

Sachuest Bay Resiliency Project Description

INTRODUCTION

In response to Hurricane Sandy, funds were made available through the Disaster Relief and Appropriations Act Of 2013 to enhance and improve the resiliency of coastal areas and communities from future storms.

Working together, the Town of Middletown, Aquidneck Land Trust, Norman Bird Sanctuary, Center for Ecosystem Restoration, the Preservation Society of Newport and others developed the Sachuest Bay Resiliency Project, which has received \$2,289,680.00 in federal funding through a competitive grant process. The Fish and Wildlife Service (Service) is assisting the partners in planning for this project.

The Sachuest Bay project includes a variety of actions which, when taken together, are designed to improve the resiliency of the area and the community to future storm events.

DESCRIPTION OF PROJECT AREA:

Maidford River Watershed:

Sachuest Bay and the Maidford River Watershed are located just a few miles east of Newport, RI, in the southeastern part of Aquidneck Island, RI. The Sakonnet River (an arm of Narragansett Bay) lies on the eastern edge of this area, while Sachuest Bay—which opens to Rhode Island Sound and the Atlantic Ocean—lies to the south. The area is located entirely within the town of Middletown, RI. Although only about five square miles, the Sachuest Bay/Maidford River parcel, with exceptional biodiversity and tremendous ecological, economic, cultural, historic, and recreational value.

Purpose of the Project:

We will install major green infrastructure improvements to create a hub of ecological and coastal resilience in the project area. Construction activities will be completed through a combination of Town in-kind services and contractual support.

The overarching goal of the project is to improve coastal resiliency of the Sachuest Bay/Maidford River area through biodiversity restoration and green infrastructure enhancement, specifically by improving water quality, fish and wildlife habitat, and such natural infrastructure as beach dunes, and by greening and improving such existing grey infrastructure elements as power lines and road networks. These improvements will preserve such vital ecological assets as wetland and estuarine habitat, and will safeguard such key human resources as drinking water, swimming, fishing, surfing, wildlife watching, and beach-going opportunities.

These projects will reduce water pollution from stormwater; protect public health; protect drinking water supplies; reduce beach closures at Second and Third Beach; reduce coastal flooding impacts; protect shorelines and improve public safety in the advent of coastal storms; restore native ecosystems, species, and biodiversity; help to restore Rhode Island's recreational and commercial fisheries; increase outdoor recreational opportunities and access; and generate critical economic activity (RI's fisheries are valued at \$300 million/year, our saltwater beaches generate more than \$150 million in economic value per year).

PROPOSED ACTIONS:

1. Invasive Species management at Norman Bird Sanctuary: We will remove non-native and undesirable plant species and replant with desired native species across approximately 100 acres of the 325 acre Norman Bird Sanctuary property. This will improve the condition of native habitats and the wildlife resources that use these areas. This project is part of an ongoing effort to minimize invasive species. The Norman Bird Sanctuary is located on previously disturbed plowed farmland. Removal methods include mechanical and manual; no herbicides will be used. Planting of native species will occur October through November of 2015 and will not require excavations exceeding one foot in depth. Interpretive signage of the plantings will be developed during the fall and winter of 2015. See Appendix A for map of area.

2. Development of a land conservation plan by the Aquidneck Land Trust: which could lead to conservation of land parcels for water quality protection, open space, and wildlife habitat. Understanding the importance of open space as green infrastructure within the Watershed, ALT proposes to survey all vacant priority Maidford River Watershed parcels and accordingly gauge the positive impact on water quality should these parcels be conserved and either left in their current state or used as artificial wetland sites with stormwater drainage outlets. This work will identify and prioritize influential corridors of open space. Using site surveys and consulting the Watershed Assessment to determine areas of bacteria and pollutant hotspots and obstacles to aquatic stream continuity within the Maidford River, we will be able to scientifically determine where the focus of green infrastructure should be within those areas to derive the greatest impact. This work will be completed in the spring of 2016. Land acquisition will be from willing landowners and will not use funds from this project. Any green infrastructure recommendations will also be implemented with funds independent of this project.

3. Second Beach Dune Walkover Structures: Construction of 8 dune walkover structures at Second Beach will enhance the dune complex and help prevent overwash and storm damage to the dunes, parking lot, and related facilities. Walkover structures will be installed over existing pathways, which have been previously excavated for installation of boardwalk during beach season. The proposed walkover structures will be elevated over the existing dune and elevation of dune will be restored to match adjacent areas to create a complete dune system. Supporting piles will be driven to a minimum of 8' below finish grade. Walkover structures will be 6 – 8' wide (depending on permitting), with at least one being ADA compliant and capable of supporting beach operations equipment including gators, rock picker, four wheelers, and emergency operation vehicles.

Walkover structures will be constructed out of pressure treated wood timbers and piles. No vegetation will be removed as part of this project; however, the dune will be re-vegetated with native shrubs and grasses along disturbed areas where walkover structures are installed. Conceptual designs attached. See Appendix B for maps of the area.

4. Second Beach Dune Restoration: We will restore the beach dunes along Second Beach, one of the largest intact dune complexes in Southern New England, by filling eroded areas, applying geotextile reinforcements under installed walkover structures to prevent pedestrian use from damaging the dunes. Areas disturbed by the installation of the walkover structures will be filled with sand to match existing grade of adjacent dunes. Geotextile stabilization fabric will be placed where the fill is required to fill in the existing walkways. Geotextiles will be biodegradable and only useful for temporary stabilization while the newly vegetated sand placed along the walkways has a chance to root. The area to be restored is approximately 0.48 acres, which encompasses the area of the eight walkover structures being installed. Given that these are sand deposits from wind and wave action, it is unlikely this project will have any impact on cultural resources. See Appendix B for maps of the area and structure conceptual drawings attached.

5. Construction of up to 10 best management projects designed to directly improve water quality. We will install a series of infiltration basins and swales along Paradise Avenue to reduce stormwater to the Maidford River and drinking water supplies, while reducing road flooding. All BMPs will be installed in the spring and fall of 2016. Maps, images of the area, and conceptual plans of the BMPs are found in Appendix C. The Best management projects to be implemented include:

a. East Meadows Neighborhood Bioretention: We will install bioretention cells in an existing lawn area. This project will be visible within the neighborhood, with new plantings to enhance aesthetics. The approximate area for this BMP will be 3,000 sq. ft. and will treat approximately 12 acres. The area is located in a field that has previously been disturbed by plowing. The property is located within the Town right of way, with a portion of it being open space private property. Further evaluation of this site to determine its sensitivity from a cultural resource perspective will be completed prior to initiating the project, and will likely include Phase 1a and Phase 1b surveys. Consultation with the State and Tribe for this project will be completed once the further evaluation is completed. Conceptual designs attached.

b. Hoogendorn Nurseries Detention Basin: We will enhance the existing system that already occupies the site to provide better treatment of stormwater. The approximate area for this BMP will be 12,000 sq. ft. and will treat approximately 31 acres. This area has been previously disturbed, and is used for nursery crops. The Town of Middletown owns the property. Conceptual designs attached. Due to extensive excavation and previous disturbance to this site, it is not anticipated that cultural resources would be impacted at this site.

c. Green End Avenue Southwest Bioretention: This highly visible site is located on public property within a right of way. This BMP will divert runoff from Green End Avenue into the Basin. The approximate area for this BMP will be 2,000 sq. ft. and will treat approximately 15.4 acres. The area to be restored has previously been disturbed. Due to extensive excavation and previous disturbance to this site, it is not anticipated that cultural resources would be impacted at this site. The property is located on Town-owned right of way. Conceptual designs attached.

d. Green End Avenue Northeast Bioretention: This highly visible site is located on public property within a right of way. This BMP will divert runoff from Green End Avenue into the Basin. The approximate area for this BMP will be 8,000 sq. ft. and will treat approximately 25.3 acres. The area to be restored had previously been disturbed during the installation of the roadway, storm drain pipe and catch basin. The property is located on Town owned right of way. Conceptual designs attached.

e. Paradise Valley Parking Lot Bioretention: This site is also highly visible and will provide a good opportunity for public education. We will retrofit existing catch basins with diversion structures and bioretention basins to capture runoff from the parking lot. This BMP will divert runoff from Green End Avenue into the Basin. The approximate area for this BMP will be 12,000 sq. ft. and will treat approximately 2.3 acres. A portion of the area to be restored had previously been disturbed, however, further evaluation of this site to determine its sensitivity from a cultural resource perspective will be completed prior to initiating the project, and will likely include Phase 1a and Phase 1b surveys. Consultation with the State and Tribe for this project will be completed once the further evaluation is completed. The Town of Middletown owns the property. Conceptual designs attached.

f. Middletown Youth Soccer Fields Bioretention: This is another highly visible site, particularly to school-age children and their families, optimal for public education. We will install several bioretention basins to capture all runoff from the parking lot. The basins will not impact the parking lot. This BMP will divert runoff from Green End Avenue into the Basin. The approximate area for this BMP will be 1,000 sq. ft. and will treat approximately 6.4 acres. The area to be restored has previously been disturbed by cut and fill to develop the soccer field and parking area. The Town of Middletown owns the property. Due to extensive excavation and previous disturbance to this site, it is not anticipated that cultural resources would be impacted at this site, however, additional evaluation will occur on portions of the site. Conceptual designs attached.

g. Paradise Avenue Vegetated Swale: This BMP will enhance existing roadside drainage features along Paradise Avenue to provide more in-swale treatment. The approximate area for this BMP will be 2,100 sq. ft. and will treat approximately 5.4 acres. The area to be restored is located on a previously disturbed drainage swale. Due to extensive excavation and previous disturbance to this site, it is not anticipated that cultural resources would be impacted at this site. The Town of Middletown owns the property. Conceptual designs attached.

h. Surfer's End Parking Lot BMP: We will install an infiltration basin at the Surfer's End beach parking lot to reduce polluted runoff to coastal waters, improve public health, and reduce the frequency of beach closures. The soils in this area are comprised of dune and sand deposited by wind and waves. Significant previous ground disturbance to create the parking lot has occurred. No cultural resources are anticipated to be impacted from the project.

No-Action Alternative:

The No-Action was considered but not selected for implementation. Taking no action would eliminate the potential of enhancing coastal resiliency and improving water quality. With subsequent storms, the dune structure at Second Beach would continue to degrade. Current access points serve as "funnels" for storm surges to access the dunes and back dune sites, resulting in a continuing loss of dune structure and damage to coastal facilities.

Water quality would continue to be hampered as no abatement in storm water treatments resulting from the BMPs would occur.

Invasive species on the Norman Bird Sanctuary would continue to establish thick and in some cases monoculture stands, as well as spreading to adjacent areas. Infestations of invasive species reduce natural diversity, the robustness of native plant populations in affected areas, and can reduce wildlife population robustness and resiliency.

Rationale for Selection:

The proposed action was selected because in combination, the projects will have the greatest impact of reducing water pollution and increasing coastal resiliency in the project area.

Relationship to Other Projects

This project compliments the Service's Coastal Resiliency grant actions at the Sachuest Point National Wildlife Refuge. Programs and projects included in this proposal include enhancing the drainage of the Maidford Saltmarsh to help prevent flooding; undergrounding of power and communications to help prevent damage during storm events; increasing the elevation of saltmarshes to partially mitigate against increasing sea level rise and to restore currently degraded saltmarsh conditions; and enhanced resiliency of coastal Middletown.

In combination with the proposed action, there are expected to be achieved in saltmarsh habitat, terrestrial wildlife habitat, water quality, reduction in flooding, better protection of the infrastructure, and a more resilient dune system.

Permits/Approvals.

The Service will evaluate potential effects on species listed under the Endangered Species Act. It is anticipated that the project will not likely cause any adverse effects on listed species.

The Service has evaluated the potential effects on cultural resources pursuant to Section 106 of the Historic Preservation Act, and has determined the following project components will not affect cultural resources, or resources potentially eligible for listing in the National Historic Register:

1. Invasive species
2. Land Conservation Plan
3. Dune walkover structures
4. Dune restoration
5. BMP's for Water Quality Improvement:
 - b. Hoogendorn Nursery BMP
 - c. Green End Avenue SW
 - d. Green End Avenue NE
 - g. Paradise Valley Road-side swales
 - h. Surfers end BMP

The following project components will require further assessment (Phase 1a and 1b) surveys for cultural resources to determine whether any cultural resources will be impacted from the project:

5. BMP's for Water Quality Improvement:
 - a. East Meadows BMP
 - e. Paradise Valley BMP
 - f. Middletown Youth Soccer field BMP

The State of Rhode Island, Historic Preservation Office, and the Narragansett Indian Tribe, will be consulted on this project.

