, AND PLANT LIFE, OR POSE A HAZARD TO TRAFFIC SAFETY. DUST CONTROL TREATMENTS SHALL BE CONSISTENT WITH RIDEM BEST MANAGEMENT PRACTICES.
9. SITE CONTRACTOR TO MAINTAIN SESC PLAN DOCUMENTATION ON THE SITE THROUGHOUT THE DURATION OF THE PROJECT.
10. SITE CONTRACTOR SHALL STAKEOUT AND PROTECT ANY PROPOSED INFILTRATION AREAS PRIOR TO CONSTRUCTION. CONSTRUCTION TRAFFIC SHALL BE AVOIDED WITHIN INFILTRATION AREAS. THIS INCLUDES WQ INFILTRATION BASINS A, B, C, D, & E AND STONE TRENCH. AREAS SHALL BE PROTECTED FROM RUNOFF DURING CONSTRUCTION AND SHALL BE AVOIDED AS TEMPORARY SEDIMENTATION AREAS DURING CONSTRUCTION TO THE EXTENT PRACTICABLE. SILT FENCE OR EQUAL SHALL BE USED TO PROTECT INFILTRATION AREAS FROM RUNOFF. CONSTRUCTION FENCING CAN BE USED TO PROTECT AREAS FROM CONSTRUCTION TRAFFIC.
11. IN ADDITION TO THOSE AREAS SPECIFICALLY DESIGNATED ON THE PLANS, ALL DISTURBED AREAS INCLUDING THE CONTRACTOR'S STOCKPILE AND STAGING AREAS SHALL BE RESTORED TO MATCH THE DESIGN PLANS OR PRE-CONSTRUCTION CONDITIONS.
12. SEQUENCE OF CONSTRUCTION PROVIDED IN SESC PLAN SHALL BE MODIFIED AS FIELD CONDITIONS WARRANT WITH PRIOR APPROVAL FROM THE OWNER OR OWNER'S REPRESENTATIVE AND THE ENGINEER OF RECORD.
13. ALL LOAM IN DISTURBED AREAS IS TO BE STOCKPILED FOR FUTURE USE.
14. STUMPS SHALL BE GROUND AND USED ONSITE OR REMOVED. NO STUMP DUMPS ARE ALLOWED ONSITE.
15. APPROXIMATE PHASE LINES AND SEDIMENT TRAP LOCATIONS ARE SHOWN. IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD FIT AND DETERMINE ACTUAL SEDIMENT TRAP SIZES ALONG WITH ALL NECESSARY DIVERSION BERMS, SWALES, SILT FENCES OR OTHER APPROPRIATE SEDIMENT CONTROL MEASURES.
16. EACH PROPOSED TEMPORARY SEDIMENT TRAP SHOWN SHALL BE DESIGNED TO ACCOMMODATE DRAINAGE FROM CONTRIBUTING AREAS RANGING FROM 1 TO 5 ACRES.
17. ONCE ALL EARTHWORK, TREE CLEARING, STUMPING AND ROUGH BMP CREATION HAS OCCURRED THE CONTRACTOR SHALL PROPERLY CLOSE LINED SEDIMENT TRAPS AND DIVERSION CHANNELS. THIS CAN BE ACCOMPLISHED BY REMOVING AND PROPERLY DISPOSING OF SEDIMENT THE LINED TRAP HAS GATHERED AND FILLING IN THE TRAP WITH AVAILABLE LOAM, TOPSOIL, OR OTHER MATERIAL APPROVED BY THE ENGINEER OF RECORD.
18. ONCE REMOVED, THE CONTRACTOR SHALL SCARIFY THE BOTTOM OF THE LINED TRAP UNDER THE SUPERVISION OF THE ENGINEER OF RECORD TO ENSURE INFILTRATION CAN OCCUR IN BMP AREAS REQUIRING SUCH.

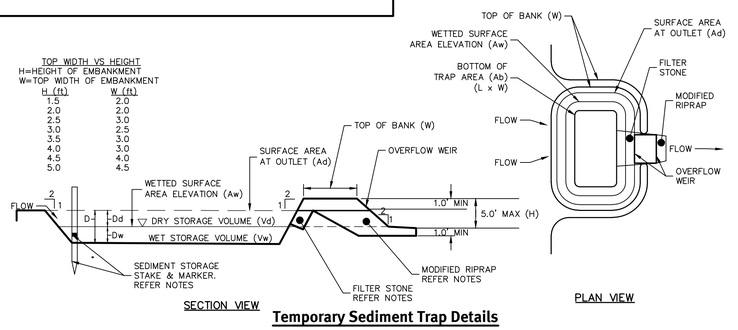
Legend:

- DIVERSION CHANNEL/BERM
- SILT FENCE
- LIMIT OF DISTURBANCE
- APPROXIMATE PHASE LINES (5 ACRE MAX)
- TEMPORARY SEDIMENT TRAPS
- PR FOOT CONTOUR (310)
- CONSTRUCTION ENTRANCE (RIDOT STD 9.9.0)
- 2:1 SLOPES



Temporary Sediment Channel

SEDIMENT TRAP DIMENSIONS	TRAP A		TRAP B	
TRIBUTARY DRAINAGE AREA	3.994	AC	3.056	AC
WET STORAGE DEPTH (Dw)	1.00	FT	1.00	FT
DRY STORAGE DEPTH (Dd)	1.00	FT	1.5	FT
TOTAL DEPTH (D)	2.00	FT	2.5	FT
BOTTOM OF TRAP AREA (Ab)	8,060	SQFT	5,235	SQFT
WETTED SURFACE AREA (Aw)	8,942	SQFT	6,213	SQFT
SURFACE AREA AT OUTLET (Ad)	9,855	SQFT	6,896	SQFT



Temporary Sediment Trap Details

Note: This Plan Must Be Reproduced In Color

DiPrete Engineering
Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-464-6046 www.diprete-eng.com
Boston • Providence • Newport

DAVID A. RUSSO
No. 14355
REGISTERED PROFESSIONAL ENGINEER
CIVIL

No.	Date	Description	By:
4	03-02-2020	Final Submission	J.A.R.
3	02-28-2020	Response to RIDOT Comments	J.A.R.
2	02-12-2020	Response to RIDOT Comments	J.A.R.
1	09-30-2019	RIDEM Permitability Determination Submission	M.A.H.
0	03-06-2019	Preliminary Plans Submission	J.A.R.

Drawn By: M.A.H. Design By: D.A.R.

Soil Erosion and Sediment Control Plan

Grand Banks Solar

Assessor's Plat 12 Lots 156 & 156A
North Smithfield, Rhode Island 02896

Applicant
Econox Renewables, Inc.
48 Waterfield Road, P.O. Box 808
Winchester, MA 01890

DE Job No: 2612-005 Copyright 2020 by DiPrete Engineering Associates, Inc.

SHEET 4 OF 8

z:\deman\projects\2612-005 grand banks solar\autocad drawings\2612-005-plan.dwg Plotted: 3/2/2020

Planning Board Conditions of Approval, dated 04-04-2019:

1. ALL DEM PERMITS SHALL BE SUBMITTED (AND INCLUSIVE OF POLLINATOR MEADOW TECHNIQUE).
2. THE APPLICANT SHALL PAY THE TOWN FOR ITS PEER REVIEW ENGINEERING SERVICES DURING CONSTRUCTION.
3. RECORDED NATIONAL GRID EASEMENT SUBMITTED WITH FINAL PLAN APPLICATION.
4. DECOMMISSIONIG BOND SHALL BE SUBMITTED WITH FINAL PLAN APPLICATION.

Site Layout Notes:

1. DETAILED SOIL EROSION AND SEDIMENT CONTROL MEASURES TO BE INCORPORATED AT THE PRELIMINARY DESIGN STAGE AND WILL CONFORM TO RIDEM BEST MANAGEMENT PRACTICES.
2. NO NEW WELLS OR OWTS PROPOSED. THE SITE IS NOT PROPOSED TO BE SERVICED BY PUBLIC WATER.
3. ALL ELECTRICAL CONNECTION AND DISTRIBUTION LINES WITHIN THE FACILITY SHALL BE UNDERGROUND. ELECTRICAL EQUIPMENT BETWEEN THE FACILITY AND THE UTILITY CONNECTION MAY BE ABOVE GROUND IF REQUIRED BY THE UTILITY.
4. NO NEW LIGHTING INSTALLATIONS ARE PROPOSED.
5. PROPOSED SIGNAGE IS LIMITED TO SECURITY SIGNS (OR SIMILAR) INSTALLED ON THE FACILITY PERIMETER FENCING.
6. PROJECT WORK WILL BE UNDERTAKEN IN ONE PHASE AND IS ANTICIPATED TO BEGIN SPRING 2020 AND CONCLUDE FALL 2020, INCLUDING ALL ASSOCIATED WORKS SESC IMPLEMENTATION PER NOTE 1.
7. NO PRIME AGRICULTURAL SOILS ARE TO BE REMOVED DURING CONSTRUCTION AND INSTALLATION OF THE SYSTEM.
8. 20' MINIMUM SEPARATION IS REQUIRED BETWEEN THE SOLAR ARRAY AND PERIMETER FENCE.
9. CONSTRUCTION STAGING AREA TO INCLUDE CONCRETE WASHOUT AREA AND VEHICLE FUELING/ STORAGE/ MAINTENANCE AREA.
10. HEIGHT OF PROPOSED SOLAR PANEL INSTALLATION RANGES FROM 3 FEET TO 12 FEET.
11. NO OFFSITE UTILITY IMPROVEMENTS ARE PROPOSED.
12. TOTAL OUTPUT OF SOLAR INSTALLATION = 1 MW DC.
13. ALL UTILITY WORK MUST BE APPLIED FOR UNDER A SEPARATE UTILITY PERMIT APPLICATION.

Dimensional Regulations:

CURRENT ZONING*:	RR (RURAL RESIDENTIAL)
MINIMUM LOT AREA:	65,000 SF
MINIMUM FRONTAGE AND LOT WIDTH:	200'
MINIMUM FRONT YARD:	40'
MINIMUM SIDE YARD:	25'
MINIMUM REAR YARD:	40'
MAXIMUM SOLAR PANEL HEIGHT:	15'
MAXIMUM LOT COVERAGE:	25%

*AP 12 LOT 156-A IS WITHIN THE SOLAR PHOTOVOLTAIC OVERLAY DISTRICT (SPOD) AREA. HOWEVER, THE SYSTEM COVERS 2.29 ACRES AND 12% OF GROSS LOT AREA, THEREFORE DOES NOT QUALIFY AS LARGE SCALE.

Viewshed Analysis:

THE PROPOSED SOLAR DEVELOPMENT WILL BE SCREENED FROM ADJACENT STREETS AND NEIGHBORING PARCELS WITH AN EXISTING VEGETATED BUFFER AND/OR LANDSCAPE SCREENING ALONG WITH EXISTING UNDISTURBED TREELINE.

Abbreviations:

EXISTING	EX
PROPOSED	PR
TYPICAL	TYP
ASSESSOR'S PLAT	AP
NOW OR FORMERLY	N/F

Approvals Received:

1. NORTH SMITHFIELD PLANNING BOARD APPROVAL – DATED: 04-04-2019.
2. RIDEM INSIGNIFICANT ALTERATION PERMIT – WETLAND APPLICATION NO. 19-0293 AND RIPDES PROGRAM FILE NO. RIR 101957 – DATED 02-07-2020
3. RIDOT PHYSICAL ALTERATION PERMIT APPLICATION NO. 200114 – DATED 02-25-2020.

Existing Legend:

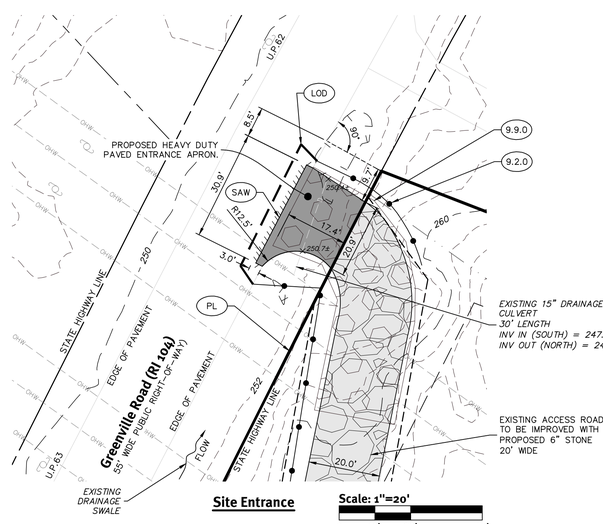
(NOT ALL ITEMS SHOWN WILL APPEAR ON PLANS)

PROPERTY LINE
ASSESSOR LINE
SETBACK
MINOR CONTOUR LINE
MAJOR CONTOUR LINE
TREELINE
WETLAND EDGE AND FLAG
WETLAND HATCH
50' PERIMETER WETLAND
100' RIVERBANK WETLAND
STREAM
SOIL LINE AND DESIGNATION
STONE WALL
OVERHEAD ELECTRIC WIRE

Proposed Legend:

(NOT ALL ITEMS SHOWN WILL APPEAR ON PLANS)

LIMIT OF DISTURBANCE – NO EROSION CONTROL
FILTREXX SEDIMENT CONTROL, SILT FENCE (RIDOT STD 9.2.0) OR APPROVED EQUAL AT LIMIT OF DISTURBANCE
6' HIGH PERIMETER FENCE
SOLAR ARRAY
SWALE
PR FOOT CONTOUR
2:1 SLOPES



Site Entrance

DiPrete Engineering
Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-464-6036 www.dipreteeng.com
Boston • Providence • Newport

DAVID A. RUSSO
No. 14355
REGISTERED PROFESSIONAL ENGINEER
CIVIL

No.	Date	Description	Drawn By: M.A.H.
4	12/02/2020	Final Submission	Design By: D.A.R.
3	02-18-2020	Response to RIDOT Comments	
2	02-12-2020	RIDOT Preliminary Determination Submission	By:
1	09-30-2019	Preliminary Plan Submission	A.K.R.
			A.K.R.
			A.K.R.
			M.A.H.

Site Layout Plan
Grand Banks Solar

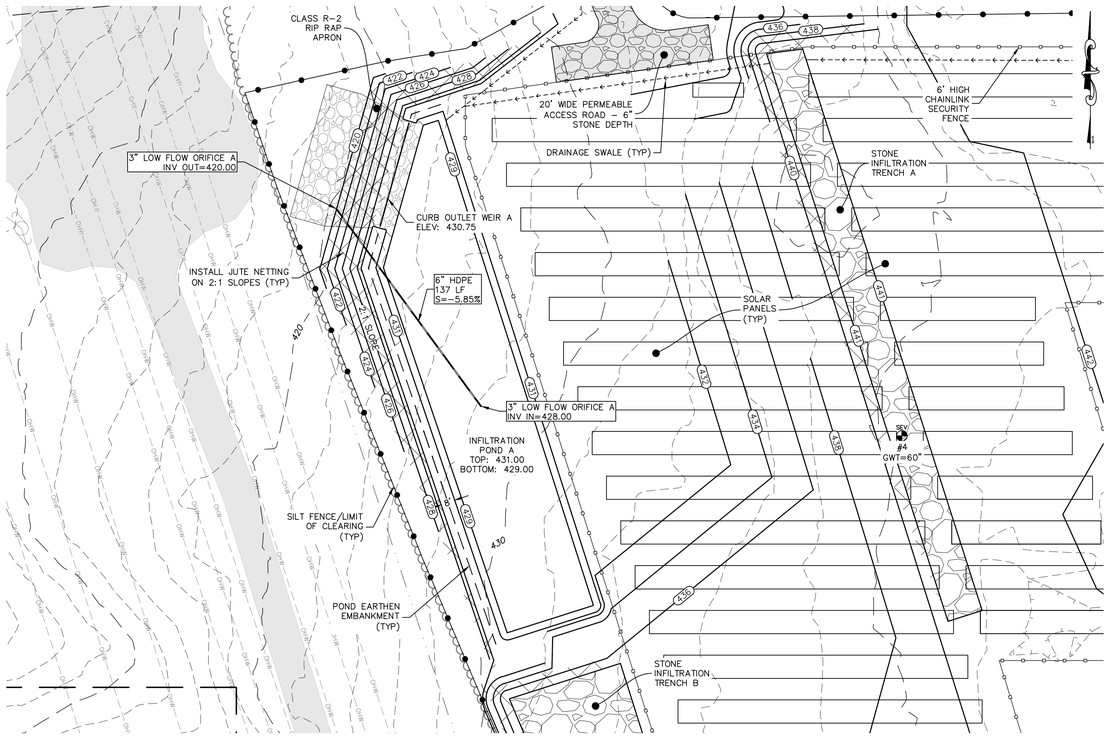
Assessor's Plat 12 - Lots 156 & 156A
North Smithfield, Rhode Island 02896

Applicant
Econox Renewables, Inc.
48 Waterfield Road, P.O. Box 808
Winchester, MA 01890

DE Job No: 2612-005 Copyright 2020 by DiPrete Engineering Associates, Inc.

SHEET 5 OF 8

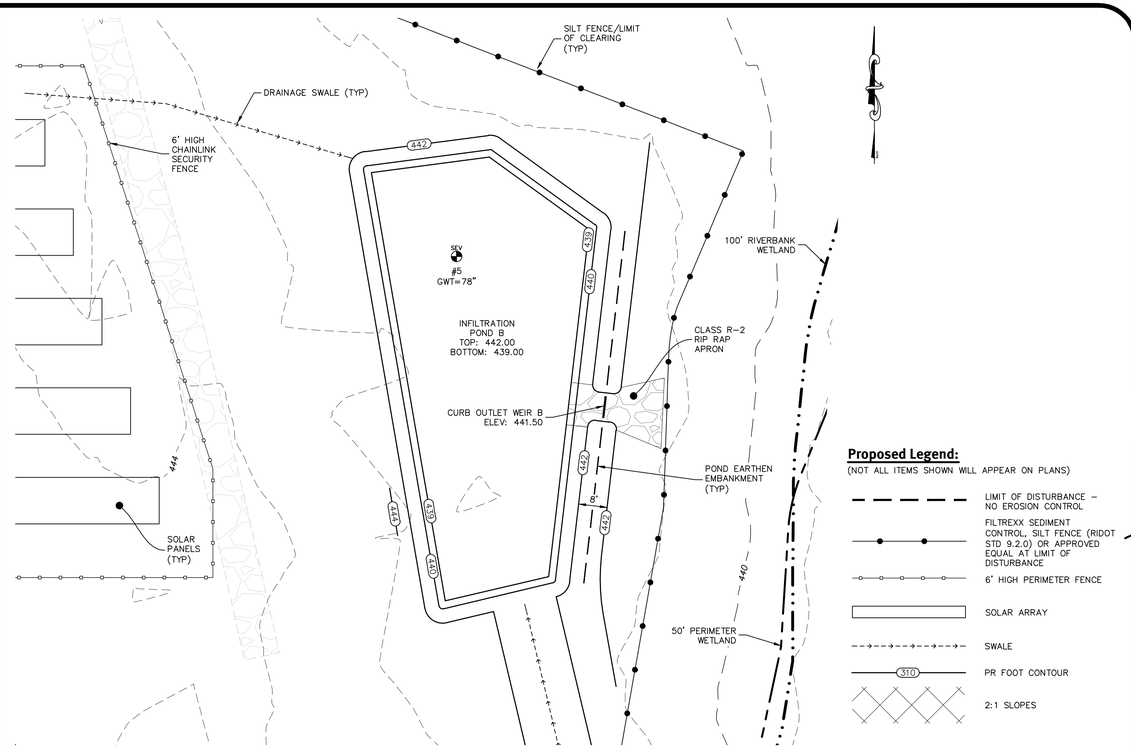
z:\dem\main\projects\2612-005 grand banks solar\autocad drawings\2612-005-plan.dwg Plottedt: 3/2/2020



Infiltration Pond A

Scale: 1"=40'

0 20' 40' 80'



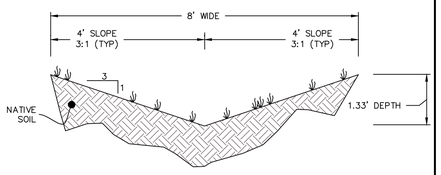
Infiltration Pond B

Scale: 1"=20'

0 10' 20' 40'

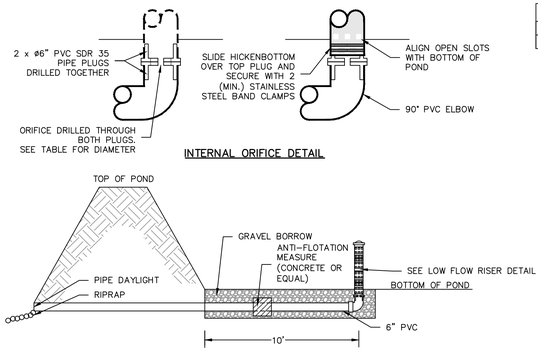
Proposed Legend:
(NOT ALL ITEMS SHOWN WILL APPEAR ON PLANS)

- LIMIT OF DISTURBANCE – NO EROSION CONTROL
- FILTREXX SEDIMENT CONTROL, SILT FENCE (RIDOT STD 9.2.0) OR APPROVED EQUAL AT LIMIT OF DISTURBANCE
- 6' HIGH PERIMETER FENCE
- SOLAR ARRAY
- SWALE
- PR FOOT CONTOUR
- 2:1 SLOPES



Drainage Swale Cross Section

NOT TO SCALE

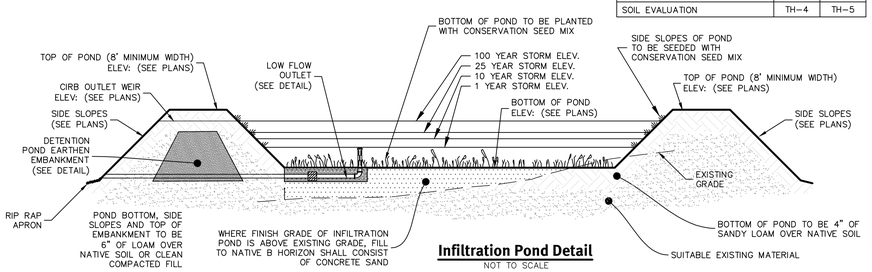


INTERNAL ORIFICE SCHEDULE		
LOCATION	INVERT	DIAMETER
POND A	428.00	3.00"

Low Flow (CPv) Outlet (Without Outlet Structure)

NOT TO SCALE

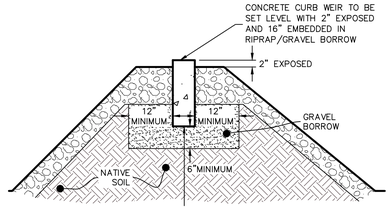
DESCRIPTION	POND A	POND B
TOP OF POND ELEVATION	431.00	442.00
100 YEAR STORM ELEVATION	430.87	441.26
25 YEAR STORM ELEVATION	429.88	440.10
10 YEAR STORM ELEVATION	429.42	439.61
1 YEAR STORM ELEVATION	429.03	439.03
BOTTOM OF POND ELEVATION	429.00	439.00
SEASONAL HIGH GWT ELEVATION	425.00	436.00
SOIL EVALUATION	TH-4	TH-5



Infiltration Pond Detail

NOT TO SCALE

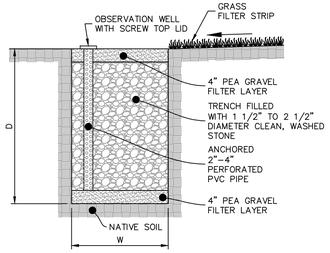
LOCATION	TOP OF POND ELEV.	WEIR INVERT	WEIR DEPTH	WEIR LENGTH	WEIR BREADTH
POND A	431.00	430.75	0.25'	60'	0.5'
POND B	442.00	441.50	0.50'	6'	0.5'



CONCRETE CURB TO BE SET ON GRAVEL BORROW SUBBASE IN ACCORDANCE WITH RHODE ISLAND STATE STANDARD SPECIFICATIONS. GRAVEL BORROW TO EXTEND MINIMUM 6" BELOW EXISTING TOP/SUBSOIL. ALL BACKFILL SHALL BE FREE FROM ORGANIC MATERIALS. ALL MATERIAL PLACED BELOW CURBING SHALL BE COMPACTED TO 95% DENSITY.

Curb Outlet Weir Cross Section

NOT TO SCALE



LOCATION	TRENCH DEPTH (D)	TRENCH WIDTH (W)	TRENCH LENGTH	TOP OF TRENCH	BOTTOM OF TRENCH	SEASONAL HIGH GWT ELEV.
INFILTRATION TRENCH A	24"	65'	235'	441.00	439.00	436.00
INFILTRATION TRENCH B	24"	20'	331'	436.00	434.00	431.00

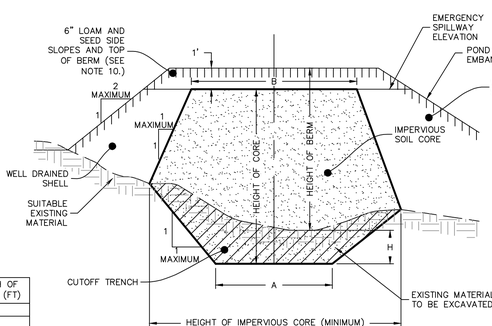
Stone Infiltration Trench

NOTE TO SCALE

NOTES:

1. IMPERVIOUS SOIL CORE TO BE PROVIDED FOR ALL POND EMBANKMENTS.
2. IMPERVIOUS SOIL CORE TO BE CONSTRUCTED OF A MATERIAL WITH A MINIMUM OF 55% PASSING THE #200 SIEVE AND A MAXIMUM PERMEABILITY OF 0.00005 CM/S.
3. WELL DRAINED SHELL TO BE CONSTRUCTED OF GRAVEL AND/OR SAND WITH LESS THAN 5% PASSING THE #200 SIEVE.
4. MINIMUM DEPTH OF CUTOFF TRENCH (H) SHALL BE 3/4 OF THE TOTAL BERM HEIGHT.
5. THE IMPERVIOUS CORE AT A MINIMUM SHALL EXTEND UP BOTH ABUTMENTS TO THE EMERGENCY SPILLWAY ELEVATION.
6. THE MINIMUM BOTTOM WIDTH (A) SHALL BE 5'-8', AND WIDE ENOUGH TO PERMIT OPERATION OF COMPACTION EQUIPMENT.
7. SIDE SLOPES OF THE TRENCH SHALL BE NO STEEPER THAN 1:1.
8. IF BEDROCK IS ENCOUNTERED BELOW THE DAM THE CUT OFF TRENCH CAN BE REDUCED TO 1'x1' (AxH)
9. COMPACTION REQUIREMENTS FOR THE SHELL AND IMPERVIOUS CORE TO BE 95% OF THE MODIFIED PROCTOR PER ASTM D1557. ALL FILL TO BE PLACED IN LIFTS NOT EXCEEDING 12".
10. SIDE SLOPE OF POND EMBANKMENT TO BE 2:1 MAXIMUM. IF SIDE SLOPES ARE STEEPER THAN 3:1, SLOPE PROTECTION MUST BE UTILIZED ON POND EMBANKMENT. THIS INCLUDES, BUT NOT LIMITED TO, RIPRAP AND EROSION CONTROL MATS.
11. THE IMPERVIOUS CORE SHALL BE KEPT FREE FROM STANDING WATER DURING THE BACKFILL OPERATION.
12. ALL EMBANKMENTS TO BE DESIGNED BY A GEOTECHNICAL ENGINEER PRIOR TO CONSTRUCTION. ALL EMBANKMENT INSTALLATIONS TO BE SUPERVISED BY A GEOTECHNICAL ENGINEER.

BERM HEIGHT (FT)	TOP WIDTH OF CORE – B (FT)
0-6.5	8.2
6.6-9.8	9.2
9.9-13.1	9.8
13.2-16.4	10.8
16.5-19.7	11.5



Pond Earthen Embankment

NOT TO SCALE

DiPrete Engineering
Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-464-6046 www.diprete-eng.com
Boston • Providence • Newport

DAVID A. RUSSO
No. 14365
REGISTERED PROFESSIONAL ENGINEER
CIVIL

No.	Date	Description	By
4	12/02/2020	Final Submission	A.K.R.
3	09-18-2020	Response to RIDOT Comments	A.K.R.
2	09-30-2019	RIDOT Preliminary Determination Submission	A.K.R.
1	09-30-2019	Preliminary Plan Submission	M.A.H.

Design By: D.A.R.
Drawn By: M.A.H.

z:\dem\an\projects\2612-005 grand banks solar\autocad drawings\2612-005-plan.dwg Plotted: 3/2/2020

Drainage Details

Grand Banks Solar

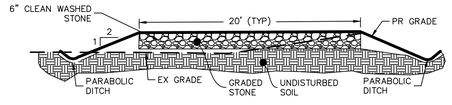
Assessor's Plat 12 Lots 156 & 156A
North Smithfield, Rhode Island 02896

Applicant
Econox Renewables, Inc.
48 Waterfield Road, P.O. Box 808
Winchester, MA 01890

DiPrete Engineering Associates, Inc.

DE Job No: 2612-005 Copyright 2020 by DiPrete Engineering Associates, Inc.

SHEET 6 OF 8



SURFACING (TYP)

PROFILE (TYP)

CONDITIONS:	ROAD THICKNESS:	STONE SIZE:	FINES:
BASE LAYER WITH GEOTEXTILE FABRIC (NOT EXCLUSIVELY WET)	4" MIN.	3-3 ½	0-6%
BASE LAYER WITH GEOTEXTILE FABRIC (WET CONDITIONS)	6" MIN.	3-3 ½	0-6%

SURFACING SPECIFICATIONS

CONSTRUCTION NOTES:

A. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER AS TO MINIMIZE POTENTIAL EROSION AND WATER QUALITY DEGRADATION.
B. FIXED EROSION CONTROLS AND SITE STABILIZATION SHALL BE CONDUCTED IN ACCORDANCE WITH APPROVED BMP'S, OR PURSUANT TO PROJECT SPECIFIC PERMITS.
C. TREES, STUMPS, ROOTS, BRUSH AND WEEDS SHALL BE REMOVED FROM THE WORK AREA IF DETERMINED NECESSARY TO SAFELY CONSTRUCT ROADWAY.
D. ON WEAK, BEARING SOIL SUCH AS LOOSE ALLUVIAL, OR WETLAND SOILS. SURFACE TREATMENTS SHOULD BE UNDERLAIN WITH WOVEN GEOTEXTILES.
E. AT MINIMUM, ROADSIDE DITCHES SHALL BE 1 FT BELOW ROAD SURFACE.
F. DISCHARGE POINTS FOR DITCHES SHALL NOT BE NEAR WETLANDS OR STREAMS, AND OR BE LOCATED AT THE DIRECTION OF THE EPSCS.

SIEVE DESIGNATION	PERCENTAGE BY MASS (WEIGHT) PASSING SQUARE MESH SIEVES
90MM (3.5 INCH)	100
75MM (3 INCH)	90–100
50MM (2 INCH)	75–100
25MM (1 INCH)	50–80
12.5MM (½ INCH)	30–60
4.75MM (NO. 4)	15–40
75µM (NO. 200)	0–6

DENSE GRADED CRUSHED STONE FOR SUBBASE:

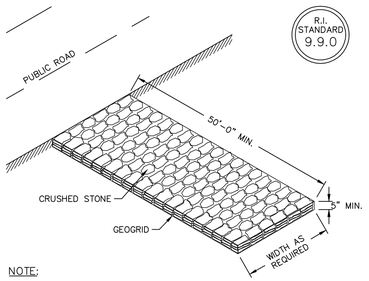
A. DENSE GRADED CRUSHED STONE FOR SUBBASE SHALL CONSIST OF CLEAN, HARD, UNIFORMLY GRADED, CRUSHED STONE. IT SHALL BE SUFFICIENTLY FREE FROM DIRT, DELETERIOUS MATERIAL, AND PIECES THAT ARE STRUCTURALLY WEAK AND SHALL MEET THE FOLLOWING REQUIREMENTS:
B. SOURCE OF MATERIAL SHALL BE OBTAINED FROM AREAS STRIPPED AND CLEANED OF SOIL AND DEBRIS BEFORE BLASTING
C. MATERIAL COARSER THAN THE 4.75MM (NO. 4) SIEVE SHALL NOT BE MORE THAN 30%, BY MASS (WEIGHT), OF THING AND/OR ELONGATED PIECES.

MATERIAL SPECIFICATIONS

NOTE:
1. CLEAN WASHED STONE IS REQUIRED FOR THE PERMEABLE ACCESS ROAD TO PROMOTE INFILTRATION.

6" Stone Permeable Access Drive

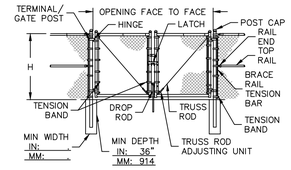
NOT TO SCALE



NOTE:
SHALL BE IN ACCORDANCE WITH SECTION 211 OF THE R.I. STANDARD SPECIFICATIONS.

Construction Access

NOT TO SCALE

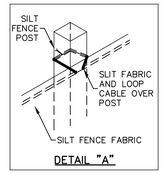


NOTE:
1. METRIC DIMENSIONS ARE NOMINAL EQUIVALENTS TO U.S. DIMENSIONS.
2. SPECIFICATIONS SHOWN CAN BE CHANGED BY THE MANUFACTURER ONLY.
3. FOOTING WIDTH TO BE (4)X POST WIDTH.

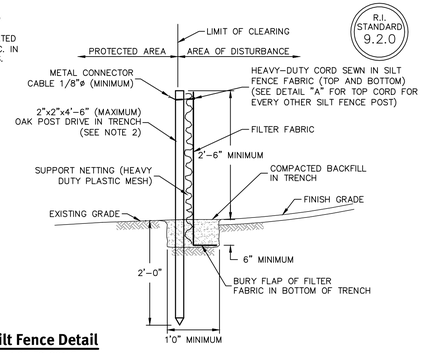
Double Swing Gate 12' Opening

NOT TO SCALE

NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 206 OF THE R.I. STANDARD SPECIFICATIONS.
2. 2"x2"x4'–6" (MAXIMUM) OAK POSTS FOR SILT FENCE SHALL BE LOCATED 8'–0" (MAXIMUM) O.C. IN WETLAND AREAS AND 4'–0" (MAXIMUM) O.C. IN WETLAND RAVINE, GULLY OR DROP–OFF AREAS AS SHOWN ON PLANS.
3. 1"x1"x4'–6"(MINIMUM) POSTS PERMITTED FOR PRE–FABRICATED SILT FENCE.
4. SILT FENCE SHALL BE INSTALLED BEFORE ANY GRUBBING OR EARTH EXCAVATION TAKES PLACE.

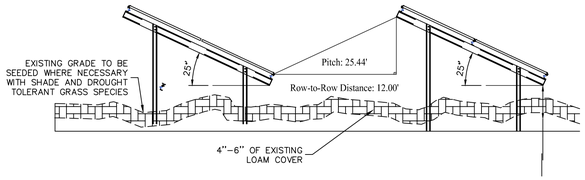


DETAIL "A"



Silt Fence Detail

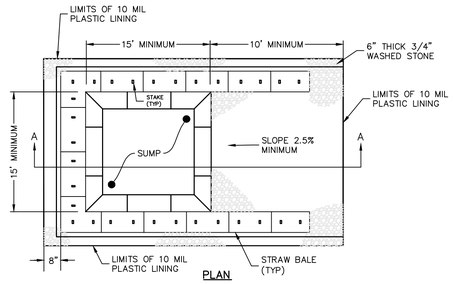
NOT TO SCALE



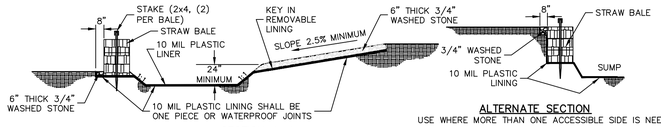
NOTE:
1. TOPSOIL ON SITE SHALL BE PRESERVED. TOPSOIL SHALL NOT BE EXPORTED FROM THE SITE.

Onsite Grading Material and PV Array
Distance Scheme - Tilt, Angle, and Shading Detail

NOT TO SCALE



PLAN



SECTION A–A

ALTERNATE SECTION
USE WHERE MORE THAN ONE ACCESSIBLE SIDE IS NEEDED

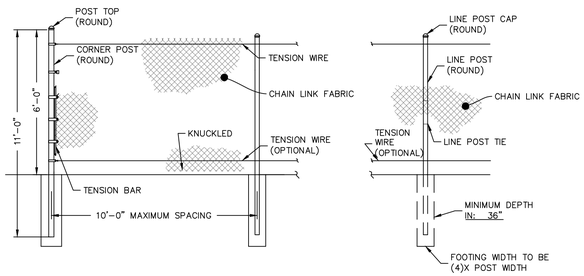
WASHOUT SIGN

NOTES:

1. PIT IS SPECIFICALLY DESIGNATED, DIKED AND IMPERVIOUS CONTAINMENT TO PREVENT CONTACT BETWEEN CONCRETE WASH AND STORMWATER.
2. WASH WATER SHALL NOT BE ALLOWED TO FLOW TO SURFACE WATER.
3. FACILITY MUST HOLD SUFFICIENT VOLUME TO CONTAIN CONCRETE WASTE WITH A MINIMUM FREEBOARD OF 12."
4. FACILITY SHALL NOT BE FILLED BEYOND 95% CAPACITY UNLESS A NEW FACILITY IS CONSTRUCTED.
5. SAWCUT PORTLAND CEMENT CONCRETE, RESIDUE FROM SAWCUT AND GRINDING TO BE DISPOSED OF IN THE PIT.
6. CONCRETE WASHOUTS SHALL BE LOCATED A MINIMUM OF 100' FROM DRAINAGE WAYS, INLETS, AND SURFACE WATERS.
7. MANUFACTURED CONCRETE WASHOUT DEVICES MAY BE USED IF REMOVED FROM THE SITE WHEN 95% FULL CAPACITY.

