

# Suffolk County Department of Health Services

## **Peconic Estuary Conceptual Habitat Restoration Design Planning Services**

Contract #: 003-4410-4560-00-00007

Land Use Ecological Services  
570 Expressway Drive South, Suite 2F  
Medford, NY 11763  
(631)727-2400

Contact: William Bowman  
[wbowman@landuse.us](mailto:wbowman@landuse.us)



## **PROJECT SUB-CONTRACTORS**

### **•Inter-Fluve Inc:**

*Experience:* River Restoration, Fish Passage, Stormwater Management

*Focus:* Big Reed Pond/Stepping Stones Pond, Narrow River, Main Road

Nick Nelson (Fluvial Geomorphologist)

Mike Burke, PE (Water Resources Engineer)



### **•LVBrown Studio LLC:**

*Experience:* Graphic Design

*Focus:* Projects requiring high-quality visual representations of ecological improvements for developing stakeholder consensus and procurement of implementation funding.

**LVBrown Studio LLC**

## **MEETING TIMELINE**

9:15 AM            Lake Montauk Alewife Access and Habitat Enhancement

10:30 AM           Iron Point Wetland Restoration

12:15 PM           Lunch Break

2:30 PM            Narrow River Wetland Restoration

3:30 PM            Main Road- Riverhead Wetland Construction/Restoration

Adjourn



## Conceptual Planning Objectives

1. Evaluate if it is possible/feasible to fulfill restoration objectives
2. Provide visual illustrations of the strategy for ecological restoration
3. Confirm that the strategy for restoration is constructable/buildable
4. Provide preliminary cost estimates for implementation
5. Assess the benefits and risks of restoration alternatives
6. Provide a realistic sense for the possibilities and limitations of restoration.

**Concept Plan Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

## **Lake Montauk Alewife Access and Habitat Enhancement: Summary of Contracted Work and Technical Approach**

### *Introduction:*

According to RFP, the purpose of the project is to restore alewife access to Stepping Stones Pond on the southwestern end of Lake Montauk and restore the historic flow in and out of Big Reed Pond by replacing an undersized impassible culvert and/or Phragmites removal.

Our contract specifies the evaluation of barriers to fish passage and development of schematic and conceptual designs and recommendations for fish passage improvements at Big Reed Pond and Stepping Stones Pond.

Subsequent discussions with Peconic Estuary Program and Suffolk County Parks have indicated that actions to correct a well-documented harmful blue-green algae (*Aphanacapsa*) bloom in Big Reed Pond are also an important priority.



## **Concept Plan Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

### **Lake Montauk Alewife Access and Habitat Enhancement:**

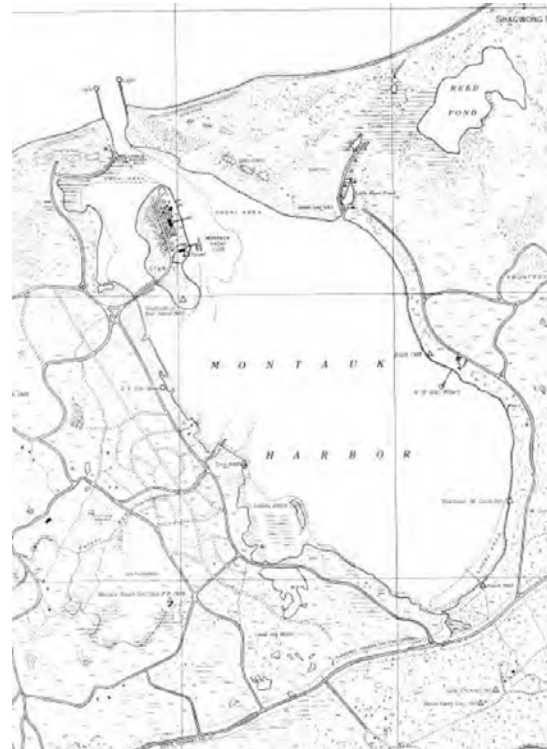
*Evaluate Fish Passage Conditions at Stepping Stones Pond and Big/Little Reed Pond; Prepare Schematic Designs:*

- Determine actual barriers to fish passage by evaluating physical and hydraulic conditions at potential barriers.
- Collect ecological information on wetland and ecological community boundaries, significant ecological communities & habitats for rare species, potential site access routes.
- Utilize available GIS data including LIDAR/DEM, aerials, and property ownership.
- Prepare schematic design for each observed fish barrier. Schematic designs will likely be drawn on existing aerial photographs with sufficient detail to promote discussion and a thorough understanding of the proposed approach, but not the finished, presentation quality of the final concept drawings.

**Concept Plan Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

**Lake Montauk Alewife Access and Habitat Enhancement:**

*Background:*



Left: 1902 map of Great Pond (i.e. Lake Montauk)

Right: Post-dredging map

Both maps from Little and Abramson (2011)

Lake Montauk was historically a freshwater lake separated from Gardiners Bay by a narrow isthmus. It was opened to Gardiners Bay in 1927 for development purposes.

## Concept Plan Meeting (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

### Lake Montauk Alewife Access and Habitat Enhancement:

#### *Background:*

#### Alewife Migrations in Lake Montauk:

##### Big Reed Pond

- Anecdotal reports of alewife run in Big Reed Pond in 1990s (L. Penny?)
- NYSDEC Freshwater Fisheries surveys have found juvenile alewives in Big Reed Pond, but not adults. Therefore, alewife population run may occur. Otherwise, landlocked population may exist.

##### Stepping Stones Pond

- In 2018, first documentation of alewife attempting to enter Stepping Stone Pond by Kate Rossi-Snook.
- Alewife scales (3) observed by Land Use on May 4, 2018 on downstream side of culvert.







# Big Reed Pond



- 1-ft pipe
- Partial fish passage barrier

Access

Staging

- Culvert to Little Reed Pond
- No fish passage barrier

## Conceptual Restoration Design

Control Points	Access
Wetland Boundary	Overhead Electric
	Staging

Notes:  
1. Aerial imagery from NYGIS, 2017  
2. Datum: 2014 USGS LIDAR (NAVD83)  
3. Scale is 1:4,250



320 Concord Avenue, 2nd Floor  
Cambridge, MA 02138



870 Expressway Drive South, Suite 2F  
Westport, NY 11783

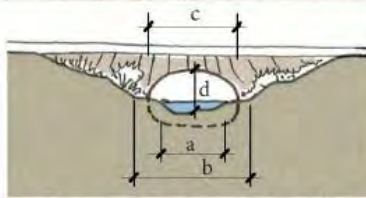








# Big Reed Pond



Proposed 2' diameter arched corrugated metal culvert, 15' long. Maintain existing pipe elevation of approximately 1.8'

Proposed limit of excavation for culvert replacement. Area is approximately 9'x15' (135 sf). Excavation would extend approximately 2' below existing grade.

Existing 1' corrugated HDPE pipe, 15' long

- Construction Notes:**
1. Approximately 1' of fill would be placed above proposed culvert
  2. Proposed invert elevations of new culvert shall match existing culvert
  3. Proposed grade of park road after construction equivalent to existing road grade (El. 3.5)
  4. Culvert replacement cannot be completed between July 1 and February 28 to minimize dispersal of invasive *Arthraxon hispidus* seeds
  5. All BMPs to limit *Arthraxon* seed transport by equipment and workers specified in Peconic Estuary Program report (July 2019) shall be implemented
  6. All temporary staging or stockpiling of equipment, materials, or fill shall occur on the existing park road. No staging or stockpiling in freshwater wetlands is authorized.
  7. All disturbed areas shall be re-seeded with native wetland seed mix at 20lbs PLS per acre (Ernst Conservation Seeds, Meadville PA, New England Riparian Mix or equivalent)

- Wetland Flags
- Silt Fence
- Edge of Natural Vegetation
- FW Wetland Boundary
- ▨ Limit of Clearing, Grading, and Ground Disturbance
- Contour (2-ft)



Existing Unpaved Park Road

Flow Direction

Big Reed Pond

## Peconic Estuary Program Conceptual Restoration Design

Big Reed Pond Culvert Replacement - Proposed Conditions  
Big Reed Pond, Montauk County Park (Montauk, NY)  
SCTM#: 300-7-1-3

Prepared 06/20/2019

- Map Notes:**
1. Contours (2 ft intervals) created from 2014 Lidar (USGS)
  2. Aerial imagery from NYGIS, 2017
  3. Landward Limits of FW Wetlands as Delineated by WP Bowman (Land Use) on May 7, 2018.
  4. Scale is 1:150



## Big Reed Pond



Photo: Downeast Lakes Land Trust

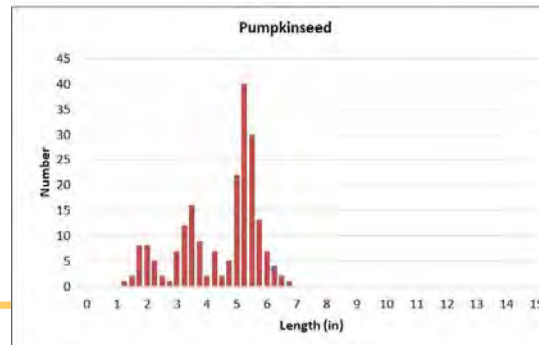
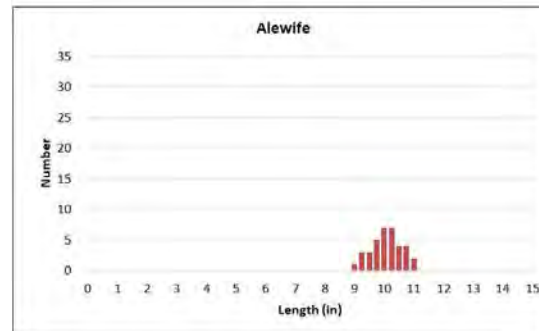
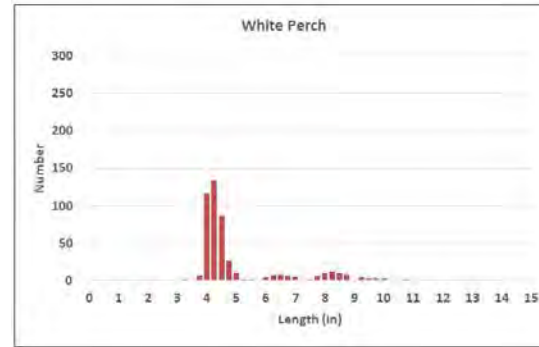
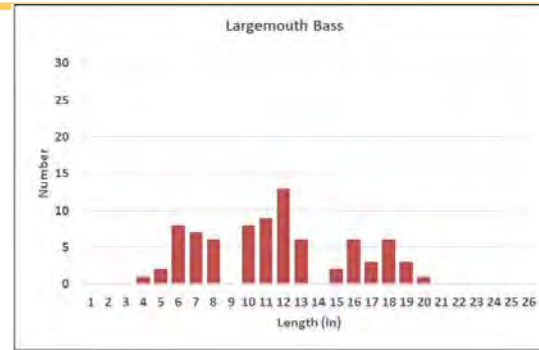


# Big Reed Pond

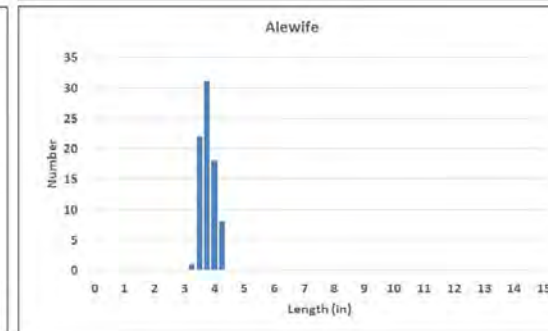
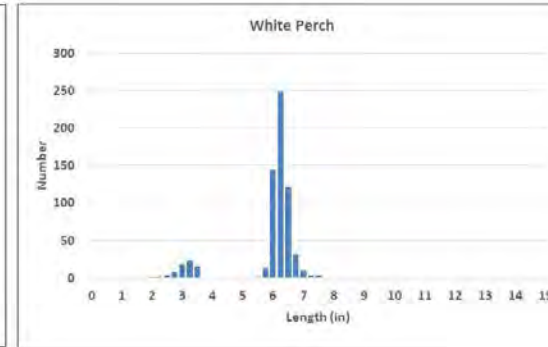
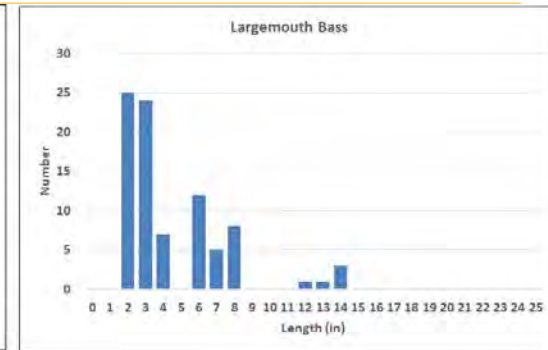
## 2010 Fish Kill

- *Low water year*
- *Warm temperatures*
- *Fish studies show populations rebounding*
- *Possible causes*
  - *Low water = high temperatures, low DO, algal blooms*
  - *Trophic imbalance lead to algal blooms*
  - *Environmental factors – salt water intrusion, increased air/water temperatures, pollutants from air quality*

1994



2016



# Big Reed Pond

## *2010 Fish Kill*

- *Questions for future studies and monitoring:*
  - Are fish populations in recovery since 2010 given the slightly younger age categories in some species?
  - What is the overall trend in fish populations by species and age category?
  - If the algal blooms are present every year, why was the fish kill observed in 2010 and no other years?
  - What is the extent of types of mortality?
    - Natural causes
    - Predation
    - Angling

## **Big Reed Pond : High Priority Invasive Species**



### Small Carpetgrass (*Arthraxon hispidus*)

- Only known location of this annual invasive in New York State
- Located along much of SC Parks road to west of Big Reed Pond
- Recommend SC Parks mow road margins between September-October to control

### Best Management Practices to Avoid Spread of Arthraxon:

- Work only between March and June to minimize spread by workers/equipment.
- Clean tools, equipment, and vehicles in large main parking area of Big Reed County Park prior to leaving the site.
- Clean tools before leaving the worksite, especially, if moving to uninfested areas.
- Remove soil, seeds and plant parts from tools, the undercarriage, tires, sideboards, tailgates, and grills of all vehicles and equipment.
- Equipment and vehicles may be cleaned without water using bristle brushes, brooms, scrapers, vacuum cleaners, and other hand tools.
- Clothing, boots and gear should be cleaned and removed of soil, mud, seeds, and any plant material before leaving worksite.

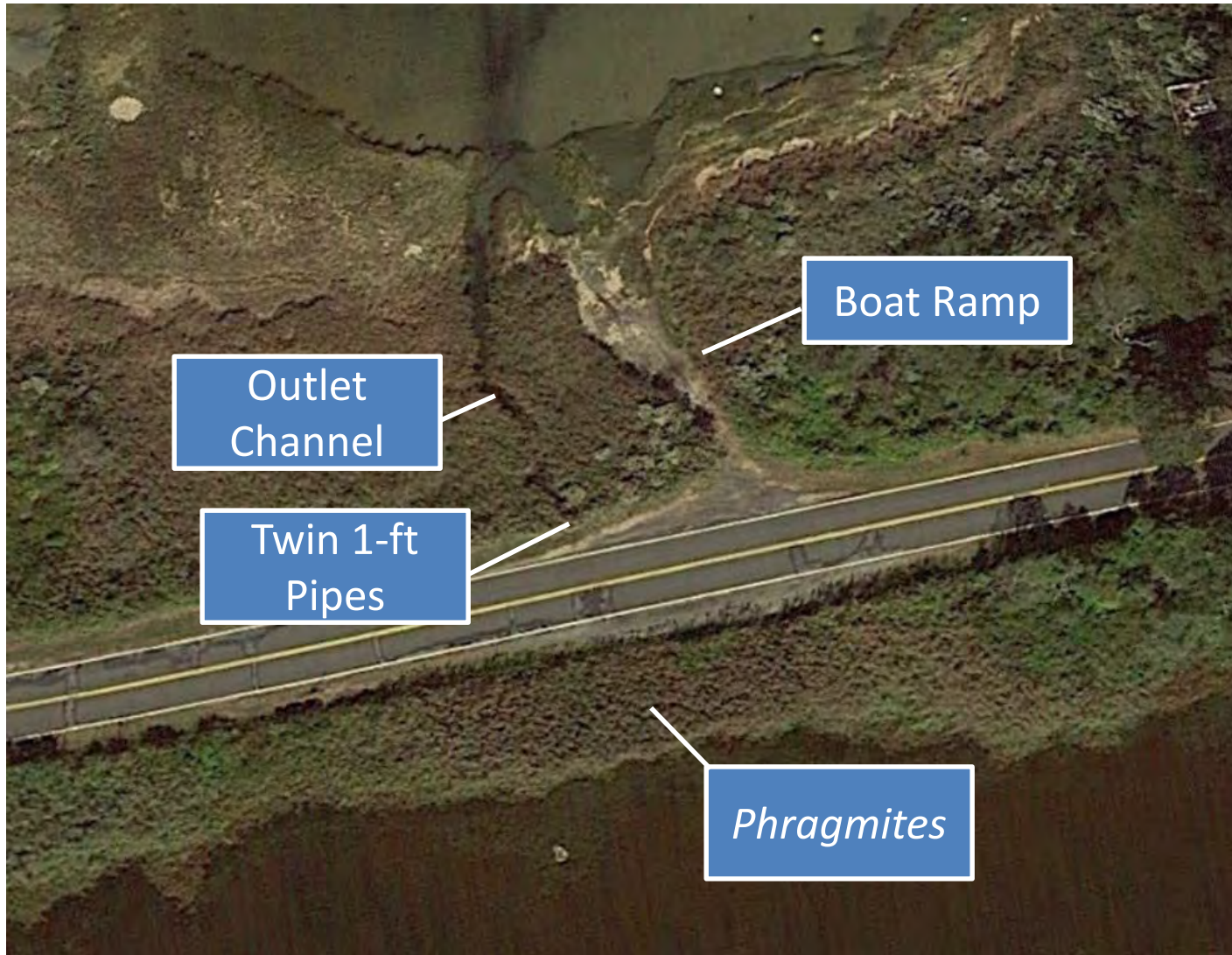
**Concept Plan Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