The State of Rhode Island may require for some projects a Coastal Assent from the Coastal Resources Management Council; and Wetland or Water Quality Certificates from the Department of Environmental Management. All of these State permits will be obtained, as needed, prior to implementing any action.

Where appropriate, written landowner permission will be received prior to implementing the installation of BMPs on private lands.

Public Involvement/Interagency Coordination

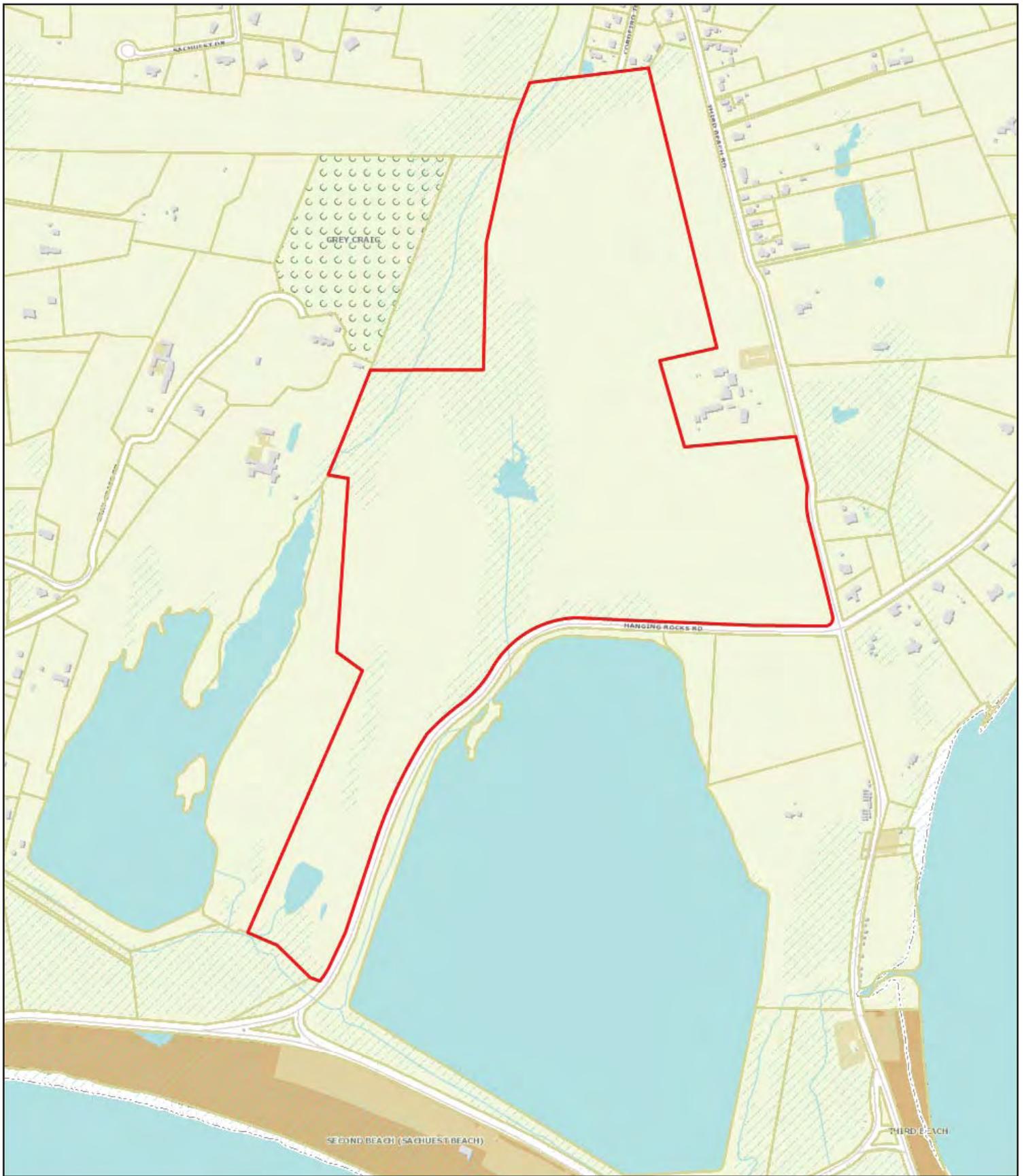
Public comment on this project is currently being solicited. Any comments received will be evaluated and incorporated into the project as appropriate.

This project is part of a larger action developed by an interagency team including the Town of Middletown, Aquidneck Land Trust, Center for Ecosystem Restoration, the Preservation Society of Rhode Island, and the Norman Bird Sanctuary. These partners collaborated in developing the larger action in the grant proposal entitled the Sachuest

Bay Resiliency Project. This project was selected in a competitive basis by a team of experts to receive funding from the National Disaster Relief and Appropriations Act.

During six Public Town Council meetings—discussions and minutes of which were covered in the local news media and on the Town’s website—the Town Council elected to receive the funds for this project, following a summary of the proposal. The Grant description was available for public review and no unfavorable public comments were received.

APPENDIX A
Map of Project Area
Invasive Species Management



The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

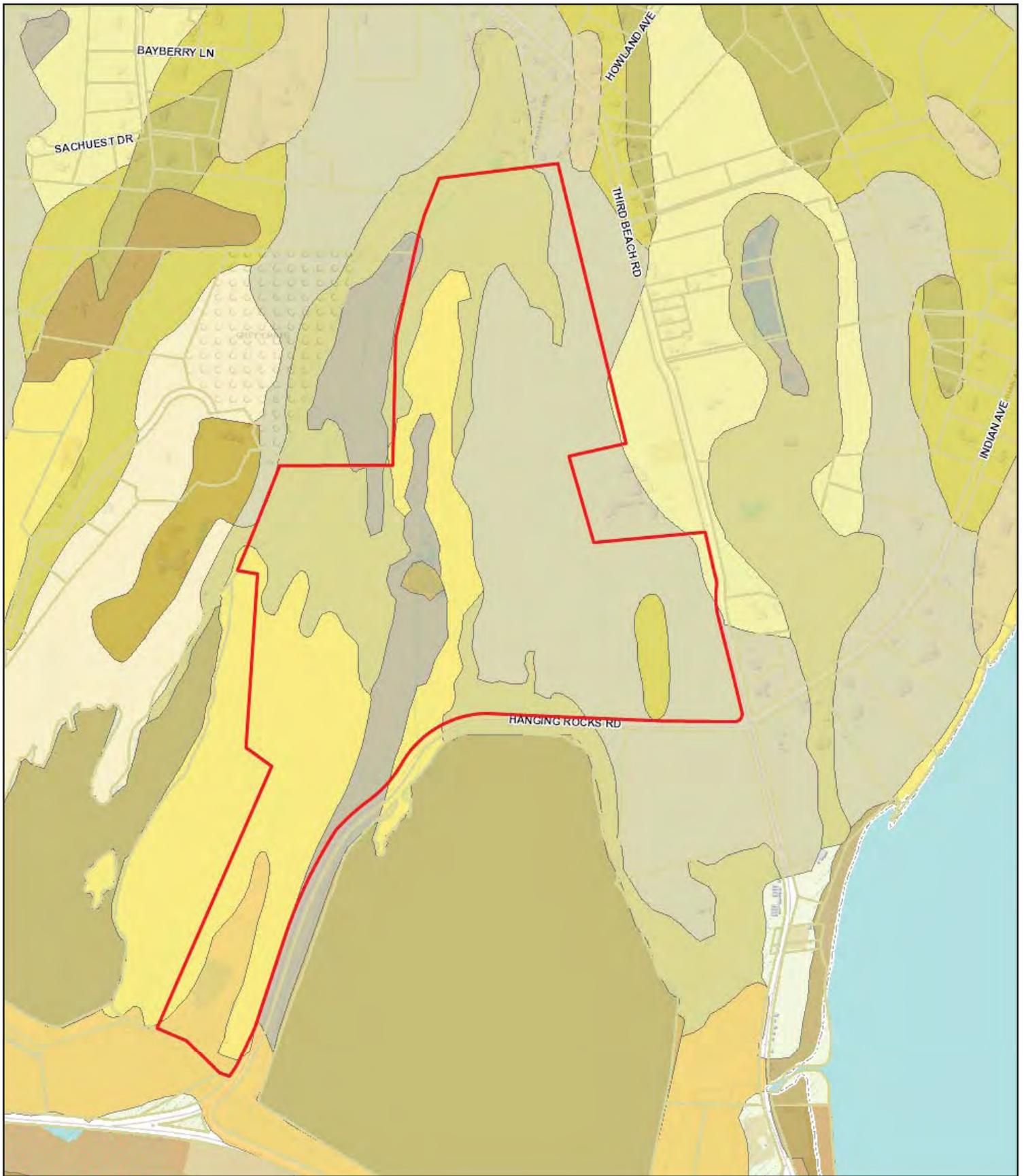
Norman Bird Sanctuary - Third Beach Rd

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The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

Norman Bird Sanctuary Soils

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APPENDIX B

Maps of Project Area

Dune Restoration and Walkover Structures



The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

Town of Middletown Sachuest Beach Dune Walkover Structures

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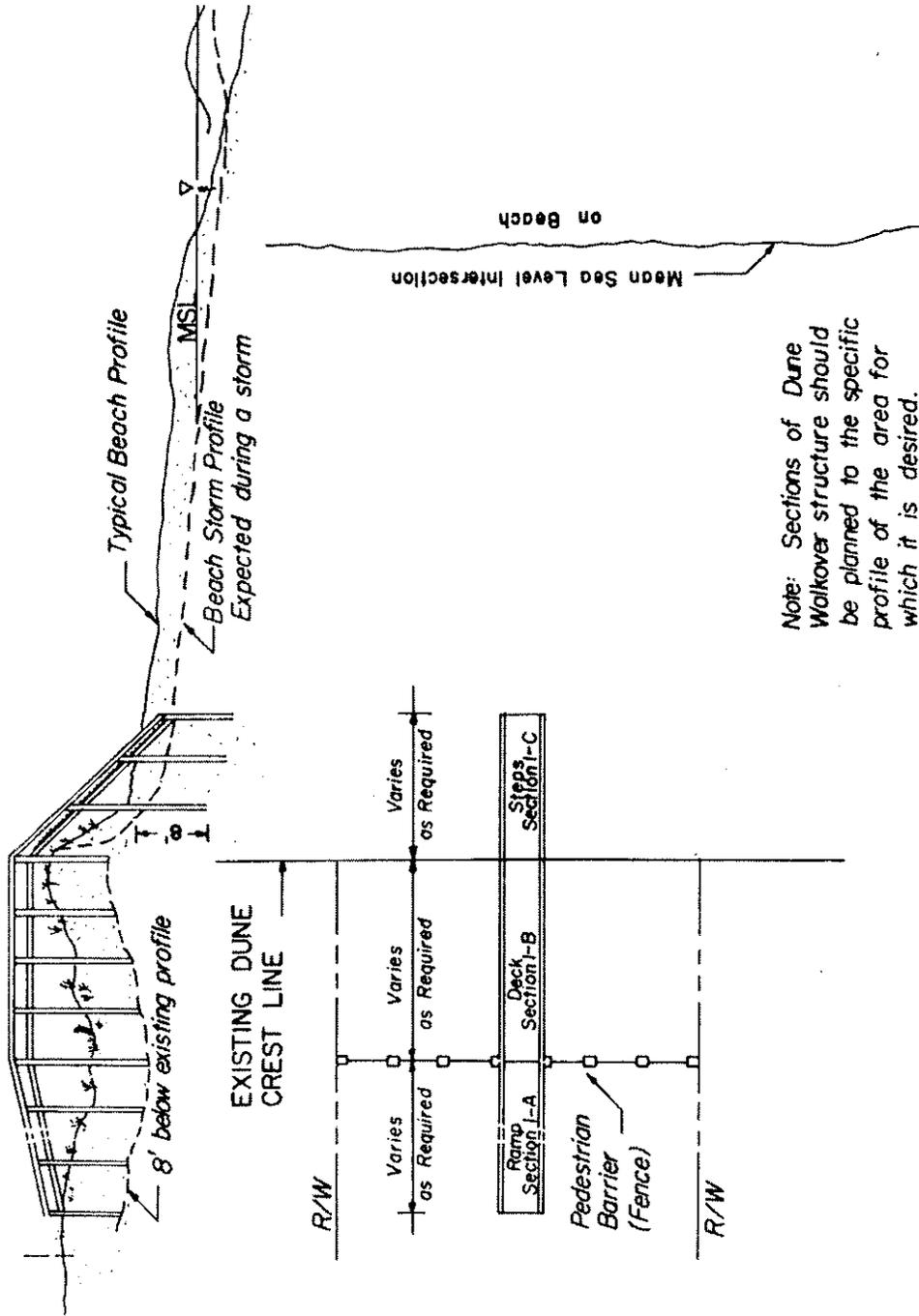
Middletown Dune Walkover Structures Soils

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Note: Sections of Dune Walkover structure should be planned to the specific profile of the area for which it is desired.

