Grant Information

Title of Project
Pamet River Restoration Project, Truro, MA

Total Amount Requested	$ 2,406,000.00
Matching Contributions Proposed	$ 236,525.00
Proposed Grant Period	06/02/ 2014 - 12/31/ 2015

Project Description
Three coastal wetland restoration and resiliency projects in the Pamet River Estuary comprised by 158-acres of Upper Pamet floodplain, 13-acre in Mill Pond and 16-acres in Eagle Neck Creek.

Project Abstract
The Pamet River Restoration Project is comprised of three distinct coastal wetland restoration opportunities within the Pamet River Estuary, Truro, MA. This proposal seeks funding to implement 1) development of a two-dimensional hydrodynamic model and evaluate alternatives for restoring tidal flow and reducing coastal flood impacts within the 158-acre Upper Pamet flood plain; 2) completion of the final engineering design, environmental permitting and compliance, and construction of a three-sided-culvert sized appropriately for tidal conditions to restore 16 acres of estuarine wetlands within the Eagle Neck Creek site; 3) translation of completed hydrology investigations at Mill Pond into engineering designs and obtain all environmental permitting and compliance to facilitate future implementation of this 13-acre restoration project; and 4) execution of a salt marsh Habitat Sustainability Assessment at Eagle Neck Creek intended to monitor and quantify wetland resilience and ecosystem services including changes in water quality, wetland productivity, soil accretion, and carbon storage. Project benefits include reduction of environmental and economic damage of wetlands and infrastructure resulting for storm damage, restored coastal wetland habitat and increased long term coastal resiliency by affording the opportunity for landward migration of estuarine wetlands in the face of expected increases in sea level.

Organization and Primary Contact Information

Organization	Town of Truro
Organization Type	State or Local Government
Organization Web Address	www.truro-ma.gov
Organization Phone	
Street Line 1	
Street Line 2	
City, State, Country, Postal Code	Truro,Massachusetts,North America - United States
Region (if international)	
Organization Congressional District	District 9 (MA)
Primary Contact	Mrs. Charleen L. Greenhalgh
Position/Title	Assistant Town Administrator/Planner

Street Line 1	P.O. Box 2030
Street Line 2	24 Town Hall Road
City, State, Country, Postal Code	Truro, Massachusetts, North America - United States, 02666
Region (if international)	
Phone and E-mail	508-349-7004 x 27; assttownadm@truro-ma.gov
Keywords	Conservation Action; Conservation Threat; Major Habitat Type; Other; Species
Sub-keywords	Action - Education & Awareness; Action - External Capacity Building; Action - Land/Water Management; Action - Land/Water Protection; Action - Livelihood, Economic & Other Incentives; Action - Species Management; Coastal - Coastal beaches, dunes and shoreline; Coastal - Estuaries and Bays; Fish - Alosa aestivalis (Blueback herring); Fish - Alosa pseudoharengus (Alewife); Marine - Continental shelf/nearshore; Other; Species - Fish; Species - Plant; Threat - Agriculture & Aquaculture; Threat - Biological Resource Use; Threat - Climate Change & Severe Weather; Threat - Geological Events; Threat - Human Intrusions & disturbance; Threat - Invasive & Other Problematic Species & Genes; Threat - Natural System Modifications; Threat - Pollution; Threat - Residential & Commercial Development; Threat - Transportation & Service Corridors
Other Keyword(s)	Coastal Resiliency, Storm Damage Protection

Project Location Information

Project Location Description	Pamet Rivert Restoration project is located within Barnstable County, Truro, MA, Pamet River Watershed, within the Cape Cod Watershed. Latitude is 41.9940148 and Longitude is -70.05224780000003
Project Country(ies)	North America - United States
Project State(s)	Massachusetts
Project Congressional District(s)	District 9 (MA)

Permits and Approvals

Permits/Approvals Description:	Massachusetts Environmental Policy Act (MEPA) Certification - The MEPA requires that state agencies study the environmental consequences of their actions, including permitting and financial assistance. MEPA review occures before permitting agencies act, to ensure tht they are fully congizant of envirmonmental consequestes of their review. Eagle Neck Creek
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	MA Executive Office of Energy and Env. - Deirdre Buckly
Permits/Approvals Submittal-Approval Date:	7/1/2014 12:00:00 AM
Permits/Approvals Description:	MassDOT Highway Access and Bridge Review - The construciton project site is not a state road; however a highway access permit will be requried and as the culvert width exceeds 10-ft, MassDOT bridge Review is also a requirement. Bridge review is completed in three phases -- 25%, 75% and 100% design phase review. We have initiated the 25% design phase review. For Eagle Neck Creek only.
Permits/Approvals Status:	Application Submitted
Permits/Approvals Agency-Contact Person:	MassDOT - Daniel Crovo
Permits/Approvals Submittal-Approval Date:	7/2/2012 12:00:00 AM
Permits/Approvals Description:	Massachusetts Wetlands Protection Act Review -- The Massachusetts Wetlands Protection Act is administered at the local (town) level and

	a Notice of Intent will be reviewed by the Truro Conservation Commission. Eagle Neck Creek.
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	Truro Conservation Agent - Patricia Pajaron
Permits/Approvals Submittal-Approval Date:	7/1/2014 12:00:00 AM
Permits/Approvals Description:	Massachusetts Environmental Policy Act (MEPA) Certification - The MEPA requires that state agencies study the environmental consequences of their actions, including permitting and financial assistance. MEPA review occures before permitting agencies act, to ensure tht they are fully congizant of envirmonmental consequestes of their review. Mill Pond.
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	MA Executive Office of Energy and Env. - Deirdre Buckly
Permits/Approvals Submittal-Approval Date:	2/2/2015 12:00:00 AM
Permits/Approvals Description:	Massachusetts Wetlands Protection Act Review -- The Massachusetts Wetlands Protection Act is administered at the local (town) level and a Notice of Intent will be reviewed by the Truro Conservation Commission. Mill Pond.
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	Truro Conservation Agent - Patricia Pajaron
Permits/Approvals Submittal-Approval Date:	2/2/2015 12:00:00 AM
Permits/Approvals Description:	401 Water Quality Permit - The purpose of §401 Clean Water Act (CWA) is for states to use its pocess to ensure that no federal license or permit authorizes an activity that would violate the state's water quality standards or become a future source of pollution. This project requires 401 Water Quality review for water-dependent activity (construction) resulting in discharge of dredge material into a waterway dependent discharge of dredge material. Eagle Neck Creek.
Permits/Approvals Status:	Intend to Apply

Permits/Approvals Agency-Contact Person:	MA Dept. Environmental Protection - Elizabeth Koulohera
Permits/Approvals Submittal-Approval Date:	7/1/2014 12:00:00 AM
Permits/Approvals Description:	Chapter 91 License - The Commonwealth's primary tool for protection and promotion of pucli use of its tidelands and other waterways is Massachusetts General Law Chapter 91, the waterways licensing program. The oldest program of its kind in the nation, Chapter 91 regulates activities on both coastal and inland waterways, including construction, dredging and filling in tidelands, great ponds and certain rivers and streams. Eagle Neck Creek.
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	MA Dept. Environmental Protection - Karen Adams
Permits/Approvals Submittal-Approval Date:	7/1/2014 12:00:00 AM
Permits/Approvals Description:	MA CZM Federal Consistency Review - The Coastal Zone Management Act gives states the authority to review federal projects to ensure that the meet state standards articulated in their coastal zone management plans through a process called federal consistency review. Eagle Neck Creek.
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	MA Office of Coastal Zone Management - Robert Boeir
Permits/Approvals Submittal-Approval Date:	7/1/2014 12:00:00 AM
Permits/Approvals Description:	Section 404 Category 2 General Permit - Section 404 of the Clean water Act (CWA) establishes a prgram to regulated the discharge of dredged or fille material into waters of the United States, includeing wetlands. §404 requires a permit before dredged or fill material may be dicharded into waters of the United States, unless the activing is exempt from Section 404 regulation (e.g. certain farming and forestry activities). Eagle Neck Creek.
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	US Army Corps of Engineers - Richard Kristoff

Permits/Approvals Submittal-Approval Date:	7/1/2014 12:00:00 AM
Permits/Approvals Description:	Section 404 Category 2 General Permit - Section 404 of the Clean water Act (CWA) establishes a prgram to regulated the discharge of dredged or fille material into waters of the United States, includeing wetlands. §404 requires a permit before dredged or fill material may be dicharded into waters of the United States, unless the activing is exempt from Section 404 regulation (e.g. certain farming and forestry activities). Mill Pond.
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	US Army Corps of Engineers - Richard Kristoff
Permits/Approvals Submittal-Approval Date:	2/2/2015 12:00:00 AM
Permits/Approvals Description:	401 Water Quality Permit - The purpose of §401 Clean Water Act (CWA) is for states to use its pocess to ensure that no federal license or permit authorizes an activity that would violate the state's water quality standards or become a future source of pollution. This project requires 401 Water Quality review for water-dependent activity (construction) resulting in discharge of dredge material into a waterway dependent discharge of dredge material. Mill Pond.
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	MA Dept. Environmental Protection - Elizabeth Koulohera
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Permits/Approvals Status:	Intend to Apply

Permits/Approvals Agency-Contact Person:	MA Dept. Environmental Protection - Karen Adams
Permits/Approvals Submittal-Approval Date:	2/2/2015 12:00:00 AM
Permits/Approvals Description:	MA CZM Federal Consistency Review - The Coastal Zone Management Act gives states the authority to review federal projects to ensure that the meet state standards articulated in their coastal zone management plans through a process called federal consistency review. Mill Pond
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	MA Office of Coastal Zone Management - Robert Boeir
Permits/Approvals Submittal-Approval Date:	2/2/2015 12:00:00 AM
Permits/Approvals Description:	MA Historic Commission Project Notification and Section 106 Historic Review. State and federal project involvment require review by the Massachusetts Historical Commission (MHC) and for compliance with Section 106 of the National Historic Preservation Act of 1966. Eagle Neck.
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	Massachusetts Historical Commission - Jonathan Patton
Permits/Approvals Submittal-Approval Date:	7/1/2014 12:00:00 AM
Permits/Approvals Description:	MA Historic Commission Project Notification and Section 106 Historic Review. State and federal project involvment require review by the Massachusetts Historical Commission (MHC) and for compliance with Section 106 of the National Historic Preservation Act of 1966. Mill Pond.
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	Massachusetts Historical Commission - Jonathan Patton
Permits/Approvals Submittal-Approval Date:	2/2/2015 12:00:00 AM
Permits/Approvals Description:	NEPA Compliance - Constructing funding through NFWF/Sandy will require review under the National Enviormental Police Act (NEPA). The Town of Truro and its

	partners will work with the lead Federal agency to prepare required documents (EA) for NEPA Review. For Eagle Neck Creek only.
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	US Dept. of Interior - TBD
Permits/Approvals Submittal-Approval Date:	7/1/2014 12:00:00 AM
Permits/Approvals Description:	MA Endangered Species Act Review - The project falls within state-designated Priority Habitat and Estimated Habitat for Rare Wildlife and will therefore require a permit under the MA Endangered Species Act. MESA Project Review will be submitted simultaneously with the Notice of Intent as allowed under the streamlined review process. Eagle Neck.
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	MA NHESA - TBD
Permits/Approvals Submittal-Approval Date:	7/1/2014 12:00:00 AM
Permits/Approvals Description:	MA Endangered Species Act Review - The project falls within state-designated Priority Habitat and Estimated Habitat for Rare Wildlife and will therefore require a permit under the MA Endangered Species Act. MESA Project Review will be submitted simultaneously with the Notice of Intent as allowed under the streamlined review process. Mill Pond.
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	MA NHESA - TBD
Permits/Approvals Submittal-Approval Date:	2/2/2015 12:00:00 AM

Salaries and Benefits

	Units	Cost Per Unit	Total
Upper Pamet - Research	2	$24,000.00	$48,000.00

Total Salaries and Benefits			**$48,000.00**
To hire seasonal research staff to support the Upper Pamet Hydrodynamic Modeling			

Equipment

	Units	Cost Per Unit	Total

Total Equipment			**$0.00**

Contractual Services

	Units	Cost Per Unit	Total
Upper Pamet Hydrodynamic Modeling	1	$150,000.00	$150,000.00
Eagle Neck Final Design and Permitting	1	$180,000.00	$180,000.00
Eagle Neck Bid Assembly	1	$10,000.00	$10,000.00
Eagle Neck Construction CCCD Project Management	1	$40,000.00	$40,000.00
Eagle Neck Construction Mgmt and OVS	1	$50,000.00	$50,000.00
Eagle Neck Creek Marsh Sustainability Assessment	1	$300,000.00	$300,000.00
Eagle Neck Construction	1	$1,375,000.00	$1,375,000.00
Mill Pond - DOT Scour Analysis	1	$50,000.00	$50,000.00

	Units	Cost Per Unit	Total
Mill Pond Full Design	1	$125,000.00	$125,000.00
Mill Pond Permitting	1	$50,000.00	$50,000.00
Mill Pond Project Mangement CCCD	1	$20,000.00	$20,000.00

Total Contractual Services			**$2,350,000.00**
Contractual Costs to hire a consultants and or CCCD to manage and advance Hydrodynamic Modeling at Upper Pamet; Designs, Permitting and Construction at Eagle Neck Creek; and Designs and Permitting at Mill Pond.			

Supplies and Materials

	Units	Cost Per Unit	Total
Eagle Neck Creek Sensors	10	$800.00	$8,000.00

Total Supplies and Materials			**$8,000.00**
Eagle Neck Creek Sensors will be used to collect data in support of the Eagle Neck Creek Sustainability Project.			

Printing

	Units	Cost Per Unit	Total

Total Printing			**$0.00**

Travel

	Units	Cost Per Unit	Total

Total Travel			**$0.00**

Other

	Units	Cost Per Unit	Total

Total Other			**$0.00**

Budget Grand Total			**$2,406,000.00**

Matching Contributions

Matching Contribution Amount:	$52,525.00
Type:	In-kind
Status:	Pledged
Source:	Town of Truro
Source Type:	Non-Federal
Description:	This Match includes staff salaries for time to be spent managing the Project, including DPW, Assistant Administrator, and Town Accountant.

Matching Contribution Amount:	$59,000.00
Type:	Cash
Status:	Received
Source:	DER
Source Type:	Non-Federal
Description:	DER used capital budget to hire contract consultants to complete Eagle Neck Creek Modeling and Design

Matching Contribution Amount:	$125,000.00
Type:	Cash
Status:	Received
Source:	Town of Truro
Source Type:	Non-Federal
Description:	Town has committed $125,000 toward Eagle Neck Construction

Total Amount of Matching Contributions $236,525.00

Activities and Outcomes

Funding Strategy: Capacity, Outreach, Incentives
Activity / Outcome: Sandy - Economic benefits - # jobs created
Description: Enter the number of jobs created
Required: Recommended
jobs created - Current: 0
jobs created - Grant Completion: 30.2
Notes: This project is projected to create 30.2 jobs and $4,228,000 in economic output per MA DER's Report on the economic benefits of Restoration: http://tinyurl.com/o2lacjk

Funding Strategy: Habitat Restoration
Activity / Outcome: Sandy - Fish passage improvements - # passage barriers rectified
Description: Enter the number of fish passage barriers rectified
Required: Recommended
passage barriers rectified - Current: 3
passage barriers rectified - Grant Completion: 1
Notes: This grant addresses 3 tidal restrictions that create barriers to fish passage. At the end of the grant, alternatives will be identified for the Upper Pamet, a new non-restrictive culvert will be installed at Eagle Neck Creek, and the culvert at Mill Pond will be prepared with final designs and permits in advance of construction.