**Stepping Stones Pond**



**Concept Plan Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

**Stepping Stones Pond**



**Concept Plan Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

**Stepping Stones Pond**

**Downstream**

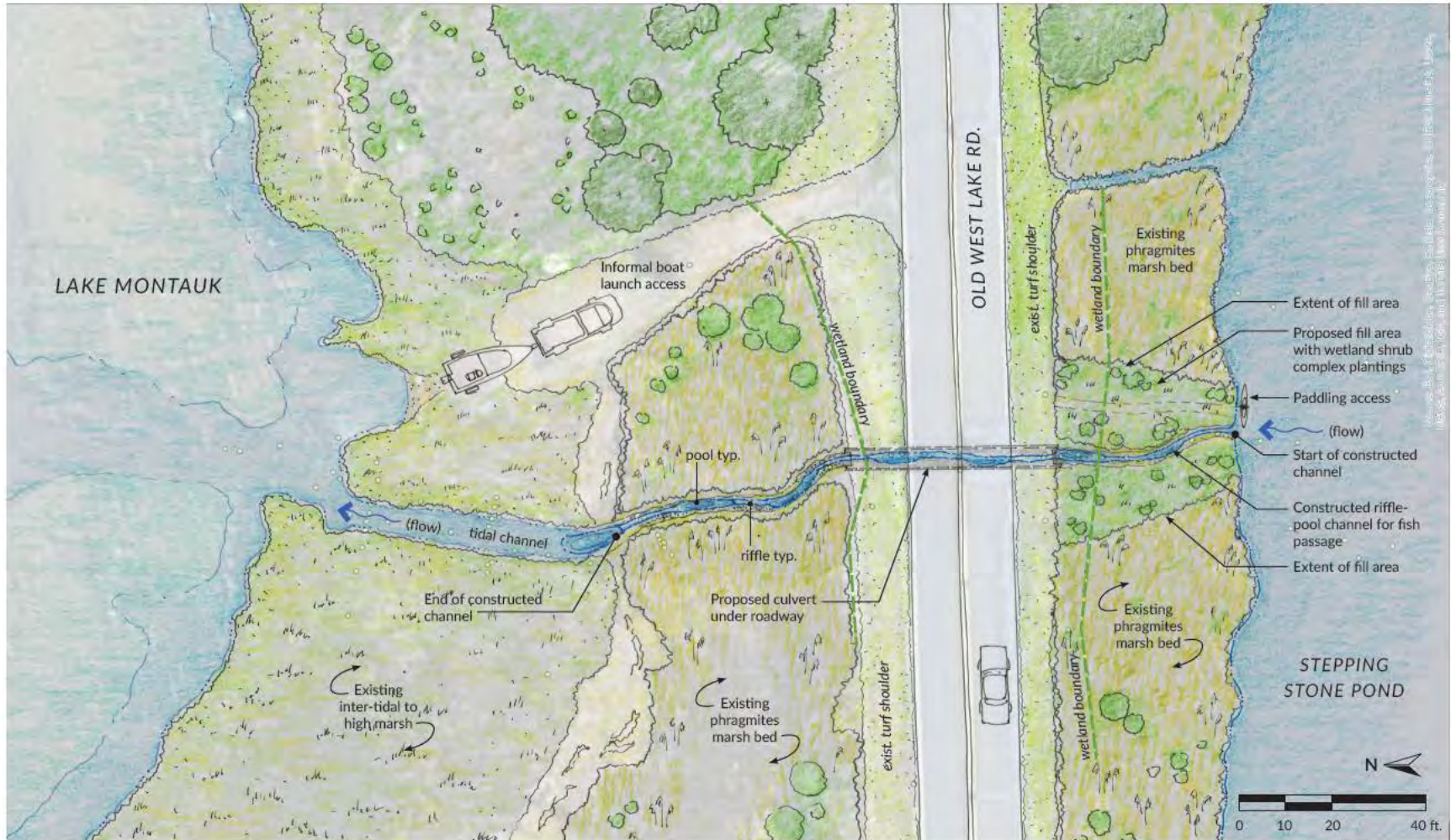


**Upstream**



# Concept Plan Meeting (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

## Stepping Stones Pond



A1

**PECONIC ESTUARY**  
May 24, 2019

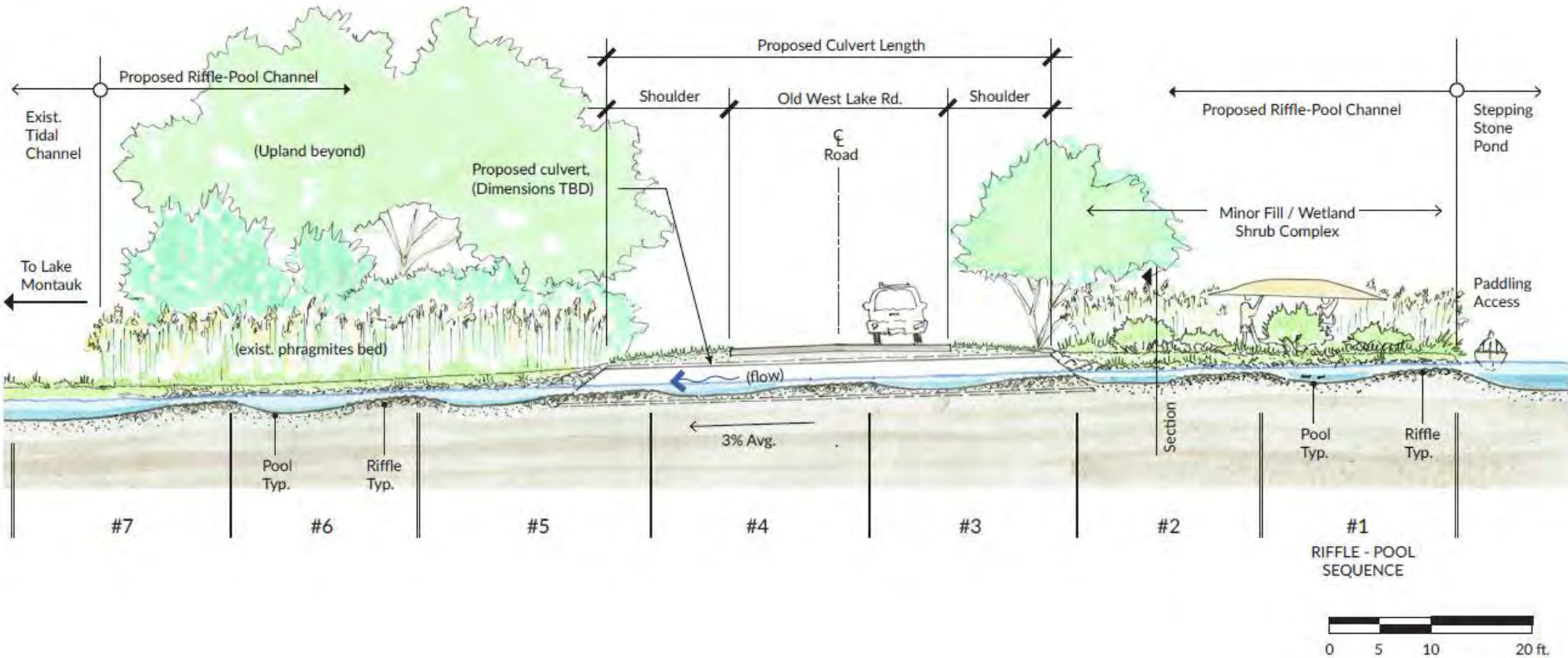
DRAFT - Conceptual Restoration Plan

LAKE MONTAUK ALEWIFE ACCESS & HABITAT ENHANCEMENT



# Concept Plan Meeting (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

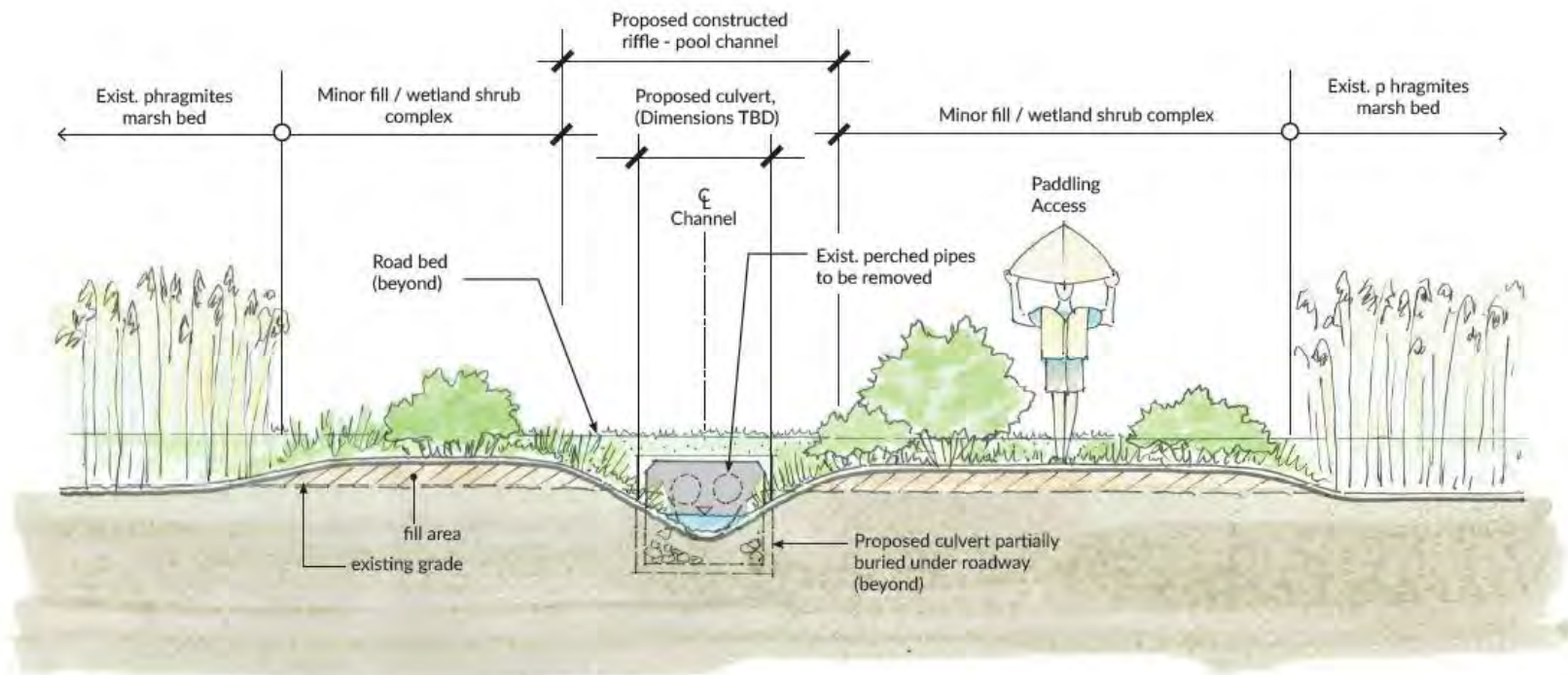
## Stepping Stones Pond





# Concept Plan Meeting (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

## Stepping Stones Pond



**Concept Plan Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

**Big Reed Pond and Stepping Stones Pond: Significant Natural Resources and Rare/Protected Species, as per NYNHP**

<b>Natural Resource</b>	<b>NYS Status</b>	<b>Habitat</b>	<b>Location</b>
Clustered Bluets	Endangered	Coastal Plain Pondshores	Big Reed Pond
Whorled Marsh Pennywort	Endangered	Coastal Plain Pondshores	Big Reed Pond
Sandplain Wild Flax	Threatened	Maritime dunes, shrublands, and grasslands	Big Reed Pond and Stepping Stone Pond
Southern Arrowwood	Threatened	Maritime dunes, shrublands, and grasslands	Big Reed Pond and Stepping Stone Pond
Salt-marsh Spike Rush	Threatened	Coastal Plain Pondshores	Stepping Stones Pond
Long-tuberclcd Spike Rush	Threatened	Coastal Plain Pondshores, High Salt Marshes	Stepping Stones Pond

## Concept Plan Meeting (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

### Big Reed Pond and Stepping Stones Pond: Permitting Required

Agency	Permit/Approval	Site
<i>United States Army Corps of Engineers</i>	Section 404 of Clean Water Act, Section 10 of Rivers and Harbors Act	Big Reed Pond
<i>New York State Department of Environmental Conservation</i>	Article 24 (Freshwater Wetlands)  Article 25 (Tidal Wetlands)  Article 15 (Protection of Waters)	Both Sites; <b>Big Reed Plans sufficient for submission for Art. 24 permit</b>  Stepping Stones Pond  Both Sites
<i>New York State Department of State</i>	Coastal Zone Consistency Determination	Stepping Stone Pond
<i>Suffolk County</i>	CEQ Approval	Big Reed Pond
Town of East Hampton	Zoning Board, Planning  Town Trustees	Both Sites  Both Sites

## **Concept Plan Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

### **Iron Point: Tidal Wetland Restoration**

#### *Introduction:*

The purpose of the project is to restore tidal flow and historical tidal wetlands landward of earthen dikes by excavating at least two (2) cuts within the dike to allow for tidal flow and flooding to the inland wetlands and dredging to the existing panne. Site investigations and conceptual designs should identify location, target elevations, and quantities associated with new cuts; determine potential sediment contamination and implications for dredge disposal; and avoid impacts to adjacent permeable reactive barrier pilot project. Our team shall collect following environmental data and obtain the following available GIS-data:

- Mapping of existing marsh community boundaries, existing elevations of marsh communities, and quantification of relative area of existing marsh communities
- Existing berm gap and ditch dimensions
- Sediment contaminant analysis (2 locations) from sediment borings
- ID access routes with minimum disturbance to high-quality plant communities
- LIDAR-based topographic map



## **Iron Point: Tidal Wetland Restoration**

*Background:*



1962 aerial (Suffolk  
County GIS)

- Historically, extensive tidal marshes (largely high marsh) along southern shoreline of the Peconic River. Filled between 1962 and 1974.
- Site consists of dredge spoils. Presumably from dredging Peconic River and nearby waterbodies (i.e. removal of duck sludge)

## **Iron Point: Tidal Wetland Restoration**

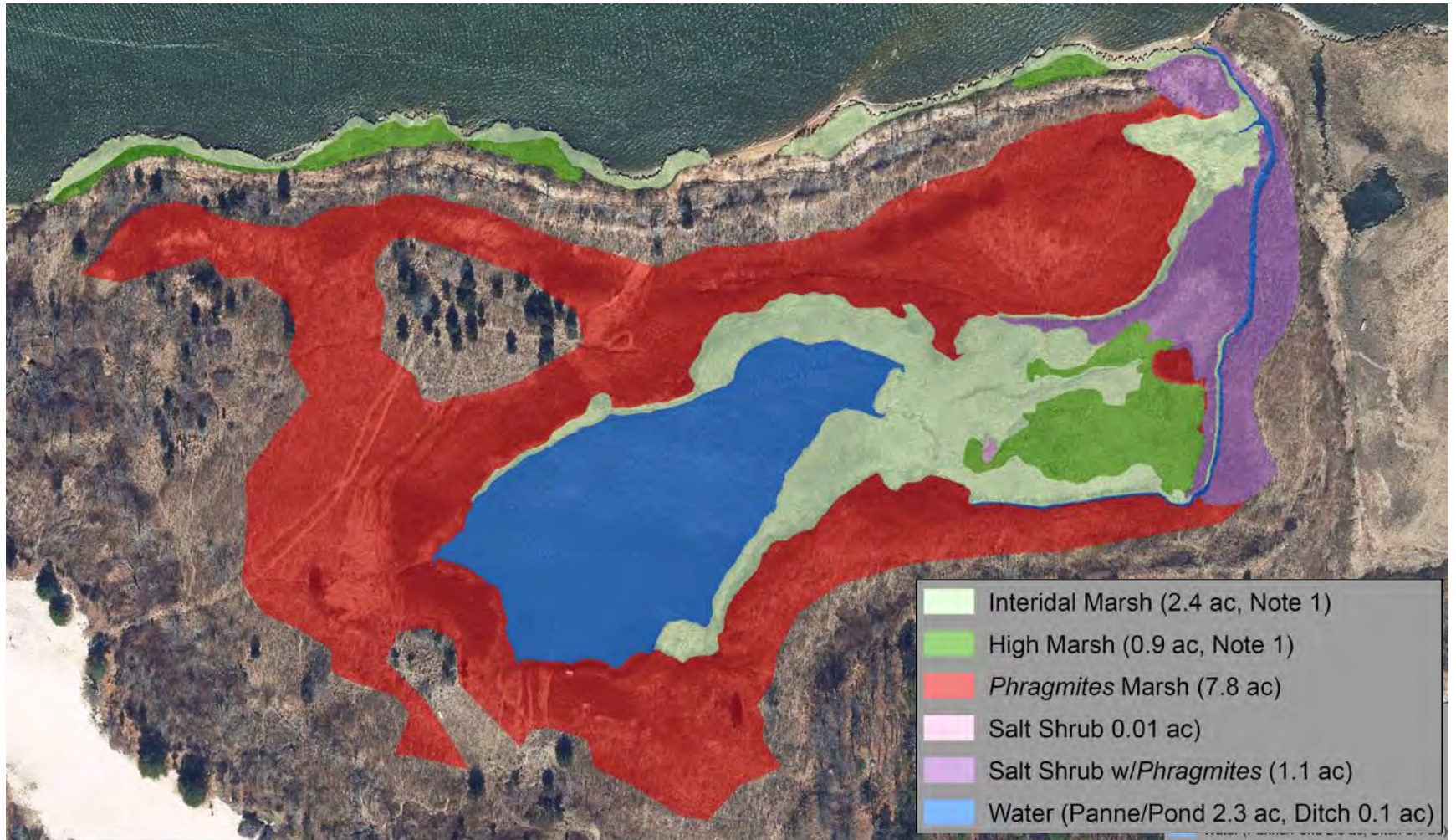
*Background:*



1978 aerial (Suffolk  
County GIS)

