

An Ecological Analysis of the Ash Creek Barrier Spit

September 7, 2021
One Nature, LLC

Introduction

The following report contains a significant amount of information related to the ecological health of the Barrier Spit at Saint-Mary's-by-the-Sea. Located at the mouth of the Ash Creek Estuary in both Fairfield and Bridgeport, Connecticut, the Barrier Spit provides important ecological, cultural, and economic benefits to surrounding communities.

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I. Ecological Assessment

Co-Authored by Bryan Quinn, RLA (CT & PA), Restoration Ecologist / Principal @ One Nature, LLC and Steven Danzer, Ph.D., PWS, Soil Scientist, Principal @ Steven Danzer Ph.D. & Associates LLC

In 2012, 2013, and 2014, The Ash Creek Conservation Association, Inc. engaged our team (One Nature, LLC and Steven Danzer Ph.D. & Associates LLC) to develop an Ecological Masterplan for the Ash Creek Estuary. During that time, we gained a solid baseline understanding of the Barrier Spit and surrounding areas. Our studies found that the Barrier Spit provides unique scenic and recreational value, in addition to significant ecological function to the greater Ash Creek Estuary. Of particular environmental and scenic importance is the Barrier Spit's wave attenuating function that protects upstream intertidal marsh, most notably the Great Marsh Island which has been recognized by numerous organizations as critical habitat. The Barrier Spit also hosts at least one, perhaps two, state-listed plant species.

In a relatively short time period, 2006 to 2016, our analysis has shown an exceptionally rapid retreat and loss of sand at the Barrier Spit – approximately 60 linear feet in some areas. At this rate of beach loss, we have computed that the Barrier Spit will be gone by 2036. The disappearance may even occur sooner as its protective vegetative cover declines. The loss of vegetation makes the Barrier Spit more susceptible to erosion and significantly diminishes the resiliency of the landform.

Barrier Spits are dynamic coastal landforms capable of gaining and losing material during “natural processes”. This Barrier Spit is documented in its current location since at least the 17th Century in early colonial maps. It persisted, more or less, in stable form until the creation of a new marina and jetty immediately to the west of the inlet. Our own analysis of publicly available orthoimagery has shown the Barrier Spit in stable condition until at least 2006. Since then, however, the Barrier Spit has lost sediment and is now in jeopardy.

In addition to the loss of the Barrier Spit, we have observed long-term loss of approximately 25,000 sf of intertidal marsh on the Great Marsh Island (aerial geoanalysis, 1991 vs 2020). This loss may be due to increased wave action caused by a reduction in the size of the Barrier Spit.

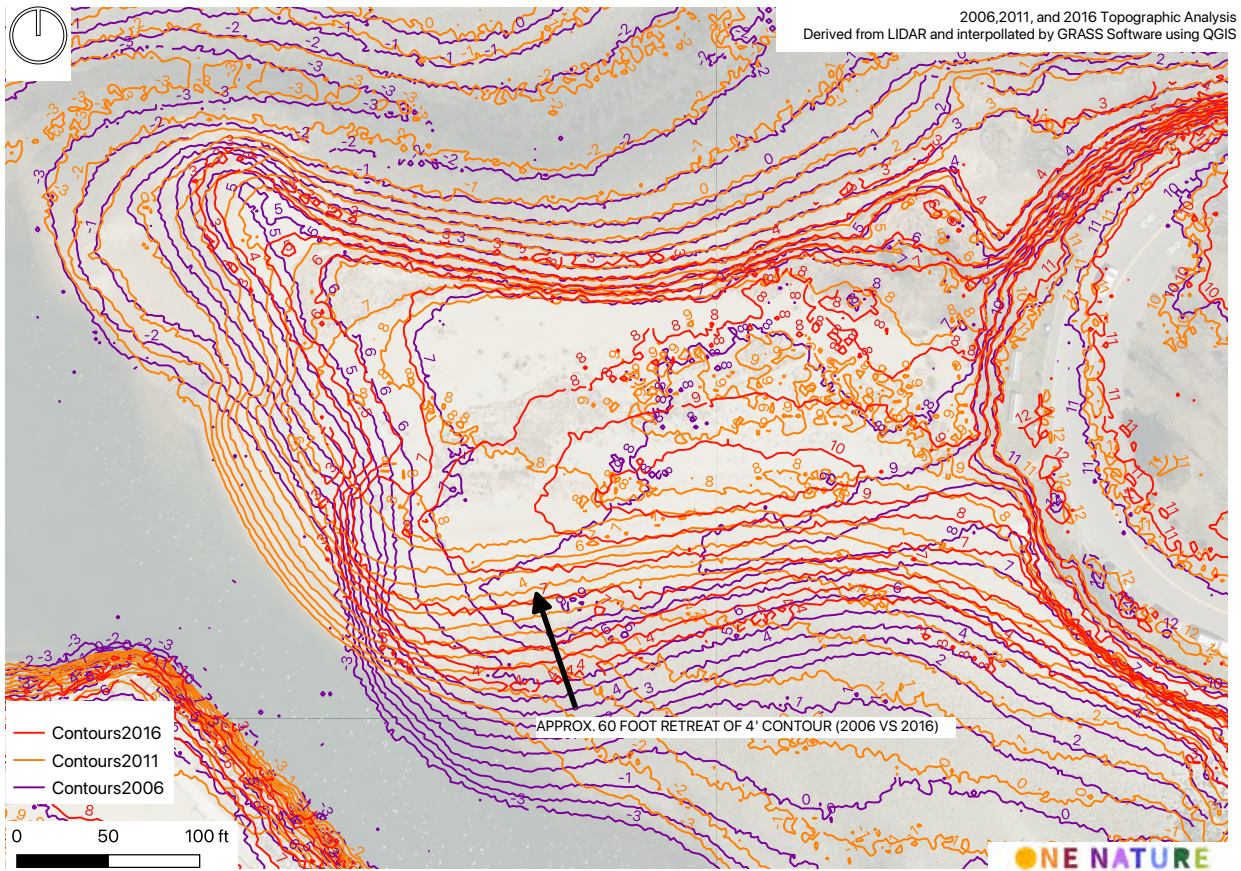
It is highly likely the rapid loss of material and area of the Barrier Spit is due to maintenance dredging of an abutting navigable waterway. To the best of our knowledge, material is regularly dredged from the channel and transported to a public beach (Jennings Beach) in Fairfield, CT. This regular removal likely “starves” the Barrier Spit of important sand material.

The channel was most recently dredged in 2019. A review of 2020 and 2021 aerial photography suggests the damage from this most recent dredging has been more detrimental to the Barrier Spit than in the past. Topographic data post- 2019 dredging was not available for this report.

In 2014, One Nature, LLC completed a complete schematic design and management strategy for the restoration of the Barrier Spit. Our recommendation at that time, which remains

unchanged, is that material harvested during maintenance dredging of the adjacent navigable channel be utilized to replenish the Barrier Spit (as opposed to off-site where it is used to nourish other beaches). This beach nourishment, the restoration plan's recommendations stated, should include mass planting of dune vegetation to encourage stabilization of the landform.