Concrete Washout Area

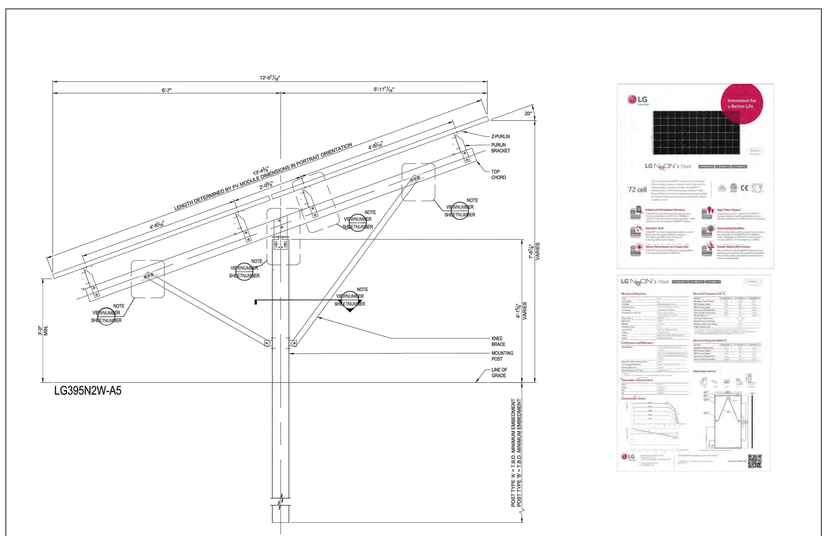
(NOT TO SCALE)



Typical High Fence

NOT TO SCALE

ROUND END POSTS, WITHOUT TOP RAIL & WITHOUT BARBED WIRE



LG395N2W-A5

NOTE:
1. SOLAR DESIGN TO BE SPECIFIED BY SOLAR ENGINEER. FOR REFERENCE ONLY.
2. NO IMPERMEABLE FOUNDATIONS WILL BE INSTALLED (POST DRIVEN INSTALLATION ONLY).

Solar Rack

NOT TO SCALE

DiPrete Engineering
Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-464-6006 www.diprete-eng.com
Boston • Providence • Newport

DAVID A. RUSSO
No. 14355
REGISTERED PROFESSIONAL ENGINEER CIVIL

No.	Date	Description	By:
4	03-02-2020	Final Submission	J.A.R.
3	02-18-2020	Response to RIBOT Comments	J.A.R.
2	02-07-2020	Final Feasibility Determination Submission	J.A.R.
1	09-30-2019	RIEFA Preliminary Determination Submission	M.A.H.
0	03-06-2019	Preliminary Plan Submission	M.A.H.

Drawn By: M.A.H. | Design By: D.A.R.

Detail Sheet-1

Grand Banks Solar

Assessor's Plat 12 Lots 156 & 156A
North Smithfield, Rhode Island 02896

Applicant
Econox Renewables, Inc.
48 Waterfield Road, P.O. Box 808
Winchester, MA 01890

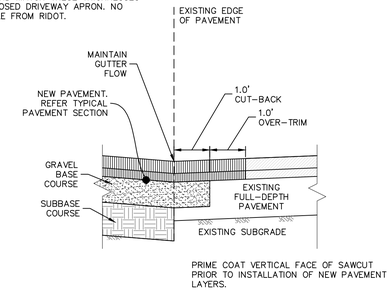
DE Job No: 2612-005 Copyright 2020 by DiPrete Engineering Associates, Inc.

SHEET 7 OF 8

z:\deman\projects\2612-005 grand banks solar\autocad drawings\2612-005 plan.dwg Plotted: 3/2/2020

NOTE:

CONTRACTOR MUST CONFIRM THICKNESS OF THE EXISTING PAVEMENT IN GREENVILLE ROAD (ROUTE 104) AND MATCH THESE THICKNESSES FOR THE PROPOSED DRIVEWAY APRON. NO DATA AVAILABLE FROM RIDOT.

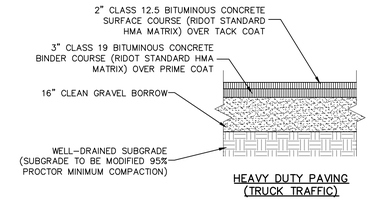


Pavement Tie-In Detail

NOT TO SCALE

NOTE:

CONTRACTOR MUST CONFIRM THICKNESS OF THE EXISTING PAVEMENT IN GREENVILLE ROAD (ROUTE 104) AND MATCH THESE THICKNESSES FOR THE PROPOSED DRIVEWAY APRON. NO DATA AVAILABLE FROM RIDOT.



Typical Pavement Section
(to be used within State Highway R.O.W.)

NOT TO SCALE

DiPrete Engineering
Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-464-6006 www.diprete-eng.com
Boston • Providence • Newport

DAVID A. RUSSO
No. 14365
REGISTERED PROFESSIONAL ENGINEER
CIVIL

This plan set must not be used for construction purposes unless stamped 'Issued for Construction' and stamped by a registered Professional Engineer of DiPrete Engineering.

DiPrete Engineering only warrants plans on a DiPrete Engineering title block stamped by registered Professional Engineer. Engineering shall not be responsible for plans by any other party.

The contractor is responsible for all of the means, methods, safety precautions and requirements, and OSHA conformance in the implementation of this plan and design.

Existing utilities shown on this plan are approximate only. DiPrete Engineering does not warrant responsibility for accuracy or locations of existing utilities.

No.	Date	Description	By:
4	03-02-2020	Final Submission	A.R.
3	02-18-2020	Response to RIDOT Comments	A.R.
2	09-12-2019	RIDOT Preliminary Determination Submission	A.R.
1	09-12-2019	RIDOT Preliminary Determination Submission	A.R.
0	03-06-2019	Preliminary Plan Submission	M.A.H.

Drawn By: M.A.H. | Design By: D.A.R.

Detail Sheet-2

Grand Banks Solar

Assessor's Plat 12 Lots 156 & 156A
North Smithfield, Rhode Island 02896

Applicant
Econox Renewables, Inc.
48 Waterfield Road, P.O. Box 808
Winchester, MA 01890

SHEET 8 OF 8

DiPrete Engineering

Letter of Transmittal

To:	**Town of North Smithfield, RI – Town Hall** Planning Department One Main Street, P.O. Box 248 Slatersville, RI 02876

Attn:	**Tom Kravitz – Town Planner**
Date:	3/4/2020
Job No:	2612-005
Re:	Grand Banks Solar

Number of Copies:	Description:
1	Application and Fee: $300.00 (Applicant has previously sent to town – copies provided)
12	24” x 36” Submission Plans
0	Survey Plans by others (12 copies to be provided under separate cover)
12	Planning Board Approval Letter
12	RIDEM Approval Letter
12	RIDOT Approval Letter
12	Fire Dept Approval Letter
2	Grant of Easement legal document
12	Stormwater Management Report
12	Soil Erosion and Sediment Control Plan
12	Operations and Maintenance Plan
1	Tax Collector Certificate
1	Final Plat Checklist
12	De-Commissioning Estimate
12	De-Commissioning Plan
12	Photovoltaic System Operations and Maintenance Plan

Remarks:

Please see the enclosed Final Submission materials for Grand Banks Solar in North Smithfield, Rhode Island. If you have any questions please don’t hesitate to contact our office, thank you.

From: _____
John Raymond
Designer
jraymond@diprete-eng.com

Copy:

Soil Erosion and Sediment Control Plan

For:

Grand Banks Solar

Greenville Road

North Smithfield, Rhode Island 02896

Assessor's Plat 12 Lots 156 & 156A

Owner:	Grand Banks Commerce Park, LLC P.O. Box 663 Slatersville, Rhode Island 02876
Operator: *TO BE DETERMINED UPON CONTRACT AWARD*	Company Name Name Address City, State, Zip Code Telephone Number Email Address
Estimated Project Dates:	Start Date: Spring 2020 Completion Date: Fall 2020
SESC Plan Prepared By:	DiPrete Engineering David Russo, P.E. 2 Stafford Court Cranston, Rhode Island 02920 (401) 943-1000 drusso@diprete-eng.com Professional Engineer RI PE 11355
SESC Plan Preparation Date:	09-24-2019
SESC Plan Revision Date:	

OWNER CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under the direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I am aware that it is the responsibility of the site owner and operator to implement and amend the Soil Erosion and Sediment Control Plan as appropriate in accordance with the requirements of the RIPDES Construction General Permit.

_____

Owner Signature: Date

Owner Name: Gary Ezovski

Owner Title: President

Company Name: Grand Banks Commerce Park, LLC

Address: P.O. Box 663, Slatersville, RI 02876

Phone Number: 401-640-5001

Email Address:

OPERATOR CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under the direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I am aware that it is the responsibility of the owner/operator to implement and amend the Soil Erosion and Sediment Control Plan as appropriate in accordance with the requirements of the RIPDES Construction General Permit.

_____

Operator Signature: Date

Contractor Representative:

Contractor Title:

Contractor Company Name:

Address:

Phone Number:

Email Address:

Contractor must fill out this section and sign after the contract is awarded and before any construction begins.

TABLE OF CONTENTS

INTRODUCTION

This Construction Site Soil Erosion and Sediment Control Plan (SESC Plan) has been prepared for Econox Renewables, Inc., for the Grand Banks Solar project in North Smithfield, RI. In accordance with the RIDEM Rhode Island Pollutant Discharge Elimination System (RIPDES) General Permit for Stormwater Discharge Associated with Construction Activity (RIPDES Construction General Permit ("CGP")), projects that disturb one (1) or more acres require the preparation of a SESC Plan. This SESC Plan provides guidance for complying with the terms and conditions of the RIPDES Construction General Permit and Minimum Standard 10 of the RI Stormwater Design and Installation Standards Manual. In addition, this SESC Plan is also consistent with Part D of the *RI SESC Handbook* entitled "Soil Erosion and Sediment Control Plans". This document does not negate or eliminate the need to understand and adhere to all applicable RIPDES regulations.

The purpose of erosion, runoff, and sedimentation control measures is to prevent pollutants from leaving the construction site and entering waterways or environmentally sensitive areas during and after construction. This SESC Plan has been prepared prior to the initiation of construction activities to address anticipated worksite conditions. The control measures depicted on the site plan and described in this narrative should be considered the minimum measures required to control erosion, sedimentation, and stormwater runoff at the site. Since construction is a dynamic process with changing site conditions, it is the operator's responsibility to manage the site during each construction phase so as to prevent pollutants from leaving the site. This may require the operator to revise and amend the SESC Plan during construction to address varying site and/or weather conditions, such as by adding or realigning erosion or sediment controls to ensure the SESC Plan remains compliant with the RIPDES Construction General Permit. Records of these changes must be added to the amendment log attached to the SESC Plan, and to the site plans as "red-lined" drawings. Please Note: **Even if practices are correctly installed on a site according to the approved plan, the site is only in compliance when erosion, runoff, and sedimentation are effectively controlled throughout the entire site.**

It is the responsibility of the site owner and the site operator to maintain the SESC Plan at the site, including all attachments, amendments and inspection records, and to make all records available for inspection by RIDEM during and after construction. (RIPDES CGP - Part III.G)

The site owner, the site operator, and the designated site inspector are required to review the SESC Plan and sign the Party Certification pages (Section 8). The primary contractor (if different) and all subcontractors (if applicable) involved in earthwork or exterior construction activities are also required to review the SESC Plan and sign the certification pages before construction begins.

Any questions regarding the SESC Plan, control measures, inspection requirements, or any other facet of this document may be addressed to the RIDEM Office of Water Resources, at 401-222-4700 or via email: water@dem.ri.gov.

ADDITIONAL RESOURCES

Rhode Island Department of Environmental Management
Office of Water Resources
235 Promenade Street
Providence, RI 02908-5767
phone: 401-222-4700
email: water@dem.ri.gov

RIDEM *RI Stormwater Design and Installation Standards Manual* (RISDISM) (as amended)
http://www.dem.state.ri.us/programs/benviron/water/permits/ripdes/stwater/t4guide/desman.htm

RI Soil Erosion and Sediment Control Handbook
http://www.dem.state.ri.us/soilerosion2014final.pdf

RIDEM 2013 RIPDES Construction General Permit
http://www.dem.ri.gov/pubs/regs/regs/water/ripdesca.pdf

Rhode Island Department of Transportation *Standard Specifications for Road and Bridge Design and Other Specifications* and *Standard Details*
http://www.dot.ri.gov/business/bluebook.php

RIDEM Office of Water Resources Coordinated Stormwater Permitting website
http://www.dem.state.ri.us/programs/benviron/water/permits/swcoord/index.htm

RIDEM RIPDES Stormwater website
http://www.dem.state.ri.us/programs/benviron/water/permits/ripdes/stwater/index.htm

RIDEM Water Quality website (for 303(d) and TMDL listings)
http://www.dem.ri.gov/programs/benviron/water/quality/index.htm

RIDEM Rhode Island Natural Heritage Program
http://www.dem.ri.gov/programs/bpoladm/plandev/heritage/index.htm

RIDEM Geographic Data Viewer – Environmental Resource Map
http://www.dem.ri.gov/maps/index.php

Natural Resources Conservation Service - Rhode Island Soil Survey Program
http://www.ri.nrcs.usda.gov/technical/soils.html

EPA NPDES – Stormwater Discharges from Construction Activities webpage:
http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Discharges-From-Construction-Activities.cfm

EPA Construction Site Stormwater Runoff Control BMP Menu
http://water.epa.gov/polwaste/npdes/swbmp/Construction-Site-Stormwater-Run-Off-Control.cfm

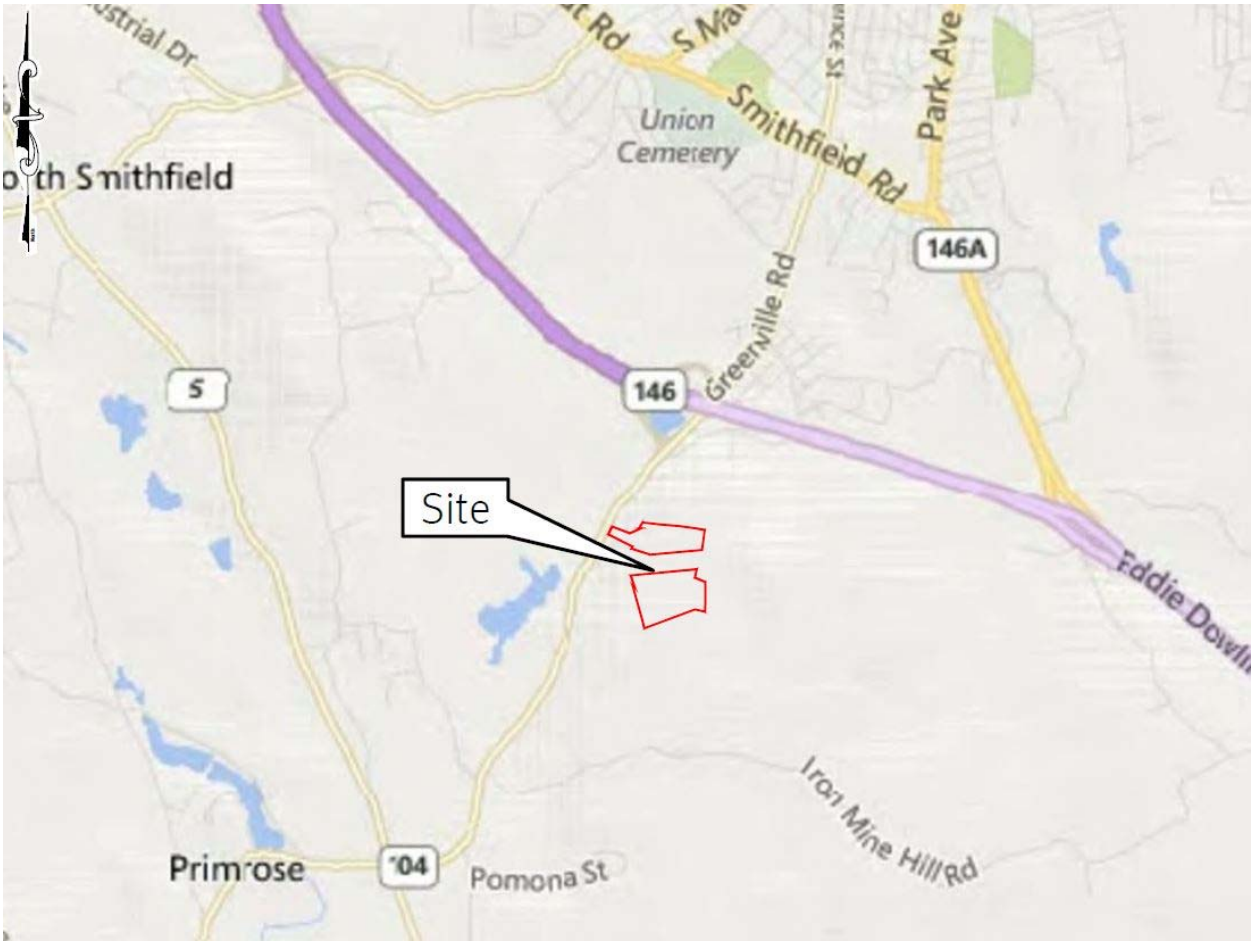
SECTION 1: SITE DESCRIPTION

1.1 Project/Site Information

Project/Site Name: Grand Banks Solar

- Located on Greenville Road in the Town of North Smithfield, RI.
- Total Area of the site is 30.52+/- acres
- The proposed improvements include the creation of a 1 MW solar farm and all associated ancillary equipment including transformers, inverters and an access drive.

Location Map:



The following are estimates of the construction site area:

- Total Project Area 30.52+/- acres
- Total Project Area to be Disturbed 8.04 acres

1.2 Receiving Waters

RIPDES CGP - Parts IV.A.7 & IV.A.8

List/description of separate storm sewer systems or drainage systems that may be impacted during construction and the water bodies that receive discharges from each storm sewer or drainage system:

- N/A

List/description of receiving waters that may be impacted during construction:

- Todd's Pond (RI0001003L-03)

Are any of the receiving waters in the vicinity of the proposed construction project listed as being impaired or subject to a TMDL?

☐ Yes ☒ No

If yes, List/provide description of 303(d)/TMDL waters and applicable TMDL requirements that must be addressed during construction:

- N/A

1.3 Natural Heritage Area Information

RIPDES CGP - Part III.H

Are there any Natural Heritage Areas being disturbed by the construction activity or will discharges be directed to the Natural Heritage Area as a result of the construction activity?

☒ Yes ☐ No

If yes, describe or refer to documentation which determines the likelihood of an impact on this area and the steps that will be taken to address any impacts.

- Received information from Paul Jordan of RIDEM (09-24-2019).

"Two species listed as "State Concern" near that location are: Common Agalinis, or Slender Gerardia, and Wild Basil"

1.4 Historic Preservation/Cultural Resources

Are there any historic properties, historic cemeteries or cultural resources on or near the construction site?

☐ Yes ☒ No

Describe how this determination was made and summarize state or tribal review comments:

- Using the RIDEM Environmental Resource Map

If yes, describe or refer to documentation which determines the likelihood of an impact on this historic property, historic cemetery or cultural resource and the steps taken to address that impact including any conditions or mitigation measures that were approved by other parties.

- N/A

1.5 Site Features and Constraints

List All Site Constraints and Sensitive Areas that require avoidance and protection through the implementation of control measures:

- Sensitive areas on site include:
    - All wetlands, perimeter wetlands and riverbank wetlands. The proposed limit of disturbance has been located out of all of these areas.
    - Streams and Rivers
    - Natural Heritage Areas
    - Electric/Gas Easements
- See Erosion Control Plan in the latest plan set prepared by DiPrete Engineering

SECTION 2: EROSION, RUNOFF, AND SEDIMENT CONTROL

RIPDES Construction General Permit – Part III.J.1

The purpose of erosion controls is to prevent sediment from being detached and moved by wind or the action of raindrop, sheet, rill, gully, and channel erosion. Properly installed and maintained erosion controls are the primary defense against sediment pollution.

Runoff controls are used to slow the velocity of concentrated water flows. By intercepting and diverting stormwater runoff to a stabilized outlet or treatment practice or by converting concentrated flows to sheet flow erosion and sedimentation are reduced.

Sediment controls are the last line of defense against moving sediment. The purpose is to prevent sediment from leaving the construction site and entering environmentally sensitive areas.

This section describes the set of control measures that will be installed before and during the construction project to avoid, mitigate, and reduce impacts associated with construction activity. Specific control measures and their applicability are contained in Section Four: Erosion Control Measures, Section Five: Runoff Control Measures, and Section Six: Sediment Control Measures of the *RI SESC Handbook*. The *RI SESC Handbook* can be found at the following address:

http://www.dem.ri.gov/soilerosion2014final.pdf.

2.1 Avoid and Protect Sensitive Areas and Natural Features

Per RI Stormwater Design and Installation Standards Manual 3.3.7.1:

Areas of existing and remaining vegetation and areas that are to be protected as identified in the Section 1.5 of the SESC Plan must be clearly identified on the SESC Site Plans for each Phase of Construction. Prior to any land disturbance activities commencing on the site, the Contractor shall physically mark limits of disturbance (LOD) on the site and any areas to be protected within the site, so that workers can clearly identify the areas to be protected.

Feature Requiring Protection	Construction Phase #	Method of Protection	Sheet #
Perimeter Wetland Areas	All Phases	Silt Fence	4
Infiltration BMPs	All Phases	Silt Fence	4
Down gradient undisturbed Areas	All Phases	Silt Fence	4

2.2 Minimize Area of Disturbance

Per RI Stormwater Design and Installation Standards Manual 3.3.7.2:

Will >5 acres be disturbed in order to complete this project?

☒ Yes ☐ No

Will <5 acres be disturbed or will disturbance activities be completed within a six (6) month window?

☒ Yes ☐ No

Construction is proposed to be completed within a 6-month window.

Based on the answers to the above questions will phasing be required for this project?

☐ Yes ☒ No

PHASING PLAN

The following are estimates of each phase of the construction project:

Phase No. or Identifier	1
Total Area of Phase	8.04 acres
Area to be Disturbed	8.04 acres

Description of Construction Sequencing for Phase 1

1. Contractor is responsible for Soil Erosion and Sediment Control (SESC) on site. Sequence of construction provided may be modified as field conditions warrant with prior approval from the Owner or their representative.

2. Construction to begin in the Spring 2020 or upon receipt of all necessary approvals.

3. Survey and stake limit of sedimentation barriers/limit of disturbance.

4. Cut Trees on site, within LOD. In no case is the limit of disturbance to extend beyond the sedimentation barriers or construction fencing.

5. Place perimeter erosion control barriers as shown on the plans along Limit of disturbance. In no case is the limit of disturbance to extend beyond the sedimentation barriers.

6. Grub and remove tree stumps on site. Topsoil is to be stripped and stockpiled in approved locations. Stockpiles are to be protected by a row of silt fence and covered or temporarily seeded.

7. Install temporary drainage swales and temporary sedimentation ponds per site plans. All temporary control devices shall be installed per the Rhode Island Soil Erosion and Sedimentation Control Handbook. Erosion control blankets shall be used as necessary to stabilize the swales in steep slope areas. Check Dams installed as necessary to detain stormwater and prevent erosion.

8. Survey drainage BMPs and protect infiltration practices from runoff and construction vehicle traffic. Protect infiltration BMPs by installing erosion control devices around BMPs if possibility of runoff exists. If no stormwater can flow to BMP install construction fencing to prevent compaction of BMP area by construction traffic.

9. Grade the proposed solar area, disturbed areas shall be stabilized with hydroseeding or approved equal. Erosion control blankets or jute netting shall be installed as necessary to stabilize soil and promote vegetation.

10. Install drain piping beginning at the lowest point and working up gradient. Protect discharge outlets with rip-rap aprons. Place erosion controls at the discharge points.

11. Flush drainage structures and pipes.

12. Remove sediments from sedimentation ponds, excavate and construct ponds per design plans.

13. Finish permanent stabilization of grass swale areas. Sediments shall be removed from site and disposed of properly.

14. Drainage infiltration ponds may be brought online once all tributary area has been stabilized.

15. Repair drainage outlets and BMPs as required. Tree limbs, leaves, cobbles, boulders, etc. shall be removed from the bottom of the BMPs before the application of topsoil. Install plantings per the Landscape Plans.

16. Remove all temporary soil erosion and sedimentation control measures following final vegetative establishment of all disturbed areas.

17. Prior to activation of stormwater utilities, the design engineer shall to be notified at least 48 hours in advance to schedule final inspection.

2.3 Minimize the Disturbance of Steep Slopes

Per RI Stormwater Design and Installation Standards Manual 3.3.7.3:

Are steep slopes (>15%) present within the proposed project area?

☐ Yes ☒ No

Steep slopes are shown and hatched on the grading drawings. Steeps slopes shall be stabilized with erosion control blankets, jute netting, rip rap, or approved equal.

2.4 Preserve Topsoil

Per RI Stormwater Design and Installation Standards Manual 3.3.7.4:

Site owners and operators must preserve existing topsoil on the construction site to the maximum extent feasible and as necessary to support healthy vegetation, promote soil stabilization, and increase stormwater infiltration rates in the post-construction phase of the project.

Will existing topsoil be preserved at the site?

☒ Yes ☐ No

The site operator shall strip top soil in proposed project limit of disturbance areas. Top Soil shall be stockpiled in the location specified on the SESC plan. Stock Pile areas shall be surrounded by silt fence or approved erosion control measures to prevent migration of soils during rain events. Upon project completion, the site operation shall redistribute top soil over disturbed areas ensuring at minimum a 4” layer is provided over all disturbed areas. Additional material shall be brought on site should the need arise. Final top soil areas have been shown on the site plans as landscape areas. Top soil should be screened and free of weeds, sticks, and stones over ¾” in size and otherwise complying with section M.18.01 of the RIDOT Standard Specifications for Road and Bridge Construction. Contractor shall follow recommendations provided by the landscape plans and the Landscape Architect.

Soil compaction must be minimized by maintaining limits of disturbance throughout construction. In instances where site soils are compacted the site owner and operator must restore infiltration capacity of the compacted soils by tilling or scarifying compacted soils and amending soils as necessary to ensure a minimum depth of topsoil is available in these areas. In areas where infiltrating stormwater treatment

practices are located compacted soils must be amended such that they will comply the design infiltration rates established in the *RI Stormwater Design and Installation Standards Manual*.

In areas of where over compaction has been compromised the natural infiltration rate of onsite soils, the contractor shall scarify, or till, these areas to restore them to their natural state. Areas prone to over compaction are paths proposed to be used by construction equipment and construction equipment storage areas. Construction equipment storage areas are shown on the SESC Plan.

2.5 Stabilize Soils

Per RI Stormwater Design and Installation Standards Manual 3.3.7.5:

Upon completion and acceptance of site preparation and initial installation of erosion, runoff, and sediment controls and temporary pollution prevention measures, the operator shall initiate appropriate temporary or permanent stabilization practices during all phases of construction on all disturbed areas as soon as possible, but not more than fourteen (14) days after the construction activity in that area has temporarily or permanently ceased.

Any disturbed areas that will not have active construction activity occurring within 14 days must be stabilized using the control measures depicted in the SESC Site Plans, in accordance with the *RI SESC Handbook*, and per manufacturer product specifications.

Only areas that can be reasonably expected to have active construction work being performed within 14 days of disturbance will be cleared/grubbed at any one time. It is NOT acceptable to clear and grub the entire construction site if portions will not be active within the 14-day time frame. Proper phasing of clearing and grubbing activities shall include temporary stabilization techniques for areas cleared and grubbed that will not be active within the 14-day time frame.

All disturbed soils exposed prior to October 15 of any calendar year shall be seeded by that date if vegetative measures are the intended soil stabilization method. Any such areas that do not have adequate vegetative stabilization, as determined by the site operator or designated inspector, by November 15, must be stabilized through the use of non-vegetative erosion control measures. If work continues within any of these areas during the period from October 15 through April 15, care must be taken to ensure that only the area required for that day's work is exposed, and all erodible soil must be re-stabilized within 5 working days. In limited circumstances, stabilization may not be required if the intended function of a specific area of the site necessitates that it remain disturbed (i.e. construction of a motocross track).

- When construction activities have temporarily or permanently ceased, stabilization controls shall consist of one or more of the following:
    - Seeding with native vegetation
    - Straw or straw application, in the amount of 2 tons/acre (temporary only)
    - Fiber mulch or covering consisting of mat/fiber lining (temporary only)
- Dust control generation shall be controlled by one or more of the following:
    - Vegetative cover (see stabilization controls above)
    - Sprinkle site with water until surface is wet. Take care to not create runoff from excessive use of water. The general contractor shall have an on-site water vehicle for dust control.
    - Stone to stabilize construction roads
    - Calcium chloride (only with approval of the Design Engineer)

<u>Temporary Vegetative Control Measures</u>

- When construction activities have temporarily ceased, stabilization controls shall consist of one or more of the following:

1. Hydro seeding
2. Seeding with native vegetation

Temporary Non-Vegetative Control Measures

- When construction activities have temporarily ceased, stabilization controls shall consist of one or more of the following:

    1. Mulching
    2. Rolled Erosion control mats – Steep Slopes >15%
    3. Rolled Erosion control netting

Permanent Vegetative Control Measures

- When construction activities have permanently ceased, stabilization controls shall consist of one or more of the following:

    1. Hydro seeding
    2. Seeding with native vegetation
    3. Sodding

2.6 Protect Storm Drain Outlets

Per RI Stormwater Design and Installation Standards Manual 3.3.7.7:

Temporary or permanent outlet protection must be used to prevent scour and erosion at discharge points through the protection of the soil surface, reduction in discharge velocities, and through the promotion of infiltration. Outlets often have high velocity, high volume flows, and require strong materials that will withstand the forces of stormwater. Storm drain outlet control measures also offer a last line of protection against sediment entering environmentally sensitive areas.

All stormwater outlets that may discharge sediment-laden stormwater flow from the construction site must be protected using the control practices depicted on the approved plan set and in accordance with the *RI SESC Handbook*.

Temporary control measures have been designed in accordance with the RI SESC Handbook. Following development completion/implementation of the permanent stormwater control measures, all stormwater will either be directed to the man-made ponds through the proposed storm drains that eventually drain into the wetland located on site or into the existing Drainage Network.

Will temporary or permanent point source discharges be generated at the site as the result of construction of sediment traps or basins, diversions, and conveyance channels?

☒ Yes ☐ No

Sediment traps and the permanent detention basins will use point source discharges. Rip rap aprons have been provided where there is chance of erosive velocities. Outfalls that do not require rip rap should be stabilized with vegetation. Temporary erosion control blankets may be used to promote vegetation and eliminate erosion during stabilization, if needed. During construction, drainage outfalls should include strawbales, siltfence, and or straw wattle to reduce the chance of sediments entering the wetlands during construction. Once all tributary areas have been stabilized these measures can be removed.

2.7 Establish Temporary Controls for the Protection of Post-Construction Stormwater Treatment Practices

Per RI Stormwater Design and Installation Standards Manual 3.3.7.8:

Temporary measures shall be installed to protect permanent or long-term stormwater control and treatment measures as they are installed and throughout the construction phase of the project so that they will function properly when they are brought online.

- Storm drain outlets shall be protected during the entire duration of the project using ALL of the following:
    1. Staked strawbales or silt fence (RI Standards 9.1.0, 9.2.0 & 9.3.0) or straw wattles
    2. Flared end. See detail on SESC Site Plans.
    3. Rip rap apron. See detail on SESC Site Plans.

- Storm drain outlets shall be protected by using one or more of the following:
    1. Catch basin inserts such as silt sacks. Install according to manufacturer specifications.
    2. Sandbags
    3. Staked strawbales or silt fence (for unpaved areas ONLY – RI Standards 9.1.0, 9.2.0 & 9.3.0)
    4. Staked filter socks (for unpaved areas ONLY). Install according to manufacturer specifications.

Will long-term stormwater treatment practices be installed at the site?

☒ Yes ☐ No

Long term stormwater treatment practices, that will use infiltration, will be staked off throughout the construction phases. No construction vehicles shall enter these staked areas to avoid sedimentation and compaction. See the Erosion Control Plan prepared by DiPrete Engineering for locations of these areas.

2.8 Divert or Manage Run-on from Up-gradient Areas

Per RI Stormwater Design and Installation Standards Manual 3.3.7.10:

Is stormwater from off-site areas anticipated to flow onto the project area or onto areas where soils will be disturbed?

☒ Yes ☐ No

Stormwater from off-site undisturbed areas will be swaled/divereted around the site construction. **.** See the Erosion Control Plan prepared by DiPrete Engineering for locations of these diversions.

Structural control measures will be used to limit stormwater flow from coming onto the project area, and to divert and slow on-site stormwater flow that is expected to impact exposed soils for the purpose of minimizing erosion, runoff, and the discharge of pollutants from the site.

Control measures shall be installed as depicted on the approved plan set and in accordance with the *RI SESC Handbook* or the *RI Department of Transportation Standard Specifications for Road and Bridge Construction*. **Run-on and Run-off Management**

Construction Phase #	On-site or Off-site Run-on?	Control measure	Identified on Sheet #	Detail(s) is/are on Sheet #
1	Off - Site	Silt Fence	4	7

2.9 Retain Sediment Onsite through Structural and Non-Structural Practices

Per RI Stormwater Design and Installation Standards Manual 3.3.7.12:

Once the erosion control measures and the run-on diversions are identified and located on the plans, the next step to site planning is sediment control and sediment management. Sediment barriers, inlet protection, construction entrances, stockpile containment, temporary sediment traps must be integrated into the SESC Plan if applicable. Refer to the RI SESC Handbook Section Six: Sediment Control Measures for additional guidance.

Per RI Stormwater Design and Installation Standards Manual 3.3.7.9:

SEDIMENT BARRIERS must be installed along the perimeter areas of the site that will receive stormwater from disturbed areas. This also may include the use of sediment barriers along the contour of disturbed slopes to maintain sheet flow and minimize rill and gully erosion during construction. Installation and maintenance of sediment barriers must be completed in accordance with the maintenance requirements specified by the product manufacturer or the *RI SESC Handbook*.

Will sediment barriers be utilized at the toe of slopes and other downgradient areas subject to stormwater impacts and erosion during construction?

☒ Yes ☐ No

Sediment barriers will be used to protect stormwater from discharging onto adjacent properties, sensitive areas and proposed BMPs.

Will sediment barriers be utilized along the contour of slopes to maintain sheet flow and minimize rill and gully erosion during construction?

☒ Yes ☐ No

SEDIMENT BARRIERS			
Construction Phase #	Sediment Barrier Type	Sediment Barrier is Labeled on Sheet #	Detail is on Sheet #
1	Silt Fence, Conveyance Channels and Sediment Traps	4	7

Per RI Stormwater Design and Installation Standards Manual 3.3.7.6:

INLET PROTECTION will be utilized to prevent soil and debris from entering storm drain inlets. These measures are usually temporary and are implemented before a site is disturbed. ALL stormwater inlets &/or catch basins that are operational during construction and have the potential to receive sediment-laden stormwater flow from the construction site must be protected using control measures outlined in the *RI SESC Handbook*.

For more information on inlet protection refer to the *RI SESC Handbook*, Inlet Protection control measure.

Maintenance

The operator must clean, or remove and replace, the inlet protection measures as sediment accumulates, the filter becomes clogged, and/or as performance is compromised. Accumulated sediment adjacent to the inlet protection measures should be removed by the end of the same work day in which it is found or by the end of the following work day if removal by the same work day is not feasible.

Do inlets exist adjacent to or within the project area that require temporary protection?

☐ Yes ☒ No

Existing on-site and off-site drainage inlets must be protected during construction. Proposed drainage inlets shall be protected once install to ensure sediments kept out of the drainage network. All inlet protections shall be maintained per the RI SESC handbook and manufacturers recommendations.

The following lists the proposed storm drain inlet types selected from Section Six of the *RI SESC Handbook*. Each row is unique for each phase and inlet protection type.

INLET PROTECTION			
Construction Phase #	Inlet Protection Type	Inlet Protection is labeled on Sheet #	Detail(s) is/are on Sheet #
N/A	N/A	N/A	N/A

CONSTRUCTION ENTRANCES will be used in conjunction with the stabilization of construction roads to reduce the amount of sediment tracking off the project. This project has avoided placing construction entrances on poorly drained soils where possible. Where poorly drained soils could not be eliminated, the detail includes subsurface drainage.

Any construction site access point must employ the control measures on the approved SESC site plans and in accordance with the *RI SESC Handbook*. Construction entrances shall be used in conjunction with the stabilization of construction roads to reduce the amount of mud picked up by construction vehicles. All construction access roads shall be constructed prior to any roadway accepting construction traffic.

The site owner and operator must:

1. Restrict vehicle use to properly designated exit points.

2. Use properly designed and constructed construction entrances at all points that exit onto paved roads so that sediment removal occurs prior to vehicle exit.

3. When and where necessary, use additional controls to remove sediment from vehicle tires prior to exit (i.e. wheel washing racks, rumble strips, and rattle plates).

4. Where sediment has been tracked out from the construction site onto the surface of off-site streets, other paved areas, and sidewalks, the deposited sediment must be removed by the end of the same work day in which the track out occurs. Track-out must be removed by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal.

Will construction entrances be utilized at the proposed construction site?

☒ Yes ☐ No

Construction entrances have been shown on the Erosion Control Plan prepared by DiPrete Engineering. Construction entrance shall be installed per RIDOT Standard 9.9.0 and maintained in accordance with the RI SESC handbook and RIDOT Standards.

STOCKPILE CONTAINMENT will be used onsite to minimize or eliminate the discharge of soil, topsoil, base material or rubble, from entering drainage systems or surface waters. All stockpiles must be located within the limit of disturbance, protected from run-on with the use of temporary sediment barriers and provided with cover or stabilization to avoid contact with precipitation and wind where and when practical.

Stock pile management consists of procedures and practices designed to minimize or eliminate the discharge of stockpiled material (soil, topsoil, base material, rubble) from entering drainage systems or surface waters.

For any stockpiles or land clearing debris composed, in whole or in part, of sediment or soil, you must comply with the following requirements:

1. Locate piles within the designated limits of disturbance.
2. Protect from contact with stormwater (including run-on) using a temporary perimeter sediment barrier.
3. Where practicable, provide cover or appropriate temporary vegetative or structural stabilization to avoid direct contact with precipitation or to minimize sediment discharge.
4. NEVER hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance, storm drain inlet, or surface water.
5. To the maximum extent practicable, contain and securely protect from wind.

STOCKPILE CONTAINMENT				
Construction Phase #	Run-on measures necessary? (yes/no)	Stabilization or Cover Type	Stockpile Containment Measure	Sheet #
All Phases	No	Top and Sub-Soil piles should be covered or vegetated	Silt Fence	4

CONSTRUCTED SEDIMENT STRUCTURES

TEMPORARY SEDIMENT TRAPS will be utilized onsite. There will be no disturbed drainage areas greater than one acre that will be exposed for longer than six months. Design and sizing calculations in accordance with the *RI SESC Handbook*, Section Six are found in attachment H of this SESC Plan. A summary of the calculations are provided below:

Are temporary sediment traps required at the site?