- Historically, extensive tidal marshes (largely high marsh) along southern shoreline of the Peconic River. Filled between 1962 and 1974.
- Site consists of dredge spoils. Presumably from dredging Peconic River and nearby waterbodies (i.e. removal of duck sludge)

*Existing Conditions:*



*Existing Conditions:*





*Existing Conditions:*

Peconic River  
Shoreline

Earthen Berm (to left)

Dimension:  
~2.5 to 6.0 ft above  
Tidal Wetlands

~50 ft wide



*Existing Conditions:*

Phragmites Marsh

Salt Panne with  
Intertidal Marsh Fringe

Photo Looking West



*Existing Conditions:*



Panne looking east (left) and west (right):

*Existing Conditions:*



**Intertidal Marsh:**  
Surrounding Panne (left)  
Near Mouth of Marsh (right)

*Existing Conditions:*



High Marsh:

*Existing Conditions:*



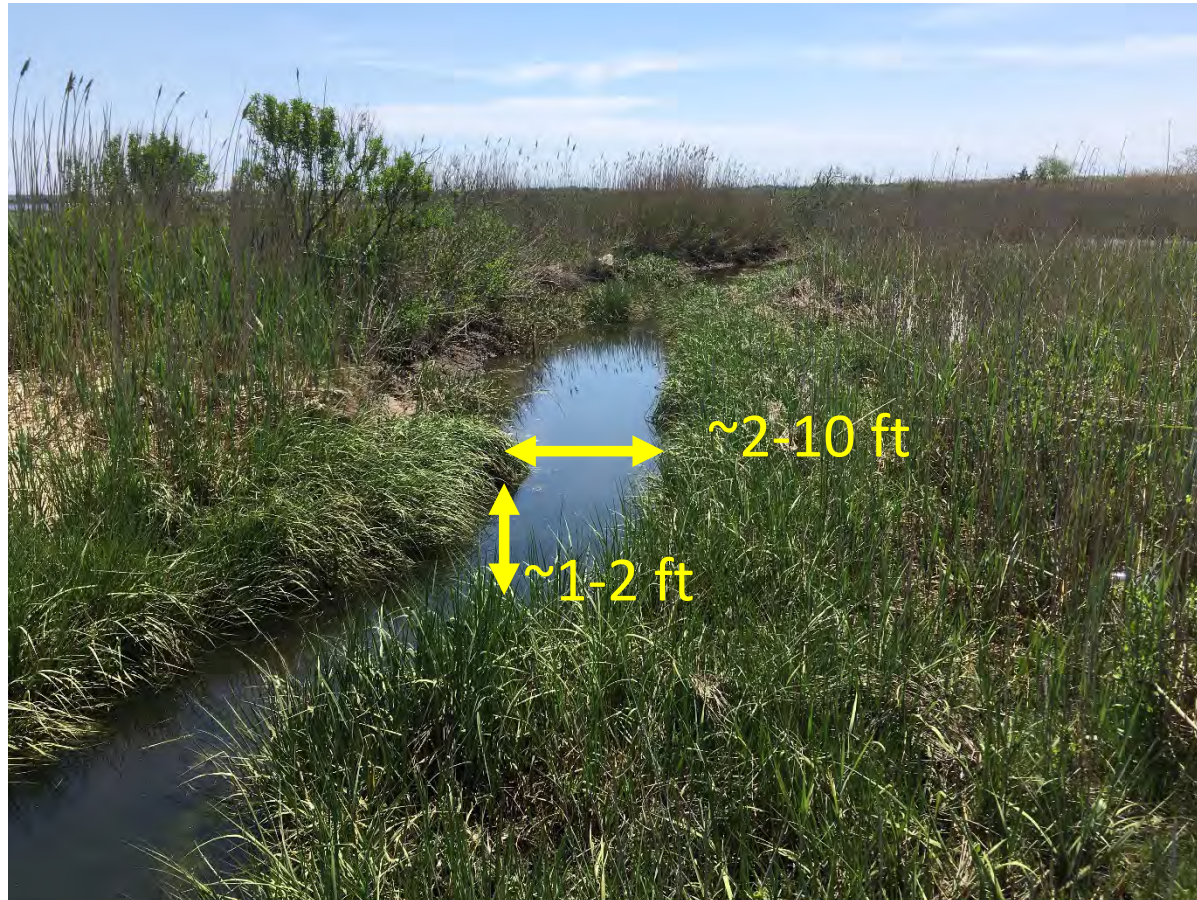
Southern Ditch

*Existing Conditions:*



Ditch Outfall to Peconic River:  
Looking Upstream (top)  
Looking Downstream (bottom)

*Existing Conditions:*





*Existing Conditions:*

New York Natural Heritage Program indicates that Mexican Seaside Goldenrod (NYS Endangered) is known to occur at Iron Point. None were observed during surveys in October 2018 in suitable high marsh habitats.



Mexican Seaside  
Goldenrod in  
nearby Flanders  
Marsh complex.



# Iron Point: Initial Schematic Plan for Marsh Restoration Actions



## Legend:

1. Increase Channel Mouth Width by 300%
2. Increase Size of Berm Cut
3. Provide Consistent Ditch Slope from Panne to River
4. Provide More Extensive Creek Network
  - 4a. New Channel between Panne and southern Ditch
  - 4b. Enlarge northern Ditch
  - 4c. Provide new Tributary Channel
5. Maintain Portion of Panne as Marsh Pond
6. Construction Access
7. Option: Partial Berm Cuts Stabilized with Bio-Engineering

## Iron Point: Discussion Points from Schematic Plan Meeting

1. Interior Marshes are “perched” relative to marshes to east and river shoreline. Restricted existing opening may be preventing “marsh drowning” seen elsewhere. Perimeter ditches may be conveying groundwater flow from uplands to river with positive effects on marsh salinity.  
**Outcome: Consider constructing limited berm cut and channel on west side with perimeter forming ditches. Using existing ditches are reference system**
2. Initial Schematic enlarged existing cut and created more extensive channel network. Drawback is *greater Disturbance in Existing Native Marsh Areas*. **Outcome: Advantageous to concentrate disturbance in *Phragmites* areas.**
3. Town of Southampton indicated that the ecological conditions have improved since acquisition of the property in 2001 and concerned about disturbance in higher quality areas of marsh.

## Iron Point: Conceptual Plan for Marsh Actions

- 1978 Aerial Imagery



# Iron Point: Revised Schematic Plan for Marsh Restoration Actions



## RECOMMENDED RESTORATION ACTIONS AT IRON POINT

1. Create new berm cut and tributary channels
  - Dimensions based on reference ditches in eastern marsh
  - Location based on topography and historic aerial imagery
  - New tributary channels in *Phragmites* marsh
2. Maintain existing berm cut and main channel
  - Maintain existing berm cut and main channel to maximize ebb/flood flow volume and maximize flushing of sediment from channel mouth.
3. Provide consistent slope within southern ditch between panne and Peconic River
  - Remove blockages in ditch to improve drainage.
4. Provide more extensive drainage network
  - 4a. Channel between panne and southern ditch; plant top of bank with *Spartina alterniflora*.
  - 4b. Provide new tributary channel to depression in northeastern *Phragmites*; plant top of bank with *S. alterniflora*.
5. Maintain portion of panne as marsh pond
  - New channel(s) does not extend to lowest elevation of panne to maintain panne/pond habitat.
6. Construction Access along top of existing berm
  - Cutting and removal of upland trees, shrubs, and vines
  - 12' wide maximum.
  - Re-plant/re-seed access route with native maritime plants.

# Iron Point: Conceptual Plan for Marsh Actions

## RECOMMENDED RESTORATION ACTIONS AT IRON POINT

1. Create new 86' wide berm cut and 1,800' of tributary channels
  - 8' wide creek channel, 2' deep, 6V:1H
  - 28' wide marsh floodplain along creek channel with intertidal marsh, high marsh, and salt shrub habitats planted with native species
  - New tributary channels 3' wide and 2' deep located within *Phragmites* marsh
  - New channels to be dug using low ground pressure (1.5 psi or less) mini-excavator or rotary ditcher.
  - New channels to be dug during dormant season to minimize disturbance to substrate and vegetation.
  - New channels must be free of hummocks and depressions to provide for marsh drainage.
2. Maintain existing berm cut and main channel
  - Remove accumulated sediments from channel mouth.
  - Provide consistent slope within existing ditch and remove blockages to improve marsh drainage.
  - Maintenance equipment should work from eastern and southern sides of ditch to minimize disturbance to interior marsh.
3. Provide more extensive drainage network and new creek tributaries.
  - 3a □ Construct 500' tributary channel in low swale with *Phragmites*. Tributary channel to be 3' wide and 2' deep, located and dug using low ground pressure (1.5 psi or less) mini-excavator or rotary ditcher.
  - 3b □ Construct 200' runnel connecting eastern margin of panne to existing ditch. Runnel not more than 1' wide and 1' deep. Runnel must be dug with hand tools. Runnel bottom must be smooth, and uniformly graded toward channel mouth.
  - Marsh peat salvaged during runnel construction shall be used to fill small depressions in the adjacent high marsh.
  - Large chunks of peat with *Spartina alterniflora* roots should be salvaged and replanted at the edge of the marsh panne.
4. Maintain portion of marsh panne / pond
  - New channel(s) does not extend to lowest elevation of panne to maintain panne/pond habitat.
5. Construction Access along top of existing berm (Sheet CP2)
  - Cutting and removal of upland trees, shrubs, and vines to establish a 12' wide maximum access road.
  - Replant/re-seed access route with native maritime plants.
  - Access at Iron Point Park parking area at end of Wood Road Trail.
  - Equipment and material staging in existing unvegetated sand area or existing parking area.
6. River and wetland overlook and interpretive signage
  - Connect to future nature trails Riverside Shoreline and River Restoration or Iron Point Park Improvements.
  - Trails to be 6' wide pervious surface with split rail fence for slope protection.
  - Educational signage to be placed along trails.
7. No on-site placement of dredge sediments due to Town of Southampton Community Preservation fund Requirements.

### Restoration Actions

- 1 - New Berm Cut and Tributary Channels
- 3 - Enhance Existing Ditches
- 1 - Proposed Marsh Plantings (3,400 sq ft)
- 1 - Proposed Upland Plantings (3,200 sq ft)
- ⋯ Proposed Contour
- ▭ Parcel Boundary



1 - New Berm Cut



2-Maintain Main Channel



2-Maintain Main Channel



3 - Improve Drainage



3 - Improve Drainage

**DATA:**  
 1. USGS 2014 Long Island NY Sandy LIDAR DEM obtained from NYS GIS Clearinghouse. Contour tool utilized on DEM to create elevation contours at 1 ft intervals.  
 2. Parcel information obtained from Suffolk County Real Property Tax Service Agency. Used with permission.  
 3. 2016 orthoimage from NYS GIS Clearinghouse (gis.ny.gov).

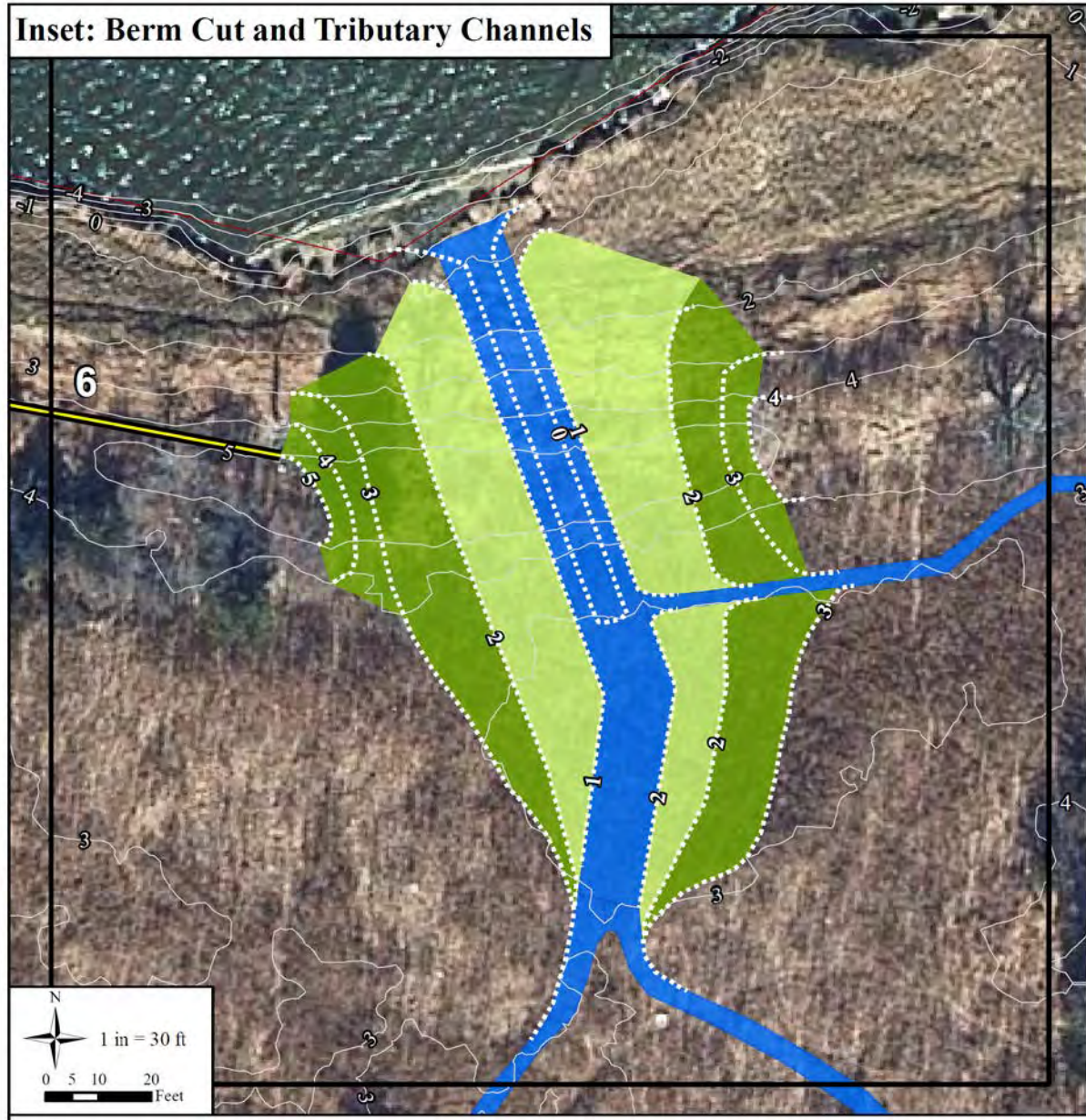


Prepared By: Land Use Ecological Services, Inc.  
 570 Expressway Drive South, Suite 2F  
 Medford, NY 11763

Project: CONCEPTUAL RESTORATION PLAN  
 For: Peconic Estuary Program  
 At: Iron Point - Town of Southampton

Date: 6/26/2019 | Revised: | Scale: As Noted | Sheet: CP1

# Iron Point: Conceptual Plan for Marsh Actions



# Iron Point: Conceptual Plan for Marsh Restoration Actions



Existing Berm (top left)