Funding Strategy: Habitat Restoration
Activity / Outcome: Sandy - Erosion control - # structures installed
Description: Enter the number of structures installed, replaced, upgraded or repaired to reduce erosion or wetland/marsh lost.
Required: Recommended
structures installed - Current: 3.00
structures installed - Grant Completion: 1.00
Notes: This Project addresses 3 structures at Upper Pamet, Eagle Neck Creek and Mill Pond. Eagle Neck Creek will be installed at the completion of this project, reducing tidal velocities and erosion to Eagle Neck Creek Marsh.

Funding Strategy: Habitat Restoration
Activity / Outcome: Sandy - Wetland restoration - Acres restored
Description: Enter the number of acres restored
Required: Recommended

Acres restored - Current: 0
Acres restored - Grant Completion: 16
Notes: This Project address the potential to restore 187 acres (158 Upper Pamet; 16 Eagle Neck Creek; 13 Mill Pond) and 16 acres will be directly restored at the completion of this project. Restored tidal hydrology at Eagle Neck Creek will be monitored after culvert installation.

Funding Strategy: Capacity, Outreach, Incentives
Activity / Outcome: Sandy - Outreach/ Education/ Technical Assistance - # people reached
Description: Enter the number of people reached by outreach, training, or technical assistance activities
Required: Recommended
people reached - Current: 0.00
people reached - Grant Completion: 104
Notes: Public Outreach will reach 85 property owners at Upper Pamet, 6 property owners at Eagle Neck Creek, 13 property owners at Mill Pond, and an unknown but larger number of staff and visitors that frequent the NPS properties these projects affect.

Funding Strategy: Capacity, Outreach, Incentives
Activity / Outcome: Sandy - Volunteer participation - # volunteers participating
Description: Enter the number of volunteers participating in projects
Required: Recommended
volunteers participating - Current: 0
volunteers participating - Grant Completion: 5
Notes: This project anticipates the participation of up to 5 youths, and an unknown number of veterans.

Funding Strategy: Planning, Research, Monitoring
Activity / Outcome: Sandy - Management or Governance Planning - # plans developed
Description: Enter the number of plans developed that had input from multiple stakeholders
Required: Recommended
plans developed - Current: 1
plans developed - Grant Completion: 2
Notes: The Eagle Neck Creek project was developed with stakeholder involvement in determining the final project design. At the end of this Project, the Upper Pamet will have a completed hydrodynamic model and alternatives for stakeholders to consider and choose the appropriate restoration action. At Mill Pond, completion of the scour analysis will allow stakeholders to choose the final restoration design and move forward with engineering plans.

Funding Strategy: Planning, Research, Monitoring
Activity / Outcome: Sandy - Research - # research studies completed
Description: Enter the number of research studies completed
Required: Recommended
research studies completed - Current: 0
research studies completed - Grant Completion: 2
Notes: At the Upper Pamet, the Hydrodynamic Assessment will be completed at the end of this study. At Eagle Neck Creek, this Project will support completion of the Sustainability Research Project.

The following pages contain the uploaded documents, in the order shown below, as provided by the applicant:

A-133 Audit
GAAP audited financial statements
IRS Form 990
Spatial Data
Statement of Litigation
Board of Trustees, Directors, or equivalent
Engineered Plans
Other Documents
Photos - Jpeg
Photos - Jpeg
Photos - Jpeg
Photos - Jpeg
Project Map
Hurrican Sandy Proposal Narrative
Letters of Support

The following uploads do not have the same headers and footers as the previous sections of this document in order to preserve the integrity of the actual files uploaded.

Hurricane Sandy Coastal Resiliency Competitive Grants Program
Full-proposal Project Narrative
Pamet River Restoration Project

A. Geographic Context:

The Pamet River is a 4.2 mile river that originates near barrier beach dunes at Ballston Beach on the Atlantic Ocean and flows west toward Cape Cod Bay across the outer Cape Cod town of Truro, Barnstable County, MA (See Map 1). In its natural condition, the river was dominated by diurnal tidal flow of saltwater and supported hundreds of acres of coastal wetlands and estuarine habitats. Similar to other river systems throughout the United States, the Pamet River has suffered from the impacts of development since colonial times, the most notable being the restriction of tides throughout the system as the result of historic transportation crossings. The focus of this funding request is to address three major tidal restrictions within the Pamet River system collectively under this Pamet River Restoration Project.

The three distinct coastal wetland restoration opportunities within the Pamet River system that comprise the Pamet River Restoration Project are known individually as the Upper Pamet River, Eagle Neck Creek, and Mill Pond Restoration Projects. The largest tidal restriction along the Pamet River occurs at the Upper Pamet River site, the result of a dike that was constructed (in 1869) across the river at its approximate mid-point, blocking salt water tidal flow into the upper reaches and effectively creating two distinct ecosystems – a salt water influenced estuary in the lower river on the downstream (western, or Cape Cod Bay) side of the dike and a freshwater system in the upper Pamet River (See Map 2). Subsequent road and rail crossings, including construction of U.S. Route 6 in the 1950s, combined with mosquito ditching and other alterations degraded the Upper Pamet further through the 19th and 20th centuries. Today, the National Park Service (NPS), through Cape Cod National Seashore (CCNS) is responsible for management of a majority of the Pamet River upstream of Route 6 and its associated former estuarine wetlands, an area of approximately 158 acres. The 16-acre Eagle Neck Creek project site is situated at a town-owned road crossing, Old County Road, and encompasses tidally restricted wetlands also located within CCNS (See Map 3). Mill Pond is a 13-acre site upstream of a tidally restricted culvert at Mill Pond Road (See Map 4).

Implementation of the Pamet River Restoration Project will benefit the Town by providing enhanced tidal drainage to the tidally restricted wetlands upstream at each of the three sites, buffering abutting residences and replaces deteriorated infrastructure thereby reducing flood risks to local landowners. Communities throughout and visitors to Cape Cod will benefit as these projects improve the sustainability and function of the coastal flood plain and reduce the flood-risk damage to an important secondary emergency evacuation route which serves not only the Town of Truro, but also the Town of Provincetown. If the main road, Route 6, is disrupted for any reason, this is the only alternative evacuation route available. Ecosystem restoration is a major goal for the NPS and salt marsh restoration in particular is a high priority at CCNS, which will benefit from restored natural resources and enhanced resiliency of coastal wetlands either directly within or adjacent to NPS boundaries.

B. Project Narrative:

a. Project Goals:

The goals of the Pamet River Restoration Project are to 1) restore the ecological integrity of coastal wetland habitats within the Pamet River Estuary for the benefit of natural fish and wildlife species they support, 2) enhance the resiliency and long-term stability of the coastal flood plain in light of future climate change and sea level rise 3) incorporate necessary infrastructure that is compatible with restoration efforts while still achieving storm damage protection and coastal storm resiliency to the built environment. This project will strengthen the native coastal salt marshes upstream of each respective restriction by restoring tidal hydrology and conditions that will support reestablishment of native salt marsh vegetation, improved fish and invertebrate access upstream, improved sediment transport to sediment starved and subsided marshes, and allow for the migration of wetlands in the face of expected sea level rise. This project reduces the vulnerability of these marshes and their related infrastructure and surrounding properties to risks from coastal storms by removing restrictions that impound stormwaters and reduce velocities that erode the marsh and undermine their respective crossings.

Project Objectives: The objectives of the Pamet River Restoration Project under this funding request are to 1) develop a two-dimensional hydrodynamic model and evaluate alternatives for restoring tidal flow and reducing coastal flood impacts within the 158-acre Upper Pamet flood plain; 2) complete the final engineering design, environmental permitting and compliance, and construction of a three-sided-culvert sized appropriately for tidal conditions to restore 16 acres of estuarine wetlands within the Eagle Neck Creek site; 3) translate completed hydrology investigations at Mill Pond into engineering designs and obtain all environmental permitting and compliance to facilitate future implementation of this 13-acre restoration project; and 4) conduct a salt marsh Habitat Sustainability Assessment at Eagle Neck Creek intended to

monitor and quantify wetland resilience and ecosystem services including changes in water quality, wetland productivity, soil accretion, and carbon storage.

Definition of Project Success: Project success will be defined by 1) completion of a two-dimensional hydrodynamic model for the Upper Pamet resulting in a report that details feasible alternatives to restoring tidal flow and mitigating associated flood and storm damage from repeated overwash events at Ballston Beach; 2) acquisition of final environmental permits and installation of the approved three-sided culvert at Eagle Neck Creek; 3) improved ecological functioning in 16 acres of historically degraded coastal wetlands at Eagle Neck Creek, confirmed via monitoring of tidal-hydrology, ecosystem processes, and quantification of habitat sustainability; and 4) completion of engineered design plans and acquisition of final environmental permits that will facilitate the future installation of a larger culvert designed to restore tidal flow and reduce related storm-damage risks upstream of Mill Pond Road at Mill Pond.

b. Priority:

Importance of Location / Need: The Pamet River is no exception when it comes to the stressors that have plagued riverine and estuarine systems since colonial times. In particular, the expansion of coastal developments and the associated construction of connecting transportation systems have played a significant role in the degradation of these habitats. When transportation crossings are improperly sized to convey the natural tidal flows that are the life-blood of the habitats upstream, the associated functions and values such as quality fish and wildlife habitat resilient to invasion and habitation conversion, flood protection, water quality purification, shoreline stabilization, groundwater recharge and stream stabilization are lost

The single-largest tidal restriction affecting the health and functioning of the Pamet River occurs along the Upper Pamet, where the system has been impacted by dikes and historic drainage activities since at least 1869. In response to a lack of daily tidal flow and salt water, the Upper Pamet has converted from a salt marsh to a largely freshwater wetland system with occasional incursion of upland plant species in some particularly well-drained areas. The headwaters of the Upper Pamet occur just beyond Ballston Beach, publicly owned by both NPS and the Town of Truro. Repeated overwash events of the beach have occurred historically (See Figures UP1, UP2), with deleterious effects after moderate to severe storm events in 1978, 1991, 1992, 2013, and 2014 (See Video: http://tinyurl.com/nlzd4dg , and recent news story: http://tinyurl.com/pc58xqx). Once the beach is breached, and ocean waters fill the Upper Pamet, drainage toward the receiving waters of Cape Cod Bay is severely limited by the undersized water control structures east of Route 6.

Flowing east and south of the Upper Pamet, Eagle Neck Creek is a 16-acre sub-basin and Mill Pond is a 13-acre sub-basin of the Pamet River Flood Plain. Eagle Neck Creek is tidally restricted by an 8-inch corrugated plastic pipe flowing under Old County Road (See Figure EN1). The channel at Mill Pond flows under Mill Pond Road via a restrictive 3-foot corrugated plastic pipe with both seaward and upstream openings submerged at mean high tide (See Figure MP1). An abandoned, breached railroad bed running across the Pamet estuary and its surrounding marshes lies seaward of these crossings. Storm tides eroded the railroad bed that was partially breached in the late1980s and finally by the no-name storm in 1991. Originally, after the breach, the Town replaced the Old County Road culvert with two, side by side, 3-foot culverts that also eventually failed due to additional storm damage, underlying soft peat and the sheer weight of the roadbed. Ultimately, Old County Road was replaced with an 8-inch diameter culvert and Mill Pond Road was repaired by raising the road and replacing the former culvert with the restrictive 3-foot culvert that exists today. Although saltwater has been reintroduced to some extent by the breach in the railroad bed, there is evidence of restricted flow at Eagle Neck Creek where Phragmites has invaded the upstream marsh (See Figure EN2) and the tidal restriction was measured (2011) between 1 and 3-feet depending on the daily cycle (See Figure EN3). At Mill Pond Road, evidence tidal restriction includes scour and erosion where the 10-15 foot wide stream must flow through the restrictive 3-foot diameter pipe and tides restricted between 2 and 3-feet depending on the daily tidal cycle (See Figure MP2).

The result of these three transportation-related crossings is the tidal restriction and degradation of over 187 acres of coastal wetlands within the Pamet River estuary as well as the continued threat of storm-related damage from flooding and impounded waters. Each of these former coastal wetland habitats upstream of their respective restrictions has suffered from the lack of daily natural tidal flow, conversion from estuarine to freshwater habitat, invasion by non-native species such as *Phragmites* (facilitated by reduction in natural salinities), reduction in water quality associated with lack of tidal flushing, erosion of substrate and scour of channels at the restrictive culverts, and subsidence from prolonged impounding of both storm surge and run-off. The unnatural impounding of storm related flooding over prolonged periods of time also presents a significant flood-risk to residences and infrastructure abutting each of these crossings. Overwash from repeated storm events at Ballston Beach threatens approximately 85 properties as impounded waters take weeks to drain (Portnoy, 2001). The erosion, scour, and impounding of waters at Eagle Neck Creek continue to pose a flood risk at Old County Road, a critical secondary evacuation route off-Cape in the event Route 6 is compromised. The restriction and

impounding and lack of natural tidal flow at Mill Pond also threaten both the integrity of Mill Pond Road as well as an additional 10+ properties upstream.

The Pamet River Restoration Project is recognized as a priority by numerous agencies and planning efforts. The Town has recognized the importance and value of salt marsh and wetland restoration, having consistently supported funding for such projects. Each of the three sites is a designated priority for restoration by the Cape Cod Commission's *The Cape Cod Atlas of Tidally Restricted Salt Marshes* (2001, see Upper Pamet-TR3 / TR4, Eagle Neck Creek-TR1, and Mill Pond-TR2, http://tinyurl.com/pa82k29). The MA Department of Fish and Game – Division of Ecological Restoration (DER) has designated Eagle Neck and Mill Pond as Priority Projects and previously committed over $125,000 in state funds to assist advancing these projects and supports efforts to identify solutions for the Upper Pamet. This Restoration effort is consistent with and supports the Goals of the Gulf of Maine's Council on the Marine Environment's 2012-2017 Action Plan (http://tinyurl.com/nrqu2xx). Ecosystem restoration is a NPS goal and salt marsh restoration a high priority of CCNS's General Management Plan. Tidal restoration for the Pamet River is part of a broader restoration program at CCNS, where projects have already been completed at Hatches Harbor salt marsh in Provincetown, partially completed for East Harbor in Truro, and planned for the Herring River in Wellfleet. Eagle Neck Creek and Mill Pond are also designated priority projects in the NRCS Cape Cod Water Resources Restoration Project (http://tinyurl.com/orv37d3).

This restoration project will contribute toward the preservation of nesting, breeding, feeding, wintering, and buffer habitat critical to both priority and focus species identified under the North American Waterfowl Conservation Act (NAWCA). This restoration effort is consistent with the objectives of the National Wildlife Refuge System, the North American Waterfowl Management Plan, Partners in Flight, U.S. Shorebird Conservation Plan, and the North American Waterbird Conservation Plan and will benefit the interests of these plans by restoring significant coastal marine habitat critical to the survival of migratory birds, diadromous, and interjurisdictional fish and marine mammals. This project also supports the identified need to strategically distribute conservation areas outside of the Refuge system and aid in preventing "gaps" along migratory routes.

Appropriateness of the Approach / Strategy: The restoration of natural tidal hydrology to degraded coastal marshes via removal and replacement of undersized and restrictive tidal crossings is a demonstrated and effective restoration strategy that initiates recovery of naturally-sustaining conditions and higher ecological function. At the Upper Pamet site, the most appropriate pathway is to develop a two-dimensional hydrodynamic model to evaluate restoration options. Detailed hydrologic analysis of the culvert at Eagle Neck Creek is complete (GeoSyntec, 2013) with draft engineering plans prepared for an 8x15-foot 3-sided replacement culvert (Fuss & O'Neil, July 2013, See Plan Set Attachment). Project partners are prepared to finalize Mass DOT model refinements, engineering plans and permits with the Town as the permit and construction lead. Town staff, through the Department of Public Works, has the capacity and experience to oversee construction with support from project partners and a contract construction consultant. Mill Pond hydraulic analysis has been initiated with additional Mass DOT scour analysis required. Similar to Eagle Neck, draft engineering plans will be prepared by a licensed Professional Engineer (P.E.) in support of environmental permitting and compliance for Mill Pond will be completed under this project.

