

100 YEAR FLOOD EL. 13.0 (ZONE VE)  
[SCALED FROM F.E.M.A. F.I.R.M. MAP  
REVISED JULY 20, 2016]

PROPOSED ADDITION  
(14.6X22.4)  
SEE NOTE 5

PORTION OF  
EXISTING RESIDENCE  
TO BE RENOVATED

MAP 34  
PARCEL 1.4


MAP 34  
PARCEL 1.8

..... denotes limit of building envelope  
shown on Plan Book 18, Page 183  
recorded at the Dukes County of Deeds

- NOTES:
1. LOT AREA: 3.63+ ACRES
  2. DATUM: NAVD 1988.
  3. THE ENTIRE LOT LIES WITHIN COASTAL DISTRICT.
  4. THE ENTIRE LOT LIES WITHIN NHESP PRIORITY HABITATS OF RARE SPECIES JURISDICTION.
  5. THE PROPOSED ADDITION IS LOCATED IN THE INLAND ZONE OF THE COASTAL DISTRICT.
  6. WETLANDS AND SALT MARSH WERE FLAGGED BY LEC ENVIRONMENTAL CONSULTANTS, INC. REFER TO WETLAND DELINEATION REPORT DATED 1-19-24 PREPARED BY LEC ENVIRONMENTAL CONSULTANTS, INC.
  7. THE ENTIRE LOT LIES WITHIN SQUIBNOCKET POND DISTRICT.

Site Plan  
in  
Chilmark, Massachusetts  
Assessor Parcel 34-1.3  
prepared for  
**Santiago Realty Trust**  
Scale 1"=30' June 2, 2023  
Revision Date February 9, 2024

  
Charles R. Gilstad  
2/9/24

  
Sourati Engineering  
Group LLC  
Professional Land Surveyors

P.O. Box 4458  
107 Beach Road, Suite 202  
Vineyard Haven, MA 02568  
Phone (508) 693-9933 Fax (508) 693-4933



# Memorandum

**DATE:** February 9, 2024  
**TO:** Chilmark Zoning Board of Appeals  
**FROM:** Mark Manganello (LEC)  
**RE:** Wetland Delineation at 9 Signal Hill Lane, Chilmark, MA  
**CC:** Sourati Engineering; Chilmark Conservation Agent

This Memorandum has been prepared in response to the Chilmark Conservation Commission’s letter to the Zoning Board of Appeals (ZBA), dated December 12, 2023 (*Conservation Commission Letter*), regarding 9 Signal Hill Lane in Chilmark (*Locus*). A copy of Mark Manganello’s resume (Attachment A) is attached for the ZBA’s reference. This memo references the attached *Wetland Resource Area Analysis Report* (Wetland Report) prepared by LEC, dated December 8, 2023 (Attachment B), and the *Site Plan in Chilmark, MA Prepared for Santiago Realty Trust (Site Plan)*, prepared by Sourati Engineering, last revised February 9, 2024 (submitted to ZBA under separate cover).

## Wetland Delineation

LEC initially performed a wetland delineation on this property in 2021. In connection with that delineation, LEC prepared the *Wetland Report*. Based on the wetland delineation, the wetlands were surveyed and shown on the original *Site Plan* for the project. When the *Conservation Commission Letter* was received, Sourati Engineering returned to the site in January 2024 to reset the original flagging by survey. Once it was reflagged, LEC returned to the site on January 17, 2024, to review and confirm accuracy. Based on our field review, the flags were properly set, and the *Site Plan* accurately depicts the wetland boundaries and flag numbers present in the field. Additional topographic contours and setback distances have also been added to the *Site Plan*, but no changes to the project or original delineation have been made.

As shown on the *Site Plan*, the wetland located closest to the proposed project on *Locus* is identified as an Isolated Vegetated Wetland (IVW) and is delineated on the *Site Plan* with flags A1-A15 (the *A-Series IVW*). A second IVW, defined with flags B1-B8 on the *Site Plan* (the *B-Series IVW*) as well as a Bordering Vegetated Wetland (BVW), defined with wetland flags C1- C5 (the *C-Series BVW*), are located much further from the Project. In fact, only a small corner of the *A-Series Wetland* is on *Locus*. The remainder of that wetland, and the entirety of the *B-Series* and *C-Series Wetlands* are located on the abutting association property.

The *A-Series* and *B- Series IVWs* are both similar in characteristics in that they occupy shallow topographic depressions and do not contain any streams or other surficial connections to Squibnocket Pond. As shown on the *Site Plan*, there is a small four-inch-diameter pipe between wetland flags A1 and A15, extending beneath a grass pathway on the neighboring association property. Although surface water from the IVW may occasionally travel through the pipe in response to heavy precipitation events, the IVW is not connected to Squibnocket Pond by any stream channel or other waterbody. The wetland itself is separated from the

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Rindge, NH 03461  
603.899.6726

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Suite 3  
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PLYMOUTH, MA

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Pond by the grass pathway maintained by the association as depicted on the *Site Plan*. As noted in the Conservation Commission letter, the wetlands shown on the *Site Plan* were previously identified on a site plan from 2013 (*2013 Plan*) prepared in connection with construction of the existing dwelling. At that time, the *A-Series IVW* was also identified as an IVW on the *2013 Plan*. On the *2013 Plan*, the IVW is larger than the IVW delineated by LEC in 2023; however, there is no corresponding data establishing how the wetlands were identified and delineated in 2013 (i.e., vegetation inventory or soil logs). LEC's delineation was based on detailed analysis of the soils and wetland vegetation, as described in the Wetland Report. We've included the MassDEP Field Data Forms with the report to support our delineation and have copied the Conservation Commission Agent on this Memorandum.

### **No Adverse Impacts from Proposed Project**

The proposed project involves construction of a small, 327 square foot addition to the existing single-family dwelling (the *Addition*). Based on the *Site Plan*, the proposed addition is 189 feet from the nearest corner of the *A-Series IVW* and well over 200 feet from the *B-Series* and *C-Series* wetlands, Squibnocket Pond, and most of the *A-series IVW* itself. Between the *A-series IVW* and the proposed *Addition*, the landscape is densely vegetated with shrubs and trees closer to the wetland and various grasses closer to the existing dwelling. The attached photographs (Attachment C) depict the conditions in the vicinity of the *Addition* and the vegetated area between the *Addition* and *A-series IVW*. The vegetated area between the *Addition* and the *A-series IVW* will not be disturbed by the project.

In my opinion, the proposed *Addition* will not adversely impact any of the wetlands nor Squibnocket Pond due to its proposed small size, the large setbacks between the Project and these resource areas, and the densely vegetated buffer lying between the project and these wetlands. The *Addition* is proposed in an area that is already developed with a garage, outdoor shower, and surrounding hardscape and lawn. No naturally vegetated areas seen in the photographs (Attachment C) will be disturbed. There is no evidence of adverse impacts to the wetlands or Squibnocket Pond from stormwater runoff. The surrounding landform is stable and very well-vegetated (Attachment C). The densely vegetated buffer of almost 200 feet from the *A-Series IVW*, and well over 200 feet from the remaining wetlands and the Pond, is more than sufficient to detain and infiltrate runoff from the existing dwelling, including the proposed *Addition*.

