Commonwealth of Massachusetts
Executive Office of Environmental Affairs ■ MEPA Office

ENF Environmental Notification Form

For Office Use Only
Executive Office of Environmental Affairs
EOEA No.: 13303
MEPA Analyst: Anne Canaday
Phone: 617-626- 1035

The information requested on this form must be completed to begin MEPA Review in accordance with the provisions of the Massachusetts Environmental Policy Act, 301 CMR 11.00.

Project Name: Waquoit Bay Yacht Club Revetment Repair		
Street: 20 Seapit Road		
Municipality: Falmouth	Watershed: Waquoit Bay	
Universal Tranverse Mercator Coordinates:	Latitude:41° 34.739' N Longitude:70° 31.595' W	
Estimated commencement date: Winter 2004-2005	Estimated completion date: Winter 2004-2005	
Approximate cost: $30,000	Status of project design: 100 %complete	
Proponent: Waquoit Bay Yacht Club, Inc.		
Street: 20 Seapit Road		
Municipality: Falmouth	State: MA	Zip Code: 02536
Name of Contact Person From Whom Copies of this ENF May Be Obtained: Kirk Bosma		
Firm/Agency: Woods Hole Group	Street: 81 Technology Park Drive	
Municipality: East Falmouth	State: MA	Zip Code: 02536
Phone: 508 540 8080	Fax: 508 540 1001	E-mail: kbosma@whgrp.com

Does this project meet or exceed a mandatory EIR threshold (see 301 CMR 11.03)? ☐Yes ☒No

Has this project been filed with MEPA before? ☐Yes (EOEA No._____) ☒No

Has any project on this site been filed with MEPA before? ☐Yes (EOEA No._____) ☒No

Is this an Expanded ENF (see 301 CMR 11.05(7)) requesting:

a Single EIR? (see 301 CMR 11.06(8))	☐Yes	☒No
a Special Review Procedure? (see 301CMR 11.09)	☐Yes	☒No
a Waiver of mandatory EIR? (see 301 CMR 11.11)	☐Yes	☒No
a Phase I Waiver? (see 301 CMR 11.11)	☐Yes	☒No

Identify any financial assistance or land transfer from an agency of the Commonwealth, including the agency name and the amount of funding or land area (in acres):

Are you requesting coordinated review with any other federal, state, regional, or local agency? ☐Yes(Specify_____) ☒No

List Local or Federal Permits and Approvals:
(to be obtained) Town of Falmouth Order of Conditions, Chapter 91 Permit, MCZM Consistency Statement, and USACE Programmatic General Permit

Which ENF or EIR review threshold(s) does the project meet or exceed (see 301 CMR 11.03):

- ☐ Land
- ☐ Water
- ☐ Energy
- ☒ ACEC
- ☐ Rare Species
- ☐ Wastewater
- ☐ Air
- ☐ Regulations
- ☒ Wetlands, Waterways, & Tidelands
- ☐ Transportation
- ☐ Solid & Hazardous Waste
- ☐ Historical & Archaeological Resources

Summary of Project Size & Environmental Impacts	Existing	Change	Total
LAND			
Total site acreage	1.06		
New acres of land altered		0	
Acres of impervious area	0	0	0
Square feet of new bordering vegetated wetlands alteration		0	
Square feet of new other wetland alteration		3200 sq. ft.	
Acres of new non-water dependent use of tidelands or waterways		0	
STRUCTURES			
Gross square footage	0	0	0
Number of housing units	0	0	0
Maximum height (in feet)	0	0	0
TRANSPORTATION			
Vehicle trips per day	0	0	0
Parking spaces	0	0	0
WATER/WASTEWATER			
Gallons/day (GPD) of water use	0	0	0
GPD water withdrawal	0	0	0
GPD wastewater generation/ treatment	0	0	0
Length of water/sewer mains (in miles)	0	0	0

State Permits & Approvals

- ☒ Order of Conditions
- ☐ Superseding Order of Conditions
- ☒ Chapter 91 License
- ☐ 401 Water Quality Certification
- ☐ MHD or MDC Access Permit
- ☐ Water Management Act Permit
- ☐ New Source Approval
- ☐ DEP or MWRA Sewer Connection/ Extension Permit
- ☒ Other Permits (*including Legislative Approvals*) – Specify:

Consistency Statement (MCZM)
Programmatic General Permit (USACE)

CONSERVATION LAND: Will the project involve the conversion of public parkland or other Article 97 public natural resources to any purpose not in accordance with Article 97?

☐Yes (Specify_____) ☒No

Will it involve the release of any conservation restriction, preservation restriction, agricultural preservation restriction, or watershed preservation restriction?