How Design is Informed by Sound Science: Each of the individual projects under the Pamet River Restoration Project is or will be supported by rigorous and sound scientific data collection and analysis including:

Upper Pamet:

The ecological and social effects of hydrologic alterations, habitat conversion, and subsidence well below the elevation of un-diked lower Pamet marshes and the apparent increased frequency and severity of overwashes at Ballston Beach are growing concerns among land managers, flood plain abutters, and the general public. Amid these concerns, the Town and CCNS are working together to employ recent, on-going, and proposed hydrologic, hydrographic and ecological research to work toward restoring the dynamic equilibrium between the Pamet wetlands and modern sea level. Recent and on-going work includes a feasibility study and groundwater investigation prepared the U.S. Army Corps of Engineers (ACOE) and the Cape Cod Commission (CCC) and stream-gauging, water level, and water quality monitoring conducted by CCNS's natural resource division. Data from these studies will be used as the basis for the two-dimensional hydrodynamic study proposed as part of this funding request. The model will be supplemented with additional CCNS data, including LiDAR-derived marsh elevations, stream cross-sections collected by RTK-GPS and total station, and additional hydrographic, sediment, and water quality data. Output from the model will be used to evaluate a range of potential tidal restoration, flood plain, and barrier beach management scenarios, identify and analyze impacts, and develop a consensus for developing an effective restoration and flood plain management plan.

Eagle Neck Creek: The Eagle Neck Creek Restoration Project is informed by completion of an RMA-2 hydrodynamic model supported by both field topographic and LIDAR data under contract with GeoSyntec, Inc.(March 2012), a qualified and experienced environmental engineering firm with significant experience in assessing, planning and designing similar wetland restoration efforts. Analysis also included an evaluation of culvert sizes and design alternatives that also incorporate the effects of Sea Level Rise. Additional scour analysis will be completed. Preliminary engineering plans were completed by a licensed P.E. with Fuss & O'Neil, also an experienced environmental engineering firm. Monitoring conducted at Eagle Neck Creek by researchers from USGS, URI, and UMass-Boston will follow stringent scientific protocols and further inform the trajectory and management needs of this restoration project.

Mill Pond: The Mill Pond Restoration Project is also informed by the completion of a HEC-RAS model (The Louis Berger Group, January 2013) which incorporates detailed elevation data, relative sea level rise assessment, and site survey to evaluate flood risk, and design the new inlet to achieve tidal flushing and culvert velocity objectives. Required Mass DOT scour analysis will be completed by an experienced hydrology consultant and restoration engineering plans will be prepared and stamped by a qualified licensed engineer with review provided by a technical team of federal, state, and local agencies and organizations with significant restoration experience.

c. Sustained Benefits:

Short and Long Term: The benefits of Pamet River Restoration Project will be realized in the short-term through the construction of larger culverts and restored tidal hydrology at Eagle Neck Creek and the future restoration of tidal flow at Mill Pond and the Upper Pamet. Water quality improvements, improved stormwater retention capacity, and enhanced fish and wildlife access will also be immediately realized benefits. Restoration of tidal flows will result in significant long-term ecological benefits including improved sediment transport and restored native salt marsh habitat for fish and wildlife, measureable via comparison of pre and post restoration monitoring. Project benefits are further protected via Massachusetts's stringent regulatory framework under the Wetlands Protection Act. The life-span of replacement of culverts and failing infrastructure at each of these sites is anticipated to exceed 75 years in the marine environment. Eagle Neck Creek and Upper Pamet are located on conservation lands and protected in perpetuity by CCNS.

Operational Costs / Re-investment Requirements: Restored wetland functions within the Pamet River will be designed to be self-sustaining. Investment costs after initial construction will be minimal; the projects at Eagle Neck and Mill Pond are being designed as a dynamically stable natural systems and the investigation of solutions at the Upper Pamet will also focus on a self-sustainable design intended to reduce or eliminate the need for continued flood remediation following overwashes at Ballston Beach. Once installed, the Town will assume all maintenance of the culverts and the adjacent Town roads at Old County Road and Mill Pond Road.

Climate and Land Change: The project will provide increased long term coastal resiliency by affording the opportunity for landward migration of estuarine wetlands in the face of expected increases in sea level. Monitoring of wetland hydrology and vegetation will be completed by the project partners with support from student interns and volunteers. The project sites will be monitored for invasive non-native plants which will be controlled under the appropriate regulatory guidelines.

Reestablishment of natural tidal flow and salinity to the Upper Pamet River, Eagle Neck Creek and Mill Pond would support a tidally-dependent, salt marsh dominated estuary, restoring a native ecosystem resilient to increased frequency of and impacts from Ballston Beach overwashes, and the tidal restrictions at Old County Road and Mill Pond Road therby restoring wetlands able to accommodate sea level rise. Allowing normal coastal events to occur will deliver large amounts of sediment to the Upper Pamet, restoring marsh surface elevations lost by more than 140 years of diking and peat subsidence. With larger culverts and a free-flowing connection to the lower Pamet and Cape Cod Bay, water forced into the Upper Pamet during overwashes will drain much more quickly, thereby mitigating any effects of ponded water on the flood plain and adjacent properties. With salt marsh habitats dominating the Upper Pamet, costly municipal efforts to rebuild the dune system along Ballston Beach, which have proven to be unsustainable and ineffective, should not be necessary. Normal shoreline and coastal process will be able to continue without interruption, greatly enhancing shorebird habitat and the function of the barrier beach.

d. Leveraging:

The Pamet River Restoration Project is a Green Infrastructure (http://tinyurl.com/lttm2do) project that focuses on the restoration of tidal hydrology and related natural processes in conjunction with the built environment in order to mitigate both the loss of natural habitat as well as damage from coastal flooding and storm damage. The proposed project will build upon collaborative interagency projects completed over the last decade to restore over 1,400 acres of degraded coastal wetlands in Massachusetts through the removal of tidal restrictions from over 85 sites and will supplement other

projects that have shown that tidal restriction causes subsidence of the original salt marsh peat wetlands and that restoration of tidal hydrology can reverse this process and support the accretion of the salt marsh surface through the landward transport of marine sediments during storm tides and the deposition of peat-derived organic matter.

The proposed project compliments recently funded Department of Interior (DOI) Hurricane Sandy projects including The Round Hill Salt Marsh Restoration Project in Dartmouth, the Muddy Creek Restoration Project in Chatham and Harwich, and the Parkers River Project in Yarmouth, MA, which will further demonstrate the positive relationship between healthy estuarine habitats and resiliency of the surrounding built environment in the face of climate change. The collection of data in support of developing a hydrodynamic model for the Upper Pamet will build upon NPS funded and proposed studies of nutrient and carbon cycling and exchange and development of a vegetation community and habitat model for the flood plain. All of these undertakings will be supported by data collected as part of the previous internal DOI Sandy mitigation funding for NPS to acquire high-resolution elevation data to improve storm surge forecasting and mitigation planning (NPS-1) and to conduct submerged marine habitat mapping as a foundation for enhancing resilience to coastal storms and other climate change drivers (NPS-5). In addition to the Town and NPS, cooperators in these efforts include USGS, FWS, NOAA, NRCS, MA-DER, Provincetown Center for Coastal Studies, Marine Biological Lab (MBL), University of Rhode Island (URI), and the Woods Hole Group.

Implementation of the Upper Pamet and Eagle Neck Creek sites, which are located on federally-owned property, and the Mill Pond Restoration Projects will inform restoration actions also proposed by the Town and CCNS and other partners at the Herring River, a proposed 1,000+ acre restoration effort located partly on NPS-owned property in Wellfleet and Truro. Dr. Jennifer Bowen, a researcher at the University of Massachusetts at Boston has received NSF funding (proposal # 1350491) to study the functioning and recovery of microbial communities in relation to restored tidal salt marshes. Eagle Neck Creek has been identified as a potential research site in support of this federally funded project.

e. Speed to Functionality:

The Pamet River Restoration Project is both a planning and implementation project that will be completed within the two-year grant period. The benefits of completing planning associated with the Upper Pamet will be realized with the identification of culvert and flood-mitigation solutions and the project positioned to initiate implementation. At Mill Pond, completion of planning associated with design and permitting will position the project to seek additional construction funds for implementation, approximately two years following this grant period based upon other successfully completed restoration efforts.

Restoration of tidal hydrology at Eagle Neck Creek, and Mill Pond in the future, based on assessments of completed similar projects that have shown immediate benefits to water quality, the passage of aquatic organisms, and flood mitigation will take effect in a matter of days or weeks following construction. Removal of the tidal restriction at Eagle Neck Creek will immediately restore more natural tidal flow as well as the ability of the system to drain stormwater from runoff and rainfall as well as impounded storm surge after storm subsidence. Significant changes to estuarine wetland vegetation has been shown to take 1-3 years, whereas the accretion of subsided marsh surfaces through the increased deposition of organic matter and inputs of marine sediments and the ability of these systems to remain resilient in the face of seal level rise is expected to occur over the longer-term.

C. Youth and/or Veteran Engagement:

Through the existing outreach programs of the Town and CCNS, with support from partner agencies, information on the project will be disseminated to abutting landowners, NPS visitors and staff, Town of Truro residents, and other coastal Cape Cod communities. Town and other project partner outreach efforts place significant emphasis on increasing youth engagement and the understanding of the natural environment through its integration with grade school, college, and summer intern programs. Specifically for this project, it is expected that youth and college groups will be involved in the project through participation in implementing some components of the project, e.g. monitoring water quality, and the response of wetland vegetation and estuarine biota. DER's partnership with the Association to Preserve Cape Cod's (APCC) Salt Marsh Monitoring Program may include pre- and post-restoration monitoring with student volunteers directed by APCC's monitoring staff.

Youth and veterans have been, and will continue to be, important participants in NPS ecosystem restoration efforts at CCNS. Dozens of students and recent graduates have been hired by CCNS as seasonal technicians and have played crucial roles in field data collection and science support on many research and monitoring projects. Young people from the Student Conservation Association and AmeriCorps have also worked closely on these studies and have been afforded opportunities to collaborate with and learn from NPS scientists and other cooperators. This level of engagement with youth and veterans will continue with the Pamet River Restoration Project. For the specific activities subject to this funding request, we anticipate hiring two recently graduated or current graduate field biology/ecology students under the age of 25 to work with permanent NPS staff on topographic and hydrographic data collection.

In addition, to conduct the Habitat Sustainability Evaluation at Eagle Neck Creek, the project team will collaborate with USGS, MBL UMASS-Boston, and URI and will hire a postdoctoral investigator, using an existing grant from USGS to support 50% of the investigator's salary. Undergraduate research assistants will participate in the research and monitoring, through URI, National Association of Geoscience Teachers, and Woods Hole Partnership for Education Program (http://www.woodsholediversity.org/pep/). The UMASS-Boston research proposal (see below) also identifies student involvement as a component of research with specific goals including engaging students in research-based learning, promoting accountability among the students so they work harder and produce higher quality outcomes, and instilling in students the notion that an important role of science is to serve a broader good.

For field data collection occurring with the CCNS portion of the Pamet River flood plain, the Town will seek the required research permits from NPS, which require a commitment to NPS' extensive standard operating protocols and guidelines to ensure maximum safety of any personnel working in the field. All standard safety procedures will be followed during youth group participation in the project including appropriate adult supervision and the use of safety equipment.

D. Collaboration and Partnerships:

Project Team and Stakeholder Involvement: This project is a partnership project, with significant coordination between the Town and CCNS due to the shared interests of managing these coastal wetlands from both an ecological perspective as well as flood and storm-damage mitigation. The project team has grown to include a Project Technical Team comprised of the Town (landowner), CCNS (landowner), the Cape Cod Conservation District (CCCD), FWS through its Partners for Fish and Wildlife Program, and DER. The technical team continues to guide development of the project design and permitting documents, and oversees all facets of project implementation. The Town will be the permit applicant and will lead community outreach and education with support from CCCD, CCNS, and DER. Federal and state agencies will provide support through technical assistance with project design, permitting, development of technical specifications, construction bid assembly and review, and project construction oversight and monitoring.

Pre- and post-restoration studies and monitoring at Eagle Neck Creek will benefit from extensive partnerships, and will be leveraged with other sources of funding and in-kind support. In particular, our proposed Habitat Sustainability Evaluation (see below) shares several of the goals of the larger "Bringing Wetlands to Market" project (BWM; http://www.nerrs.noaa.gov/NSCIndex.aspx?ID=702 ; Kroeger, Tang and Moseman-Valtierra, co-PIs), which is a broad multi-collaborator effort for generating science, management tools, and policy guidance to incentivize tidal wetland restoration and facilitate the introduction of coastal wetlands into international carbon markets. Similar to the BWM project, the Eagle Neck Creek assessment will involve measuring carbon sequestration and greenhouse gas reductions, which represent important societal benefits resulting from salt marsh restoration. At the conclusion of the project, such societal benefits and their market potential will be communicated through workshops targeted toward end-users, including MA DER, NPS, FWS, EPA, NOAA NERRs, Conservation International, The Nature Conservancy, and many other agencies and non-governmental organizations. The effectiveness of the USGS monitoring and research program will be further enhanced by collaboration with J. Bowen at the University of Massachusetts, Boston. Dr. Bowen has been awarded a 5-yr National Science Foundation grant designed to examine how a key ecosystem service, the ability of salt marshes to remove anthropogenic nitrogen via microbially-mediated denitrification, is altered by a rapid state change induced by a sudden return of salt water to a degraded oligohaline marsh.

Project Funding: To date, approximately $250,000 has been provided or committed by the Town of Truro ($125,000), DER ($125,000), to complete feasibility studies (site topography, tidal hydrology, low-property flood assessment, hydrologic modeling), and for project design, permitting, and pre-restoration monitoring. Additionally, the Town of Truro has committed to $52,525 in future in-kind technical assistance in support of project construction at Eagle Neck and the Town is seeking an additional $30,000 (not yet committed) from the Truro Conservation Trust. In-kind technical assistance valued at $45,000 is expected to be provided by FWS, DER, and CCNS staff during the 2-year timeframe for the project.

Project Review: DER has a track record of coordinating regulatory review of tidal restorations in Massachusetts, with over 85 projects completed over the last decade. This project has advanced with close coordination and review from all levels of local, state, and federal agencies. The Cape Cod Conservation District (CCCD) has additional expertise in both state and federal permitting and will assist the Town with local outreach and in obtaining all necessary permits as well as assist with project management and construction oversight. The Eagle Neck Creek site has already received MassDOT 25% design review. Additional state and federal regulatory review will be initiated over the next six-eight months with review occurring at the local (Town), State (DER, Mass DEP, MA CZM) and Federal (NPS, USACOE, FWS) levels

E. Work Plan & Logistics:

a. Project Team:

Project Team/Qualifications: A Project Technical Team composed of the Town (landowner), CCNS (landowner), and FWS through its Partners for Fish and Wildlife Program, USGS, MADER, and the CCCD will guide the development of project feasibility, design and permitting documents and oversee project implementation.

The Town has demonstrated experience in managing successful completion of public culvert and road projects including securing local/state permits s well as providing outreach and education to the community. The Town will act as the permit applicant for Eagle Neck Creek and Mill Pond, hold the construction contract for Eagle Neck Creek and provide important outreach to abutting landowners, neighbors, and the larger community including long term education, monitoring and documentation for the Pamet River Restoration project as a whole. Project Management at the Town will be provided by Paul Morris (DPW Director, 30 years DPW experience), Trudi Brazil (Town Accountant) and Charleen Greenhalgh (Assistant Town Administrator).