Most importantly perhaps for the Zoning Board's review under the Squibnocket Overlay District Zoning Bylaw, the proposed addition will not impact the water quality of Squibnocket Pond. It's proposed distance of well over 200 feet from the Pond, across a densely vegetated buffer zone, ensures that no surface runoff from the proposed *Addition* will reach the Pond. In addition, the owners are proposing a denitrification septic system which will reduce the daily nitrogen loads from the dwelling, even though the proposal includes two additional bedrooms. The attached letter from John R. Smith, President of KleanTu Wastewater Treatment Technologies (Attachment D), indicates that the proposed seven-bedroom NitROE® septic system will reduce total nitrogen on site by between 81% and 91% from existing conditions, which is currently serviced with a five-bedroom, traditional Title 5 septic system. With this new septic system, protection of the Pond's water quality will be significantly increased by the proposed project due to the reduction of total nitrogen from the site.

If you have any questions about the wetland delineation or project analysis reviewed in this letter, please don't hesitate to contact me at 508-746-9491 or at [mmanganello@lecenvironmental.com](mailto:mmanganello@lecenvironmental.com).

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**Attachment A**

Mark L. Manganello Resume



## Mark L. Manganello

Senior Wetland Scientist/Asst. Director Ecological Services

### EDUCATION

#### Clark University

Worcester, Massachusetts  
 Bachelor of Arts, Geography  
 Cartography Concentration

### AFFILIATIONS

Society of Wetland Scientists  
 Association of Massachusetts  
 Wetland Scientists  
 Massachusetts Association of  
 Conservation Commissions

### EMPLOYMENT

#### LEC Environmental Consultants, Inc.

Plymouth, Massachusetts  
 2002 – Present

#### KEY Environmental Services

Rockland, Massachusetts  
 2000 – 2002  
 Wetland Specialist

Mark is responsible for management and supervision of staff and operations at LEC’s Plymouth office. In addition to management responsibilities, he maintains position as senior Project Manager and Wetland Scientist, managing projects for a variety of clients, including municipal Conservation Commissions, real estate developers, engineering/surveying/architecture companies, and private homeowners and landowners. Mark’s associated tasks include wetland boundary delineations, riverfront area studies, vernal pool studies, stream status determinations, rare species studies, wildlife habitat evaluations, construction monitoring, regulatory compliance analysis and permitting under the MA Wetlands Protection Act Regulations, local Bylaws, and other state and federal environmental regulations. Mark is also highly experienced with presenting projects at public hearings and onsite meetings before state and local regulators, preparation of wetland replication/restoration plans, proposal writing and budget tracking, and direct client communications. Mark has been accepted as an expert witness and provided expert testimony during a MassDEP Adjudicatory Hearing.

### SELECT PROJECT EXPERIENCE

- Stearns Meadow Water Treatment Plant, Scituate, MA
- Mass Maritime Dock Improvement Project, Bourne, MA
- MWRA Conley Terminal Berth 12 Pavement Rehabilitation Project, South Boston, MA
- Forest River Park Seawall Repair Project, Salem, MA
- MWRA Deer Island Parking Lot Project, Boston, MA
- Quincy Public Safety Complex, Quincy, MA
- Puritan Road/Great Easker Park Flood Mitigation and Ecological Resilience Project, Weymouth, MA
- Canal Street Flood Mitigation, Salem, MA
- Bridge Street Reconstruction, Salem, MA
- Commander Shea Boulevard Extension Project, Quincy, MA

## REPRESENTATIVE PROJECT EXPERIENCE

### **Mass Maritime Pier Improvements Project, Bourne, MA**

On behalf of Mass Maritime Academy (MMA), Mr. Manganello is providing comprehensive environmental permitting services for the Mass Maritime Academy Patriot II Dock Upgrade Project. The project involves improvements to the existing dock facilities at MMA to accommodate the new National Security Multi-Mission Vessel II training ship. LEC identified Coastal Wetland Resource Areas, provided design consultation to streamline permitting, and prepared and submitted environmental permit applications, including a Notice of Intent (NOI) with the Bourne Conservation Commission, a Chapter 91 Waterways License application, and an Environmental Assessment (EA) with NEPA.

### **Conley Terminal Berth 12 Pavement Rehabilitation Project, South Boston, MA**

On behalf of Massport, and in collaboration with the project engineer, Mr. Manganello provided environmental permitting services to rehabilitate a portion of the Conley Terminal container storage facility. LEC prepared and filed the Notice of Intent (NOI) application with the Boston Conservation Commission, presented the NOI to the Commission at a Public Hearing, and collaborated with Massport and the project engineer to expedite the permitting process. The NOI included a detailed project description, analysis of Wetland Resource Areas and disturbances, and analysis of relevant environmental regulations.

### **Forest River Park Seawall Repair Project, Salem, MA**

On behalf of the City of Salem, Mr. Manganello provided comprehensive environmental permitting services associated with a seawall reconstruction project in Salem. The project was designed to protect Forest River Park and the upgradient residential neighborhoods from coastal flood damage. LEC delineated Wetland Resource Areas and provided design consultation to streamline permitting and provided permitting services including filing a Notice of Intent Application with the Salem Conservation Commission; Environmental Notification Form with MEPA; Chapter 91 Waterways License Application with DEP; and Water Quality Certification Applications (Fill and Dredge) with DEP. The project is currently under construction.

### **Deer Island Parking Lot Project, Boston, MA**

Mr. Manganello completed a Coastal Wetland Resource Area delineation and prepared a Wetland Resource Area Analysis Report for a proposed expansion to the parking area at Deer Island. The project site contained a complex coastal environment with historic disturbance and multiple overlapping resource areas. In addition to identifying and describing the resource areas, the Report prepared by LEC included an analysis of potential environmental permits required for the project.

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**Attachment B**

Wetland Resource Area Analysis Report, Prepared by LEC, dated December 8, 2023



December 8, 2023

Email [gsourati@souratiengineering.com]

Chilmark Zoning Board of Appeals  
401 Middle Road  
P.O. Box 119  
Chilmark, MA 02535

**Re: Wetland Delineation Report  
9 Signal Hill Lane  
Chilmark, Massachusetts**

[LEC File #: SEGLLC\21-338.01]

Dear Members of the Board:

LEC Environmental Consultants, Inc., (LEC) has prepared a *Wetland Delineation Report* documenting the results of LEC’s site evaluations at 9 Signal Hill Lane in Chilmark, Massachusetts. The purpose of the site evaluations was to review existing conditions and delineate vegetated wetlands boundaries on and adjacent to the property. The evaluation was completed in accordance with the *Massachusetts Wetlands Protection Act* (M.G.L. c. 131, s. 40), and its implementing *Regulations* (310 CMR 10.00) and the *Town of Chilmark Wetland Protection Bylaw and Regulations*. This report also addresses relevant sections of the *Chilmark Zoning By-laws*.

The wetland boundaries delineated by LEC and associated Buffer Zones are depicted on the *Site Plan*, prepared by Sourati Engineering Group, LLC (SEG) dated June 2, 2023. MassDEP field data forms are included with this report (Attachment B) along with photographic documentation from the evaluation (Attachment C).

**General Site Description**

The 130,680 square foot site (Assessor’s Map 34, Parcel 1) is located southwest of Signal Hill Lane, a gravel roadway extending south/southwest from State Road toward the northeastern shoreline of Squibnocket Pond (Attachment A, Figure 1 and 2).