II. Graphic Attachments



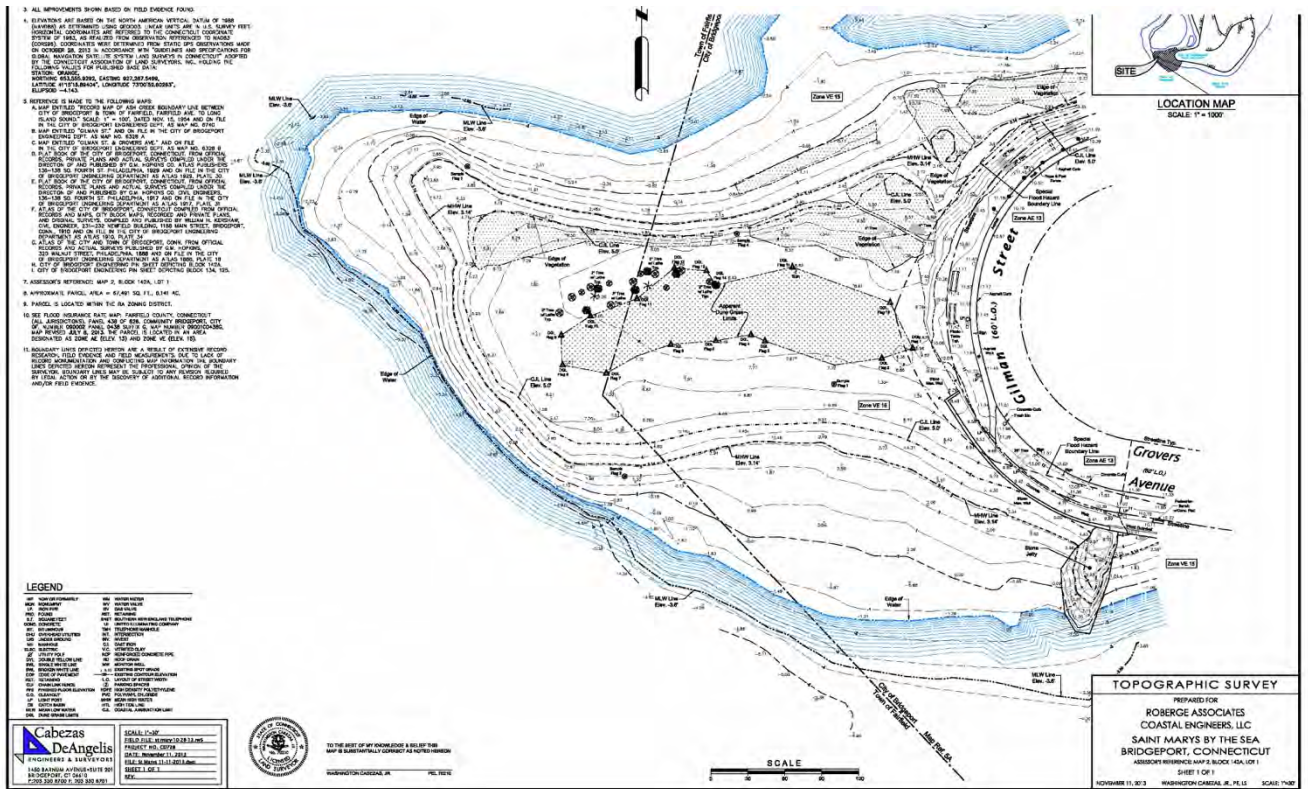


Figure 1: 2013 Survey by Cabezas and DeAngelis

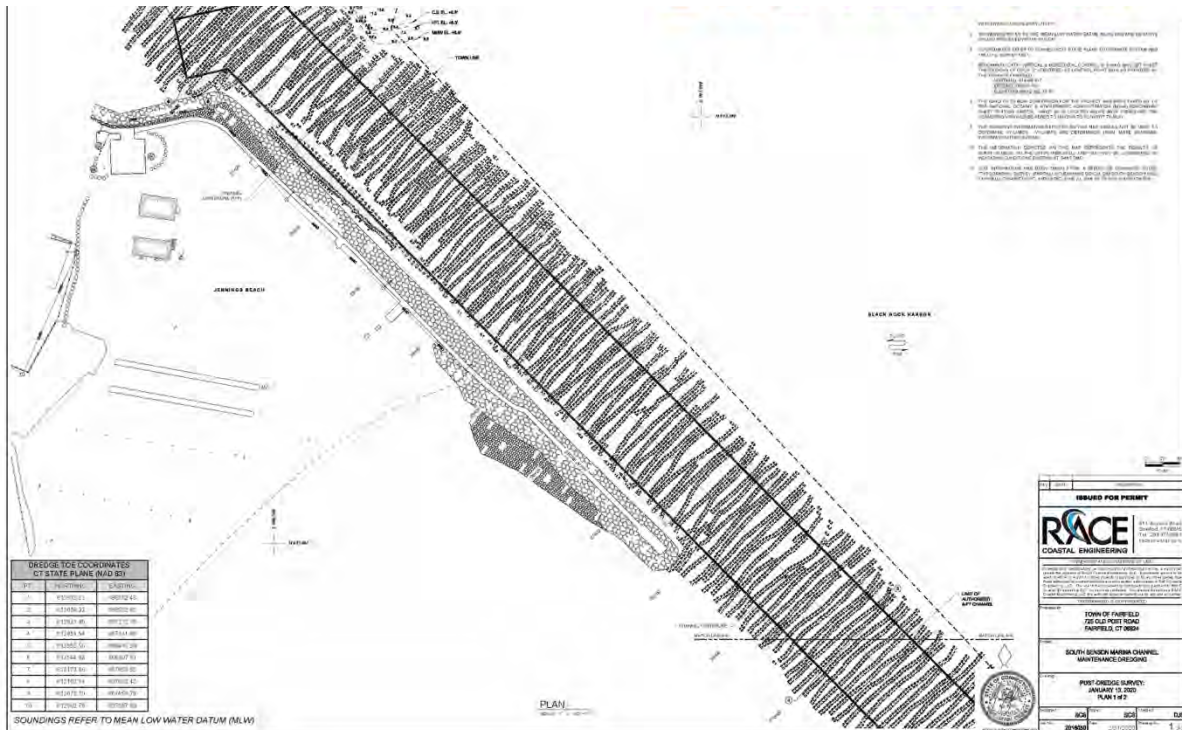


Figure 2: Dredge Survey (1 of 2) by RACE Engineering

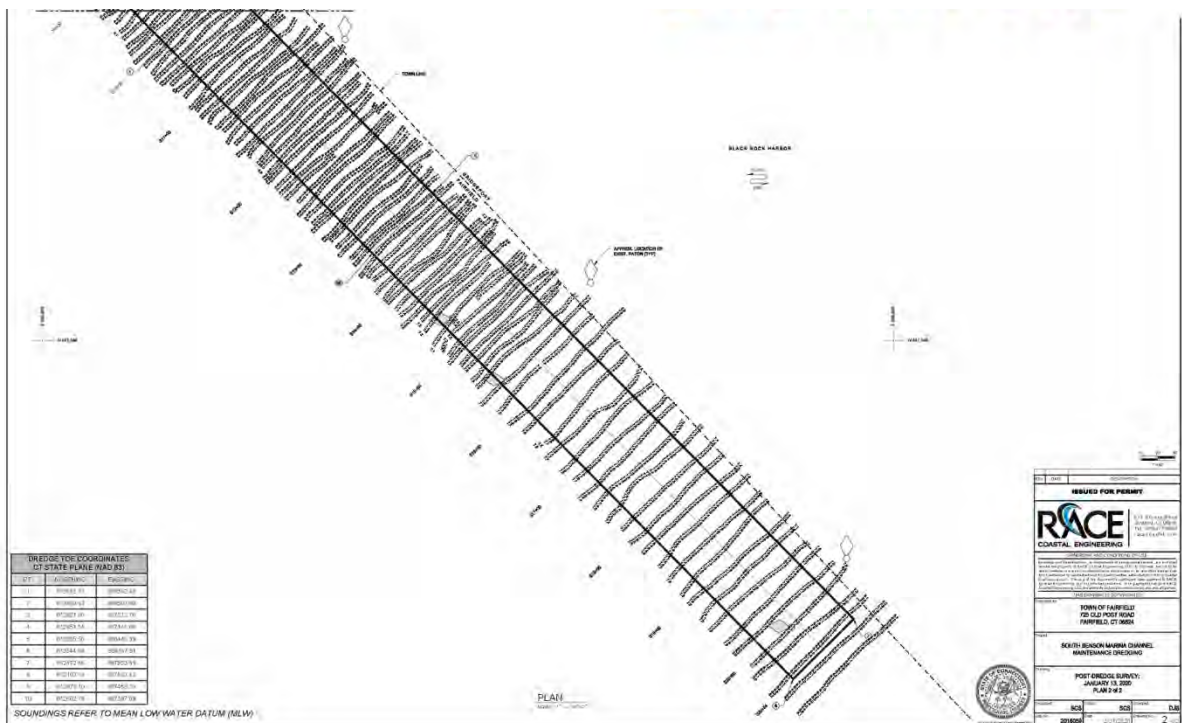


Figure 3: Dredge Survey (2 of 2) by RACE Engineering



Figure 4: 2004 Google Earth Aerial

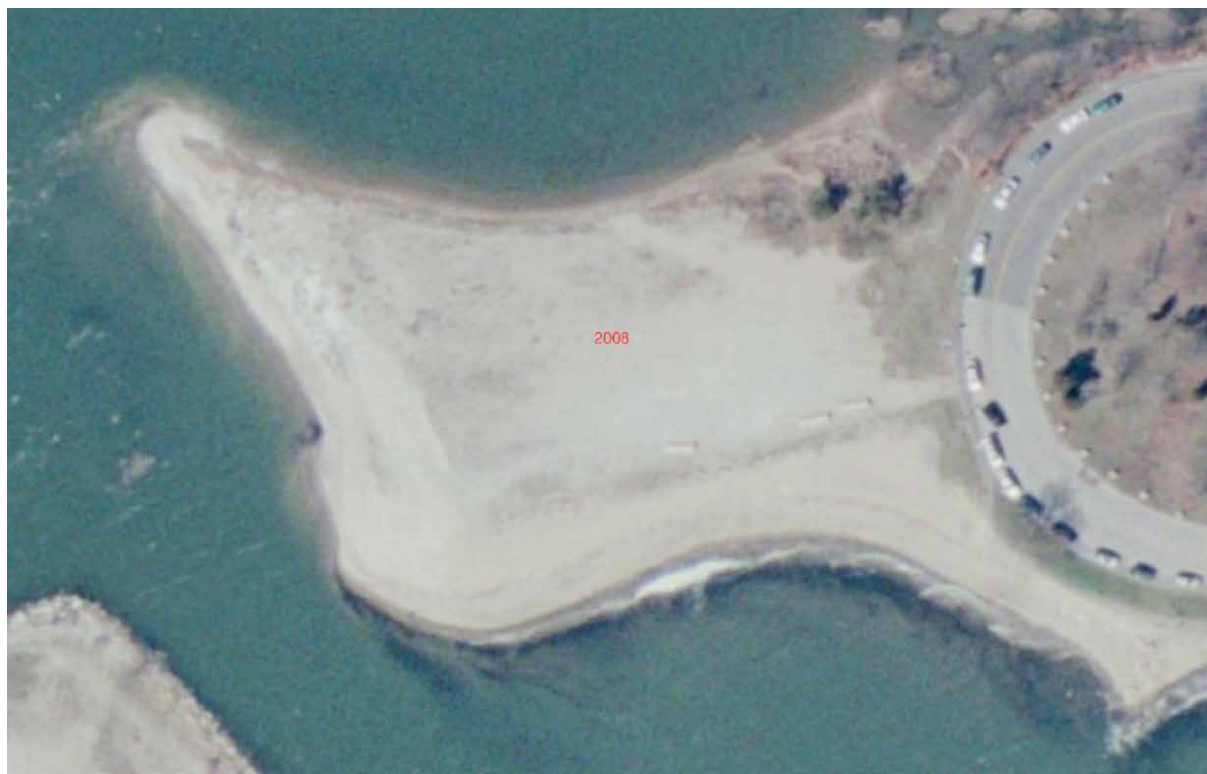