Georgeann Keer, a Restoration Ecologist and Project Manager for the Massachusetts Department of Fish and Game's Division of Ecological Restoration, currently manages multiple coastal wetland restoration projects throughout the state of Massachusetts, providing technical assistance in project development, feasibility assessment, engineering and design, funding acquisition, permitting, construction, and monitoring. DER's project managers draw on 17 years of past programmatic experience related to the identification and implementation of over 85 projects and 1,450 acres under restoration. Ms. Keer will assist managing this project by coordinating contracts for development of Feasibility Study at Upper Pamet, completion of MA DOT scour analysis via a DER consultant contraction, preparation of final engineering design plans, permitting, bid specifications, bid review, contracting and construction for Eagle Neck Creek and assist development of contracts for engineering plans and permitting for Mill Pond. Additional technical review will be provided by Franz Ingelfinger, a project manager at DER with 12-years restoration experience.

Martha Reinhart, with the CCCD is a certified Professional Wetland Scientist with over 20 years of experience working in coastal wetlands. She works as the Coastal Wetlands Restoration Project Manager for the Cape Cod Conservation District, as part of the Cape Cod Water Resources Restoration Project, managing the implementation of several successful salt marsh restoration projects, including those at Red River Beach in Harwich, Sunken Meadow in Eastham, and Freemans Pond in Brewster.

Tim Smith is a Restoration Ecologist at CCNS, responsible for coastal wetland restoration and research projects throughout the Seashore. He draws on 19 years of experience in ecosystem restoration and has developed significant partnerships with both the immediate technical team as well as the State and Federal agencies that will provide regulatory review. Mr. Smith will lead and manage the feasibility investigation at the Upper Pamet, and provide technical review for Eagle Neck Creek.

Eric Derleth is a fish and wildlife biologist with 35 years of experience with the FWS. He currently serves as the coordinator for the Service's private lands habitat restoration program (Partners for Fish and Wildlife Program) for NH, MA, and RI. His technical expertise includes restoration of degraded salt marsh habitat, the restoration of degraded riverine and riparian systems including the restoration of fish passage through dam removal and/or culvert replacement, and projects that focus on the restoration of early successional forest and control of non-native, invasive species.

Dr. Kevin Kroger (USGS Woods Hole Science Center), and Dr. Judith Drexler (USGS California Water Science Center) will be co-principal investigators for the Eagle Neck Creek Marsh Sustainability Evaluation.

Over the last decade personnel from MADER, FWS, and CCCD and have worked collaboratively and have demonstrated experience in the design, permitting, and implementation of over 100 voluntary, proactive habitat restoration projects including the removal of tidal restrictions, removal of dams and culverts, and wetland and stream restoration. These projects can be complex and often have necessitated successful interactions with community stakeholders as well as interagency negotiations on permitting and environmental compliance issues, including analysis of contaminants, cultural resource assessments, water quality assessments, sediment management, and fish passage. For the Eagle Neck Creek project NPS intends to complete all requirements under the National Environmental Policy Act and Section 106 of the National Historic Preservation Act. Additionally, interagency personnel have a proven record of working collaboratively to develop and oversee the development of project designs, contract bid documents, bid review, and project oversight.

b. Work Plan:

Task	Schedule & Task Lead	Description
Upper Pamet Hydrodynamic Modeling	June 2014 – June 2016 Tech. Team w/ Town and NPS Lead	In order identify, refine, and evaluate restoration alternatives for the upper Pamet River, the Town will seek a consultant to develop a detailed, two-dimensional hydrodynamic model of the Pamet River system building upon a hydrologic model previously developed by the Army Corps of Engineers. The selected Consultant will work closely with the Town, DER, CCNS, and other partners, on all aspects of the project. Sub-tasks to be completed are: Review and Selection of the Appropriate Model, Data Review and Compilation, Selection of Simulation Alternatives, Model Development, Establishing Boundary Conditions, Computational Grid Formulation, Data Inputs, Calibration, Validation, Preliminary Model Runs, Review Preliminary Results, Supplemental Model Runs, Review Supplemental Runs, Uncertainly Analysis, Develop Draft and Final Output Visualizations, Draft and Final Narrative Report.
Eagle Neck Modeling	Ongoing, Complete June 2014 Tech Team w/ DER Lead	Finalize Draft-Final Modeling Results and MADOT Comments (Matching Funds) via contract consultant.
Eagle Neck Creek Design	Ongoning, Complete Sept. 2014 Tech Team w/ Town and DER Lead	Complete engineering design plans sufficient for permitting and final MADOT review via contract consultant.
Eagle Neck Creek Project Permitting	Ongoing, Complete January, 2015 Tech. Team w/ Town and CCCD Lead	Obtain all permits including: 1) MEPA Certification 2) Mass DOT Access Permit (under review); 3) Local Order of Conditions with MESA review; 4) 401 Water Quality Cert.; 5) Chapter 91 Waterways Lic.; 6) MA CZM Federal Consistency Certification; 7) ACOE Section 404 Cat. II General Permit; 8) MA Historical Commission Certification, and 9) NEPA with assistance via contract consultant.
Eagle Neck Bid Assembly and Construction Contracting	Jan. - June, 2015 Tech. Team w/ Town Lead	Incorporate required permitting design changes, develop construction design specifications, assemble and bid construction package, award construction contract, establish contract, issue notice to proceed. Contract Consultant will provide assistance for this task.
Eagle Neck Project Construction	Sep. - Dec. 2015 Tech. Team w/ Town Lead	Construct project (anticipated 8-week construction window) via construction contractor.
Mill Pond Design	Complete September, 2014 Tech. Team w/ CCCD Lead	Complete engineering design plans sufficient for permitting and final MADOT review
Mill Pond Permitting	Complete September 2015 Tech. Team w/ CCCD Lead	Obtain all permits including: 1) MEPA Certification 2) Mass DOT Access Permit; 3) Local Order of Conditions with MESA review; 4) 401 Water Quality Cert.; 5) Chapter. 91 Waterways Lic.; 6) MA CZM Federal Consistency Certification; 7) ACOE Section 404 Cat. II General Permit; 8) MA Historical Commission Certification
Maintenance	As Needed Town Lead	Inspect annually for anticipated 75-year culvert lifespan. Maintenance requirements are minimal.
Post-Restoration Monitoring	2016 - 2020 Town w/ DER Assistance and NPS, USGS, URI, MBL, UMASS-Boston Lead	Implement post-construction monitoring plan. Eagle Neck Creek Marsh Sustainability Assessment (see below, Monitoring and Measuring Performance

c. Monitoring and Measuring Performance:

Future implementation at Upper Pamet as well as construction of Eagle Neck Creek and future construction of Mill Pond will be assessed via 1) Written certification by MADOT will be sought in accordance with state law at Eagle Neck Creek and Mill Pond if applicable 2) Water levels will be monitored by MADER and partners for a full lunar cycle and surveyed to determine the extent of tidal restoration 3) Salt marsh monitoring will be implemented by MADER with project partners to measure tidal hydrology (water surface elevation, salinity), freshwater flow, and vegetation response, which will track the hydrological and ecological responses of the wetland and tidal creek habitats.

Eagle Neck Creek Marsh Sustainability Assessment:

The purpose of this sustainability assessment is to track the evolution of Eagle Neck Creek marsh, capturing the dramatic changes in (1) plant community composition, (2) key ecosystem processes and ecosystem services, and (3) water quality during the first year of restoration. Since resilience and rate of soil accretion are long-term questions, NPS and USGS personnel will leverage agency funds to continue monitoring of the site for a number of years beyond the duration of the restoration grant. The data gathered on long-term resilience of wetlands with restored tidal flows will be relevant to the large number of wetlands that have already undergone such restoration, or that are slated to be restored by DER and other agencies with aligned missions. As a high-profile example, this assessment will serve as a test case for the much larger restoration being considered at nearby Herring River, which will restore tidal flows to an area of approximately 1,000+ acres of primarily NPS land.

Assessment Components:

I. Plant Community Composition: DER and NPS ecologists will track changes in plant community composition at Eagle Neck Creek marsh subsequent to restoration. The summer after the installation of the new culvert, a vegetation survey will be carried out in order to assess the condition of dominant vegetation in the five different vegetation zones described in the Eagle Neck Creek Wetland Assessment Report.

II. Ecosystem Processes: Several key processes will likely change subsequent to restoration of the salt marsh including gross (total) primary productivity of vegetation, ecosystem respiration (loss of carbon through metabolic processes), storage of carbon and other elements in the peat soils, accretion of newly deposited material on the marsh plain, and reductions in greenhouse gas emissions. Gas flux studies, in which chambers are placed on the marsh surface and coupled to laser absorption field gas analyzers, will be used to measure the fluxes of the greenhouse gases carbon dioxide, methane, and nitrous oxide. Primary productivity and ecosystem respiration will be measured based on the balance between carbon dioxide uptake and release under a range of light and dark conditions. A series of soil cores will be collected before the restoration to assess the amount of carbon storage and whether or not the soils are sinks for contaminants in the watershed. Six and twelve months after restoration, accreted materials that have deposited on the marsh plain will be collected using cryo-coring (freezing of sediments using liquid nitrogen). The resulting cores will be analyzed for total organic matter, organic carbon, and inorganic sediment in order to assess the sustainability of the newly restored marsh under sea-level rise.

III. Water quality: Water quality parameters including nutrients, suspended sediment, metals, organic and inorganic carbon, pH, and specific conductance will be monitored using autonomous sensors and water sample collections across a range of timescales including tidal, lunar and seasonal cycles.

d. Return on Investment:

Implementation of this project will benefit the DOI through the CCNS at Upper Pamet by providing recommended management solutions directly applicable to both the CCNS and the Town of Truro who share a common interest in restoring the Upper Pamet and mitigating storm-damage and flooding experienced within the system. Restoration of Eagle Neck Creek at the completion of this project will result in the immediate return of 16 acres of formerly tidally restricted salt marsh and prepare Mill Pond for future restoration of 13 acres, both providing enhanced fish and wildlife habitat outlined as a priority by multiple FWS administered programs including: the North American Waterfowl Conservation Act (NAWCA), National Wildlife Refuge System, the North American Waterfowl Management Plan, Partners in Flight, U.S. Shorebird Conservation Plan, and the North American Waterbird Conservation Plan.

The project will create local jobs. For every $1,000,000 spent on environmental restoration in MA, 12.5 jobs are generated, and $1,750,000 in total economic output is generated and for an investment of $2,416,000 funded by NFWF under this project, a total of 30.20 jobs and an economic output of $4,228,000 will be generated. See _ . Completion of the project is expected to reduce future storm-related flood damage through cost avoidance to town-owned infrastructure

and associated ecological damage to NPS-owned property. The project will also be used as an example to other Cape Cod communities to promote outreach on the linkage of healthy coastal wetlands and their relationship to storm protection and resiliency in the face of sea level rise.

e. Risk:

This project has minimal risk of project failure and/or negative impacts to the coupled human / natural system. At the Upper Pamet, this project will complete a feasibility study, and all work is investigatory in nature, involving the collection and synthesis of data. At Eagle Neck Creek, the project will not change the predicted FEMA storm flood elevations as the 100-year coastal surge will continue to overtop the existing Old County Road. However, the completed Eagle Neck Creek project is expected to enhance tidal drainage during the ebb tide through the removal the tidally restrictive culverts. The restored mix of 16 acres of estuarine wetlands on NPS property will serve as a wetland buffer to mitigate against damage from coastal flood events. Mill Pond is confined to a well-defined basin, and the built environment is well above any elevation of flood concern. This project will have no adverse effect on coastal flooding. The risk of failure to receive project permits is minimal due to previous project outreach and broad community support.

f. Permits and Approvals:

A Project Technical Team composed of the Town of Truro (landowner), NPS (landowner), FWS through its Partners for Fish and Wildlife Program, MADER, and CCCD will coordinate on project design and permitting documents. At Eagle Neck Creek and Mill Pond, the Town, as the owner of the road and existing culverts) and will seek a local Order of Conditions with MESA review from the Truro Conservation Commission. Additional applicable permits include: 1) MEPA Certification; 2) Mass DOT Access Permit (for Eagle Neck Creek only, under review); 3) 401 Water Quality Certification; 4) Chapter 91 Waterways License; 5) Coastal Zone Management Federal Consistency Concurrence; 6) Army Corps of Engineers MA PGP II; 7) Section 106 Historic property review; and 7) for Eagle Neck Creek only, an Environmental Assessment and Finding of No Significant Impact under NEPA. All regulatory review will be complete by January 2015 for Eagle Neck Creek and September 2105 for Mill Pond. Eagle Neck Creek will move to construction during the fall, 2015.

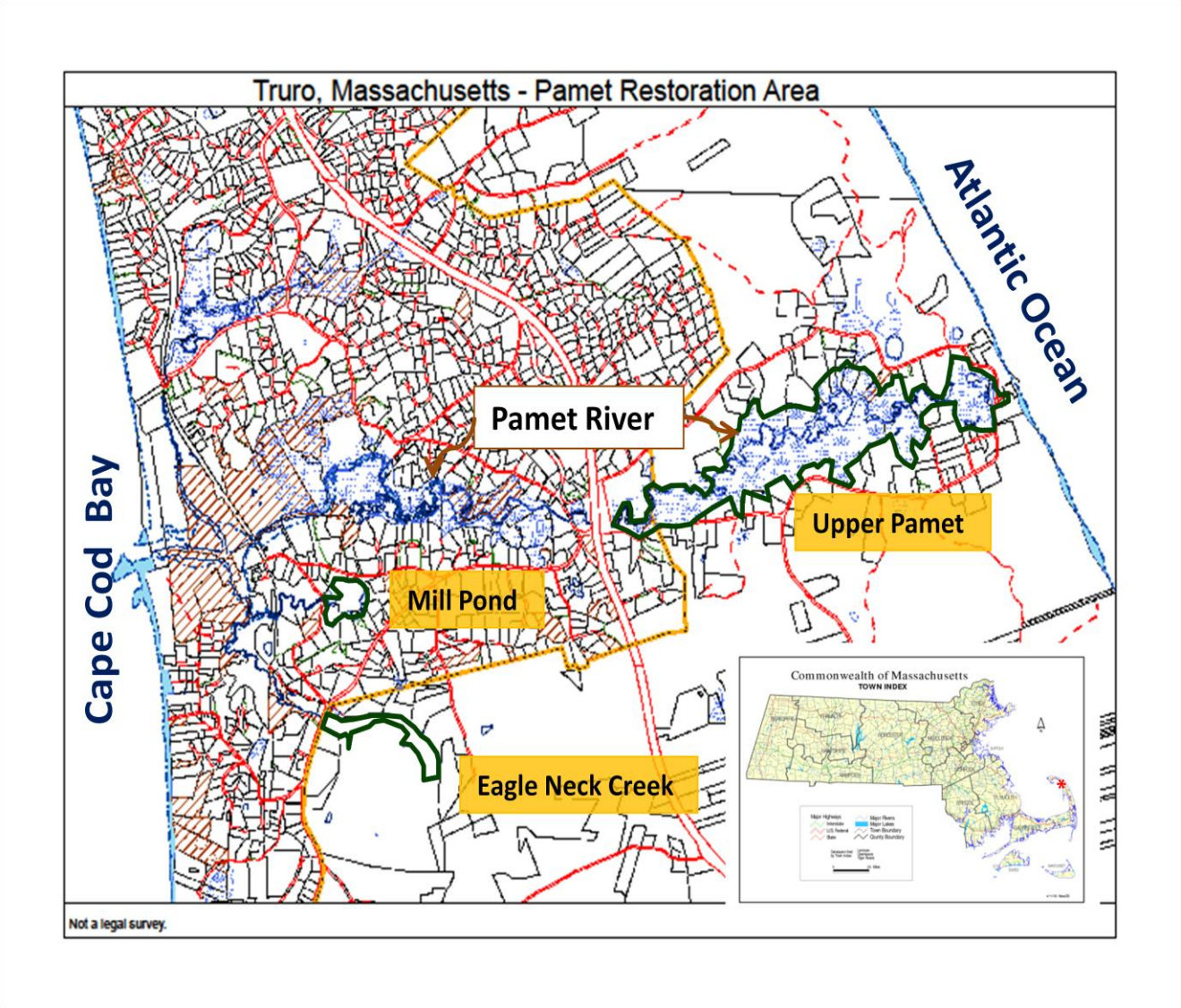
Over the last decade DER has advanced over 85wetland restoration projects to construction and has extensive experience working with regulators to permit wetland restoration projects. DER will assist the Project Technical Team in finalizing designs for Eagle Neck Creek and Mill Pond and in coordinating public outreach and advancing the project through regulatory review. Over the past four years, the CCCD has managed the implementation of several successful salt marsh restoration projects, including those at Red River Beach in Harwich, Sunken Meadow in Eastham, and Freemans Pond in Brewster, and has been involved with all aspects of at least a dozen other tidal restoration projects on Cape Cod. CCCD will assist the Town in acquiring all necessary permits for Eagle Neck Creek, as well as assist in project management and construction oversight. CCCD will also help the Town manage design efforts at Mill Pond.