The site contains a single-family dwelling located close to Signal Hill Lane, with a lawn/meadow area extending around the building and downgradient toward Squibnocket Pond. There are two gravel parking areas adjacent to the dwelling extending from Signal Hill Lane. The dwelling is situated on a topographic high point on the property with moderately steep slopes extending from Signal Hill Lane and the dwelling downgradient toward the shoreline of Squibnocket Pond located off-site. The Signal Hill Homeowners

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PLYMOUTH, MA	WAKEFIELD, MA	WORCESTER, MA	RINDGE, NH	EAST PROVIDENCE, RI



Association owns property to the west and south between the site and Squibnocket Pond. A network of six- to ten-foot-wide grass paths extend from the site onto the association property, providing access to the water and continuing off-site to the southeast.

A densely vegetated upland thicket occupies the northern, western and southern portions of the site beyond the meadow. Vegetation in the upland thicket is dominated by sweet pepperbush (*Clethra alnifolia*), arrowwood (*Viburnum dentatum*), staghorn sumac (*Rhus typhina*), highbush blueberry (*Vaccinium corymbosum*), multiflora rose (*Rosa multiflora*), and winterberry (*Ilex verticillata*) with scattered eastern red cedar (*Juniperus virginiana*), black cherry (*Prunus serotina*), and oak saplings (*Quercus* spp.). Groundcover includes various goldenrods (*Solidago* spp.). Numerous entanglements of Asiatic bittersweet (*Celastrus orbiculata*), grape (*Vitis* spp.), and poison ivy (*Toxicodendron radicans*) are also located within the upland thicket plant community.

A small portion of an Isolated Vegetated Wetland (IVW), located primarily off-site on the association property, extends onto the western portion of the site, as depicted on the *Plans*. Additional off-site vegetated wetlands delineated by LEC on the association property include another IVW, a Bordering Vegetated Wetland (BVW), a small Coastal Beach, and Salt Marsh fringing along the shoreline of Squibnocket Pond.

## **Natural Heritage and Endangered Species Program Designation**

According to the 15<sup>th</sup> Edition of the *Massachusetts Natural Heritage Atlas* (effective August 1, 2021) published by the Natural Heritage & Endangered Species Program (NHESP), the site is within a Priority Habitat of Rare Species (Attachment A, Figure 4). The site is not within Estimated Habitat of Rare Wildlife and does not contain any Certified Vernal Pools or Potential Vernal Pools.

## **Floodplain Designation**

According to the FEMA Flood Insurance Rate Map (FIRM) (Community Panel#25007C0158J, dated July 20, 2016 (Attachment A, Figure 3), a V-Zone (el. 14.0) is located along the shoreline of Squibnocket Pond in the vicinity of the site. According to DEP's manual, *Applying the Massachusetts Coastal Wetland Regulations*, "where A-Zone's such as these are not mapped, the V-Zone will extend to the designated ground elevation that corresponds to the V-Zone BFE on the FIRM." This V-Zone constitutes the boundary of Land Subject to Coastal Storm Flowage (LSCSF).

## **Soil Survey Mapping**

According to the NRCS Plymouth County Websoil Survey, the area surrounding the dwelling is mapped as Nantucket Loamy Sand, while the remainder of the site is mapped as Eastchop Loamy Sand (Attachment A, Figure 5). Eastchop soils are described as "very deep, gently sloping, excessively drained soil in broad areas on outwash plains and on low hills in areas of glacial lake deposits." Soils were evaluated throughout the densely vegetated upland areas using a hand-held soil auger. The typical non-



hydric soil profile contained dark brown A-Horizon (10YR 2/1) with a bright orange Bw-Horizon (10YR 4/6) consistent with the soil survey.

### **Wetland Boundary Determination Methodology**

On December 2, 2021, LEC conducted a site evaluation to identify and characterize existing protectable Wetland Resource Areas located on or adjacent to the site. LEC returned to the site on May 23, 2023 to review existing conditions and confirmed the accuracy of the 2021 delineation.

The IVW and BVW boundaries were confirmed by observing existing plant communities, the presence or absence of hydric soils, and hydrologic indicators in accordance with the Massachusetts Department of Environmental Protection (MassDEP) handbook, *Delineating Bordering Vegetated Wetlands under the Massachusetts Wetlands Protection Act* (September 2022), the *Field Indicators for Identifying Hydric Soils in New England* (2019), and the criteria set forth in 310 CMR 10.55. The boundaries of Salt Marsh and Coastal Dune were determined based on the applicable definitions in the *Massachusetts Wetlands Protection Act*.

### **Isolated Vegetated Wetland**

According to the *Bylaw* [3.02 (1)(a)], *Vegetated Wetlands are freshwater wetlands, classified as wet meadows, marshes, swamps and bogs. They are usually areas where the topography is relatively flat, or areas of sheet flow on moderate slopes, and where the soils are perennially saturated. The ground and surface water regime and the vegetational community which occur in each type of freshwater wetland are specified in Section 3.02(1)(c) below. Freshwater wetlands also include: disturbed areas such as, but not limited to, filled or devegetated wetlands where the substrate is composed of hydric soils.*

Two IVWs were identified near the property, delineated with wetland flags numbered A1-A15 and B1-B8. A small portion of the A-series IVW extends onto the western portion of the property. The B-series IVW is located off site to the west/southwest. The IVWs have formed in shallow depressions in the landscape which contain small areas of shallow standing water during the spring hydroperiod. Vegetation in the IVWs includes dense clusters of winterberry, sweet pepperbush, highbush blueberry, and arrowwood. Groundcover species include skunk cabbage (*Symplocarpus foetidus*), cinnamon fern (*Osumunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), and sphagnum moss (*Sphagnum* spp.). A MassDEP field data form was completed along the boundary of the IVW to document vegetation, hydrology, and soil conditions in the wetland and the adjacent upland (Attachment B).

The IVWs do not contain a sufficient water column to provide Vernal Pool habitat or meet the definition of Isolated Land Subject to Flooding (ILSF). There are no streams connecting the IVWs to Squibnocket Pond and no other evidence of surface water flow from these IVWs to Squibnocket Pond. As a result, the jurisdictional Buffer Zone to the IVWs is 100 feet under the *Chilmark Wetland Protection Bylaw and Regulations* and the *Chilmark Zoning By-laws*. According to Article 12.3 (c) of the *Zoning By-law*, *the buffer zone within which the Conservation Commission may claim jurisdiction is increased from 100-feet*



to 200-feet for streams and wetlands draining to the Pond. As described above, the IVW's do not contain streams and do not drain to the Pond; therefore, the applicable jurisdictional Buffer Zone for the Conservation Commission is 100 feet.

### **Off-Site Bordering Vegetated Wetlands (BVW)**

According to the *Act Regulations* [310 CMR 10.55(2)], BVW is defined as: *freshwater wetlands which border on creeks, rivers, streams, ponds, and lakes...Bordering Vegetated Wetlands are areas where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants...The boundary of Bordering Vegetated Wetlands is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist.*

A BVW is located off-site to the south on association property. Only the portion of the BVW located closest to the site was delineated with flags C1-C5. LEC confirmed that the wetland extends west toward Squibnocket Pond and “Borders” on the Pond. However, no internal streams were observed and there is no evidence of a surface water connection to Squibnocket Pond. Vegetation within the BVW is similar to the species identified in the IVWs. One to four inches of surface water was present in portions of the BVW amidst dense colonies of skunk cabbage. As described above, the BVW does not contain streams and does not drain to the Pond; therefore, the applicable jurisdictional Buffer Zone for the Conservation Commission is 100 feet.