☒ Yes ☐ No

SEDIMENT TRAPS				
Construction Phase #	Exposed Area (acres)	Trap #	Sheet #	Detail found on Sheet#
1	3.994	A	4	4
1	3.056	B	4	4

Trap #	Wet Storage Volume (cu.ft)	Dry Storage Volume (cu.ft.)	Cleanout Depth (ft)	Provide Reference to Location of Supporting Design and Sizing Calculations
A	7,601	9,399	2	Sheet 4
B	5,281	9,832	2.5	Sheet 4

All traps will be functional and installed prior to disturbance in the contributing drainage area. Access for sediment removal is provided on the plans with cleanout depth requirements. The removed sediment will be utilized onsite or disposed of properly off-site.

2.10 Properly Design Constructed Stormwater Conveyance Channels

Are temporary stormwater conveyance practices required in order to properly manage runoff within the proposed construction project?

☒ Yes ☐ No

Temporary swales have been shown on the Erosion Control Plan prepared by DiPrete Engineering. Swales hav been designed to handle the 10-year storm and be non erosive. Flows within the swales do not exceed 1.5 ft/s and will be grassed. The conveyance will be maintained as depicted on SESC Site Plans and in accordance with the *RI SESC Handbook* and if applicable.

2.11 Erosion, Runoff, and Sediment Control Measure List

It is expected that this table and corresponding Inspection Reports will be amended as needed throughout the construction project as control measures are added or modified.

Phase No. #1		
Location/Station	**Control Measure Description/Reference**	**Maintenance Requirement**
Down gradient Limit of disturbance Silt Fence	Straw Wattle/Straw Bales and/or Silt Fence Section Six: Sediment Control Measures – RI SESC Handbook.	Inspection should be made after each storm event and repair or replacement should be made promptly as needed. Cleanout of accumulated sediment behind the bales is necessary if ½ of the original height of the bales becomes filled in with sediment.
Construction Entrances	Stone Stabilized Pad. Section Six: Sediment	The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment

	Control Measures – Construction Entrances –RI SESC Handbook. Constriction pad per RIDOT Standard 9.9.0	onto pave surfaces. Provide periodic top dressing with additional stone or additional length as conditions demand. Roads adjacent to entrance shall be clean at the end of each day. If maintenance alone is not enough to prevent excessive track out, increase length of entrance, modify construction access road surface, or install washrack or mudrack.
Temporary Sediment Trap	Temporary Sediment Traps, Section Six: Sediment Control Measures – RI SES Handbook	Inspect trap a minimum once per week or within 24 hours after a rainfall event greater than ¼". Remove sediments when half of the minimum required volume of the wet storage is exceeded.

SECTION 3: CONSTRUCTION ACTIVITY POLLUTION PREVENTION

Per RI Stormwater Design and Installation Standards Manual 3.3.7.14:

The purpose of construction activity pollution prevention is to prevent day to day construction activities from causing pollution.

This section describes the key pollution prevention measures that must be implemented to avoid and reduce the discharge of pollutants in stormwater. Example control measures include the proper management of waste, material handling and storage, and equipment/vehicle fueling/washing/maintenance operations.

Where applicable, include *RI SESC Handbook* or the *RI Department of Transportation Standard Specifications for Road and Bridge Construction* (as amended) specifications.

3.1 Existing Data of Known Discharges from Site

Per RIPDES Construction General Permit – Part III.I:

Are there known discharges from the project area?

☐ Yes ☐ No

Describe how this determination was made:

- Existing Conditions Survey, Online GIS information

If yes, list discharges and locations:

- N/A

Is there existing data on the quality of the known discharges?

☐ Yes ☒ No

If yes, provide data:

- N/A

3.2 Prohibited Discharges

Per RI SESC Handbook – Part D

The following discharges are prohibited at the construction site:

- Contaminated groundwater, unless specifically authorized by the DEM. These types of discharges may only be authorized under a separate DEM RIPDES permit.
- Wastewater from washout of concrete, unless the discharge is contained and managed by appropriate control measures.
- Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials.
- Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance. Proper storage and spill prevention practices must be utilized at all construction sites.
- Soaps or solvents used in vehicle and equipment washing.
- Toxic or hazardous substances from a spill or other release.

All types of waste generated at the site shall be disposed of in a manner consistent with State Law and/or regulations.

Will any of the above listed prohibited discharges be generated at the site?

☐ Yes ☒ No

3.3 Proper Waste Disposal

Per RI SESC Handbook – Part D

Building materials and other construction site wastes must be properly managed and disposed of in a manner consistent with State Law and/or regulations.

- A waste collection area shall be designated on the site that does not receive a substantial amount of runoff from upland areas and does not drain directly to a waterbody or storm drain.
- All waste containers shall be covered to avoid contact with wind and precipitation.
- Waste collection shall be scheduled frequently enough to prevent containers from overfilling.
- All construction site wastes shall be collected, removed, and disposed of in accordance with applicable regulatory requirements and only at authorized disposal sites.
- Equipment and containers shall be checked for leaks, corrosion, support or foundation failure, or other signs of deterioration. Those that are found to be defective shall be immediately repaired or replaced.

Is waste disposal a significant element of the proposed project?

☒ Yes ☐ No

General construction waste is anticipated. Before construction begins, an area within the project limits will be designated as a waste collection area. A waste collection time will be arranged so that the containers do not overflow. In the event that a container does spill, cleanup will be provided immediately. The construction waste will be collected, removed, and disposed of only at authorized disposal areas. All waste shall be disposed of in a manner consistent with federal, state and local regulations. Construction debris shall be disposed of daily to avoid exposure to precipitation.

3.4 Spill Prevention and Control

Per RI SESC Handbook – Part D

All chemicals and/or hazardous waste material must be stored properly and legally in covered areas, with containment systems constructed in or around the storage areas. Areas must be designated for materials delivery and storage. All areas where potential spills can occur and their accompanying drainage points must be described. The owner and operator must establish spill prevention and control measures to reduce the chance of spills, stop the source of spills, contain and clean-up spills, and dispose of materials contaminated by spills. The operator must establish and make highly visible location(s) for the storage of spill prevention and control equipment and provide training for personnel responsible for spill prevention and control on the construction site.

Are spill prevention and control measures required for this particular project?

☒ Yes ☐ No

- The construction site supervisor will create and adopt a spill control plan that includes measures to stop the source of the spill, contain the spill, clean up the spill, dispose of materials contaminated by the spill, and identify and train personnel responsible for spill prevention and control. The following measures will be appropriate for a spill prevention and response plan.
- Store and handle materials to prevent spills
    - Tightly seal containers.
    - Make sure all containers are clearly labeled
    - Stack containers neatly and securely
- Reduce storm water contact if there is a spill
    - Have cleanup procedures clearly posted
    - Have cleanup materials readily available
    - Contain any liquid
    - Stop the source of the spill
    - Cover spill with absorbent materials such as sawdust.
- At no time shall spills be cleaned and/or flushed down storm drains or to any environmentally sensitive area (stream, pond, wetland etc.)
- Dispose of contaminated materials according to manufacturer's instructions or according to state or local requirements.
- Equipment/vehicle fueling and repair/maintenance operations or hazardous material storage shall not take place within regulated wetlands or buffer zone area. Designated areas shall be approved by site owner and project engineer.
- Identify personnel responsible for responding to spill of toxic or hazardous materials.
    - Provide personnel spill response training

  - Post names of spill response personnel
  - Keep the spill area well ventilated
  - If necessary, use a private firm that specializes in spill cleanup
- Spills that exceed Reportable Quantity (RQ) levels or reportable materials must be reported and documented.
  - Notify the Rhode Island Department of Environmental Management (401) 222-3961, (401) 222-6519 or (401) 222-2284 at night as soon as there is knowledge of a spill.
  - Notify the permitting authority in writing within 5 days.
  - The SESC must be modified within 14-days to provide a description of the release, the circumstances leading to the release and the date of the release.
- Stone Stabilization Pad (RI Standard 9.9.0)
  - Located at construction site entrance/exit as shown on the SESC Site Plans.
  - The maintenance shall include top dressing with additional stone or additional length as conditions demand or as directed by the engineer.
  - Sediments spilled, dropped, washed or tracked on the public right of way must be removed immediately by the contractor and disposed of according to all applicable regulations.

3.5 Control of Allowable Non-Stormwater Discharges

Per RIPDES Construction General Permit – Part III.J.2.e:

Are there allowable non-Stormwater discharges present on or near the project area?

☐ Yes ☒ No

List of allowable non-stormwater discharge(s) and the associated control measure(s):

- Water for Dust Control
- Fire Hydrant / Water Main Flushing.
- Stormwater Main Flushing

If any existing or proposed discharges consist of contaminated groundwater, such discharges are not authorized under the RIPDES Construction General Permit. These discharges must be permitted separately by seeking coverage to treat and discharge under a separate RIPDES individual permit or under the RIPDES Remediation General Permit. Contact the RIDEM Office of Water Resources RIPDES Permitting Program at 401-222-4700 for application requirements and additional information.

Are there any known or proposed contaminated discharges, including anticipated contaminated dewatering operations, planned on or near the project area?

☐ Yes ☒ No

If yes, list the discharge types and the RIPDES individual permit number(s) or RIPDES Remediation General Permit Authorization number(s) associated with these discharges.

- N/A

3.6 Control Dewatering Practices

Per RI SESC Handbook – Part D

Site owners and operators are prohibited from discharging groundwater or accumulated stormwater that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation, unless such waters are first effectively managed by appropriate control measures.

Examples of appropriate control measures include, but are not limited to, temporary sediment basins or sediment traps, sediment socks, dewatering tanks and bags, or filtration systems (e.g. bag or sand filters) that are designed to remove sediment. Uncontaminated, non-turbid dewatering water can be discharged without being routed to a control.

At a minimum the following discharge requirements must be met for dewatering activities:

1. Do not discharge visible floating solids or foam.

2. To the extent feasible, utilize vegetated, upland areas of the site to infiltrate dewatering water before discharge. In no case will surface waters be considered part of the treatment area.

3. At all points where dewatering water is discharged, utilize velocity dissipation devices.

4. With filter backwash water, either haul it away for disposal or return it to the beginning of the treatment process.

5. Replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications.

6. Dewatering practices must involve the implementation of appropriate control measures as applicable (i.e. containment areas for dewatering earth materials, portable sediment tanks and bags, pumping settling basins, and pump intake protection.)

Is it at all likely that the site operator will need to implement construction dewatering in order to complete the proposed project?

☐ Yes ☒ No

Dewatering maybe required during deep utility construction. Any dewatering practices must comply with the RI SESC Handbook. Dewatering basins shall be used on site and comply with RIDOT Standard 9.7.0 or approved equal. Contractor to submit alternatives to project engineer for approval.

3.7 Establish Proper Building Material Staging Areas

Per RI SESC Handbook – Part D

All construction materials that have the potential to contaminate stormwater must be stored properly and legally in covered areas, with containment systems constructed in or around the storage areas. Areas must be designated for materials delivery and storage. Designated areas shall be approved by the site owner/engineer. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in the discharge of pollutants, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use).

- An inventory will be kept of all reportable materials and all materials with a reportable quantity on site. There will be neat and orderly storage of hazardous materials. Regular garbage, rubbish, construction waste, and sanitary waste disposal will be employed. There will be prompt cleanup of any spills, either liquid or dry materials. The following practices will be used to avoid problems associated with the disposal of hazardous materials.
- Check with local waste management authorities to determine what the requirements are for disposing of hazardous materials.
- Use the entire product before disposing of the container.

- Do not remove the original product label from the container, since it contains important information.
- If surplus products must be disposed, do not mix products together unless specifically recommended by the manufacturer.
- The correct method of disposal of hazardous materials varies with the product use. Follow the manufacturer's recommended method, which is often found on the label.

- Construction materials will consist of any or all of the following:

• Asphalt	• Detergents
• Concrete	• Fertilizers (no Phosphate based fertilizers permitted)
• Loam	• Petroleum Based Products
• Gravel for Roadway	• Cleaning Solvents
• Stone	• Wood
• Sewer Pipe	• Paints (enamel and latex)
• Drainage Pipe	• Roofing Shingles
• Water Pipe	• Masonry Block
• Gas pipe	• Sheet Rock / Gypsum Board
• Manholes	• Electrical Materials/Supplies
• Catch Basins	• Plumbing Materials/Supplies
• Catch Basin / Manhole Frames & Grates	

3.8 Minimize Dust

Per RI SESC Handbook – Part D

Dust control procedures and practices shall be used to suppress dust on a construction site during the construction process, as applicable. Precipitation, temperature, humidity, wind velocity and direction will determine amount and frequency of applications. However, the best method of controlling dust is to prevent dust production. This can best be accomplished by limiting the amount of bare soil exposed at one time. Dust Control measures outlined in the *RI SESC Handbook* shall be followed. Other dust control methods include watering, chemical application, surface roughening, wind barriers, walls, and covers.

- Dust control will be utilized throughout the entire construction process. For example, keeping disturbed surfaces moist during windy periods will be an effective control measure, especially for construction haul roads. The use of dust control will prevent the movement of soil to offsite areas. However, care must be taken to not create runoff from excessive use of water to control dust. The following are methods of Dust Control that may be used on-site:
  - Vegetative Cover - The most practical method for disturbed areas not subject to traffic.
  - Sprinkling - The site may be sprinkled until the surface is wet. Sprinkling will be effective for dust control on haul roads and other traffic routes.
  - Stone - Stone will be used to stabilize construction roads; it will also be effective for dust control.
  - Calcium Chloride – Calcium Chloride or other additive may be used with approval of Engineer.
  - The general contractor will have an on-site water vehicle to control dust.

3.9 Designate Washout Areas

Per RI SESC Handbook – Part D

At no time shall any material (concrete, paint, chemicals) be washed into storm drains, open ditches, streets, streams, wetlands, or any environmentally sensitive area. The site operator must ensure that construction waste is properly disposed of, to avoid exposure to precipitation, at the end of each working day.

Will washout areas be required for the proposed project?

☒ Yes ☐ No

- The construction site supervisor shall establish a washout area prior to construction as indicated on the Erosion Control Plan prepared by DiPrete Engineering. This area shall not be located in or adjacent to a permanent stormwater BMP.
- Concrete trucks may be allowed to wash out or discharge surplus concrete or drum wash water in the washout area. However, this material must be disposed of in a manner that prevents contact between these materials and stormwater runoff.

3.10 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices

Per RI SESC Handbook – Part D

Vehicle fueling shall not take place within regulated wetlands or buffer zone areas, or within 50-feet of the storm drain system. Designated areas shall be depicted on the SESC Site Plans, or shall be approved by the site owner.

Vehicle maintenance and washing shall occur off-site, or in designated areas depicted on the SESC Site Plans or approved of by the site owner. Maintenance or washing areas shall not be within regulated wetlands or buffer zone areas, or within 50-feet of the storm drain system. Maintenance areas shall be clearly designated, and barriers shall be used around the perimeter of the maintenance area to prevent stormwater contamination.

Construction vehicles shall be inspected frequently for leaks. Repairs shall take place immediately. Disposal of all used oil, antifreeze, solvents and other automotive-related chemicals shall be according to applicable regulations; at no time shall any material be washed down the storm drain or in to any environmentally sensitive area.

Vehicle fueling storage and maintenance should only be done in the area as shown on the Erosion Control Plan prepared by DiPrete Engineering. Any spills should be handled per section 3.4.

3.11 Chemical Treatment for Erosion and Sediment Control

Per RI SESC Handbook – Appendix J

Chemical stabilizers, polymers, and flocculants are readily available on the market and can be easily applied to construction sites for the purposes of enhancing the control of erosion, runoff, and sedimentation. The following guidelines should be adhered to for construction sites that plan to use treatment chemicals as part of their overall erosion, runoff, and sedimentation control strategy.

The U.S. Environmental Protection Agency has conducted research into the relative toxicity of chemicals commonly used for the treatment of construction stormwater discharges. The research conducted by the EPA focused on different formulations of chitosan, a cationic compound, and both cationic and anionic polyacrylamide (PAM). In summary, the studies found significant toxicity resulting from the use of chitosan and cationic PAM in laboratory conditions, and significantly less toxicity associated with using anionic PAM.

EPA's research has led to the conclusion that the use of treatment chemicals for erosion, runoff, and sedimentation control requires proper operator training and appropriate usage to avoid risk to aquatic species. In the case of cationic treatment chemicals additional safeguards may be necessary.

Application/Installation Minimum Requirements

If a site operator plans to use polymers, flocculants, or other treatment chemicals during construction the SESC plan must address the following:

1. Treatment chemicals shall not be applied directly to or within 100 feet of any surface water body, wetland, or storm drain inlet.

2. Use conventional erosion, runoff, and sedimentation controls prior to and after the application of treatment chemicals. Use conventional erosion, runoff, and sedimentation controls prior to chemical addition to ensure effective treatment. Chemicals may only be applied where treated stormwater is directed to a sediment control (e.g. temporary sediment basin, temporary sediment trap or sediment barrier) prior to discharge.

3. Sites shall be stabilized as soon as possible using conventional measures to minimize the need to use chemical treatment.

4. Select appropriate treatment chemicals. Chemicals must be selected that are appropriately suited to the types of soils likely to be exposed during construction and to the expected turbidity, pH, and flow rate of stormwater flowing into the chemical treatment system or treatment area. **Soil testing is essential. Using the wrong form of chemical treatment will result in some form of performance failure and unnecessary environmental risk.**

5. Minimize discharge risk from stored chemicals. Store all treatment chemicals in leak-proof containers that are kept under storm-resistant cover and surrounded by secondary containment structures (e.g., spill berms, decks, spill containment pallets), or provide equivalent measures, designed and maintained to minimize the potential discharge of treatment chemicals in stormwater or by any other means (e.g., storing chemicals in covered areas or having a spill kit available on site).

6. Use chemicals in accordance with good engineering practices and specifications of the chemical provider/supplier. You must also use treatment chemicals and chemical treatment systems in accordance with good engineering practices, and with dosing specifications and sediment removal design specifications provided by the supplier of the applicable chemicals, or document specific departures from these practices or specifications and how they reflect good engineering practice.

Will chemical stabilizers, polymers, flocculants or other treatment chemicals be utilized on the proposed construction project?

☐ Yes ☒ No

3.12 Construction Activity Pollution Prevention Control Measure List

It is expected that this table will be amended as needed throughout the construction project.

Phase No. #		
Location/Station	**Control Measure Description/Reference**	**Maintenance Requirement**

Adjacent Roads	Public roads adjacent to a construction site shall be clean at the end of each day.	Street Sweep if construction site sediment is visible
Site Wide	Pick up of construction trash and debris.	All loose trash and debris must be disposed of properly at the end of each working day.
Construction Entrances	Stone Stabilized Pad. Section Six: Sediment Control Measures – Construction Entrances –RI SESC Handbook. Constriction pad per RIDOT Standard 9.9.0	The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto pave surfaces. Provide periodic top dressing with additional stone or additional length as conditions demand. Roads adjacent to entrance shall be clean at the end of each day. If maintenance alone is not enough to prevent excessive track out, increase length of entrance, modify construction access road surface, or install washrack or mudrack.

SECTION 4: CONTROL MEASURE INSTALLATION, INSPECTION, and MAINTENANCE

4.1 Installation

Per RI SESC Handbook – Part D:

Complete the installation of temporary erosion, runoff, sediment, and pollution prevention control measures 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 may be found in manufacturer specifications and/or the *RI SESC Handbook*.

Erosion control measures shall be located per the Erosion Control Plan prepared by DiPrete Engineering.

4.2 Monitoring Weather Conditions

Per RI SESC Handbook – Part D:

Anticipating Weather Events - Care will 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.

Storm Event Monitoring For Inspections - At a minimum, storm events must be monitored and tracked in order to determine when post-storm event inspections must be conducted. Inspections must be conducted and documented 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.

The weather gauge station and website that will be utilized to monitor weather conditions on the construction site is as follows:

Goodwin Bros. Farm Primrose, RI (Station ID: KRINORTH30)
https://www.wunderground.com/dashboard/pws/KRINORTH30

4.3 Inspections

Per RI SESC Handbook – Part D:

Minimum Frequency - Each of the following areas must 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:

a. All areas that have been cleared, graded, or excavated and where permanent stabilization has not been achieved;

b. All stormwater erosion, runoff, and sediment control measures (including pollution prevention control measures) installed at the site;

c. Construction material, unstabilized soil stockpiles, waste, borrow, or equipment storage, and maintenance areas that are covered by this permit and are exposed to precipitation;

d. All areas where stormwater typically flows within the site, including temporary drainage ways designed to divert, convey, and/or treat stormwater;

e. All points of discharge from the site;

f. All locations where temporary soil stabilization measures have been implemented;

g. All locations where vehicles enter or exit the site.

Reductions in Inspection Frequency - If earth disturbing activities are suspended due to frozen conditions, inspections may be reduced to a frequency of once per month. The owner and operator must document the beginning and ending dates of these periods in an inspection report.

Qualified Personnel – The site owner and operator are responsible for designating personnel to conduct inspections and for ensuring that the personnel who are responsible for conducting the inspections are "qualified" to do so. A "qualified person" is a person knowledgeable in the principles and practices of erosion, runoff, sediment, and pollution prevention controls, who possesses the skills to assess conditions at the construction site that could impact stormwater quality, and the skills to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of the permit.

Recordkeeping Requirements - All records of inspections, including records of maintenance and corrective actions must be maintained with the SESC Plan. Inspection records must include the date and time of the inspection, and the inspector's name, signature, and contact information.

General Notes

- A separate inspection report will be prepared for each inspection.
- The Inspection Reference Number shall be a combination of the RIPDES Construction General Permit No - consecutively numbered inspections. ex/ Inspection reference number for the **4**th inspection of a project would be: RIR10####-**4**
- Each report will be signed and dated by the Inspector and must be kept onsite.
- Each report will be signed and dated by the Site Operator.
- The corrective action log contained in each inspection report must be completed, signed, and dated by the site operator once all necessary repairs have been completed.
- It is the responsibility of the site operator to maintain a copy of the SESC Plan, copies of all completed inspection reports, and amendments as part of the SESC Plan documentation at the site during construction.

Failure to make and provide documentation of inspections and corrective actions under this part constitutes a violation of your permit and enforcement actions under 46-12 of R.I. General Laws may result.

4.4 Maintenance

Per RI SESC Handbook – Part D:

Maintenance procedures for erosion and sedimentation controls and stormwater management structures/facilities are described on the SESC Site Plans and in 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.

Note: It is recommended that the site operator designates a full-time, on-site contact person responsible for working with the site owner to resolve SESC Plan-related issues.

4.5 Corrective Actions

Per RI SESC Handbook – Part D:

If, in the opinion of the designated site inspector, corrective action is required, the inspector shall note it on the inspection report and shall inform the site operator that corrective action is necessary. The site operator must make all necessary repairs whenever maintenance of any of the control measures instituted at the site is required.

In accordance with the *RI SESC Handbook*, the site operator shall initiate work to fix the problem immediately after its discovery, and complete such work by the close of the next work day, if the problem does not require significant repair or replacement, or if the problem can be corrected through routine maintenance.

When installation of a new control or a significant repair is needed, site owners and operators must ensure that the new or modified control measure is installed and made operational by no later than seven (7)

calendar days from the time of discovery where feasible. If it is infeasible to complete the installation or repair within seven (7) calendar days, the reasons why it is infeasible must be documented in the SESC Plan along with the schedule for installing the control measures and making it operational as soon as practicable after the 7-day timeframe. Such documentation of these maintenance procedures and timeframes should be described in the inspection report in which the issue was first documented. If these actions result in changes to any of the control measures outlined in the SESC Plan, site owners and operators must also modify the SESC Plan accordingly within seven (7) calendar days of completing this work.

SECTION 5: AMENDMENTS

Per RIPDES Construction General Permit – Part III.F:

This SESC Plan is intended to be a working document. It is expected that amendments will be required throughout the active construction phase of the project. **Even if practices are installed on a site according to the approved plan, the site is only in compliance when erosion, runoff, and sedimentation are effectively controlled throughout the entire site for the entire duration of the project.**

The SESC Plan shall be amended within seven (7) days whenever there is a change in design, construction, operation, maintenance or other procedure which has a significant effect on the potential for the discharge of pollutants, or if the SESC Plan proves to be ineffective in achieving its objectives (i.e. the selected control measures are not effective in controlling erosion or sedimentation).

In addition, the SESC Plan shall be amended to identify any new operator that will implement a component of the SESC Plan.

All revisions must be recorded in the Record of Amendments Log Sheet, which is contained in Attachment G of this SESC Plan, and dated red-lined drawings and/or a detailed written description must be appended to the SESC Plan. Inspection Forms must be revised to reflect all amendments. Update the Revision Date and the Version # in the footer of the Report to reflect amendments made.

All SESC Plan Amendments, except minor non-technical revisions, must be approved by the site owner and operator. Any amendments to control measures that involve the practice of engineering must be reviewed, signed, and stamped by a Professional Engineer registered in the State of RI.

The amended SESC plan must be kept on file at the site while construction is ongoing and any modifications must be documented.

Attach a copy of the Amendment Log.

SECTION 6: RECORDKEEPING

RIPDES Construction General Permit – Parts III.D, III.G, III.J.3.b.iii, & V.O

It is the site owner and site operator's responsibility to have the following documents available at the construction site and immediately available for RIDEM review upon request:

- A copy of the fully signed and dated SESC Plan, which includes:
    - A copy of the General Location Map
      INCLUDED AS ATTACHMENT A
    - A copy of all SESC Site Plans
      INCLUDED AS ATTACHMENT B
    - A copy of the RIPDES Construction General Permit
      INCLUDED AS ATTACHMENT C
    - A copy of any regulatory permits (RIDEM Freshwater Wetlands Permit, CRMC Assent, RIDEM Water Quality Certification, RIDEM Groundwater Discharge Permit, RIDEM RIPDES Construction General Permit authorization letter, etc.)
      INCLUDED AS ATTACHMENT D
    - The signed and certified NOI form or permit application form
      INCLUDED AS ATTACHMENT E
    - Completed Inspection Reports w/Completed Corrective Action Logs
      INCLUDED AS ATTACHMENT F
    - SESC Plan Amendment Log
      INCLUDED AS ATTACHMENT G
    - Sediment Traps Design and Sizing Calculations
      INCLUDED AS ATTACHMENT H

SECTION 7: PARTY CERTIFICATIONS

RIPDES Construction General Permit – Part V.G

All parties working at the project site are required to comply with the Soil Erosion and Sediment Control Plan (SESC Plan including SESC Site Plans) for any work that is performed on-site. The site owner, site operator, contractors and sub-contractors are encouraged to advise all employees working on this project of the requirements of the SESC Plan. A copy of the SESC Plan is available for your review at the following location: Construction Trailer, or may be obtained by contacting the site owner or site operator.

The site owner and site operator and each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement.

I acknowledge that I have read and understand the terms and conditions of the Soil Erosion and Sediment Control (SESC) Plan for the above designated project and agree to follow the control measures described in the SESC Plan and SESC Site Plans.

Site Owner:

Grand Banks Commerce Park, LLC
Gary Ezovski
P.O. Box 663
Slatersville, RI 02876
401-640-5001

_____
signature/date

Site Operator:

Insert Company or Organization Name
Insert Name & Title
Insert Address
Insert City, State, Zip Code
Insert Telephone Number, Insert Fax/Email

_____
signature/date

Designated Site Inspector:

Insert Company or Organization Name
Insert Name & Title
Insert Address
Insert City, State, Zip Code
Insert Telephone Number, Insert Fax/Email

_____
signature/date

SubContractor SESC Plan Contact:

Insert Company or Organization Name
Insert Name & Title
Insert Address
Insert City, State, Zip Code
Insert Telephone Number, Insert Fax/Email

_____
signature/date

LIST OF ATTACHMENTS

Attachment A - General Location Map

(See latest plan set prepared by DiPrete Engineering)

Attachment B - SESC Site Plans

(See latest plan set prepared by DiPrete Engineering)

Attachment C - Copy of RIPDES Construction General Permit and Authorization to Discharge

Attachment D - Copy of Other Regulatory Permits

Attachment E - Copy of RIPDES NOI

Attachment F - Inspection Reports w/ Corrective Action Log

SESC Plan
Inspection Report Instructions

For all projects subject to the requirements of the *RI Stormwater Design and Installation Standards Manual* or the *RIPDES Construction General Permit* the site owner and operator are required to develop and comply with a site specific Soil Erosion and Sediment Control Plan (SESC Plan) in order to remain in compliance with applicable regulations.

This inspection report template has been provided by RIDEM for use by the site operator and designated inspector to document the adequacy and condition of erosion, runoff, sediment, and pollution prevention control measures specified for use on the construction site. It should be customized for your specific site conditions and consistent with the SESC Plan developed for your site.

Using the Inspection Report

This inspection report is designed to be customized according to the control measures and conditions at the site. On a copy of the applicable SESC Site Plans, number or label all stormwater control measures and areas of the site that will be inspected. Include all control measures (temporary traps, basins, inlet protection measures, etc.) and areas that will be inspected. Also, identify all point source discharges/outfalls, and the priority natural resource areas (i.e. streams, wetlands, mature trees, etc). List each control measure or area to be inspected separately in the site-specific control measure section of the inspection report.

Complete any items that will remain constant, such as the project information and control measure locations and descriptions. Then, print out multiple copies of this customized inspection report to use during the inspections.

When conducting the inspection, walk the site by following the SESC Site Plans and numbered control measure locations for inspection. Also note whether the overall site issues have been addressed. Customize this list according to the conditions at the site.

Minimum Monitoring and Reporting Requirements

Your site must 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. Read Section 4.2 of your SESC Plan for more information regarding the importance of monitoring weather conditions.

General Notes

- A separate inspection report will be prepared for each inspection.

Revision Date: May 1, 2015

- The Inspection Reference Number shall be a combination of the RIPDES Permit Authorization Number - consecutively numbered inspections. For example: Inspection reference number for the **4**th inspection of a project would be: RIR101000-**4**

- Each report will be signed and dated by the inspector and forwarded to the site operator within 24 hours of the inspection.

- Each report will be signed and dated by the site operator upon his/her receipt and after completion of all required corrective actions.

- It is the responsibility of the site operator to maintain a copy of the SESC Plan, copies of all completed inspection reports, and amendments as part of the SESC Plan documentation at the site during construction.

Corrective Actions

If the SESC Plan Inspection determines that corrective actions are necessary to install or repair control measures, the resultant actions taken must be documented by the site operator. The actions must be recorded in the Corrective Action Log attached to each SESC Plan inspection form. If the site operator disagrees with the corrective action recommendations, it must be documented, with justifiable reasons, in the Corrective Action Log, as well. **Required timeframes for corrective actions are established by regulation and are discussed in Section 4.5 of your SESC Plan.**

Amendments

All SESC Plan Amendments, except minor non-technical revisions, must be approved by the site owner and site operator. The revision must be recorded in the Record of Amendments Log Sheet within the SESC Plan, and dated red-line drawings and/or a detailed written description of the revision must be appended to the SESC Plan. Inspection forms must be revised to reflect all amendments. Update the *Revision Date* and the *Version* # in the footer of the report to reflect amendments made.

The SESC Plan shall be amended whenever there is a change in design, construction, operation, maintenance or other procedure, which has a significant effect on the potential for the discharge of pollutants, or if the SESC Plan proves to be ineffective in achieving its objectives.

******Remember that the regulations are performance-oriented. Even if all control measures are installed on a site according to the SESC Plan, the site is only in compliance when erosion, runoff, sedimentation, and pollution are effectively controlled. ******

SESC Plan Inspection Report

Project Information			
Name			
Location			
DEM Permit No.			
Site Owner	**Name**	**Phone**	**Email**
Site Operator	**Name**	**Phone**	**Email**

Inspection Information			
Inspector Name	**Name**	**Phone**	**Email**
Inspection Date		**Start/End Time**	

Inspection Type
❑ **Weekly** ❑ **Pre-storm event** ❑ **During storm event** ❑ **Post-storm event** ❑ **Other**

Weather Information
Last Rain Event **Date:** **Duration (hrs):** **Approximate Rainfall (in):**
Rain Gauge Location & Source:
Weather at time of this inspection:

Check statement that applies then sign and date below:

☐ **I, as the designated Inspector, certify that this site has been inspected as required by regulation and I have determined that maintenance and corrective actions are not required at this time.**

☐ **I, as the designated Inspector, certify that this site has been inspected as required by regulation and I have made the determination that the site requires corrective actions. The required corrective actions are noted within this inspection report.**

	Print Name	**Signature**	**Date**
Inspector:			

The Site Operator acknowledges by his/her signature, the receipt of this SESC Plan inspection report and its findings. He/she acknowledges that all recommended corrective actions must be completed and documentation of all such corrective actions must be made in this inspection report per applicable regulations.

	Print Name	**Signature**	**Date**
Operator:			

Site-specific Control Measures

Number the structural and non-structural stormwater control measures identified in the SESC Plan and on the SESC Site Plans and list them below (add as necessary). Bring a copy of this inspection form and any applicable SESC Site Plans with you during your inspections. This list will assist you to inspect all control measures at your site.
FILL THIS TABLE USING THE SESC PLAN TABLES 2.11 & 3.12.

	Location/Station	Control Measure Description	Installed & Operating Properly?	Assoc. Photo/ Figure #	Corrective Action Needed (Yes or No; if 'Yes', please detail action required)
1	Example 1: Eastern Parcel – Slope No. 4 Adjacent to I-95. Straw Wattles	Straw Wattle. Section Six, Sediment Control Measures, Straw Wattles, Compost Tubes and Fiber Rolls - *RI SESC Handbook*.	❑Yes ❑No		
2	Example 2: Western Parcel – Green Street Construction Entrance	Stone Stabilized Pad. Section Six: Sediment Control Measures – Construction Entrances –*RI SESC Handbook*.	❑Yes ❑No		
3	Example 3: Hospital Main Footings – Excavation Area – SESC Site Plan Sheet No. 3.	Pump Intake Protection Using Stone Filled Sump with Standpipe. Section Six: Sediment Control Measures, Pump Intake Protection, *RI SESC Handbook.*	❑Yes ❑No		
4	Example 4: Bridge Abutment Construction Southbound Bridge Abutment, Bridge No. 244 – SESC Site Plan Sheet No. 18.	Prefabricated Concrete Washout Container with Ramp. Used to contain concrete washout during concrete pouring operations. Section Three: Pollution Prevention and Good Housekeeping, Concrete Washouts, *RI SESC Handbook*.	❑Yes ❑No		
5	INSERT TEXT	INSERT TEXT	❑Yes ❑No		
6	**Attention Operator:**	**You must modify this inspection form as the project progresses, control measure locations change, and amendments to the SESC Plan are instituted in the field.**	❑Yes ❑No		
7			❑Yes ❑No		
8			❑Yes ❑No		

	Location/Station	Control Measure Description	Installed & Operating Properly?	Assoc. Photo/ Figure #	Corrective Action Needed (Yes or No; if 'Yes', please detail action required)
9			❑Yes ❑No		
10			❑Yes ❑No		
11			❑Yes ❑No		
12			❑Yes ❑No		
13			❑Yes ❑No		
14			❑Yes ❑No		
15			❑Yes ❑No		
16			❑Yes ❑No		
17			❑Yes ❑No		
18			❑Yes ❑No		
19			❑Yes ❑No		
20			❑Yes ❑No		
21			❑Yes ❑No		
22			❑Yes ❑No		
23			❑Yes ❑No		
24			❑Yes ❑No		

	Location/Station	Control Measure Description	Installed & Operating Properly?	Assoc. Photo/ Figure #	Corrective Action Needed (Yes or No; if 'Yes', please detail action required)
25			❑Yes ❑No		
26			❑Yes ❑No		
27			❑Yes ❑No		
28			❑Yes ❑No		
29			❑Yes ❑No		
30			❑Yes ❑No		

(add more as necessary)

General Site Issues

*Below are some general site issues that should be assessed during inspections. Please **customize** this list as needed for conditions at the site.*

	Compliance Question		**Assoc. Photo/ Figure #**	**Corrective Action Needed (If 'Yes', please detail action required and include location/station)**
1	Have all control measures been installed as specified in the RISESC Handbook and prior to any earth disturbing activities?	❑Yes ❑No ❑ N/A		
2	Are appropriate limits of disturbance (LOD) established?	❑Yes ❑No ❑ N/A		
3	Are controls that limit runoff from exposed soils by diverting, retaining, or detaining flows (such as check dams, sediment basins, etc.) in place?	❑Yes ❑No ❑ N/A		
4	Are all temporary conveyance practices installed correctly and functioning as designed?	❑Yes ❑No ❑ N/A		
5	Has maintenance been performed as required to ensure continued proper function of all temporary conveyances practices?	❑Yes ❑No ❑ N/A		
6	Were all exposed soils seeded by October 15th?	❑Yes ❑No ❑ N/A		
7	Have soils been stabilized where earth disturbance activities have permanently or temporarily ceased on any portion of the site and will not resume for more than 14 days?	❑Yes ❑No ❑ N/A		
8	In instances where adequate vegetative stabilization was not established by November 15th, have non-vegetative erosion control measures must be employed?	❑Yes ❑No ❑ N/A		
9	If work is to continue from October 15th through April 15th, are steps taken to ensure that only the day's work area will be exposed and all erodible soil is stabilized within 5 working days?	❑Yes ❑No ❑ N/A		
10	Have inlet protection measures (such as fabric drop inlet protection, curb drop inlet protection, etc.) been properly installed?	❑Yes ❑No ❑ N/A		
11	Has the operator cleaned and maintained inlet protection measures when needed?	❑Yes ❑No ❑ N/A		
12	Has the operator removed accumulated sediment adjacent to inlet protection measures within 24 hours of detection?	❑Yes ❑No ❑ N/A		

	Compliance Question		**Assoc. Photo/ Figure #**	**Corrective Action Needed (If 'Yes', please detail action required and include location/station)**
13	Has the operator properly installed outlet protection (such as riprap, turf mats, etc.) at all temporary and permanent discharge points?	❑Yes ❑No ❑ N/A		
14	Are all outlet protection measures functioning properly in order to reduce discharge velocity, promote infiltration, and eliminate scour?	❑Yes ❑No ❑ N/A		
15	Have all discharge points been inspected to ensure the prevention of scouring and channel erosion?	❑Yes ❑No ❑ N/A		
16	Have sediment controls been installed along perimeter areas that will receive stormwater from earth disturbing activities?	❑Yes ❑No ❑ N/A		
17	Is the operator maintaining sediment controls in accordance with the requirements in the *RI SESC Handbook*?	❑Yes ❑No ❑ N/A		
18	Have temporary sediment barriers been installed around permanent infiltration areas (such as bioretention areas, infiltration basins, etc.)?	❑Yes ❑No ❑ N/A		
19	Have staging areas and equipment routing been implemented to avoid compaction where permanent infiltration areas will be located?	❑Yes ❑No ❑ N/A		
20	Are surface outlet structures (such as skimmers, siphons, etc.) installed for each temporary sediment basin? [Exception: frozen conditions]	❑Yes ❑No ❑ N/A		
21	Have all temporary sediment basins or traps been inspected and maintained as required to ensure proper function?	❑Yes ❑No ❑ N/A		
22	Does the project include the use of polymers, flocculants, or other chemicals to control erosion, sedimentation, or runoff from the site?	❑Yes ❑No ❑ N/A		
23	Are all chemicals being managed in accordance with Appendix J of the *RISESC Handbook* and current best management practices?	❑Yes ❑No ❑ N/A		
24	Has the site operator taken steps to **prohibit** the following pollutant discharges on the site?			
a	Contaminated groundwater.	❑Yes ❑No ❑ N/A		

	Compliance Question		**Assoc. Photo/ Figure #**	**Corrective Action Needed (If 'Yes', please detail action required and include location/station)**
b	Wastewater from washout of concrete; unless properly contained, managed, and disposed of.	❑Yes ❑No ❑ N/A		
c	Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction products.	❑Yes ❑No ❑ N/A		
d	Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.	❑Yes ❑No ❑ N/A		
e	Soaps or solvents used in vehicle and equipment washing.	❑Yes ❑No ❑ N/A		
f	Toxic or hazardous substances from a spill or other release.	❑Yes ❑No ❑ N/A		
25	Is the operator using properly constructed entrances/exits to the site so sediment removal occurs prior to vehicles exiting?	❑Yes ❑No ❑ N/A		
26	If needed, are additional controls (such as rumble strips, rattle plates, etc.) in place to remove sediment from tires prior to exiting?	❑Yes ❑No ❑ N/A		
27	Is sediment track-out being removed by the end of the same workday in which it occurs (via sweeping, shoveling, or vacuuming)?	❑Yes ❑No ❑ N/A		
28	Are all wastes generated at the site being managed and properly disposed of by the end of each workday?	❑Yes ❑No ❑ N/A		
29	Are all chemicals and hazardous waste materials stored properly in covered areas and surrounded by containment control systems?	❑Yes ❑No ❑ N/A		
30	Has the operator established highly visible locations for the storage of spill prevention and control equipment on the construction site?	❑Yes ❑No ❑ N/A		
31	Are allowable non-stormwater discharges being managed properly with adequate controls?	❑Yes ❑No ❑ N/A		
32	Is the site operator properly managing groundwater or stormwater that is removed from excavations, trenches, or similar points of accumulation?	❑Yes ❑No ❑ N/A		
33	Are proper procedures and controls in place for the storage of materials that may discharge pollutants if	❑Yes ❑No ❑ N/A		

	Compliance Question		**Assoc. Photo/ Figure #**	**Corrective Action Needed (If 'Yes', please detail action required and include location/station)**
	exposed to stormwater?			
	Are stockpiles located within the limits of disturbance?	❑Yes ❑No ❑ N/A		
	Are stockpiles being protected from contact with stormwater using a temporary sediment barrier?	❑Yes ❑No ❑ N/A		
	Where needed, has cover or appropriate temporary vegetative or structural stabilization been utilized for stockpiles?	❑Yes ❑No ❑ N/A		
	Is the operator effectively managing the generation of dust through the use of water, chemicals, or minimization of exposed soil?	❑Yes ❑No ❑ N/A		
	Are designated washout areas (such as wheel washing stations, washout for concrete, paint, stucco, etc.) clearly marked on the site?	❑Yes ❑No ❑ N/A		
	Are vehicle fueling and maintenance areas properly located to prevent pollutants from impacting stormwater and sensitive receptors?	❑Yes ❑No ❑ N/A		
	(Other)			

(add more as necessary)

General Field Comments:

Photos:

(Associated photos – each photo should be dated and have a unique identification # and written description indicating where it is located within the project area. If a close up photo is required, it should be preceded with a photo including both the detail area and some type of visible fixed reference point. Photos should be annotated with Station numbers and other identifying information where needed.)