g. Safety:

The project will be designed and constructed with safety as a primary concern. Data collection for the Upper Pamet will either be overseen by a qualified contracted vendor or directly by CCNS staff and require appropriate access permits. At Eagle Neck Creek, the project will be a significant construction site and such will be closed to the general public during construction. A highway access and traffic management plan will be required and submitted to Mass DOT for approval and implemented during construction. Oversight of construction activities including the wearing of personal protective gear will occur at three different levels, 1) Site Foreman for the Contractor, 2) Consulting Engineer, and 3) Representatives of the Project Technical Team. The selected contractor will be responsible for securing the site during construction and close coordination during weekly meetings with the Project Technical Team issues related to safety and project implementation will be discussed. The existing culvert design at Eagle Neck and future designs at Upper Pamet and Mill Pond will take culvert velocities into consideration and design will focus on minimizing velocities that may be hazardous to health and human safety. After construction at Eagle Neck Creek, appropriate signage will be posted on both sides of the structure with notice to remain clear of culverts and swift currents.

Hurricane Sandy Coastal Resiliency Competitive Grants Program

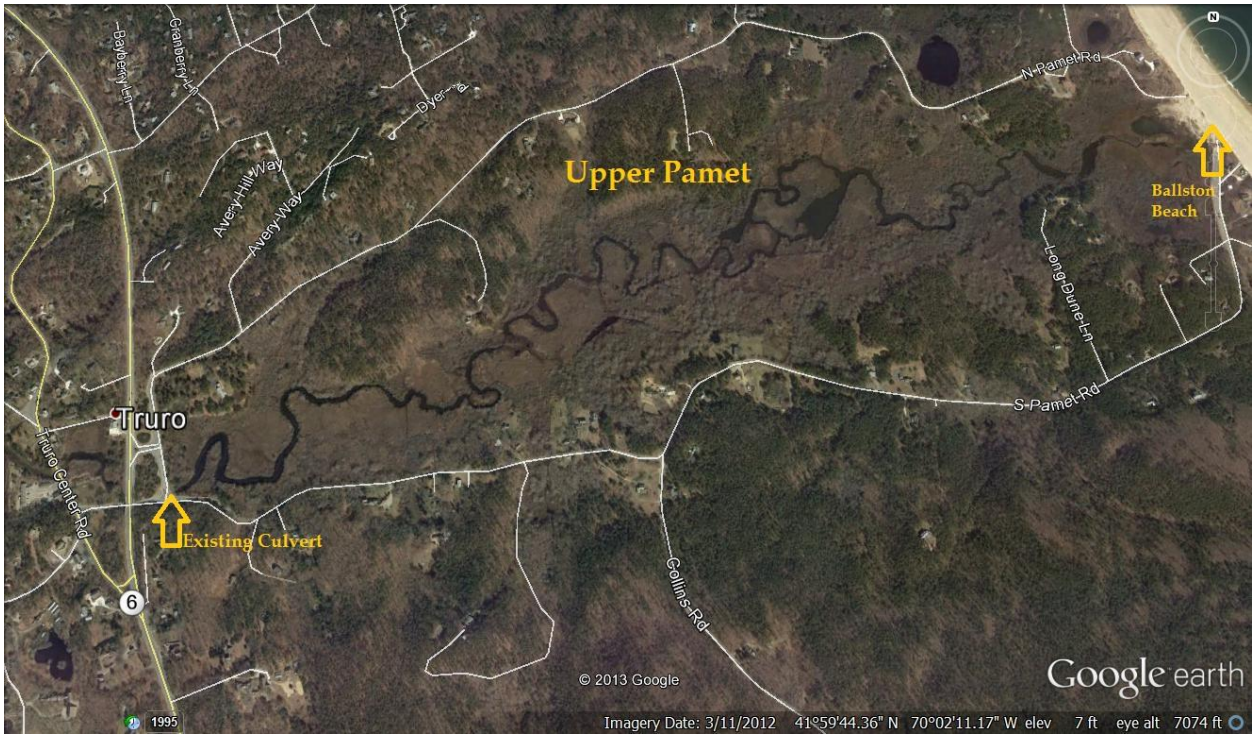
Pamet River Restoration Project Maps



Map 1: Overall Project Map showing location of the Pamet River Restoration Projects with relation to the Atlantic Ocean and Cape Cod Bay.

Hurricane Sandy Coastal Resiliency Competitive Grants Program

Pamet River Restoration Project Maps



Map 2: Aerial Map of the Upper Pamet.

Map 3: Aerial Map of the Eagle Neck Creek Restoration Site.

Hurricane Sandy Coastal Resiliency Competitive Grants Program

Pamet River Restoration Project Maps

Map 3: Aerial Map of the Mill Pond Restoration Site.

01/29/2014

Mandy Chesnutt
Senior Manager, Conservation Programs
National Fish and Wildlife Foundation
1133 15th St., NW, Suite 1100
Washington, D.C. 20005

RE: National Fish and Wildlife Foundation – Hurricane Sandy Coastal Resiliency Competitive Grants Application for the Pamet River Restoration Project, Truro, MA

Dear Ms Chesnutt:

The Association to Preserve Cape Cod (APCC) supports the Town of Truro's application for project planning and implementation funding of the Pamet River Restoration Project under the National Fish and Wildlife Foundation – Hurricane Sandy Coastal Resiliency Competitive Grant.

APCC is a regional non-profit environmental organization, founded in 1968, to promote programs and policies that foster the protection of the natural resources of Cape Cod. Through outreach, advocacy and science-based research we work to protect drinking water, preserve open space, and promote an environmental ethic. Our salt marsh program was established in 2003 to monitor the health of salt marshes and advocate for tidal restoration. Working with trained volunteers and summer interns, we measure salinity, survey plants, birds and fish to measure health and document the need for and effectiveness of ecosystem restoration. In 2012 we monitored Eagle Neck Creek to establish the current state of health. We fully support future monitoring through Massachusetts Division of Ecological Restoration in the Pamet River Restoration Project prior to and after tidal restoration.

The Pamet River Restoration Project consists of tidal restrictions located at the Upper Pamet River, Eagle Neck Creek and Mill Pond. The project proposes to support the planning and potential implementation of 187 acres of tidally restricted salt marshes, focusing on replacement of undersized and failing culverts and infrastructure that impact these ecologically important habitats. Formerly three separate projects, this integrated approach will improve protection and enhance the resiliency and capacity of this ecosystem and its related infrastructure to withstand impacts of future storms. Ultimately, restored hydrology at these sites will provide significant benefits including:

- improved coastal habitat critical to NFWF and USFWS key species such as native Atlantic coast estuarine-dependent and diadromous species (alewife, blueback herring, American eel, and American shad) and restored buffer habitat critical to species such as American black duck, saltmarsh sparrow, Atlantic brant, and common eider;

- increased opportunity for landward migration of estuarine wetlands in the face of anticipated climate change and increases in sea level;

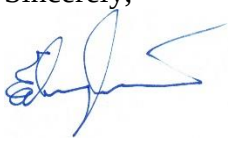
- addressing consequences of large-scale storms that over-wash Ballston Beach; and

- decreased flood damage and economic and commercial disruption from the closure of roads in the Pamet River area including Mill Pond Road and Old County Road.

As the Town of Truro and the National Park Service move forward on identifying solutions for the Upper Pamet Site, APCC and the Mass Bays Program (Cape Cod region) anticipate providing continued technical and monitoring support through all phases of these tidal restoration projects.

I encourage your favorable review and award under this grant application.

Sincerely,



Ed DeWitt
Executive Director

cc: Charleen Greenhalgh, Assistant Town Administrator, Town of Truro
Georgeann Keer, Division of Ecological Restoration, Massachusetts

WILLIAM R. KEATING
9TH DISTRICT, MASSACHUSETTS

COMMITTEE ON FOREIGN AFFAIRS
SUBCOMMITTEES
RANKING MEMBER
EUROPE, EURASIA, AND EMERGING THREATS
ASIA AND THE PACIFIC

COMMITTEE ON HOMELAND SECURITY
SUBCOMMITTEES
COUNTERTERRORISM AND INTELLIGENCE
CYBERSECURITY, INFRASTRUCTURE PROTECTION, AND
SECURITY TECHNOLOGIES

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WASHINGTON DC OFFICE
315 CANNON HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-3111

CAPE AND ISLANDS OFFICE
297 NORTH STREET, SUITE 312
HYANNIS, MA 02601
(508) 771-0666

New BEDFORD OFFICE
558 PLEASANT STREET, SUITE 309
NEW BEDFORD, MA 02740
(508) 999-6462

PLYMOUTH OFFICE
2 COURT STREET
PLYMOUTH, MA 02360
(508) 74 9000

January 29, 2014

Mr. Martin Kodis
Re: Hurricane Sandy Coastal Resiliency Grant Program
Fish and Wildlife Service
U.S. Depaitment of the Interior
1133 15th Street, NW, Suite 1100
Washington, D.C. 20005

Dear Mr. Kodis:

I am writing in support of Town of Truro's application for funding through the National Fish and Wildlife Federation (NFWF) and U.S. Fish and Wildlife Service's (USFWS) Hurricane Sandy Coastal Resiliency grant program. The Pamet River system extends from Cape Cod Bay to the Atlantic Ocean, and the Pamet River Restoration Project is of great environmental importance to Truro and the Cape Cod National Seashore. By addressing the tidal restrictions located at the Upper Pamet, Eagle Neck and Mill Pond sites within the Pamet River system, the Town is taking a critical step toward protecting and enhancing the resiliency and capacity of this ecosystem and its related infrastructure to withstand impacts of future storms.

Successful receipt of this funding will allow the Town of Truro to complete permitting and construction of a new culvert at Eagle Neck Creek; planning and engineering design for a new culvert at Mill Pond and planning, design and modeling of the Upper Pamet, which has been impacted by an undersized culvert and over-wash at Ballston Beach. This is critical to future planning and potential implementation of the restoration of 187 acres of tidally restricted salt marshes, focusing on replacement of undersized and failing culverts and infrastructure that impact these ecologically important habitats.

Ultimately, restored hydrology at these sites will provide significant benefits including restored coastal habitat critical to NFWF and USFWS focal species such as native Atlantic coast estuarine-dependent or anadromous species (alewife, blueback herring, American eel, and American shad,) and restored buffer habitat critical to species such as American black duck, saltmarsh sharp-tailed sparrow, mallard, and greater scaup, Atlantic brant, common eider, and American widgeon; and others; increased opportunity for landward migration of estuarine wetlands in the face of anticipated climate change and increases in sea level; and address consequences of large-scale storms that over-wash Ballston Beach; and flood damage and economic and commercial disruption from the closure of roads at Mill Pond and Mill Pond Road and Eagle Neck Creek and Old County Road.

Respectfully, I request your full and fair consideration of the Town of Truro's application for funding through the Hurricane Sandy Coastal Resiliency Grant. Please do not hesitate to contact Michael Jackman on my staff at

(508) 746-9000 or by email at Michael.Jackrnan@mail.house.gov regarding any additional questions or concerns.

Sincerely,

WIL} A G
Member of Congress

COMMONWEALTH OF MASSACHUSETTS
Division of Ecological Restoration
Tim Purinton, *Director*

Deval Patrick
Governor
Richard K. Sullivan, Jr.
Secretary
Mary B. Griffin
Commissioner

January 27, 2014

Mandy Chesnutt
Senior Manager, Conservation Programs
National Fish and Wildlife Foundation
1133 15th St., NW, Suite 1100
Washington, D.C. 20005

Dear Mandy:

I write to express strong support of the MA Division of Ecological Restoration (DER) for the Town of Truro, Massachusetts proposal: ***Pamet River Restoration Project***.

The Pamet River Restoration Project will plan and implement the restoration of 187 acres of tidally restricted salt marshes, focusing on replacement of undersized and failing culverts and other infrastructure that impact these ecologically important habitats. By addressing the tidal restrictions located at the Upper Pamet, Eagle Neck, and Mill Pond sites within the Pamet River system, the Town is taking a critical step toward enhancing the resiliency and capacity of this ecosystem and its related infrastructure to withstand impacts of future storms. The project will:

- address consequences of coastal storms that over-wash Ballston Beach, causing flood damage and economic and commercial disruption from multiple road closures;
- restore coastal habitat critical to federal focal species, such as alewife, blueback herring, American eel, and American shad, and buffer habitat critical to Atlantic-flyway avian species;
- facilitate landward migration of estuarine wetlands in response to increases in sea level; and
- enhance the ecological integrity and resiliency of DOI-related interests in property owned and managed by the National Park Service – Cape Cod National Seashore.

DER is a core project team member and has designated the Eagle Neck and Mill Pond restorations as Priority Projects. Over $125,000 in public funding has advanced these projects through feasibility and / or engineered design. We will continue to provide support as these projects advance.

We urge your support for the Town of Truro proposal.

Sincerely,

Hunt Durey

Hunt Durey
Acting Director

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
55 Great Republic Drive
Gloucester, MA 01930-2276

January 28, 2014

Ms. Mandy Chesnutt
Senior Manager, Conservation Programs
National Fish and Wildlife Foundation
1133 15th St., NW, Suite 1100
Washington, D.C. 20005

RE: National Fish and Wildlife Foundation - Hurricane Sandy Coastal Resiliency Competitive Grants Application for the Pamet River Restoration Project, Truro, MA

Dear Ms. Chesnutt:

The Massachusetts Division of Ecological Restoration (DER) strongly supports the Town of Truro's application for project planning and implementation funding of the Pamet River Restoration Project under the National Fish and Wildlife Foundation - Hurricane Sandy Coastal Resiliency Competitive Grant.

The Pamet River Restoration Project proposes to support the planning and potential implementation of 187 acres of tidally restricted salt marshes, focusing on replacement of undersized and failing culverts and infrastructure that impact these ecologically important habitats. By addressing the tidal restrictions located at the Upper Pamet, Eagle Neck and Upper Pamet sites within the Pamet River system, the Town is taking a critical step toward protecting and enhancing the resiliency and capacity of this ecosystem and its related infrastructure to withstand impacts of future storms. Ultimately, restored hydrology at these sites will provide significant benefits including:

- restored coastal habitat critical to NFWF and USFWS (and NOAA) focal species such as native Atlantic coast estuarine-dependent or anadromous species (alewife, blueback herring, and American eel) and restored buffer habitat critical to species such as American black duck;

- increased opportunity for landward migration of estuarine wetlands in the face of anticipated climate change and increases in sea level; and

- and address consequences of large-scale storms that over-wash Ballston Beach; and flood damage and economic and commercial disruption from the closure of roads at Mill Pond and Mill Pond Road and Eagle Neck Creek and Old County Road.

