LANDTECH

Civil & Structural Engineers
Environmental Engineers & Scientists
Site Planners
Permit Coordination & Management
Construction Management
Construction Finance

Third Annual Monitoring Report
Tidal Wetland Restoration
159 Long Neck Point Road, Darien, CT
NAE-2007-1130

December 15, 2014

1) Project Overview

This is the third year of a five year monitoring program designed to monitor the restoration of an approximate ¼± acre tidal wetland within a protected cove at 159 Long Neck Point Road in Darien, CT.

A monoculture of common reed (*Phragmites australis*) had taken over the tidal wetland along the southwestern shoreline of Ziegler's Cove in Darien, CT. The Phragmites population was approximately ¼ acre in size and situated along the northern side of a stone wall associated with an access way to Hay Island and west of a residential wooden dock.

The objective of the tidal restoration plan was to employ all practical efforts to control the Phragmites population within the tidal restoration area and to allow a stable population of native shoreline vegetation to establish naturally. This included the application of herbicide and the removal of accumulated sediment to lower the substrate elevation up to 18 inches to restore tidal flushing. This restoration activity was conducted as compensation for the construction of an adjacent residential dock to the east and to restore the wetland's functions and aesthetics. Photographs prior to and after the physical restoration activity are located in Appendix C.

This restoration plan was approved by the USACE in permit NAE-2007-1130 on December 15, 2010 and by the then named Connecticut Department of Environmental Protection under permit 201101116-KR dated June 17, 2011. Mitigation success shall be achieved after: the 5 year mitigation monitoring, the implementation of any corrective measures, the submittal of any needed mitigation monitoring reports, and a final wetland assessment.

This year's monitoring found the continued natural colonization of the Spartina population in the restoration area. The Phragmite population was drastically reduced. A small isolated population of stressed Phragmites was observed during the spring inspection but was not present during the fall visit. No major issues were observed.

2) Requirements

The restoration plan consists of four components: A) herbicide application and physical removal of *Phragmites australis*; B) lowering of the substrate by 12-18" to provide tidal flushing allowing brackish water to flow into the tidal wetland and over the former Phragmites population; C) planting of native shrub species within the narrow area along the stone wall to accelerate colonization of native species and, D) monitoring of the restoration area for 5 years.

Components A and B were completed in 2011, shrub planting (Component C) was conducted in August 2012. The monitoring phase began in the fall of 2012 and will continue until the fall of 2016.

As stated in the 2012 report, item C (native shrub planting) was re-evaluated. The planted native shrubs did not do well as much of the area was too wet now that the area was lowered. We decided last year that it would be better to wait until 2015 to see if native vegetation establishes naturally and then make a decision on whether replanting is necessary.

The 2014 data continue to show a successful restoration of the wetland. The Spartina population has grown more dense and has spread slightly using existing seed sources. Stem counts from the test and control plots are presented in the Summary Data section. Photos showing the recolonization are presented in Appendix C.

During the spring visit, the invasive Phragmites population was reduced to a small isolated area along the southern wall. This population was not present during the fall inspection. The entire wetland will be re-inspected during the 2015 growing season to see if this population has been controlled or if a last spot treatment is necessary.

3) Summary Data

Site visits to inspect the progress of the restoration effort were conducted on May 27 and October 2, 2014.

During the May27th site visit, the *Spartina alterniflora* population covered approximately 60% of the restoration area. A small depression located in the southwestern portion of the restoration area continued to support little to no Spartina growth. The Phragmites population was severely stressed (brown and approximately 4 feet high) or dead within 10 to 15 feet of the wall. A small lobe of the population encroached further north along the edge of the depression.

October 2, 2014 – The invasive Phragmites population was dead, some stalks remained but no seed heads were present. Spartina density within the 2 one square meter test plots were reinspected. The stake from the control plot was missing but since it was in a mature and established population, we don't expect to see much variability year to year. Therefore we will not be creating a new control station.

The number of Spartina stems and fiddler crab burrows were counted in each of the test and control plots. The results are presented below.