Photo #:	Station:
(insert Photo here)	Description:

Photo #:	Station:
(insert Photo here)	Description:

Photo #:	Station:
(insert Photo here)	Description:

Photo #:	Station:
(insert Photo here)	Description:

Photo #:	Station:
(insert Photo here)	Description:

Photo #:	Station:
(insert Photo here)	Description:

(add more as necessary)

Corrective Action Log

TO BE FILLED OUT BY SITE OPERATOR

Describe repair, replacement, and maintenance of control measures, actions taken, date completed, and note the person that completed the work.

	Location/Station	Corrective Action	Date Completed	Person Responsible
Operator Signature:			**Date:**	

Attachment G - SESC Plan Amendment Log

PROJECT:

Amendment Log

TO BE FILLED OUT BY SITE OPERATOR

Describe amendment(s) to be made to the SESC Plan, the date, and the person/title making the amendment. ALL amendments must be approved by the Site Owner.

#	Date	Description of Amendment	Amended by: Person/Title	Site Owner Must Initial
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Add more lines/pages as necessary

Attachment H – Sediment Traps Design and Sizing Calculations

DiPrete Engineering
Engineers • Planners • Surveyors

Temporary Sediment Trap Sizing

NOTE: Only for use on contributing drainage areas of 5 acres or less. For areas larger than 5 acres use a **Temporary Sediment Basin**.

RI Soil Erosion Sediment Control Handbook - Section 6: Temporay Sediment Traps - Page 3

Sediment Trap A

Drainage Area (DA) = 3.994 Acres

Test #1: RISESCH Initial Storage Volume (V)

V = 134 cu.yd./acre x DA
V = 535 cu.yd.
V = **14,450** cu.ft.

Test #2: RISDISM Standard 10 Requires 1" runoff Volume (V)

V = DA x 1"
V = **14,498** cu.ft.

Test #3: RISESCH Sediment Storage Volume (V)

V = [(DA)(A)(DR)(TE)(2000lbs./ton)]/[(y)(43,560sq.ft./ac)]
V = **36** cu.ft.

Drainage area (DA)	3.99	acres
Average Erosion (A)	50	ton/ac/yr
Delivery Ratio (DR)	0.010	ratio
Trap Efficiency (TE)	0.80	
Estimated Sed. Density (y)	90	lbs/cu.ft

Sediment Storage Volume Required, V = **14,498** cu.ft.

Wet Storage Volume Calc

Wet Storage Volume(Vw) = 0.85 x Aw x Dw
Vw = 7,601 cu.ft.
Wet Storage Volume Check = Vw > 0.5 V Ok

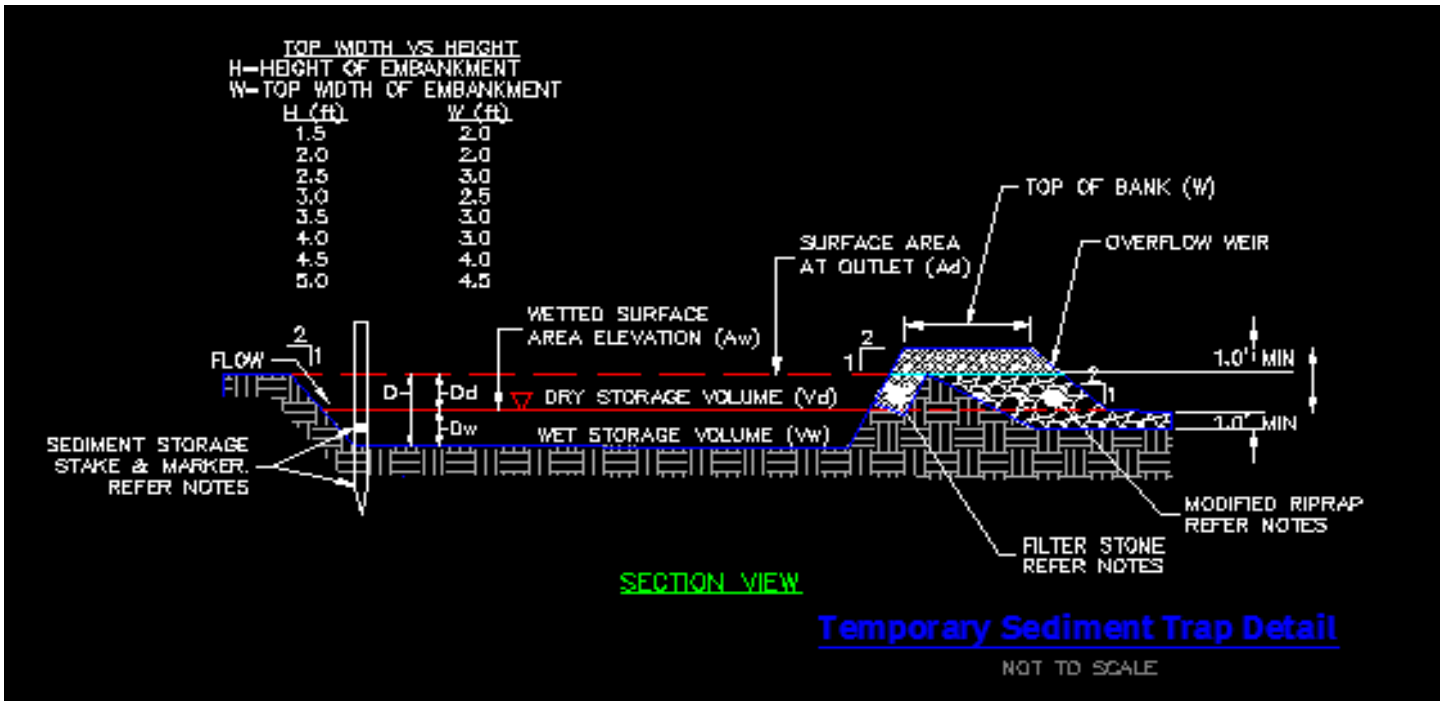
Dry Storage Volume Calc

Dry Storage Volume (Vd) = [(Aw + Ad)/2] * Dd
Vd = 9,399 cu.ft.

Sediment Storage Volume Provided, V = **16,999** cu.ft.

Sediment Trap Dimensions

Wet Storage Depth (Dw)	1.0	ft
Dry Storage Depth (Dd)	1.0	ft
Total Depth (D)	2	ft
Bottom of Trap Area (Ab)	8,060	sq.ft
Wetted Surface Area (Aw)	8,942	sq.ft
Surface Area at Outlet (Ad)	9,855	sq.ft



DiPrete Engineering
Engineers • Planners • Surveyors

Temporary Sediment Trap Sizing

NOTE: Only for use on contributing drainage areas of 5 acres or less. For areas larger than 5 acres use a **Temporary Sediment Basin**.

RI Soil Erosion Sediment Control Handbook - Section 6: Temporay Sediment Traps - Page 3

Sediment Trap **B**

Drainage Area (DA) = 3.056 Acres

Test #1: RISESCH Initial Storage Volume (V)

V = 134 cu.yd./acre x DA
V = 410 cu.yd.
V = **11,057** cu.ft.

Test #2: RISDISM Standard 10 Requires 1" runoff Volume (V)

V = DA x 1"
V = **11,093** cu.ft.

Test #3: RISESCH Sediment Storage Volume (V)

V = [(DA)(A)(DR)(TE)(2000lbs./ton)]/[(y)(43,560sq.ft./ac)]
V = **27** cu.ft.

Drainage area (DA)	3.06	acres
Average Erosion (A)	50	ton/ac/yr
Delivery Ratio (DR)	0.010	ratio
Trap Efficiency (TE)	0.80	
Estimated Sed. Density (y)	90	lbs/cu.ft

Sediment Storage Volume Required, V = **11,093** cu.ft.

Wet Storage Volume Calc

Wet Storage Volume(Vw) = 0.85 x Aw x Dw
Vw = 5,281 cu.ft.
Wet Storage Volume Check = Vw > 0.5 V No

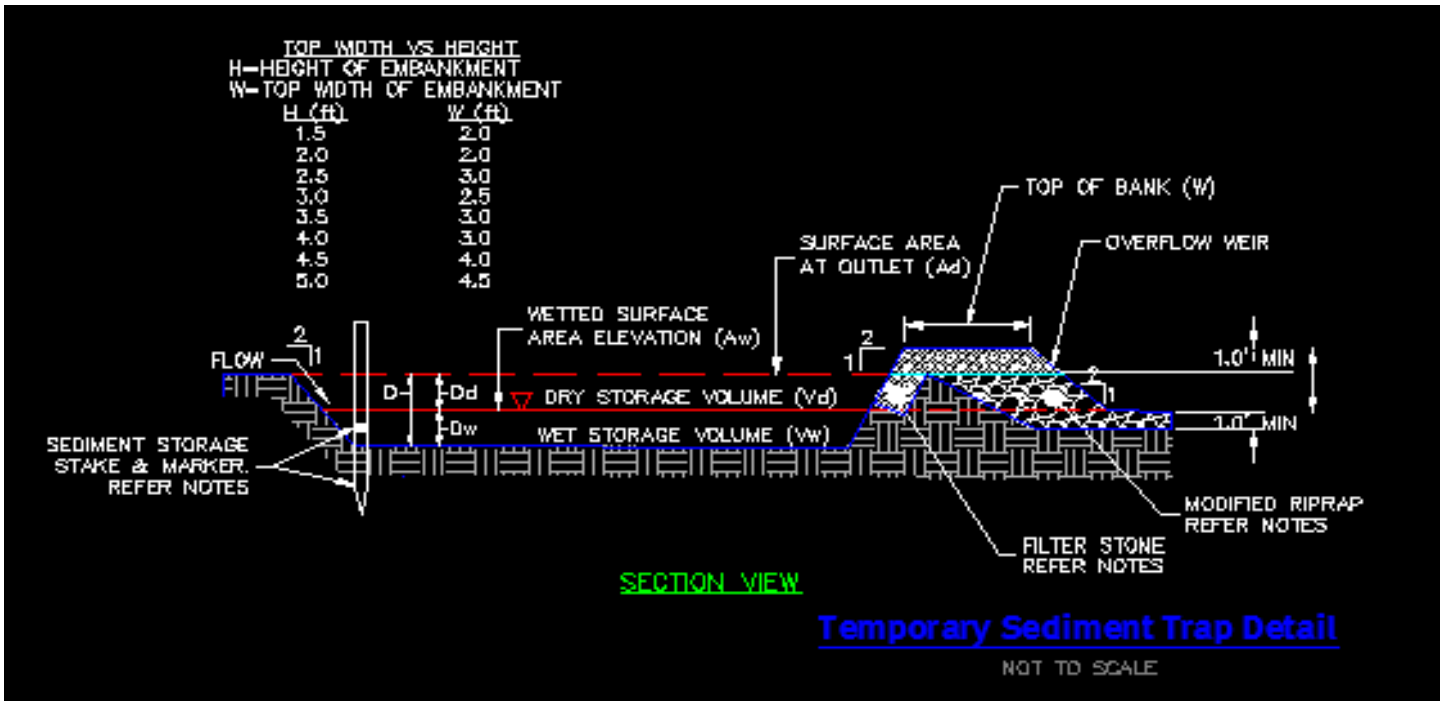
Dry Storage Volume Calc

Dry Storage Volume (Vd) = [(Aw + Ad)/2] * Dd
Vd = 9,832 cu.ft.

Sediment Storage Volume Provided, V = **15,113** cu.ft.

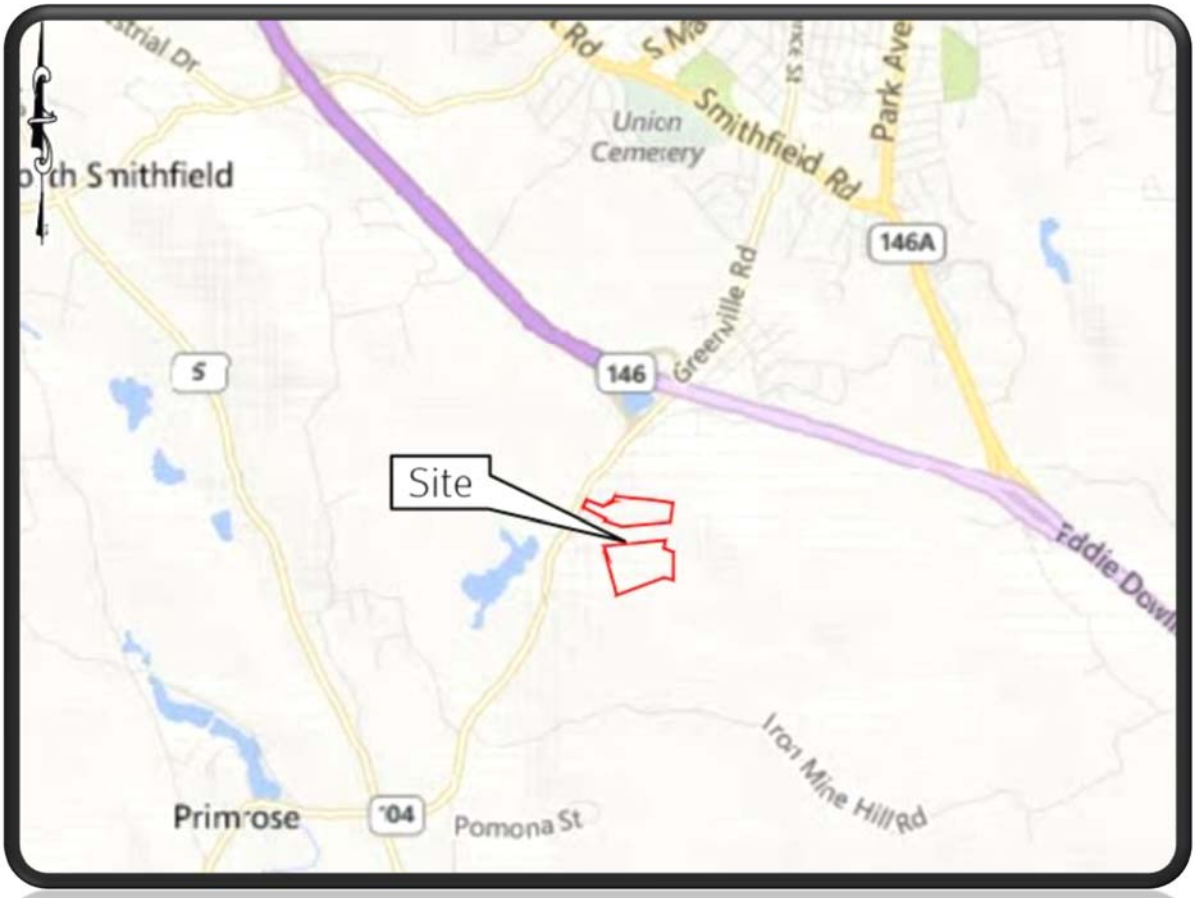
Sediment Trap Dimensions

Wet Storage Depth (Dw)	1.0	ft
Dry Storage Depth (Dd)	1.5	ft
Total Depth (D)	3	ft
Bottom of Trap Area (Ab)	5,235	sq.ft
Wetted Surface Area (Aw)	6,213	sq.ft
Surface Area at Outlet (Ad)	6,896	sq.ft



DiPrete Engineering

Operation & Maintenance Plan



Grand Banks Solar

Located in North Smithfield, Rhode Island

Applicant: Econox Renewables, Inc.

09-25-2019

Table of Contents

Operation & Maintenance Plan Overview

An essential component of a successful Stormwater System (SS) is the ongoing Operation and Maintenance (O&M) of the various components of the stormwater drainage, control, and conveyance systems. These components include swales, pipes, catch basins, and treatment/ control devices are commonly referred to as Best Management Practices (BMPs). Failure to provide effective maintenance can reduce the hydraulic capacity and the pollutant removal efficiency of stormwater practices.

Many people expect that stormwater facilities will continue to function correctly forever. However, it is inevitable that deterioration of the stormwater system will occur once it becomes operational. The question is not whether stormwater system maintenance is necessary but how often.

This plan has been developed to proactively address operations and maintenance to minimize potential problems and maximize potential stormwater runoff treatment and management. Ongoing inspections and maintenance will extend the service life of the Best Management Practices.

This plan addresses;

1. Stormwater management system(s) owners;
2. The party or parties responsible for operation and maintenance, including how future property owners will be notified of the presence of the stormwater management system and the requirement for proper operation and maintenance;
3. A description and delineation of public safety features;
4. The routine (scheduled) and non-routine (corrective) maintenance tasks for each BMP to be undertaken after construction is complete and a schedule for implementing those tasks;
5. A plan that is drawn to scale and shows the location of all stormwater BMPs in each treatment train along with the discharge point;
6. An estimated operation and maintenance budget; and
7. Funding source for operation and maintenance activities and equipment.

A major contributor to unmaintained stormwater facilities is a lack of clear ownership and responsibility definition. In order for an inspection and maintenance program to be effective, the roles for each responsibility must be clearly defined prior to construction of a system. This can be accomplished with a maintenance agreement between the site owners and the responsible authority.

This report is suitable for recording as an attachment to a maintenance agreement between the site owner and the responsible authority. A copy of a sample agreement prepared by RIDEM is attached to this report as Appendix B.

Stormwater System Owner / Party Responsible for O&M

Stormwater BMPs are maintained during construction by the site contractor as identified in the Soil Erosion and Sediment Control Plan (SESC) for the site. A copy of the SESC is required to be kept on site during construction. The SESC requires maintenance and inspection of the BMPs during the construction phase of project and requires a log be kept of these activities. Once construction is complete and the contractor's warranty period is elapsed, the contractor must obtain the signature of the stormwater system's owner releasing the contractor from his maintenance and inspection responsibilities. A copy of this release of contractor's responsibility shall be attached to this document.

The property owner will also be the owner of the stormwater system. Upon completion of construction, the owner of the property along with mailing and emergency contact information must be added below.

Owner; _____

Mailing Address; _____

_____

Emergency Contact Name; _____

Phone; _____

Transfer of Ownership

In the event that the owner of the property changes, the current owner (grantor) must provide a copy of this document to the new owner (grantee). The new owner must notify the Rhode Island Department of Environmental Management of the change of ownership and provide a signed updated Operations and Maintenance Plan to the Rhode Island Department of Environmental Management.

The Stormwater System Owner is the Party Responsible for the ongoing O&M of the system.

The two key components to adequately maintain the stormwater infrastructure are:

1. Performance of periodic and scheduled inspections
2. Performance of scheduled maintenance

The actual operation and maintenance of the system may be performed by a third party designated by the owner. If the owner contracts with a third party for O&M the name, address, and emergency contact information must be added below and updated if the third-party designee changes.

Name; _____

Mailing Address; _____

_____

Emergency Contact Name; _____

Phone; _____

Public Safety

Public safety was a critical factor in designing the stormwater system. Public safety features included in this design are:

- Accessibility to Stormwater BMPs
- 20' wide permeable driveway – which will require periodic rejuvenation of the stone roadway surface to maintain a rapidly permeable surface
- 6' high security fence

Accessibility to Stormwater BMPs
As shown on the site plans, a gravel access is proposed which will allow access to the stormwater BMPs for maintenance.

Winter Maintenance
The following tasks shall be performed to protect public safety during the winter season:

- Inspect the stone access road and drainage structures post storm event to alleviate any signs of icing or damming

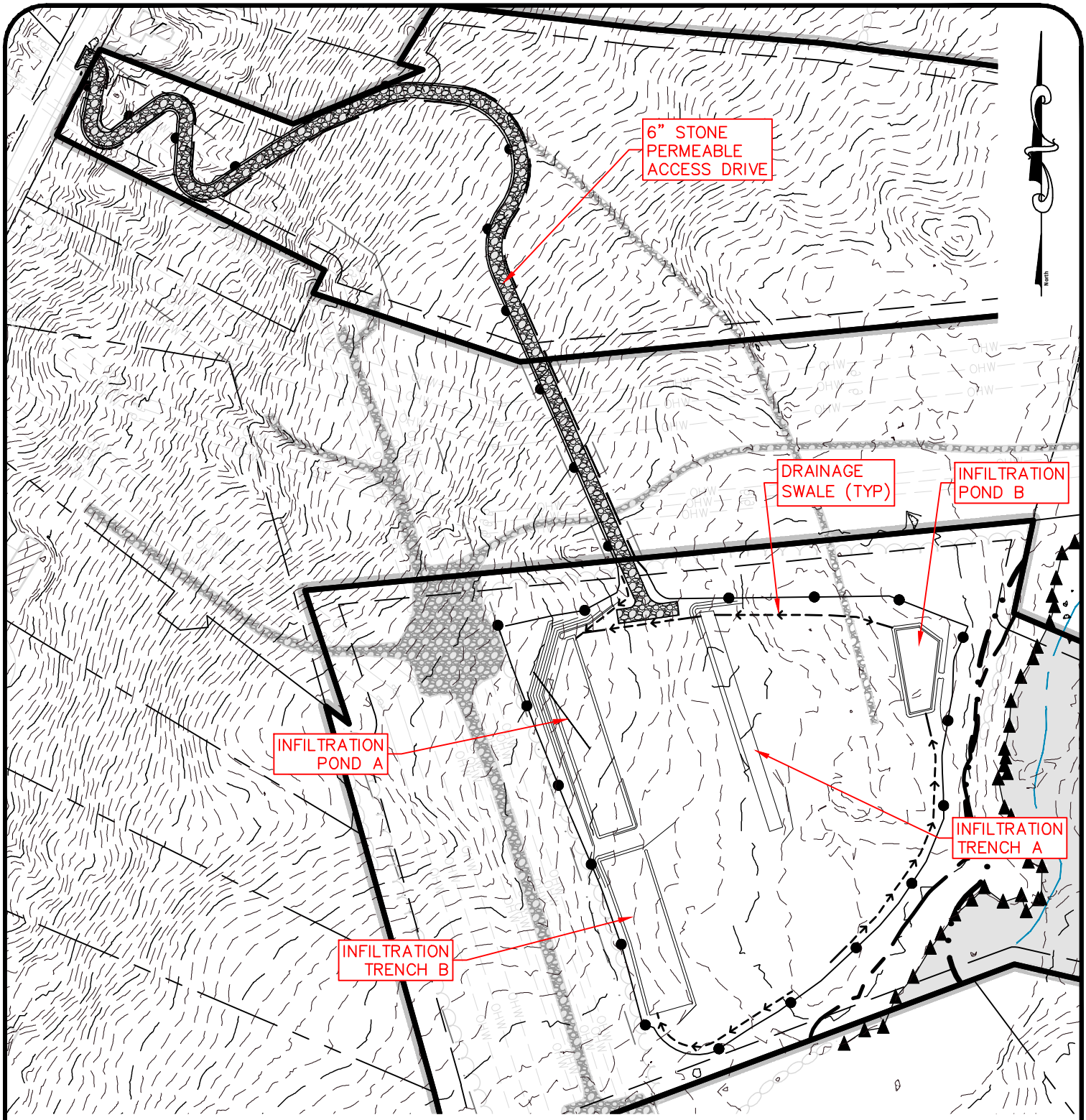
Non-Winter Maintenance
The following tasks shall be performed to protect public safety during the non-winter seasons:

- The contractor will inspect and maintain the storm water management systems in accordance with the enclosed Operations & Maintenance Plan
- Periodic rejuvenation of the stone roadway surface will be required to maintain a rapidly permeable surface.

Particular care must be taken in the operation and maintenance of these features.

Stormwater System Plan

A plan identifying each component of the stormwater system is included on the following page.



SHEET 1 OF 1

O&M Plan

Grand Banks Solar

North Smithfield, Rhode Island

Date:
09-26-2019

DiPrete Engineering

Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-464-6006 www.diprete-eng.com

Boston • Providence • Newport

Inspections & Maintenance

Inspections shall be performed on a regular basis and scheduled based on the BMP type and configuration. It is not mandatory that all inspectors be trained engineers, but they shall have some knowledge or experience with stormwater systems and in general, trained stormwater engineers should direct the inspectors. Follow-up inspections by registered professional engineers shall be performed where a routine inspection has revealed a question of structural or hydraulic integrity affecting public safety.

Not all inspections can be conducted by direct human observation. For subsurface systems, video equipment may be required. There may be cases where other specialized equipment is necessary. The inspection program shall be tailored to address the operational characteristics of the system.

The inspection process shall document observations made in the field and shall cover structural conditions, hydraulic operational conditions, evidence of vandalism, condition of vegetation, occurrence of obstructions, unsafe conditions, and build-up of trash, sediments and pollutants.

Maintenance of the stormwater management system is essential and can be divided into two types, scheduled and corrective.

Scheduled maintenance tasks are those that are typically accomplished on a regular basis and can generally be scheduled without referencing inspection reports. These items consist of such things as vegetation maintenance (such as mowing) and trash and debris removal. These tasks are required at well-defined time intervals and are a requirement for all stormwater structural facilities.

Corrective maintenance tasks consist of items such as sediment removal, stream bank stabilization, and outlet structure repairs that are done on an as-needed basis. These tasks are typically scheduled based on inspection results or in response to complaints.

Since specialized equipment may be required, some maintenance tasks can be effectively handled on a contract basis with an outside entity specializing in that field. In addition, some maintenance may also require a formal design and bid process to accomplish the work.

Appendix A provides an "Inspection Schedule & Maintenance Checklist" for the stormwater system components on this site. Completed checklists shall be maintained as an ongoing record of inspections for each component of the stormwater system.

In addition to the maintenance of the stormwater system, maintenance of other site improvements can significantly enhance the ability for the BMPs to function as designed. We have identified several of these below, along with the suggested maintenance.

Lawn, Garden and Landscape Management

- Mowing Schedule - Project landscaping will take place a minimum of two times a year or as necessary to eliminate shading on panels. Typically grass trimming occurs in the spring and fall.
- Grass Height Range - Lawns shall be cut to 3-6 inch in height using mowers and string trimmers. No fertilizer or chemicals will be used. All trees/ shrubs will be trimmed as necessary to maintain proper screening, plant health and preferred height.

- Infiltration ponds shall be mowed at least twice per year.
- No fertilizer shall be used onsite
- Weeds should be dug or pulled out. Large area of weeds can be removed by covering with large plastic sheet for a few days
- Chemical pesticides should be as a last resort. A healthy lawn is naturally diseases resistant.
    - Visible insects can be removed by hand, by spraying with water, or even vacuum cleaning.
    - Store bought traps, specific for a species, can be used
    - Slugs and other soft bodied insects and slugs can be eliminated using diatomaceous earth.
    - Plants infected with bacteria and fungi should be removed and disposed of.
    - Beneficial organisms should be maintained on the property and should be encouraged/attracted to the property. Property facility maintenance personal should become familiar with beneficial organisms.
- Irrigation should be minimal if required at all. Most lawns do not require watering and will become dormant during dry periods.
    - Established lawns require no more than one inch of water per week.
    - Areas should be watered before 9am to avoid evaporation.
- During National Grid and maintenance activities a visual inspection of the site will be performed checking for any erosional features or any incipient erosion. If any substandard erosion conditions are found, immediate corrective measures will occur. Please see appendix A for the – Inspection Schedule & Maintenance Checklists

Road and Parking Area Management

Street and Parking Lot Sweeping

- There are no streets on site therefore, no street sweeping is needed.
- Periodic rejuvenation of the stone roadway surface will be performed as needed to maintain a rapidly permeable surface. This rejuvenation will occur in compliance with RIDEM standard practices.

Deicing:

- No deicing shall occur onsite

Sealants:

- No coal-tar based asphalt sealants shall be used on site.

Snow Removal:

- No snow removal is proposed

Solid Waste Containment

- This is will not be accessed by the public and will not contain trash and recycling receptacles.

On Site Waste Materials

- The disposal of all waste materials that may be associated with the proposed long-term maintenance of the proposed solar panels shall be disposed of off site in compliance with all applicable federal, state, and local regulations.

***Reference**; Additional information relating to operation and maintenance of specific BMPs can be found in the Rhode Island Stormwater Design and Installation Standards Manual.*
(www.dem.ri.gov/pubs/regs/regs/water/swmanual.pdf)

Estimated Inspections & Maintenance Budget

It is important to be able to budget for the O&M costs associated with the stormwater system. To assist the owner in budgeting, we have developed an estimate of the costs that may be incurred in maintaining the system. The costs have been estimated on a yearly basis.

Infiltration Structure:
For a 25-year finance period, Infiltration Structures cost approximately $1,277.77 per acre of tributary area per year. The site contains approximately 7 acres of area flowing to infiltration basins. This equates to an approximate cost of $8,944 per year to maintain the infiltration ponds.

Based on the costs outlined above, the stormwater system will cost approximately $8,944.00 per year to maintain. This is only an estimate and costs may vary.

These costs are the responsibility of the stormwater system owner. Funding for the costs will be provided by the site owner.

***Reference**; Maintenance costs are based on information provided by Horsely Witten during the January 19, 2011 Stormwater Manual Training.*
(http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/stwater/t4guide/slides/sess210.ppt)

Appendix A – Inspection Schedule & Maintenance Checklists

Grassed Channel or Grassed Swale
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

Notes:

- **Beyond inspection frequency noted in parenthesis, i.e. (quarterly), inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)**
- **All Checklist Maintenance items are MANDATORY.**
- **During inspections, if maintenance items are found not to be applicable, note as N/A in comments**
- **All removed sediments shall be disposed at an approved and permitted location.**
- **All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor**
- **If the surface of the grass channel becomes clogged to the point that standing water is observed on the surface 48 hours after precipitation events, the bottom should be roto-tilled or cultivated to break up any hard-packed sediment, and then reseeded**

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
1. Debris Cleanout (Quarterly)*		
The channel/swale bottom is clear of debris or litter.		
Inflow pipes / inlet areas clear of debris		
Outflow pipes / outlet area clear of debris		
Overflow Weir / outlet area clear of debris		
2. Sedimentation (Quarterly)*		
Obvious trapping of sediment		

Grassed Channel or Grassed Swale
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

When sediment accumulates to a depth of approximately ¼ of the original design depth, it should be removed, and the channel should be reconfigured to its original dimensions		
3. Vegetation (Quarterly)*		
The grass in the channel should be mowed at least 2 times during the growing season		
Dethatching swale bottom and removal of thatching		
4. Embankments (Quarterly)*		
Evidence of erosion		
Slopes stabilized with vegetation, slope protection, riprap, etc		

COMMENTS:

Grassed Channel or Grassed Swale
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

ACTIONS TO BE TAKEN:

Detention / Infiltration Pond
Operation, Maintenance, and Management
Inspection Checklist

Project:	Date:
Location:	Time:
Site Status:	Inspector:

Notes:

- **Beyond inspection frequency noted in parenthesis, i.e. (quarterly), inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)**
- **All Checklist Maintenance items are MANDATORY.**
- **During inspections, if maintenance items are found not to be applicable, note as N/A in comments**
- **All removed sediments shall be disposed at an approved and permitted location.**
- **All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor**
- **Sediment shall be removed from stormwater basins when the sediment volume exceeds 10% of the total basin volume. Sediment shall be disposed of in an acceptable manner at an approved and permitted location.**
- **Infiltration Ponds Only: When infiltration rates decrease below design infiltration rates, remove accumulated surface sediments and rototill pond bottom. Revegetate bottom of infiltration pond as needed**

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
1. Embankment and Emergency Spillway (Annual)		
Vegetation and Ground Cover Adequate		
Embankment Erosion		
Animal Burrows		
Unauthorized Planting		
Cracking, bulging or sliding of dam		
• Upstream face		
• Downstream face		

Detention / Infiltration Pond
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

• At or beyond toe		
• Downstream		
• Upstream		
• Emergency Spillway		
Basin, toe & chimney drains clear and functioning		
Seeps/leaks on downstream face		
Slope protection or riprap failure		
Vertical/horizontal alignment of top of dam "As-Built"		
Emergency Spillway clear of obstructions and debris		
2. Riser and Principal Spillway (Annual)		
Type: Reinforced Concrete___ Corrugated Pipe_____ Masonry_____ Low-flow orifice obstructed		
Low-flow trash rack • Debris removal necessary		
• Corrosion control		
Weir trash rack maintenance • Debris removal necessary		
• Corrosion control		
Excessive Sediment accumulation inside riser		
Concrete/Masonry condition riser and barrels • cracks or displacement		
• Minor spalling (<1")		

Detention / Infiltration Pond
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

• Major spalling (rebars exposed)		
• Joint failures		
• Water tightness		
Metal pipe Condition		
Control Valve • Operational/ Exercised		
• Chained and Locked		
Basin Drain Valve • Operational/ Exercised		
Outfall channels functioning		
3. Dry Basin Areas (Annual)		
Vegetation adequate		
Undesirable vegetative growth		
Undesirable woody vegetation		
Low-flow channels clear of obstructions		
Standing water or wet spots		
Annual mowing of vegetation along the maintenance access roads.		
Annual inspection of vegetation within basin.		
Prune all dead or dying vegetation within the extents of the basin or WVTS.		
Sediment and/or trash accumulation *		

Detention / Infiltration Pond
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

Remove all herbaceous vegetation root stock when overcrowding of the maintenance access to the facility, remove any vegetation that has a negative impact on stormwater flowage through facility, and trim any overgrown vegetation within the basin.		
Replace any/all original vegetation that has died off or has not fully established, as determined at the time of the inspection.		
WVTS vegetation should be reinforced to its original design standards if less than 50% of the original vegetation is established after two years.		
Any invasive vegetation encroaching upon the perimeter of the facility should be pruned or removed if it is prohibiting access to the facility, compromising sight visibility and/or compromising original design vegetation.		
4. Condition of Outfalls (Annual)		
Riprap Failures		
Slope erosion		
Storm drain pipes		
Endwalls/ Headwalls		
Other (specify)		
1. Emergent Vegetation (Annual)		
Annual mowing of vegetation: Annual mowing of the basin setback is only required along maintenance rights-of-way and the embankment. The remaining setback can be managed as rangeland (mowing every other year) or forest		
Vegetation healthy and growing WVTS maintaining 50% surface area coverage of		

Detention / Infiltration Pond
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

emergent plants after the second growing season (If unsatisfactory, reinforcement plantings needed)		
Dominant emergent plants: Survival of desired emergent plant species. Distribution according to planting plan?		
Evidence of invasive species		
Maintenance of adequate water depths for desired emergent plant species		
Harvesting of emergent plantings needed		
Have sediment accumulations reduced pool volume significantly or are plants “choked” with sediment		
Eutrophication level of the WVTS		

Detention / Infiltration Pond
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

COMMENTS:

ACTIONS TO BE TAKEN:

Stone Infiltration Trench
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

Notes:

- **Beyond inspection frequency noted, inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)**
- **All Checklist Maintenance items are MANDATORY.**
- **During inspections, if maintenance items are found not to be applicable, note as N/A in comments**
- **All removed sediments shall be disposed at an approved and permitted location.**
- **All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor**

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
Monthly inspect for trash and debris and remove if present.		
Monthly inspect for erosion and evidence of channelized flows. Erosion and channels must be corrected immediately by re-establishing original grade by raking existing stone or applying new stone as necessary.		
Semi-Annually inspect for excessive sediments and remove sediments if present. If sediment source is observed, eliminate source.		
Every 5 years, remove and wash pea stone layer or replace with new pea stone.		