NOAA Restoration Center has experience working with the Town of Truro and the National Park Service on similar tidal restoration projects and found them to be excellent project partners, both knowledgeable and capable of successfully implementing restoration projects. I encourage your favorable review and award under this grant application

Sincerely.

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Northeast and Great Lakes Regional Supervisor
NOAA Restoration Center

Friends of Herring River

Wellfleet and Truro, Massachusetts

January 27, 2014

Mandy Chesnutt
Senior Manager, Conservation Programs
National Fish and Wildlife Foundation
1133 15th St., NW, Suite 1100
Washington, D.C. 20005

RE: National Fish and Wildlife Foundation - Hurricane Sandy Coastal Resiliency Competitive Grants Application for the Pamet River Restoration Project, Truro, MA

Dear Ms. Chesnutt:

Friends of Herring River, a local NGO engaged in the restoration of the tidally restricted Herring River Estuary in Wellfleet and Truro, strongly support the application by the Town of Truro for the Pamet River Project. The importance of coastal wetlands in helping to mitigate the impacts of future storms and sea level rise can hardly be overstated.

Having observed the effects of a recent storm that over-washed the dunes at Ballston Beach and the ecological damage and impact on private property, we believe this is a project that needs immediate attention. This is a project that both restores the natural ecosystem and increases the resiliency of the Town to future events. The Town of Truro and partners, especially the National Park Service, have reached out to the community in order to both engage the residents and gain their support as well as scope the actions needed to minimize the potential for future negative impacts. They are well prepared to move forward.

On behalf of Friends of Herring River, I encourage your favorable review and award of a grant for the Pamet River Restoration Project.

incerely,

Donald J. Palladino
President
Friends of Herring River

United States Department of the Interior

NATIONAL PARK SERVICE
Cape Cod National Seashore
99 Marconi Site Road
Wellfleet, MA 02667
508.771.2144
508.349.9052 Fax

IN REPLY RHER TO:
N2221

January 27, 2014

Ms. Mandy Chesnutt
Senior Manager, ConserYation Programs
National Fish and Wildlife Federation
1133 Fifteenth St., N.W., Suite 1100
Washington, D.C. 20005

RE: Town of Truro Hurricane Sandy Coastal Resiliency 2014 Grant Application

Dear Ms. Chesnutt:

I wish to express my strong support of the Town of Truro's (the Town) application for funding through the Hurricane Sandy Coastal Resiliency Grant. National seashore staff is working with the Town to increase coastal flood plain and barrier beach resiliency and restore native tidal marsh habitat to large portions of the Pamet River in and adjacent to the national seashore.

Ecosystem restoration is a NPS goal and salt marsh restoration a high priority at the national seashore. The Pamet River system, including several tributaries, has been impacted by road crossings, dikes, and historic drainage activity since at least 1869. In response to agency and public concern after repeated overwash events occurring during coastal storms in 1978, 1991, 1992, 2013, and 2014 at Ballston Beach (a barrier beach on the Atlantic Ocean at the headwaters of the upper Pamet Valley), the national seashore and the Town have agreed to pursue a holistic and sustainable approach to managing the Pamet River flood plain.

Funding is needed to proceed with critical engineering design, construction, and technical studies for several projects within the Pamet River flood plain. Restoration of the Pamet River is of great environmental importance to Cape Cod and Southeastern Massachusetts in its support for habitat restoration, removal of in-stream migration barriers, restoration of bivalve shellfish habitat, and creation of a healthy salt marsh with a hydrologic reconnection to Cape Cod Bay and the Gulf of Maine. Restoration of the Pamet River will also greatly improve the region's resiliency to coastal storms, climate change and sea level rise.

Receipt of funding from the National Fish and Wildlife Federation will allow the Town to complete several important projects necessary for achieving the goals of the Pamet River Restoration. These arc to:

I) develop a two-dimensional hydrodynamic model and other assessment tools in order to evaluate alternatives for restoring tidal flow to the NPS-owned and managed upper Pamet River and enhancing the coastal flood mitigation functions of Ballston Beach and the Pamet River flood plain;

2) complete the final engineering design, environmental permitting and compliance, and construction of an enlarged and improved culvert along Old County Road in order to restore tidal exchange to 16-acres of degraded inter-tidal habitat at the NPS-owned and managed Eagle Neck Creek salt marsh, and;

3) prepare engineering designs and obtain all environmental permitting and compliance to facilitate future implementation of a 13-acre restoration project at Mill Pond.

Cape Cod National Seashore staff will work closely with the Town on all of these activities, including significant technical support and consultation on engineering and compliance for the Eagle Neck Creek Project. In addition, our Natural Resource Management and Science Division staff will work directly on development of the hydrodynamic model and evaluation of the upper Pamet River and Ballston Beach, providing support for field data collection, data management and analysis, and integration of data into the hydrodynamic model and assessment framework. This will provide non-NPS scientists, students, youth volunteers, and others working for the Town with the experience of collaborating with NPS scientists within and adjacent to a National Park on real world science and management issues and will allow the national seashore to expand our ecological inventory and monitoring efforts beyond our typical activities.

I highly recommend the Town of Truro's application for funding through the Hurricane Sandy Coastal Resiliency Grant

Sincerely,

George E. Price, Jr.
Superintendent

Truro Conservation Trust

P. 0. Box 327
North Truro, MA 02652

www.truroconservationtrust.org

January 30, 2014

Mandy Chesnutt
Senior Manager, Conservation Programs
National Fish and Wildlife Foundation
1133 15th St. NW, Suite 1100
Washington, D.C. 20005

RE: National Fish and Wildlife Foundation - Hurricane Sandy Coastal Resiliency Competitive Grants Application for the Pamet River Restoration Project, Truro, MA

Dear Ms. Chesnutt:

The Truro Conservation Trust (TCT) strongly supports the Town of Truro's application for project planning and implementation funding of the Pam.et River Restoration Project under the National Fish and Wildlife Foundation - Hurricane Sandy Coastal Resiliency Competitive Grant.

The Pam.et River Restoration Project proposes to support the planning and potential implementation of 187 acres of tidally restricted salt marshes, focusing on replacement of undersized and failing culverts and infrastructure that impact these ecologically important habitats. By addressing the tidal restrictions located at the Upper Pam.et, Eagle Neck and Mill Pond sites within the Pam.et River system, the Town is taking a critical step toward protecting and enhancing the resiliency and capacity of this ecosystem and its related infrastructure to withstand impacts of future storms.

The TCT dedicates its resources to the protection of the unique beauty that is Truro by acquiring, managing, protecting, and maintaining donated, purchased, and restricted land. The TCT currently oversees eight (8) properties within the Eagle Neck Creek and Mill Pond areas and the restoration efforts only enhance the work of the TCT.

On behalf of the Board of Trustees of the TCT, we encourage your favorable review and award under this grant application.

Sincerely,

//

Fred Gaechter
President, Truro Conservation Trust
On the Behalf of the Board of Trustees

TOWN OF TRURO

Office of the Board of Selectmen

P.O. Box 2030, Truro, M A 02666

Tel: (508) 349 7004, Ext.10 or 24 Fax: (508) 349 5505

January 22, 2014

Mandy Chesnutt
Senior Manager, Conservation Programs
National Fish and Wildlife Foundation
1133 15th St., NW, Suite 1100
Washington, D.C. 20005

RE: National Fish and Wildlife Foundation - Hurricane Sandy Coastal Resiliency Competitive Grants Application for the Pamet River Restoration Project, Truro, MA

Dear Ms. Chesnutt:

The Town of Truro, in cooperation with the Massachusetts Division of Ecological Restoration (DER) and with assistants from the National Park Service - Cape Cod National Seashore (CCNS), is summiting an application for project planning and implementation funding of the Pamet River Restoration Project under the National Fish and Wildlife Foundation - Hurricane Sandy Coastal Resiliency Competitive Grant. The Truro Board of Selectmen strongly supports this application.

The Pamet River Restoration Project proposes to support the planning and potential implementation of 187 acres of tidally restricted salt marshes, focusing on replacement of undersized and failing culverts and infrastructure that impact these ecologically important habitats. By addressing the tidal restrictions located at the Upper Pamet, Eagle Neck and Mill Pond sites within the Pamet River system, the Town is taking a critical step toward protecting and enhancing the resiliency and capacity of this ecosystem and its related infrastructure to withstand impacts of future storms. Ultimately, restored hydrology at these sites will provide significant benefits including:

- restored coastal habitat critical to NFWF and USFWS focal species such as native Atlantic coast estuarine-dependent or anadromous species (alewife, blueback herring, American eel, and American shad,) and restored buffer habitat critical to species such as American black duck, saltmarsh sharp-tailed sparrow, mallard, and greater scaup, Atlantic brant, common eider, and American widgeon; and others.;

- increased opportunity for landward migration of estuarine wetlands in the face of anticipated climate change and increases in sea level;

- and address consequences of large-scale storms that over-wash Ballston Beach; and flood damage and economic and commercial disruption from the closure of roads at Mill Pond and Mill Pond Road and Eagle Neck Creek and Old County Road.

The Town of Truro has approved funding, $125,000 for the Eagle Neck project and has spent many staff hours on all of the project. DER, a core project team member, has been instrumental in

facilitating the designated Priority Projects at Eagle Neck and Mill Pond by providing over $116,000 in public funding to advance these projects through feasibility and / or engineered design. Truro staff looks forward to continuing its relationship with DER and CCNS staff; both agencies anticipate providing continued technical assistance and project support through all phases of these tidal restoration projects.

On behalf of the Truro Board of Selectmen and the Town of Truro, I encourage your favorable review and award under this grant application

Sillcerely,

Jay Coburn, Chair
Truro Bbard of Selectmen

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

Re: 2013 Hurricane Sandy Coastal Resiliency Competitive Grants Program — January 29, 2014
USFWS Letter of Support -
Town of Truro, Pamet River Restoration Project

Ms. Mandy Chesnutt
Senior Manager, Conservation Programs
National Fish and Wildlife Federation
1133 Fifteenth St., N.W., Suite 1100
Washington, D.C. 20005

Dear Ms. Chesnutt:

The U.S. Fish and Wildlife Service (USFWS) and its Partners for Fish and Wildlife (PFW) Program would like to express its support of the Town of Truro's proposal that is being submitted for consideration to the 2013 Hurricane Sandy Coastal Resiliency Competitive Grants Program. The Pamet River Restoration Project combines the restoration of estuarine salt marsh habitats and the replacement of aging and deteriorated infrastructure to achieve both ecosystem resiliency and risk reduction to the Town in the face of future coastal storms and predicted sea level rise.

As part of an interagency Technical Team, USFWS PFW Program staff will actively collaborate with the Town, the National Park Service (NPS) - Cape Cod National Seashore, the Massachusetts Division of Ecological Restoration, and other partners to complete this phase of the Pamet River Restoration Project. Specific objectives that will be achieved with this funding will occur in the following three areas of the watershed:

- completion of engineering designs, permitting and environmental compliance, and replacement of an undersized and failing municipally owned culvert on Old County Road to restore estuarine salt marsh habitats in a degraded 16-acre wetland;
- completion of engineering designs, permitting, and environmental compliance in preparation for the future replacement of an undersized municipally owned culvert on Mill Pond Road to restore 13 acres of estuarine wetlands; and
- completion of site assessments and the development of hydrodynamic modeling to evaluate alternatives for restoring tidal influence to 158 acres of the NFS-managed upper Pamet River watershed, including the potential removal or replacement of culverts that restrict flood and ebb tidal flows.

Benefits of enhanced ecosystem resiliency in the intertidal waters of the Parnet River will also result in significant improvements to salt marsh and subtidal habitats utilized by migratory birds, shellfish and near-shore marine fish.

If you have any questions, please contact Eric Derleth of this office at (603) 223-2541.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

TOWN OF WELLFLEET

300 MAIN STREET WELLFLEET MASSACHUSETTS 02667
Tel (508) 349-0300 Fax (508) 349-0305
www.wellfleetma.org

January 30, 2014

Ms. Mandy Chesnutt
National Fish and Wildlife Foundation
1133 Fifteenth St., N.W., Suite 1100
Washington, D.C. 20005

RE: Hurricane Sandy Coastal Resiliency Competitive Grants Program: Proposal from the Town of Truro Pamet River Restoration Project

Dear Ms. Chesnutt:

The Town of Wellfleet strongly supports the proposal by the Town of Truro for the Pamet River Restoration Project for funding through the Hurricane Sandy Coastal Resiliency Grant. The Restoration Project proposes to support the planning and potential implementation of 187 acres of tidally restricted salt marshes, focusing on replacement of undersized and failing culverts and infrastructure that impact these ecologically important habitats. By addressing the tidal restrictions located at the Upper Pamet, Eagle Neck and Mill Pond sites within the Pamet River system, the Truro is taking a critical step toward protecting and enhancing the resiliency and capacity of this ecosystem and its related infrastructure to withstand impacts of future storms. Ultimately, restored hydrology at these sites will provide significant benefits including:

- restored coastal habitat critical to NFWF and USFWS focal species such as native Atlantic coast estuarine-dependent or anadromous species (alewife, blueback herring, American eel, and American shad,) and restored buffer habitat critical to species such as American black duck, saltmarsh sharp-tailed sparrow, mallard, and greater scaup, Atlantic brant, common eider, and American widgeon; and others.;

- increased opportunity for landward migration of estuarine wetlands in the face of anticipated climate change and increases in sea level;

- and address consequences of large-scale storms that over-wash Ballston Beach; and flood damage and economic and commercial disruption from the closure of roads at Mill Pond and Mill Pond Road and Eagle Neck Creek and Old County Road.

The Town of Wellfleet strongly supports the Town of Truro's Pamet River Restoration Project application for funding through the through the Hurricane Sandy Coastal Resiliency Grant.