Test plot 1. Test plot #1 continued to support a monoculture of *Spartina alterniflora*. The visible coverage within the plot was approximately 75% which was an increase from last year's 50%. The one square meter plot contained approximately 168± Spartina stems and 31± fiddler crab burrows.

Test plot 2. This plot contained 108± Spartina stems (an approximate 40% coverage) and 15 fiddler crab burrows.

Control plot. The control plot contained an established population of Spartina. The plants were slightly taller than the test plots and contained 140± stems in 2013 with a visual coverage of approximately 70% coverage.

Table 1. Spartina Density Comparison

Plot	**2013**	**2014**
Test Plot 1 stems per m^2	98±	168±
Test Plot 2 stems per m^2	84±	108±
Control Plot stems per m^2	140±	

These plots will be re-inspected over the next two years to document the status of re-colonization by tidal vegetation.

No remedial actions were needed this year. Next year we plan to install plugs of Spartina within the slightly deeper area that has not been colonized. These plugs would be intended to accelerate the establishment of a Spartina population in this area.

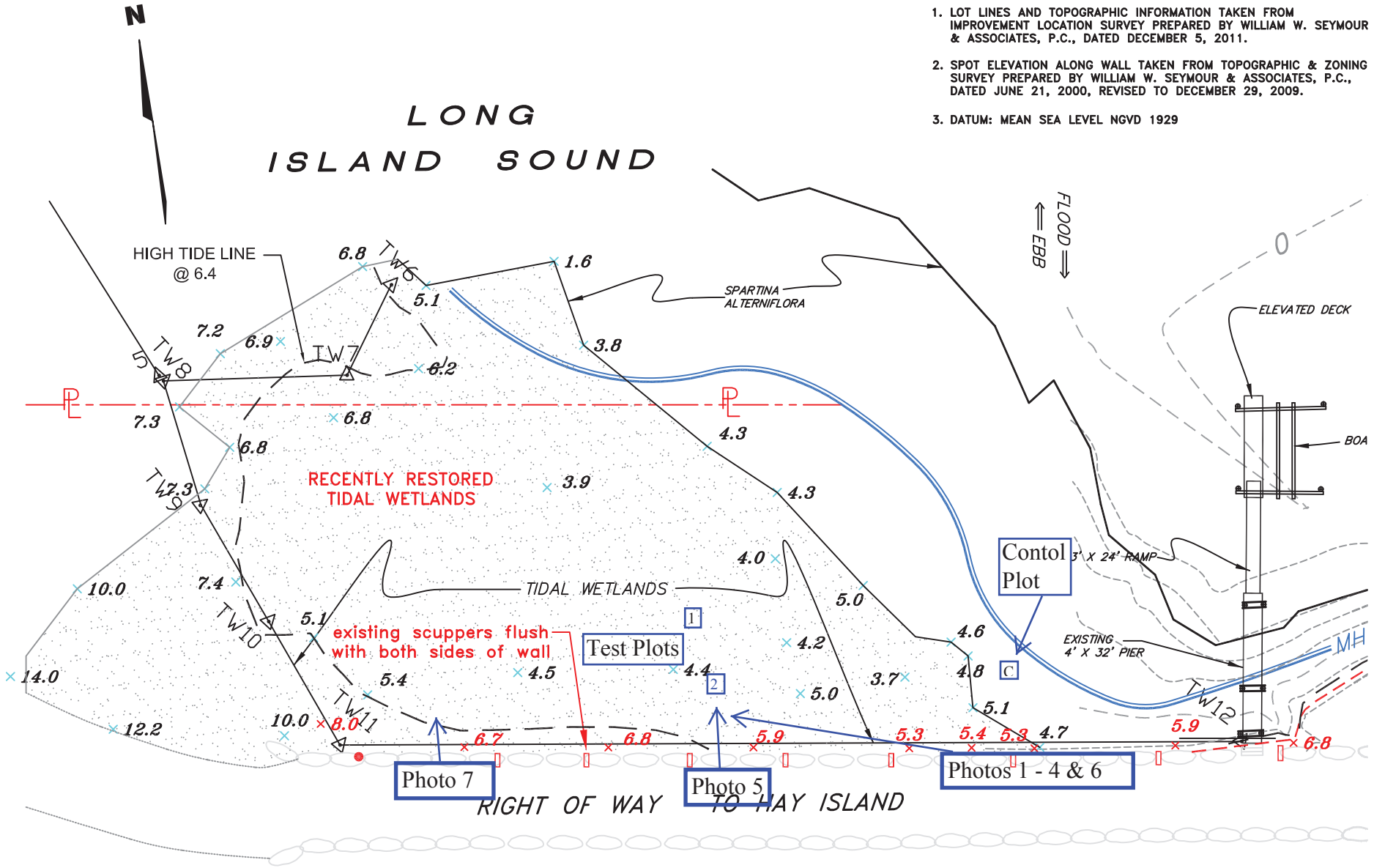
4) Maps/Plans

Approved Tidal Wetland Restoration Plan

Revised to Show Photograph Views and Plot Locations Referenced in Report.

NOTE:

1. LOT LINES AND TOPOGRAPHIC INFORMATION TAKEN FROM IMPROVEMENT LOCATION SURVEY PREPARED BY WILLIAM W. SEYMOUR & ASSOCIATES, P.C., DATED DECEMBER 5, 2011.
2. SPOT ELEVATION ALONG WALL TAKEN FROM TOPOGRAPHIC & ZONING SURVEY PREPARED BY WILLIAM W. SEYMOUR & ASSOCIATES, P.C., DATED JUNE 21, 2000, REVISED TO DECEMBER 29, 2009.
3. DATUM: MEAN SEA LEVEL NGVD 1929



DATUM CONVERSION CHART		
1929		1988
- 2.8	MLW	- 3.9
4.3	MHW	3.2
6.6	CJL	5.5

LANDTECH

Civil & Structural Engineers
Environmental Scientists
Permit Coordination
Construction Management
Construction Finance

31 Franklin Street Westport, Connecticut 06880 203-454-2110 Info@landtechconsult.com