Stone Infiltration Trench
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

COMMENTS:

ACTIONS TO BE TAKEN:

Infiltration System Operation, Maintenance, and Management Inspection Checklist

Project:

Location:

Site Status:

Date:

Time:

Inspector:

Note: Maintenance items in **bold** text are REQUIRED MAINTENANCE ELEMENTS.

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Annual)*		
The sediment forebay and Trench/chamber or basin surface clear of debris or accumulated sediment.		
Inflow pipes clear of debris		
Overflow spillway clear of debris		
Inlet area clear of debris		
2. Mowing (Semi-Annual)		
Infiltration ponds shall be mowed at least twice per year.		
3. Sediment Traps or Forebays (Annual)*		
Obviously trapping sediment		
Greater than 50% of storage volume remaining. Cleanout sediment when depth of sediment is more than 50% design depth**.**		
Vegetation within sediment forebay to be limited to 18” in height.		
Outlet devices (stand pipes, weirs, etc.) shall be cleaned/repaired when draw down exceeds 36 hours.		

Infiltration System Operation, Maintenance, and Management Inspection Checklist

Project:

Location:

Site Status:

Date:

Time:

Inspector:

4. Dewatering (Annual)*		
Trench/chamber or basin dewaters between storms		
5. Sediment Cleanout of Trench/Chamber or Basin (Annual)*		
No evidence of sedimentation in trench/chamber or basin		
Sedimentation accumulation doesn't yet require cleanout **		
6. Inlets (Annual)*		
Good condition		
No evidence of erosion		
7. Outlet/Overflow Spillway (Annual)*		
Annual inspection that inlet and outlet devices are free of debris		
Monthly cleaning and removal of debris from inlet and outlet structures		
5-year removal of sediment from basin		
Good condition, no need for repair		
No evidence of erosion		
8. Aggregate Repairs (Annual)*		
Annual inspection for damage		

Infiltration System Operation, Maintenance, and Management Inspection Checklist

Project:

Location:

Site Status:

Date:

Time:

Inspector:

Annual inspection for hydrocarbon build-up and removal if detected.		
Annual inspection for sediment accumulation in the facility		
Surface of aggregate clean		
Top layer of stone does not need replacement		
Trench/chamber or basin does not need rehabilitation		
9.0 EMBANKMENT AND EMERGENCY SPILLWAY (ANNUAL)*		
1. Vegetation and Ground Cover Adequate		
2. Embankment Erosion		
3. Animal Burrows		
4. Unauthorized Planting		
5. Cracking, bulging or sliding of dam		
A. Upstream face		
B. Downstream face		
C. At or beyond toe		
C.1 Downstream		
C.2 Upstream		

Infiltration System Operation, Maintenance, and Management Inspection Checklist

Project:

Location:

Site Status:

Date:

Time:

Inspector:

D. Emergency Spillway		
6. Basin, toe & chimney drains clear and functioning		
7. Seeps/leaks on downstream face		
8. Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam "As-Built"		
10. Emergency Spillway clear of obstructions and debris		

***- Inspections shall be conducted annually and after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7").**

****- If sedimentation or organic matter build-up limits infiltration capabilities of infiltration basins to below the design rate, the top 6 inches shall be removed and the surface roto-tilled to a depth of 12 inches. The basin bottom shall be restored according to the original design specifications.**

COMMENTS:

_____

_____

_____

_____

_____

_____

Infiltration System Operation, Maintenance, and Management Inspection Checklist

Project:

Location:

Site Status:

Date:

Time:

Inspector:

_____

_____

_____

_____

ACTIONS TO BE TAKEN:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Appendix B – RIDEM Sample Stormwater Facility Maintenance Agreement

****A site specific Stormwater Facility Maintenance Agreement between the Owner and RIDEM shall be developed prior to construction****

Sample Stormwater Facility Maintenance Agreement

THIS AGREEMENT, made and entered into this ___ day of _____, 20___, by and between (Insert Full Name of Owner) _____ hereinafter called the "Landowner", and the [Local Jurisdiction], hereinafter called the "[Town/City]". WITNESSETH, that WHEREAS, the Landowner is the owner of certain real property described as (Tax Map/Parcel Identification Number) _____ as recorded by deed in the land records of [Local Jurisdiction] Deed Book _____ Page _____, hereinafter called the "Property".

WHEREAS, the Landowner is proceeding to build on and develop the property; and WHEREAS, the Site Plan/Subdivision Plan known as _____, (Name of Plan/Development) hereinafter called the "Plan", which is expressly made a part hereof, as approved or to be approved by the [Town/City], provides for detention of stormwater within the confines of the property; and

WHEREAS, the [Town/City] and the Landowner, its successors and assigns, including any homeowners association, agree that the health, safety, and welfare of the residents of [Local Jurisdiction] require that on-site stormwater management facilities be constructed and maintained on the Property; and

WHEREAS, the [Town/City] requires that on-site stormwater management facilities as shown on the Plan be constructed and adequately maintained by the Landowner, its successors and assigns, including any homeowners association.

NOW, THEREFORE, in consideration of the foregoing premises, the mutual covenants contained herein, and the following terms and conditions, the parties hereto agree as follows:

1. The on-site stormwater management facilities shall be constructed by the Landowner, its successors and assigns, in accordance with the plans and specifications identified in the Plan.
2. The Landowner, its successors and assigns, including any homeowners association, shall adequately maintain the stormwater management facilities in accordance with the required Operation and Maintenance Plan. This includes all pipes, channels or other conveyances built to convey stormwater to the facility, as well as all structures, improvements, and vegetation provided to control the quantity and quality of the stormwater. Adequate maintenance is herein defined as good working condition so that these facilities are performing their design functions. The Stormwater Best Management Practices Operation, Maintenance and Management Checklists are to be used to establish what good working condition is acceptable to the [Town/City].

3. The Landowner, its successors and assigns, shall inspect the stormwater management facility and submit an inspection report annually. The purpose of the inspection is to assure safe and proper functioning of the facilities. The inspection shall cover the entire facilities, berms, outlet structure, basin areas, access roads, etc. Deficiencies shall be noted in the inspection report.
4. The Landowner, its successors and assigns, hereby grant permission to the [Town/City], its authorized agents and employees, to enter upon the Property and to inspect the stormwater management facilities whenever the [Town/City] deems necessary. The purpose of inspection is to follow-up on reported deficiencies and/or to respond to citizen complaints. The [Town/City] shall provide the Landowner, its successors and assigns, copies of the inspection findings and a directive to commence with the repairs if necessary.
5. In the event the Landowner, its successors and assigns, fails to maintain the stormwater management facilities in good working condition acceptable to the [Town/City], the [Town/City] may enter upon the Property and take whatever steps necessary to correct deficiencies identified in the inspection report and to charge the costs of such repairs to the Landowner, its successors and assigns. This provision shall not be construed to allow the [Town/City] to erect any structure of permanent nature on the land of the Landowner outside of the easement for the stormwater management facilities. It is expressly understood and agreed that the [Town/City] is under no obligation to routinely maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the [Town/City].
6. The Landowner, its successors and assigns, will perform the work necessary to keep these facilities in good working order as appropriate. In the event a maintenance schedule for the stormwater management facilities (including sediment removal) is outlined on the approved plans, the schedule will be followed.
7. In the event the [Town/City] pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner, its successors and assigns, shall reimburse the [Town/City] upon demand, within thirty (30) days of receipt thereof for all actual costs incurred by the [Town/City] hereunder.
8. This Agreement imposes no liability of any kind whatsoever on the [Town/City] and the Landowner agrees to hold the [Town/City] harmless from any liability in the event the stormwater management facilities fail to operate properly.
9. This Agreement shall be recorded among the land records of [Local Jurisdiction] and shall constitute a covenant running with the land, and shall be binding on the Landowner, its administrators, executors, assigns, heirs and any other successors in interests, including any homeowners association.

WITNESS the following signatures and seals:

_____
Company/Corporation/Partnership Name (Seal)

By: _____

_____
(Type Name and Title)

The foregoing Agreement was acknowledged before me this ____ day of _____, 20___, by _____.

_____
NOTARY PUBLIC
My Commission Expires: _____

By: _____

_____
(Type Name and Title)

The foregoing Agreement was acknowledged before me this ____ day of _____, 20___, by _____.

_____
NOTARY PUBLIC
My Commission Expires: _____

Approved as to Form:

_____ _____
[Town/City] Attorney Date

DiPrete Engineering

Stormwater Management Report

Grand Banks Solar

Located in North Smithfield, RI

Applicant: Econox Renewables, Inc.

09-20-2019

Page Intentionally Left Blank

Table of Contents

Page Intentionally Left Blank

Executive Summary

On behalf of the Client, we are submitting drainage calculations for the proposed development at Greenville Road in North Smithfield, RI. The site is located on Assessors' Plat 12 Lots 156 and 156-A. The site exists today as almost entirely wooded with gravel roads, cart paths, and trails associated with utility access to an off-site electric overhead transmission line R.O.W. The client proposes to construct a 1MW DC solar photovoltaic system with a permeable access drive to Greenville Road with a total disturbance of approximately 8.04+/- acres, out of total lot area of 30.52+/- acres. The proposed solar photovoltaic system will provide a sustainable energy source.

The post development stormwater will be treated for water quality using Best Management Practices (BMPs). The Site has been designed to meet the Rhode Island Stormwater Design and Installation Standards Manual (RISDISM). The ground cover underneath and surrounding the panels are proposed as grass.

To mitigate post development flows on site, a series of grass swales are utilized to convey runoff to stone infiltration trenches and infiltration ponds. The infiltration systems are designed to control runoff for the 1 through 100-year storm events. Existing and proposed drainage patterns will remain relatively the same. The minimal grading shown on the plan is to meet design parameters for the stone infiltration trenches and the infiltration ponds.

This report details how the site will reduce flows to the maximum extent practicable, with no increase in stormwater runoff flow for the 10 year and the 100 year storm events, and a minimal increase in the WQ and 1 year storm events due to several uncontrolled portions of the site, which is bisected by a large utility electric overhead transmission line R.O.W. offsite.

Pre-Development Conditions versus Post Development Conditions for each watershed are summarized below:

Subwatershed (design point)	1.2" Peak Flow		1-yr Peak Flow		10-yr Peak Flow		25-yr Peak Flow		100-yr Peak Flow	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
DL-1:	0.59	0.66	0.86	1.02	19.64	19.30	37.06	36.10	83.42	80.22
DL-2:	0.00	0.00	0.12	0.12	1.51	1.06	2.67	1.77	5.62	3.54
Totals:	0.59	0.66	0.98	1.14	21.15	20.36	39.73	37.87	89.04	83.76

All flows in cubic feet per second (cfs)

Page Intentionally Left Blank

APPENDIX A: STORMWATER MANAGEMENT CHECKLIST AND LID PLANNING REPORT

PROJECT NAME: Grand Banks Solar	(RIDEM USE ONLY)
CONTACT FOR STORMWATER DESIGN QUESTIONS: David Russo, P.E.	
PHONE NUMBER: (401) 943-1000	
EMAIL ADDRESS: drusso@diprete-eng.com	
BRIEF PROJECT DESCRIPTION: 7 acre +/- enclosed solar installation with associated clearing, driveway and stormwater management.	DATE RECEIVED

STORMWATER MANAGEMENT PLAN ELEMENTS

APPENDIX A: STORMWATER MANAGEMENT CHECKLIST	STORMWATER ANALYSIS AND DRAINAGE REPORT	SOIL EROSION AND SEDIMENT CONTROL PLAN	OPERATIONS AND MAINTENANCE PLAN
PART 1: PROJECT AND SITE INFORMATION **MINIMUM STANDARDS:** 6. REDEVELOPMENT 8. LUHHPL IDENTIFICATION **PART 2.** **MINIMUM STANDARD:** 1. LID SITE PLANNING **PART 3.** SUMMARY OF REMAINING STANDARDS **PART 4.** SUBWATERSHED MAPPING SITE PLAN DETAILS	ADDRESSES MINIMUM STANDARDS: 2. GROUNDWATER RECHARGE 3. WATER QUALITY VOLUME 4. CONVEYANCE & NATURAL CHANNEL PROTECTION 5. OVERBANK AND FLOOD PROTECTION 9. ILLICIT DISCHARGE DETECTION AND ELIM.	ADDRESSES MINIMUM STANDARDS: 7. POLLUTION PREVENTION DURING CONSTRUCTION 10. CONSTRUCTION EROSION AND SEDIMENTATION CONTROL	ADDRESSES MINIMUM STANDARDS: 7. POLLUTION PREVENTION AFTER CONSTRUCTION 11. OPERATIONS AND MAINTENANCE

Note: **All** stormwater construction projects **must submit** a Stormwater Management Plan (SMP). However, not every element listed below (see the Stormwater Management Plan Table) is required per the RISDISM and the RIPDES Construction General Permit (CGP). This checklist will help you identify the elements of the stormwater plan you are required to submit with your permit application.

PART 1. PROJECT AND SITE INFORMATION

PROJECT TYPE (Check all that apply)

☐ RESIDENTIAL	☐ COMMERCIAL	☐ FEDERAL	☐ RETROFIT	☐ RESTORATION
☐ ROAD	X UTILITY	☐ FILL	☐ DREDGE	☐ MINE

☐ OTHER: (please explain)	
SITE INFORMATION	
X VICINITY MAP (**See Sheets 1 and 2 of Plan Set**)	
X EXISTING ZONING (**Zoned: Rural Residential**)	
DISCHARGE LOCATION: The WQv discharges to: (you may choose more than one answer if there are several discharge points on the project) (Guidance to identify receiving waters)	
X GROUNDWATER	GROUNDWATER ☐ GAA X GA ☐ GB
X SURFACE WATER	X ISOLATED WETLAND X NAMED WATERBODY ☐ UNNAMED WATERBODY CONNECTED TO NAMED WATERBDY
☐ MS4	☐ RIDOT ☐ RIDOT ALTERATION PERMIT IS APPROVED ☐ TOWN ☐ OTHER:_____
RECEIVING WATER INFORMATION: (check all that apply and *repeat* this row for each waterbody)	
THE WATER QUALITY VOLUME DISCHARGES TO: X N/A (discharges to: CSO, Disconnected wetland or Groundwater) WATERBODY NAME: Todd's Pond WATERBODY ID: **RI0001003L-03** IMPAIRMENTS: N/A N/A TMDL FOR: _____ N/A CONTRIBUTES TO A PRIORITY OUTFALL LISTED IN THE TMDL	☐ IMPAIRED (303(d) LIST) ☐ SRPW ☐ COLDWATER ☐ WARMWATER X UNASSESSED ☐ 4TH ORDER STREAM X POND OF 50 ACRES OR MORE ☐ KNOWN HISTORY OF REPETITIVE FLOODING (i.e. Pocassett River) ☐ CONTRIBUTES STORMWATER TO A PUBLIC BEACH ☐ CONTRIBUTES TO SHELLFISHING GROUNDS
PROJECT HISTORY:	
N/A PRE-APPLICATION MEETING DATE: _____	☐ MINUTES ARE ATTACHED
N/A RIDEM GRANT FUNDING INVOLVED	GRANT SOURCE:_____
N/A TOWN MASTER PLAN APPROVAL DATE: **Pending**	☐ MINUTES ARE ATTACHED
N/A SUBDIVISION SUITABILITY REQUIRED	APPROVAL #: _____
N/A PREVIOUS ENFORCEMENT ACTION HAS BEEN TAKEN ON THIS	ENFORCEMENT # _____

PROPERTY	
FRESHWATER WETLANDS JURISDICTION: X **FEMA FLOODPLAIN FIRMETTE HAS BEEN REVIEWED** N/A CALCULATIONS ARE PROVIDED FOR CUT/FILL PROPOSED ANYWHERE WITHIN THE 100-YR FLOODPLAIN N/A RESTRICTIONS OR MODIFICATINS ARE PROPOSED TO THE FLOWPATH OR VELOCITIES IN A FLOODWAY. N/A FLOODPLAIN STORAGE CAPACITY IS IMPACTED	AMOUNT OF FILL: ____**N/A**_____(CY) AMOUNT OF CUT: ____**N/A**_____(CY)
CRMC JURISDICTION N/A THIS PROJECT REQUIRES A CRMC PERMIT N/A THE PROPERTY IS SUBJECT TO A SPECIAL AREA MANAGEMENT PLAN N/A SEA LEVEL RISE MITIGATION WAS DESIGNED INTO THIS PROJECT	
MINUMUM STANDARD 8: LUHHPL IDENTIFICATION (N/A)	
OFFICE OF WASTE MANAGEMENT (OWM) N/A THERE ARE KNOWN OR SUSPECTED RELEASES OF HAZARDOUS MATERIAL AT THE SITE N/A THIS SITE IS ON THE LIST OF CERCLA and STATE SITES in RI	OWM CONTACT: _____ ☐ SITE ID#:_____
STORMWATER INDUSTRIAL PERMITTING N/A THERE ARE EXISTING OR PROPOSED ACTIVITIES THAT ARE CONSIDERED LAND USES WITH HIGHER POTENTIAL POLLUTANT LOADS (LUHPPLS) (see Table 3-2) N/A 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. N/A ADDITIONAL STORMWATER TREATMENT IS REQUIRED BY THE MSGP	ACTIVITIES: _____ SECTOR: _____ MSGP PERMIT #: _____ EXPLAIN ADDITIONAL TREATMENT: ____ _____

MINIMUM STANDARD 6. REDEVELOPMENT (*Required calculation for all construction projects)

X PRE-CONSTRUCTION IMPERVIOUS AREA		TOTAL IMPERVIOUS AREA **(TIA)** = 0.00 AC.
X CALCULATE THE SITE SIZE SITE SIZE **(SS)** = **(TSA)** – **(JW)** – **(CL)** = 28.38+/- AC		TOTAL SITE AREA **(TSA)** = 30.52+/- AC. JURISDICTIONAL WETLANDS **(JW):** 2.14 AC CONSERVATION LAND **(CL)** = 0 AC.
(TIA)/(SS) = 0	**(TIA)/(SS)** IS **>** 0.4) ☐ YES (REDEVELOPMENT) (address minimum standards 3 and 7-11)	**(TIA)/(SS)** IS **<** 0.4) X NO (NEW DEVELOPMENT) (all standards must be addressed)

PART 2: MINIMUM STANDARD 1

LOW IMPACT DEVELOPMENT ASSESSMENT

(**NOT REQUIRED FOR REDEVELOPMENT OR RETROFITS**) – You may delete this section if it is not required

State Law requires the use of low impact-design techniques as the primary method of stormwater control to the maximum extent practicable. LID is intended to maintain or replicate predevelopment hydrology through the use of site planning, source control, and small-scale practices integrated throughout the site to prevent, infiltrate, and manage runoff as close to its source as possible. Non-structural LID techniques to Avoid and Reduce the stormwater impacts of development shall be explored as a first priority before LID structural practices are planned to Manage stormwater as part of a comprehensive LID approach.

The applicant must document specific LID Site Planning and Design Strategies applied for the project (see Manual Chapter Four and the *RI Low Impact Development (LID) Site Planning and Design Guidance Manual* for more details regarding each strategy). This checklist is designed to guide the required documentation of the site planning process, and to ensure that the proposed project is consistent with and taking advantage of LID strategies required or allowed in the municipality where the project is proposed. Included within this checklist are specific LID techniques (and practices) taken from the *RI Low Impact Development (LID) Site Planning and Design Guidance Manual* that a municipality may require or allow.

If a particular strategy is not used or not applicable, a written description of why a certain method is not used or applicable at the site must be provided. Appropriate answers may include such statements as:

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

A) PRESERVATION OF UNDISTURBED AREAS, BUFFERS AND FLOODPLAINS X Sensitive resource areas and site constraints are identified (required) X Local development regulations have been reviewed (required) X All vegetated buffers and coastal and freshwater wetlands have been designed to be protected during and after construction ☐ Conservation Development or other site design technique to protect open space and pre-development hydrology; [NOTE: If this technique has been used, check box and skip to **c**.] X Maintain as much natural vegetation and pre-development hydrology as possible	***IF NOT IMPLEMENTED - EXPLAIN HERE***
B) LOCATE DEVELOPMENT IN LESS SENSITIVE AREAS AND WORK WITH THE NATURAL LANDSCAPE CONDITIONS, HYDROLOGY, AND SOILS X Building envelopes/ development sites directed away from wetlands/waterbodies X Development and stormwater systems are located in areas with greatest infiltration capacity (e.g., soil groups A and B. ☐ Plans show measures to prevent soil compaction in areas designated as Qualified Pervious Areas (QPA's) X Building envelopes/ development sites are directed away from floodplains X Site designed to locate buildings, roadways and parking to avoid impacts to surface water features. X Building envelopes/ development sites directed away from steep slopes (≥15%) ☐ Other:	***IF NOT IMPLEMENTED - EXPLAIN HERE*** Stormwater systems proposed within B soils onsite
C) MINIMIZE CLEARING AND GRADING X Site clearing restricted to <u>minimum area needed</u> for building footprints, development activities, construction access and safety. X Site designed to locate buildings, roadways and parking to minimize grading (cut and fill quantities) ☐ Protection for stands of trees and individual trees and their root zones to be preserved is specified and such protection extends at least to the drip line ☐ Notes on plan specify that public trees that are removed or damaged during construction shall be replaced with equivalent.	***IF NOT IMPLEMENTED - EXPLAIN HERE*** Solar installation will result in minimal earthwork. Trees are cleared only to the extent required for sufficient sun exposure for the panels.

D) REDUCE IMPERVIOUS COVER ☐ Reduce roadway widths (≤22 feet for ADT ≤ 400; ≤ 26 feet for ADT 400-2,000) X Reduce 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) ☐ Reduced building footprint: Explain approach ☐ Reduce sidewalk area (≤ 4 ft. wide; one side of the street; unpaved path; pervious surface) ☐ Reduce cul-de-sacs (radius < 45 ft; vegetated island; alternative turn-around) ☐ Reduced parking lot area: Explain approach X Pervious surfaces (driveways, sidewalks, parking areas/overflow parking area) X Maximum Impervious Surface (project meets or is less than the maximum specified by the Zoning Ordinance ☐ Other (describe):	***IF NOT IMPLEMENTED - EXPLAIN HERE*** No roadways are proposed as part of this development. A pervious driveway with approximately 20' width is proposed, minimum needed to accommodate maintenance and emergency vehicles.
E) DISCONNECT IMPERVIOUS AREA ☐ Impervious surfaces have been disconnected and runoff has been diverted to QPAs to the maximum extent possible ☐ Residential street edges allow side-of-the-road drainage into vegetated open swales ☐ Parking lot landscaping breaks up impervious expanse AND accepts runoff ☐ Other:	***IF NOT IMPLEMENTED - EXPLAIN HERE*** No impervious area.
F) MITIGATE RUNOFF AT THE POINT OF GENERATION ☐ Small-scale BMPs have been designated to treat runoff as close as possible to the source	***IF NOT IMPLEMENTED - EXPLAIN HERE***
G) PROVIDE LOW-MAINTENANCE NATIVE VEGETATION ☐ Low-maintenance landscaping is proposed using native species and cultivars ☐ Plantings of native trees and shrubs in areas previously cleared of native vegetation are shown on the site plan ☐ Lawn areas have been limited and/or minimized and yards have been kept undisturbed to the maximum extent on residential lots	***IF NOT IMPLEMENTED - EXPLAIN HERE*** No lawn areas proposed, maintenance of grassed areas.
H) RESTORE STREAMS/WETLANDS ☐ Historic drainage patterns have been restored by removing closed drainage systems, daylighting buried streams, and/or restoring degraded stream channels and/or wetlands. ☐ Removal of invasive species ☐ Other	***IF NOT IMPLEMENTED - EXPLAIN HERE*** Not applicable.

PART 3: SUMMARY OF REMAINING STANDARDS

Minimum Standard 2: Groundwater Recharge

✓ YES ☐ NO The project has been designed to meet the groundwater recharge standard.

If No, please explain the justification for groundwater recharge criterion waiver (i.e. threat of groundwater contamination, or physical limitation), if applicable (see Section 3.3.2);

Please describe your waiver request

The site has no new impervious area

☐ YES ✓ NO Is this site listed as a CERCLA or contaminated site?, if yes?

☐ YES ☐ NO Has any part of the site been approved for infiltration by the Office of Waste Management? (see Subsurface Contamination Guidance)

☐ YES ✓ NO Is there an ELUR on the property?

TABLE 2-1: Summary of Recharge (see Manual section 3.3.2)

Subwatershed	Total Re_v Required (Acre-ft)	LID Stormwater Credits (Manual see Section 4.6.1)		Recharge Required by Remaining BMPs (acre-ft)	Recharge Provided by BMPs (acre-ft)
		Impervious volume directed to a QPA (acre-ft)	Recharge Credit Applied (acre-ft)		
DL-1: Greenville Road	0	0	0	0	0
DL-2: Wetland	0	0	0	0	0

**Note: Only BMPs listed in Manual Table 3-5, List of BMPs Acceptable for Recharge may be used to meet the recharge requirement.*

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

Stormwater Management Report – Section 3.2 and $Re_v=1"*F*I/12$

Minimum Standard 3: Water Quality

✓ YES ☐ NO Does this project meet or exceed the required water quality volume WQv (see section 3.3.3)?

☐ YES ✓ NO Is the proposed final impervious cover is greater than 20% of the disturbed area (see section 3.3.3)?

☐ If yes, the Spit Pervious/Impervious method in Hydro-Cad was used to calculate WQv, or

☐ If yes, TR-55 or TR-20 was used to calculate WQv, and

☒ If no, the project meets the minimum WQv of 0.2 watershed inches over the entire disturbed area.

✓ YES ☐ NO Does this project meet or exceed the ability to treat required water quality flow WQf (see section 3.3.3.2)

☐ YES ✓ NO Is there 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.

☐ RISDISM section H.3 Pollutant Loading Analysis

☐ The Water Quality Guidance Document (Water Quality Goals and Pollutant Loading Analysis Guidance for Discharges to Impaired Waters)

☐ YES ✓ NO BMPs are proposed that are on the approved technology list if yes, please provide all of the required worksheets from the manufacturer.

☐ YES ✓ NO 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 Manual section 3.3.3)

Subwatershed	Total WQ_v Required (Acre-ft)	LID Stormwater Credits (Manual see Section 4.6.1)		Water Quality Treatment Remaining (acre-ft)	Water Quality Provided by BMPs (acre-ft)
		Impervious volume directed to a QPA (acre-ft)	Water Quality Credit Applied (acre-ft)		
DL-1: Greenville Road	0	0	0	0	0
DL-2: Wetland	0	0	0	0	0

**Note: Only BMPs listed in Chapter 5 of the Manual or the Approved Technologies List of BMPs is Acceptable for Water Quality treatment.*

***Water quality volumes have been calculated using 0.2" of runoff per disturbed watershed area. Because there is so little impervious onsite (<1%) when running the water quality storm by calculating separate pervious/impervious runoff (SBUH weighting) the numbers are extremely low and some of the runoff will not reach the BMPs from unconnected impervious area.*

✓ YES ☐ NO This project has met the setback requirements for each BMP. If no, please explain

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

NA – WQv Storm not included in report due to zero runoff leaving or entering the BMPs during this event.

Minimum Standard 4: Conveyance and Natural Channel Protection (3.3.4)

✓ YES ☐ NO Is this standard waived? If yes, please check indicate one or more of the reasons below:

☐ The project directs discharge to a large river (i.e., 4th-order stream or larger. See Appendix I for State-wide list and map of stream order), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters.

☒ The project directs is a small facility with impervious cover of less than or equal to 1 acre.

☒ The project has a post-development peak discharge rate from the facility that is less than 2 cfs for the 1-year, 24-hour Type III design storm event (prior to any attenuation). (**NOTE:** *LID design strategies can greatly reduce the peak discharge rate)*

✓ YES ☐ NO Conveyance and natural channel protection for the site have been met.

The BMPs have been designed to fully infiltrate the 1-year storm event.

TABLE 4-1: Summary of Channel Protection Volumes (see Manual section 3.3.4)

Drainage Point	Receiving Water Body Name	Coldwater Fishery? Y/N	Total CPv Required (acre-ft)	Total CPv Provided (acre-ft)	Release Rate Modeled in the 1-yr storm (cfs)
DL-1: Greenville Road	Todd's Pond	NA	NA	1-year storm infiltrated	NA

✓ YES ☐ NO The CPv is released at roughly a uniform rate over a 24-hour duration (see example sizing calculations in Appendix D of the RISDISM).

☐ YES ✓ NO Do additional design restrictions apply resulting from any discharge to cold water fisheries;

If yes, please indicate restrictions and solutions

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

NA – small facilities with impervious cover less than or equal to 1 acre.

Minimum Standard 5: Overbank Flood Protection (3.3.5) (and other potential high flows)

☐ YES ✓ NO Is this standard waived? If yes, please check indicate one or more of the reasons below:

☐ The project directs discharge to a large river (i.e., 4th-order stream or larger. See Appendix I for State-wide list and map of stream order), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters.

☐ A Downstream Analysis (see section 3.3.6), indicates that peak discharge control would not be beneficial or would exacerbate peak flows in a downstream tributary of a particular site (i.e. through coincident peaks)

☐ YES ✓ NO Does the project flow to an MS4 system? If yes, indicate below:

☐ RIDOT ☐ Other _____

(**NOTE**: *your 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 your strategy to comply with RIDEM and the MS4.

_____
_____
_____

☑ YES ☐ NO Did you use a model for your analysis, if yes, indicate below

☐ TR-55 ☐ TR-20 ☑ Hydrocad ☐ Other _____

☑ YES ☐ NO Does the hydrologic model demonstrate that flows from the 100-year event will be safely conveyed to a control practice designed to manage the 100-year event? If no, please explain

_____
_____

☑ YES ☐ NO Do off-site areas contribute to the subwatersheds and design points? If yes,

☑ YES ☐ NO Are the areas modeled as "present condition" for both pre- and post-development analysis

☑ YES ☐ NO Are the off-site areas are shown on the subwatershed maps

☑ YES ☐ NO Does the hydrologic model confirm safe passage of the 100-year flow through the site for off-site runoff;

☐ YES ☑ NO Is a Downstream Analysis required? (see Manual Section 3.3.6):

Please calculate the following:

Area of disturbance within the sub-watershed (areas) 8.6

Impervious cover (%) <1%

☐ YES ☑ NO Is a dam breach analysis required (earthen embankements over six (6) feet in height, or a capacity of 15 acre-feet or more, and contributes to a significant or high hazard dam?

☑ YES ☐ NO Does this project meet the overbank flood protection standard?

Subwatershed (design point)	1.2" Peak Flow		1-yr Peak Flow		10-yr Peak Flow		25-yr Peak Flow		100-yr Peak Flow	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
DL-1:	0.59	0.66	0.86	1.02	19.64	19.30	37.06	36.10	83.42	80.22
DL-2:	0.00	0.00	0.12	0.12	1.51	1.06	2.67	1.77	5.62	3.54
Totals:	0.59	0.66	0.98	1.14	21.15	20.36	39.73	37.87	89.04	83.76

All flows in cubic feet per second (cfs)

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

✓ Existing condition analysis for each subwatershed, including (curve numbers, times of concentration, runoff rates, volumes, and water surface elevations showing methodologies used and supporting calculations);

Section 3.5.3 and Appendix 3.5.4 of the Stormwater Management Report

✓ Proposed condition 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);

Section 3.5.3 and Appendix 3.5.4 of the Stormwater Management Report

✓ Final sizing calculations for structural stormwater BMPs including, contributing drainage area, storage, and outlet configuration;

Appendix 3.5.4 of the Stormwater Management Report

✓ Stage-storage, inflow and outflow hydrographs for storage facilities (e.g., detention, retention, or infiltration facilities);

Appendix 3.5.4 of the Stormwater Management Report

Table 5-2 Summary of Best Management Practices

DP No.	BMP ID.	BMP Type (i.e. bioretention or tree filter)	BMP Functions (acre-ft)				Overbank Flood Reduction	Internal Bypass	Horizontal Setback Criteria Met	
			Pre-treatment (volume)	Re_v	WQ_v	CP_v *1-yr STORM INFILTRATED	Y/N	Y/N	Distance (ft)	From constraint (i.e. private well or foundation)
DL-1	200ET	Stone Infiltration Trench		X	X		Y	N	277	Wetland
	200WP	Infiltration Pond				X	Y	N	435	Wetland
	300T	Stone Infiltration Trench		X	X		Y	N	228	Wetland
DL-2	400P	Infiltration Pond				X	Y	N	115	Wetland

Table 5-3 Summary of Soils to evaluate each BMP

DP No.	BMP ID.	BMP Type (i.e. bioretention or tree filter)	Soils Analysis for Each BMP						
			Primary Test Pit ID #	Secondary Test Pit ID #	Top of Filter Elevation (ft)	SHWT Elevation (ft)	Separation Distance (ft)	Hydrologic Soil Group A,B,C or D	Exfiltration Rate Applied (in/hr)
DL-1	200ET	Stone Infiltration Trench	TH-4	TH-3	441.0	436.0	2.0	B	1.02
	200WP	Infiltration Pond	TH-4	-	431.0	425.0	4.0	B	1.02
	300T	Stone Infiltration Trench	TH-1	-	436.0	431.0	3.0	B	1.02
DL-2	400P	Infiltration Pond	TH-5	TH-3	442.0	437.0	2.0	B	1.02

Minimum Standard 7: (questions are now asked in Minimum Standard 10 and 11)

Minimum Standard 8: Land Uses with Higher Potential Pollutant Loads (LUHPPLs)

☐ YES ✓ NO Are there any existing activities or land uses proposed that would be considered LUHPPLs (see Manual Table 3-2)? If yes, please describe. If no, you may continue on to Minimum Standard 9:

_____

_____

☐ YES ✓ NO Are these activities already covered under an MSGP? If, no please explain if you have applied for an MSGP, or intend to do so?

_____

_____

☐ YES ✓ NO ☐ List the specific BMPs that are proposed for this project that receive stormwater from LUHPPL drainage areas. These BMP types must be listed in Manual Table 3-3, "Acceptable BMPs for Use at LUHPPLs";

Please list BMPs _____

☐ Additional BMPs, or additional pretreatment BMP's if any, that meet RIPDES MSGP requirements;

Please list BMPs _____

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

_____

Minimum Standard 9: Illicit Discharges

✓ YES ☐ NO Have you checked for illicit discharges?

☐ YES ✓ NO Have any been found and/or corrected? If yes, please identify

_____

✓ YES ☐ NO Does your report explain preventative measures that keep non-stormwater discharges out of the Waters of the State (during and after construction)?

Minimum Standard 10 Soil Erosion and Sediment Control

✓ YES ☐ NO Have you included a Soil Erosion and Sediment Control Plan Set and/or Complete Construction Plan Set?

✓ YES ☐ NO Did you provide a separately bound document based upon the SESC Template? If yes, proceed to Minimum Standard 11 (the following items can be assumed to be addressed). If no, include a document with your submittal that addresses the following:

Elements of a SESC Plan:

☐ Soil Erosion and Sediment Control Plan project narrative including a description of how the fifteen (15) Performance Criteria have been met:

☐ Provide Natural Buffers and Maintain Existing Vegetation;

☐ Minimize Area of Disturbance;

☐ Minimize the Disturbance of Steep Slopes;
☐ Preserve Topsoil;
☐ Stabilize Soils;
☐ Protect Storm Drain Inlets;
☐ Protect Storm Drain Outlets;
☐ Establish Temporary Controls for the Protection of Post-Construction Stormwater Control Measures;
☐ Establish Perimeter Controls and Sediment Barriers;
☐ Divert or Manage Run-On from Up-Gradient Areas;
☐ Properly Design Constructed Stormwater Conveyance Channels;
☐ Retain Sediment On-Site;
☐ Control Temporary Increases in Stormwater Velocity, Volume, and Peak Flows;
☐ Apply construction Activity Pollution Prevention Control Measures;
☐ Install, Inspect, and Maintain Control Measures and Take Corrective Actions.

☐ Qualified SESC plan preparer's information and certification;
☐ Operator's information and certification; if not known at the time of application the operator must certify the SESC Plan upon selection and prior to initiating site activities;
☐ Description of control measures such as temporary sediment trapping and conveyance practices, including design calculations and supporting documentation, as required.

Minimum Standard 7&11: Stormwater Management System Operation, Maintenance and Pollution Prevention Plan (See section 3.2.11 and Appendices G and E for guidance)

✓ YES ☐ NO Have you minimized all sources of pollutant contact with stormwater runoff, to the maximum extent practicable?

✓ YES ☐ NO Have you provided a separately bound **Operations, Maintenance and Pollution Prevention Manual** for the site and for all of the BMPs.?

The (O&M and PP Plan Contains):

✓ YES ☐ NO Contact name, address, and phone number of the responsible party for maintenance;

✓ YES ☐ NO 8.5" x 11" map indicating the location of all the proposed stormwater BMPs that will require maintenance;

✓ YES ☐ NO Description of routine and non-routine maintenance tasks and their frequency for required elements for each BMP;

✓ YES ☐ NO A description and delineation of public safety features;

✓ YES ☐ NO An estimated operations and maintenance budget;

✓ YES ☐ NO Minimum vegetative cover requirements;

✓ YES ☐ NO Access and safety for maintenance?