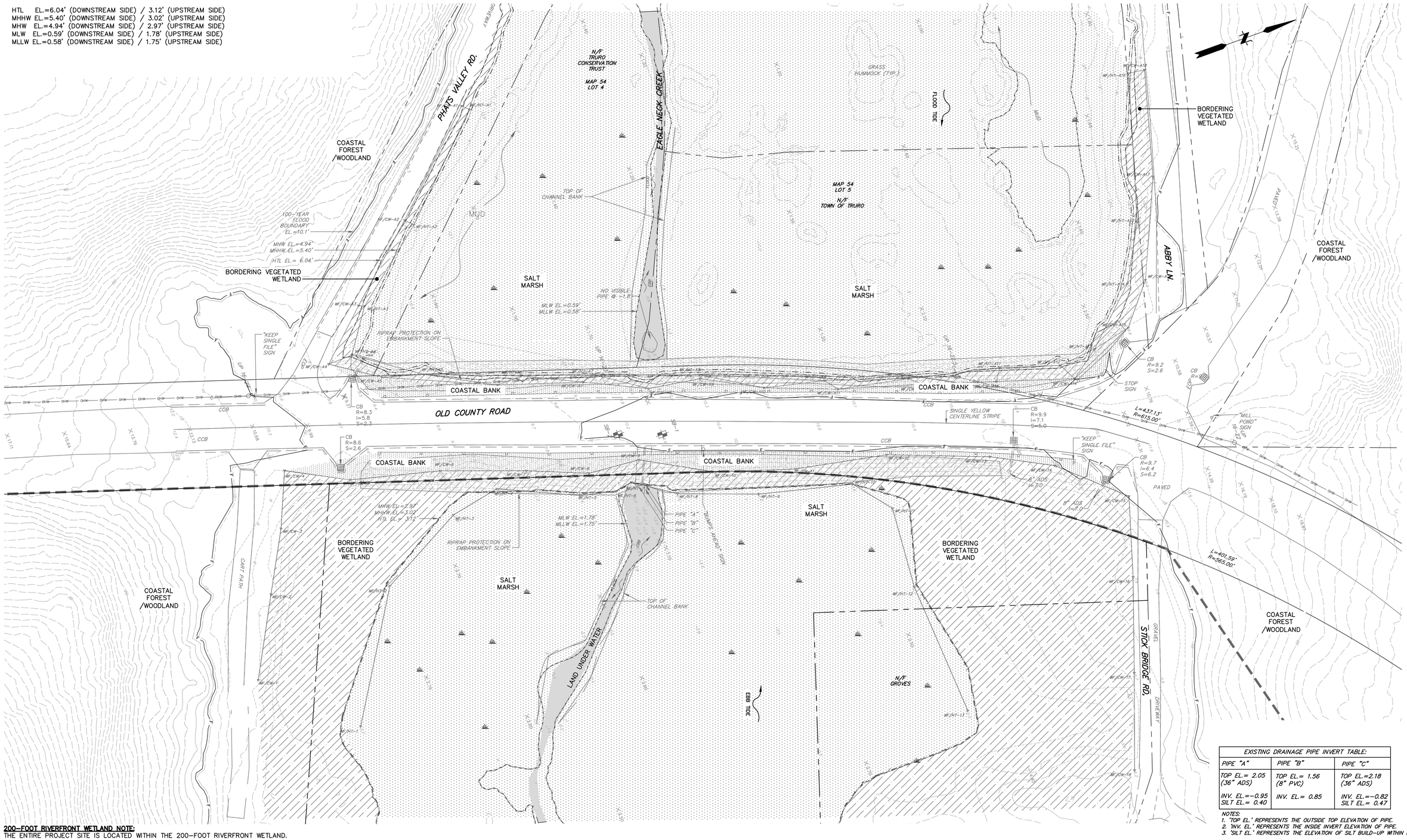
Sincerely,

Harry Sarkis Terkanian
Wellfleet Town Administrator

cc: Wellfleet Board of Selectmen
Charleen Greenhalgh, Truro Town Planner

TIDE TABLE FOR EAGLE NECK CREEK AT OLD COUNTY ROAD:

HTL EL.=6.04' (DOWNSTREAM SIDE) / 3.12' (UPSTREAM SIDE)
MHHW EL.=5.40' (DOWNSTREAM SIDE) / 3.02' (UPSTREAM SIDE)
MHW EL.=4.94' (DOWNSTREAM SIDE) / 2.97' (UPSTREAM SIDE)
MLW EL.=0.59' (DOWNSTREAM SIDE) / 1.78' (UPSTREAM SIDE)
MLLW EL.=0.58' (DOWNSTREAM SIDE) / 1.75' (UPSTREAM SIDE)



EXISTING DRAINAGE PIPE INVERT TABLE:		
PIPE "A"	PIPE "B"	PIPE "C"
TOP EL.= 2.05 (36" ADS)	TOP EL.= 1.56 (8" PVC)	TOP EL.=2.18 (36" ADS)
INV. EL.=-0.95 SILT EL.= 0.40	INV. EL.= 0.85	INV. EL.=-0.82 SILT EL.= 0.47

NOTES:
1. 'TOP EL.' REPRESENTS THE OUTSIDE TOP ELEVATION OF PIPE.
2. 'INV. EL.' REPRESENTS THE INSIDE INVERT ELEVATION OF PIPE.
3. 'SILT EL.' REPRESENTS THE ELEVATION OF SILT BUILD-UP WITHIN PIPE.

200-FOOT RIVERFRONT WETLAND NOTE:
THE ENTIRE PROJECT SITE IS LOCATED WITHIN THE 200-FOOT RIVERFRONT WETLAND.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.			SDA/PDB	NSW

SEAL

SEAL

NOT FOR CONSTRUCTION

SCALE:
HORZ.: 1" = 20'
VERT.:
DATUM:
HORZ.: NAD83
VERT.: NAVD88
20 10 0 20
GRAPHIC SCALE

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

DIVISION OF ECOLOGICAL RESTORATION

EXISTING CONDITIONS PLAN

EAGLE NECK CREEK WETLAND RESTORATION
CULVERT REPLACEMENT PROJECT

OLD COUNTY ROAD TRURO, MASSACHUSETTS

PROJ. No.: 20110202C21
DATE: JUNE 2013

CS-102

4 OF 20

File Path: J:\DWG\P20110202C\C21\Civil\Plan\20110202C21_EXC01.dwg, Layout: CS-102, Plotted: Fri, Jun 28, 2013 - 3:27 PM User: sirons
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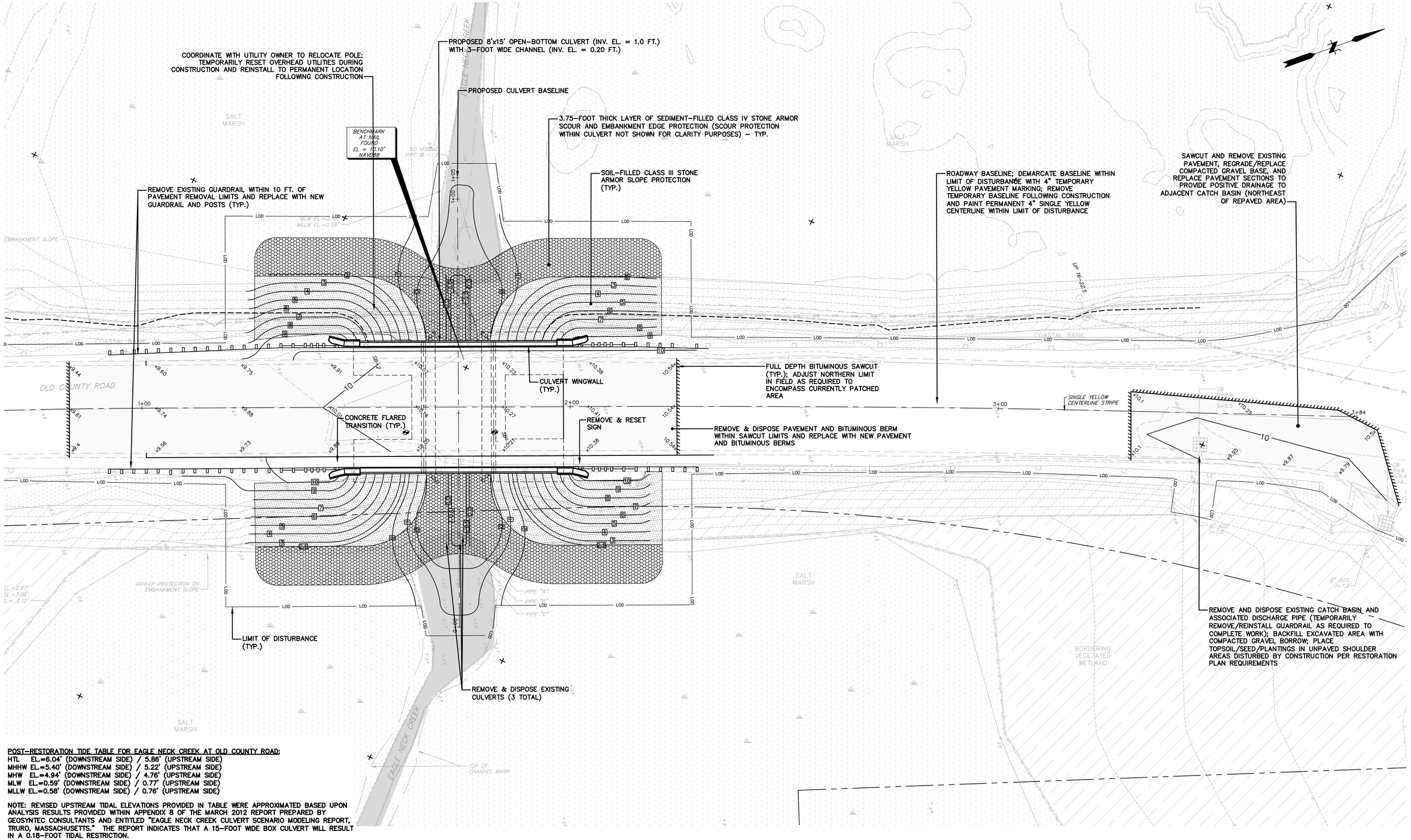

POST-RESTORATION TIDE TABLE FOR EAGLE NECK CREEK AT OLD COUNTY ROAD;
HTL EL.=6.04' (DOWNSTREAM SIDE) / 5.86' (UPSTREAM SIDE)
MHHW EL.=5.40' (DOWNSTREAM SIDE) / 5.22' (UPSTREAM SIDE)
MHW EL.=4.94' (DOWNSTREAM SIDE) / 4.76' (UPSTREAM SIDE)
MLW EL.=0.59' (DOWNSTREAM SIDE) / 0.77' (UPSTREAM SIDE)
MLLW EL.=0.58' (DOWNSTREAM SIDE) / 0.76' (UPSTREAM SIDE)

NOTE: REVISED UPSTREAM TIDAL ELEVATIONS PROVIDED IN TABLE WERE APPROXIMATED BASED UPON ANALYSIS RESULTS PROVIDED WITHIN APPENDIX 8 OF THE MARCH 2012 REPORT PREPARED BY GEOSYNTEC CONSULTANTS AND ENTITLED "EAGLE NECK CREEK CULVERT SCENARIO MODELING REPORT, TRURO, MASSACHUSETTS." THE REPORT INDICATES THAT A 15-FOOT WIDE BOX CULVERT WILL RESULT IN A 0.18-FOOT TIDAL RESTRICTION.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.			SDA/PDB	NSW

SEAL

SEAL

NOT FOR CONSTRUCTION

SCALE:
HORZ.: 1" = 10'
VERT.:
DATUM:
HORZ.: NAD83
VERT.: NAVD88
10 5 0 10
GRAPHIC SCALE

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

DIVISION OF ECOLOGICAL RESTORATION

PROPOSED CONDITIONS PLAN

EAGLE NECK CREEK WETLAND RESTORATION
CULVERT REPLACEMENT PROJECT

OLD COUNTY ROAD TRURO, MASSACHUSETTS

PROJ. No.: 20110202C21
DATE: JUNE 2013

CS-103

5 OF 20

File Path: J:\DWG\P20110202C21\Civil\Plan\20110202C21_STP02.dwg, Layout: CS-103, Plotted: Fri, Jun 28, 2013 - 3:28 PM User: sirons
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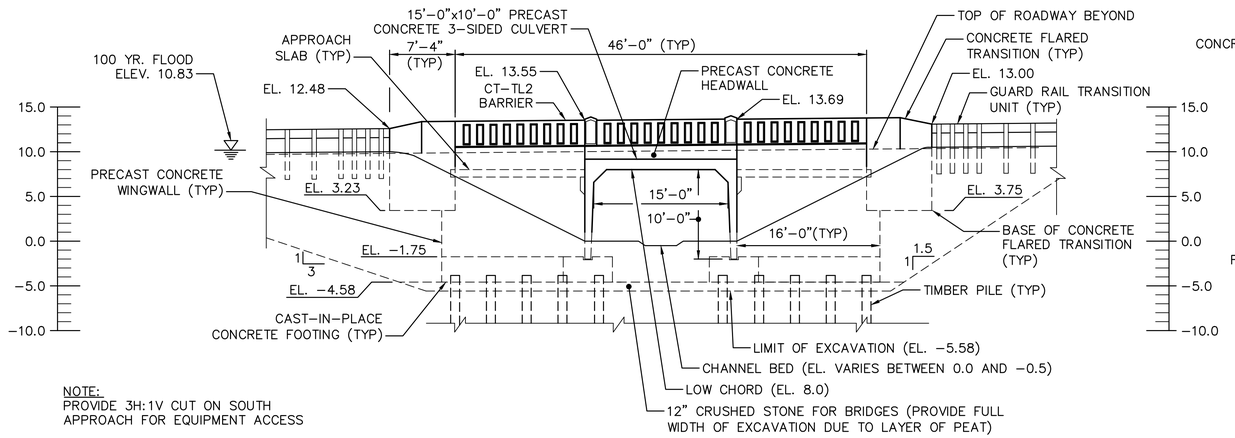
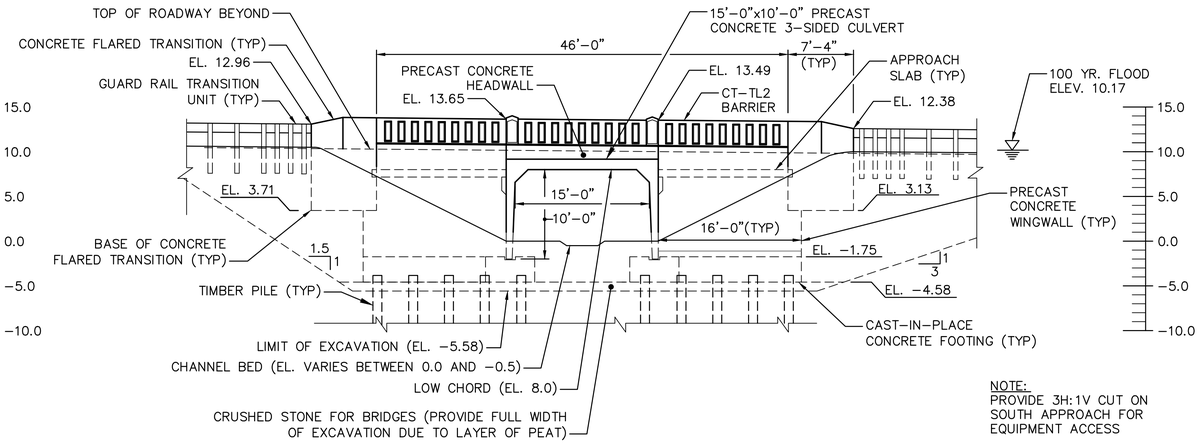


NOTE:
PROVIDE 3H:1V CUT ON SOUTH APPROACH FOR EQUIPMENT ACCESS

EAST ELEVATION

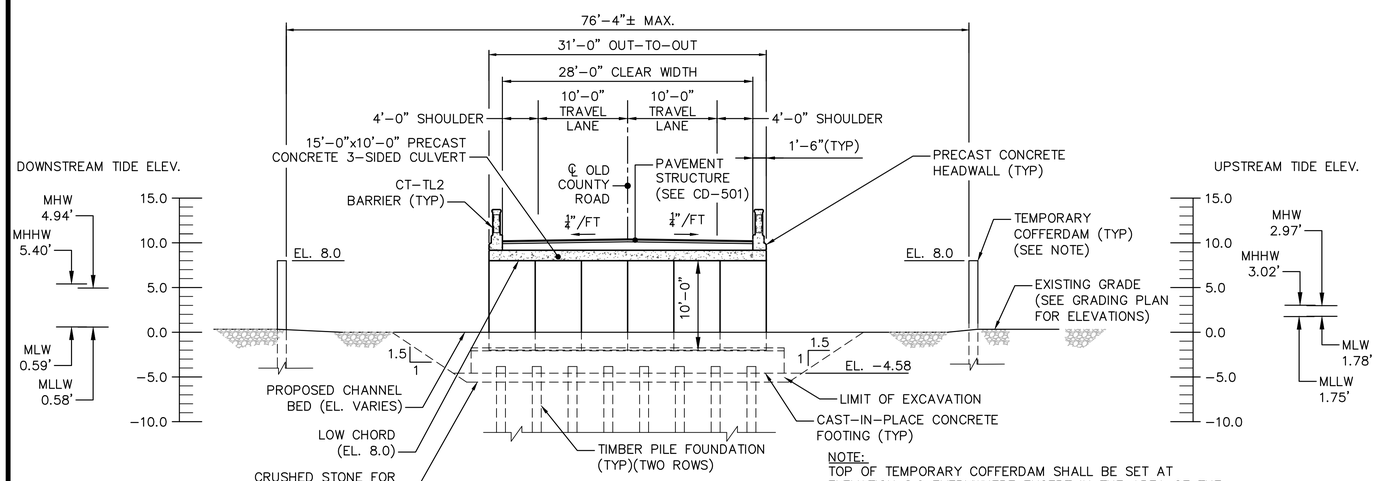
SCALE: 1/8" = 1'-0"



NOTE:
PROVIDE 3H:1V CUT ON SOUTH APPROACH FOR EQUIPMENT ACCESS

WEST ELEVATION

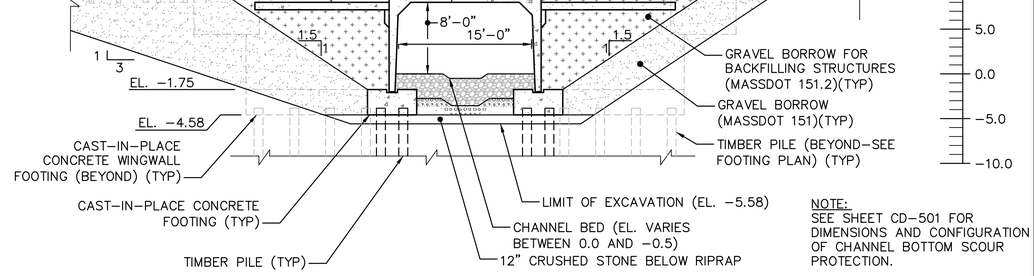
SCALE: 1/8" = 1'-0"



NOTE:
TOP OF TEMPORARY COFFERDAM SHALL BE SET AT ELEVATION 8.0 EVERYWHERE EXCEPT IN THE AREA OF THE 3:1 CUT ON THE SOUTH APPROACH FOR CONSTRUCTION ACCESS WHERE THE TOP OF TEMPORARY COFFERDAM MAY BE SET AT ELEVATION 6.5 TO FACILITATE CONSTRUCTION ACCESS.