PREPARED FOR: ROBERT MINICUCCI

PROJECT LOCATION: 159 LONG NECK POINT DARIEN, CT.

TITLE: **TIDAL RESTORATION MONITORING PLAN**

DATE: 9/13/13 | DWN. BY: JMS | DOC. NO.: 05-4430-01

SCALE: 1"=30' | CKD. BY: TSR | SHEET 1 OF 1

5) Conclusion

As with last year, this year's data show that the restoration area continues to be successful. The data collected from the 2012 through 2014 growing seasons show that the vast majority of the Phragmites population is under control with the exception of a narrow band along the waterward side of the wall which was only observed in the spring. This population was very stressed or dead during the fall inspection. This population will continue to be watched over the next two years.

The Spartina population continues to recolonize itself within the restoration area. The test plots showed a recolonization of 168 and 108 stems per square meter in this third growing season in comparison to both the 98 and 84 stems per square meter recorded last year and the 140 stems per square meter located in the undisturbed control plot. The data show that where the Spartina is establishing, it is doing well. There is however a relatively large area in the western portion of the restoration area where the Spartina has not recolonized (photo 6). We plan to accelerate the colonization of this area in 2015 through the installation of Spartina plugs. This activity will be reported in next year's report.

6) Appendices

Appendix C – Site Photos
Appendix E – Mitigation Report Transmittal and Self-Certification
Appendix F – Mitigation Report Project Overview Form

Appendix C

Site Photos.

Photo 1 – Tidal restoration area facing west. Photo Taken January 6, 2011 Prior to Restoration Work. Photo shows Phragmites Population and Ground Elevation.

Photo 2 – Phragmites Population in Tidal Restoration Area on July 26, 2011 after Initial Herbicide Application but Prior to Regrading.