☐Yes (Specify_____) ☒No

RARE SPECIES: Does the project site include Estimated Habitat of Rare Species, Vernal Pools, Priority Sites of Rare Species, or Exemplary Natural Communities?
☐Yes (Specify_____) ☒No

HISTORICAL /ARCHAEOLOGICAL RESOURCES: Does the project site include any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth?
☐Yes (Specify_____) ☒No

If yes, does the project involve any demolition or destruction of any listed or inventoried historic or archaeological resources?
☐Yes (Specify_____) ☒No

AREAS OF CRITICAL ENVIRONMENTAL CONCERN: Is the project in or adjacent to an Area of Critical Environmental Concern?
☒Yes (Specify: Waquoit Bay_____) ☐No

PROJECT DESCRIPTION: The project description should include **(a)** a description of the project site, **(b)** a description of both on-site and off-site alternatives and the impacts associated with each alternative, and **(c)** potential on-site and off-site mitigation measures for each alternative (*You may attach one additional page, if necessary.*)

Waquoit Bay Yacht Club (Figure 1) is a shore front property situated at the head of Waquoit Bay in Falmouth, Massachusetts. Waquoit Bay connects to Vineyard Sound through a jettied entrance to the south. The site contains a number of coastal wetland resource areas including coastal beach, coastal bank, coastal dune, salt marsh and land under the ocean. A majority of the property's shoreline is heavily armored with a revetment that extends approximately 160 feet along the shoreline (Figure 2). As shown in Figure 2, this structure consists of two distinct sections. The southern portion of the structure is in good condition and is fronted with a mix of salt marsh and coastal beach resources. The northern portion of the structure, directly fronting the yacht club building, lacks both the sediment resource and salt marsh. This portion of the revetment requires repair/enhancement. To the north, adjacent to the revetment, lies a small pocket beach that is used to launch mid-size and smaller vessels, and further north, on the adjacent property, is a healthy salt marsh. The yacht club has an existing license plan for floats (#1774), which are stored upland during the winter months (as shown in Figure 1).

Figure1. Waquoit Bay Yacht Club.

The existing yacht club, originally constructed in 1927, is located at its closest point 7.5 feet from the top of the coastal bank. The yacht club is currently protected by the rip-rap revetment at the front of the structure, which acts as the coastal bank on the subject property. The clubhouse is situated in close proximity to the water and an existing concrete patio is directly adjacent to the shoreline. The portion of the revetment directly fronting the clubhouse building is primarily comprised of a single layer of large armor units with a concrete promenade (which forms the patio, as shown in Figure 3). The interspatial gaps in this portion of the revetment are filled with a concrete grout to join the large armor units. Directly fronting this portion of the revetment, there exists a small salt marsh region, comprised of *spartina alterniflora. Spartina alterniflora* typically grows in a fairly narrow range of elevations

Figure 2. Existing revetment at Waquoit Bay Yacht Club.

governed by the tide range at the site. In general, *spartina alterniflora* grows between Mean Tide Level (MTL) and Mean High Water (MHW). It is this portion of the revetment, directly fronting the clubhouse, which is of primary concern. Failure of this portion of the revetment would result in immediate damage to the clubhouse, including collapse of the deck and likely foundation slippage of the clubhouse.

Currently, a majority of the revetment is in good conditions, except for the portion directly fronting the clubhouse (where concrete grout is used). Significant gaps in the toe of the structure have developed allowing for removal of the finer grain sediments from the core. In this region of revetment, which is most critical, there is significant washout of the backfill of the revetment. Washout eventually causes significant cavities and local collapse of the structure. Some cavities have already formed due to this ongoing washout and were evident beneath the structure promenade. At Waquoit Bay Yacht Club, continued cavity formation and subsequent collapse of the existing revetment would present an immediate threat to the structural stability of the clubhouse.

Figure 3. Concrete patio directly landward of existing revetment.

Typically, wave induced pressure gradients cause washout of the finer material through the coarser armor units when stable filter criteria are not met. In this case, the existing revetment was not constructed with appropriate under layers and filter criteria to resist potential washout failure. In addition, the property resides in a relatively sheltered location and experiences minimal wave action. All of the waves at the site are generated locally by the winds acting on the water surface within the restricted area (Waquoit Bay). These waves are formed as a function of the wind speed, wind duration, water depth, and fetch (the distance over which the wind acts on the water). The washout is therefore primarily caused by tidal flows through the existing gaps of the revetment, as well as the large wave event induced pressures acting on the face of the revetment.

A wide range of alternatives was considered for reducing the washout of the backfill material and providing protection to the clubhouse. An alternatives analysis was performed to evaluate potential impacts and effectiveness of each of the alternatives. The alternatives considered and a brief explanation of potential impacts. The preferred alternative is presented in detail herein.

- **Do Nothing** – This alternative is not acceptable as washout will continue and endanger the clubhouse.
- **Injection Grout Filling** – Injection grout filling consists of pumping grout material directly behind the existing structure. This would potentially eliminate the washout concern, but would also completely eliminate the potential sediment source, although small, from the beach. In addition, this alternative is not completely effective at stabilizing the backfill material and may not completely eliminate washout. Therefore, this alternative was

eliminated.