Fig. 1 TYPICAL PLAN and ELEVATION VIEW

Scale: 1" = 20'

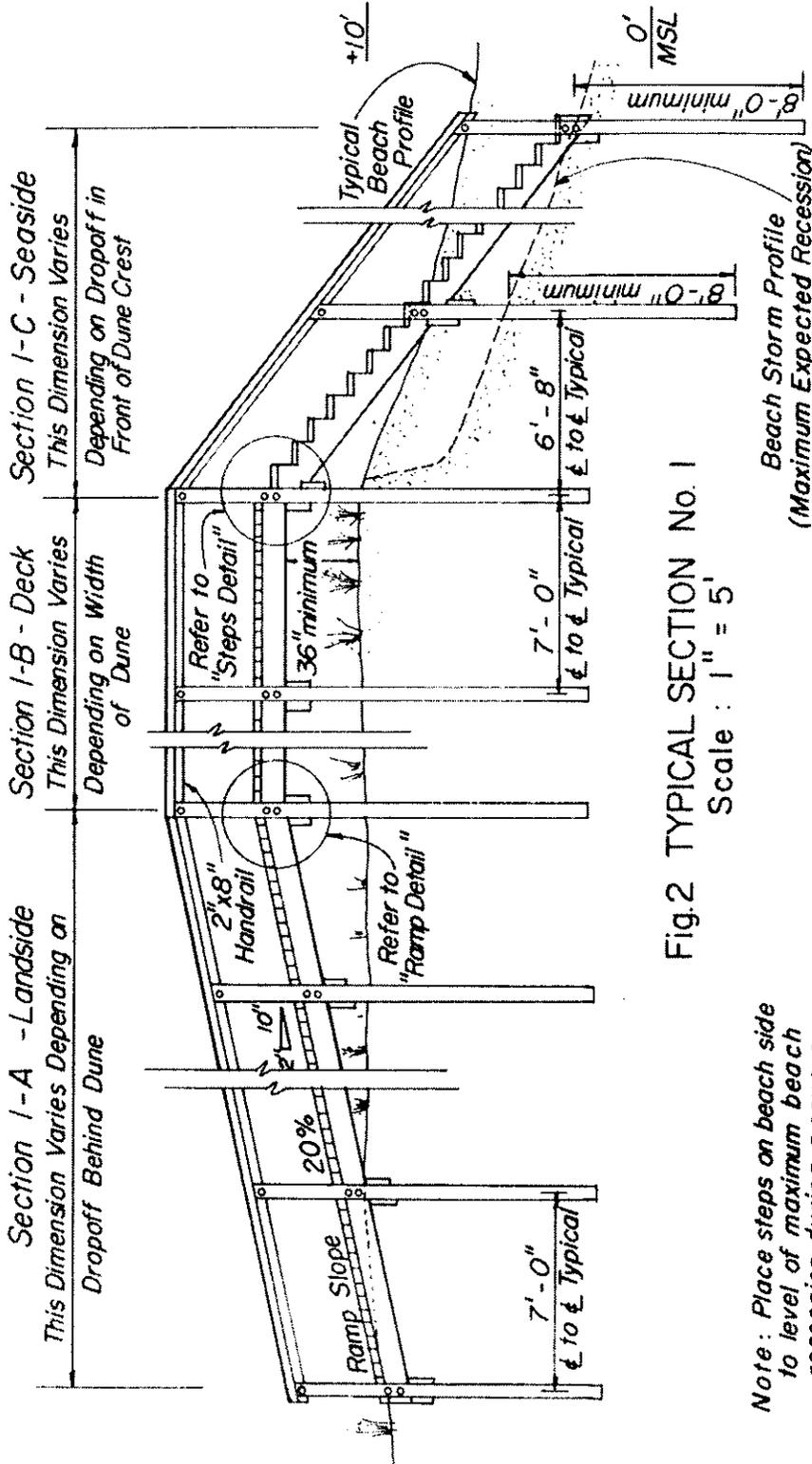


Fig.2 TYPICAL SECTION No. 1
Scale : 1" = 5'

Note : Place steps on beach side to level of maximum beach recession during a severe storm or tropical hurricane

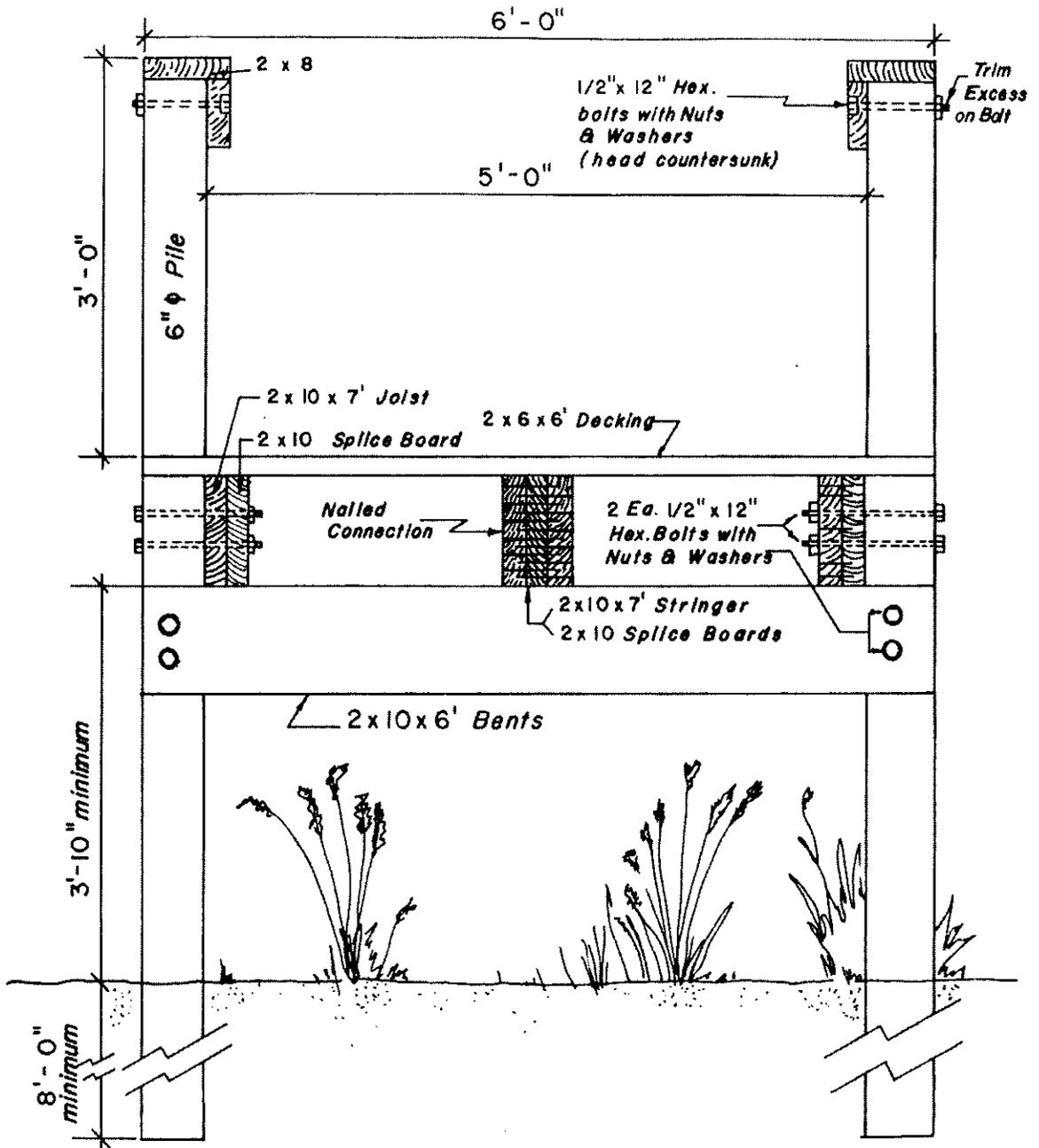


Fig.3 TYPICAL SECTION I-B DECK
 Scale: 1" = 1'-0"

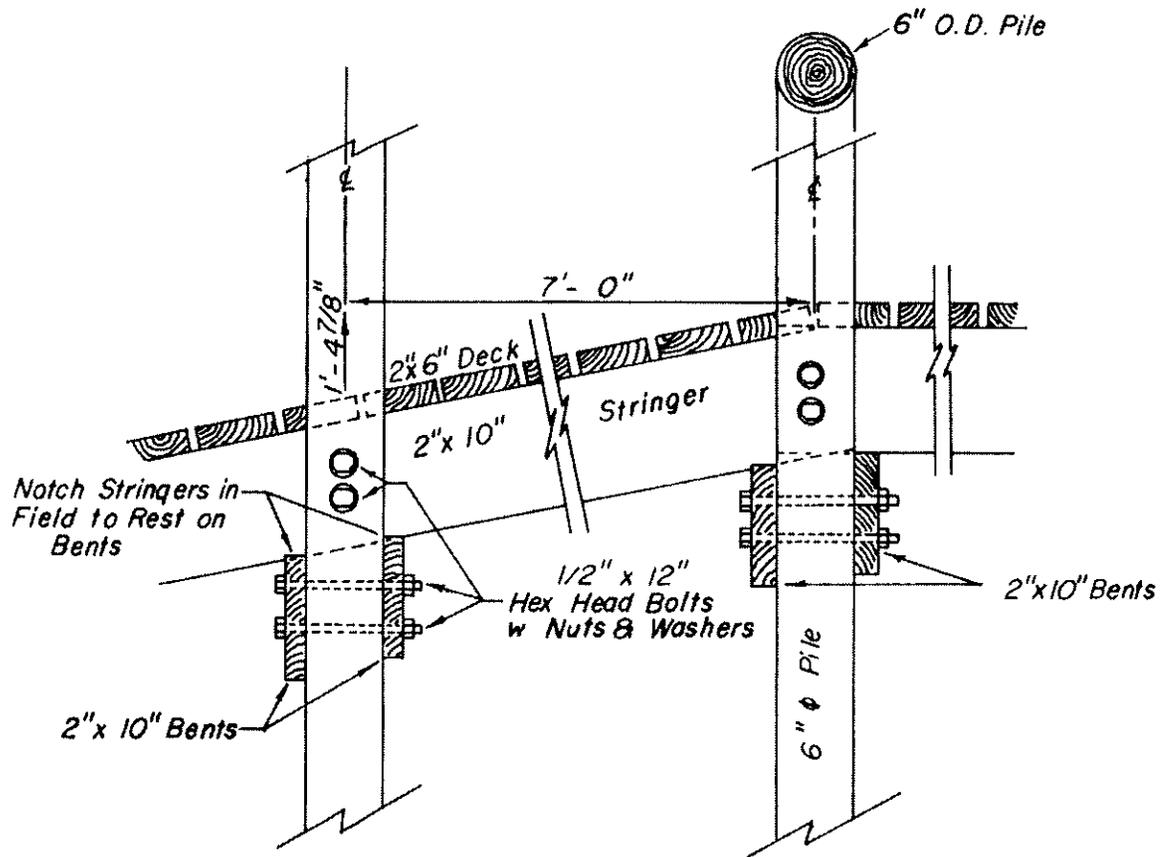


Fig. 4 TYPICAL RAMP DETAIL

Scale: 1" = 1'-0"