Figure 5: 2008 Google Earth Aerial



Figure 6: 2010 Google Earth Aerial



Figure 7: 2016 Google Earth Aerial

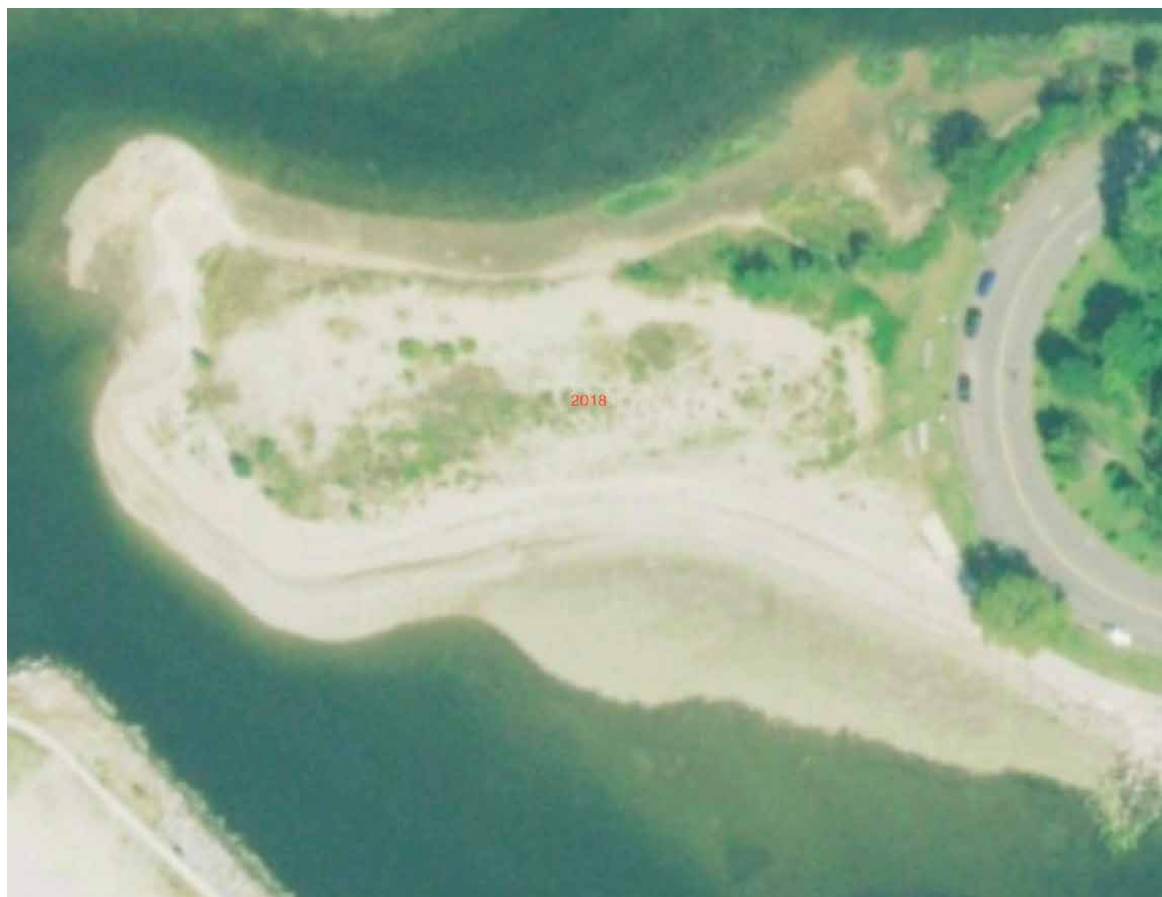


Figure 8: 2018 Google Earth Aerial



Figure 9: 1990 Google Earth Aerial. Note the *Spartina* Wetland on the SW Corner of Great Marsh Island



Figure 10: 2004 Aerial. Note the *Spartina* Wetland on the SW Corner of Great Marsh Island