- **Sheet Pile Wall with Backfill** – A sheet pile wall would be constructed seaward of the existing revetment and backfilled. This alternative would eliminate washout and would stabilize the shoreline and the coastal bank fronting the clubhouse. However, the impermeable, vertical wall would result in increased erosion in front of the structure due to increased wave reflection. This alternative also eliminates the small sediment source available to the beach, and has environmental impacts. Therefore, this alternative was eliminated.
- **Internal Vinyl Sheet Pile Wall** – An internal vinyl sheet pile wall would be constructed landward of the current revetment. This alternative is unobtrusive in the short term and eliminates the washout of material from behind the revetment. However, in the long-term, potential revetment failure would expose the vertical sheet pile wall and again result in increased erosion, as in the alternative above. The associated environmental impacts resulted in elimination of this alternative.
- **Sheet Pile Toe Wall** – A low profile sheet pile toe wall would be installed seaward of the existing revetment. This alternative reduces the potential for increased erosion, but still has the potential for increased wave reflection through time and eliminates the potential sediment source. Again, the vertical structure in this sensitive region would potentially have environmental impacts. Therefore, this alternative was eliminated.
- **Revetment Construction\Re-construction** – A complete revetment reconstruction is cost prohibitive. A new revetment, with a milder slope was also considered; however, the limited amount of landward surface area backing the revetment and in front of the yacht club structure (Figure 2), makes this infeasible. Therefore, this alternative was eliminated.
- **Filter Fabric, Stone Repair, and Nourishment** – Preferred Alternative, described below.

The preferred alternative, as presented in the Plan of Proposed Conditions, proposes minor repairs of several sections of the existing rip-rap revetment. This includes the installation of MIRAFI FW 403 Filterweave fabric behind the existing structure, the addition of a bedding and drainage stone layer behind the structure, the addition of a stormwater runoff trench at the crest of the existing structure, the addition of clean backfill material behind the structure as needed, and addition of compatible beach material in front of the structure that will be planted with marsh species and encouraged to develop into salt marsh. The proposed work will not alter the shape of the existing revetment, which ties in with the existing bank geomorphology to the south by merging with existing coastal protection structures to the south. The length of the revetment that will be enhanced totals approximately 80 feet. Details on the proposed sediment placement are shown in the Plan of Proposed Conditions.

The beach nourishment portion of the project has been proposed to provide an increased sediment source, additional protection, enhance the salt marsh, and to match the neighboring shores. A small amount of clean, beach compatible sediment (approximately 118 cubic yards) will be placed in front of the structure along approximately 80 feet of shoreline. The slope of the new beach was designed to be similar to the neighboring beach that is currently stable and experiencing salt marsh growth. In addition, *Spartina patens* and/or *Spartina alterniflora* will be planted between mean tide level and the landward extent of the beach in order to stabilize the beach and encourage growth of the salt marsh resource area. Minimal dispersion of material is expected due to the low energy wave climate, planting of supporting vegetation, and similarity to neighboring shorelines. Details on the proposed sediment placement are shown in the Plan of Proposed Conditions.

Sediment samples were taken both on the existing coastal beach resources fronting the existing

structure, and behind the existing structure (presented in Appendix A). The beach nourishment material will be taken from an upland source and will be selected to be compatible with the native beach grain size. The sediment sample taken from behind the structure was utilized to determine the adequate filter fabric type.

Potential impacts and enhancements of the proposed project, include:

- Inclusion of a drainage trench that will inhibit direct stormwater and upland runoff from draining directly into Waquoit Bay. Currently, upland runoff advances directly down the concrete patio and empties into the bay unimpeded. The proposed project includes a drainage trench that will allow for some natural filtering through bedding and drainage stone.
- Beach replenishment that will expand coastal beach resources, provides additional protection to upland areas, and provides a sediment source to the beach regions.
- Although a small portion of salt marsh will be covered during the beach replenishment, the entire region will be planted following replenishment and salt marsh growth and expansion will be encouraged.

Construction access from the upland will be gained via the existing driveway to the north of the yacht club building as indicated on the Proposed Plans. The access paths will be used by light construction machinery, as necessary. The existing concrete patio/pad will be cut as needed and material behind the structure will be evacuated as required. The cavity will be replaced with bedding/drainage stone and backed with the Mirafi FW 403 filter fabric. The excavation will go as deep as possible, while maintaining structural stability, in order to wrap the filter fabric around an armor unit near the base of the structure. In order to maintain stability of the existing revetment, armor units near the crest of the structure may be temporarily removed during the excavation and placement process. Additional voids behind the stone layer will be filled with clean fill as necessary. The concrete pad will be replaced except for the inclusion of a 1 to 2 foot wide drainage trench at the seaward end of the concrete pad. Construction will occur during the winter and within appropriate construction windows to protect fish and wildlife.

Beach compatible material from an upland site will also be placed in front of the existing structure. After placement the material will be graded as specified. The crest of the placement will be at 2.5 feet NGVD and extend seaward for approximately 5 feet and then advance at a 6:1 H:V slope seaward. This slope is similar to the neighboring beach/sale marsh region. Following grading, the replenishment area will be planted with *Spartina alterniflora* in the early spring. The construction is expected to take approximately one month to complete.