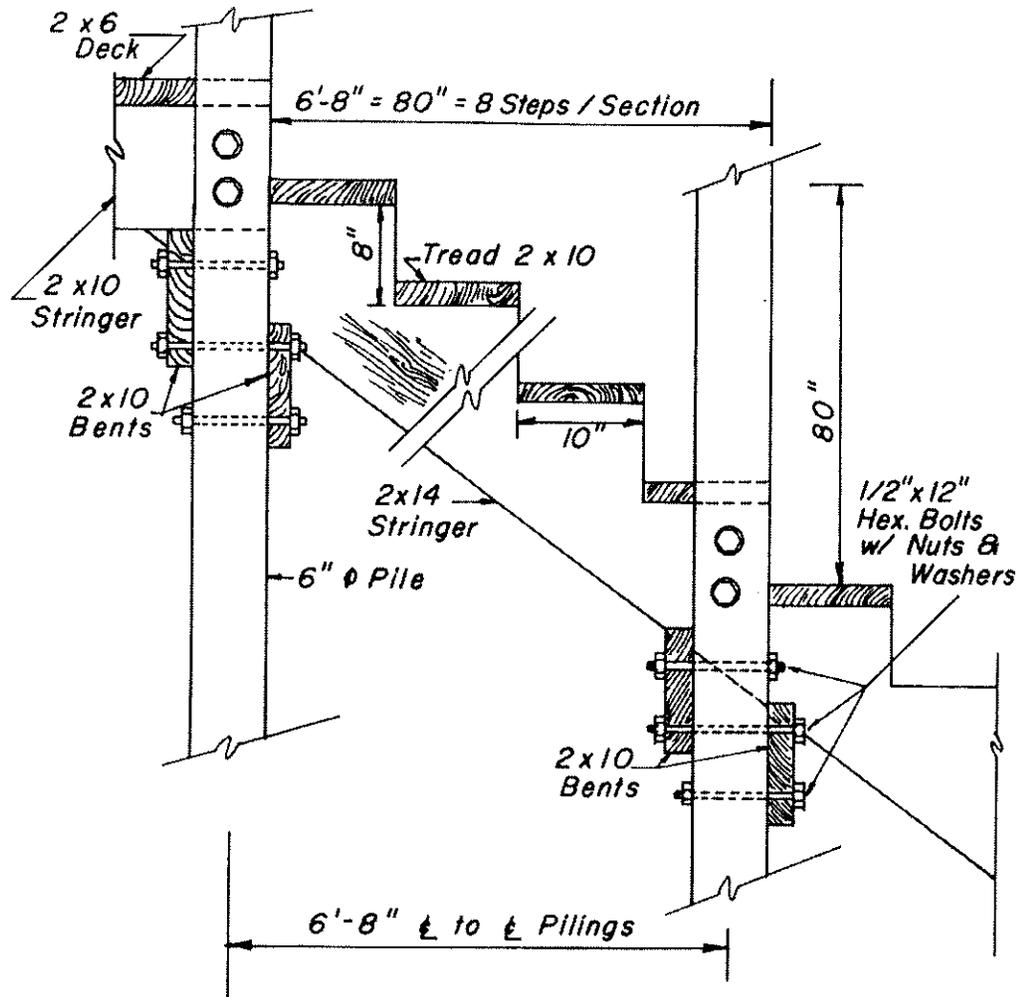
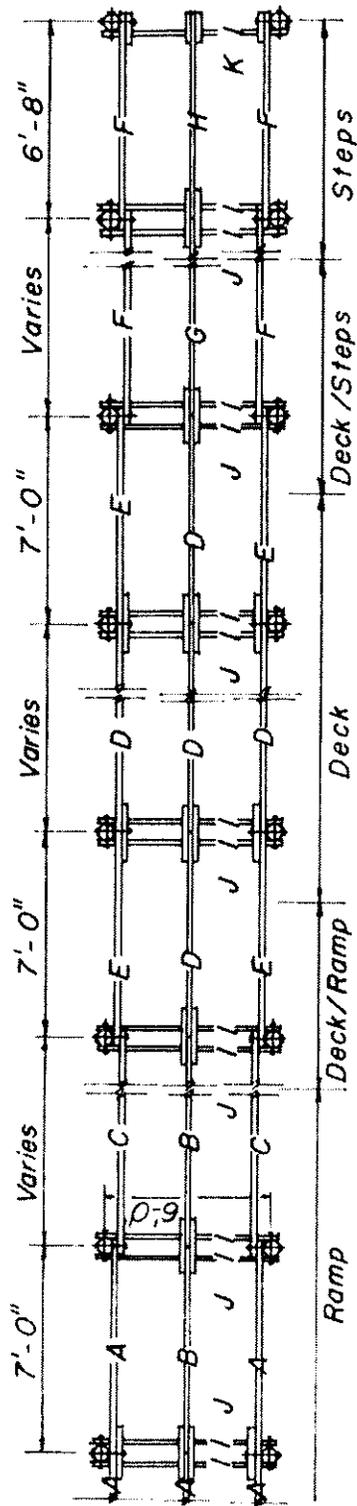


Fig. 5 TYPICAL STEPS DETAIL
Scale : 1" = 1'- 0"



Note: All splice blocks to be nailed to stringers to provide both lateral support at joints and bearing support. All $\frac{1}{2}$ " hex bolt connections to be $\frac{1}{2}$ " x 12" hex bolt with nut and washers.

Stringer Dimensions	
A	2 x 10 x 7'-9"
B	2 x 10 x 7'-6"
C	2 x 10 x 8'-4"
D	2 x 10 x 7'-0"
E	2 x 10 x 7'-3"
F	2 x 14 x 9'-0"
G	2 x 14 x 8'-6"
H	2 x 14 x 8'-9"
Bent Dimension	
I	2 x 10 x 5'-6"
Splice Dimension	
J	2 x 10 x 2'-0"
K	2 x 10 x 1'-6"

Note: Bill of Materials based on ramp length of 21'; deck length of 28' and 2 stair sections of 6'-8" each.

Bill of Materials	
Quan.	Item - Description
44	2 x 6 x 20' dressed
9	2 x 8 x 20' dressed
5	2 x 10 x 20' dressed
19	2 x 10 x 20' rough
3	2 x 14 x 20' rough
20	6" ϕ Piles @ 16'
100	1/2" x 12" hex. bolt with nut and washers

Fig. 6 TYPICAL STRINGER LAYOUT DETAIL

Scale: 1" = 5'-0"

Include as many step sections as necessary to grade from top of dune + 3 feet to base of rear dune.

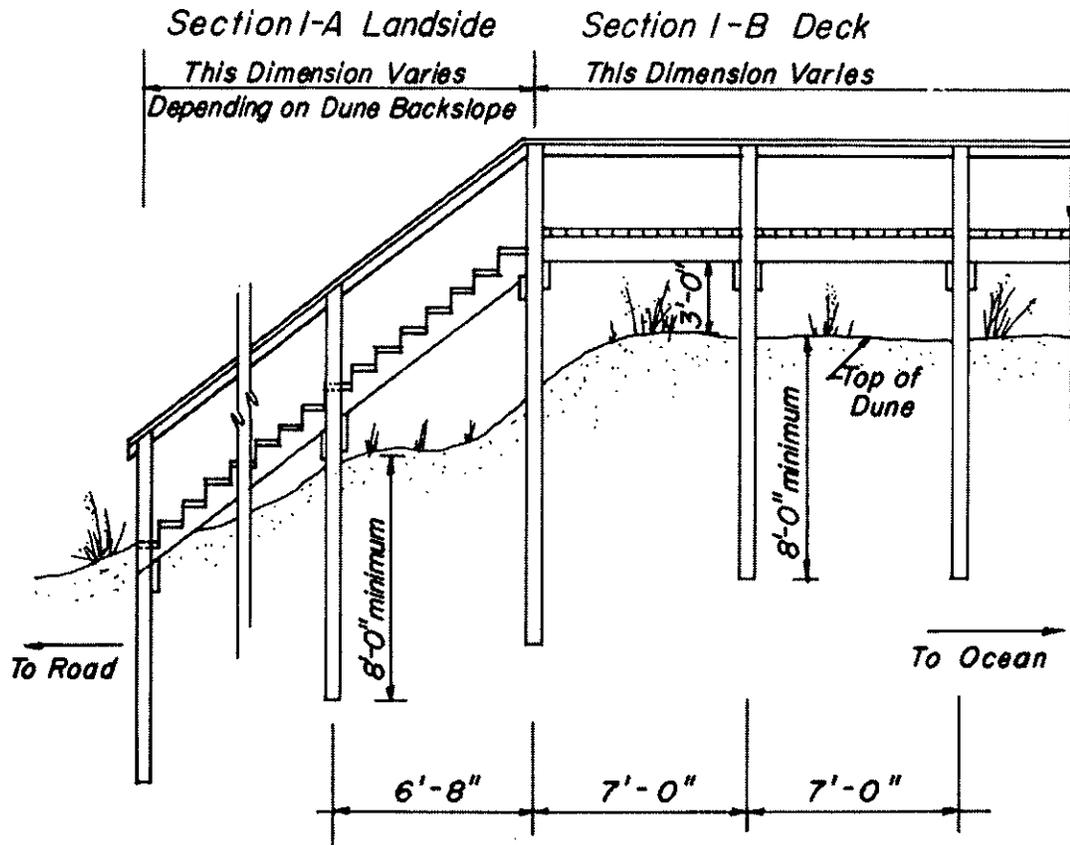


Fig.7 ALTERNATE SECTION No.1
 Scale : 1" = 5'-0"
 (Refer to details as per Figure 2)

APPENDIX C
Maps of Project Area
BMP Projects

5A. East Meadows Neighborhood Bio-retention Basin BMP



BMP area looking North. Grass swale to be placed on shoulder of road; Retention Basin near trees. Note field where bio-retention to be placed has been levelled; note fill adjacent to road.

BMP looking East, note past field levelling in area.

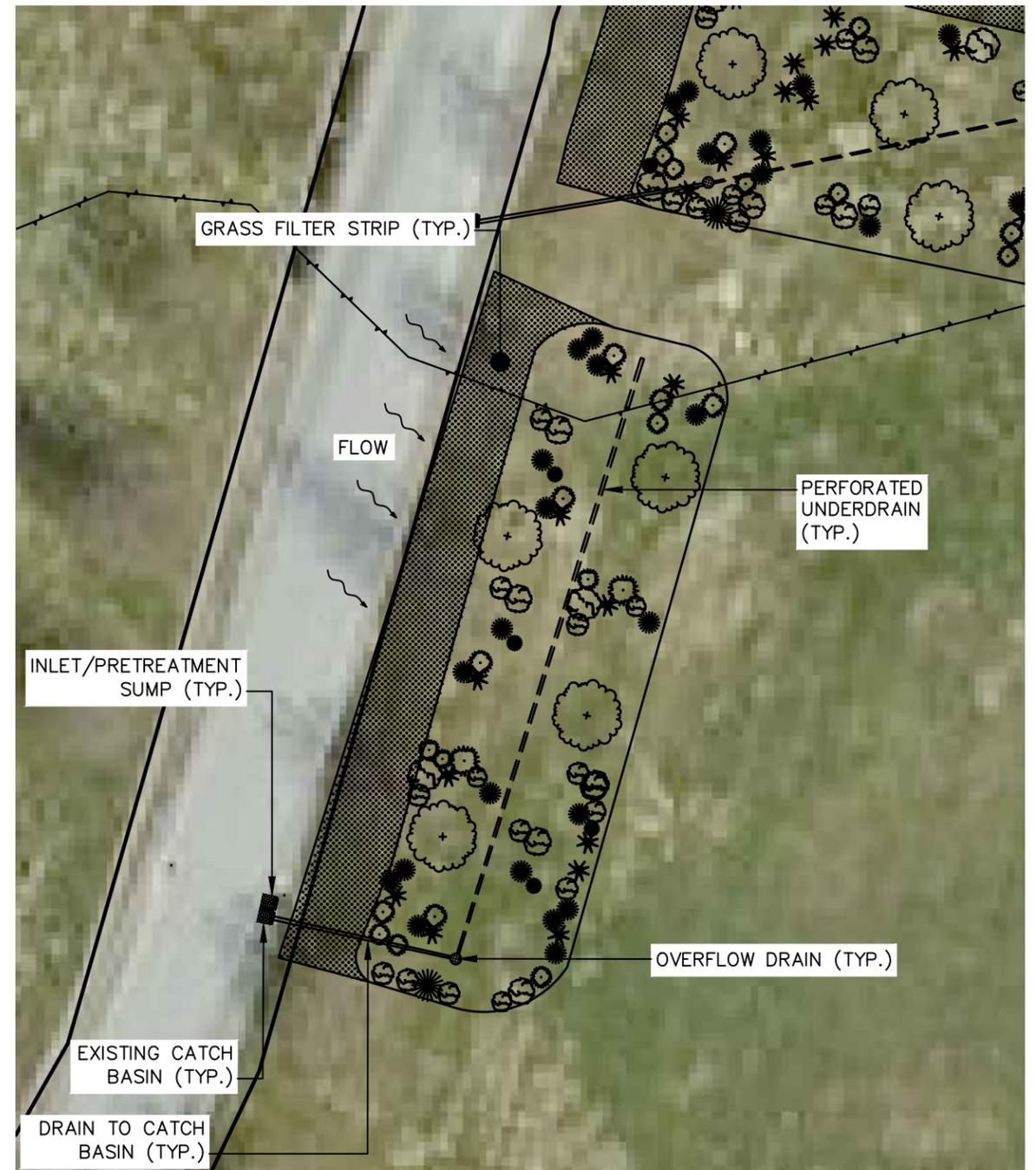


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EAST MEADOWS NEIGHBORHOOD

SCALE: 1" = 200'