✓ YES ☐ NO Lawn, Garden and Landscape Management meet the requirements of section G.7? If not, why not?

_____

_____

✓ YES ☐ NO Is the property owner or homeowner's association is responsible for the stormwater maintenance of all BMP's?

If no, you must provide a legally binding and enforceable maintenance agreement (see Appendix E-page 26) that identifies the entity that will be responsible for maintenance of the stormwater. Please indicate

where this agreement can be found in your report:_____

☐ YES ☑ NO Do you anticipate that you will need legal agreements related to the stormwater structures? (e.g. off-site easements, deed restrictions, and covenants).
If yes, have you obtained them? Or please explain your plan to obtain them:
_____
_____

☐ YES ☑ NO Is stormwater being directed from public areas to private property? If yes, *(***NOTE***: this is not allowed unless there is a funding mechanism in place to provide the finances for the long-term maintenance of the BMP and drainage unless there is a funding mechanism is demonstrated that can guarantee the long-term maintenance of a stormwater BMP by an individual homeowner*)
_____
_____

Pollution Prevention Section Contains:

☐ YES ☑ NO Designated snow stockpile locations?

☐ YES ☑ NO Trash racks to prevent floatables, trash and debris from discharging to waters of the state?

☐ YES ☑ NO Asphalt only based sealants?

☐ YES ☑ NO Pet waste stations? (**NOTE:** *if a receiving water has a bacterial impairment and the project involves housing units, this could be an important part your pollution prevention plan*)

☐ YES ☑ NO Regular sweeping? Please describe _____

☐ YES ☑ NO Deicing specifications in accordance with Appendix G of the Manual. (**NOTE***: if the groundwater is GAA or this area contributes to a drinking water supply, this could be an important part of your pollution prevention plan (see Appendix G):*
_____

☑ YES ☐ NO A prohibition of phosphate-based fertilizers? (**NOTE**: *if the site discharges to a phosphorus impaired waterbody, this could be an important part of your pollution prevention plan*)?

PART 3: SUBWATERSHED MAPPING AND SITE PLAN DETAILS

Existing and Proposed Subwatershed Mapping (REQUIRED)

☒ Existing and proposed drainage area delineations

- ✓ Locations, cross sections, and profiles of all streams and drainage swales and their method of stabilization;
- ✓ Drainage flow paths mapped according to the DEM *Guidance for Preparation of Drainage Area Maps* (included in Appendix K).
- ✓ Complete drainage area boundaries; include off-site areas in both mapping and analyses, as applicable;
- ✓ Logs of borings and/or test pit investigations along with supporting soils/geotechnical report.

☒ Mapped seasonal high-water table,

☒ Mapped locations of the site-specific borings and/or test pits and soils information from the test pits at the locations of the BMPs

☒ Mapped locations of the BMPs with the BMPs consistently identified on the Site Construction Plans

☐ Mapping bedrock within 3' of any BMP not applicable

✓ YES ☐ NO Soils were logged by a:

✓ DEM-licensed Class IV soil evaluator Name: Christian Sutter

☐ RI-registered PE. Name; _____

Subwatershed Summary *(add or subtract rows as necessary)*				
Subwatershed (acres to each design point)	**First Receiving Water ID or MS4**	**Area Disturbed (acres)**	**Existing Impervious (acres)**	**Proposed Impervious (acres)**
DL-1: 37.80	RI0001003L-03	6.58	0	0
DL-2: 2.61	NA - Unconnected	1.46	0	0
Totals: 40.41		8.04	0	0

Site Construction Plans (the following applicable specifications are provided)

- ✓ Existing and proposed plans (scale not greater than 1" = 40') with North arrow
- ✓ Existing and proposed site topography (with 1 or 2-foot contours). 10-foot contours accepted for off-site areas
- ✓ Boundaries of existing predominant vegetation and proposed limits of clearing;
- ✓ Site Location clarification
- ✓ Location and field-verified boundaries of resource protection areas such as:
  - freshwater and coastal wetlands, lakes, ponds,
  - coastal shoreline features
  - Perennial and intermittent streams, in addition to areas subject to storm flowage (ASSFs);
- ✓ All required setbacks (e.g., buffers, water supply wells, septic systems);
- ✓ Representative cross-section and profile drawings, notes and details of structural stormwater management practices and conveyances (i.e., storm drains, open channels, swales, etc.), which include:
  - Location and size of the stormwater treatment practices (type of practice, depth, area). Stormwater treatment practices (BMPs) must have labels that correspond to 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., invert 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;

- Logs of borings and/or test pit investigations along with supporting soils/geotechnical report and corresponding water tables.

Mapping of any OWM approved activities related to current/former site use areas for any known contamination and/or remedial clean-up efforts.

✓ Location of existing and proposed roads, buildings, and other structures including limits of disturbance;

- 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, as well as location(s) of final discharge point (wetland, waterbody);
- Cross sections of roadways, with edge details such as curbs and sidewalks;
- Location and dimensions of channel modifications, such as bridge or culvert crossings;
- Locations, cross sections, and profiles of all stream or wetland crossings and their method of stabilization

1.0 Project Description

The project site area for the solar development affects 8.04+/- acres on AP 12 Lots 156 and 156-A in North Smithfield, Rhode Island. The proposed development includes the installation of ground-mounted solar photovoltaic arrays, associated transformer, breakers, poles, underground electric and seeding.

The stormwater quality will be improved by utilizing Best Management Practices (BMPs) as established by the RISDISM for the treatment of storm water runoff from the proposed development. BMPs will consist of a stone access road, stone infiltration ponds, grass swales and stone infiltration trenches. The system has been designed to meet the RIDEM Stormwater Design and Installations Standards Manual.

2.0 Site Conditions

2.1 SOILS

There are the following soil types within the analyzed area of the Site as mapped by the NRCS USDA Soil Conservation service:

Soil Symbol	Description	Hydrologic Group
CeC	Canton and Charlton fine sandy loams, very rocky, 3 to 15 percent slopes	B
ChB	Canton and Charlton very stony fine sandy loams, 3 to 8 percent slopes	B
ChD	Canton and Charlton very stony fine sandy loams, 15 to 25 percent slopes	B
Rf	Ridgebury, Whitman, and Leicester extremely stony fine sandy loams	D

Site specific soil evaluations can be found in Appendix A2.1.

2.2 EXISTING SITE CONDITIONS

The project site exists today as almost entirely wooded with gravel roads, cart paths, and trails associated with utility access to an abutting off-site electric transmission line R.O.W. There is a ridgeline

which bisects the proposed project area. The high point of this ridgeline onsite is elevation 446. Stormwater west of this ridge line is directed downslope toward Greenville Road - Route 104 (DL-1) with a low point of elevation 250. Stormwater east of this ridge line is directed toward an unconnected wetland complex (Design Line-2) with a low point adjacent to the site of elevation 432.

2.3 POST SITE CONDITIONS

In post development conditions there are relatively few changes in the drainage. The site is being minimally graded where needed to meet the slope parameters for the stormwater BMP's.

In order to provide an unobstructed view of the southern sky, 7.05+/- acres of clearing is proposed on the east, west and south sides of the solar arrays. Ground cover over the entire cleared area, including under the solar arrays, will consist of low-growth, shade tolerant, native grasses with no fertilizer required to maintain growth. Access to the project is provided by portion of an existing gravel road, which will be improved with 6" stone detailed as a 20-foot wide permeable access drive.

The proposed drainage analysis uses stormwater management systems to control and treat runoff from the proposed development. The following BMP's are used on site and have been designed to include the following elements:

- Stone Infiltration Trenches
    - Safely meters the 100-year storm
    - Promotes recharge for all storm events
- Infiltration Pond
    - Safely convey the 100-year storm
- Drainage Swales
    - Provides conveyance to the primary BMPs

The above elements will be used to meet the design standards of the Rhode Island Stormwater Design and Installation Standard.

The primary goal of increasing water quality treatment is accomplished by seeding with low growth, shade tolerant, native grasses with no fertilizer required to maintain growth. Stormwater runoff mitigation is provided through the use of stone infiltration trenches and infiltration ponds. By reducing post development stormwater flow rate to a level no greater than the pre-development rate, the second goal of the proposed drainage system is achieved. Any potential impacts from the proposed development on the abutting properties have been mitigated.

3.0 Minimum Standards

The site has been designed to meet the minimum standards as outlined in the Rhode Island Stormwater Design and Installation Standards Manual (RISDISM). The following sections outline how the site meets and exceeds the minimum required standards.

3.1 Minimum Standard 1: LID Site Planning and Design Strategies

See "Appendix A: Stormwater Management Checklist" from the RISDISM provided at the beginning of this report.

3.2 Minimum Standard 2: Groundwater Recharge

Groundwater is to be recharged per watershed based on impervious area coverage in accordance with section 3.2.2 of the RISDISM.

The ground cover for the solar field is grass; therefore, the impervious cover is 0% and the standard is waived. However, the proposed stone infiltration trenches will provide recharge.

3.3 Minimum Standard 3: Water Quality

This site has been designed to use stone infiltration trenches and an infiltration basin as BMPs. There are no pollutant-specific requirements and/or pollutant removal efficiencies applicable to the site as the result of SAMP, TMDL, or other watershed-specific requirements. All stormwater runoff from the solar panels is to be considered clean runoff since these solar panels are air-tight and there will be no pollutants from storm water runoff on the panels. The entirety of the water quality storm tributary to the stormwater BMPs will be infiltrated for the WQv storm.

Stone Infiltration Trenches

The stone infiltration trenches have been located down gradient to capture runoff from the surrounding areas. Trenches have either 1' or 2' depth of stone.

Infiltration Ponds

The infiltration ponds have been sized using HydroCAD and an infiltration rate based on a parent material within the footprint of the BMP. The project site largely consists of sandy loam and an infiltration rate was used from table 5.5.4 of the RISDISM. See Appendix A3.2 for the HydroCAD analysis for the water quality event. The infiltration ponds have been designed to fully infiltrate the water quality event.

No Pretreatment is required due to no impervious cover is being proposed. However, some level of pretreatment for the infiltration pond is provided thru the proposed grass cover under the solar panels and the grass drainage swales conveying flows to the pond.

3.4 Minimum Standard 4: Conveyance and Natural Channel Protection

3.4.1 Drainage Network Design Parameters:

No piped networks are proposed.

3.4.2 Channel Protection Volume:

This site classifies as a "small facility with impervious cover less than or equal to 1 acre" and therefore the CP_V criterion is waived per Section 3.3.4 in the RISDISM.

3.5 Minimum Standard 5: Overbank Flood Protection & Downstream Analysis

3.5.1 Method of Analysis

USDA Soil Conservation Service Method as defined by Technical Release No. 20 (TR-20) determines Stormwater runoff rate and volume. Type III rainfall distribution is utilized. Time of concentration is determined using Technical Release No 55 (TR-55) methodology, through the computer program *HydroCAD ver. 10.0* by Applied Microcomputer Systems. The existing soils have a texture of sandy loam and therefore the stone trenches have been modeled in HydroCAD with a 1.02 inches/hour infiltration rate per Section 5.5.4 of the Stormwater Regulations. The drainage system has been designed to mitigate all stormwater flows for the 1, 10 and 100-year storm events.

3.5.2 Design Storm

Analysis of 1-year, 10-year, and 100-year frequency storms are included. The following 24-hour rainfall intensities are obtained from the Rhode Island Stormwater Design and Installation Standards Manual, Table 3-1 for Providence County.

1 year =	2.7 inches
10 year =	4.9 inches
100 year=	8.7 inches

3.5.3 Design Point Breakdown

The site is analyzed as 2 watershed areas. In the pre-development stage, there are 4 sub-catchments. In the post development stage, there are 8 sub-catchments. Each watershed will demonstrate minimal to zero increase of runoff due to the proposed development. A description of each watershed and associated sub-catchments are summarized as follows, for cover types see color watershed maps located in back of this report. Numbers in parentheses ( ) indicate the HydroCAD Node Number.

<u>Design Line 1 – Greenville Road (Route 104):</u>

This watershed flows to Design Line – 1 (DL-1) and watershed consists of the western portion of the site. The design point is Greenville Road (Route 104).

In Pre-Development conditions, sub-catchments (10), (20), and (30), the area is primarily wooded with gravel access roads, cart paths, and trails associated with an existing electric overhead transmission lines R.O.W. The stormwater runs via overland flow toward Greenville Road (Route 104) - (DL-1).

In Post Development conditions, sub-catchments (100), (200E), (200W), (201), (300), (301), (400) and (401), The area within the developed area (200E), (200W), and (300), consists of grass. The remaining areas are primarily wooded with gravel access roads, cart paths, and trails associated with an existing electric company R.O.W. The existing gravel access road within (100), (201), and (200W) will be improved with 6' stone and utilized for access to the proposed development.

Below is a summary of the hydrologic parameters for the pre and post development sub-areas in Design Line -1.

	Area (acres)	CN	Tc (min)
Pre-10	8.827	57	25.5
Post-100	8.765	58	25.5
Pre-20	18.263	53	26.0
Post-200E	1.307	65	10.3
Post-200W	2.294	66	8.3
Post-201	15.014	53	19.1
Pre-30	10.764	57	29.6
Post-300	1.784	68	12.7
Post 301	8.639	58	20.3

Design Line 2 – Wetland Complex:

This watershed flows to Design Line – 2 (DL-2) and watershed consists of the eastern portion of the site. The design point is a wetland complex (DL-2).

In Pre-Development conditions, sub-catchment (40), the area is totally wooded with a gravel access road associated with an existing electric company R.O.W. The stormwater runs via overland flow towards a wetland complex - (DL-2).

In Post Development conditions, sub-catchment (400), consists of grass with a gravel access road associated with an existing electric company R.O.W. Sub-Catchment (401) consists of predominantly wooded areas and a small area of grass, and flows uncontrolled to wetland (410) and Design Line 2 (DL-2).

Below is a summary of the hydrologic parameters for the pre and post development sub-areas in Design Line -2.

	Area (acres)	CN	Tc (min)
Pre-40	2.555	58	34.9
Post-400	1.287	64	16.4
Post-401	1.319	61	28.4

3.5.4 Q_p BMP Calculations

The emergency outlets have been sized to safely pass the 100-year storm and beyond without erosion or overtopping the embankment. For this analysis, the infiltration pond was assumed to have all of the orifices clogged and only the emergency outlet functioning. Under normal conditions, no stormwater will flow over the emergency spillway and the basin will have a minimum of one foot of freeboard.

Basin	Q(cfs)	V (ft/s)	Top of Basin	Flood Elevation
Pond 200WP	0.95	0.15	433.00	432.87
Pond 400P	0.00	0.00	442.00	441.26

The velocity over the spillway is less than 3 ft/s thus no erosion will take place on the embankment or downstream. The basin maintains freeboard even with all orifices clogged and the 100-year storm flowing over the embankment. See attached HydroCAD.

3.5.5 Downstream Analysis

A downstream analysis is required under the following conditions:

Area of Disturbance (Acres)	Impervious Cover (%)
>5 to 10	>75
>10 to 25	>50
>25 to 50	>25
>50	All Projects

The proposed project disturbs 8.04 acres and is 0 acres of impervious. A downstream analysis is not required.

3.5.6 Overbank Flood Protection Conclusion

The table below presents a summary of the pre-development flows vs. the mitigated post development flows. This report details how the site will reduce flows to the maximum extent practicable, with no increase in stormwater runoff flow for the 10 year and the 100 year storm events, and a minimal increase in the WQ and 1 year storm events due to several uncontrolled portions of the site, which is bisected by a large utility electric overhead transmission line R.O.W. offsite.

Pre-Development Flows vs. Post Development Flows Mitigated

Subwatershed (design point)	1.2" Peak Flow		1-yr Peak Flow		10-yr Peak Flow		25-yr Peak Flow		100-yr Peak Flow	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
DL-1:	0.59	0.66	0.86	1.02	19.64	19.30	37.06	36.10	83.42	80.22
DL-2:	0.00	0.00	0.12	0.12	1.51	1.06	2.67	1.77	5.62	3.54
Totals:	0.59	0.66	0.98	1.14	21.15	20.36	39.73	37.87	89.04	83.76

All flows in cubic feet per second (cfs)

As shown in the tables above, no increase in stormwater runoff flow for the 10 year and the 100-year storm events, and a minimal increase in the WQ and 1-year storm events due to several uncontrolled portions of the site.

3.6 Minimum Standard 6: Redevelopment and Infill Projects.

The site is not classified as a redevelopment or infill project.

3.7 Minimum Standard 7: Pollution Prevention

A Soil Erosion and Sediment Control Plan (SESC) for this development can be found under a separate document. See the Soil Erosion and Sediment Control Plan for the development prepared by DiPrete Engineering. The SESC contains information for construction pollution prevention. For post construction pollution prevention see the Operations and Maintenance (O&M) document prepared for this development by DiPrete Engineering.

3.8 Minimum Standard 8: Land Uses with High Potential Pollutant Loads (LUHPPls)

The site is not considered LUHHPL.

3.9 Minimum Standard 9: Illicit Discharges

There are no proposed Illicit Discharges on site.

3.10 Minimum Standard 10: Construction Activity Soil Erosion, Runoff and Sedimentation and Pollution Prevention Control Measure Requirements

See the SESC for this development prepared by DiPrete Engineering.

3.11 Minimum Standard 11: Stormwater Management System Operation and Maintenance

See the O&M for this development prepared by DiPrete Engineering.

Page Intentionally Left Blank

Appendix A

Page Intentionally Left Blank

A2.1 Soil Evaluations

Page Intentionally Left Blank

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** NA

Property Owner: Grand Banks Commerce Park LLC
Property Location: Greenville Road (AP 12 Lots 156 & 156-A) North Smithfield, RI
Date of Test Hole: August 12, 2019
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Clear, 80's Shaded: Yes ☐ No ☑ Time: 8:00 am

TH 1 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-4"	C	S	10YR 3/2					fsl	1-sbk	fri	4
Bw	4-23"	C	S	10YR 4/6					fsl	1-sbk	fri	4
C	23-39"	C	S	2.5Y 5/2	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2Cd	39-102"			2.5Y 5/4					gsl	0-m	fir	8

TH 2 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-8"	C	S	10YR 3/2					fsl	1-sbk	fri	4
Bw	8-32"	C	S	10YR 5/6					fsl	1-sbk	fri	4
Cd	32-120"			2.5Y 5/2	7.5YR 5/8	C	3	P	gfsl	0-m	fir	8

TH 1 Soil Class Dense Till Total Depth 102" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 36" (og)
TH 2 Soil Class Dense Till Total Depth 120" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 32" (og)

Comments:

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** NA

Property Owner: Grand Banks Commerce Park LLC
Property Location: Greenville Road (AP 12 Lots 156 & 156-A) North Smithfield, RI
Date of Test Hole: August 12, 2019
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Clear, 80's Shaded: Yes ☐ No ☑ Time: 8:00 am

TH 3 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-10"	C	S	10YR 3/2					fsl	1-sbk	fri	4
Bw	10-28"	C	S	10YR 4/6					fsl	1-sbk	fri	4
C	28-108"			2.5Y 5/4					vcbsl	0-m	fri	6

TH 4 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-8"	C	S	10YR 3/2					fsl	1-sbk	fri	4
Bw	8-29"	C	S	10YR 5/6					fsl	1-sbk	fri	4
C1	29-60"	C	S	2.5Y 5/3	7.5YR 5/8	C	3	P	gfsl	0-m	fir	8
C2	60-108"			2.5Y 5/4	7.5YR 5/8	C	3	P	gsl	0-m	fri	6

TH 3 Soil Class Dense Till Total Depth 108" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 88" (og)
TH 4 Soil Class Dense Till Total Depth 108" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 60" (og)

Comments:

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** NA

Property Owner: Grand Banks Commerce Park LLC
Property Location: Greenville Road (AP 12 Lots 156 & 156-A) North Smithfield, RI
Date of Test Hole: August 12, 2019
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Clear, 80's Shaded: Yes ☐ No ☑ Time: 8:00 am

TH 5 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-6"	C	S	10YR 3/2					fsl	1-sbk	fri	4
Bw	6-34"	C	S	10YR 4/6					fsl	1-sbk	fri	4
Cd	34-42"	C	S	2.5Y 5/2	7.5YR 5/8	C	3	P	fsl	0-m	fir	8
2C1	42-78"	C	S	2.5Y 5/3					glfs	0-m	fri	6
2C2	78-108			2.5Y 5/4					gcbfsl	0-m	fri	7
TH____ Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				

TH 5 Soil Class Dense Till Total Depth 108" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 78" (og)

TH _____ Soil Class _____ Total Depth _____ Impervious/Limiting Layer Depth _____ (og) GW Seepage Depth _____ SHWT _____ (og)

Comments: _____

Page Intentionally Left Blank

A3.2 Water Quality HydroCAD Storm Analysis

Page Intentionally Left Blank

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 10: Subcat 10 Runoff Area=8.827 ac 3.29% Impervious Runoff Depth=0.03"
Flow Length=1,403' Tc=25.5 min CN=56/98 Runoff=0.20 cfs 0.024 af

Subcatchment 20: Subcat 20 Runoff Area=18.262 ac 0.29% Impervious Runoff Depth=0.00"
Flow Length=1,624' Tc=26.0 min CN=53/98 Runoff=0.03 cfs 0.004 af

Subcatchment 30: Subcat 30 Runoff Area=10.764 ac 5.44% Impervious Runoff Depth=0.05"
Flow Length=1,489' Tc=29.6 min CN=55/98 Runoff=0.37 cfs 0.048 af

Subcatchment 40: Subcat 40 Runoff Area=2.554 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=481' Tc=34.9 min CN=58/0 Runoff=0.00 cfs 0.000 af

Link 31: DL-1 - Greenville Road - PRE Inflow=0.59 cfs 0.076 af
Primary=0.59 cfs 0.076 af

Link 41: DL-2 - Wetland Complex - PRE Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Page Intentionally Left Blank

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 100: Post Subcat 100 - Runoff Area=8.765 ac 3.31% Impervious Runoff Depth=0.03"
Flow Length=1,403' Tc=25.5 min CN=56/98 Runoff=0.20 cfs 0.024 af

Subcatchment 200E: Post Subcat 200 - Site Runoff Area=1.307 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=195' Tc=10.3 min CN=65/0 Runoff=0.00 cfs 0.000 af

Subcatchment 200W: Post Subcat 200 - Site Runoff Area=2.293 ac 0.00% Impervious Runoff Depth=0.01"
Flow Length=282' Tc=8.3 min CN=66/0 Runoff=0.00 cfs 0.001 af

Subcatchment 201: Post Subcat 201 - Runoff Area=15.014 ac 0.35% Impervious Runoff Depth=0.00"
Flow Length=1,363' Tc=19.1 min CN=53/98 Runoff=0.04 cfs 0.004 af

Subcatchment 300: Post Subcat 300 - Site Runoff Area=1.784 ac 0.00% Impervious Runoff Depth=0.01"
Flow Length=291' Tc=12.6 min CN=68/0 Runoff=0.00 cfs 0.002 af

Subcatchment 301: Post Subcat 301 - Runoff Area=8.638 ac 6.78% Impervious Runoff Depth=0.07"
Flow Length=1,381' Tc=20.3 min CN=55/98 Runoff=0.43 cfs 0.048 af

Subcatchment 400: Post Subcat 400 - Site Runoff Area=1.288 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=248' Tc=16.4 min CN=64/0 Runoff=0.00 cfs 0.000 af

Subcatchment 401: Post Subcat 401 - Runoff Area=1.318 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=208' Tc=28.4 min CN=61/0 Runoff=0.00 cfs 0.000 af

Reach 200R: Reach to Greenville Road Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.240 L=1,045.0' S=0.1672 '/' Capacity=106.77 cfs Outflow=0.00 cfs 0.000 af

Reach 300R1: Reach to Greenville Road Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.240 L=365.0' S=0.0915 '/' Capacity=184.78 cfs Outflow=0.00 cfs 0.000 af

Reach 301R2: Reach to Greenville Road Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.400 L=801.0' S=0.1253 '/' Capacity=250.04 cfs Outflow=0.00 cfs 0.000 af

Pond 200ET: Stone Infiltration Trench A Peak Elev=439.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 200WP: Infiltration Pond A Peak Elev=429.00' Storage=1 cf Inflow=0.00 cfs 0.001 af
Discarded=0.00 cfs 0.001 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.001 af

Pond 300T: Stone Infiltration Trench B Peak Elev=434.00' Storage=0 cf Inflow=0.00 cfs 0.002 af
Discarded=0.00 cfs 0.002 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.002 af

Pond 400P: Infiltration Pond B Peak Elev=439.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

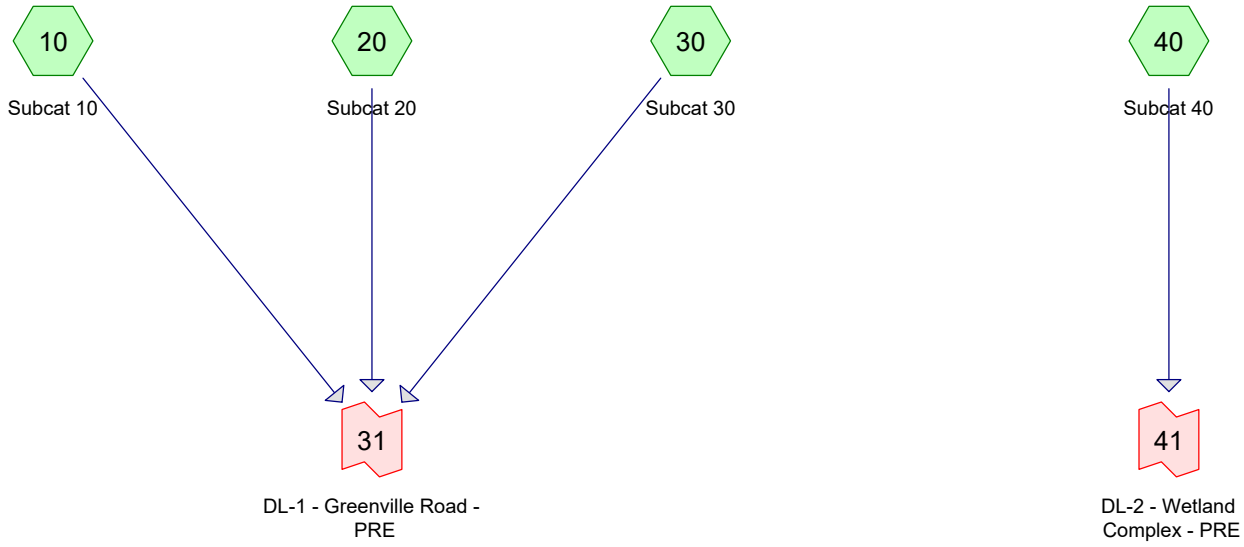
Link 310: DL-1 - Greenville Road - POST Inflow=0.66 cfs 0.076 af
Primary=0.66 cfs 0.076 af

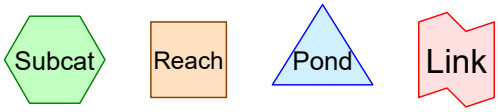
Link 410: DL-2 Wetland Complex - POST

Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

A3.5.4.1 HydroCAD Node Diagram

Page Intentionally Left Blank





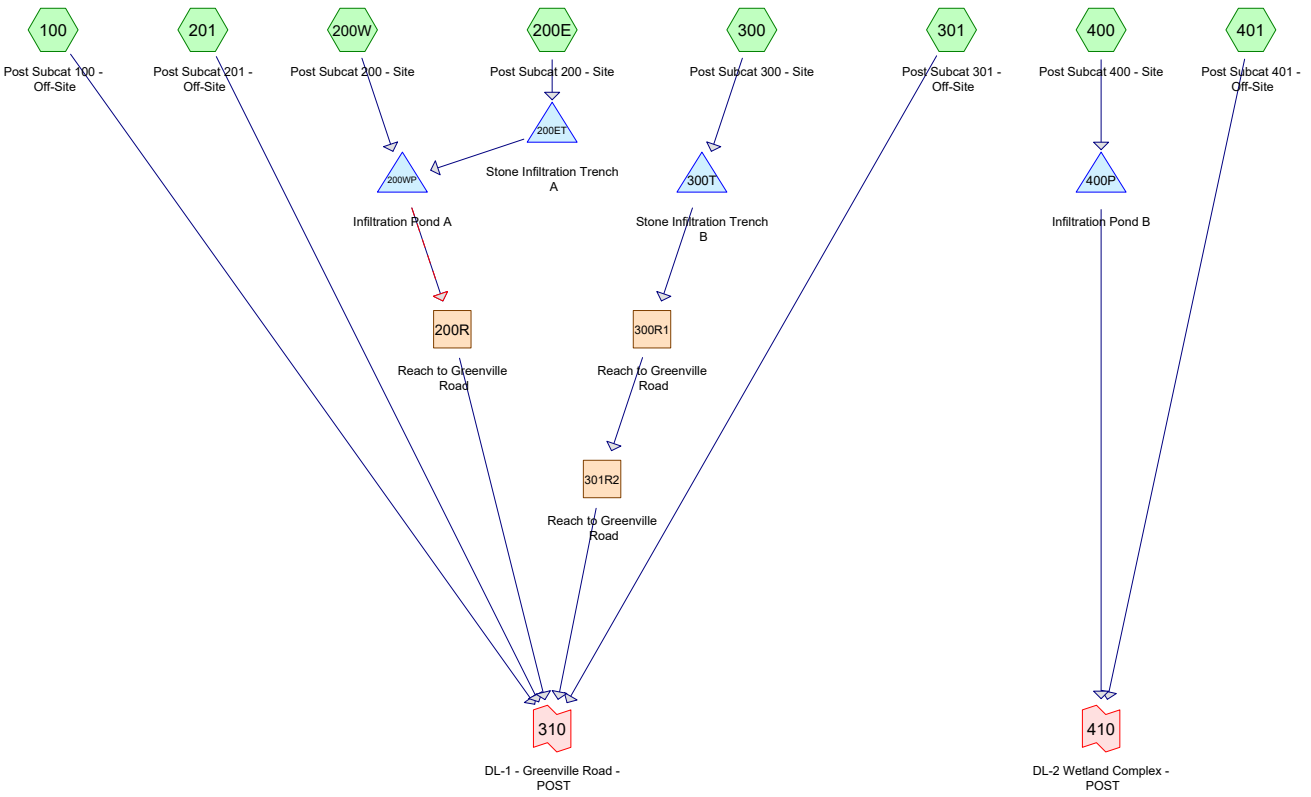
Routing Diagram for 2612-005-ALLS-EHCD-INHS-20190913
Prepared by DiPrete Engineering, Printed 10/1/2019
HydroCAD® 10.00-24 s/n 01125 © 2018 HydroCAD Software Solutions LLC

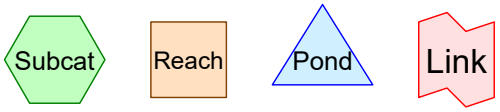
Page Intentionally Left Blank

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.895	61	>75% Grass cover, Good, HSG B (10, 20, 30)
16.724	48	Brush, Good, HSG B (10, 20, 30, 40)
0.002	73	Brush, Good, HSG D (40)
2.009	96	Gravel surface, HSG B (10, 20, 30, 40)
0.722	98	Offsite Impervious, HSG B (10, 20, 30)
0.207	98	Offsite Roofs, HSG B (10, 20, 30)
19.492	55	Woods, Good, HSG B (10, 20, 30, 40)
0.356	77	Woods, Good, HSG D (40)
40.407	**55**	**TOTAL AREA**

Page Intentionally Left Blank





Routing Diagram for 2612-005-ALLS-PHCD-INHS-20190930
Prepared by DiPrete Engineering, Printed 10/1/2019
HydroCAD® 10.00-24 s/n 01125 © 2018 HydroCAD Software Solutions LLC

Page Intentionally Left Blank

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.811	84	6" Stone, HSG B (100, 200W, 201)
6.973	61	>75% Grass cover, Good, HSG B (100, 200E, 200W, 201, 300, 301, 400, 401)
0.006	80	>75% Grass cover, Good, HSG D (400, 401)
16.543	48	Brush, Good, HSG B (100, 200W, 201, 301, 401)
0.002	73	Brush, Good, HSG D (401)
1.636	96	Gravel surface, HSG B (100, 201, 301)
0.722	98	Offsite Impervious, HSG B (100, 201, 301)
0.207	98	Offsite Roofs, HSG B (100, 201, 301)
0.914	98	Water Surface, 0% imp, HSG B (200E, 200W, 300, 400)
12.244	55	Woods, Good, HSG B (100, 200W, 201, 300, 301, 400, 401)
0.350	77	Woods, Good, HSG D (400, 401)
40.407	**58**	**TOTAL AREA**

Page Intentionally Left Blank

A3.5.4.2 HydroCAD 1-Year Storm Analysis

Page Intentionally Left Blank

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 10: Subcat 10 Runoff Area=8.827 ac 3.29% Impervious Runoff Depth=0.16"
Flow Length=1,403' Tc=25.5 min CN=57 Runoff=0.35 cfs 0.119 af

Subcatchment 20: Subcat 20 Runoff Area=18.262 ac 0.29% Impervious Runoff Depth=0.09"
Flow Length=1,624' Tc=26.0 min CN=53 Runoff=0.22 cfs 0.133 af

Subcatchment 30: Subcat 30 Runoff Area=10.764 ac 5.44% Impervious Runoff Depth=0.16"
Flow Length=1,489' Tc=29.6 min CN=57 Runoff=0.41 cfs 0.146 af

Subcatchment 40: Subcat 40 Runoff Area=2.554 ac 0.00% Impervious Runoff Depth=0.18"
Flow Length=481' Tc=34.9 min CN=58 Runoff=0.12 cfs 0.039 af

Link 31: DL-1 - Greenville Road - PRE Inflow=0.86 cfs 0.399 af
Primary=0.86 cfs 0.399 af

Link 41: DL-2 - Wetland Complex - PRE Inflow=0.12 cfs 0.039 af
Primary=0.12 cfs 0.039 af

Page Intentionally Left Blank

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 100: Post Subcat 100 - Runoff Area=8.765 ac 3.31% Impervious Runoff Depth=0.18"
Flow Length=1,403' Tc=25.5 min CN=58 Runoff=0.46 cfs 0.135 af

Subcatchment 200E: Post Subcat 200 - Site Runoff Area=1.307 ac 0.00% Impervious Runoff Depth=0.38"
Flow Length=195' Tc=10.3 min CN=65 Runoff=0.31 cfs 0.041 af

Subcatchment 200W: Post Subcat 200 - Site Runoff Area=2.293 ac 0.00% Impervious Runoff Depth=0.41"
Flow Length=282' Tc=8.3 min CN=66 Runoff=0.68 cfs 0.078 af

Subcatchment 201: Post Subcat 201 - Runoff Area=15.014 ac 0.35% Impervious Runoff Depth=0.09"
Flow Length=1,363' Tc=19.1 min CN=53 Runoff=0.18 cfs 0.110 af

Subcatchment 300: Post Subcat 300 - Site Runoff Area=1.784 ac 0.00% Impervious Runoff Depth=0.48"
Flow Length=291' Tc=12.6 min CN=68 Runoff=0.60 cfs 0.071 af

Subcatchment 301: Post Subcat 301 - Runoff Area=8.638 ac 6.78% Impervious Runoff Depth=0.18"
Flow Length=1,381' Tc=20.3 min CN=58 Runoff=0.49 cfs 0.133 af

Subcatchment 400: Post Subcat 400 - Site Runoff Area=1.288 ac 0.00% Impervious Runoff Depth=0.34"
Flow Length=248' Tc=16.4 min CN=64 Runoff=0.23 cfs 0.037 af

Subcatchment 401: Post Subcat 401 - Runoff Area=1.318 ac 0.00% Impervious Runoff Depth=0.26"
Flow Length=208' Tc=28.4 min CN=61 Runoff=0.12 cfs 0.028 af

Reach 200R: Reach to Greenville Road Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.240 L=1,045.0' S=0.1672 '/' Capacity=106.77 cfs Outflow=0.00 cfs 0.000 af

Reach 300R1: Reach to Greenville Road Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.240 L=365.0' S=0.0915 '/' Capacity=184.78 cfs Outflow=0.00 cfs 0.000 af

Reach 301R2: Reach to Greenville Road Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.400 L=801.0' S=0.1253 '/' Capacity=250.04 cfs Outflow=0.00 cfs 0.000 af

Pond 200ET: Stone Infiltration Trench A Peak Elev=439.08' Storage=181 cf Inflow=0.31 cfs 0.041 af
Discarded=0.16 cfs 0.041 af Primary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.041 af

Pond 200WP: Infiltration Pond A Peak Elev=429.03' Storage=408 cf Inflow=0.68 cfs 0.078 af
Discarded=0.32 cfs 0.078 af Primary=0.00 cfs 0.000 af Outflow=0.32 cfs 0.078 af

Pond 300T: Stone Infiltration Trench B Peak Elev=434.05' Storage=256 cf Inflow=0.60 cfs 0.071 af
Discarded=0.36 cfs 0.071 af Primary=0.00 cfs 0.000 af Outflow=0.36 cfs 0.071 af

Pond 400P: Infiltration Pond B Peak Elev=439.03' Storage=170 cf Inflow=0.23 cfs 0.037 af
Discarded=0.12 cfs 0.037 af Primary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.037 af

Link 310: DL-1 - Greenville Road - POST Inflow=1.02 cfs 0.377 af
Primary=1.02 cfs 0.377 af

Link 410: DL-2 Wetland Complex - POST

Inflow=0.12 cfs 0.028 af
Primary=0.12 cfs 0.028 af

A3.5.4.3 HydroCAD 10-Year Storm Analysis

Page Intentionally Left Blank

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 10: Subcat 10 Runoff Area=8.827 ac 3.29% Impervious Runoff Depth=1.05"
Flow Length=1,403' Tc=25.5 min CN=57 Runoff=5.53 cfs 0.774 af

Subcatchment 20: Subcat 20 Runoff Area=18.262 ac 0.29% Impervious Runoff Depth=0.81"
Flow Length=1,624' Tc=26.0 min CN=53 Runoff=7.85 cfs 1.240 af

Subcatchment 30: Subcat 30 Runoff Area=10.764 ac 5.44% Impervious Runoff Depth=1.05"
Flow Length=1,489' Tc=29.6 min CN=57 Runoff=6.35 cfs 0.943 af

Subcatchment 40: Subcat 40 Runoff Area=2.554 ac 0.00% Impervious Runoff Depth=1.11"
Flow Length=481' Tc=34.9 min CN=58 Runoff=1.51 cfs 0.237 af