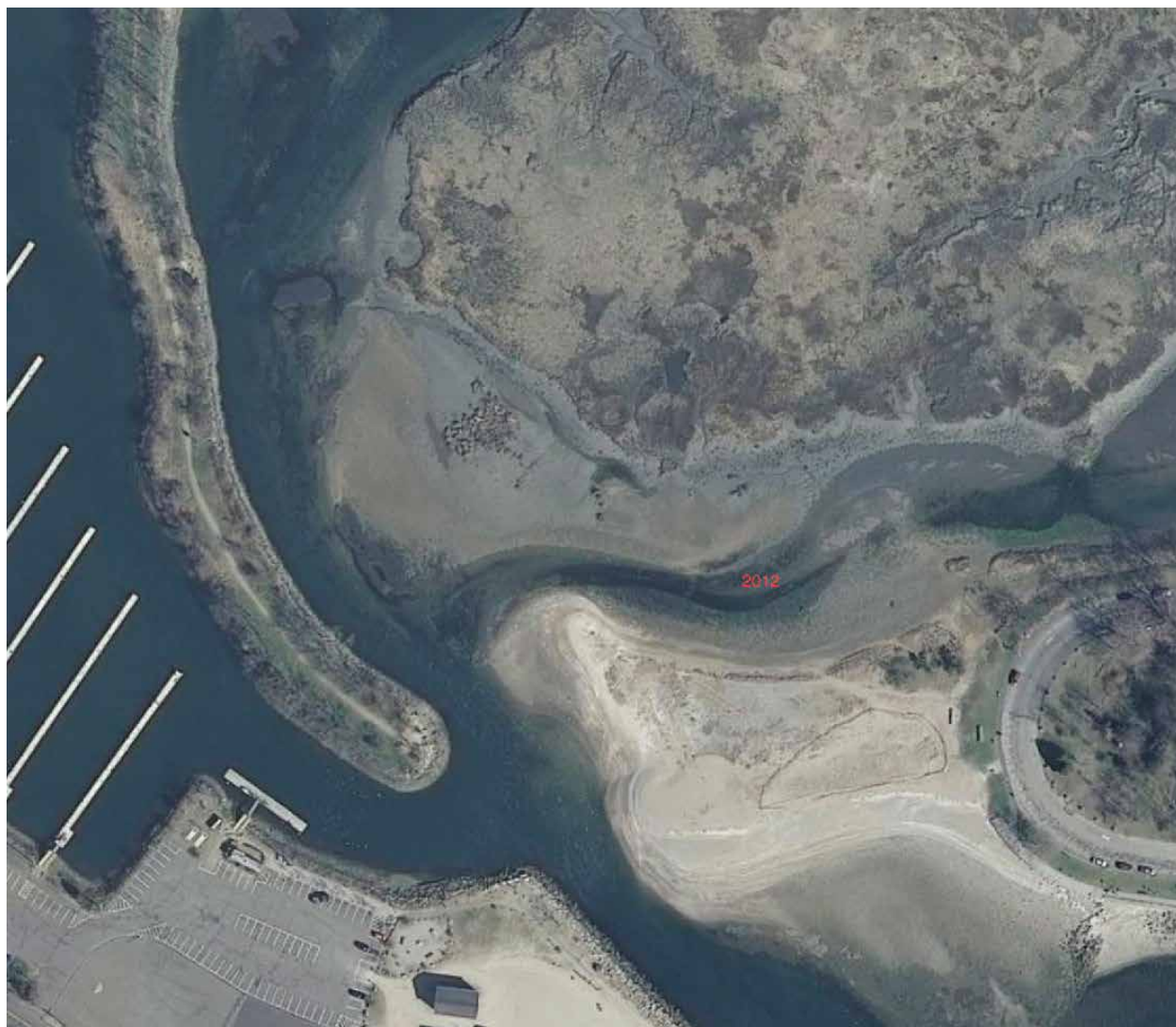


Figure 11: 2012 Aerial. Note the *Spartina* Wetland on the SW Corner of Great Marsh Island.

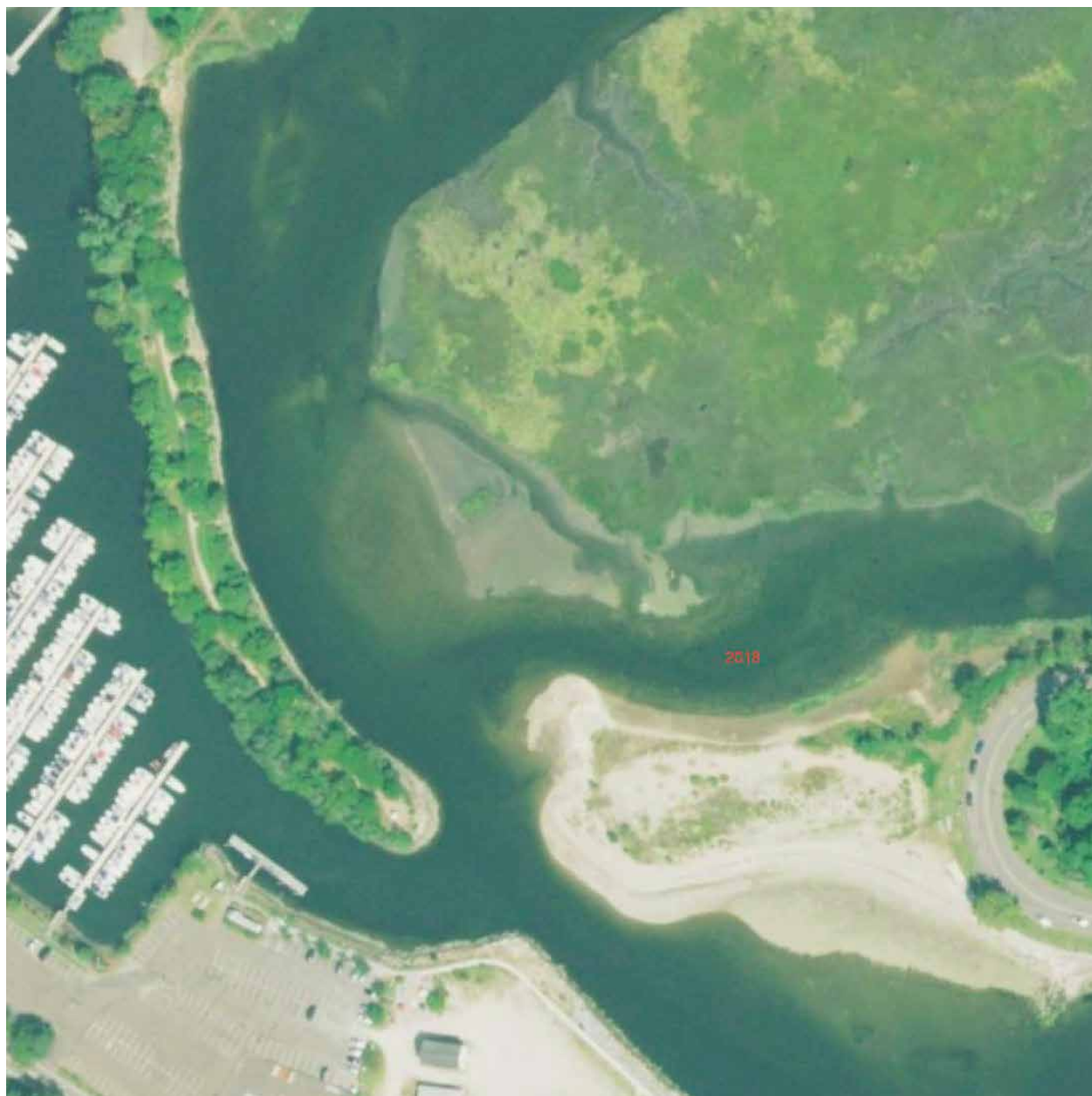


Figure 12: 2018 Aerial. Note the *Spartina* Wetland on the SW Corner of Great Marsh Island, now nearly gone.

III. 2014 Design, Estimate, and Narrative

The following information was created in 2014. To be applicable in 2021, this design, estimate, and narrative must be revised to account for recent history. Our team has not done a new estimate for the project, however, our team assumes for planning purposes that construction costs have escalated by 25%-50% since 2014.

The Restoration and Reconstruction of Saint-Mary's-by-the-Sea in Bridgeport & Fairfield, Connecticut will create significant recreational, economic, and environmental benefits to the region. In the past century, Black Rock has seen this important neighborhood park decline from a sandy beach to a coarse, rocky beach providing limited recreational value. The park's defining feature, a sand dune, has shrunk over time as a result of recent coastal storms.

Saint Mary's is an important recreation site to the surrounding community and to the overall environmental health of Long Island Sound. It provides recreation for local residents, serves as an environmental education location for nearby schools, and protects inland habitat and residences from storm damage.

The project is made more urgent by the historic degradation of the beach, which has lost several feet of elevation over the past fifty years and is in danger of further decline. Predicted future rises in sea levels and increased storm intensity necessitate the repair and long term management of this landscape. This long-term landscape stewardship should be aided by ongoing dredging activities for the adjacent South Benson Marina in Fairfield, CT. These dredging activities currently take sand from Ash Creek and place it on Jennings Beach—it would be better used and cheaper to place it at Saint Mary's to build and maintain the dune's elevation.

In addition to the immediate benefits this project will provide, we also hope it serves as a precedent for future collaboration between Bridgeport and Fairfield elsewhere in the Ash Creek Estuary and Rooster River Watershed. This and other co-management strategies will be crucial for the management of Ash Creek.

The attached set of drawings are 50% complete professional schematic design drawings that outline what it will take to reconstruct and restore Saint-Mary's-by-the-Sea. While these drawings are not final construction documents (these would need to be created later, along with a permitting process), they do provide an accurate enough approach for capital fundraising purposes. In total, implementation of this project would cost around 300,000 dollars, about as much as a house. This investment is relatively small when compared to the dramatic improvements that would follow. Some of these improvements will include:

- Increased area for sunbathing and fishing;
- Improved neighborhood aesthetics;
- Improved pedestrian connections to the adjacent esplanade;
- A dense, lush, and biodiverse native plant community;
- Greater protection of inland residences from coastal storm events;
- Greater protection of the Great Marsh Island from coastal storm events; and,
- Decreased operational costs for periodic dredging associated with South Benson Marina.”