BIORETENTION BASIN

SCALE: 1" = 30'

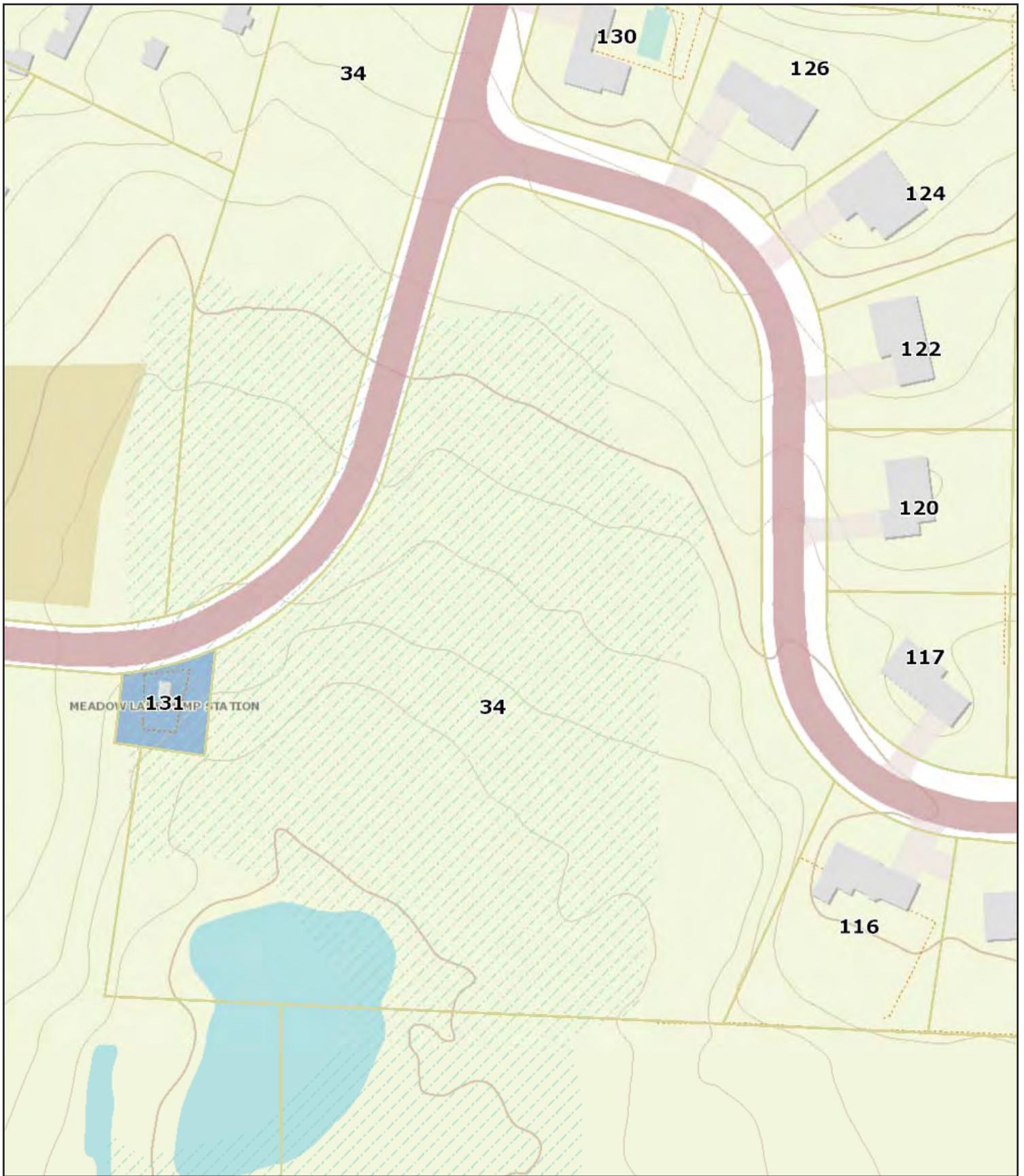
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 PROVIDENCE, RI 02908
 401.861.3070
 www.fando.com

TOWN OF MIDDLETOWN
 SITE PLAN FOR BMP A1 (EAST MEADOWS)
 MAIDFORD RIVER BMPS
 MIDDLETOWN
 RHODE ISLAND

PROJ. No.: 20140870_A10
 DATE: AUGUST 2015
CS-102



The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

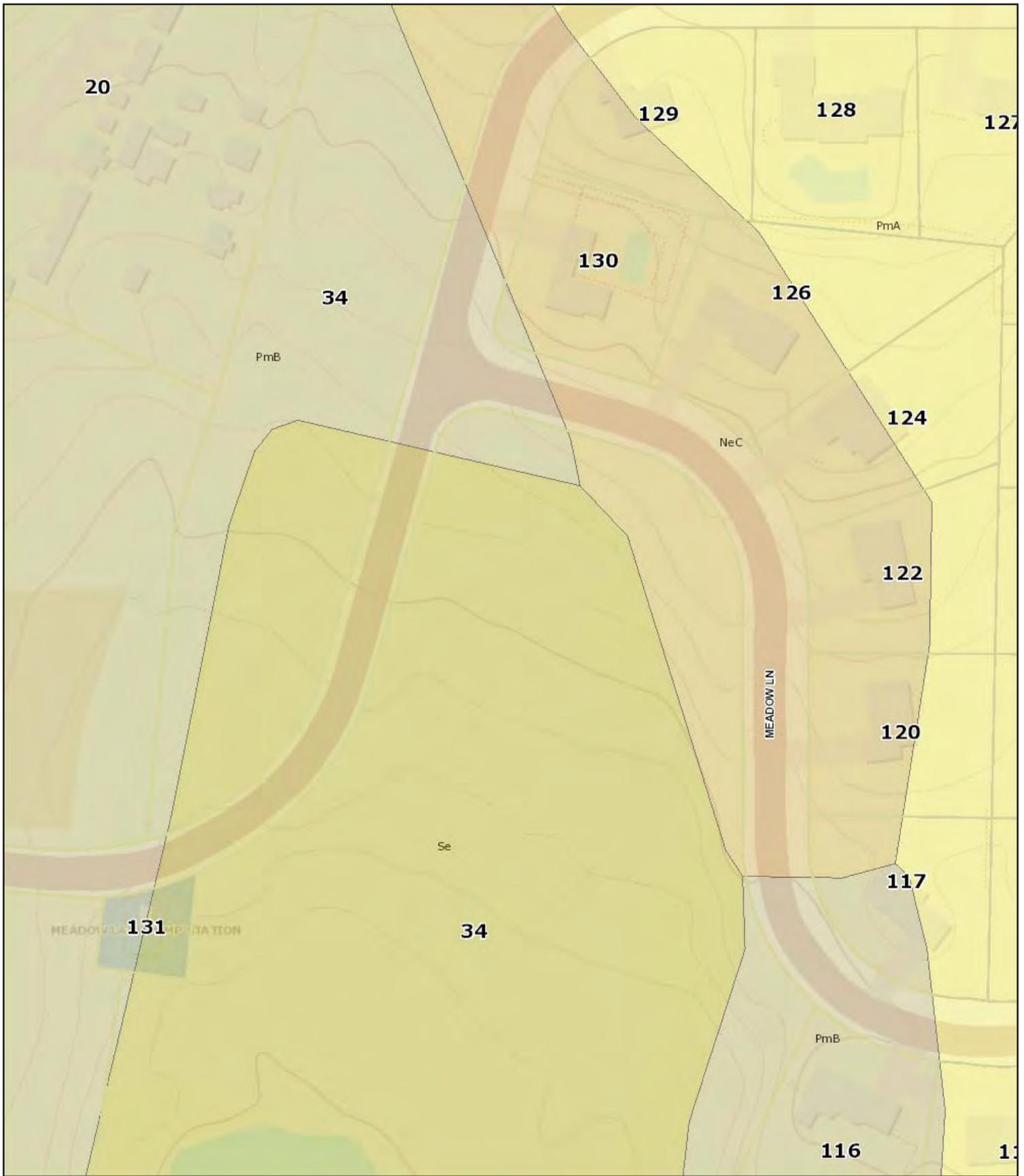
Town of Middletown East Meadow Bioretention

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Middletown East Meadow Soils

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5B Hoogendorn Nurseries Detention Basin Improvement



This is an existing structure which will be rehabilitated. Note level of ground disturbance existing.





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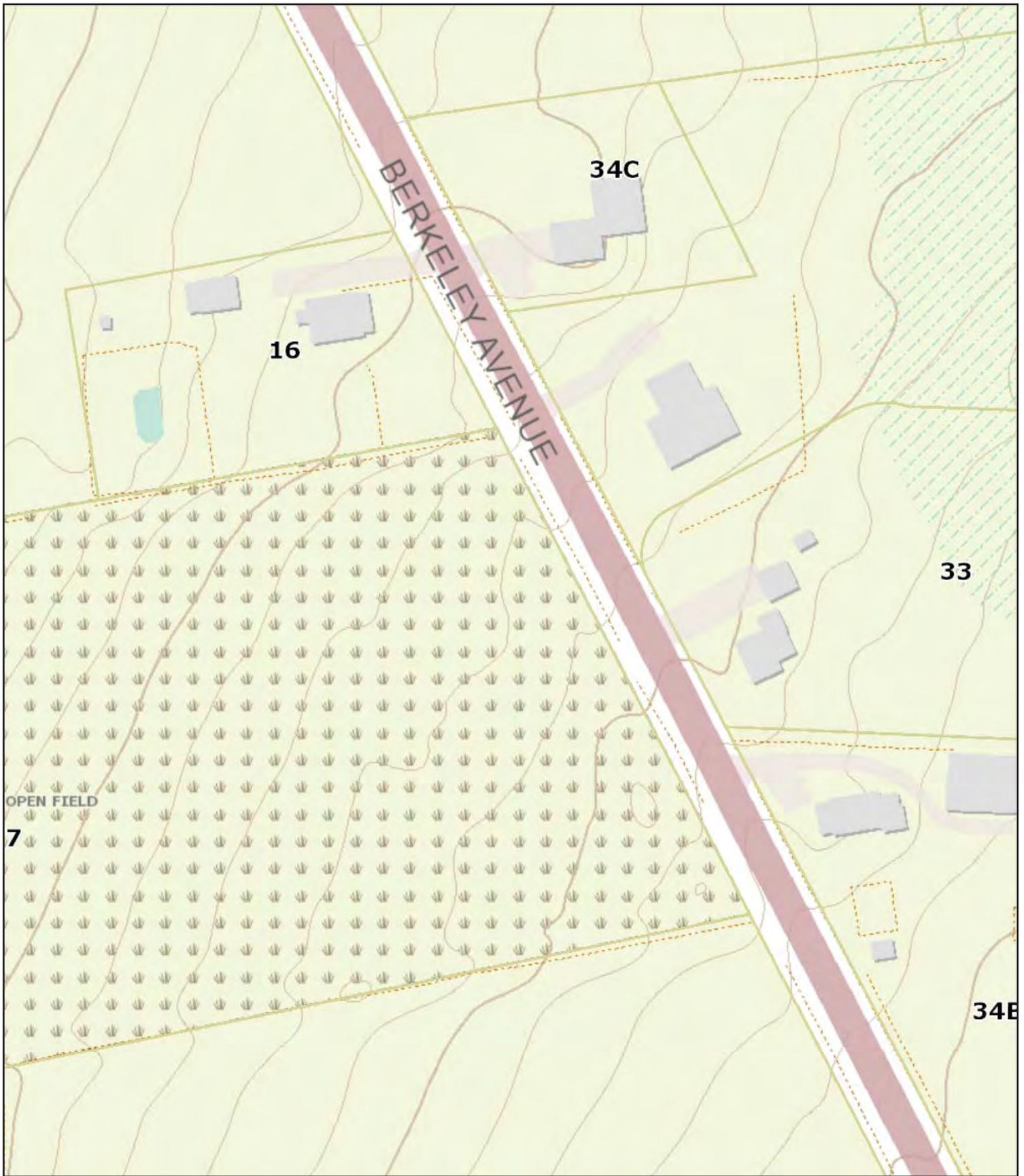
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TOWN OF MIDDLETOWN
 DETAIL FOR BMP A2 (HOOGENDORN NURSERY)
 MAIDFORD RIVER BMP
 MIDDLETOWN RHODE ISLAND