TRANSVERSE SECTION

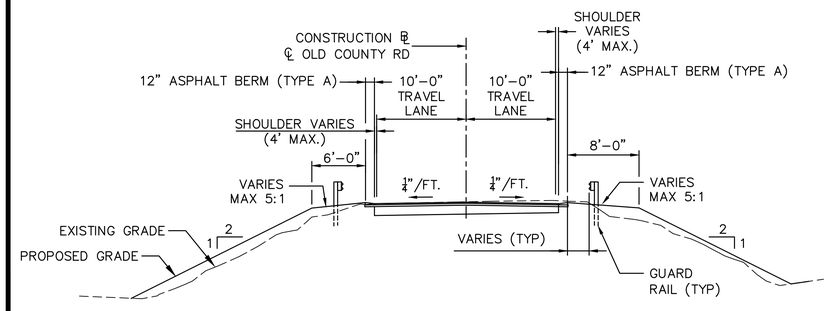
SCALE: 1/8" = 1'-0"



NOTE:
SEE SHEET CD-501 FOR DIMENSIONS AND CONFIGURATION OF CHANNEL BOTTOM SCOUR PROTECTION.

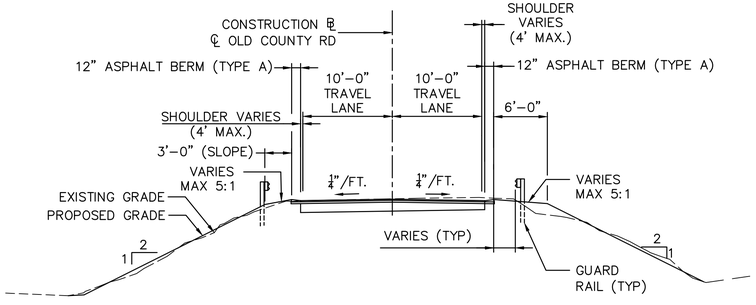
CLEARANCE DIAGRAM

SCALE: 1/8" = 1'-0"



TYPICAL SOUTH APPROACH SECTION

SCALE: 1/8" = 1'-0"



TYPICAL NORTH APPROACH SECTION

SCALE: 1/8" = 1'-0"

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.			SDA/PDB	NSW

SEAL

SEAL

NOT FOR CONSTRUCTION

SCALE:
HORZ.: 1/8"=1'
VERT.: 1/8"=1'
DATUM:
HORZ.: NAD83
VERT.: NAVD88
8 4 0 8
GRAPHIC SCALE

FUSS & O'NEILL
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DIVISION OF ECOLOGICAL RESTORATION

STRUCTURAL DETAILS

EAGLE NECK CREEK WETLAND RESTORATION
CULVERT REPLACEMENT PROJECT

OLD COUNTY ROAD — TRURO, MASSACHUSETTS

PROJ. No.: 20110202C21
DATE: JUNE 2013

SA-103

Hurricane Sandy Coastal Resiliency Competitive Grants Program

Pamet River Restoration Project Figures

Figure UP1: Overwash at Ballston Beach into the Upper Pamet / headwaters of the Pamet River. Photo courtesy of: Cape Cod Times.

Figure UP2: Aerial photo of overwash at Ballston Beach into the Upper Pamet / headwaters of the Pamet River. Photo courtesy of: Cape Cod Times.

Hurricane Sandy Coastal Resiliency Competitive Grants Program

Pamet River Restoration Project Figures

Figure EN1: Eagle Neck Creek and 8 inch culvert under Old County Road.

Figure EN2: View of Eagle Neck Creek marsh, with substantial Phragmites stands in the background.

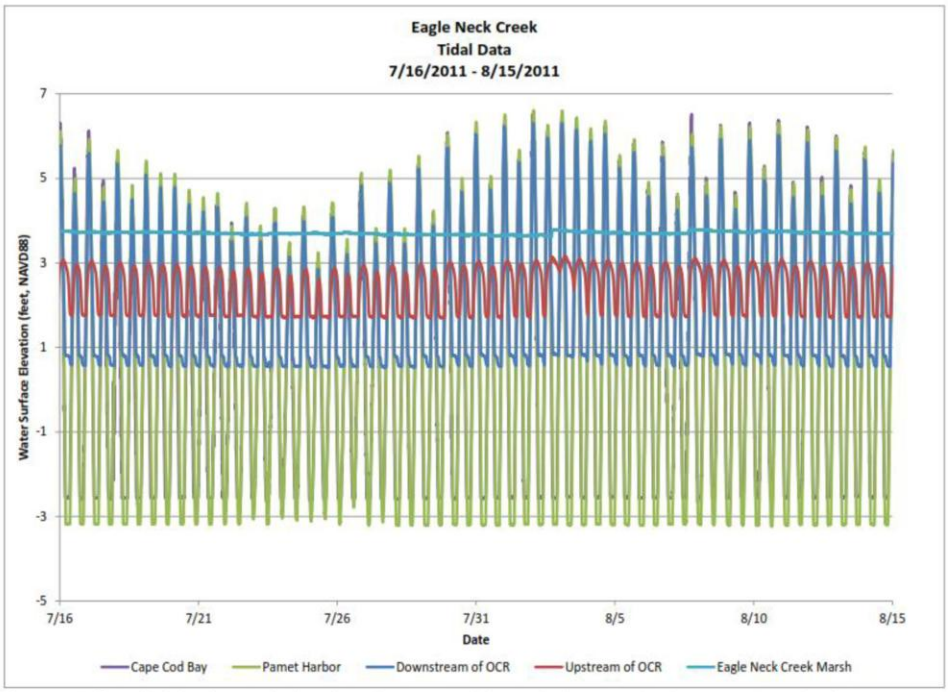

Figure EN3: Tidal hydrograph showing the severe tide restriction ranging between 1 and 3-feet depending on the daily tidal cycle. Green is the unrestricted tide range in Pamet Harbor, while dark blue is just downstream of the culvert at Old County Road (OCR), and red is just upstream. Light blue is at the upper end of the system, showing no tidal influence.

Hurricane Sandy Coastal Resiliency Competitive Grants Program

Pamet River Restoration Project Figures

Figure MP1: Existing Culvert 3-foot culvert at Mill Pond and Mill Pond Road, Truro

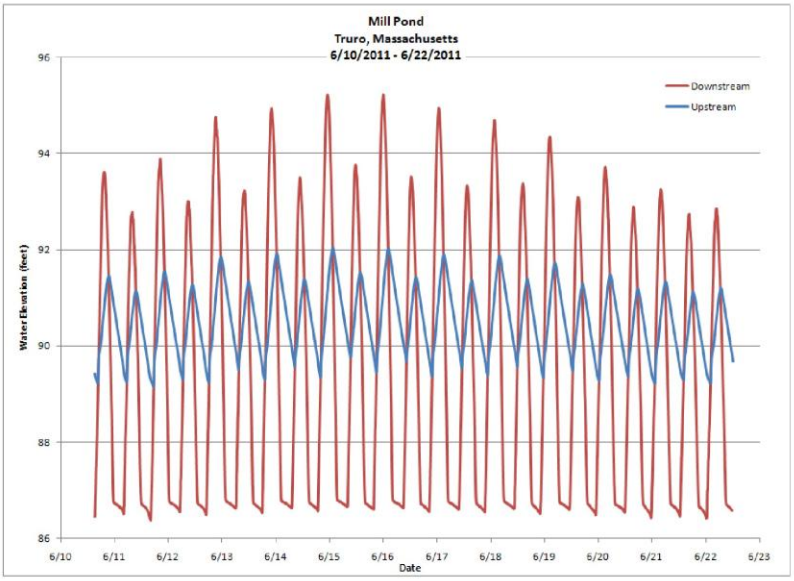

Figure MP2: Plot of water surface elevations recorded up and downstream of Mill Pond Road, Truro, between June 10-22, 2011.

NFWF

Statement of Litigation

Instructions: Save this document on your computer and complete. The final narrative should not exceed two (2) pages; do not delete the text provided below. Once complete, upload this document into the on-line application as instructed.

Litigation: In the space provided below, state any litigation (including bankruptcies) involving your organization and either a federal, state, or local government agency as parties. This includes anticipated litigation, pending litigation, or litigation completed within the past twelve months. Federal, state, and local government applicants are not required to complete this section. If your organization is not involved in any litigation, please state below.

The Town of Truro is a municipality of the Commonwealth of Massachusetts is therefore not required to complete this section.

Charleen L. Greenhalgh
Assistant Town Administrator/Planner

Date: Jan 30, 2014

TOWN OF TRURO

Charleen L. Greenhalgh, ATA/Planner
P.O. Box 2030, Truro, MA 02666
Tel: (508) 349 7004, Ext. 27 Fax: (508) 349 5505
assttownadm@truro ma.gov

January 30, 2014

Re: Hurricane Sandy Coastal Resiliency Grant Program - Town of Truro

The Town of Truro is a municipality of the Commonwealth of Massachusetts. The Board of Selectmen consists of five residents who are elected to three-year terms on a community-wide basis. Massachusetts General Laws vest the Board of Selectmen with all municipal authority no delegated to other elected boards or retained by Town Meeting, as the Town's legislative branch. The Board of Selectmen employs a Town Administrator to manage the day-to-day business of the Town within the Board's policy direction and a Town Counsel to handle the Town's legal affairs.

Town of Truro Board of Selectmen:

- Jay Coburn, Chairman
- Breon Dunigan, Vice-Chair
- Janet Worthington, Clerk
- Paul Wisotzky, Member
- Robert Weinstein, Member

Si i :, : *Town* **Administrator/Planner**

DER NFWF Project Budget Template

	Unit	# of Units
Salaries and Benefits		
Upper Pamet Staff - Research	lump sum	2
Upper Pamet: Town Accountant	hours	20
Upper Pamet: Town Administrator		40
Upper Pamet: Town DPW		40
Eagle Neck: Town Accountant	hours	120
Eagle Neck: Assistant Administrator	hours	270
Eagle Neck: Town DPW	hours	150
Mill Pond: Town Accountant	hours	120
Mill Pond: Assistant Administrator	hours	270
Mill Pond: Town DPW	hours	75
Equipment		
Contractual Services		
Upper Pamet Hydrodynamic Modeling	lump sum	1
Eagle Neck Modeling	lump sum	1
Eagle Neck Final Design and Permitting	lump sum	1
Eagle Neck Bid Assembly	lump sum	1
Eagle Neck Construction CCCD Project Management	lump sum	1
Eagle Neck Construction Mgmt and OVS	lump sum	1
Eagle Neck Creek Marsh Sustainability Assessment	lump sum	1
Eagle Neck Construction	lump sum	1
Mill Pond Modeling - Alternatives	lump sum	1
Mill Pond Modeling - DOT Scour	lump sum	1
Mill Pond Design	lump sum	1
Mill Pond Permitting	lump sum	1
Mill Pond PM CCCD		1
Supplies and Materials		
Eagle Neck Creek Sensors	each	10
Printing		
Travel		
Total		

Per Unit cost	Total	NFWF Request	Match	Other Sources
	$ 100,525	**$ 48,000**	**$ 52,525**	**$ -**
$ 24,000	$ 48,000	$ 48,000		
$ 45	$ 900		$ 900	
$ 48	$ 1,920		$ 1,920	
$ 49	$ 1,960		$ 1,960	
$ 45	$ 5,400		$ 5,400	
$ 48	$ 12,960		$ 12,960	
$ 49	$ 7,350		$ 7,350	
$ 45	$ 5,400		$ 5,400	
$ 48	$ 12,960		$ 12,960	
$ 49	$ 3,675		$ 3,675	
	$ -	**$ -**	**$ -**	**$ -**
	$ 2,534,000	**$ 2,350,000**	**$ 184,000**	**$ 66,000**
$ 150,000	$ 150,000	$ 150,000		
$ 17,000	$ 17,000		$ 17,000	
$ 180,000	$ 222,000	$ 180,000	$ 42,000	$ 36,000
$ 10,000	$ 10,000	$ 10,000		
$ 40,000	$ 40,000	$ 40,000		
$ 50,000	$ 50,000	$ 50,000		
$ 300,000	$ 300,000	$ 300,000		
$ 1,500,000	$ 1,500,000	$ 1,375,000	$ 125,000	
				$ 30,000
$ 50,000	$ 50,000	$ 50,000		
$ 125,000	$ 125,000	$ 125,000		
$ 50,000	$ 50,000	$ 50,000		
$ 20,000	$ 20,000	$ 20,000		
	$ 8,000	**$ 8,000**	**$ -**	**$ -**
$ 800	$ 8,000	$ 8,000		
	$ -	**$ -**	**$ -**	**$ -**
	$ -	**$ -**	**$ -**	**$ -**
	$ 2,642,525	**$ 2,406,000**	**$ 236,525**	**$ 66,000**

DER NFWF Project Budget Template

	Unit	# of Units	Per Unit cost
Salaries and Benefits			
Upper Pamet Staff - Research	lump sum	2	$ 24,000
Equipment			
Contractual Services			
Upper Pamet Hydrodynamic Mo	lump sum	1	$ 150,000
Supplies and Materials			
Printing			
Travel			
Total			

Total	NFWF Request	Match	Other Sources
$ 48,000	**$ -**	**$ -**	**$ -**
$ 48,000	$ -		
$ -			
$ -	**$ -**	**$ -**	**$ -**
$ 150,000	**$ 150,000**	**#REF!**	**$ -**
$ 150,000	$ 150,000	$ 150,000	
$ -	**$ -**	**$ -**	**$ -**
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$ -			
$ -			
$ -			
$ 198,000	**$ 150,000**	**#REF!**	**$ -**