- Project Narrative, July 9th, 2014. Written by One Nature, LLC

SCHEMATIC DESIGN FOR THE RECONSTRUCTION AND RESTORATION OF SAINT-MARY'S-BY-THE-SEA


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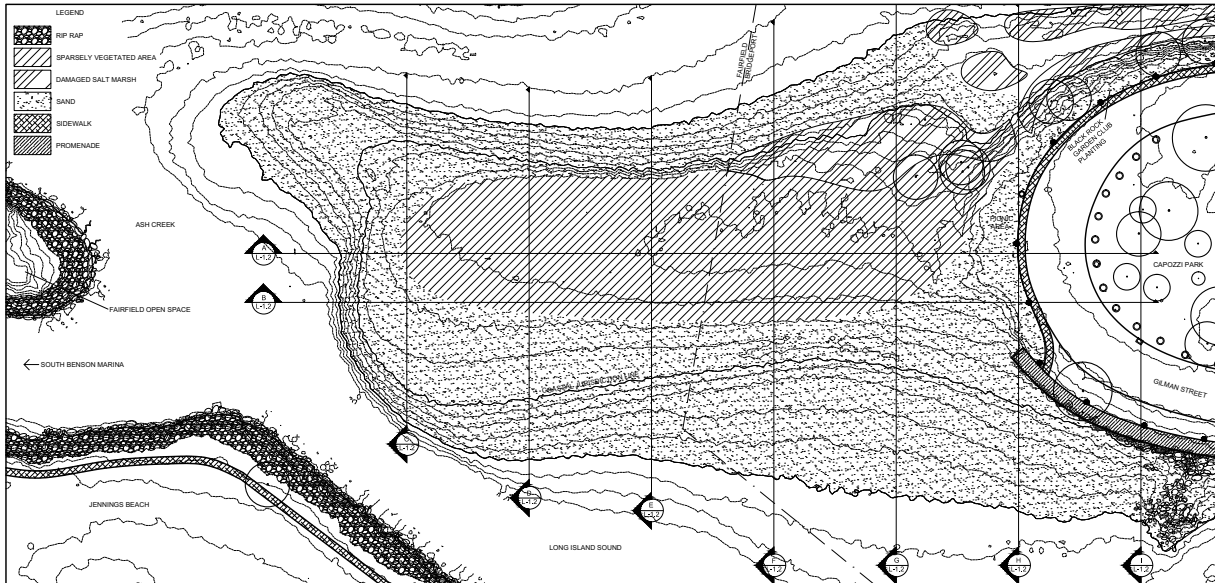
- S-1 2012 LIDAR TOPOGRAPHY
- S-2 2011 LIDAR TOPOGRAPHY
- L-1.1 EXISTING CONDITIONS PLAN
- L-1.2 EXISTING CONDITIONS SECTIONS
- L-2 LAYOUT PLAN
- L-3 GRADING PLAN
- L-4.1 PLANTING PLAN
- L-4.2 PLANTING SCHEDULE
- L-5.1 DETAILS
- L-5.2 DETAILS




NOTES:

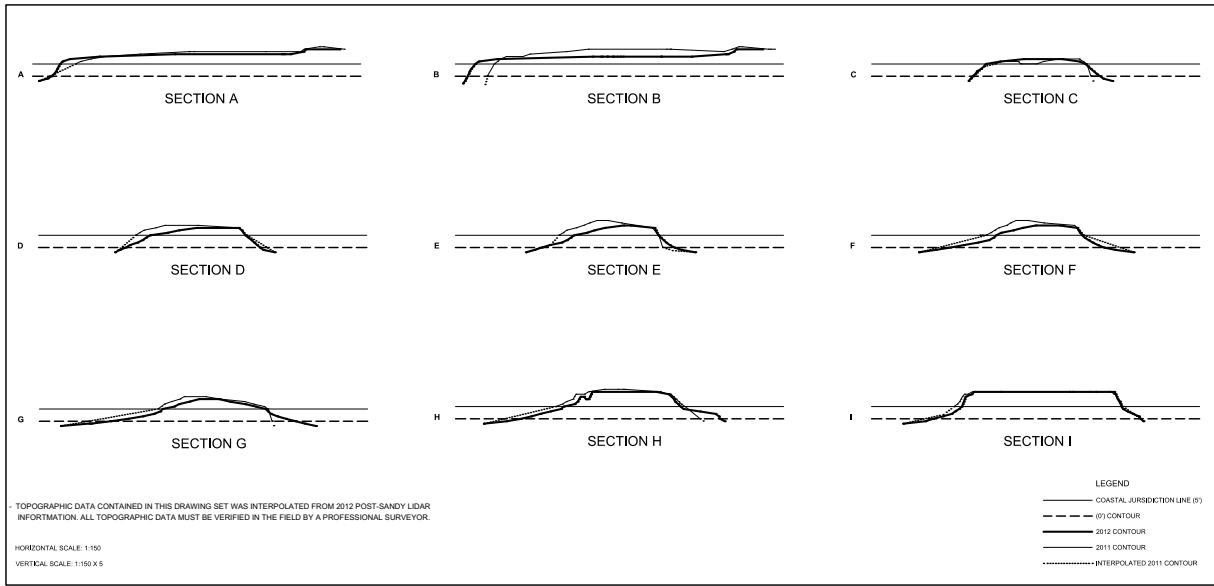
- ALL INFORMATION IN THIS DRAWING SET IS SUBJECT TO CHANGE DURING FURTHER DESIGN DEVELOPMENT.
- THIS DOCUMENT SET REQUIRES FURTHER APPROVAL FROM MUNICIPAL, STATE, AND FEDERAL AGENCIES PRIOR TO CONSTRUCTION.
- TOPOGRAPHIC DATA CONTAINED IN THIS DRAWING SET WAS INTERPOLATED FROM 2012 POST-SANDY LIDAR INFORMATION. ALL TOPOGRAPHIC DATA MUST BE VERIFIED IN THE FIELD BY A PROFESSIONAL SURVEYOR.
- ALL IMPORTED FILL MATERIAL FOR BEACH RESTORATION MUST BE PROVED TO BE FREE OF HAZARDOUS MATERIAL AND SIMILAR IN PARTICLE SIZE TO SAND ALREADY EXISTING ON THE SITE.
- ALL CONSTRUCTION WORK MUST BE PERFORMED DURING TIMES OF YEAR AND USING CONSTRUCTION METHODS THAT PROTECT EXISTING BIOLOGICAL RESOURCES.
- ALL WORK ON SITE SHALL BE OVERSEEN AND APPROVED BY A QUALIFIED LANDSCAPE ARCHITECT AND RESTORATION ECOLOGIST.



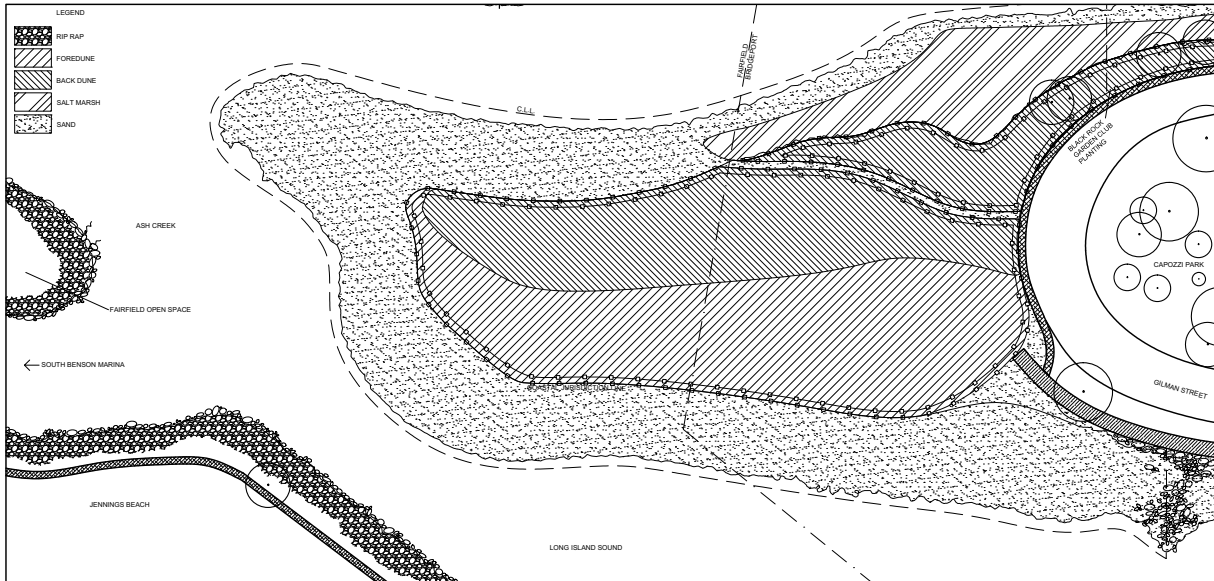
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	<p>SAINT-MARY'S-BY-THE-SEA ASH CREEK CONSERVATION ASSOCIATION BRIDGEPORT & FAIRFIELD, CT.</p>		L-0