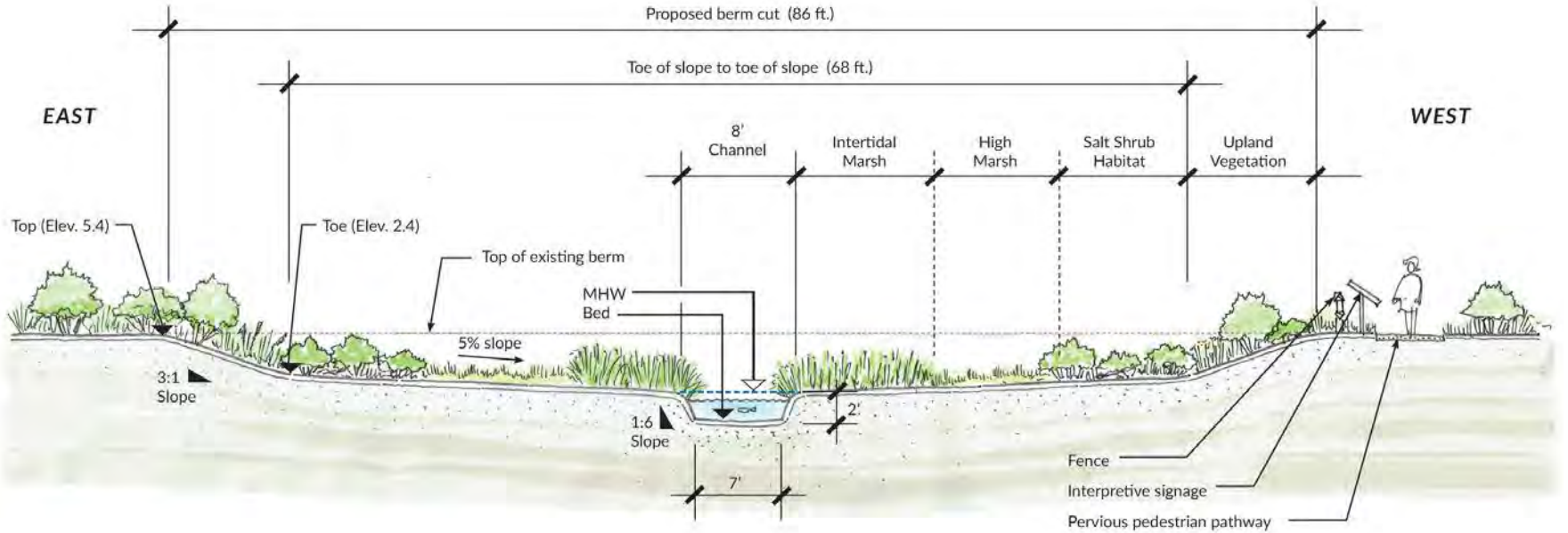
Ditch Outfall to Peconic River:

Looking Upstream (top right)

Looking Downstream (bottom)



# Iron Point: Conceptual Plan for Marsh Actions



# Iron Point: Conceptual Plan for Marsh Actions

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  - Trails to be 6' wide pervious surface with split rail fence for slope protection.
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7. No on-site placement of dredge sediments due to Town of Southampton Community Preservation fund Requirements.

### Restoration Actions

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- 3 - Enhance Existing Ditches
- 1 - Proposed Marsh Plantings (3,400 sq ft)
- 1 - Proposed Upland Plantings (3,200 sq ft)
- ⋯ Proposed Contour
- ▬ Parcel Boundary



1 - New Berm Cut



2-Maintain Main Channel



2-Maintain Main Channel



3 - Improve Drainage



3 - Improve Drainage

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Project: CONCEPTUAL RESTORATION PLAN  
 For: Peconic Estuary Program  
 At: Iron Point - Town of Southampton

Date: 6/26/2019 | Revised: | Scale: As Noted | Sheet: CP1

# Iron Point: Conceptual Plan for Marsh Restoration Actions

- Remove blockages and high points in channel profile to provide improve drainage and flushing of the marsh at low tide.



Main Ditch to Peconic River:  
Obstruction Looking Upstream (top)  
Obstruction Looking Downstream (bottom)

## Iron Point: Conceptual Plan for Marsh Restoration Actions

- 12' access route requiring clearing of upland trees, shrubs, and vines.
- Re-plant/re-seed access route with native maritime plants
- Marsh can be accessed for construction without potential impacts to CCE Pilot Reactive Barrier location.



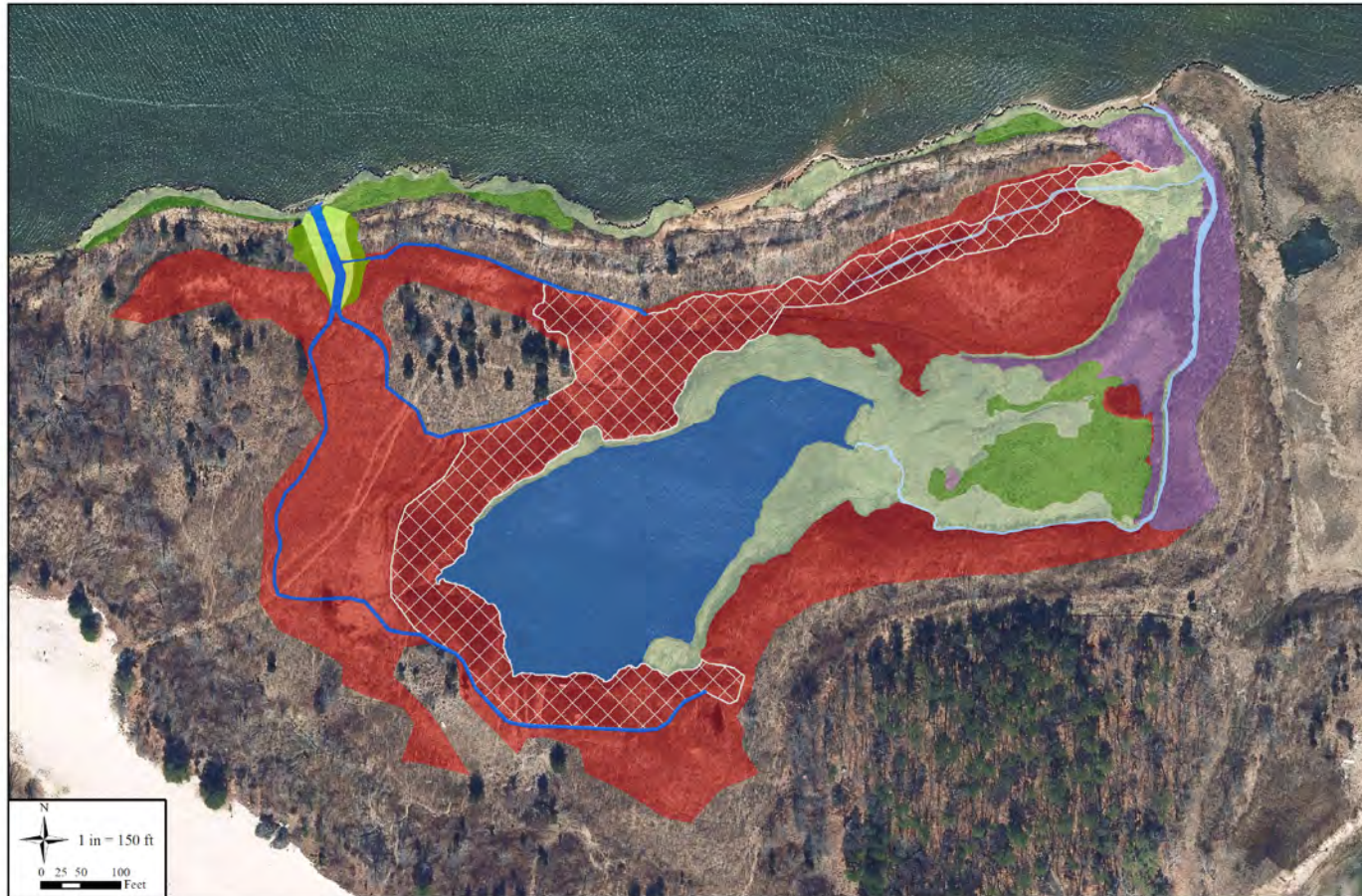
# Iron Point: Conceptual Plan for Marsh Actions

## Alternative: Phased Implementation of Berm Cut and Tributary Channels

- Phase I: Berm Cut with Marsh Channel and Central Tributary Channel
- Phase II: Construction of Northern and/or Southern Tributary Channel

Dimensions of Recommended Marsh Channels				
Recommended Restoration Action	Length (ft)	Width (ft)	Depth (ft)	Volume (CY)
Berm Cut with Marsh Channel	140	86 (Berm Cut) 12 (Channel)	5.4 (Berm) 2 (Channel)	296
Tributary Channels to New Cut	1758 (Total) 405 (North) 371 (Central) 982 (South)	3	2	390 (Total) 90 (North) 82 (Central) 218 (South)
Tributary Channel to Existing Ditch	504 (3a)	3	2	112
Runnel	183 (3b)	1	1	7

# Iron Point: Conceptual Plan for Marsh Actions



	<b>Target Marsh Restoration Area (Note 1)</b>
<b>Existing Ecological Communities</b>	
	Intertidal Marsh (2.4 ac, Note 3)
	High Marsh (0.9 ac, Note 3)
	<i>Phragmites</i> Marsh (7.8 ac)
	Salt Shrub (0.01 ac)
	Salt Shrub w/ <i>Phragmites</i> (1.1 ac)
	Water (Panne/Pond 2.3 ac, Ditch (0.1 ac)
<b>Restoration Actions</b>	
	1 - New Berm Cut and Tributary Channels
	3 - Enhance Existing Ditches
	1 - Proposed Marsh Plantings (3,400 sq ft)
	1 - Proposed Upland Plantings (3,200 sq ft)

**NOTES:**

**1. Target Marsh Restoration Area (2.4 acres):**

- □ Area of existing *Phragmites* marsh expected to be colonized with native wetland vegetation upon completion of Restoration Actions (tributary channels and existing ditch enhancements).
- □ Marsh restoration area based on elevation of existing tidal wetland with native vegetation.

**2. Comparison of Potential Impacts vs. Benefits:**

- □ Anticipated impact to native marshes from new berm cut, construction of tributary channels, and ditch enhancements is 2,300 sf (0.05 acres).
- □ Proposed native marsh plantings 3,400 sf (0.08 acres).
- □ Target marsh restoration area 105,000 sf (2.4 acres).
- □ Net native marsh restoration area 106,100 sf (2.43 acres).

**3. Areas of intertidal and high marsh by location are as follows:**

- IM Iron Point Project Area - 2.0 ac
- IM Peconic River - 0.4 ac
- HM Iron Point Project Area - 0.6 ac
- HM Peconic River 0.3 ac

## **Iron Point: Conceptual Plan for Marsh Restoration Actions**

### **Disposal of Sediments:**

**As per Town, no dredge spoils may be disposed on property due to acquisition under Community Preservation Fund.**

# Iron Point: Conceptual Plan for Marsh Restoration Actions

## Concept-level Construction Costs:

Restoration Action	Design Cost	Construction Cost	Notes
New Berm Cut with Tributary Channels and Maintenance of Existing Drainage Ditches	\$83K	\$198K	<ul style="list-style-type: none"><li>- Assumes ~90 ft berm cut and 1800 lf of new tributary channels</li><li>- Assumes ~6600 SF of wetlands and upland plantings</li><li>- Assumes off-site disposal of ~1000 CY of sediments at a Long Island landfill</li><li>- Cost does not include nature trail or visitor amenities</li><li>- Cost includes construction contingency and cost escalation</li></ul>



# Iron Point: Conceptual Plan for Marsh Restoration Actions

## Environmental Permits Needed:

Agency	Permit/Approval
<i>United States Army Corps of Engineers</i>	Section 404 of Clean Water Act, Section 10 of Rivers and Harbors Act
<i>New York State Department of Environmental Conservation</i>	Article 25 (Tidal Wetlands) Article 15 (Protection of Waters) Division of Materials Management; Sediment Sampling Plan and Approval of Disposal Location
<i>New York State Department of State</i>	Coastal Zone Consistency Determination
Town of Southampton	Town Conservation Board Town Trustees

**RFP#: 10-10015** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

**LUNCH**



**Concept Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

## **Narrow River: Culvert Modifications to Improve Tidal Exchange**

*Introduction:* The purpose of the project is to improve tidal flow within Broad Meadows Marsh to reduce *Phragmites* abundance and to recommend potential culvert modifications at the Route 25 culvert leading to Whitcom Marsh.

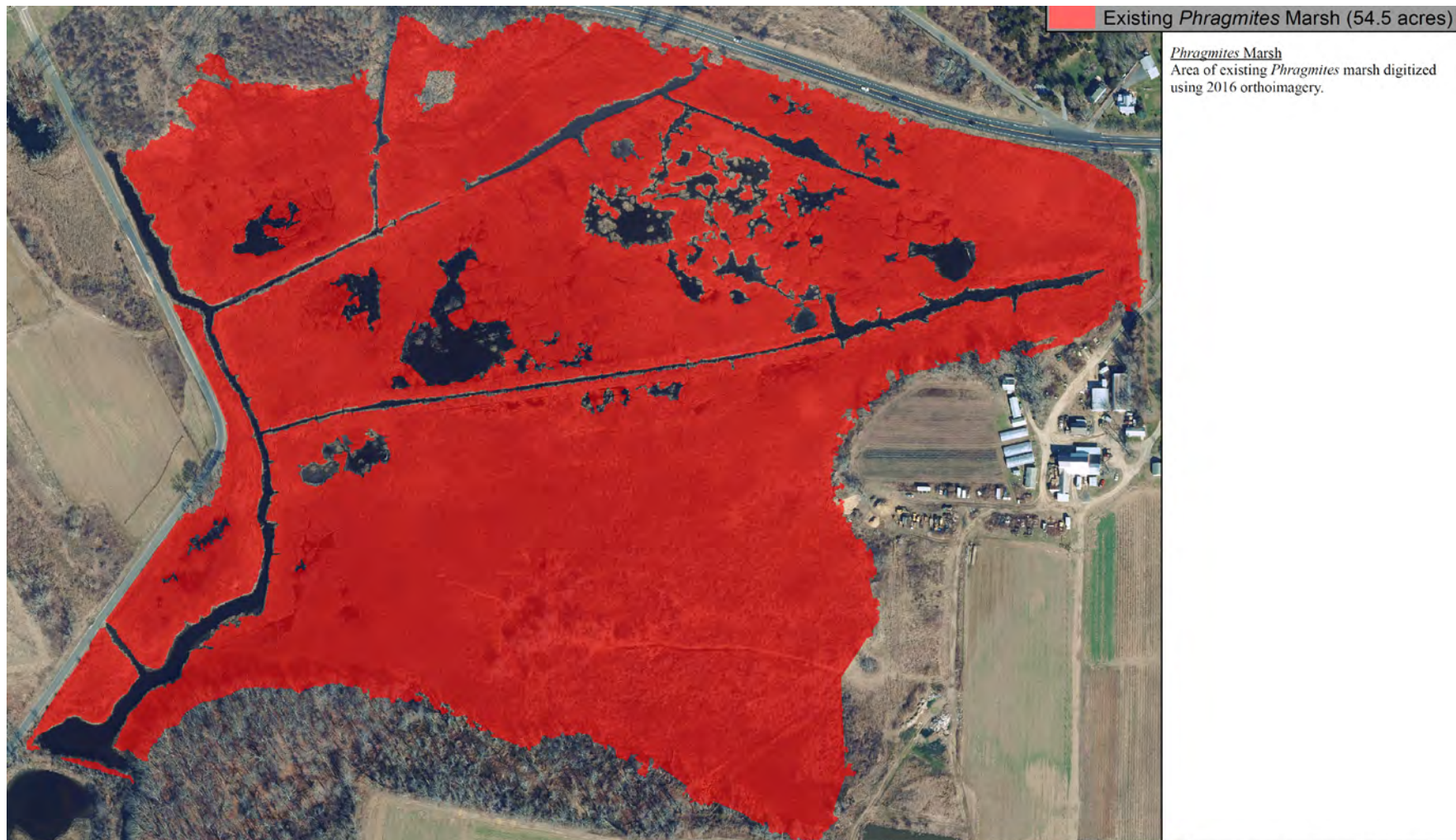


Left: Broad Meadows Marsh



Right: Culverts with Tide Gate

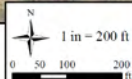
# Concept Meeting (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)



Existing *Phragmites* Marsh (54.5 acres)

*Phragmites* Marsh  
Area of existing *Phragmites* marsh digitized using 2016 orthoimagery.

1. 2016 USGS CoNED Topobathymetric Model (1887 - 2016); New England data from NOAA Data Access Viewer utilized for site topography. Contour tool used to generate 0.25 ft contours for site.
2. 2016 orthoimage from NYS GIS Clearinghouse ([gis.ny.gov](http://gis.ny.gov)).