### **Off-Site Salt Marsh**

Salt Marsh is defined at 310 CMR 10.32 to mean *a coastal wetland that extends landward up to the highest high tide line, that is, the highest spring tide of the year, and is characterized by plants that are well adapted to or prefer living in, saline soils. Dominant plants within salt marshes are salt meadow cord grass (*Spartina patens*) and/or salt marsh cord grass (*Spartina alterniflora*). A salt marsh may contain tidal creeks, ditches and pools.*

Salt Marsh extends along the shoreline of Squibnocket Pond off-site on the association property. The Salt Marsh is a narrow fringing band of vegetation, intermingled with sandy areas which abruptly transitions into upland thicket conditions described above. Salt marsh cordgrass (*Spartina alterniflora*) and salt meadow cordgrass (*Spartina patens*) are the dominant species in the marsh. Sandy areas in between the patches of Salt Marsh may also be protected as Coastal Beach.

### **Off-site Coastal Dune**

Coastal Dune is defined at 310 CMR 10.28 (2) as *any natural hill, mound or ridge of sediment landward of a coastal beach deposited by wind action or storm overwash. Coastal dune also means sediment deposited by artificial means and serving the purpose of storm damage prevention or flood control.*

A small Coastal Dune area is located on association property along the shoreline of Squibnocket Pond. The area is used for temporary storage of small watercrafts and for access to the Pond. Vegetation



appears to be occasionally mowed and includes American beachgrass (*Ammophila brevilugulata*), switchgrass (*Panicum virgatum*), and other grasses.

### Summary

As requested, LEC conducted a site evaluation to identify and delineate vegetated wetlands boundaries at 9 Signal Hill Lane. LEC demarcated the boundary of an IVW which extends onto the western portion of the property. BVW, IVW, Salt Marsh, and Coastal Dune are located off-site on Signal Hill Homeowners Association property to the west of the site. The IVW is not protected or regulated under the *Massachusetts Wetlands Protection Act Regulations* (310 CMR 10.00) but is protected under the *Chilmark Wetlands Protection Bylaw*. Offsite resource areas including BVW, Salt Marsh, and Coastal Dune are jurisdictional under the *Massachusetts Wetlands Protection Act Regulations* and the *Chilmark Wetlands Protection Bylaw*. Based on the *Chilmark Wetlands Bylaw* and *Chilmark Zoning By-law*, the jurisdictional Buffer Zone to the IVWs and BVW is 100 feet.

Thank you for the opportunity to provide you with these services. If you have any questions or require additional information, please don't hesitate to contact me.

Sincerely,

**LEC Environmental Consultants, Inc.**

Mark L. Manganello

Assistant Director of Ecological Services

Attachments

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## Attachment A

### Locus Maps

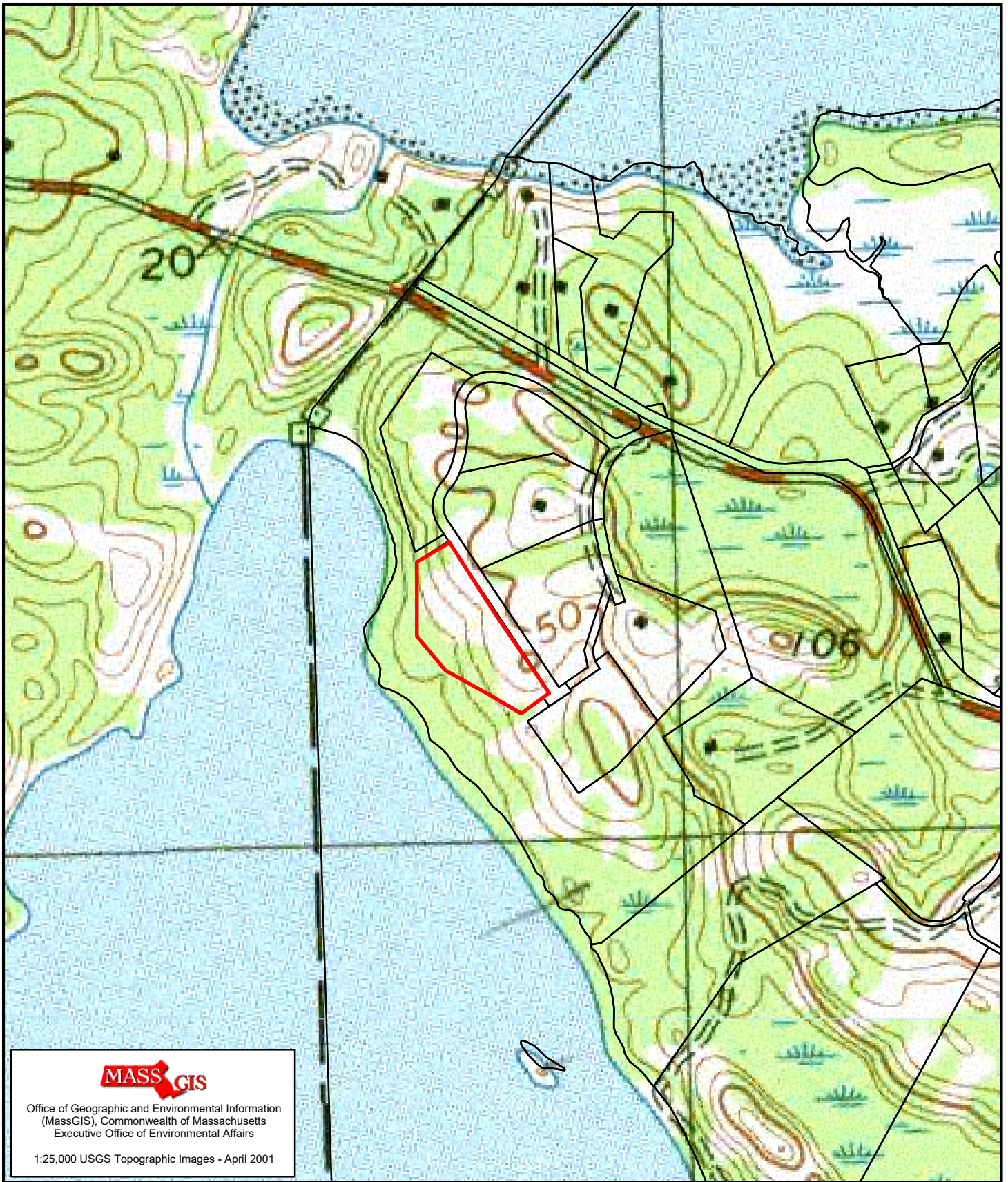
Figure 1: USGS Topographic Map

Figure 2: Aerial Orthophoto Map

Figure 3: FEMA Flood Insurance Rate Map

Figure 4: NHESP Map

Figure 5: Soil Map



**MASS GIS**  
Office of Geographic and Environmental Information  
(MassGIS), Commonwealth of Massachusetts  
Executive Office of Environmental Affairs  
1:25,000 USGS Topographic Images - April 2001

**LEC**

Environmental Consultants, Inc.

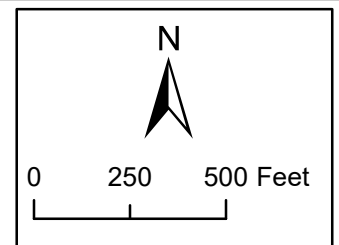
Wakefield, MA  
781.245.2500

[www.lecenvironmental.com](http://www.lecenvironmental.com)

**Figure 1: USGS Topographic Map**

9 Signal Hill Lane  
Chilmark, MA

July 22, 2021





2021 Aerial Orthophoto acquired from the Office of Geographic Information (MassGIS) website.

0 150 300 600 Feet



LEC Environmental Consultants, Inc.