PROJ. No.: 20140870_A10
 DATE: AUGUST 2015
 CS-103



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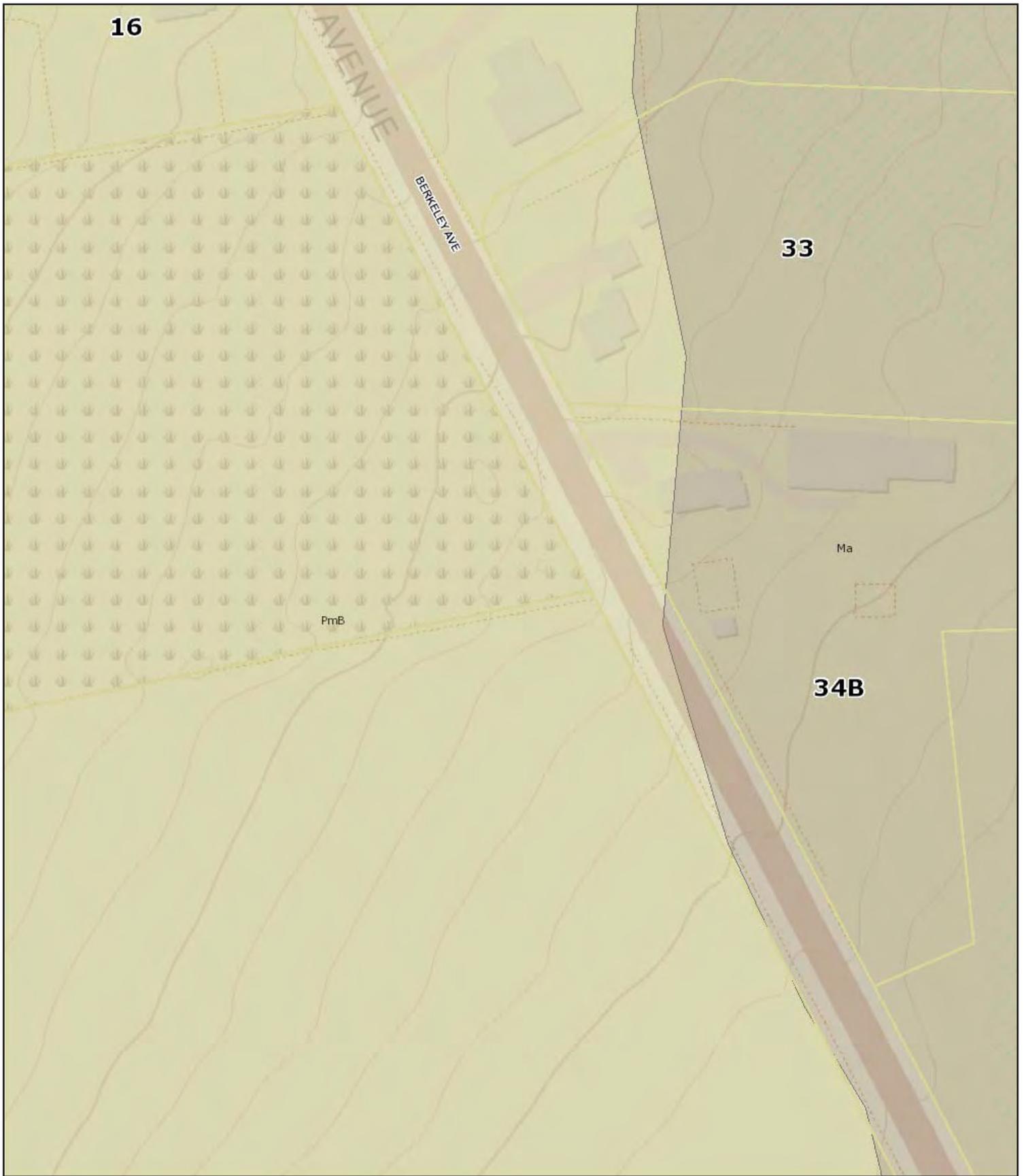
Town of Middletown Hoogendorn Nursery Detention Basin

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Middletown Hoogendorn Nursery Soils

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5D. Green end Avenue NE Bio-retention BMP

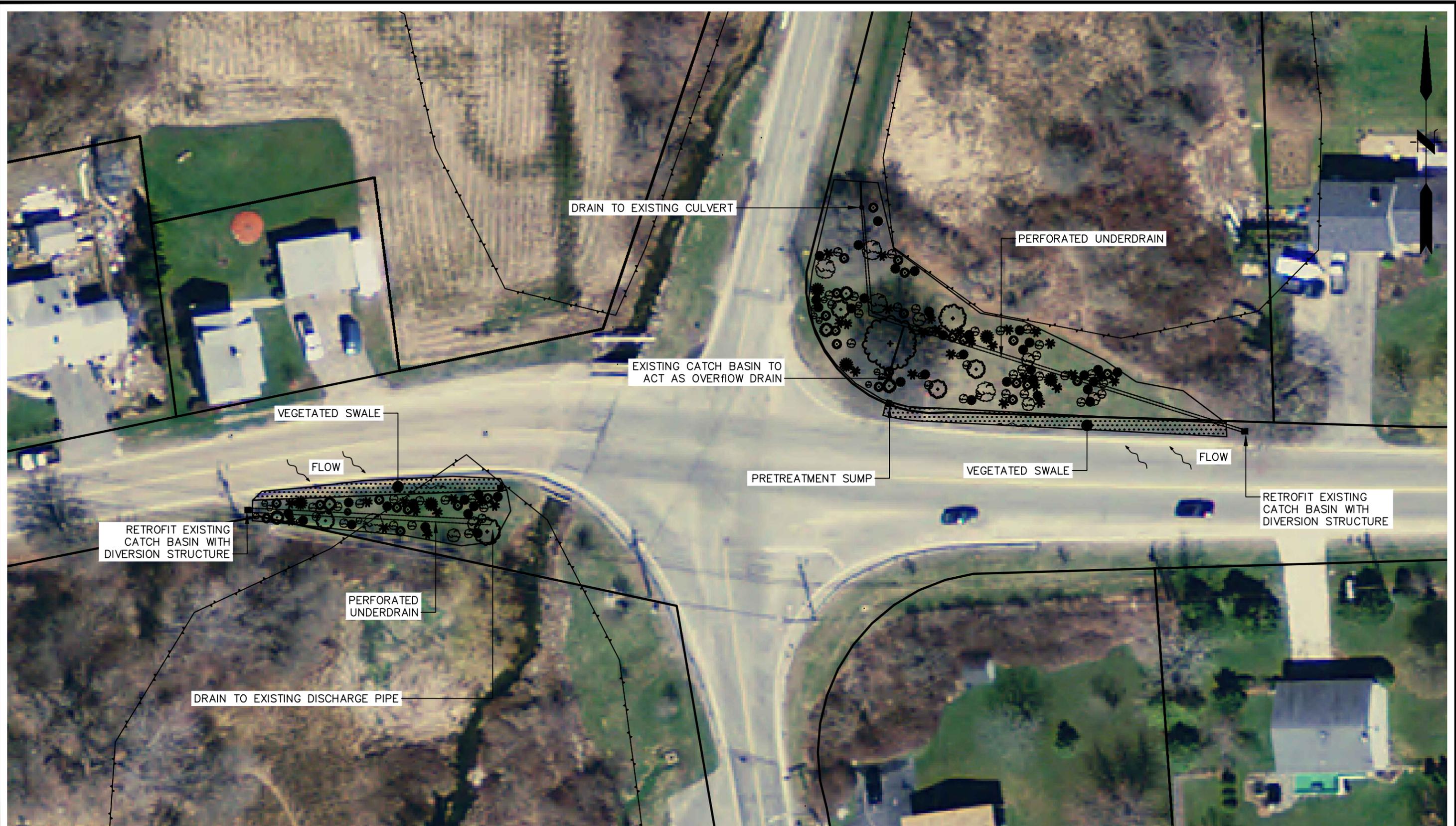


BMP Area looking East. Note drain in foreground. Existing pipe runs underneath ground along road.



Green end Avenue SW. Note pipe opening on left of image, pipe lays underground and runs towards house in background. Maidford River is in immediate foreground.





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TOWN OF MIDDLETOWN
 SITE PLAN FOR BMP C3 (GREEN END AVENUE)
 MAIDFORD RIVER BMPS
 MIDDLETOWN RHODE ISLAND

PROJ. No.: 20140870.A10
 DATE: AUGUST 2015
CS-106



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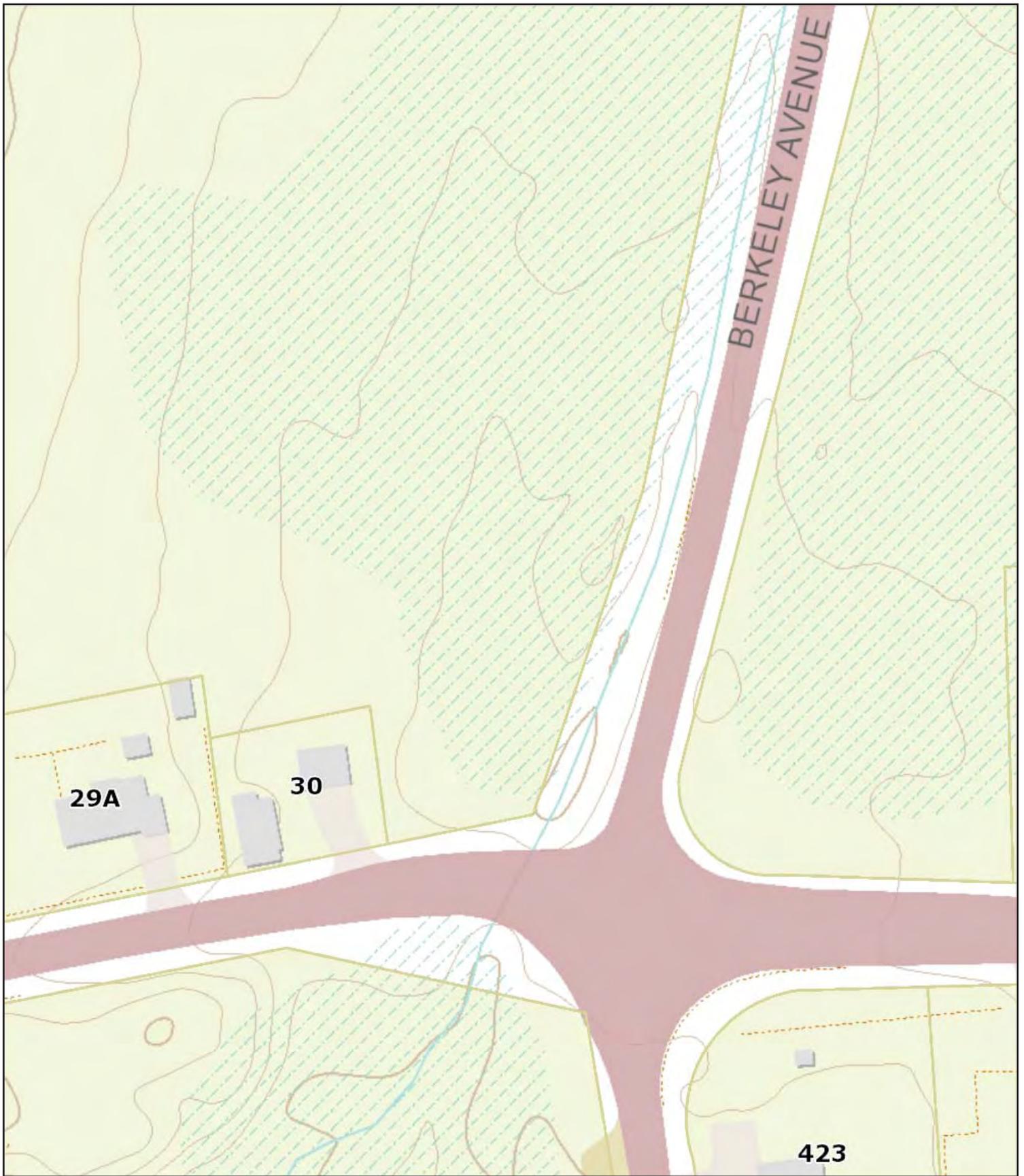
Middletown Green End Soils