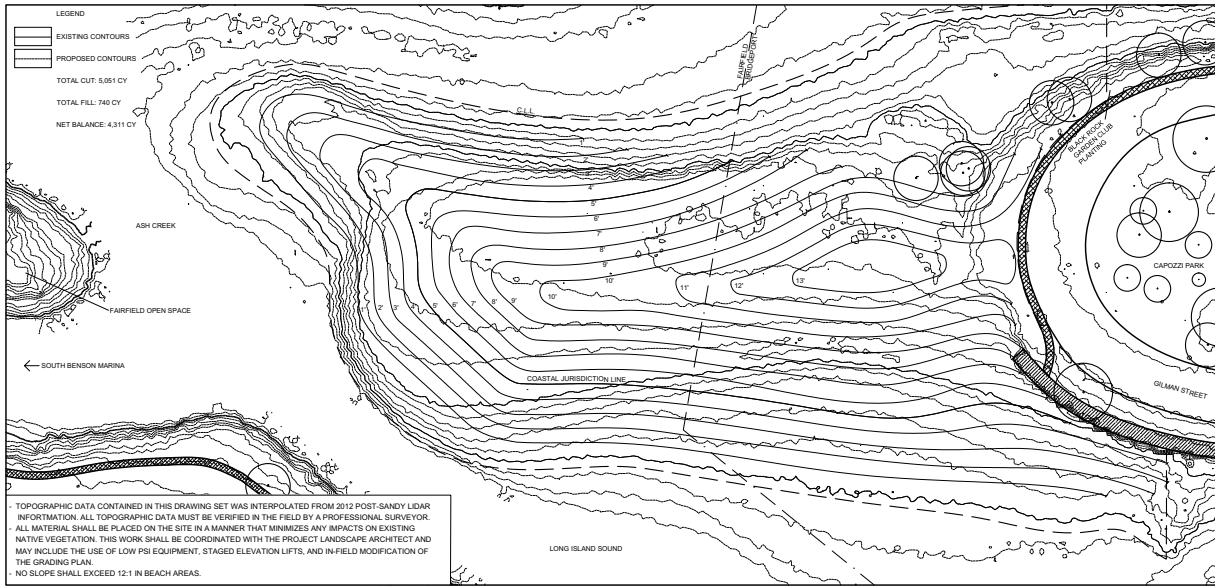
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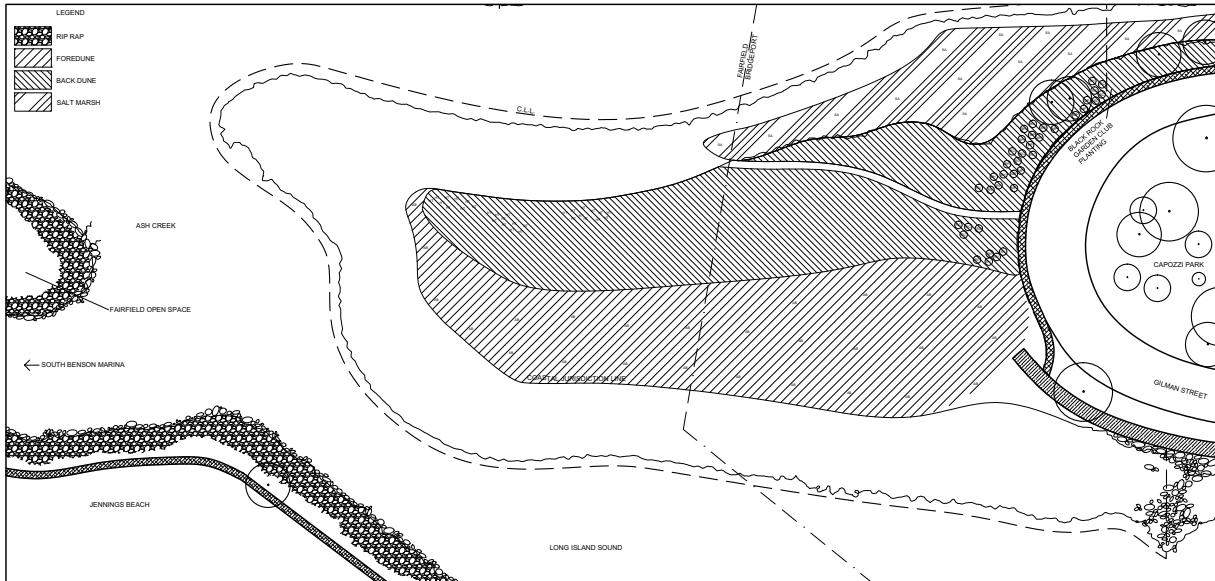
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<p>One Nature info@onenaturellc.com 718.395.3613 www.onenaturellc.com 94 Ninth Street Brooklyn, New York 11215</p>	<p>GRADING PLAN</p>	<p>SCALE: 1:60</p>	<p>DATE: MAY 02, 2014</p>
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<p>One Nature info@onenaturellc.com 718.395.3613 www.onenaturellc.com 94 Ninth Street Brooklyn, New York 11215</p>	<p>PLANTING PLAN</p>	<p>SCALE: 1:60</p>	<p>DATE: MAY 02, 2014</p>
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SALT MARSH PERENNIALS - 18153 SQ FT					
SYMBOL	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	NOTES
SA	16406	SPARTINA ALTERNIFLORA	SALT MARSH CORDGRASS	PLUG	18" SPACING, 2/HOLE

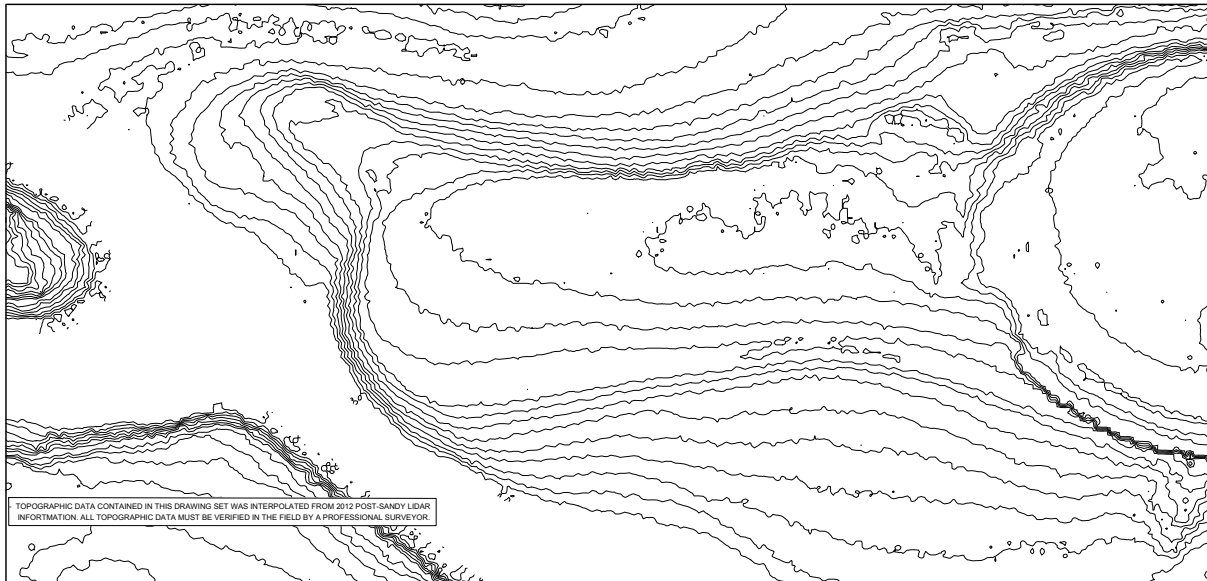
FOREDUENE PERENNIALS - 47046 SQ FT					
SYMBOL	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	NOTES
AB	43010	AMMOPHILA BREVIGULATA	BEACH GRASS	PLUG	18" SPACING, 2/HOLE
CF	500	CHAMAECRISTA FASCICULATA	PARTRIDGE PEA	PLUG	18" SPACING, 1/HOLE
LJ	500	LATHYRUS J. VAR. MARITIMA	BEACH PEA	PLUG	18" SPACING, 1/HOLE
LC	500	LIMONIUM CAROLINIANUM	SEA LAVENDER	PLUG	18" SPACING, 1/HOLE
PA	500	PANICUM AMARUM	BITTER PANIC GRASS	PLUG	18" SPACING, 1/HOLE
PV	500	PANICUM VIRGATUM	SWITCHGRASS	PLUG	18" SPACING, 1/HOLE
SOS	500	SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUG	18" SPACING, 1/HOLE



BACKDUNE PERENNIALS - 66515 SQ FT					
SYMBOL	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	NOTES
AS	5080	ASCLEPIAS SYRIACA	MILKWEED	PLUG	18" SPACING 1/HOLE
EH	5080	EUPATORIUM HYSSOPIFOLIUM	LATE BONESET	PLUG	18" SPACING 1/HOLE
EG	5080	EUTHAMIA GRAMINIFOLIA	FLAT-TOPPED GOLDENROD	PLUG	18" SPACING 1/HOLE
PV	5080	PANICUM VIRGATUM	SWITCH GRASS	PLUG	18" SPACING 1/HOLE
SC	5080	SOLIDAGO CANADENSIS	COMMON GOLDENROD	PLUG	18" SPACING 1/HOLE
SOS	5080	SOLIDAGO SEMPERVIRENS	SEASIDE GOLDENROD	PLUG	18" SPACING 1/HOLE