Link 31: DL-1 - Greenville Road - PRE Inflow=19.64 cfs 2.957 af
Primary=19.64 cfs 2.957 af

Link 41: DL-2 - Wetland Complex - PRE Inflow=1.51 cfs 0.237 af
Primary=1.51 cfs 0.237 af

Page Intentionally Left Blank

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 100: Post Subcat 100 - Runoff Area=8.765 ac 3.31% Impervious Runoff Depth=1.11"
Flow Length=1,403' Tc=25.5 min CN=58 Runoff=5.95 cfs 0.814 af

Subcatchment 200E: Post Subcat 200 - Site Runoff Area=1.307 ac 0.00% Impervious Runoff Depth=1.59"
Flow Length=195' Tc=10.3 min CN=65 Runoff=1.98 cfs 0.173 af

Subcatchment 200W: Post Subcat 200 - Site Runoff Area=2.293 ac 0.00% Impervious Runoff Depth=1.66"
Flow Length=282' Tc=8.3 min CN=66 Runoff=3.93 cfs 0.317 af

Subcatchment 201: Post Subcat 201 - Runoff Area=15.014 ac 0.35% Impervious Runoff Depth=0.81"
Flow Length=1,363' Tc=19.1 min CN=53 Runoff=7.18 cfs 1.020 af

Subcatchment 300: Post Subcat 300 - Site Runoff Area=1.784 ac 0.00% Impervious Runoff Depth=1.81"
Flow Length=291' Tc=12.6 min CN=68 Runoff=2.94 cfs 0.269 af

Subcatchment 301: Post Subcat 301 - Runoff Area=8.638 ac 6.78% Impervious Runoff Depth=1.11"
Flow Length=1,381' Tc=20.3 min CN=58 Runoff=6.42 cfs 0.802 af

Subcatchment 400: Post Subcat 400 - Site Runoff Area=1.288 ac 0.00% Impervious Runoff Depth=1.52"
Flow Length=248' Tc=16.4 min CN=64 Runoff=1.55 cfs 0.163 af

Subcatchment 401: Post Subcat 401 - Runoff Area=1.318 ac 0.00% Impervious Runoff Depth=1.31"
Flow Length=208' Tc=28.4 min CN=61 Runoff=1.06 cfs 0.144 af

Reach 200R: Reach to Greenville Road Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.240 L=1,045.0' S=0.1672 '/' Capacity=106.77 cfs Outflow=0.00 cfs 0.000 af

Reach 300R1: Reach to Greenville Road Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.240 L=365.0' S=0.0915 '/' Capacity=184.78 cfs Outflow=0.00 cfs 0.000 af

Reach 301R2: Reach to Greenville Road Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.400 L=801.0' S=0.1253 '/' Capacity=250.04 cfs Outflow=0.00 cfs 0.000 af

Pond 200ET: Stone Infiltration Trench A Peak Elev=440.52' Storage=3,330 cf Inflow=1.98 cfs 0.173 af
Discarded=0.16 cfs 0.173 af Primary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.173 af

Pond 200WP: Infiltration Pond A Peak Elev=429.42' Storage=5,790 cf Inflow=3.93 cfs 0.317 af
Discarded=0.33 cfs 0.317 af Primary=0.00 cfs 0.000 af Outflow=0.33 cfs 0.317 af

Pond 300T: Stone Infiltration Trench B Peak Elev=434.85' Storage=4,284 cf Inflow=2.94 cfs 0.269 af
Discarded=0.36 cfs 0.269 af Primary=0.00 cfs 0.000 af Outflow=0.36 cfs 0.269 af

Pond 400P: Infiltration Pond B Peak Elev=439.61' Storage=3,336 cf Inflow=1.55 cfs 0.163 af
Discarded=0.13 cfs 0.163 af Primary=0.00 cfs 0.000 af Outflow=0.13 cfs 0.163 af

Link 310: DL-1 - Greenville Road - POST Inflow=19.30 cfs 2.636 af
Primary=19.30 cfs 2.636 af

Link 410: DL-2 Wetland Complex - POST

Inflow=1.06 cfs 0.144 af
Primary=1.06 cfs 0.144 af

A3.5.4.4 HydroCAD 25-Year Storm Analysis

Page Intentionally Left Blank

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 10: Subcat 10 Runoff Area=8.827 ac 3.29% Impervious Runoff Depth=1.74"
Flow Length=1,403' Tc=25.5 min CN=57 Runoff=10.01 cfs 1.278 af

Subcatchment 20: Subcat 20 Runoff Area=18.262 ac 0.29% Impervious Runoff Depth=1.42"
Flow Length=1,624' Tc=26.0 min CN=53 Runoff=15.78 cfs 2.159 af

Subcatchment 30: Subcat 30 Runoff Area=10.764 ac 5.44% Impervious Runoff Depth=1.74"
Flow Length=1,489' Tc=29.6 min CN=57 Runoff=11.46 cfs 1.558 af

Subcatchment 40: Subcat 40 Runoff Area=2.554 ac 0.00% Impervious Runoff Depth=1.82"
Flow Length=481' Tc=34.9 min CN=58 Runoff=2.67 cfs 0.387 af

Link 31: DL-1 - Greenville Road - PRE Inflow=37.06 cfs 4.995 af
Primary=37.06 cfs 4.995 af

Link 41: DL-2 - Wetland Complex - PRE Inflow=2.67 cfs 0.387 af
Primary=2.67 cfs 0.387 af

Page Intentionally Left Blank

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 100: Post Subcat 100 - Runoff Area=8.765 ac 3.31% Impervious Runoff Depth=1.82"
Flow Length=1,403' Tc=25.5 min CN=58 Runoff=10.53 cfs 1.329 af

Subcatchment 200E: Post Subcat 200 - Site Runoff Area=1.307 ac 0.00% Impervious Runoff Depth=2.42"
Flow Length=195' Tc=10.3 min CN=65 Runoff=3.14 cfs 0.264 af

Subcatchment 200W: Post Subcat 200 - Site Runoff Area=2.293 ac 0.00% Impervious Runoff Depth=2.51"
Flow Length=282' Tc=8.3 min CN=66 Runoff=6.13 cfs 0.481 af

Subcatchment 201: Post Subcat 201 - Runoff Area=15.014 ac 0.35% Impervious Runoff Depth=1.42"
Flow Length=1,363' Tc=19.1 min CN=53 Runoff=14.65 cfs 1.775 af

Subcatchment 300: Post Subcat 300 - Site Runoff Area=1.784 ac 0.00% Impervious Runoff Depth=2.70"
Flow Length=291' Tc=12.6 min CN=68 Runoff=4.50 cfs 0.401 af

Subcatchment 301: Post Subcat 301 - Runoff Area=8.638 ac 6.78% Impervious Runoff Depth=1.82"
Flow Length=1,381' Tc=20.3 min CN=58 Runoff=11.39 cfs 1.310 af

Subcatchment 400: Post Subcat 400 - Site Runoff Area=1.288 ac 0.00% Impervious Runoff Depth=2.33"
Flow Length=248' Tc=16.4 min CN=64 Runoff=2.50 cfs 0.251 af

Subcatchment 401: Post Subcat 401 - Runoff Area=1.318 ac 0.00% Impervious Runoff Depth=2.07"
Flow Length=208' Tc=28.4 min CN=61 Runoff=1.77 cfs 0.228 af

Reach 200R: Reach to Greenville Road Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.240 L=1,045.0' S=0.1672 '/' Capacity=106.77 cfs Outflow=0.00 cfs 0.000 af

Reach 300R1: Reach to Greenville Road Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.240 L=365.0' S=0.0915 '/' Capacity=184.78 cfs Outflow=0.00 cfs 0.000 af

Reach 301R2: Reach to Greenville Road Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.400 L=801.0' S=0.1253 '/' Capacity=250.04 cfs Outflow=0.00 cfs 0.000 af

Pond 200ET: Stone Infiltration Trench A Peak Elev=441.01' Storage=4,373 cf Inflow=3.14 cfs 0.264 af
Discarded=0.16 cfs 0.221 af Primary=1.22 cfs 0.043 af Outflow=1.38 cfs 0.264 af

Pond 200WP: Infiltration Pond A Peak Elev=429.88' Storage=12,436 cf Inflow=6.13 cfs 0.523 af
Discarded=0.35 cfs 0.523 af Primary=0.00 cfs 0.000 af Outflow=0.35 cfs 0.523 af

Pond 300T: Stone Infiltration Trench B Peak Elev=435.56' Storage=7,844 cf Inflow=4.50 cfs 0.401 af
Discarded=0.36 cfs 0.401 af Primary=0.00 cfs 0.000 af Outflow=0.36 cfs 0.401 af

Pond 400P: Infiltration Pond B Peak Elev=440.10' Storage=6,140 cf Inflow=2.50 cfs 0.251 af
Discarded=0.14 cfs 0.251 af Primary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.251 af

Link 310: DL-1 - Greenville Road - POST Inflow=36.10 cfs 4.414 af
Primary=36.10 cfs 4.414 af

Link 410: DL-2 Wetland Complex - POST

Inflow=1.77 cfs 0.228 af
Primary=1.77 cfs 0.228 af

A3.5.4.5 HydroCAD 100-Year Storm Analysis

Page Intentionally Left Blank

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 10: Subcat 10 Runoff Area=8.827 ac 3.29% Impervious Runoff Depth=3.51"
Flow Length=1,403' Tc=25.5 min CN=57 Runoff=21.59 cfs 2.582 af

Subcatchment 20: Subcat 20 Runoff Area=18.262 ac 0.29% Impervious Runoff Depth=3.04"
Flow Length=1,624' Tc=26.0 min CN=53 Runoff=37.53 cfs 4.623 af

Subcatchment 30: Subcat 30 Runoff Area=10.764 ac 5.44% Impervious Runoff Depth=3.51"
Flow Length=1,489' Tc=29.6 min CN=57 Runoff=24.63 cfs 3.148 af

Subcatchment 40: Subcat 40 Runoff Area=2.554 ac 0.00% Impervious Runoff Depth=3.63"
Flow Length=481' Tc=34.9 min CN=58 Runoff=5.62 cfs 0.772 af

Link 31: DL-1 - Greenville Road - PRE Inflow=83.42 cfs 10.352 af
Primary=83.42 cfs 10.352 af

Link 41: DL-2 - Wetland Complex - PRE Inflow=5.62 cfs 0.772 af
Primary=5.62 cfs 0.772 af

Summary for Subcatchment 10: Subcat 10

Runoff = 21.59 cfs @ 12.38 hrs, Volume= 2.582 af, Depth= 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
0.423	61	>75% Grass cover, Good, HSG B
2.272	48	Brush, Good, HSG B
0.439	96	Gravel surface, HSG B
0.193	98	Offsite Impervious, HSG B
0.097	98	Offsite Roofs, HSG B
5.403	55	Woods, Good, HSG B
8.827	57	Weighted Average
8.536	56	96.71% Pervious Area
0.291	98	3.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	36	0.0111	0.05		**Sheet Flow, 10A - 10B** Woods: Light underbrush n= 0.400 P2= 3.30"
10.1	64	0.0187	0.11		**Sheet Flow, 10B - 10C** Grass: Dense n= 0.240 P2= 3.30"
3.6	1,303	0.1369	5.96		**Shallow Concentrated Flow, 10C - 10D** Unpaved Kv= 16.1 fps
25.5	1,403	Total			

Summary for Subcatchment 20: Subcat 20

Runoff = 37.53 cfs @ 12.39 hrs, Volume= 4.623 af, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
0.022	61	>75% Grass cover, Good, HSG B
11.868	48	Brush, Good, HSG B
1.252	96	Gravel surface, HSG B
0.052	98	Offsite Impervious, HSG B
0.000	98	Offsite Roofs, HSG B
5.069	55	Woods, Good, HSG B
18.262	53	Weighted Average
18.210	53	99.71% Pervious Area
0.052	98	0.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	100	0.0190	0.08		**Sheet Flow, 20A - 20B** Woods: Light underbrush n= 0.400 P2= 3.30"
4.4	1,524	0.1257	5.71		**Shallow Concentrated Flow, 20B - 20C** Unpaved Kv= 16.1 fps
26.0	1,624	Total			

Summary for Subcatchment 30: Subcat 30

Runoff = 24.63 cfs @ 12.43 hrs, Volume= 3.148 af, Depth= 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
0.451	61	>75% Grass cover, Good, HSG B
2.481	48	Brush, Good, HSG B
0.288	96	Gravel surface, HSG B
0.476	98	Offsite Impervious, HSG B
0.110	98	Offsite Roofs, HSG B
6.958	55	Woods, Good, HSG B
10.764	57	Weighted Average
10.178	55	94.56% Pervious Area
0.586	98	5.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.1	100	0.0130	0.07		**Sheet Flow, 30A - 30B** Woods: Light underbrush n= 0.400 P2= 3.30"
4.5	1,389	0.1008	5.11		**Shallow Concentrated Flow, 30B - 30C** Unpaved Kv= 16.1 fps
29.6	1,489	Total			

Summary for Subcatchment 40: Subcat 40

Runoff = 5.62 cfs @ 12.52 hrs, Volume= 0.772 af, Depth= 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
0.104	48	Brush, Good, HSG B
0.002	73	Brush, Good, HSG D
0.031	96	Gravel surface, HSG B
2.062	55	Woods, Good, HSG B
0.356	77	Woods, Good, HSG D
2.554	58	Weighted Average
2.554	58	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.2	100	0.0070	0.05		**Sheet Flow, 40A - 40B** Woods: Light underbrush n= 0.400 P2= 3.30"
2.7	381	0.0220	2.39		**Shallow Concentrated Flow, 40B - 40C** Unpaved Kv= 16.1 fps
34.9	481	Total			

Summary for Link 31: DL-1 - Greenville Road - PRE

Inflow Area = 37.853 ac, 2.45% Impervious, Inflow Depth = 3.28" for 100-Year event
Inflow = 83.42 cfs @ 12.40 hrs, Volume= 10.352 af
Primary = 83.42 cfs @ 12.40 hrs, Volume= 10.352 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Link 41: DL-2 - Wetland Complex - PRE

Inflow Area = 2.554 ac, 0.00% Impervious, Inflow Depth = 3.63" for 100-Year event
Inflow = 5.62 cfs @ 12.52 hrs, Volume= 0.772 af
Primary = 5.62 cfs @ 12.52 hrs, Volume= 0.772 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Page Intentionally Left Blank

Page Intentionally Left Blank

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Subcatchment 100: Post Subcat 100 - Runoff Area=8.765 ac 3.31% Impervious Runoff Depth=3.63"
Flow Length=1,403' Tc=25.5 min CN=58 Runoff=22.25 cfs 2.650 af

Subcatchment 200E: Post Subcat 200 - Site Runoff Area=1.307 ac 0.00% Impervious Runoff Depth=4.47"
Flow Length=195' Tc=10.3 min CN=65 Runoff=5.92 cfs 0.487 af

Subcatchment 200W: Post Subcat 200 - Site Runoff Area=2.293 ac 0.00% Impervious Runoff Depth=4.59"
Flow Length=282' Tc=8.3 min CN=66 Runoff=11.38 cfs 0.877 af

Subcatchment 201: Post Subcat 201 - Runoff Area=15.014 ac 0.35% Impervious Runoff Depth=3.04"
Flow Length=1,363' Tc=19.1 min CN=53 Runoff=35.07 cfs 3.801 af

Subcatchment 300: Post Subcat 300 - Site Runoff Area=1.784 ac 0.00% Impervious Runoff Depth=4.83"
Flow Length=291' Tc=12.6 min CN=68 Runoff=8.16 cfs 0.718 af

Subcatchment 301: Post Subcat 301 - Runoff Area=8.638 ac 6.78% Impervious Runoff Depth=3.63"
Flow Length=1,381' Tc=20.3 min CN=58 Runoff=24.17 cfs 2.612 af

Subcatchment 400: Post Subcat 400 - Site Runoff Area=1.288 ac 0.00% Impervious Runoff Depth=4.35"
Flow Length=248' Tc=16.4 min CN=64 Runoff=4.78 cfs 0.466 af

Subcatchment 401: Post Subcat 401 - Runoff Area=1.318 ac 0.00% Impervious Runoff Depth=3.99"
Flow Length=208' Tc=28.4 min CN=61 Runoff=3.54 cfs 0.438 af

Reach 200R: Reach to Greenville Road Avg. Flow Depth=0.12' Max Vel=0.58 fps Inflow=1.16 cfs 0.154 af
n=0.240 L=1,045.0' S=0.1672 '/' Capacity=106.77 cfs Outflow=0.59 cfs 0.154 af

Reach 300R1: Reach to Greenville Road Avg. Flow Depth=0.24' Max Vel=0.63 fps Inflow=6.57 cfs 0.177 af
n=0.240 L=365.0' S=0.0915 '/' Capacity=184.78 cfs Outflow=2.64 cfs 0.177 af

Reach 301R2: Reach to Greenville Road Avg. Flow Depth=0.08' Max Vel=0.24 fps Inflow=2.64 cfs 0.177 af
n=0.400 L=801.0' S=0.1253 '/' Capacity=250.04 cfs Outflow=0.90 cfs 0.177 af

Pond 200ET: Stone Infiltration Trench A Peak Elev=441.04' Storage=4,373 cf Inflow=5.92 cfs 0.487 af
Discarded=0.16 cfs 0.264 af Primary=8.38 cfs 0.222 af Outflow=8.54 cfs 0.487 af

Pond 200WP: Infiltration Pond A Peak Elev=430.87' Storage=27,493 cf Inflow=19.26 cfs 1.099 af
Discarded=0.38 cfs 0.945 af Primary=1.16 cfs 0.154 af Outflow=1.53 cfs 1.099 af

Pond 300T: Stone Infiltration Trench B Peak Elev=436.05' Storage=10,070 cf Inflow=8.16 cfs 0.718 af
Discarded=0.36 cfs 0.541 af Primary=6.57 cfs 0.177 af Outflow=6.93 cfs 0.718 af

Pond 400P: Infiltration Pond B Peak Elev=441.26' Storage=13,545 cf Inflow=4.78 cfs 0.466 af
Discarded=0.16 cfs 0.466 af Primary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.466 af

Link 310: DL-1 - Greenville Road - POST Inflow=80.22 cfs 9.394 af
Primary=80.22 cfs 9.394 af

Link 410: DL-2 Wetland Complex - POST

Inflow=3.54 cfs 0.438 af
Primary=3.54 cfs 0.438 af

Summary for Subcatchment 100: Post Subcat 100 - Off-Site

Runoff = 22.25 cfs @ 12.38 hrs, Volume= 2.650 af, Depth= 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
0.352	84	6" Stone, HSG B
0.461	61	>75% Grass cover, Good, HSG B
2.265	48	Brush, Good, HSG B
0.304	96	Gravel surface, HSG B
0.193	98	Offsite Impervious, HSG B
0.097	98	Offsite Roofs, HSG B
5.093	55	Woods, Good, HSG B
8.765	58	Weighted Average
8.475	56	96.69% Pervious Area
0.290	98	3.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	36	0.0111	0.05		**Sheet Flow, 100A - 100B** Woods: Light underbrush n= 0.400 P2= 3.30"
10.1	64	0.0187	0.11		**Sheet Flow, 100B - 100C** Grass: Dense n= 0.240 P2= 3.30"
3.6	1,303	0.1369	5.96		**Shallow Concentrated Flow, 100C - 100D** Unpaved Kv= 16.1 fps
25.5	1,403	Total			

Summary for Subcatchment 200E: Post Subcat 200 - Site

Runoff = 5.92 cfs @ 12.14 hrs, Volume= 0.487 af, Depth= 4.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
1.155	61	>75% Grass cover, Good, HSG B
0.152	98	Water Surface, 0% imp, HSG B
1.307	65	Weighted Average
1.307	65	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0190	0.17		**Sheet Flow, 200EA - 200EB** Grass: Short n= 0.150 P2= 3.30"
0.5	95	0.0326	2.91		**Shallow Concentrated Flow, 200EB - 200EC** Unpaved Kv= 16.1 fps
10.3	195	Total			

Summary for Subcatchment 200W: Post Subcat 200 - Site

Runoff = 11.38 cfs @ 12.12 hrs, Volume= 0.877 af, Depth= 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
0.066	84	6" Stone, HSG B
1.689	61	>75% Grass cover, Good, HSG B
0.010	48	Brush, Good, HSG B
0.310	98	Water Surface, 0% imp, HSG B
0.219	55	Woods, Good, HSG B
2.293	66	Weighted Average
2.293	66	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0400	0.23		**Sheet Flow, 200WA - 200WB** Grass: Short n= 0.150 P2= 3.30"
1.0	182	0.0324	2.90		**Shallow Concentrated Flow, 200WB - 200WC** Unpaved Kv= 16.1 fps
8.3	282	Total			

Summary for Subcatchment 201: Post Subcat 201 - Off-Site

Runoff = 35.07 cfs @ 12.29 hrs, Volume= 3.801 af, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
0.393	84	6" Stone, HSG B
0.266	61	>75% Grass cover, Good, HSG B
11.683	48	Brush, Good, HSG B
1.044	96	Gravel surface, HSG B
0.052	98	Offsite Impervious, HSG B
0.000	98	Offsite Roofs, HSG B
1.576	55	Woods, Good, HSG B
15.014	53	Weighted Average
14.962	53	99.65% Pervious Area
0.052	98	0.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0420	0.11		**Sheet Flow, 201A - 201B** Woods: Light underbrush n= 0.400 P2= 3.30"
3.4	1,263	0.1502	6.24		**Shallow Concentrated Flow, 201B - 201C** Unpaved Kv= 16.1 fps
19.1	1,363	Total			

Summary for Subcatchment 300: Post Subcat 300 - Site

Runoff = 8.16 cfs @ 12.17 hrs, Volume= 0.718 af, Depth= 4.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
1.450	61	>75% Grass cover, Good, HSG B
0.332	98	Water Surface, 0% imp, HSG B
0.002	55	Woods, Good, HSG B
1.784	68	Weighted Average
1.784	68	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0130	0.15		**Sheet Flow, 300A - 300B** Grass: Short n= 0.150 P2= 3.30"
1.1	191	0.0325	2.90		**Shallow Concentrated Flow, 300B -300C** Unpaved Kv= 16.1 fps
12.6	291	Total			

Summary for Subcatchment 301: Post Subcat 301 - Off-Site

Runoff = 24.17 cfs @ 12.29 hrs, Volume= 2.612 af, Depth= 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
0.631	61	>75% Grass cover, Good, HSG B
2.482	48	Brush, Good, HSG B
0.288	96	Gravel surface, HSG B
0.476	98	Offsite Impervious, HSG B
0.110	98	Offsite Roofs, HSG B
4.652	55	Woods, Good, HSG B
8.638	58	Weighted Average
8.052	55	93.22% Pervious Area
0.586	98	6.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	100	0.0390	0.10		**Sheet Flow, 301A - 301B** Woods: Light underbrush n= 0.400 P2= 3.30"
4.1	1,281	0.1022	5.15		**Shallow Concentrated Flow, 301B - 301C** Unpaved Kv= 16.1 fps
20.3	1,381	Total			

Summary for Subcatchment 400: Post Subcat 400 - Site

Runoff = 4.78 cfs @ 12.23 hrs, Volume= 0.466 af, Depth= 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
1.156	61	>75% Grass cover, Good, HSG B
0.002	80	>75% Grass cover, Good, HSG D
0.120	98	Water Surface, 0% imp, HSG B
0.008	55	Woods, Good, HSG B
0.001	77	Woods, Good, HSG D
1.288	64	Weighted Average
1.288	64	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0070	0.11		**Sheet Flow, 400A - 400B** Grass: Short n= 0.150 P2= 3.30"
1.7	148	0.0081	1.45		**Shallow Concentrated Flow, 400B - 400C** Unpaved Kv= 16.1 fps
16.4	248	Total			

Summary for Subcatchment 401: Post Subcat 401 - Off-Site

Runoff = 3.54 cfs @ 12.40 hrs, Volume= 0.438 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (ac)	CN	Description
0.165	61	>75% Grass cover, Good, HSG B
0.004	80	>75% Grass cover, Good, HSG D
0.104	48	Brush, Good, HSG B
0.002	73	Brush, Good, HSG D
0.695	55	Woods, Good, HSG B
0.349	77	Woods, Good, HSG D
1.318	61	Weighted Average
1.318	61	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9	100	0.0100	0.06		**Sheet Flow, 401A - 401B** Woods: Light underbrush n= 0.400 P2= 3.30"
0.5	108	0.0583	3.89		**Shallow Concentrated Flow, 401B - 401C** Unpaved Kv= 16.1 fps
28.4	208	Total			

Summary for Reach 200R: Reach to Greenville Road

Inflow Area = 3.600 ac, 0.00% Impervious, Inflow Depth = 0.51" for 100-Year event
Inflow = 1.16 cfs @ 15.40 hrs, Volume= 0.154 af
Outflow = 0.59 cfs @ 14.47 hrs, Volume= 0.154 af, Atten= 49%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.58 fps, Min. Travel Time= 29.9 min
Avg. Velocity = 0.27 fps, Avg. Travel Time= 65.1 min

Peak Storage= 1,062 cf @ 14.47 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 2.00' Flow Area= 36.0 sf, Capacity= 106.77 cfs

8.00' x 2.00' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 5.0 '/' Top Width= 28.00'
Length= 1,045.0' Slope= 0.1672 '/'
Inlet Invert= 430.75', Outlet Invert= 256.00'

‡

Summary for Reach 300R1: Reach to Greenville Road

Inflow Area = 1.784 ac, 0.00% Impervious, Inflow Depth = 1.19" for 100-Year event
Inflow = 6.57 cfs @ 12.35 hrs, Volume= 0.177 af
Outflow = 2.64 cfs @ 12.55 hrs, Volume= 0.177 af, Atten= 60%, Lag= 11.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.63 fps, Min. Travel Time= 9.6 min
Avg. Velocity = 0.21 fps, Avg. Travel Time= 28.8 min

Peak Storage= 1,518 cf @ 12.55 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 2.00' Flow Area= 88.0 sf, Capacity= 184.78 cfs

14.00' x 2.00' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 15.0 '/' Top Width= 74.00'
Length= 365.0' Slope= 0.0915 '/'
Inlet Invert= 435.00', Outlet Invert= 401.60'

‡

Summary for Reach 301R2: Reach to Greenville Road

Inflow Area = 1.784 ac, 0.00% Impervious, Inflow Depth = 1.19" for 100-Year event
Inflow = 2.64 cfs @ 12.55 hrs, Volume= 0.177 af
Outflow = 0.90 cfs @ 13.07 hrs, Volume= 0.177 af, Atten= 66%, Lag= 31.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.24 fps, Min. Travel Time= 55.2 min
Avg. Velocity = 0.11 fps, Avg. Travel Time= 121.4 min

Peak Storage= 2,989 cf @ 13.07 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 2.00' Flow Area= 150.0 sf, Capacity= 250.04 cfs

45.00' x 2.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 15.0 '/' Top Width= 105.00'
Length= 801.0' Slope= 0.1253 '/'
Inlet Invert= 401.60', Outlet Invert= 301.20'

‡

Summary for Pond 200ET: Stone Infiltration Trench A

Inflow Area = 1.307 ac, 0.00% Impervious, Inflow Depth = 4.47" for 100-Year event
Inflow = 5.92 cfs @ 12.14 hrs, Volume= 0.487 af
Outflow = 8.54 cfs @ 12.15 hrs, Volume= 0.487 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.16 cfs @ 10.85 hrs, Volume= 0.264 af
Primary = 8.38 cfs @ 12.15 hrs, Volume= 0.222 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 441.04' @ 12.15 hrs Surf.Area= 6,626 sf Storage= 4,373 cf

Plug-Flow detention time= 175.2 min calculated for 0.486 af (100% of inflow)
Center-of-Mass det. time= 175.3 min (1,010.6 - 835.3)

Volume	Invert	Avail.Storage	Storage Description
#1	439.00'	4,373 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 13,252 cf Overall x 33.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
439.00	6,626	0	0
441.00	6,626	13,252	13,252

Device	Routing	Invert	Outlet Devices
#1	Discarded	439.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	441.00'	**333.0' long x 0.5' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.16 cfs @ 10.85 hrs HW=439.02' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=8.38 cfs @ 12.15 hrs HW=441.04' TW=429.68' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 8.38 cfs @ 0.58 fps)

Summary for Pond 200WP: Infiltration Pond A

Inflow Area = 3.600 ac, 0.00% Impervious, Inflow Depth = 3.66" for 100-Year event
Inflow = 19.26 cfs @ 12.15 hrs, Volume= 1.099 af
Outflow = 1.53 cfs @ 15.40 hrs, Volume= 1.099 af, Atten= 92%, Lag= 195.0 min
Discarded = 0.38 cfs @ 14.46 hrs, Volume= 0.945 af
Primary = 1.16 cfs @ 15.40 hrs, Volume= 0.154 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 430.87' @ 14.46 hrs Surf.Area= 15,943 sf Storage= 27,493 cf

Plug-Flow detention time= 632.9 min calculated for 1.099 af (100% of inflow)
Center-of-Mass det. time= 632.9 min (1,454.8 - 821.8)

Volume	Invert	Avail.Storage	Storage Description
#1	429.00'	29,602 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
429.00	13,486	0	0
431.00	16,116	29,602	29,602

Device	Routing	Invert	Outlet Devices
#1	Discarded	429.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	430.75'	**60.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Primary	428.00'	**3.00" Horiz. Outlet 1: 3" Low Flow Orifice** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.38 cfs @ 14.46 hrs HW=430.87' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.38 cfs)

Primary OutFlow Max=0.98 cfs @ 15.40 hrs HW=430.86' TW=430.86' (Dynamic Tailwater)
├**2=Broad-Crested Rectangular Weir** (Weir Controls 0.97 cfs @ 0.15 fps)
└**3=Outlet 1: 3" Low Flow Orifice** (Orifice Controls 0.01 cfs @ 0.12 fps)

Summary for Pond 300T: Stone Infiltration Trench B

Inflow Area = 1.784 ac, 0.00% Impervious, Inflow Depth = 4.83" for 100-Year event
Inflow = 8.16 cfs @ 12.17 hrs, Volume= 0.718 af
Outflow = 6.93 cfs @ 12.35 hrs, Volume= 0.718 af, Atten= 15%, Lag= 10.6 min
Discarded = 0.36 cfs @ 11.26 hrs, Volume= 0.541 af
Primary = 6.57 cfs @ 12.35 hrs, Volume= 0.177 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 436.05' @ 12.35 hrs Surf.Area= 15,257 sf Storage= 10,070 cf

Plug-Flow detention time= 222.5 min calculated for 0.718 af (100% of inflow)
Center-of-Mass det. time= 222.5 min (1,053.9 - 831.4)

Volume	Invert	Avail.Storage	Storage Description
#1	434.00'	10,070 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 30,514 cf Overall x 33.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
434.00	15,257	0	0
436.00	15,257	30,514	30,514

Device	Routing	Invert	Outlet Devices
#1	Discarded	434.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	436.00'	**235.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.36 cfs @ 11.26 hrs HW=434.02' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.36 cfs)

Primary OutFlow Max=6.57 cfs @ 12.35 hrs HW=436.05' TW=435.02' (Dynamic Tailwater)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 6.57 cfs @ 0.60 fps)

Summary for Pond 400P: Infiltration Pond B

Inflow Area = 1.288 ac, 0.00% Impervious, Inflow Depth = 4.35" for 100-Year event
Inflow = 4.78 cfs @ 12.23 hrs, Volume= 0.466 af
Outflow = 0.16 cfs @ 17.92 hrs, Volume= 0.466 af, Atten= 97%, Lag= 341.4 min
Discarded = 0.16 cfs @ 17.92 hrs, Volume= 0.466 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 441.26' @ 17.92 hrs Surf.Area= 6,750 sf Storage= 13,545 cf

Plug-Flow detention time= 890.5 min calculated for 0.466 af (100% of inflow)
Center-of-Mass det. time= 890.6 min (1,733.7 - 843.1)

Volume	Invert	Avail.Storage	Storage Description
#1	439.00'	18,697 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
439.00	5,235	0	0
440.00	5,883	5,559	5,559
442.00	7,255	13,138	18,697

Device	Routing	Invert	Outlet Devices
#1	Discarded	439.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	441.50'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.16 cfs @ 17.92 hrs HW=441.26' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=439.00' TW=0.00' (Dynamic Tailwater)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 310: DL-1 - Greenville Road - POST

Inflow Area = 37.802 ac, 2.46% Impervious, Inflow Depth = 2.98" for 100-Year event
Inflow = 80.22 cfs @ 12.30 hrs, Volume= 9.394 af
Primary = 80.22 cfs @ 12.30 hrs, Volume= 9.394 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Link 410: DL-2 Wetland Complex - POST

Inflow Area = 2.605 ac, 0.00% Impervious, Inflow Depth = 2.02" for 100-Year event
Inflow = 3.54 cfs @ 12.40 hrs, Volume= 0.438 af
Primary = 3.54 cfs @ 12.40 hrs, Volume= 0.438 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Page Intentionally Left Blank

A3.5.4.6 HydroCAD 100-Year Emergency Outlet Calculations

Page Intentionally Left Blank

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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

Pond 200WP: Infiltration Pond A Peak Elev=430.87' Storage=27,493 cf Inflow=19.26 cfs 1.099 af
Discarded=0.38 cfs 0.945 af Primary=1.10 cfs 0.154 af Outflow=1.47 cfs 1.099 af

Pond 400P: Infiltration Pond B Peak Elev=441.26' Storage=13,545 cf Inflow=4.78 cfs 0.466 af
Discarded=0.16 cfs 0.466 af Primary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.466 af

Summary for Pond 200WP: Infiltration Pond A

Inflow Area = 3.600 ac, 0.00% Impervious, Inflow Depth = 3.66" for 100-Year event
Inflow = 19.26 cfs @ 12.15 hrs, Volume= 1.099 af
Outflow = 1.47 cfs @ 15.48 hrs, Volume= 1.099 af, Atten= 92%, Lag= 199.8 min
Discarded = 0.38 cfs @ 14.46 hrs, Volume= 0.945 af
Primary = 1.10 cfs @ 15.48 hrs, Volume= 0.154 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 430.87' @ 14.46 hrs Surf.Area= 15,943 sf Storage= 27,493 cf

Plug-Flow detention time= 632.9 min calculated for 1.099 af (100% of inflow)
Center-of-Mass det. time= 632.9 min (1,454.8 - 821.8)

Volume	Invert	Avail.Storage	Storage Description
#1	429.00'	29,602 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
429.00	13,486	0	0
431.00	16,116	29,602	29,602

Device	Routing	Invert	Outlet Devices
#1	Discarded	429.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	430.75'	**60.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.38 cfs @ 14.46 hrs HW=430.87' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.38 cfs)

Primary OutFlow Max=0.94 cfs @ 15.48 hrs HW=430.85' TW=430.85' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.94 cfs @ 0.15 fps)

Summary for Pond 400P: Infiltration Pond B

Inflow Area = 1.288 ac, 0.00% Impervious, Inflow Depth = 4.35" for 100-Year event
Inflow = 4.78 cfs @ 12.23 hrs, Volume= 0.466 af
Outflow = 0.16 cfs @ 17.92 hrs, Volume= 0.466 af, Atten= 97%, Lag= 341.4 min
Discarded = 0.16 cfs @ 17.92 hrs, Volume= 0.466 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 441.26' @ 17.92 hrs Surf.Area= 6,750 sf Storage= 13,545 cf

Plug-Flow detention time= 890.5 min calculated for 0.466 af (100% of inflow)
Center-of-Mass det. time= 890.6 min (1,733.7 - 843.1)

Volume	Invert	Avail.Storage	Storage Description
#1	439.00'	18,697 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
439.00	5,235	0	0
440.00	5,883	5,559	5,559
442.00	7,255	13,138	18,697

Device	Routing	Invert	Outlet Devices
#1	Discarded	439.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	441.50'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.16 cfs @ 17.92 hrs HW=441.26' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=439.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Page Intentionally Left Blank

Watershed Maps

Page Intentionally Left Blank

Legend

- Woods - B Soils
- Grass - B Soils
- Gravel - B Soils
- Impervious
- Brush - B Soils
- Water
- 6" Stone - B Soils

Legend

- Tc Line (With Elevations)
- Subcat Area
- Soil Boundary
- Subcatchment
- Drainage Pond/Bio Retention/ Infiltrating Swale
- Drainage Structure/Pond with Insignificant Storage
- Swale or Reach
- Design Point
- Reach
- Swale

NOTE:

AREAS OF COLOR OUTSIDE SUBCAT AREA BOUNDARIES ARE NOT INCLUDED WITHIN HYDROCAD ANALYSIS (FOR PICTORAL USE ONLY).