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The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

Town of Middletown Green
End Ave SW & NE
Bioretention(s)

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5E. Paradise Valley Parking Lot Bio-retention BMP



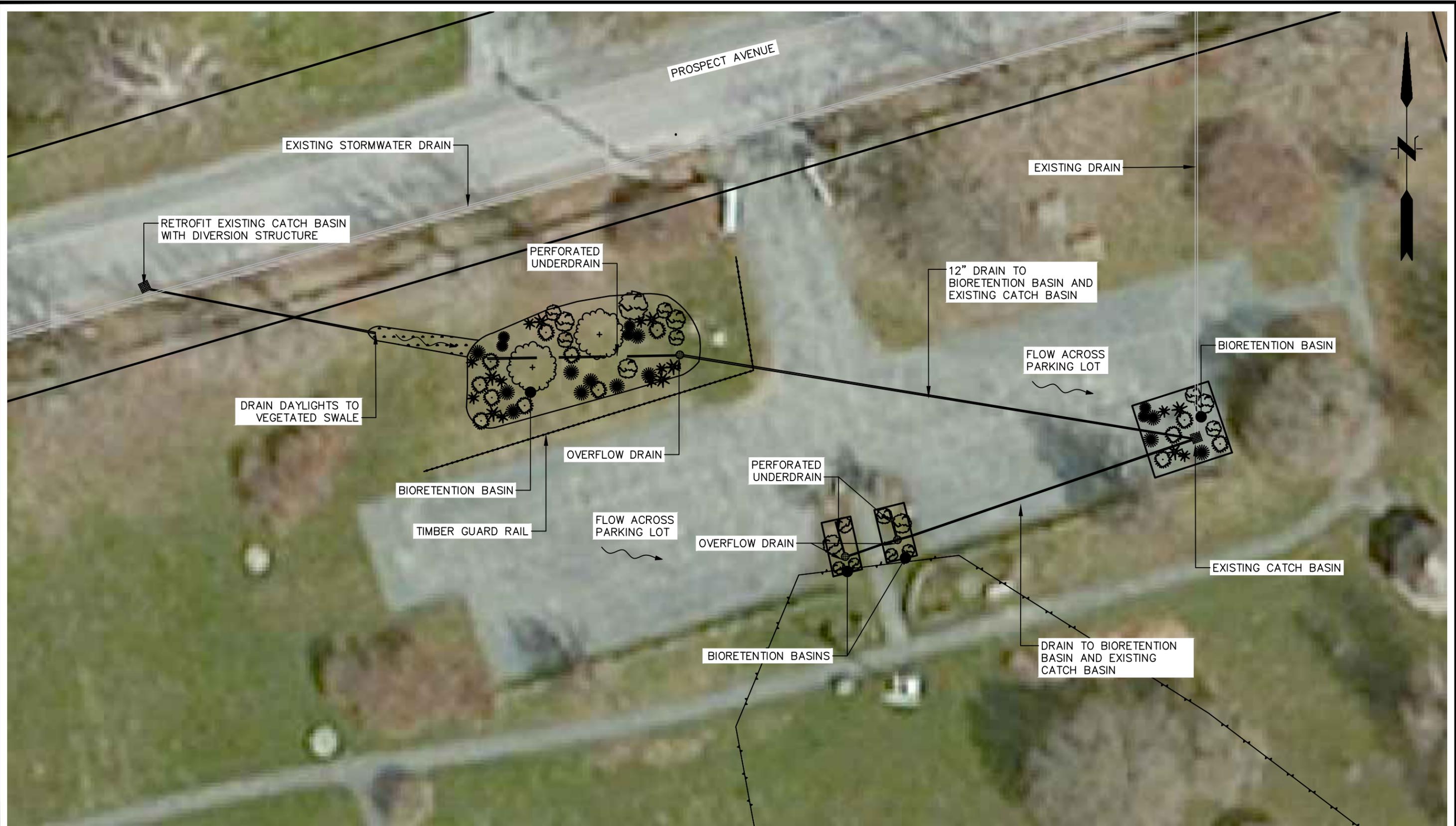
BMP Area looking East, foreground would have bio-retention basin placed. Note stone wall on left indicating past plowing disturbance.



BMP Area looking West. Vegetative swale and bio-retention would be placed in foreground.



BMP area on South side of parking lot. Perforated underdrain would be placed in foreground.



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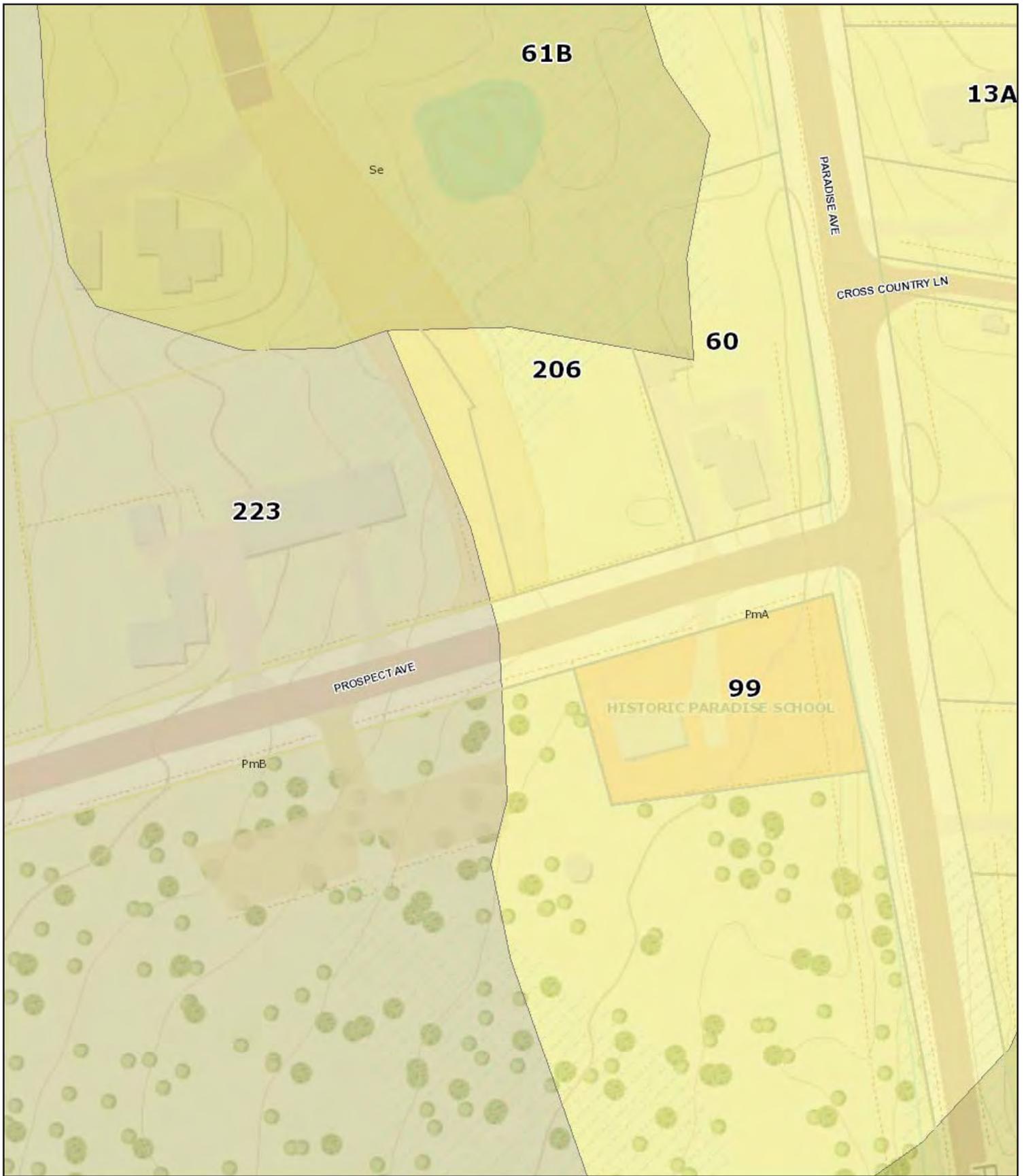
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TOWN OF MIDDLETOWN
 SITE PLAN FOR BMPs C5 AND C6 (PARADISE VALLEY PARK)
 MAIDFORD RIVER BMPs
 MIDDLETOWN RHODE ISLAND

PROJ. No.: 20140870_A10
 DATE: AUGUST 2015
CS-110



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Middletown Paradise Valley Park Soils

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**Town of Middletown
Paradise Valley Park
Diversion & Bioretention**

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5F. Middletown Soccer fields Bio-retention BMP



BMP area looking West. Note levelled ground. Bio-retention basin to be placed along left side of image.



BMP area looking West. Bio-retention basin to be placed at bottom of levelled hill. Area has been graded extensively for placement of soccer fields.



BMP area looking West. Note existing catch basin (pipe lays below grade) and extensive levelling of ground.



File Path: J:\DWG\20140870\A10\CivilPlan\20140870_A10_STP01_recover.dwg Layout: C1 Plotted: Mon, August 31, 2015 - 5:22 PM User: rweiler
 Plotter: DWG TO PDF.PC3 CTB File: FO.STB
 MS VIEW: LAYER STATE:

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.				