Prepared By: Land Use Ecological Services, Inc.  
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Date: 6/26/2019 | Revised:

Project: Narrow River - Town of Southold  
For: Peconic Estuary Program  
Suffolk County Dept. of Health Services

Sheet: PM-1

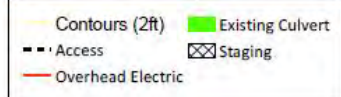
# Concept Meeting *(Peconic Estuary Habitat Restoration Conceptual Design Planning Services)*



## Peconic Estuary Assessment

Narrow River Culvert Replacements  
 Sheet 2 - Existing Conditions and Site Photos  
 Narrow River, Orient, NY, Suffolk County (NY)  
 SCTM#: 300-7-1-3

Prepared 06/26/2019



Notes:

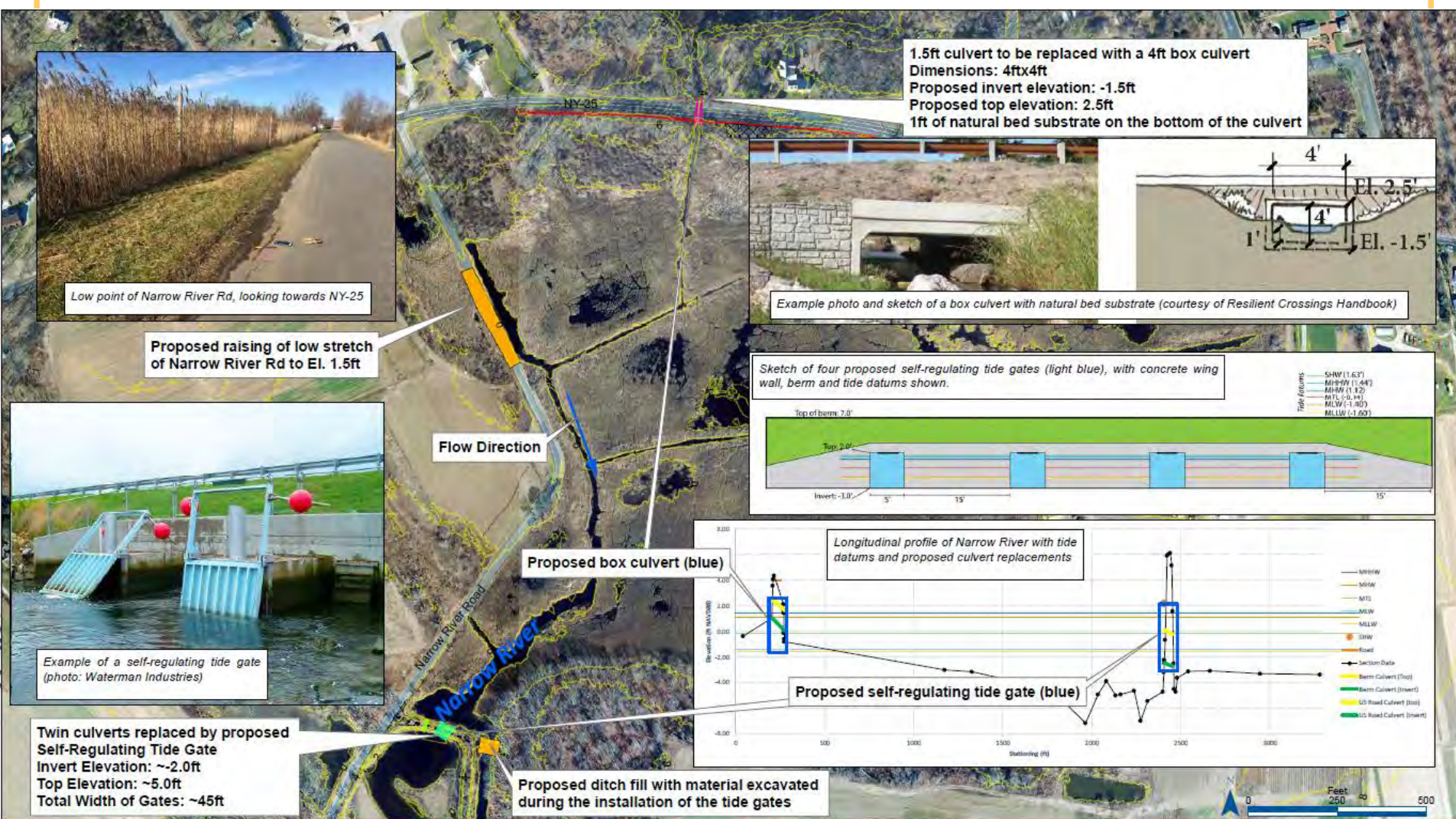
1. Contours (2 ft intervals) created from 2014 Lidar (USGS)
2. Aerial imagery from NYGIS, 2017
3. Scale is 1:3,000

**Concept Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

Datum	Orient Harbor NAVD88 (ft)	Cornell Cooperative Extension (ft)
Mean Spring High Water (MSHW)	1.63	
Mean Higher High Water (MHHW)	1.44	
Mean High Water (MHW)	1.12	0.6
Mean Tide Level (MTL)	-0.14	
Mean Low Water (MLW)	-1.4	-1.1
Mean Lower Low Water (MLLW)	-1.6	

Narrow River Road elevation at lowest point: 0.8ft

# Concept Meeting (Peconic Estuary Habitat Restoration Conceptual Design Planning Services)



**Concept Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

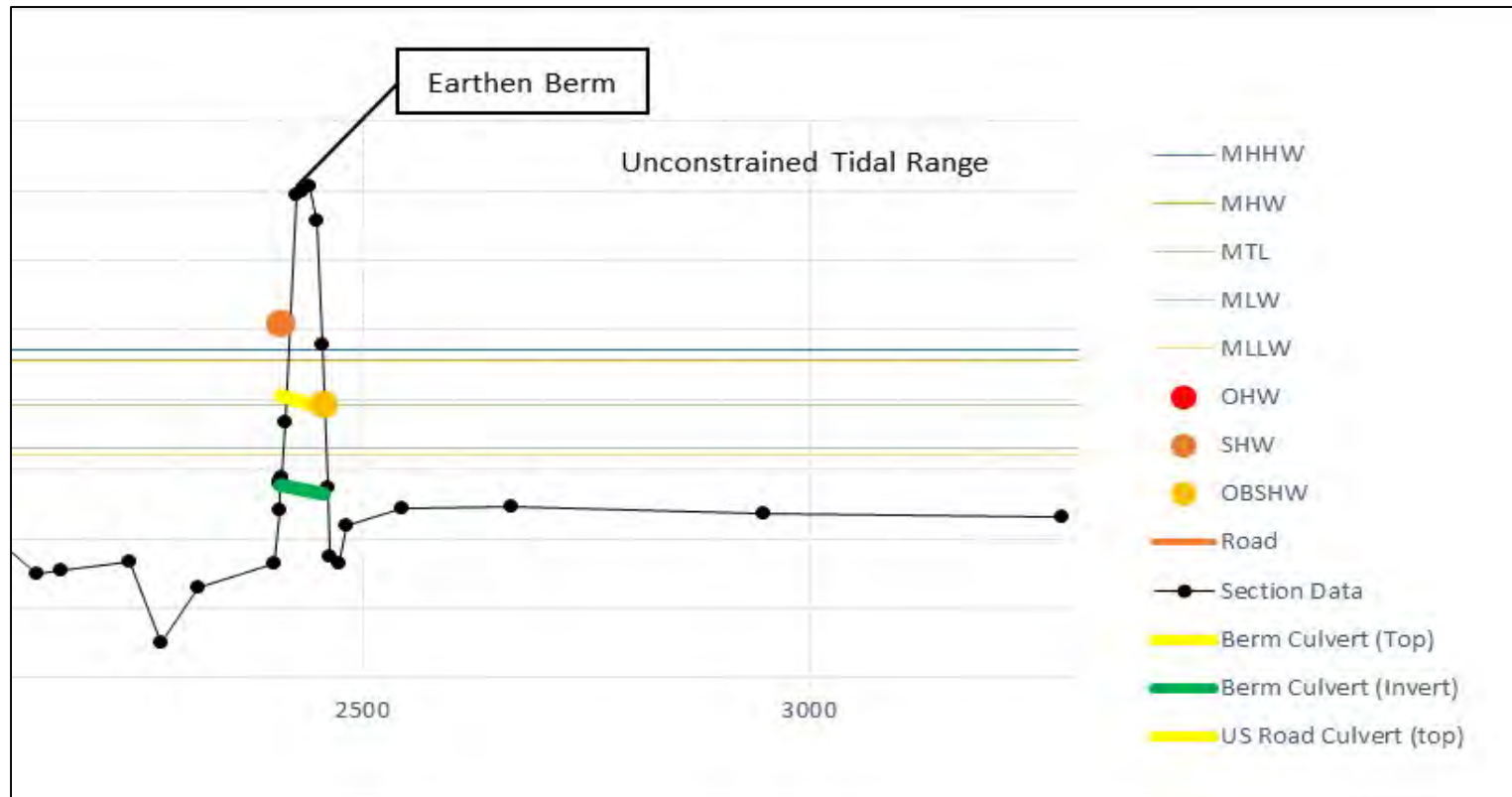
**Double Culvert at Earthen Berm** – 1.6 feet in diameter with flap gates





Concept Meeting (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

**Double Culvert at Earthen Berm – 1.6 feet in diameter with flap gates**

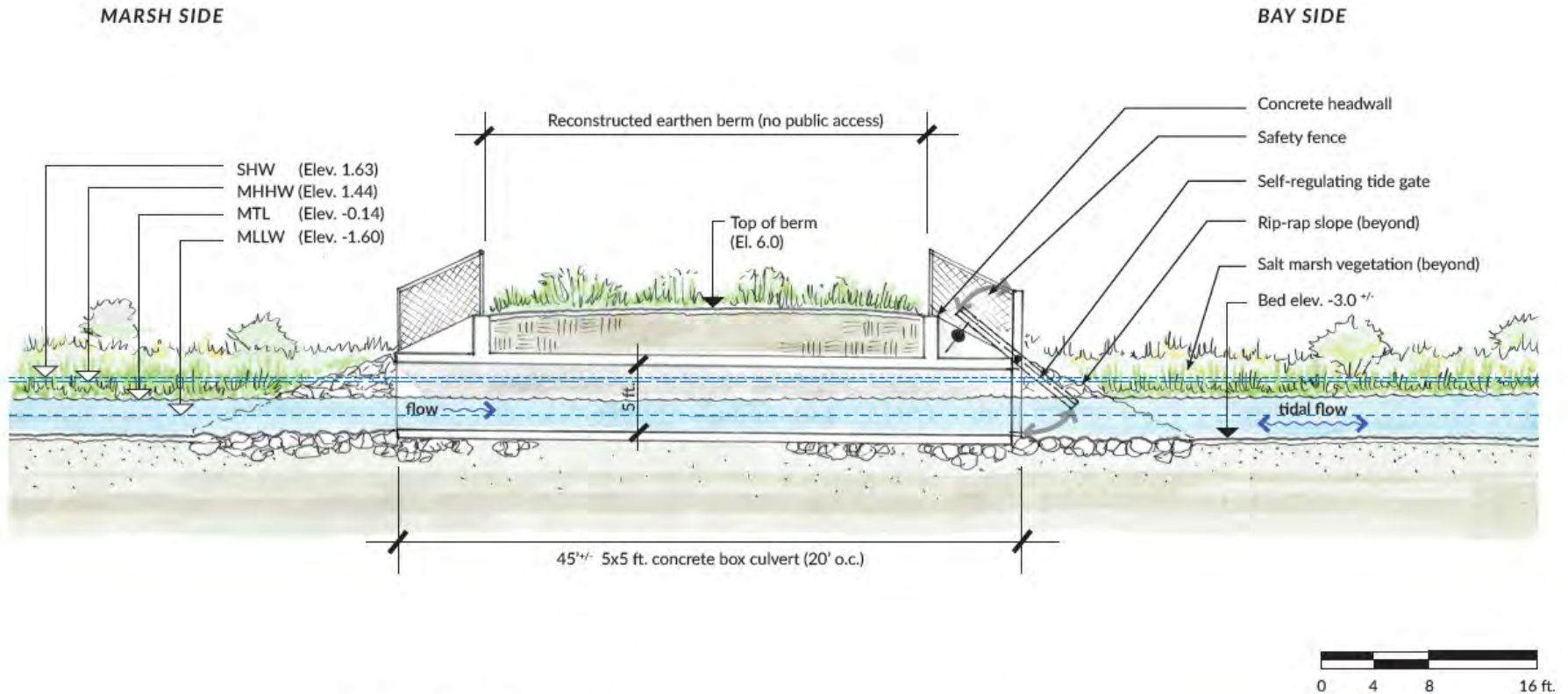


**Concept Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

## **Self-Regulating Tide Gates**



# Concept Meeting (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)



Conceptual Section:  
 Double Culvert Replacement with Self-Regulating Tide Gate  
 BROAD MEADOWS MARSH (ORIENT, NY)

C1

**PECONIC ESTUARY PROGRAM** June 27, 2019

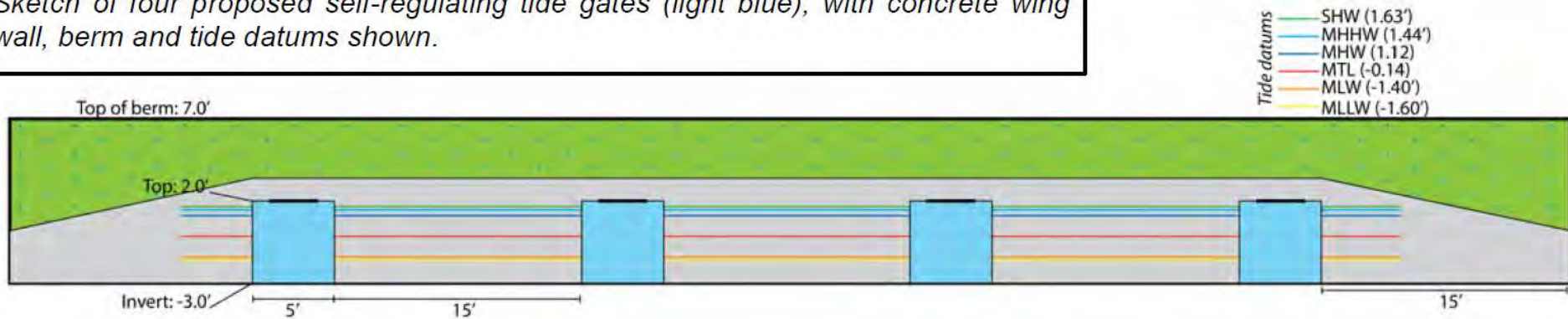


# Concept Meeting (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

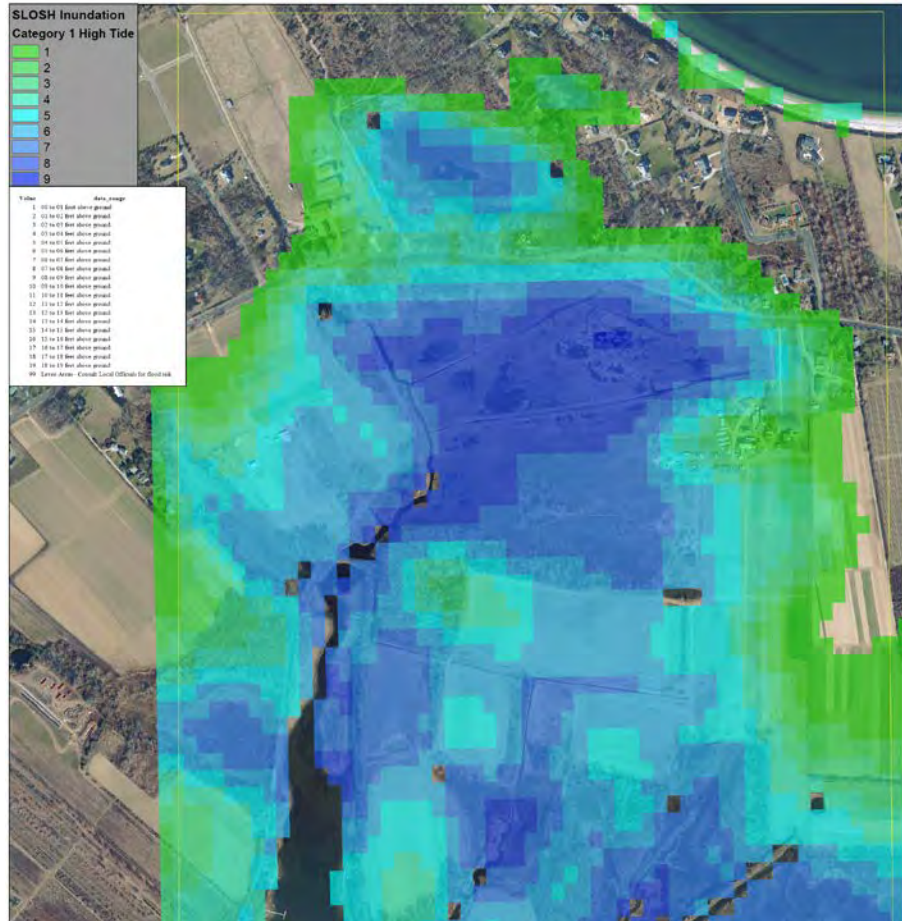
## Narrow River

*Proposed self regulating tide gates: 4, 5x5-ft gates with associated box culverts*

*Sketch of four proposed self-regulating tide gates (light blue), with concrete wing wall, berm and tide datums shown.*



## Concept Meeting (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)



The coastal flooding hazards are greatly increased during storm events (left) or under future sea level rise projections (right).