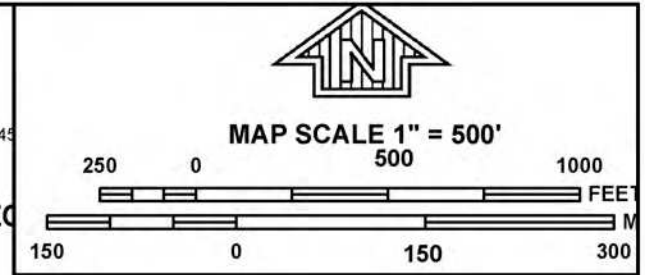
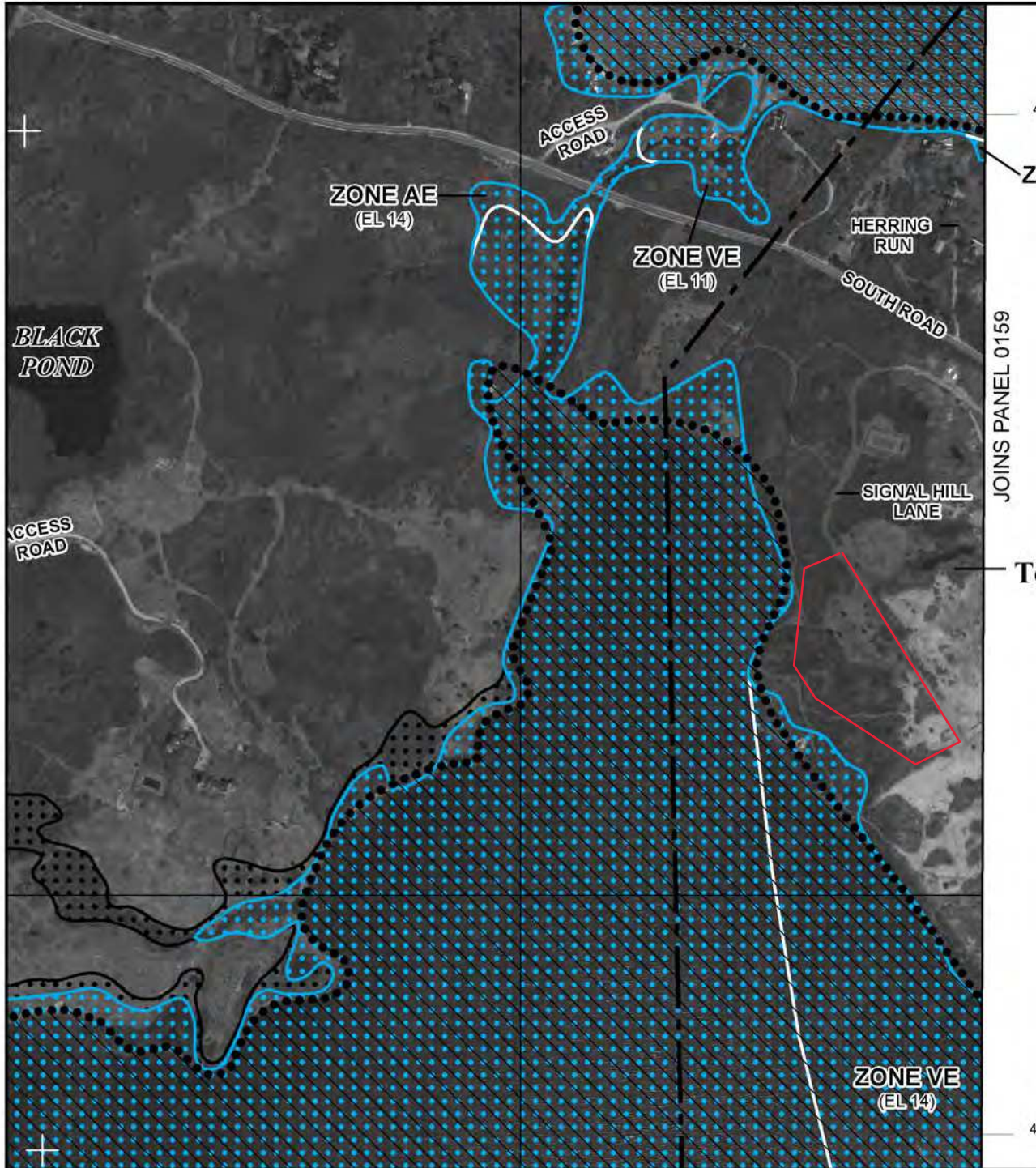
Plymouth, MA  
508.746.9491  
www.lecenvironmental.com

## Aerial Orthophoto Map

9 Signal Hill Lane  
Chilmark, Massachusetts



Figure 3: FEMA Flood Insurance Rate Map



NFIP

PANEL 0158.J

**FIRM**  
FLOOD INSURANCE RATE MAP  
DUKES COUNTY,  
MASSACHUSETTS  
(ALL JURISDICTIONS)

PANEL 158 OF 227  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
AQUINNAH, TOWN OF	250070	0158	J
CHILMARK, TOWN OF	250068	0158	J

-NOTE-  
THIS MAP INCLUDES BOUNDARIES OF THE COASTAL BARRIER RESOURCES SYSTEM ESTABLISHED UNDER THE COASTAL BARRIER RESOURCES ACT OF 1982 AND/OR SUBSEQUENT ENABLING LEGISLATION.