Photo 3 - Post Restoration, Facing West on November 28, 2012.

Photo 4 – Spartina Starting to Recolonize the Wetland on September 13, 2013.
Phragmites Population Present along Waterward Side of Wall.

Photo 5 – Facing North on September 13, 2013. Phragmites Along Wall in Foreground, Recolonizing Spartina population in Middle and Undisturbed Spartina Population in Background. Stake for Test Plot #2 is Observable Just Beyond the Phragmites Population.

Photo 6 – Facing West on October 2, 2014. Dead Phragmites Located Along Wall in Upper Left of Photo.

Photo 7 - Western Portion of Wetland Facing North on October 2, 2014. Dead Phragmites in Foreground. Spartina Slowly Colonizing the Lower Elevation areas in middle of Photo.

APPENDIX E

MITIGATION REPORT
TRANSMITTAL AND SELF-CERTIFICATION

DEPARTMENT OF THE ARMY PERMIT NUMBER: NAE-2007-1130
PROJECT TITLE: Tidal Wetland Restoration - 159 Long Neck Point Road, Darien, CT

PERMITTEE: Robert Minicucci
MAILING ADDRESS: 159 Long Neck Point Road, Darien, CT 06820

TELEPHONE:

AUTHORIZED AGENT: LandTech, Inc.
MAILING ADDRESS: 31 Franklin Street
Westport, CT 06880

TELEPHONE: 203-454-2110

ATTACHED MITIGATION REPORT
TITLE: Third Annual Monitoring Report
Tidal Wetland Restoration 159 Long Neck Point Road, Darien, CT
NAE-2007-1130

PREPARERS: Thomas Ryder, LandTech, Inc.

DATE: December 15, 2014

CERTIFICATION OF COMPLIANCE: I certify that the attached report is accurate and discloses that the mitigation required by the Department of the Army Permit **[is]** ~~**[is not]**~~ in full compliance with the terms and conditions of that permit.

CORRECTIVE ACTION: A need for corrective action ~~**[is]**~~ **[is not]** identified in the attached report.

CONSULTATION: I **[do]** ~~**[do not]**~~ request consultation with the Corps of Engineers to discuss a corrective strategy or permit modification.

CERTIFIED: Thomas Ryder authorized agent for 12-15-14
(Signature of permittee) Robert Minicucci Date

APPENDIX F

MITIGATION REPORT
PROJECT OVERVIEW FORM

Corps Permit No.: NAE-2007-1130
Mitigation Site Name(s): 159 Long Neck Point Road, Darien, CT
Monitoring Report: 3 of 5
Name and Contact Information for Permittee and Agent:
Permittee: Robert Minicucci, 159 Long Neck Point Road, Darien, CT
Agent: LandTech, 31 Franklin Street, Westport, CT 06880
Name of Party Responsible for Conducting the Monitoring:
Thomas Ryder of LandTech.

Date(s) of Inspection(s): June 27 and October 2, 2014

Project Summary:

Restore an approximate 1/4 acre tidal wetland which has been over taken by invasive species. Restoration includes lowering the area by 12" to 18", applying herbicide to the invasive population and monitor area for 5 years.

Location of and Directions to Mitigation Site(s): From I-95, take exit 11 to Route 1 south. Travel 1 mile and turn left on Rings End Road. At end of road, turn right onto Goodwives River Road, then veer left on to Long Neck Point Road. Go 0.7± miles to subject site on left.
Start and Completion Dates for Mitigation:
Sediment removal and initial application of herbicide was conducted in 2011. Followup application of herbicide was conducted in 2013.
Performance Standards (**are**) / **are not** being met:

This year inspections found that *Spartina alterniflora* and other native tidal wetland vegetation are continuing to recolonize the wetland covering approximately 60% of the area.

Dates of Corrective or Maintenance Activities Conducted Since Last Report:
No corrective measures were required.

Recommendations for Additional Remedial Actions:

We will be inserting plugs of Spartina alterniflora into the western portion of the restoration area which is slow to colonize.