**Concept Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

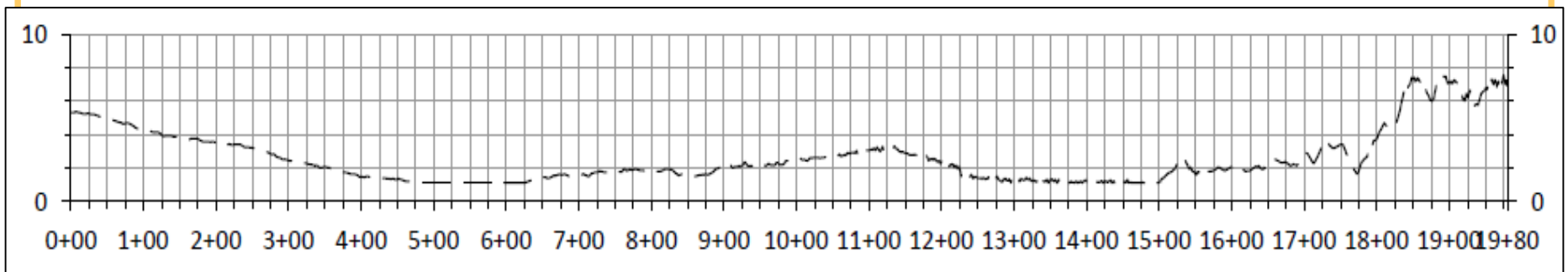
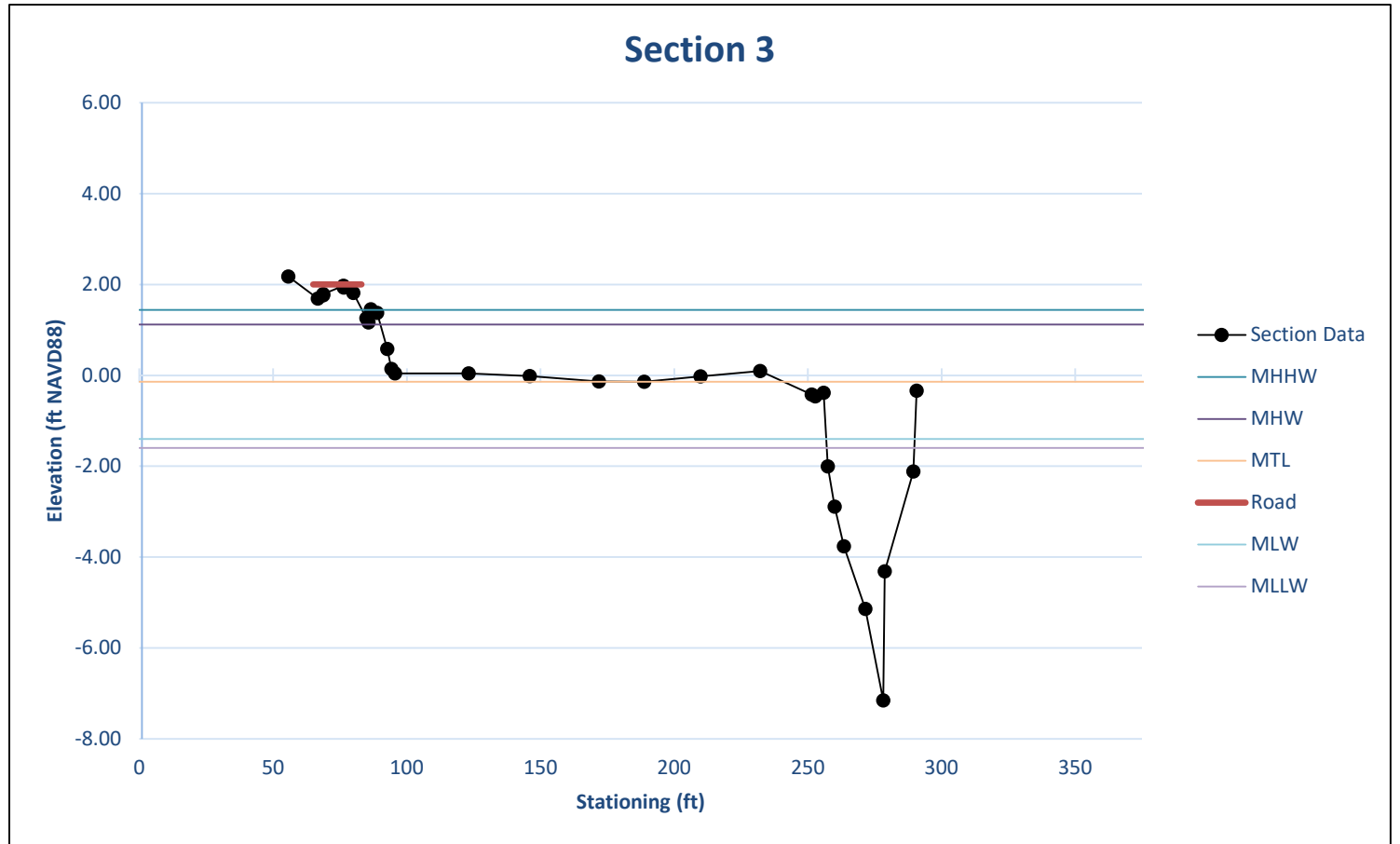
**Narrow River Road**





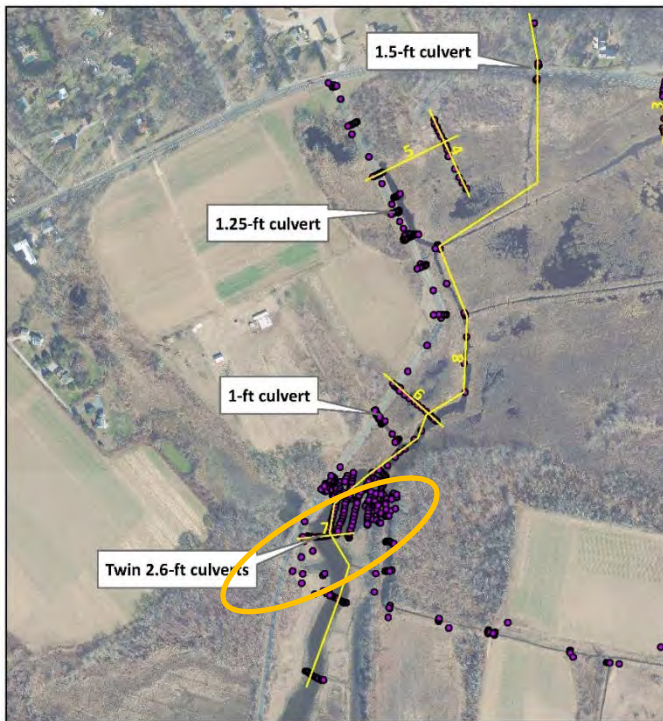
# Concept Meeting (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

## Narrow River Road





# Concept Meeting *(Peconic Estuary Habitat Restoration Conceptual Design Planning Services)*



## Peconic Estuary Program Conceptual Restoration Design

Narrow River Culvert Replacements - Culverts and Survey Data  
 Narrow River, Orient, NY, Suffolk County (NY)  
 SCTM#: 300-7-1-3

Prepared 06/24/2019

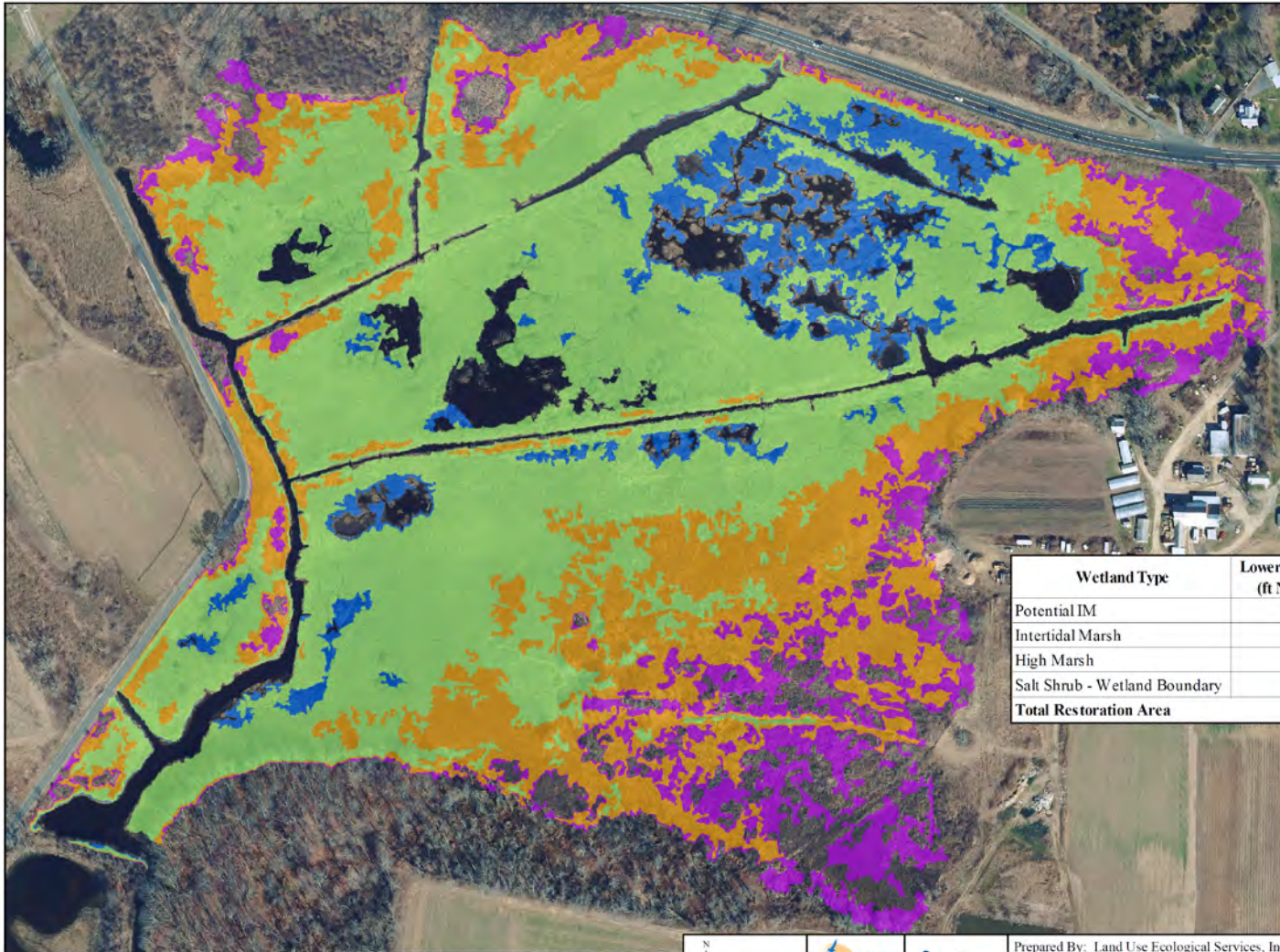
- Section (Numbered)
- Survey Data

Marsh Community Type	Elevation Range (NAVD88)
Intertidal Marsh	-0.37 to 1.27 (more typically 0.24 to 1.21)
High Marsh	0.92 to 1.43
Phragmites	-0.25 to 1.93 (more typically -0.25 to 0.15 within Broad Meadows)

Elevation Data collected by IFI and Ducks Unlimited

Tidal Elevation	NAVD 88 (ft) Orient Harbor Tide Station
Mean Spring High Water	1.63
Mean Higher High Water	1.44
Mean High Water	1.12
Mean Tide Level	-0.14
Mean Low Water	-1.4
Mean Lower Low Water	-1.6

# Concept Meeting (Peconic Estuary Habitat Restoration Conceptual Design Planning Services)

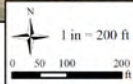


Marsh Restoration			
	Potential Intertidal Marsh		
	Intertidal Marsh		
	High Marsh		
	Salt Shrub, Wetland Boundary		

Wetland Type	Lower Contour (ft NAVD)	Upper Contour (ft NAVD)	Restoration Area (acre)
Potential IM	-0.25	0	3.6
Intertidal Marsh	0	1	28.2
High Marsh	1	1.5	12.9
Salt Shrub - Wetland Boundary	1.5	1.75	6.2
<b>Total Restoration Area</b>			<b>50.9</b>

**MARSH RESTORATION**  
 Analysis of wetland restoration based on increase in tidal flow. Analysis utilized elevations of existing marsh types south of the berm to generate restoration north of the berm once the tide gate is installed. No correction for depth of *Phragmites* thatch used on this sheet.

1. 2016 USGS CoNED Topobathymetric Model (1887 - 2016): New England data from NOAA Data Access Viewer utilized for site topography. Contour tool used to generate 0.25 ft contours for site.  
 2. 2016 orthoimage from NYS GIS Clearinghouse (gis.ny.gov).



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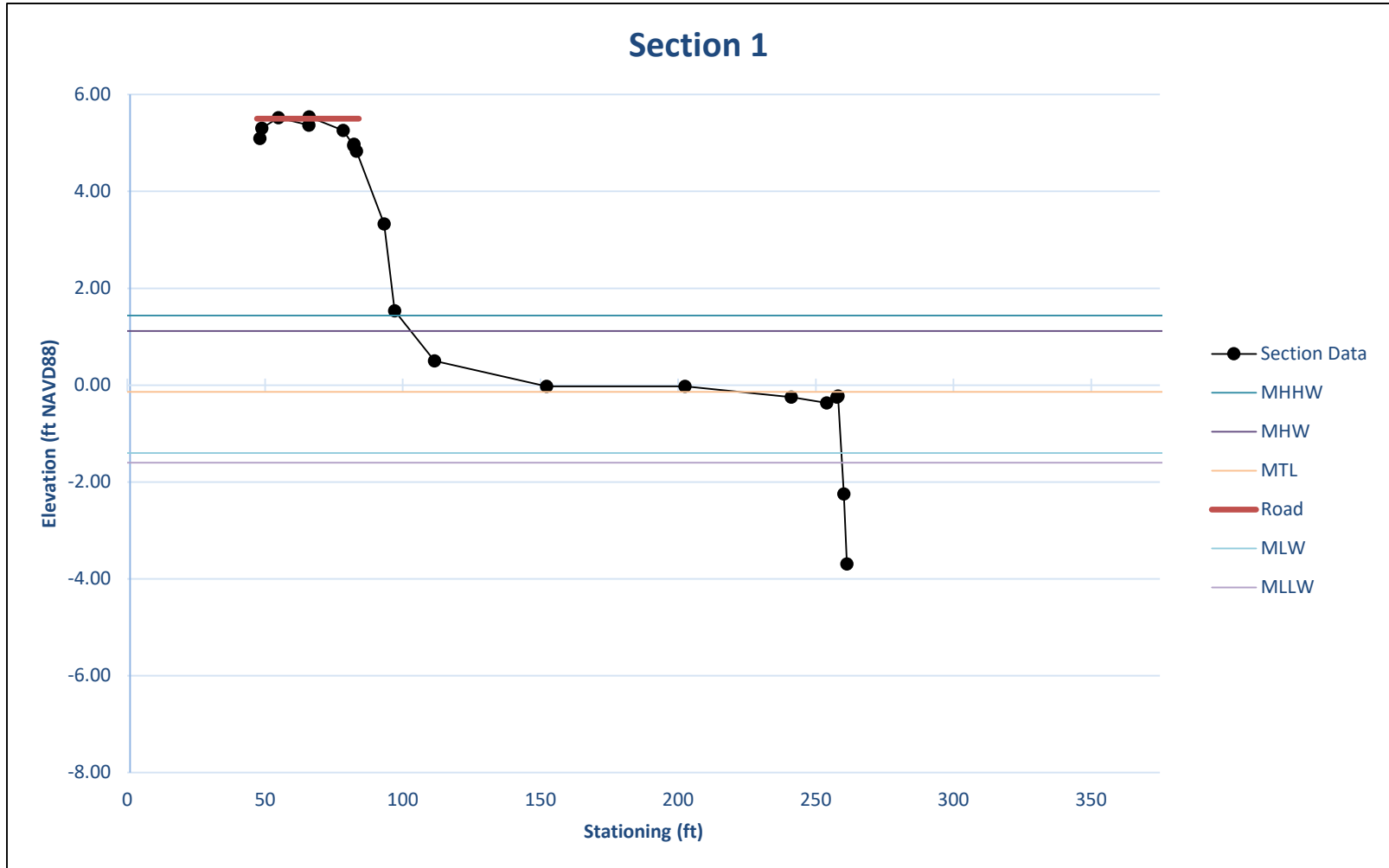
Project: Narrow River - Town of Southold  
 For: Peconic Estuary Program  
 Suffolk County Dept. of Health Services

Date: 6/26/2019    Revised:

Sheet: MR-1

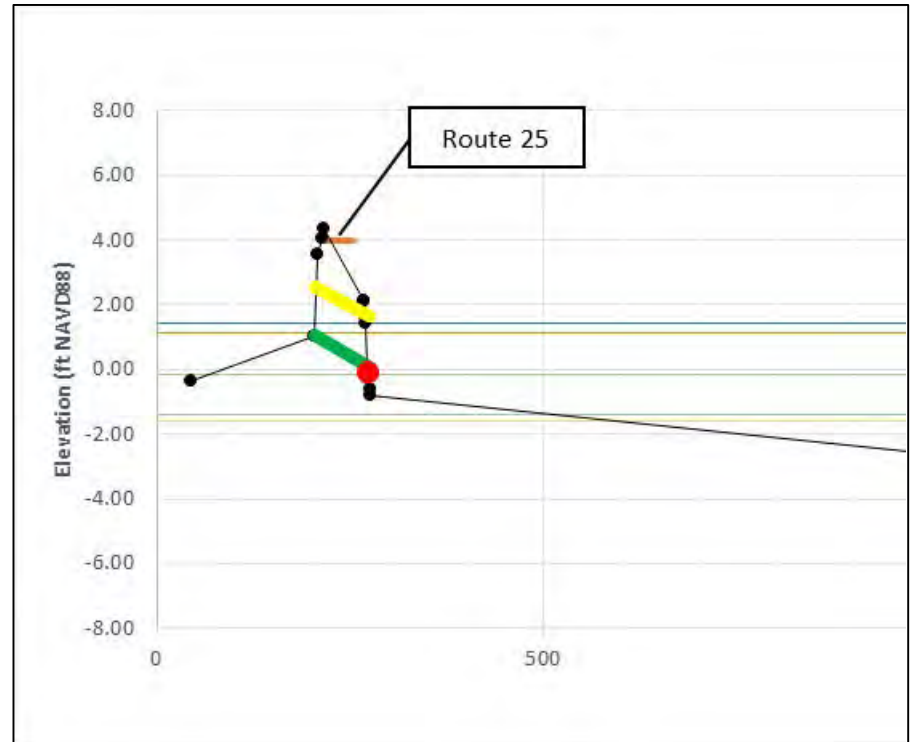
# Concept Meeting (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

## Route 25



**Concept Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

**Route 25 Culvert**



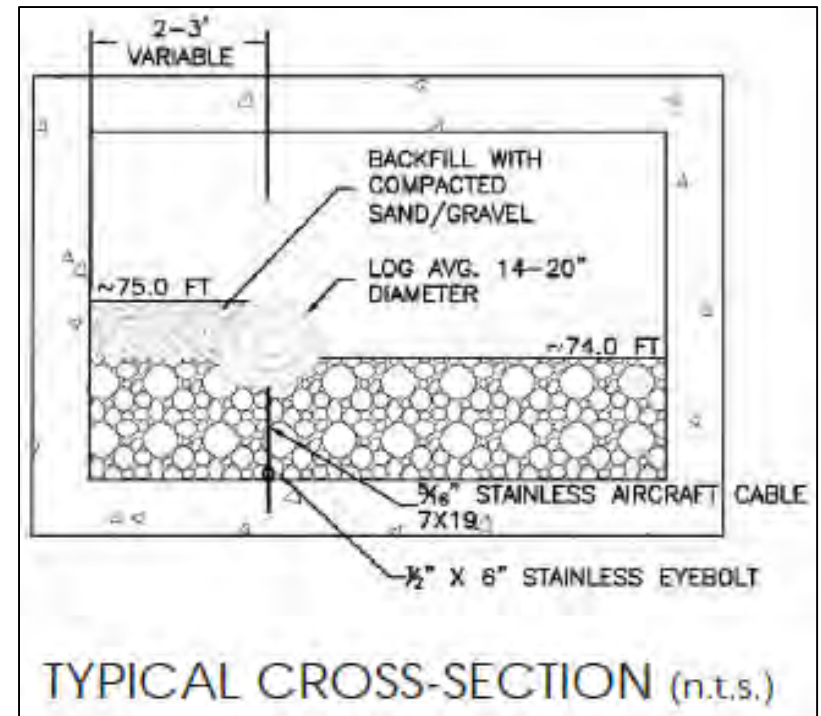
## Concept Meeting (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

### Route 25 Culvert

*Proposed culvert replacement: 4x4-ft concrete box culvert*

*Bottom filled with rounded river stone*

*Floodplain bench for terrestrial passage*



## Narrow River:

### Environmental Permits Needed:

<b>Agency</b>	<b>Permit/Approval</b>
<i>United States Army Corps of Engineers</i>	Section 404 of Clean Water Act, Section 10 of Rivers and Harbors Act
<i>New York State Department of Environmental Conservation</i>	Article 25 (Tidal Wetlands) Article 15 (Protection of Waters) Division of Materials Management; Sediment Sampling Plan and Approval of Disposal Location
<i>New York State Department of State</i>	Coastal Zone Consistency Determination
<i>New York State Department of Transportation</i>	
<i>Town of Southold</i>	Southold Town Trustees Town of Southold Planning Board and Building Department Permits

# Engineer's Opinion of Probable Cost

Alternative	Design Cost	Construction Cost	Notes
Route 25: Culvert Replacement	\$137-182K	\$251-335K	<ul style="list-style-type: none"> <li>- Proposed culvert is a 4x4-ft concrete box culvert approximately 50 feet in length</li> <li>- Culvert cost is assumed to be \$1,200 per linear foot</li> <li>- Assume reconstruction of the road, though no sidewalks or guardrails needed</li> <li>- Assume \$25,000 allowance for managing utilities under the road. While it is understood that utilities are under road, we do not know the type of utility or where they are located (above or below the culvert). This cost could be substantially greater if sewer, water, gas and fiberoptic need to be temporarily shut off and redirected during construction.</li> <li>- Assumes active pumping for water control</li> <li>- Assumes traffic is reduced to one lane, but that complete road closure is not possible</li> </ul>

# Engineer's Opinion of Probable Cost

Alternative	Design Cost	Construction Cost	Notes
Narrow River Road: Raise Road Elevation	\$68-80K	\$123-165K	<ul style="list-style-type: none"> <li>- Proposed design includes the raising of the low portions of this road to approximately elevation 1.5 feet</li> <li>- Road reconstruction assumed to be \$15 per square foot</li> </ul>
Tide Gate Replacement	\$137-182K	\$765K-1.025M	<ul style="list-style-type: none"> <li>- Proposed design includes 4, 5x5-foot self-regulating tide gates with 4, 5x5-foot associated concrete box culverts (final number could be updated following more detailed modeling). Self-regulating tide gates = \$70,000 each; concrete box culverts = \$1,400 per linear foot.</li> <li>- Approximately 15 feet of concrete headwall lies between each culvert and tide gate</li> <li>- Approximately 15 feet of concrete wingwall on each end of the headwall</li> <li>- Assumes concrete headwall and wingwalls only on the downstream side of the berm</li> <li>- Assumes excavated materials will not be disposed of in a landfill but in the open ditch to the east</li> <li>- Passive water control, using the existing culverts until the new ones are finished, but active water management will be necessary to keep water out of the work zone while installing the concrete headwall, wingwalls, culverts and tide gates</li> </ul>



# Meetinghouse Creek- Main Road Wetland:

## *Introduction:*

The purpose of the project is to provide a 0.6 acre stormwater treatment wetland to receive flow from an existing outlet structure. The wetland is proposed to treat the water quality volume from a 1.2 inch rainfall with flows exceeding this rain event will transverse an emergency spillway to the existing NYSDEC-regulated Phragmites marsh. Our team shall collect following environmental data and obtain the following available GIS-data:

- Topographic data required to prepare conceptual plan for recommended sediment forebay
- GPS locations of existing stormwater drainage infrastructure;
- Location, dimensions, materials, and condition of existing stormwater outfall;
- Locations of existing utility infrastructure;
- GPS locations of freshwater wetland boundary;
- GPS locations of upland and wetland community boundaries and invasive plant stands;
- LIDAR or digital elevation model data to assess general site topography, and;
- Suffolk County real property records



## Meetinghouse Creek- Main Road Wetland:

*Background:* A 2.61 acre Town of Riverhead property bordered by the Aquebogue Cemetery (to the west) and private property to east & south including the Crescent Duck Farm downstream of the site.



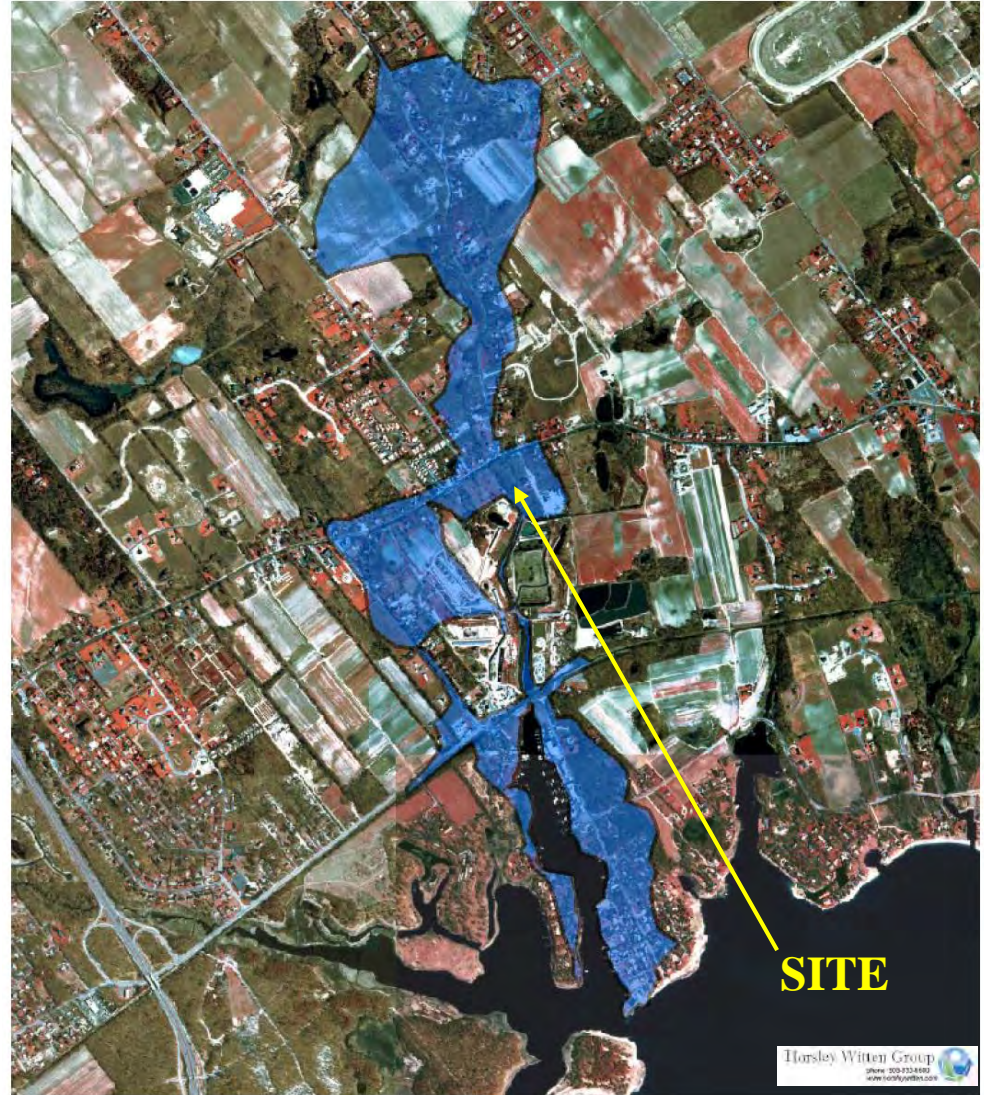
## Meetinghouse Creek- Main Road Wetland:

*Background:* A site is the upstream limit of surface waters associated with Meetinghouse Creek (which empties in Flanders Bay approximately 1.2 miles to the south).

Watershed extends much farther north encompassing 32.1 acres north of Main Road.

The stormwater wetland is intended to reduce sedimentation and improve water quality a 5.6 acre section of the Meetinghouse Creek watershed.

Meetinghouse Creek Watershed Management Plan completed by Horsley Witten Group (2006).



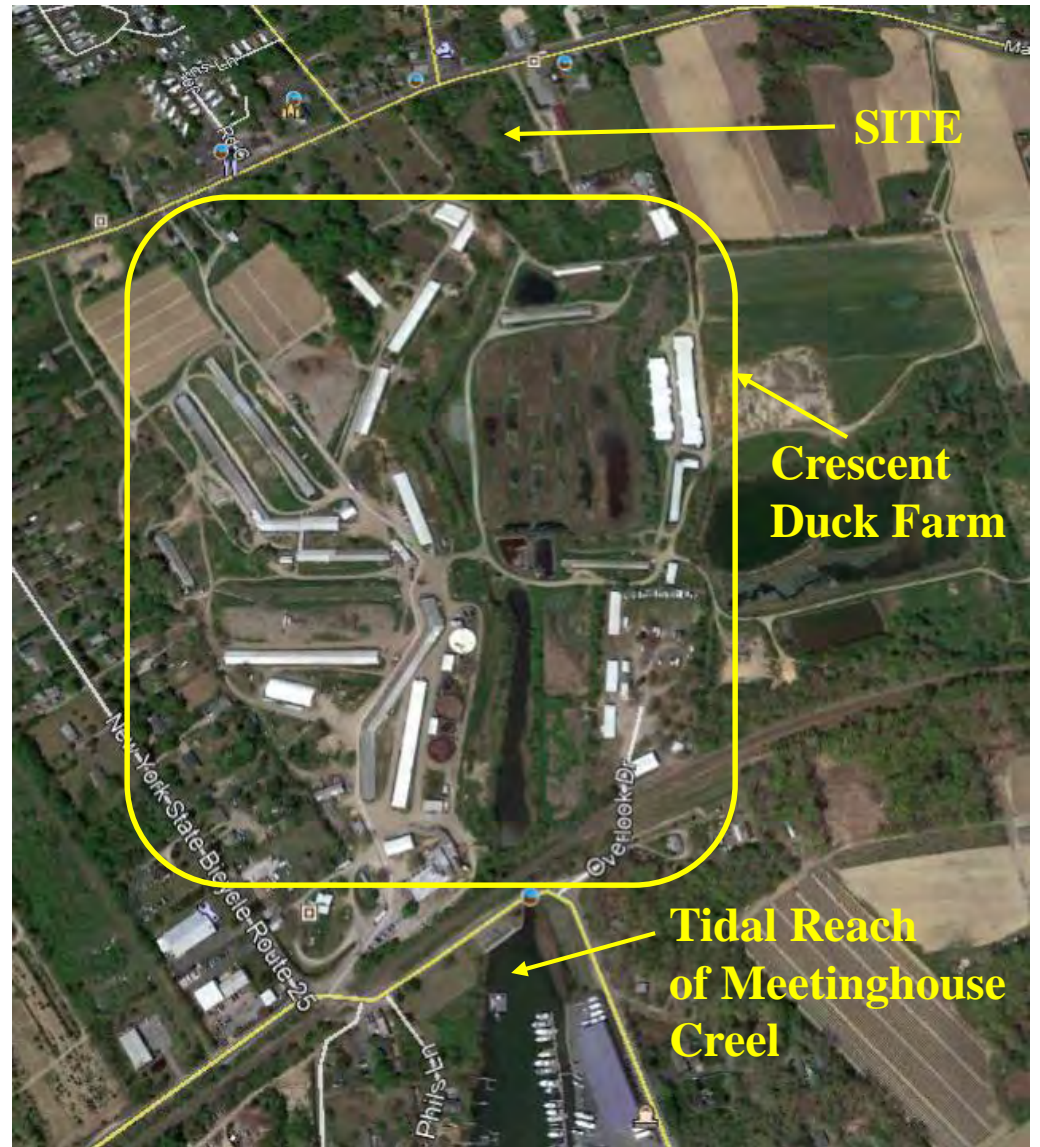
## Meetinghouse Creek- Main Road Wetland:

*Background:* A site is the upstream limit of surface waters associated with Meetinghouse Creek (which empties in Flanders Bay approximately 1.2 miles to the south).

Watershed extends much farther north encompassing 32.1 acres north of Main Road.

The stormwater wetland is intended to improve in a 5.6 acre section of the Meetinghouse Creek watershed.

Meetinghouse Creek Watershed Management Plan completed by Horsley Witten Group (2006).