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
25007C0158J

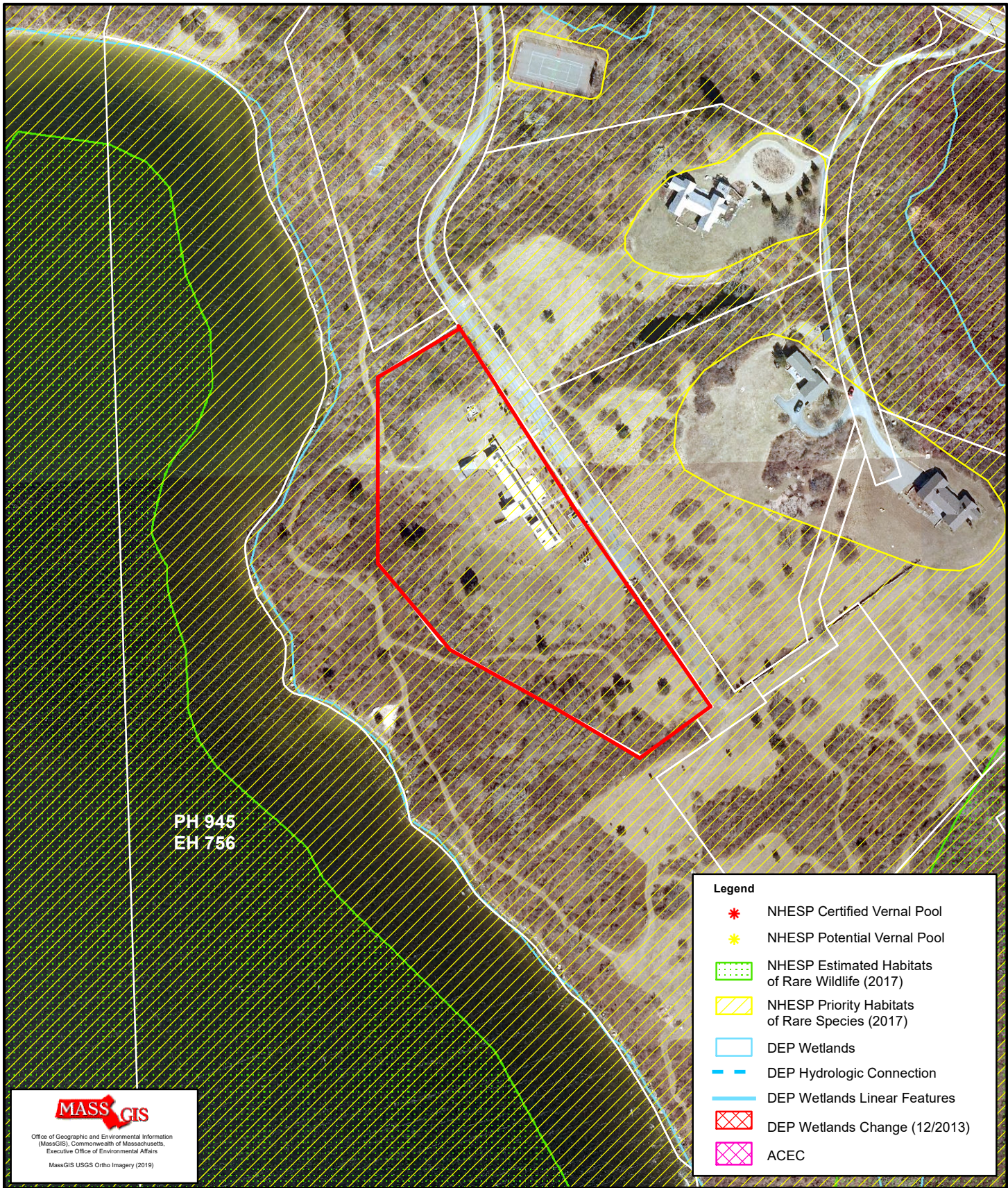
**MAP REVISED**  
JULY 20, 2016

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at <https://msc.fema.gov>.





**MASS GIS**  
 Office of Geographic and Environmental Information  
 (MassGIS), Commonwealth of Massachusetts,  
 Executive Office of Environmental Affairs  
 MassGIS USGS Ortho Imagery (2019)

**LEC**  
 Environmental Consultants, Inc.  
 Wakefield, MA  
 781.245.2500  
 www.lecenvironmental.com

**Figure 4: NHESP Map**

9 Signal Hill Lane  
 Chilmark, MA

July 22, 2021

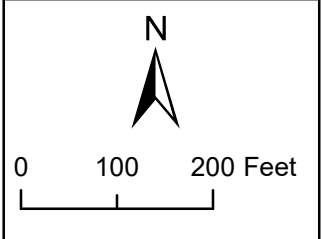



Figure 5: Soil Map—Dukes County, Massachusetts



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Dukes County, Massachusetts  
Survey Area Data: Version 17, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Nov 5, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
285C	Eastchop loamy sand, 8 to 15 percent slopes, very stony	4.7	60.0%
382C	Nantucket sandy loam, 8 to 15 percent slopes, very stony	3.0	38.5%
607	Water, saline	0.1	1.5%
<b>Totals for Area of Interest</b>		<b>7.8</b>	<b>100.0%</b>

---

**Attachment B**

Bordering Vegetated Wetland Determination Forms

**BORDERING VEGETATED WETLAND DETERMINATION FORM**

Project/Site: 9 Signal Hill Lane City/Town: Chilmark Sampling Date: May 23, 2023

Applicant/Owner: Santiago Realty Trust Sampling Point or Zone: Transect 1, Plot 2

Investigator(s): Mark Manganello Latitude / Longitude: 41 19' 33.45" N/70 46' 59.17"W

Soil Map Unit Name: Eastchop Loamy Sand NWI or DEP Classification: Freshwater Forested/Shrub

Are climatic/hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks)

Are Vegetation , Soil , or Hydrology  significantly disturbed? (If yes, explain in Remarks)

Are Vegetation , Soil , or Hydrology  naturally problematic? (If yes, explain in Remarks)

**SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.**

Wetland vegetation criterion met?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydic Soils criterion met?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Wetlands hydrology present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		

Remarks, Photo Details, Flagging, etc.:  
 Sampling location on upland side of IVW located partially off-site. Very dense thicket conditions.

**HYDROLOGY**

<b>Field Observations:</b>			
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches)	_____
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches)	_____
Saturation Present (including capillary fringe)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches)	_____

<b>Wetland Hydrology Indicators</b>		
Reliable Indicators of Wetlands Hydrology	Indicators that can be Reliable with Proper Interpretation	Indicators of the Influence of Water
<input type="checkbox"/> Water-stained leaves	<input type="checkbox"/> Hydrological records	<input type="checkbox"/> Direct observation of inundation
<input type="checkbox"/> Evidence of aquatic fauna	<input type="checkbox"/> Free water in a soil test hole	<input type="checkbox"/> Drainage patterns
<input type="checkbox"/> Iron deposits	<input type="checkbox"/> Saturated soil	<input type="checkbox"/> Drift lines
<input type="checkbox"/> Algal mats or crusts	<input type="checkbox"/> Water marks	<input type="checkbox"/> Scoured areas
<input type="checkbox"/> Oxidized rhizospheres/pore linings	<input type="checkbox"/> Moss trim lines	<input type="checkbox"/> Sediment deposits
<input type="checkbox"/> Thin muck surfaces	<input type="checkbox"/> Presence of reduced iron	<input type="checkbox"/> Surface soil cracks
<input type="checkbox"/> Plants with air-filled tissue (aerenchyma)	<input type="checkbox"/> Woody plants with adventitious roots	<input type="checkbox"/> Sparsely vegetated concave surface
<input type="checkbox"/> Plants with polymorphic leaves	<input type="checkbox"/> Trees with shallow root systems	<input type="checkbox"/> Microtopographic relief
<input type="checkbox"/> Plants with floating leaves	<input type="checkbox"/> Woody plants with enlarged lenticels	<input type="checkbox"/> Geographic position (depression, toe of slope, fringing lowland)
<input type="checkbox"/> Hydrogen sulfide odor		

Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):  
 IVW occurs in a shallow topographic depression on a hill side extending from elevation 44.0 down to the shoreline of a Salt Pond. The depression is located between elevation 8.0 and 10.0.