BACKDUNE TREES & SHRUBS					
SYMBOL	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	NOTES
BH	7	BACCHARIS HALIMIFOLIA	GROUNSEL BUSH	1 GAL	
HT	30	HUDSONIA TOMENTOSA	FALSE BEACH-HEATHER	1 GAL	
MP	11	MORELLA PENNSYLVANICA	BAYBERRY	1 GAL	
RC	12	ROSA CAROLINA	CAROLINA ROSE	1 GAL	
RV	8	ROSA VIRGINIANA	VIRGINIA ROSE	1 GAL	


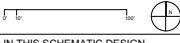
- NOTES:**
- ALL PLANTS USED MUST BE APPROVED BY THE DESIGNER PRIOR TO INSTALLATION.
 - ALL PLANT MATERIAL MUST BE SOURCED FROM SEED STOCK WITHIN THE LONG ISLAND SOUND.
 - THIS PLANT LIST IS FOR PLANNING PURPOSES ONLY AND MAY REQUIRE REVISION PRIOR TO CONSTRUCTION.
 - ALL PLANTS MUST BE PROTECTED FROM HERBIVORY FOR 12 MONTHS POST INSTALLATION.
 - BI-WEEKLY HAND WEEDING OF ALIEN INVASIVE PLANT SPECIES SHALL BE PERFORMED FOR THE FIRST TWO YEARS OF POST-CONSTRUCTION.
 - ALL PLANTS SHALL BE INSPECTED AT THEIR ORIGIN PLANT NURSERY BY A LANDSCAPE ARCHITECT PRIOR TO DELIVERY.
 - ALL WORK SHALL BE COORDINATED WITH THE BLACK ROCK GARDEN CLUB TO ENSURE THE PROTECTION OF VOLUNTEER PLANTINGS.

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OneNature

50% Design Estimate for the Reconstruction and Restoration of Saint-Mary's-By-the-Sea in Bridgeport and Fairfield, Connecticut

DRAFT 5.9.14

Item	Unit Type	Units	Unit Cost	Total Cost
Beach Sand	CY	4,300	\$40*	\$172,000
Plant Material	Per	35,000	\$2	\$70,000
Dune Fence	LF	400	\$7	\$2,800
Subtotal**				\$244,800
Mobilization	LS		5% of subtotal	\$12,240
Construction Total				\$257,040
Permitting			5% of total construction subtotal	\$12,240
Design Development			10% of total construction subtotal	\$22,733
Total Estimated Cost DRAFT				\$292,013
Suggested Contingency***			10% of total	\$24,800

All totals approximate. This estimate is preliminary and subject to further revision. This document is for planning purposes only and not intended for construction.

*Cost of sand is assumed for delivery by truck. This cost may be reduced through coordination with nearby dredging projects provided material meets criteria for dune restoration. If "free" sand is obtained from dredging for South Benson Marina or nearby projects then the total project cost will decrease by 50%, or more.

**All construction costs include installation.

***Suggested contingency is based on total project estimate and intended to be used for overruns for unexpected future events and field conditions.

IV. Excerpts of 2012 Ash Creek Estuary Ecological Master Plan

C.1 Description

This unit includes the inlet of Ash Creek, where the waters of Long Island Sound flow into Ash Creek and where the flow from Ash Creek outlets into the Sound.

The geographic unit is approximately 10.8 acres in size, of which the water at high tide occupies about 7 acres.

The environmental and cultural features that define this area include:

1. Tidal inlet/outlet channel;
2. St. Mary's sand spit;
3. St. Mary's By the Sea rocky shorefront;
4. Forested Open Space; and,
5. Tidal creek

The tidal inlet/outlet channel is the narrow passageway between the sand spit and the Fairfield mainland. The channel area is bounded by the sand spit on its east side. The channel is bounded on the west side by rip rap lined coastline including a jetty at the terminus of Jennings Beach and an artificial peninsula that was created by dredging activities related to the construction of South Benson Marina. The channel is approximately 220 feet in width between the sand spit and the far shore. The channel is relatively deep due to regular dredging and therefore has a strong tidal current. Dredging activities in the central channel appear to be limited north of the navigable entry to Benson Marina.

The St. Mary's sand spit is a type of coastal barrier landform known as a barrier spit. Barrier spits are coastal barriers that are attached to the mainland at only one end and extend into open water. (Barrier spits can become barrier islands if they detach completely from the mainland, and conversely, a barrier spit can attach on both sides to the mainland and be called a bay barrier). The sand spit occupies approximately 2.5 acres at high tide.



1934 Aerial

The sand spit faces both inland towards the tidal creek and outward towards the Sound. The Sound facing portion of the sand spit is a fore (sand) dune environment. Vegetation is primarily characterized by low growing herbaceous plants, shrubs, and a few trees. These plants are rooted in deposits of unconsolidated loamy and coarse sand. The shape of taller species is impacted by the predominant onshore winds. Between the dune vegetation and the Sound is an intertidal zone of vegetated beach.

The tidal creek facing portion of the sand spit is a back dune environment. Vegetation is primarily characterized by low growing herbs, shrubs, and grasses, rooted on a deposit of unconsolidated loamy and coarse sand.

The St. Mary's By the Sea consists of approximately 660 feet of predominately rocky intertidal shorefront. The far most western portion of this area is sandy. Above the slope to the shorefront there is a promenade with a walking path, and a grassy strip with park benches. Grovers Avenue runs parallel to the promenade with parallel parking spaces on the Sound side of the street. The promenade is part of the City of Bridgeport St. Mary's By the Sea Park. Benches, streetlights, and occasional trash receptacles can be found up and down the promenade.

The Forested Open Space is located at the bottom of Black Rock, Bridgeport, east of the Gilman street bend. It is approximately 1.75 acres in size, and is mainly forested with a small lawn area in front with what appears to be a single infrequently maintained port-a-john. The locals refer to the area as the "bird sanctuary" although it's officially known on several maps as Capozzi Park. Vegetation within the forested portion of the open space consists of a thick woody overstory and a dense understory which is dominated by nonnative species.

The tidal creek runs along the north side of the barrier spit. It contains mudflat, low marsh, and high marsh plant communities. The walkway along Grover's Avenue rises above the eastern side of the tidal creek. The creek is discussed in greater detail in section A: Lower Creek.

C.2 Historic Interpretation

Densely packed glacial deposits formed what is known today as Black Rock during the Pleistocene era. The hilly Black Rock landform provides a hardened shoreline which partly creates the conditions for the formation of a sand spit and barrier beach (Jennings Beach) to the west. These sand formations, in turn, allow for the creation of the Great Marsh Island.

This area appears to have been a tidal inlet at least since the late 17th century. The sand spit and barrier beach complex, split by the Ash Creek inlet, formerly abutted a large intertidal marshland to the north (described in Section X Lower Creek) which drained into Ash Creek. Though heavily modified in the past few centuries, the sand spit appears to have retained its basic morphological character. In contrast, the barrier beach (Jennings Beach) has been heavily modified.

The channel and peninsula (Fairfield side of the study area) was created as part of the creation of Benson Marina when the former tidal marshland was dredged to make navigable harbor. Some of the dredge spoils were then used to create the peninsula and to fill in surrounding tidal wetlands. This entire area, consisting of the western edge of the study area, is now lined with medium sized rip rap.

Approximately at the same time, large rip rap was used to create the jetty along the edge of Jennings Beach. The purpose of the jetty is to capture littoral drift (i.e. to keep the beach sand from moving away from Jennings Beach) and to mitigate against dangerous currents.

The edge of the sand spit has aggraded and degraded over the years according to the influence of human activities on vegetation and by the channel maintenance. It is unknown if beach nourishment activities have taken place on Jennings Beach, or how frequently the channel is dredged. Deep waters created by dredging activities make this location a popular fishing area.

Historic dredging activities and the development of South Benson Marina have had a disturbance impact on the great marsh island since channel deepening causes stronger currents with erosive ripple effects on adjacent landforms. Dredging activities appear





to have also required mobilization of heavy equipment on the barrier spit, which has resulted in damaged habitat.