SCALE:
 HORZ.: 1" = 60'
 VERT.:
 DATUM:
 HORZ.:
 VERT.:

 GRAPHIC SCALE

FUSS & O'NEILL
 317 IRON HORSE WAY, SUITE 204
 PROVIDENCE, RI 02908
 401.861.3070
 www.fando.com

TOWN OF MIDDLETOWN
 SITE PLAN FOR BMP C1 (MIDDLETOWN YOUTH SOCCER FIELDS)
 MAIDFORD RIVER BMPS
 MIDDLETOWN RHODE ISLAND

PROJ. No.: 20140870_A10
 DATE: AUGUST 2015
CS-105

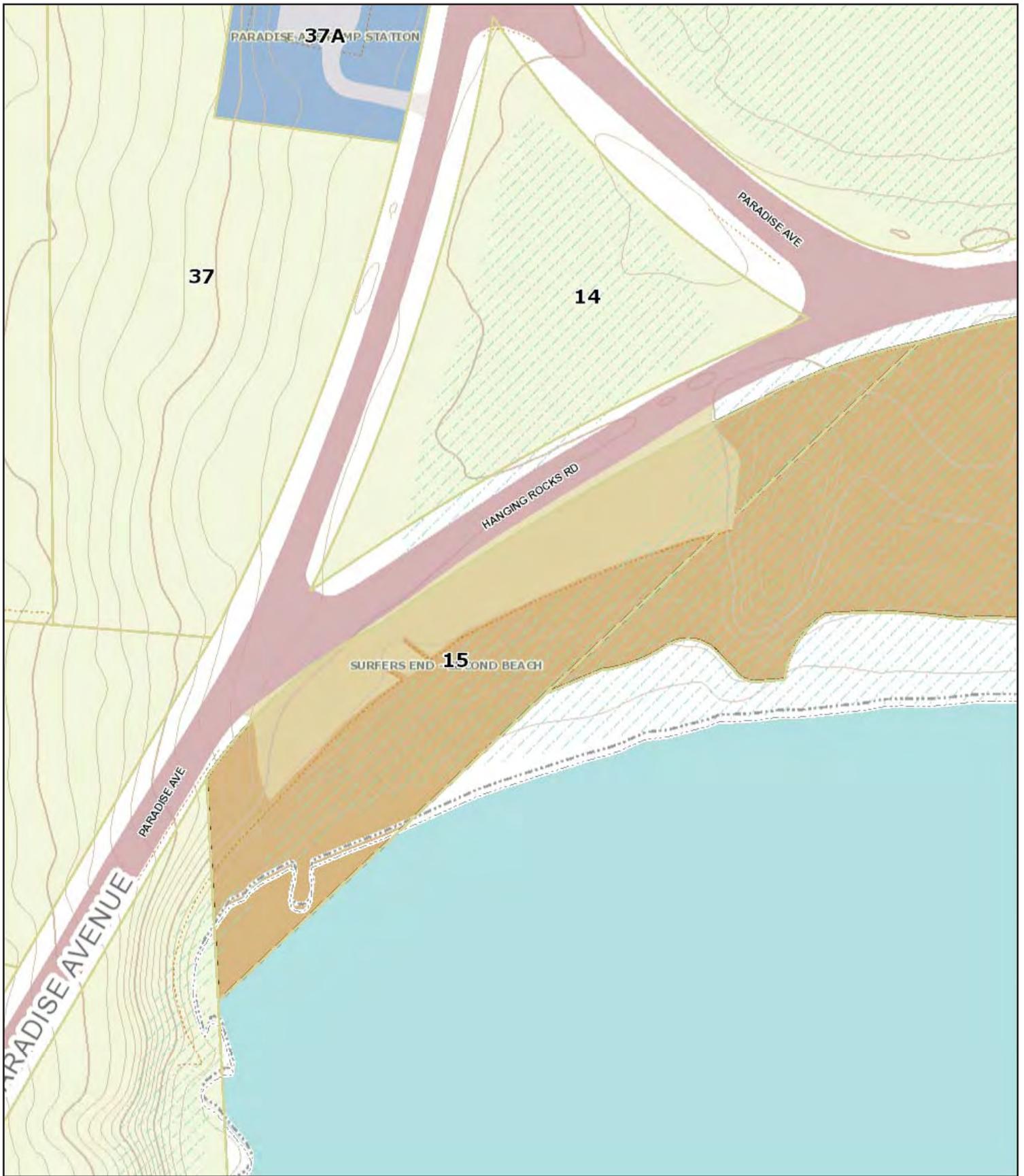
5G. Surfers End BMP Site



Project will install an infiltration system adjacent to the seawall within the parking lot. Image taken looking East.



Surfers end BMP site looking West.



The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

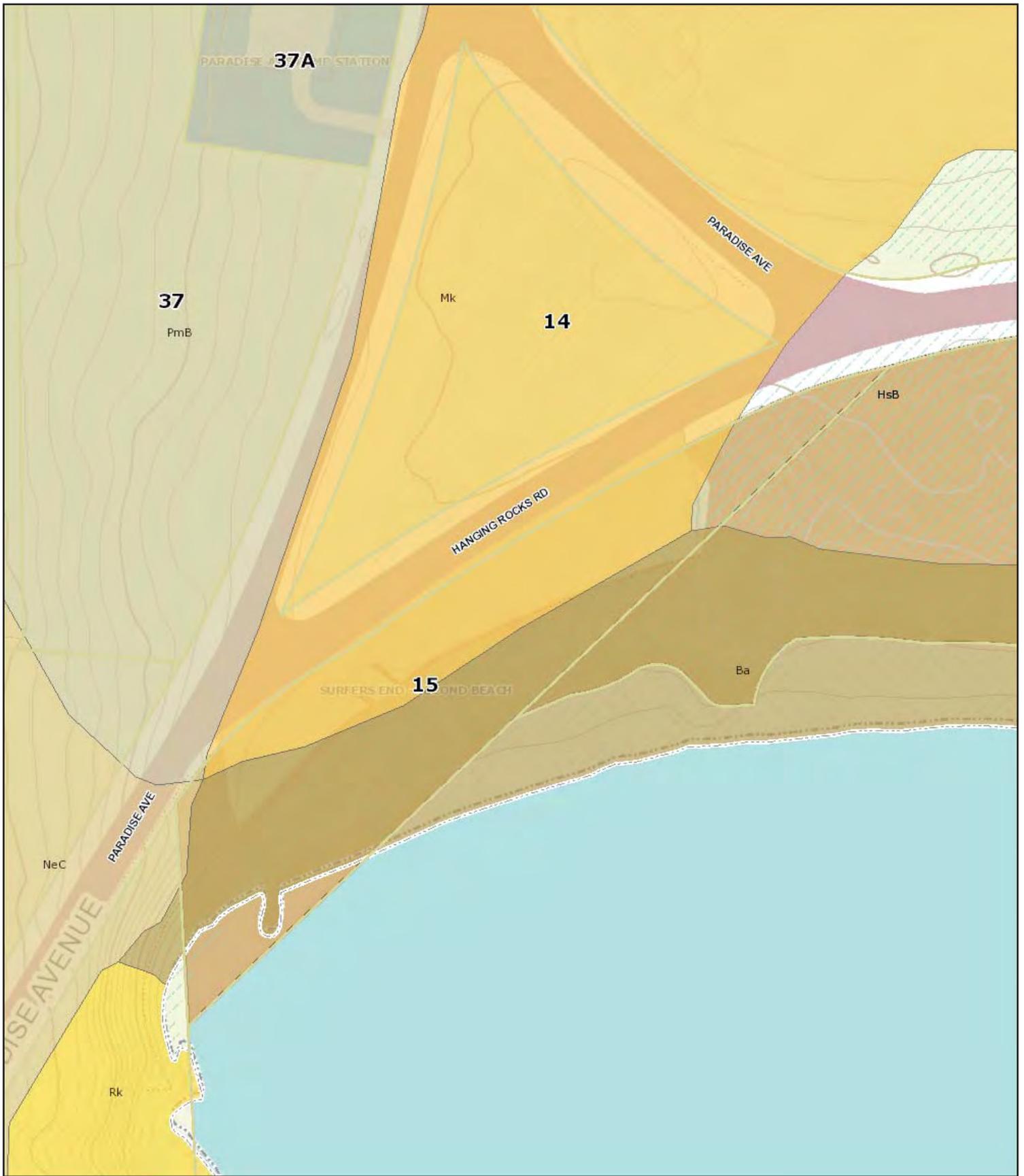
**Town of Middletown
Surfer's End BMP**

9/2/2015 2:52:14 PM



1:1200
1"=100'





The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

Middletown Surfer's End Soils

9/2/2015 2:48:12 PM



1:1200
1"=100'

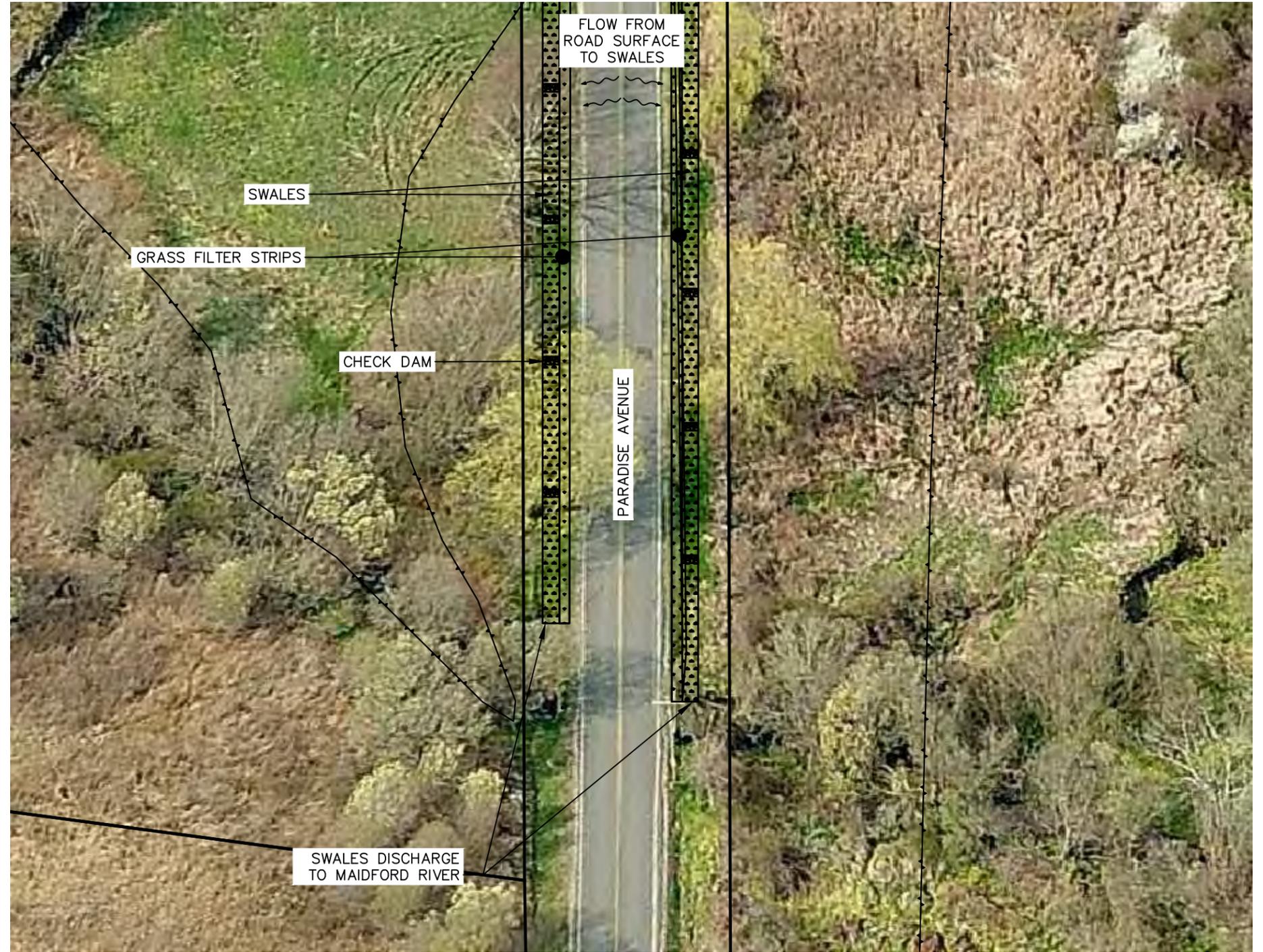


File Path: J:\DWG\20140870A10\CivilPlan\20140870A10_SITP01_recover.dwg Layout: B7 Plotted: Tue, September 01, 2015 - 7:34 AM User: rweiller
 Plotter: DWG TO PDF.PC3 C:\B File: FO.STB
 MS VIEW: LAYER STATE:



PARADISE AVENUE SWALE

SCALE: 1" = 500'



PARADISE AVENUE LINEAR BIORETENTION SYSTEM

SCALE: 1" = 30'

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.				

SCALE:	HORIZ.: AS NOTED
	VERT.:
DATUM:	HORIZ.: NAD83
	VERT.:
GRAPHIC SCALE	


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TOWN OF MIDDLETOWN
 SITE PLAN FOR BMP B7 (PARADISE AVE)
 MAIDFORD RIVER BMPS
 MIDDLETOWN
 RHODE ISLAND

PROJ. No.: 20140870.A10
 DATE: AUGUST 2015

CS-104