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

**VEGETATION** – Use both common and scientific names of plants.

<u>Tree Stratum</u>		Plot size <u>30-feet</u>			
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indicator? (yes/no)
1. Eastern Red Cedar	<i>Juniperus virginiana</i>	FACU	20.5	Yes	No
2. Staghorn Sumac	<i>Rhus typhina</i>	FACU	10.5	Yes	No
3.					
4.					
5.					
6.					
7.					
8.					
9.					
<u>31.0</u> = Total Cover					
<u>Shrub/Sapling Stratum</u>		Plot size <u>15-feet</u>			
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indicator? (yes/no)
1. Sweet Pepperbush	<i>Clethra alnifolia</i>	FAC	20.5	Yes	Yes
2. Arrowwood	<i>Viburnum dentatum</i>	FAC	20.5	Yes	Yes
3. Virginia Rose	<i>Rosa virginiana</i>	FACU	3.0	No	No
4.					
5.					
6.					
7.					
8.					
9.					
<u>44.0</u> = Total Cover					
<u>Herb Stratum</u>		Plot size <u>5 feet</u>			
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indicator? (yes/no)
1. Sweet Pepperbush	<i>Clethra alnifolia</i>	FAC	20.5	Yes	No
2. Black Cherry seedling	<i>Prunus serotina</i>	FACU	10.5	Yes	No
3. Goldenrod	<i>Solidago</i> spp.	FACU	10.5	Yes	No
4. Raspberry	<i>Rubus</i> spp.	FACU	3.0	No	No
5. Virginia creeper	<i>Parthenocissus quinquefolia</i>	FACU	3.0	No	No
6.					No
7.					No
8.					No
9.					No
10.					No
11.					No
12.					No
<u>47.5</u> = Total Cover					

**VEGETATION** – continued.

<u>Woody Vine Stratum</u>		Plot size <u>N/A</u>		Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indicator? (yes/no)
Common name		Scientific name					
1.							
2.							
3.							
4.							
				0.0 = Total Cover			

<b>Rapid Test:</b> Do all dominant species have an indicator status of OBL or FACW?			Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
<b>Dominance Test:</b>	Number of dominant species	Number of dominant species that are wetland indicator plants	Do wetland indicator plants make up ≥ 50% of dominant plant species?	
	7	3	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
<b>Prevalence Index:</b>		Total % Cover (all strata)	Multiply by:	Result
	OBL species		X 1	= 0.00
	FACW species		X 2	= 0.00
	FAC species		X 3	= 0.00
	FACU species		X 4	= 0.00
	UPL species		X 5	= 0.00
	Column Totals	(A) 0		(B) 0
Prevalence Index		B/A =		Is the Prevalence Index ≤ 3.0?
				Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>Wetland vegetation criterion met?</b>			Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>

**Definitions of Vegetation Strata**

- Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height
- Shrub / Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall
- Herb - All herbaceous (non-woody plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall
- Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

Cover Ranges	
Range	Midpoint
1-5 %	3.0 %
6-15 %	10.5 %
15-25 %	20.5 %
26-50 %	38.0 %
51-75 %	63.0 %
76-95 %	85.5 %
96-100 %	98.0 %



**SOIL**

<b>Profile Description:</b> (Describe to the depth needed to document the indicator or confirm the absence of indicators)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Location <sup>2</sup>		
4.00	10 YR 2/1	0.0%		0.0%			SL	A Horizon
4.00	10 YR 3/3	0.0%		0.0%			SL	Bw1 Horizon
8.00	10 YR 4/6	0.0%		0.0%			SL	Bw2 Horizon
		0.0%		0.0%				
		0.0%		0.0%				
		0.0%		0.0%				
		0.0%		0.0%				
		0.0%		0.0%				
		0.0%		0.0%				
		0.0%		0.0%				

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains      <sup>2</sup>Location: PL=Pore Lining, M=Matrix

<b>Hydric Soil Indicators</b> (Check all that apply)		<b>Indicators for Problematic Hydric Soils</b>
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Polyvalue Below Surface (S8)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Thin Dark Surface (S9)	<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Dark Surface (S7)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Polyvalue Below Surface (S8)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Thin Dark Surface (S9)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F7)	<input type="checkbox"/> Iron-Manganese Masses (F12)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F8)	<input type="checkbox"/> Mesic Spodic (A17)
<input type="checkbox"/> Sandy Mucky Mineral (S1)		<input type="checkbox"/> Red Parent Material (F21)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)		<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Sandy Redox (S5)		<input type="checkbox"/> Other (Include Explanation in Remarks)
<input type="checkbox"/> Stripped Matrix (S6)		
<input type="checkbox"/> Dark Surface (S7)		

**Restrictive Layer (if observed)**    Type: \_\_\_\_\_    Depth (inches): \_\_\_\_\_

Remarks: Plot located on upland side of IVW. Topography slopes gently upgradient from the wetland boundary.

**Hydric Soils criterion met?**      Yes     No

**BORDERING VEGETATED WETLAND DETERMINATION FORM**

Project/Site: 9 Signal Hill Lane City/Town: Chilmark Sampling Date: May 23, 2023

Applicant/Owner: Santiago Realty Trust Sampling Point or Zone: Transect 1, Plot 2

Investigator(s): Mark Manganello Latitude / Longitude: 41 19' 33.45" N/70 46' 59.17"W

Soil Map Unit Name: Eastchop Loamy Sand NWI or DEP Classification: Freshwater Forested/Shrub

Are climatic/hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks)

Are Vegetation , Soil , or Hydrology  significantly disturbed? (If yes, explain in Remarks)

Are Vegetation , Soil , or Hydrology  naturally problematic? (If yes, explain in Remarks)

**SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.**

Wetland vegetation criterion met?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydic Soils criterion met?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Wetlands hydrology present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		

Remarks, Photo Details, Flagging, etc.:  
 Sampling location on upland side of IVW located partially off-site. Very dense thicket conditions.

**HYDROLOGY**

<b>Field Observations:</b>			
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches)	_____
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches)	_____
Saturation Present (including capillary fringe)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches)	_____

<b>Wetland Hydrology Indicators</b>		
Reliable Indicators of Wetlands Hydrology	Indicators that can be Reliable with Proper Interpretation	Indicators of the Influence of Water
<input type="checkbox"/> Water-stained leaves	<input type="checkbox"/> Hydrological records	<input type="checkbox"/> Direct observation of inundation
<input type="checkbox"/> Evidence of aquatic fauna	<input type="checkbox"/> Free water in a soil test hole	<input type="checkbox"/> Drainage patterns
<input type="checkbox"/> Iron deposits	<input type="checkbox"/> Saturated soil	<input type="checkbox"/> Drift lines
<input type="checkbox"/> Algal mats or crusts	<input type="checkbox"/> Water marks	<input type="checkbox"/> Scoured areas
<input type="checkbox"/> Oxidized rhizospheres/pore linings	<input type="checkbox"/> Moss trim lines	<input type="checkbox"/> Sediment deposits
<input type="checkbox"/> Thin muck surfaces	<input type="checkbox"/> Presence of reduced iron	<input type="checkbox"/> Surface soil cracks
<input type="checkbox"/> Plants with air-filled tissue (aerenchyma)	<input type="checkbox"/> Woody plants with adventitious roots	<input type="checkbox"/> Sparsely vegetated concave surface
<input type="checkbox"/> Plants with polymorphic leaves	<input type="checkbox"/> Trees with shallow root systems	<input type="checkbox"/> Microtopographic relief
<input type="checkbox"/> Plants with floating leaves	<input type="checkbox"/> Woody plants with enlarged lenticels	<input type="checkbox"/> Geographic position (depression, toe of slope, fringing lowland)
<input type="checkbox"/> Hydrogen sulfide odor		

Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):  
 IVW occurs in a shallow topographic depression on a hill side extending from elevation 44.0 down to the shoreline of a Salt Pond. The depression is located between elevation 8.0 and 10.0.