Design Line 1 (DL-1)

Design Line 2 (DL-2)

Greenville Road (Rt 10A)
(50' WIDE PUBLIC RIGHT-OF-WAY)

PR 6" STONE ACCESS ROAD

TH-1 GWT=36"

TH-2 GWT=32"

TH-3 GWT=88"

TH-4 GWT=60"

TH-5 GWT=78"

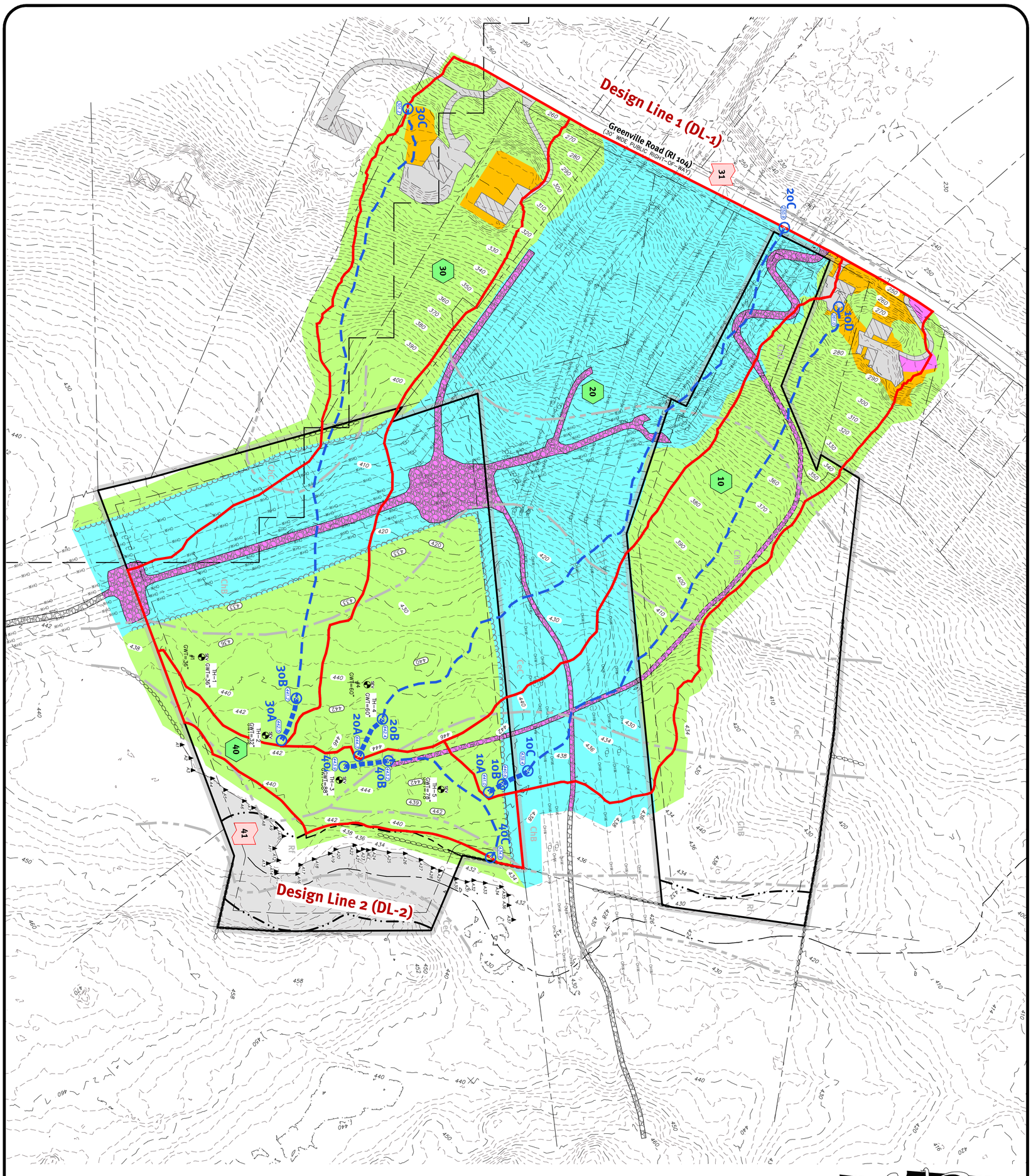
Scale: 1"=100'
0 50' 100' 200'

Post-Watershed Map
Grand Banks Solar
DiPrete Engineering
Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-460-6006 www.diprete-eng.com

DE Job No: 2612.005 Copyright 2019 by DiPrete Engineering Associates, Inc.

z:\dem\ah\projects\2612-005 grand banks solar\autocad drawings\2612-005-wsmp.dwg Plotted: 10/1/2019

z:\demain\projects\2612-005 grand banks solar\autocad drawings\2612-005-wamp.dwg Plotted: 10/1/2019



NOTE:
AREAS OF COLOR OUTSIDE SUBCAT AREA BOUNDARIES ARE NOT INCLUDED WITHIN HYDROCAD ANALYSIS (FOR PICTORAL USE ONLY).

Legend

- Woods- B Soils
- Grass- B Soils
- Gravel- B Soils
- Impervious
- Brush- B Soils

Legend

- Tc Line (With Elevations)
- Subcat Area
- Soil Boundary
- Subcatchment
- Drainage Pond/Bio Retention/ Infiltrating Swale
- Drainage Structure/Pond with Insignificant Storage
- Swale
- Design Point
- Reach

Scale: 1"=100'
0 50' 100' 200'

Pre-Watershed Map
Grand Banks Solar

DiPrete Engineering
Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-464-6006 www.diprete-eng.com

RECEIVED FOR RECORD
NORTH SMITHFIELD R.I.
Aug 08,2019 at 05:13P
BOOK 821 PAGE 12
DOC #: 00040154

GRANT OF EASEMENT

GRAND BANKS COMMERCE PARK, LLC, a Rhode Island limited liability company with a mailing address at P.O. Box 663, Slatersville, Rhode Island 02876 ("Grantor"), for consideration of One ($1.00) Dollar, grants to THE NARRAGANSETT ELECTRIC COMPANY, a Rhode Island corporation having a principal place of business at 280 Melrose Street, Providence, Rhode Island 02907, and VERIZON NEW ENGLAND INC., a corporation organized and existing under the laws of New York and duly authorized to do business in said State of Rhode Island, with a principal place of business at 185 Franklin Street, Boston, Massachusetts ("Grantees"), their successors and assigns, with Quitclaim Covenants, a perpetual right and easement as described in Section 1 below ("Easement") in, under, through, over, across, and upon the Grantor's land, as described in Section 2 below ("Grantor's Land").

Property Address: AP 12 Lot 156 - 0 Greenville Road, North Smithfield, R.I.

Section 1 – Description of Easement

The "Easement" granted by the Grantor to the Grantees consists of the perpetual right and easement:

a) To install, construct, reconstruct, repair, replace, add to, maintain and operate an overhead distribution system ("Distribution System") for the distribution of electric current and for telephone use, which Distribution System includes a line of poles with the necessary wires, cables, anchors, guys, bollards, equipment and appurtenances attached thereto, over, across and upon the Grantor's land, as may from time to time be required for the purpose of supplying electric and telephone service to the Grantor's Land;
b) To clear and keep cleared from time to time the portions of the Grantor's Land wherein the Distribution System is located of such trees, shrubs, bushes, above ground and below ground structures, objects and surfaces as may in the opinion and judgment of the Grantees, their successors and assigns, interfere with the safe and proper operation of the Distribution System;
c) To make such excavation or excavations as may be reasonable and necessary to construct, reconstruct, repair and remove the Distribution System. But the Grantees shall properly backfill any excavation and restore the surface of the Grantor's Land in as good condition as before the excavation was made; and
d) To pass over and across the Grantor's Land as reasonable and necessary for all the purposes described in this Section.

Section 2 – Description of Grantors' Land

The "Grantor's Land" consists of land situated on the easterly side of Greenville Road, aka Farnum Pike, in the Town of North Smithfield, County of Providence, State of Rhode Island, designated as Lot 156, North Smithfield Tax Assessor's Map 10, being that certain tract or parcel of land conveyed to the Grantor by deed from Ed's Construction, Inc duly recorded with the Records of Land Evidence in North Smithfield on September 1, 2004, in Book 274, Page 947.

RE25059198JX

Address of Grantee:
Narragansett El., 280 Melrose Street, Providence, RI 02907
Verizon, 5 High Street Pawtucket, Rhode Island 02860

After recording return to:
Joyce Xifaras
National Grid
Service Company, Inc.
280 Melrose St.
Providence, RI 02907

49 NSMIRI GEN

6956-1

Section 3 – Location of the Distribution System

The "Distribution System" shall extend in a general easterly direction from an existing pole # 62, which is located on the easterly side of Greenville Road, to a proposed line of poles which are to be located within certain portions of Grantor's Land. Said Distribution System shall be located in a location mutually satisfactory to the Grantor and to the Grantees and such location shall become established by and upon the installation thereof by the Grantees. The Grantor, for itself, its successors and assigns, covenant and agrees with the Grantees, for themselves, their successors and assigns, that this Grant of Easement and the location of the Distribution System may not be changed or modified without the written consent of the Grantees, their successors and assigns, which consent may be withheld by the Grantees in their sole discretion.

Section 4 – Distribution System Ownership

It is agreed that the Distribution System shall remain the property of the Grantees, their successors and assigns, and that the Grantees, their successors and assigns shall pay all taxes assessed thereon.

By signing this easement, Gary S. Ezovski certifies that he is signing in the name of the GRAND BANKS COMMERCE PARK, LLC and he is the authorized member and is empowered to grant the within easement on the terms and conditions stated herein.

Executed as a sealed instrument as of this 23rd day of July, 2019,

In the presence of:

GRAND BANKS COMMERCE PARK, LLC

By: Gary S. Ezovski
Its: Member

STATE OF Rhode Island
COUNTY OF Providence

In North Smithfield in said County on the 23rd day of July, 2019, before me personally appeared the above named Gary S. Ezovski, to me known and known by me to be the party executing the foregoing instrument, and he acknowledged said instrument, by him executed, to be his free act and deed, in his capacity, and the free act and deed of GRAND BANKS COMMERCE PARK, LLC.

Notary Public
Printed Name: Jerianne Nunes
My Commission expires: 11/29/21

Jerianne Nunes
Notary Public
State of Rhode Island

RECORDED IN NORTHSMITHFIELD RI Aug 08,2019
AT 05:13P ATTEST DEBRA A TODD
Town Clerk

WR#25059198

Town of North Smithfield Planning Board

Preliminary Minor Land Development Decision of Approval

1. Applicant

Developer: Econox Renewables, Inc.
c/o DiPrete Engineering
2 Stafford Court, Cranston RI 02920

Surveyor/Engineer: DiPrete Engineering, Inc..

2. Property

Location: Plat 12, Lots: 156 and 156A

Zoned: RA

3. The Record:

At its meeting of April 4th, 2019, the Planning Board voted unanimously by a count of 7-0 to authorize the Town Planner to write this positive Findings of Fact Decision for approval including conditions. The Final Application must be submitted to the Planning Board for approval.

4. Statement of Review, Hearing & Authority:

This application was heard under the provisions of the *North Smithfield, Rhode Island Land Development & Subdivision Regulations adopted* pursuant to Title 43, Chapter of the Genera Laws of the State of Rhode Island & Providence Plantations, entitled *The Land Development and Subdivision Review Enabling Act of 1992 as amended.*

5: Findings of Fact:

Pursuant to R.I.G.L. § 45-23-60, The following findings of fact shall serve as the decision:

1. The proposed development is consistent with the comprehensive community plan as follows: Land Use Goal 4. Grow the non-residential tax base in a manner that encourages local employment opportunities. Goal 5. Encourage growth of an appropriate scale commensurate with road carrying capacity. Energy, Natural Hazards and Climate Change Action 1.a.1. Promote energy incentives. Policy 1.b. Promote environmental sustainability through reduction of greenhouse gases.
2. The proposed development is consistent with the standards and provisions of the municipality's zoning ordinance, particularly Section 5.7 solar photovoltaic system installations. The Planning Board considers this decision of approval supportive by way of an advisory opinion to the ZBR in conjunction with any conditions imposed by ZBR. The Planning Board has requested to review the Final Application inclusive of said ZBR recorded decision.
3. No significant negative environmental impacts from the proposed development are anticipated. The project must obtain all salient DEM permits as a condition of this approval

prior to commencement of land clearing activity. All DEM Permits shall be submitted with the Final Application to the Planning Board.

4. The land development will not result in the creation of individual lots with physical constraints to development that building on those lots according to pertinent regulations and building standards would be impracticable. (See definition of Buildable lot); and
5. The proposed land development must obtain adequate and permanent physical access to Greenville Road. The form of that access includes an access easement from National Grid. A copy of which shall be recorded in the Town's land evidence records and submitted with the Final Application.

Conditions of Approval:

1. All DEM permits shall be submitted (and inclusive of pollinator meadow technique).
2. The applicant shall pay the Town for its peer review engineering services during construction.
3. Recorded National Grid easement submitted with Final Plan Application.
6. Decommissioning bond shall be submitted with Final Plan Application.

<u>All the above-conditions must be met prior to the issuance of a building permit in advance of any and all site work including land clearing.</u>

6. Certification:

This is to certify that the above statement(s) of Decision and conditions reflects the action of the North Smithfield Planning Board at their regularly scheduled meeting of Thursday, July 11, 2019. This is a true and accurate recording of such action and is intended to be part of the official record of the North Smithfield Planning Board.

Certified:

_____ Date: _____

Thomas Kravitz
Administrative Officer

TOWN of NORTH SMITHFIELD
PLANNING DEPARTMENT

One Main Street
Slatersville, RI 02876
Phone: 767-2200 Fax: 766-0016

APPENDIX B: APPLICATION FOR SUBDIVISION AND LAND DEVELOPMENT PROJECTS

The undersigned owner of land hereby requests to be placed on the agenda of the North Smithfield Planning Board and state that the required information detailed in the Subdivision Regulations of the Town of North Smithfield have been presented to the Administrative Officer.

Scott Milnes of Econox Renewables Inc.
is hereby designated as the person to whom legal process may be served in condition with any proceedings arising out of this application. I/We also certify that the undersigned is the owner of the property designed below:

Name of Project: Grand Banks Solar **Date:** 2/26/2020

Classification

- [X] Minor
- [ ] Major

Type of Project

- [ ] Administrative
- [ ] Subdivision
- [X] Land Development Project

Review Stage

- [ ] Pre-Application/Concept
- [ ] Master Plan
- [ ] Preliminary Plan
- [X] Final Plan

1. Assessor's Plat(s) 12 Assessor's Lot(s) 156 & 156-A
2. Number of Lots: 2 3. Zoning Designation(s): RA
4. Street Name: Greenville Road
5. Divider/ Developer: Econox Renewables, Inc.
6. Divider's/ Developer's Name: Scott Milnes - Econox Renewables - President
   (Please Print)
   Divider's/ Developer's Name: Scott Milnes
   (Signature)
7. Names, addresses, and signatures of all persons with 10% or more interest:

Pres/MBR Grand Banks Commerce Bank LLC Gary S. Ezovski
(Signature) (Please Print)

(Signature) (Please Print)

8. Surveyor/ Engineer/ Attorney/ Representative: DiPrete Engineering
   Name: Dave Russo
   Address: 2 Stafford Court, Cranston, RI 02920
   Daytime Telephone # 401-943-1000 Facsimile #

(The owner hereby grants permission to Planning Board members and other Town officials to enter the designated property for the purpose of inspection after notifying the owner 48 hours in advance of site visit.)

Solar Project
Facility Decommissioning Plan

Grand Banks Solar
1,000 kW Ground Mount Solar Array
Greenville Road
North Smithfield, RI

Plat 12 Lot 156 & 156A

Contents

Solar Project Facility Decommissioning Plan

1. Introduction

1.1. Background

As a condition of approval of the Planning Board a Decommissioning Plan for the Solar facility has been developed for review. The Decommissioning Plan is required to include a detailed plan with time frames or milestones after termination of operations for restoring the property to the conditions that existed prior to the plant construction.

The useful life of the solar plant is expected to be 25 years or more. At the end of useful life, the system owner will suspend operations and decommission the plant including necessary demolition and site reclamation.

1.2. Plan Purpose

The purpose of this document is to establish a detailed plan for decommissioning and reclamation activities after the useful life of the project has ended. Refinement of these activities will be required to reflect the future best practices or improvements are discovered by the solar industry during the life of the project. It will be necessary to update and finalize this demolition and reclamation plan.

2. Decommissioning Project Elements and Milestones

The key tasks of the project are divided into related activities that represent milestones in the process. We describe the activities in each of the tasks in more detail below process.

The key Project components to be affected by decommissioning activities are discussed below. In general, decommissioning would attempt to maximize the recycling of all facility components. Specific opportunities for recycling are discussed below in the context of various site components. The individual Project components to be decommissioned will be recycled to the maximum extent practicable or removed from the site and disposed of at an appropriately licensed disposal facility. The general decommissioning approach would be the same whether a portion of the Project or the entire Project would be decommissioned.

2.1. Planning

The activities involved in the facility closure will depend on the expected future use of the site. Certain facility equipment and features may be left in place for future uses, such as transmission facilities and roads. At the time of decommissioning, a plan will be submitted to the Town proposing the equipment that will be removed and, if applicable, equipment that will remain, based on expected future use of the site.

Pre-closure activities, include final closure and reclamation planning, that identifies measures to be taken to restore the site to near pre-construction conditions or compatible with surrounding land and land use that may have evolved during the period the plant is in service. This includes several activities;

- Complete an analysis of the project materials and their composition to identify those specific components that may be recycled, scrapped, or sent to disposal sites. Identify specific recycling facilities and disposal sites for materials.

- Develop specifications for demolition and reclamation, which will serve as the basis for contractor bids for the decommissioning project and establish the scope of demolition and reclamation, including developing reclamation plans in compliance with local, state, and federal regulations.

2.2. Permitting

During the planning process the Town will be briefed and other applicable agencies on the decommissioning process and plans. The permits and approvals required for the decommissioning will be identified and permits will be obtained prior to commencing operations.

2.3. Site Preparation for Decommissioning

The first step in the decommissioning process would be to assess existing site conditions and prepare the site for demolition. While planning of decommission may take up to one (1) year actual site decommissioning and equipment removal will be completed within 180 days from the date of discontinued operation. Therefore, access roads, fencing, some electrical power, and other facilities will temporarily remain in place for use by the decommissioning workers until no longer needed. Demolition debris will be placed in temporary onsite storage area(s) pending final transportation and disposal and/or recycling according to the procedures listed below.

A plan for de-energizing portions of the facility to allow safe decommissioning and formal lock out and tag out procedures will be implemented. This will ensure all electrical components are placed and maintained in a safe condition for demolition activities prior start of work.

2.4. Disassembly and Demolition

PV Module and Racking Removal and Recycling

During decommissioning, Project components that are no longer needed would be removed from the site and recycled or disposed of at an appropriately licensed disposal facility. The first operation is to disconnect and remove modules from the racking assemblies. Modules are segregated for transportation to the nearest storage facility

Next comes the disassembly of the racking and mounting structures, DC wiring materials, and combiner boxes. The material will be segregated for disposal or salvage. Steel piles that support the PV racking system will be removed. Below ground portions of the supports will be removed.

The demolition debris and removed equipment may be cut or dismantled into pieces that can be safely lifted or carried with the onsite equipment being used. The debris and equipment will be processed for transportation and delivery to an appropriately licensed disposal facility or recycling center. Modules will be recycled or disposed of in accordance with applicable laws at the time of decommissioning.

Internal Power Collection System

The combiner boxes that convey DC power generated from the solar arrays will be dismantled. The inverters that convert the DC power to AC power and the transformers that convert the output of the inverter and convey the power to the substation will also be dismantled and removed. The cast-in-place concrete foundations of the transformer. Will be broken up, removed and recycled.

Any overhead portions of the collection system will be removed. Overhead conductors will be removed from the poles, and the poles and pole foundations will be removed. Aluminum from the conductors will be recycled or removed from the site to an appropriately licensed disposal facility. If not planned for other use, the utility interconnection will be deactivated and restored to the extent agreed upon with the local utility or to the point of change of ownership

Medium voltage collector system electrical components will be electrically disconnected and made safe for removal. The switches will be disassembled and removed from the site. The underground conduit and metal dead-end structures will also be disassembled and removed. Concrete foundations for equipment will be broken up and removed from the site. Steel, aluminum, copper and other materials will be temporarily stockpiled at or near a designated processing location pending transport to an appropriate offsite recycling facility. All metals will be recycled to the extent practical given the recycling options available at the time of decommissioning.

Roads
Onsite access roads will remain in place to accomplish decommissioning at the end of the Project's life. At the time of decommissioning, if the roads will be beneficial for future use of the site; those roads may remain after decommissioning. Roads that will not be used will be restored during contouring operations at the end of the process.

Fencing
Project site perimeter fencing will be removed at the end of the decommissioning project, unless it may be utilized for future use of the site. Since the project site was not originally fenced, this includes removal of all posts, fencing material, gates etc. to return the site to pre-project condition.

2.5. Transportation and Clean up

During the disassembly and demolition process materials are segregated and temporarily place in gathering areas for transportation. The various materials including concrete, steel, aluminum, copper and other materials will be temporarily stockpiled at or near a designated processing location pending transport to an appropriate offsite recycling facility. All such materials will be transported from the site to approved designated facilities for recycling, scrapping or disposal. All metals will be recycled to the extent practical given the recycling options available at the time of decommissioning. Modules will be collected and transported to storage sites for final recycling.

Clean-up of soils and site, if identified will be completed to ensure that clean closure is accomplished.

2.6. Re-contouring and vegetation

In general, the decommissioning will be undertaken using traditional heavy construction equipment including but not limited to front end loaders, track mounted and rubber tired excavators. Where excavation is required those areas of removal will be backfilled with natural material. Any voids left from the removal of foundations will be backfilled with surrounding subsoil and topsoil and fine graded to ensure suitable drainage and reclamation of natural grades.

Soil management and re-contouring operations will be conducted so as to minimize the surface area disturbance and implement the activities in the safest and most efficient manner and in accordance withal applicable local requirements. Major earthwork is not anticipated as construction of the site will not alter the general grade across the site.

To provide for post-decommissioning dust control on the site, areas of exposed soils will be revegetated, consistent with the expected future use of the site. For example, future site use is expected to be agricultural, a revegetation approach will be implemented that will not conflict with the expect agricultural use. The native dry grass vegetation will be re-established to prevent the spread of weeds and long-term monitoring will be conducted to confirm reclamation and weed control are successful. Mulching may be used for temporary dust control until vegetation is established.

We have assumed that the planning process would be initiated one year prior to the anticipated end of commercial operation. Planning for the decommissioning activities and the associated permitting is scheduled far in advance to allow for meaningful consultation with the Town or other applicable agencies. Permitting will be finalized prior to the start of on-site activities. Actual site decommissioning and equipment removal will be completed within 180 days from the date of discontinued operation.

Photovoltaic System Operations and Maintenance Plan

Grand Banks Solar

1,000 kW Ground Mount Solar Array

Greenville Road

North Smithfield, RI

Plat 12 Lot 156 & 156A

OPERATIONS AND MAINTENANCE

Service Life and Availability

The Project's expected service life of the proposed facility is 25-30 years. The minimum specifications for the solar module production warranty are estimated at 90 percent of nameplate capacity at year 10 and 80 percent of nameplate capacity at year 25. Similarly, the inverters are factory warranted to be free from defects in material and workmanship for a period of 10 years. Inverter components can be replaced and repaired if maintenance is required. The racking system and associated piers are galvanized steel and have a useful life in excess of 25 years.

Operations and Maintenance Plan

The maintenance plan for the Project is created to ensure the performance of the solar facilities. It includes a scheduled check of the main items and a predictive maintenance approach of the devices subjected to derating/degradation. The main scheduled activities are listed below:

- Housekeeping of the site: road maintenance, grass cutting, fence and gate inspection and PV panel washing (if required). Panel washing will be performed with water only, no soap or detergents.
- Performance monitoring: weekly or monthly download of the data acquired by the on-site customer owned data acquisition system (energy produced, alarms, faults, etc.).
- Inspection of the main equipment:
  - PV panels: visual check of the panels, racking system and surrounding grounds to verify the integrity of the panels and racking structure, the presence of animals and nests, etc.
  - Inverters, transformer and electrical panels:
    - Visual check of the devices including the connection cabinet and the grounding network. Check for presence of water and dust;
    - Electrical check: measurement of the insulation level and dispersion. Check of the main switches and safety devices (fuses);
    - Noise: check of abnormal sounds.
- Cabling and Wiring: visual check of the buried and aerial electrical line and connection box to verify their status.

All maintenance activities will be performed by qualified personnel. Notably, maintenance can be performed without shutting down the entire plant. As an example, if a module needed repair, that particular section of the array can be disconnected from the array by opening the combiner box circuit. The module can then be replaced and the combiner cox circuit closed.
This temporary shutdown would affect a small percent of the array's production capability for the plant. This allows the photovoltaic modules to operate during an unscheduled outage.
The generation plant will be remotely operated through a real time control system. All the monitored data will be managed by a qualified subcontractor.

Vegetation Maintenance Plan

In order to minimize mowing frequency, as well as the potential fire threat posed by dry vegetation in the immediate vicinity of the solar panels, the solar farm has been seeded with a mix specifically designed to maintain a low height. See attached seed description.

Additionally, inspections and mowing frequencies will be maintained in order to ensure that the average height is maintained at 12" or less with the maximum height of vegetation being 18". The low side of the modules are at least 36" from the ground, so this provides a buffer of at least 18". Inspections will be at least quarterly, and mowing will be a minimum of 2x per year.

Site inspections and mowing frequency may be adjusted if necessary to maintain the above limits. Additionally, if necessary we may employ additional measures for weed control to maintain safety while considering aesthetics, cost, and environmental responsibility.

Vegetative screening shall be maintained per the site plan. Pruning of trees/bushes on property, or overhang property that cause shading of the PV panels or potential damage to fencing/equipment. Dead plantings shall be replaced as required.

EMERGENCY INFORMATION

Emergency Contact:

_____

EMERGENCY SHUTDOWN PROCEDURE

The following steps are required to shut the system down in an emergency; for each inverter:

1 Turn the AC Disconnect Switch to the "OFF" position.

2 Turn the DC Disconnect Switch to the "OFF" position.

These steps will power off the inverter; however, AC power from the grid and DC power from the array will still be present in the inverter wire termination section.

The next step will disconnect power from the utility transformer to the inverters:

1 Open the main overhead disconnect switch. Or disconnect the individual inverter circuit breakers located inside the switchboards within the site.

IMPORTANT NOTES:
WHILE THE ABOVE STEPS ISOLATE THE PV ARRAY CIRCUITS FROM THE INVERTERS, ALL CIRCUITS BETWEEN THE PV MODULES AND THE INVERTERS WILL BE ENERGIZED DURING DAYLIGHT HOURS. HIGH VOLTAGE WILL BE PRESENT EVEN AT LOW LEVELS OF SUNLIGHT.
IT IS IMPERATIVE TO FOLLOW SAFE WORK PRACTICES AND USE PROPER SAFETY EQUIPMENT DURING ANY EMERGENCY OPERATIONS, WHICH INVOLVE ANY PORTION OF THE PV ARRAY.

Operations and Maintenance Tasks and Frequency

Plant device and job	***Frequency***
Photovoltaic Field	
PV modules visual/Torque check	*Once Yearly*
Wirings and Junction boxes visual check	*Once Yearly*
PV strings measurement of the insulation	*Once Yearly*
PV strings and string boxes faults	*Once Yearly*
PV panels washing	*Yearly (if required)*
Grass cutting	*As noted above*
Vegetative Screening Upkeep *(if applicable at site)*	*Once in spring, once in summer*
Electric boards	
Case visual check	*Once Yearly*
Fuses check	*Once Yearly*
Surge arresters check	*Once Yearly*
Torque check	*Once Yearly*
DC voltage and current check	*Once Yearly*
Grounding check	*Once Yearly*
Inverter	
Case visual inspection	*Once Yearly*
Air intake and filters inspections	*Once Yearly*
Conversion stop for lack of voltage	*Once Yearly*
AC voltage and current check	*Once Yearly*
Conversion efficiency inspection	*Once Yearly*
Data-logger memory download	*Once Yearly*
Fuses check	*Once Yearly*
Grounding check	*Once Yearly*
Torque check	*Once Yearly*
Noise Inspection	*Once Yearly*
Support structures	
Visual check	*Once Yearly*

SOLAR MIX

Valley Greens experts have been customizing seed blends for over 20 years and have come up with a custom seed blend answer for the solar farm industry. Over the past ten years we have been blending and improving our mixes to achieve the requirements for a low maintenance, low growth product that can perform in a variety of challenging environments.

Valley Greens experts have chosen a balanced blend of fescue cultivars based upon each of their strengths with all cultivars naturally exhibiting low growth habits and drought tolerance. Not only can these cultivars perform in poor soil situations it's where they originally populated soils and improved through natural selection and survival.

The seed farming and production industry has improved upon these natural characteristics through pollination and propagation techniques that have given us the strongest plants to retain soils with little to no maintenance. They naturally have low nutritional requirements due to these low growth habits.

This blend contains a balance of Hard, Creeping, Chewing and Sheep Fescues. Valley Green is continually seeking new varieties of these and other cultivars to keep our blends packed with the best germinating seeds that perform in all the challenges you encounter.

With any planting irrigation during the establishment stage will dramatically increase germination and help to properly colonize your soil.

This is a custom blend and it's best to inform your Valley Green location of your needs so they can be available for you when you require them.

VALLEY GREEN INC.

SOLAR MIX

PURITY	SEED VARIETIES	GERM		
24.78%	**HENRY HARD FESCUE**	**85%**		
24.78%	**AZURE SHEEPS FESCUE**	**85%**	SEED TOTAL	98.86%
24.67%	**AMBROSE CHEWINGS FESCUE**	**85%**	OTHER TOTAL	0.00%
24.63%	**CREEPING RED FESCUE**	**85%**	TOTAL	98.86%

COARSE KIND: NONE CLAIMED

1.01% **INERT** 0.13% **CROP** 0.00% **WEED**

TESTED: 1/17 **VALLEY GREEN INC CHARLTON, MA** **508-987-101**

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
235 Promenade Street
Providence, Rhode Island 02908

February 7, 2020

Grand Banks Commerce Park, LLC
c/o Gary S. Ezovski
P.O. Box 663
Slatersville, RI 02876

Insignificant Alteration – Permit

RE: Wetlands Application No. 19-0293 and RIPDES Program File No. RIR 101957 in reference to the property and proposed project located:

> Approximately 1,250 feet southeast of Greenville Road; approximately 2,100 feet south of the intersection of Old Greenville Road and Greenville Road; Assessor's Plat 12, Lots 156, 156-A, & 312, North Smithfield, RI.

Dear Mr. Ezovski:

Kindly be advised that the Department of Environmental Management's ("DEM") Freshwater Wetlands Program ("Program") has completed its review of your **Request for Preliminary Determination** application. This review included a site inspection of the above referenced property ("subject property") and an evaluation of the proposed construction of a 1MW solar photovoltaic system with permeable access drive, electrical connections, and stormwater best management practices, as illustrated and detailed on site plans submitted with your application. These site plans were received by the DEM on October 4, 2019.

Our observations of the subject property, review of the site plans and evaluation of the proposed project reveals that alterations of freshwater wetlands are proposed. However, pursuant to 250-RICR-150-15-1.9 of the Rules and Regulations Governing the Administration and Enforcement of the Fresh Water Wetlands Act, 250-RICR-150-15-1 (Rules), this project may be permitted as an **insignificant alteration** to freshwater wetlands under the following terms and conditions:

Terms and Conditions for Wetlands Application No. 19-0293 and RIPDES File No. RIR101957:

1. This letter is the DEM's permit for this project under the R.I. Fresh Water Wetlands Act, R.I. Gen. Laws § 2-1-18 et seq.

2. This determination also includes your final authorization to discharge storm water associated with construction activity under the **2018 RIDPES General Permit for Stormwater Discharge During Construction Activity ("CGP")**. For future references and inquiry, your permit authorization number is RIPDES File No. **RIR 101957.**

3. This permit is specifically limited to the project, site alterations and limits of disturbance as detailed on the site plans submitted with your application and received by the DEM on October 4, 2019. A copy of the site plans stamped approved by the DEM is enclosed. Changes or revisions to the project that would alter freshwater wetlands are not authorized without a permit from the DEM.

4. Where the terms and conditions of the permit conflict with the approved site plans, these terms and conditions shall be deemed to supersede the site plans.

5. You must notify this Program in writing of the anticipated start date, and of your contractor's contact information, by submitting the Notice of Start of Construction Form prior to commencement of any permitted site alterations or construction activity. You must also notify this Program in writing upon completion of the project, including submittal of the Notice of Termination Form. The Start of Construction Form and the Notice of Termination can be found on the webpage: dem.ri.gov/stormwaterconstruction

6. A copy of the stamped approved site plans and a copy of this permit must be kept at the site at all times during site preparation, construction, and final stabilization. Copies of this permit and the stamped approved plans must be made available for review by any DEM or City/Town representative upon request.

7. Within ten (10) days of the receipt of this permit, you must record this permit in the land evidence records of the Town of North Smithfield and supply this Program with written documentation obtained from the Town showing this permit was recorded.

8. The effective date of this permit is the date this letter was issued. This permit expires four (4) years from the date of this letter unless renewed pursuant to the Rules.

9. Any material utilized in this project must be clean and free of matter that could pollute any freshwater wetland.

10. Prior to commencement of site alterations, you shall erect or post a sign resistant to the weather and at least twelve (12) inches wide and eighteen (18) inches long, which boldly identifies the initials "DEM" and the application number of this permit. This sign must be maintained at the site in a conspicuous location until such time that the project is complete.

11. Both the owner and the contractor retained to undertake the construction activity are required to comply with all terms and conditions of the CGP. This includes maintaining the Soil Erosion and Sediment Control (SESC) Plan, performing the required inspections and maintenance of the selected Best Management Practices (BMPs), and retaining inspection records. Further information on the requirements of the CGP is available at: http://www.dem.ri.gov/programs/benviron/water/permits/swcoord/pdf/cpg092618.pdf.

12. Temporary erosion and sediment controls detailed or described on the approved site plans shall be properly installed at the site prior to or commensurate with site alterations. Such controls shall be properly maintained, replaced, supplemented, or modified as necessary throughout the life of this project to minimize soil erosion and to prevent sediment from being deposited in any wetlands not subject to disturbance under this permit.

13. Upon permanent stabilization of all disturbed soils, temporary erosion and/or sediment controls must be removed.

14. You are responsible for the proper installation, operation, maintenance and stability of any mitigative features, stormwater treatment facilities, and systems of treatment and control that are installed or used in compliance with this permit to prevent harm to adjacent wetlands until documentation is provided that this responsibility has been assigned to another entity. Operation and maintenance shall be as described in the plan entitled, "Operation and Maintenance Plan, Grand Banks Solar, Located in North Smithfield, Rhode Island, Applicant: Econox Renewables, Inc", dated 9/25/2019, as prepared by DiPrete Engineering, Two Stafford Court, Cranston, RI 02920.

15. You are obligated to install, utilize and follow all best management practices detailed or described on the approved site plans in the construction of the project to minimize or prevent adverse impacts to any adjacent freshwater wetlands and the functions and values provided by such wetlands.

16. You must provide written certification from a registered land surveyor or registered professional engineer that the stormwater drainage system including any and all basins, piping systems, catch basins, culverts, swales and any other stormwater management control features have been constructed/installed in accordance with the site plans approved by this permit. This written certification must be submitted to this Program within twenty (20) days of its request or upon completion of the project.

Pursuant to the provisions in 250-RICR-150-15-1.7(A)(9) and 250-RICR-150-15-1.11(D), as applicable, any properly recorded and valid permit is automatically transferred to the new owner upon sale of the property.

Please be aware that the RIDEM's Rules and Regulations Governing the Establishment of Various Fees (250-RICR-30-00-1) require that RIPDES CGP permit holders to pay an Annual Fee of $100.00. An invoice will be sent to the owner on record in May/June of each year if the construction was still active as of December 31st of the previous year. The owner will be responsible for the Annual Fee until the construction activity has been completed, the site has been properly stabilized, and a completed Notice of Termination (NOT) has been received by the RIPDES Program.

You are required to comply with the terms and conditions of this permit and to carry out this project in compliance with the Rules at all times. Failure to do so may result in an enforcement action by this Department.

In permitting the proposed alterations, the DEM assumes no responsibility for damages resulting from faulty design or construction.

Kindly be advised that this permit is not equivalent to a verification of the type or extent of freshwater wetlands on site. Should you wish to have the types and extent of freshwater wetlands verified, you may submit the appropriate application in accordance with 250-RICR-150-15-1.8(C).

This permit does not remove your obligation to obtain any local, state, or federal approvals or permits required by ordinance or law and does not relieve you from any duties owed to adjacent landowners with specific reference to any changes in drainage.

Please contact Daniel Kowal of this office (telephone: 401-222-4700, ext. 7416) should you have any questions regarding this letter.

Sincerely,

Martin D. Wencek

Martin D. Wencek, Permitting Supervisor
Freshwater Wetlands Program
Office of Water Resources

MDW/DMK/dmk

Enclosure: Approved site plans

ec: Nicholas A Pisani, P.E., DEM Stormwater Program
David Russo, PE, DiPrete Engineering
Kerry Anderson, North Smithfield Building Official

Town of North Smithfield
Detail Level History
Receivable Group: ALL
Printed on 03/03/2020 at 11:06:16 AM

TOWN OF NORTH SMITHFIELD
TAX COLLECTOR
575 SMITHFIELD ROAD
NORTH SMITHFIELD RI 02896
1-855-722-6149

To: GRAND BANKS COMMERCE PARK LLC
PO BOX 663
SLATERSVILLE RI 02876-0663

Account : 07-0641-57
Penalty as of: 03/03/2020

2019 RP Tax Roll

Description	Principal	Penalty	Date	Batch	Pay Method	Trans #
012-156 at GREENVILLE RD	1868.90					
Payment	-467.23	0.00	01/16/2020	011620-MJP	Check #: 93495895, 93495897	593148
Payment	-467.23	0.00	10/15/2019	W-101519	Check #: 8	585979
Payment	-467.22	0.00	08/15/2019	AUG'19-RL3	Check #: 55485133	580438
Balance	**467.22**					
Penalty Due	0.00					
Total Due	467.22					
012-156-A at GREENVILLE RD	360.14					
Payment	-90.03	0.00	01/16/2020	011620-MJP	Check #: 93495895, 93495897	593148
Payment	-90.03	0.00	10/15/2019	W-101519	Check #: 8	585979
Payment	-90.04	0.00	08/15/2019	AUG'19-RL3	Check #: 55485133	580438
Balance	**90.04**					
Penalty Due	0.00					
Total Due	90.04					

2018 RP Tax Roll

Description	Principal	Penalty	Date	Batch	Pay Method	Trans #
012-156 at GREENVILLE RD	2177.03					
Payment	-544.25	0.00	04/18/2019	041819-MJP	Check #: 95881566, 95881564, 95881568, 95881567	570007
Payment	-544.25	0.00	01/15/2019	MAIL1/19RL	Check #: 71881533	562939
Payment	-544.25	0.00	10/18/2018	101818-MJP	Check #: 48029110, 48029109, 48029111, 48029107	555464
Payment	-544.28	0.00	08/17/2018	081718-MJP	Check #: 25108503	548221
Balance	**0.00**					
Penalty Due	0.00					
Total Due	0.00					
012-156-A at GREENVILLE RD	391.28					
Payment	-97.82	0.00	04/18/2019	041819-MJP	Check #: 95881566, 95881564, 95881568, 95881567	570007
Payment	-97.82	0.00	01/15/2019	MAIL1/19RL	Check #: 71881533	562939
Payment	-97.82	0.00	10/18/2018	101818-MJP	Check #: 48029110, 48029109, 48029111, 48029107	555464
Payment	-97.82	0.00	08/17/2018	081718-MJP	Check #: 25108503	548221
Balance	**0.00**					
Penalty Due	0.00					
Total Due	0.00					