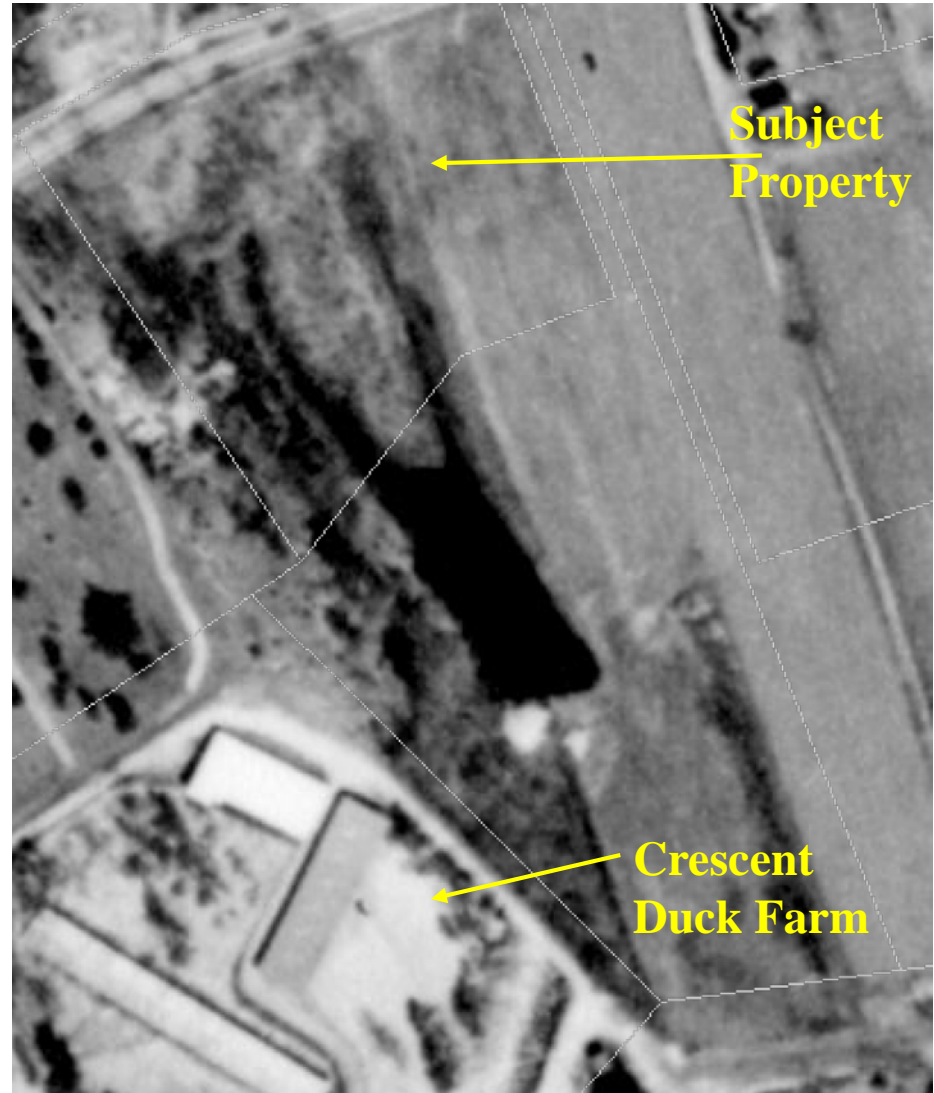
## Meetinghouse Creek- Main Road Wetland:

### *Background:*

In 1962, the pond appears highly manipulated with a channelized approach to the duck farm.

The two existing flow paths for water in the current marsh are relics of the upper branches of this pond.

Source: Suffolk County GIS Mapper



# Meetinghouse Creek- Main Road Wetland:

*Existing Conditions:* Upland Area (1.6 acres); Freshwater Wetland (1.0 acres)



**Concept Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

**Meetinghouse Creek- Main Road Wetland:**

*Existing Conditions:*



Main Road looking  
towards wetland.

**Concept Meeting** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

**Meetinghouse Creek- Main Road Wetland:**

*Existing Conditions:*

Main Road Stormwater Outfall Culvert:



Existing 24” reinforced concrete  
pipe outfall and headwall



## Meetinghouse Creek- Main Road Wetland:

*Existing Conditions:*

Main Road Stormwater Outfall Culvert:



Flow path to wetlands  
from outfall.

## Meetinghouse Creek- Main Road Wetland:

*Existing Conditions:*



Successional forest between  
Main Road and wetland.

## Meetinghouse Creek- Main Road Wetland:

*Existing Conditions:*



Successional forest located to east of wetland.

## Meetinghouse Creek- Main Road Wetland:

*Existing Conditions:*



Successional forest located to east of wetland.

## Meetinghouse Creek- Main Road Wetland:

*Existing Conditions:*



Successional forest located to east of wetland.

## Meetinghouse Creek- Main Road Wetland:

*Existing Conditions:*



‘Stream’ flowing from  
*Phragmites* marsh (Southwest  
corner of marsh)

## Meetinghouse Creek- Main Road Wetland:

*Existing Conditions:*



Downstream end of eastern  
ditch in *Phragmites* marsh  
(Southeast corner of marsh)

## Meetinghouse Creek- Main Road Wetland:

*Existing Conditions:*



Saturated, mucky soils with watercress where flow paths converge (to south of marsh)



## Meetinghouse Creek- Main Road Wetland:

*Existing Conditions:*



‘Stream’ exiting *Phragmites* marsh to pond on adjacent property to south.

# Meetinghouse Creek- Main Road Wetland:



## Peconic Estuary Assessment



Meetinghouse Creek

- Edge Phragmites Marsh
- FWW Boundary
- Contour (ft)
- Parcel

### Notes:

1. Contours (2 ft intervals) created from 2014 Lidar (USGS)
2. Aerial imagery from NYGIS, 2017

## Meetinghouse Creek- Main Road Wetland:

### *Critical Questions or Assumptions Impacting Project Feasibility:*

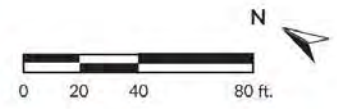
- How much upland area is located on the site (if regulatory agencies will not authorize using an existing wetland for stormwater treatment)?
- Shallow water zones of the stormwater wetland will be highly susceptible to colonization by *Phragmites*. Creation of additional wetland area is environmentally beneficial and the adjacent uplands do not feature high-quality native plant communities. However, over the long-term, the stormwater wetland will likely not provide high quality wetland habitat for plants or wildlife.
- The 0.4 (0.87 acre-feet) acre stormwater wetland with sediment forebay (not including buffer) will not meet all NYSDEC Design Standards, but may accommodate standard Water Quality Volume.

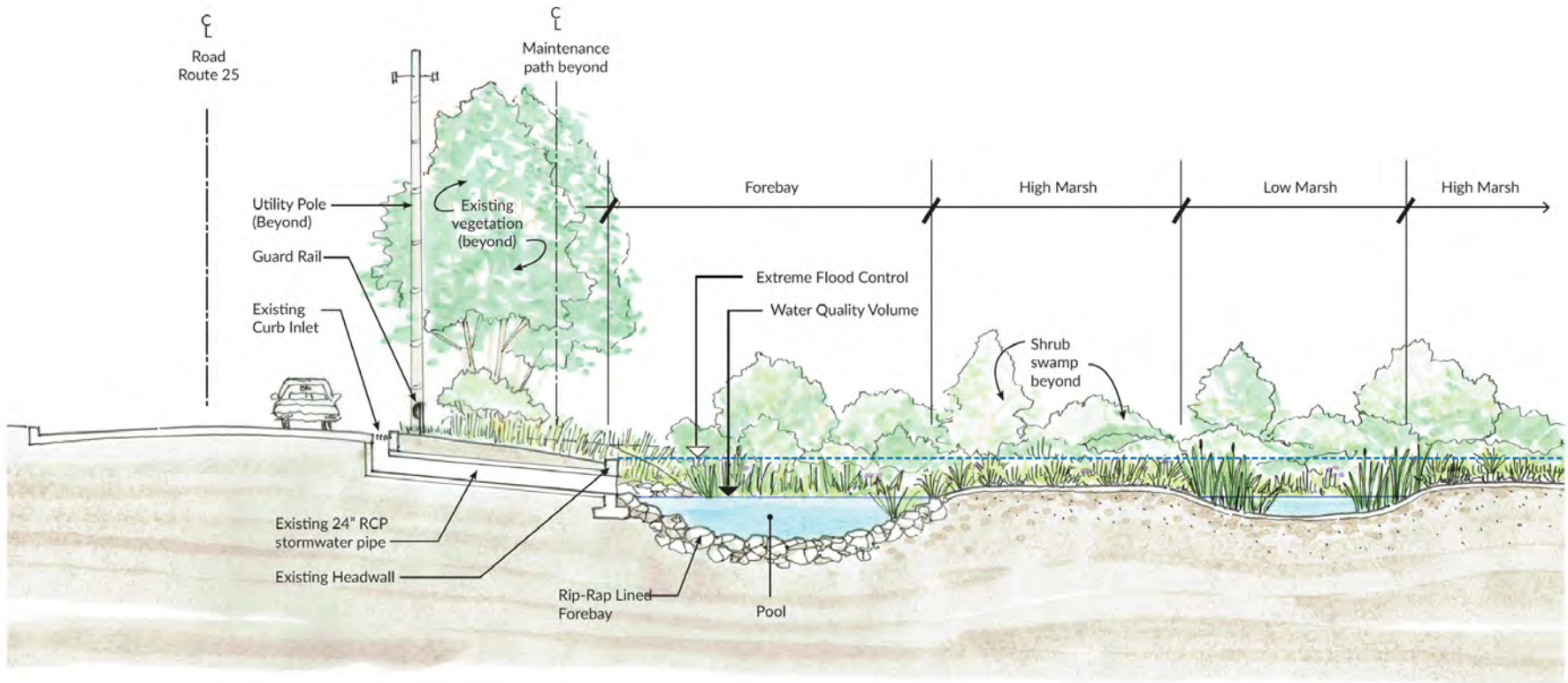


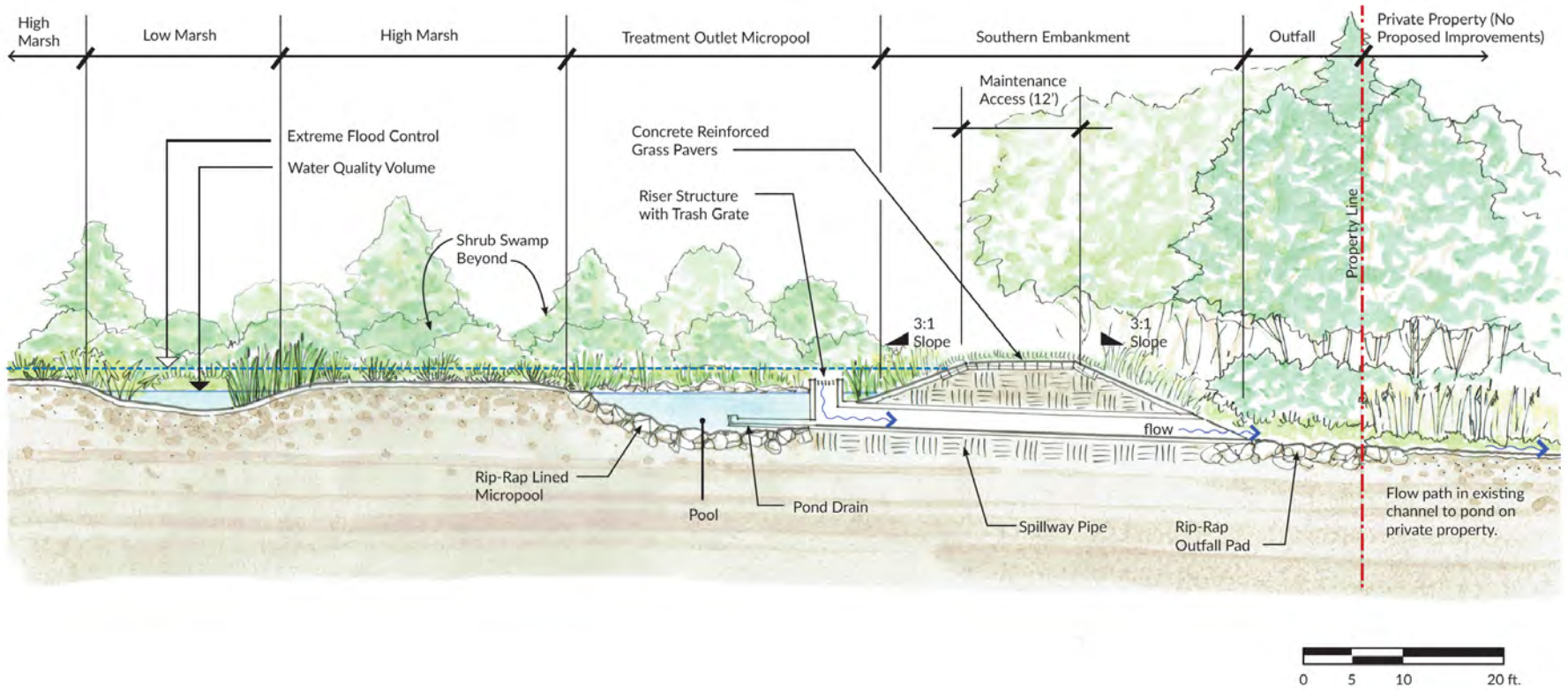
### NOTES LEGEND

- Edge of existing Phragmites
- Existing wetland boundary
- Property boundary
- Flow

1. Existing storm sewer outfall
2. Guard rail (proposed?)
3. Treatment area forebay (rip-rap lined)
4. Treatment area micropool
5. Outlet riser structure with trash grate
6. Spillway pipe (under embankment)
7. Outfall rip-rap pad
8. Existing flow path on private property (no improvements)
9. Emergency spillway
10. Maintenance access entry/egress
11. Potential turn-around









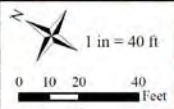
- Utility Pole (LIPA)
- Catch Basin
- Freshwater Wetland Point (Note 1)
- Freshwater Wetland Boundary (Note 1)
- Edge of *Phragmites* Marsh
- Contour (ft)
- Subject Parcel

**Proposed Pocket Wetland Conceptual Design**

- Forebay (755 sq ft)
- Wetland (53,050 sq ft)
- Micropool (850 sq ft)
- Sluiceway (200 sq ft)
- Outfall (260 sq ft)
- Emergency Spillway (2,550 sq ft)
- Maintenance Access 12' Wide
- Embankment Slope (7 ft wide, 1V:3H)
- Top of Embankment 6' Wide

**DESIGN NOTES**

1. Wetland
  - a. Low Marsh Zone - 10,000 sq ft
  - b. High Marsh Zone - 10,000 sq ft
  - c. Shrub Swamp - 33,050 sq ft
2. Flow Path through high and low marsh areas must have a ratio of 1.5L:1W. Recommend placing these areas within the existing wetland. Shrub swamp would then be in the east area that is currently Successional Forest.



Prepared By: Land Use Ecological Services, Inc.  
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 Medford, NY 11763

Date: 6/10/2019 Revised:

Project: Main Road Pocket Wetland  
 For: Pecos Estuary Program  
 Town of Riverhead  
 At: Main Road, Aquebogue, NY

Scale: As Noted Sheet: PW-1

## Meetinghouse Creek- Main Road Wetland:

Conceptual Design provides for the following the NYS Stormwater Manual standards:

- Provides for WQ<sub>v</sub> (runoff from 90% storm event) and 100-year storm protection.
- Flowpaths through wetland should be maximized and the flowpath shall have a minimum length to relative width ratio of 2:1.
- The surface area of the entire stormwater wetland shall be at least one percent of the contributing drainage area (e.g. recommended wetland is 21% of contributing area).
- A minimum of 35% of the total surface area (in this case of the portion of the wetland to accommodate the WQ<sub>v</sub>) can have a depth of six inches or less, and at least 65% of the total surface area shall be shallower than 18 inches. In this wetland, 46% is less than six inches and 92% is less than 18 inches.
- At least 25% of the WQ<sub>v</sub> shall be in deepwater zones with a depth greater than four feet and outlet micropool must accommodate at least 10% of the WQ<sub>v</sub>.
- A vegetated buffer extends 25 feet outward from the maximum water surface elevation.



## Meetinghouse Creek- Main Road Wetland:

### Maintenance:

Following the NYS Stormwater Manual, these maintenance practices are recommended:

- The outflow equipped with a removable trash rack and cleaned annually or as needed.
- Sediment removal in the forebay shall occur every five to six years or after 50% of total forebay capacity has been lost.
- All safety elements should be inspected and maintained on an annual basis.

### Other Maintenance:

- Herbicide Treatments of *Phragmites* will be necessary.
- Year 1-2 during construction and every 2-4 years as maintenance



## Meetinghouse Creek- Main Road Wetland:

### *NYSDEC Meeting:*

- NYSDEC Bureau of Habitat may approve stormwater wetland within *Phragmites* marsh if 1) overall wetland area increases, 2) habitat value of wetland increases, and 3) designed wetland provides better stormwater treatment than existing *Phragmites* marsh.
- NYSDEC flexibility regarding Art. 24 (Freshwater Wetlands) permitting allows the stormwater wetland to potentially comply with 2015 NYS Stormwater Manual to greater extent (WQv and Extreme Storm Protection standards).

# Main Road Wetland: Conceptual Plan for Stormwater Wetland

## Concept-level Construction Costs:

Restoration Action	Design Cost	Construction Cost	Notes
1.2 acre Stormwater Wetland	\$174K	\$597K	<ul style="list-style-type: none"><li>- 20,000 SF of high and low marsh zones and 33,050 SF shrub swamp and associated herbaceous and upland plantings.</li><li>- Assumes 2.5-ft perimeter berm to provide storage for 100-year storm event and associated fill.</li><li>- Assumes traffic control costs; erosion and sediment control, mobilization and demobilization costs</li><li>- Assumes precast concrete grass pavers for maintenance road.</li><li>- Assumes herbicide application to control <i>Phragmites</i></li><li>- Cost includes construction contingency and cost escalation</li></ul>

# **Main Road Wetland: Conceptual Plan for Stormwater Wetland**

## **Environmental Permits Needed:**

The recommended construction of the 1.2 acre stormwater management wetland at this site will require the following environmental permits:

### *United States Army Corps of Engineers:*

Section 404 of Clean Water Act, Section 10 of Rivers and Harbors Act

### *New York State Department of Environmental Conservation:*

Article 24 (Freshwater Wetlands)

Article 15 (Protection of Waters)

SPDES/Division of Water

### *New York State Department of Transportation*

### *Town of Riverhead:*

Conservation Advisory Council Review under Section 107 (Tidal and Freshwater Wetlands) of Town Code

Building Construction

**RFP#: 10-10015** (*Peconic Estuary Habitat Restoration Conceptual Design Planning Services*)

**THANK YOU.**