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

**VEGETATION** – Use both common and scientific names of plants.

<u>Tree Stratum</u>		Plot size <u>30-feet</u>			
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indicator? (yes/no)
1. Eastern Red Cedar	<i>Juniperus virginiana</i>	FACU	20.5	Yes	No
2. Staghorn Sumac	<i>Rhus typhina</i>	FACU	10.5	Yes	No
3.					
4.					
5.					
6.					
7.					
8.					
9.					
<u>31.0</u> = Total Cover					
<u>Shrub/Sapling Stratum</u>		Plot size <u>15-feet</u>			
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indicator? (yes/no)
1. Sweet Pepperbush	<i>Clethra alnifolia</i>	FAC	20.5	Yes	Yes
2. Arrowwood	<i>Viburnum dentatum</i>	FAC	20.5	Yes	Yes
3. Virginia Rose	<i>Rosa virginiana</i>	FACU	3.0	No	No
4. Arrowwood	<i>Viburnum dentatum</i>		20.5		
5.					
6.					
7.					
8.					
9.					
<u>44.0</u> = Total Cover					
<u>Herb Stratum</u>		Plot size <u>5 feet</u>			
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indicator? (yes/no)
1. Sweet Pepperbush	<i>Clethra alnifolia</i>	FAC	20.5	Yes	No
2. Black Cherry seedling	<i>Prunus serotina</i>	FACU	10.5	Yes	No
3. Goldenrod	<i>Solidago</i> spp.	FACU	10.5	Yes	No
4. Raspberry	<i>Rubus</i> spp.	FACU	3.0	No	No
5. Virginia creeper	<i>Parthenocissus quinquefolia</i>	FACU	3.0	No	No
6.					No
7.					No
8.					No
9.					No
10.					No
11.					No
12.					No
<u>47.5</u> = Total Cover					

**VEGETATION** – continued.

<u>Woody Vine Stratum</u>		Plot size <u>N/A</u>		Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indicator? (yes/no)
Common name		Scientific name					
1.	Common Greenbrier	Smilax rotundifolia			10.5		
2.							
3.							
4.							
				0.0 = Total Cover			

<b>Rapid Test:</b> Do all dominant species have an indicator status of OBL or FACW?			Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
<b>Dominance Test:</b>	Number of dominant species	Number of dominant species that are wetland indicator plants	Do wetland indicator plants make up ≥ 50% of dominant plant species?	
	7	3	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
<b>Prevalence Index:</b>		Total % Cover (all strata)	Multiply by:	Result
	OBL species		X 1	= 0.00
	FACW species		X 2	= 0.00
	FAC species		X 3	= 0.00
	FACU species		X 4	= 0.00
	UPL species		X 5	= 0.00
	Column Totals	(A) 0		(B) 0
Prevalence Index		B/A =		Is the Prevalence Index ≤ 3.0?
				Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>Wetland vegetation criterion met?</b>			Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>

**Definitions of Vegetation Strata**

- Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height
- Shrub / Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall
- Herb - All herbaceous (non-woody plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall
- Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

Cover Ranges	
Range	Midpoint
1-5 %	3.0 %
6-15 %	10.5 %
15-25 %	20.5 %
26-50 %	38.0 %
51-75 %	63.0 %
76-95 %	85.5 %
96-100 %	98.0 %

**SOIL**

<b>Profile Description:</b> (Describe to the depth needed to document the indicator or confirm the absence of indicators)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Location <sup>2</sup>		
4.00	10 YR 2/1	0.0%		0.0%			SL	A Horizon
4.00	10 YR 3/3	0.0%		0.0%			SL	Bw1 Horizon
8.00	10 YR 4/6	0.0%		0.0%			SL	Bw2 Horizon
		0.0%		0.0%				
		0.0%		0.0%				
		0.0%		0.0%				
		0.0%		0.0%				
		0.0%		0.0%				
		0.0%		0.0%				
		0.0%		0.0%				

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains      <sup>2</sup>Location: PL=Pore Lining, M=Matrix

<b>Hydric Soil Indicators</b> (Check all that apply)		<b>Indicators for Problematic Hydric Soils</b>
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Polyvalue Below Surface (S8)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Thin Dark Surface (S9)	<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Dark Surface (S7)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Polyvalue Below Surface (S8)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Thin Dark Surface (S9)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F7)	<input type="checkbox"/> Iron-Manganese Masses (F12)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F8)	<input type="checkbox"/> Mesic Spodic (A17)
<input type="checkbox"/> Sandy Mucky Mineral (S1)		<input type="checkbox"/> Red Parent Material (F21)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)		<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Sandy Redox (S5)		<input type="checkbox"/> Other (Include Explanation in Remarks)
<input type="checkbox"/> Stripped Matrix (S6)		
<input type="checkbox"/> Dark Surface (S7)		

**Restrictive Layer (if observed)**    Type: \_\_\_\_\_    Depth (inches): \_\_\_\_\_

Remarks: Plot located on upland side of IVW. Topography slopes gently upgradient from the wetland boundary.

**Hydric Soils criterion met?**      Yes     No

---

**Attachment C**

Photographs



Photo 1: Existing home and lawn area looking north.



Photo 2: Lawn area looking west toward pond. IVWs located within thicket beyond edge of lawn.



Photo 3: Existing grass path extending from lawn off-site.



Photo 4: Vegetation in wetland near edge of grass path.





Photo 5: Dense layer of skunk cabbage within C-series wetland.



Photo 6: Typical upland thicket conditions.



Photo 7: Salt Marsh and Beach along shoreline of Pond.



Photo 8: Salt Marsh and Dune area along shoreline of Pond.

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**Attachment C**

Photographs













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**Attachment D**

KleanTu Wastewater Treatment Technologies Letter



John R. Smith  
President  
[jsmith@kleantu.com](mailto:jsmith@kleantu.com)  
(412) 719-5976 - cell

February 7, 2024

Zoning Board of Appeals  
Town of Chilmark  
P.O. Box 119  
Chilmark, MA 02535

RE: S426 Santiago Realty Trust, 9 Signal Hill Lane, Map 34 Parcel 1.3, Chilmark, MA

Dear Board Members,

On behalf of the Santiago Realty Trust, I am writing to you to address whether a 7-bedroom NitROE® system releases less nitrogen than the 5-bedroom standard Title 5 system currently in use.

The answer is **YES**, with between **81 to 91 percent** less total nitrogen (TN) discharged to a leach-field by using a NitROE® system to treat a 7-bedroom house compared to a 5-bedroom standard Title 5 system.

This is based on KleanTu®'s experience after testing septic tank effluents monitored on over 70 individual systems, over multiple years, resulting in an average total nitrogen (TN) in the septic tank effluent of 100 mg/l. A Title 5 leach field should remove 25% of this TN, leaving 75 mg/l going from the leach field to the groundwater.

A 5-bedroom conventional Title 5 system has a design flow rate of 550 gallons per day (gpd). From our experience, the actual flow rate is less than this. For our calculation, we used half or 275 gpd flow rate as a conservative value. Using appropriate conversion factors, the TN discharge is **5.2 pounds per month** (lb./month) for 5-bedrooms and a Title 5 system.

A NitROE® system would reduce the total nitrogen in the septic tank effluent by 90-95%, before the leach field based on the monitoring of over 70 individual systems. That is, a NitROE® system effluent, prior to a leach field, would discharge between 5 mg/l - 10 mg/l TN on average, with a septic tank effluent of 100 mg/l TN. As such, using the same calculation approach of half of the design flow rate of 385 gpd, i.e., half of 770 gpd, a 7-bedroom NitROE® system would discharge to the leach field only **0.5 - 1 lb./month** TN on average. Therefore, a NitROE® system for 7 bedrooms should reduce the TN discharge from this residence by **81-91%** over the current discharge rate of the 5-bedroom Title 5 system.

Let me know if you have questions or want more information.

Sincerely,

*John Smith*