C.3 Qualitative Assessment of Existing Conditions and Ecological Functions

Aesthetic

The barrier spit offers a unique contrast to the interior sections of the estuary and the eastern rip rap shore. This creates a more diverse visitor experience. Moreover, the forms found in intertidal sandy beaches and dune environments (such as sand waves, dune geometry, and angles of repose) are typically considered aesthetically pleasing design elements. The point of the Sand Spit is a particularly beautiful place where visitors may gaze deep into clear water, out towards the horizon line above the sound, or inward to the Great Marsh. The undeveloped nature of the Sand Spit provides an aesthetic compliment to the comparatively more developed Fairfield and Bridgeport shorelines.



Biodiversity

This study area is relatively small compared to the overall size of the estuary but contains species found nowhere else in the system. In this small section there are unique habitats such as foredune, backdune, and maritime forest which attract a diversity of vertebrate and invertebrate species.

Flood and Storm Protection

This barrier spit absorbs wave action and protects interior marshland, and plays an important role in absorbing storm surges. If the spit were to be reduced in width or elevation, it could cause negative impacts especially on the Great Marsh Island. The spit also protects the St. Mary's walkway and Gilman Road from erosive wave action that could cause undercutting. The marine forest in the Capozzi Park buffers coastal winds from interior sections of the lower creek, especially the eastern shoreline. It also creates a sheltered environment for recreational walkers, bikers, and dog walkers.

Habitat

Foredune and Backdune environments in the sand spit are important habitat types for

a variety of sand loving plant and animal species. American beachgrass, in particular, is not found elsewhere in the estuary. Capozzi Park provides an important refuge for migratory and resident species of birds and insects, especially during storm events.

Recreation

The barrier spit provides important waterfront access for multiple user types including fishermen, bird watchers, sunbathers, and beachcombers. Recreational use of the rest of the public landscapes is also significant. Walkers, bikers, dog walkers, and fisherpeople all utilize the public space. The seaward views, parking availability and the promenade make this an attractive resource for recreation.

Water Quality

By decreasing wave action within the lower creek, the barrier spit calms the waterway which enables more productive sediment deposition and nutrient fixation.

C.4 Potential Threats

Erosion and deposition of the sand spit

The underlying sand spit deposits are subject to erosion during severe storms. The erosion has been accelerated in recent years due to human related activities.

Although large storm events can negatively affect and degrade the landform, on the whole this is a short term impact. The long term stability and therefore the health of the landform depends mainly on the replenishment by sand carried by the offshore currents moving westerly along the edge of the coast.

If this normal process of littoral drift is interrupted over time due to diversions from groins, jetties, or other hardened structures, there will be no current to transport and deposit the sand. Additionally, if there is a shortage of sand due to excessive shorefront development, then there will be a shortage of sand to replenish the spit sand and the landform would be expected to degrade over time. Both of these factors may be of concern to the future of this landform.





In the short term, the level of human use has a substantial impact on the stability of the landform due to the potential for humans to accelerate erosion. This impact is more pronounced when a high level of human alteration coincides with a large storm event.

The sand spit plays an important role in the function of the creek, notably by providing a unique ecology and biodiversity to the area, and by protecting the inner creek from erosive wave action during storm events, and therefore mitigating flooding to the inner creek and to inland structures. Without the sheltering from the sand spit, the Great Salt Marsh Island would erode away. The sand spit also serves as sand storage areas that supply sand to eroded beaches during storms, and serves to buffer windblown sand and salt spray from the inner shores.

The sand dunes located in the middle of the spit are an important component of the sand spit, and are absolutely vital to the protective function of the spit. By being at a higher elevation than the rest of the sand spit, they absorb the impact of storm surges and high waves. The dunes are created and maintained by wind-blown sand that becomes trapped by the vegetation. Over time, the sand accretes into dunes. Any activity such as trampling or unnecessary development which disturbs the natural vegetation will also ultimately harm the sand dunes, since the natural vegetation is required to create and maintain the sand dunes. Furthermore, care should be taken in any future restoration project to ensure that the higher elevation of the dune zone is maintained so that the sand spit can fully perform all of its protective functions to the estuary.

The promenade walkway along the exposed coast shows signs of erosion damage which will eventually lead to the collapse in undermined sections.

Jurisdictional Overlap

According to Town of Fairfield documents such as their Multiple Use Management Plan for Coastal Open Space and the USGS topographic quadrangle, and several newspaper articles dating back to 1954, the Fairfield/Bridgeport municipal boundary line possibly runs directly through the sand spit, or through an accreting edge. This makes dual municipal management of the spit a complex and often neglected matter.



Because of the uncertainty of the location of the municipal boundary, often site plans for the sand spit neglect to indicate the municipal boundary in relation to the landform.

The presence of this municipal boundary triggers certain regulatory requirements that are often overlooked. All development activities that may impact the sand spit may be subject to dual regulation by BOTH the Town of Fairfield and the City of Bridgeport, and possibly the Connecticut Department of Energy and Environmental Protection (CTDEEP).

According to the CT General Statutes, even activities that appear to be constrained to one side of the municipal boundary are likely still subject to regulation by the other municipality IF the activity is within 500 feet of the municipal boundary, or IF the activity impacts the environmental resources of the other municipality.

Alien and Invasive Species

There is a high level of invasive species growing in the shrub and herbaceous understory of the “bird sanctuary” (Capozzi Park). Non-native species have been observed in the barrier spit area. Alien and invasive species pose a threat to certain types of native plants and animals.

Sea Level Change

Predicted rises in sea level would negatively impact the integrity of the barrier spit. Under higher sea conditions, waves would more easily overtop and wrap the existing landform, causing increased erosion of the spit and lower creek habitats.

Recreational Use and Development

Heavy dog use of the sand spit and adjacent high marsh leads to the fecal pollution of the waterway and the Sound. Heavy and minimally managed recreational use of the sand spit leads to loss of plant life, and to accelerated erosion of the landform. Intensive use of the sole portable port-o-john located at Capozzi Park has led to a visually offensive and potentially unsanitary condition of the amenity.

Motorized Boats

Increased use of the channel by motorized watercraft will lead to adverse impacts to the ecosystem such as motor oil pollution, erosion, sedimentation, and increased





turbidity due to prop dredging and wake effects which lead to the smothering of seed oysters and other bottom dwelling and aquatic organisms, and the disturbance of nesting patterns of shorebirds.

Storm Events

Major storm events, such as hurricanes and Nor’easters, have the potential to cause major changes to coastal morphology and upland habitat. These events, though unpredictable, may intensify in the future as a result of climate change.

C.5 Potential Ecosystem Improvements

Aesthetic

1. Enhance native vegetation throughout the study area.
2. Improve vistas across the lower creek and the sound through planting, placement of benches, and pathway alignment.
3. Install aesthetically pleasing dune fencing along topographic contours.
4. Improve gathering spaces through use of permeable pavers, fill placement, and historically appropriate site furnishing.
5. Create custom signage and educational kiosks to be used throughout the Ash Creek estuary to establish a local feeling respectful of cultural and ecological conditions.

Biodiversity

1. Protect large sections of the barrier spit from dogs and foot traffic.
2. Supplemental spot planting to encourage specific species.
3. Develop forest management plan for Capozzi Park. Thin trees and control invasive



species to create greater plant diversity.

Carbon fixation

1. Generally encourage the restoration of native plant materials.
2. Monitor all design and construction activities to reduce use of heavy equipment or building materials with high carbon footprints.
3. Manage the Bird Sanctuary to promote more standing and ground sequestered biomass. Expand the forest farther west.
4. Convert all lawn spaces to native coastal vegetation.

Habitat

1. Restore tidal salt marsh and riparian zones on the northeast side of the barrier spit.
2. Bring back coastal meadow and shrub habitat on the southwest edge of the Bird Sanctuary.
3. Convert mown lawn on promenade walkway to native shrubs and grasses.

Recreation

1. Better define access points to the barrier spit to avoid trampling native plants.
2. Install bike racks.
3. Construct new pathways through the Bird Sanctuary to counter the dominance of the road on visitor experience and to provide access to additional environmental education.

BIOREGIONAL AESTHETIC

Landscape architectural design that is based on ecological principles leads to a specific type of look and feel that varies from region to region based on local environmental factors. In addition to being aesthetically pleasing, designs based on bioregional aesthetics tend to be more resilient and easier to manage. This style of design works well with preservation efforts to protect culturally significant features.





4. Temporary toilets should be removed, added, better maintained, or replaced with permanent bathrooms.
5. Design and install a defined bikeway and sidewalk system that would create a safer and more accessible experience.

Water Quality

1. Use green infrastructure techniques to address street drainage.
2. Provide bags and signage to control dog waste. The drainage for the road can be improved using green infrastructure technologies.
3. Restore native plant communities and discourage off-trail disturbance.



