

3.B.3.1 Chequessett Yacht and Country Club

Hydrodynamic modeling shows that portions of the CYCC golf course would be affected by the proposed inundation levels in the Mill Creek sub-basin. As proposed, the Project will implement mitigation measures designed to prevent impacts to the CYCC golf course. Mitigation work includes:

- Improvements to the CYCC golf course, including raising and renovating portions of the five lower fairways, tees, greens, roughs, sand traps and cartpaths (Holes #s 1, 6, 7, 8 & 9), said improvements designed to mitigate against water levels up to the elevation 6.4 feet NAVD 88. This 6.36-foot elevation represents the maximum water level that would occur under storm of record conditions with tide gates in the Mill Creek water control structure open 3 feet high and the tide gates in the Chequessett Neck Road water control structure open 10 feet high, and full Project restoration (beyond Phase 1) has occurred;
- Excavation and then reconstruction of one upland CYCC golf course hole (Hole #2) which will provide a portion of fill needed for the Project (approximately 253,000 cubic yards), to be used in raising the five lower holes of the golf course (approximately 180,000 cubic yards) and also for other Project-related needs outside of the CYCC Property (approximately 73,000 cubic yards);
- Installation of new irrigation on Holes #s 1, 2, 6, 7, 8 & 9 and relocation of the practice area to an upland portion of the CYCC Property; and
- Clearing channels and managing natural vegetation on the course and in the Mill Creek sub basin as may be needed to augment restoration (some channels will be identified and cleared mechanically to improve drainage, and others will be cleared naturally as restoration proceeds).

In addition it will be necessary to make improvements on three other holes not impacted by inundation, to make them suitable for golf course use and compatible with the Mitigation Work.

CYCC and the Town of Wellfleet have entered into an Agreement intended to achieve the goals of 1) implementing the Project in a way that furthers the public interest, and 2) avoiding and mitigating potential harm to CYCC that could be caused by increased tidal flow on the golf course now or in the future due to the Project.

Consistent with the terms of the MOU between CYCC and the Town, the Project proposes a Water Level Review Threshold of +0.15 feet for mean water levels in the lower Herring River basin to be included as a Cape Cod Commission permit condition. This Water Level Review Threshold sets a mean water level for tidal restoration in the lower Herring River basin that cannot be exceeded before one or the other of the following conditions is met:

- The Mitigation Work and other related work on CYCC's property (as approved in the permit plans) has been substantially completed and evidence of substantial completion has been presented to and approved by all necessary permit issuing authorities; or
- Project proponents apply for and obtain a review and approval from the Cape Cod Commission

authorizing tidal restoration to proceed to the full scope of Phase 1 restoration (a maximum mean high tide level in the Lower Herring River basin of 3.6 feet). Consistent with the procedural and substantive review provisions of the Cape Cod Commission, Project proponents would have to satisfy the Commission's applicable standards in order to obtain relief, and public notice and comment would be consistent with the Cape Cod Commission's regulations. The Town recognizes that it cannot confer jurisdiction or specify performance standards for Cape Cod Commission review, and do not intend to do so here.

During the first stage of the Phase 1 restoration, mean water levels in Lower Herring River will remain at or below pre-restoration levels. Therefore, groundwater levels on the golf course would not be increased above pre-restoration levels during the first stage of tidal restoration, and are in fact anticipated to drop due to lower mean water levels and improved drainage in Mill Creek and the Lower Herring River.

The Town and Project Partners will develop a monitoring program capable of determining changes to tide range in the Herring River and seasonal variations in groundwater on the CYCC Property that are attributable to the Project. Project Partner Agencies have already initiated multi-year groundwater monitoring with U.S. Geological Survey to establish the range of baseline groundwater levels prior to initiation of restoration. Once restoration of tidal flow in the Herring River basin has begun, if the monitoring program indicates that increasing tide range in the Herring River would result in groundwater increases on CYCC property above the range of baseline groundwater levels, the Town will coordinate with Project Partner Agencies to proactively evaluate and employ measures intended to prevent Project-related changes to groundwater from exceeding the baseline range. Monitoring data would be examined to determine actions that could allow increases to Herring River tide range while preventing adverse effects on the CYCC Property related to the Project. These actions, if necessary, could include adjusting the CNR and/or Mill Creek tide control structures to reduce Herring River mean water levels and maintain Mill Creek groundwater to within the baseline range, or improving drainage in Mill Creek.

Notwithstanding efforts to include the CYCC portion of the overall restoration in all Phase 1 design, permitting, and funding requests, the Town acknowledges that the regulatory approvals and funding for implementation of various project elements are dependent on the actions of many others outside the CYCC and the Town. Thus, despite best efforts to permit and raise funds for the CYCC mitigation concurrently with other project Phase 1 activities, a scenario may occur where tidal restoration activities in the main Herring River basin proceed before the Mill Creek tidal restoration and CYCC work are completed. In this case, the Town and CYCC have agreed upon a contingent approach that will allow the Project to begin restoration before completion of Mill Creek tidal restoration and CYCC mitigation.

In this contingent scenario, where tidal restoration in the main Herring River basin begins before completion of work on CYCC's property, then the new Mill Creek water control structure will be set to only allow drainage of freshwater out of the Mill Creek basin. A pump will be installed above the Mill Creek water control structure to assist with drainage of stormwater runoff. Pumping of groundwater is

not intended. The pump will be designed and operated if necessary to prevent tide levels from exceeding what they would be under current conditions for an extreme storm event and thereby prevent potential damage to the CYCC golf course in the event of extreme conditions. Operating protocols will ensure that the pump does not significantly alter wetland function. The pump system design and the determination of water-level thresholds for turning on and off the pump will be developed in consultation with CYCC and will be subject to review in subsequent permitting processes. To aid in the development of the water-level thresholds and required pumping capacities, additional hydrodynamic modeling was conducted to provide a comprehensive comparison of the conditions that could be expected to occur with the Mill Creek structure's tide gates set to only allow flow out of the system. Simulations evaluated conditions with combined major precipitation and tidal storm surge events.

3.B.3.2 Low-Lying Road Crossings and Culverts (Pole Dike, Bound Brook Island and Old County Roads)

The Project area consists of several low-lying roadways (LLR) that are vulnerable to high tide water levels under the proposed Project. The primary design objective of this mitigation measure is to elevate the roadways to prevent overtopping during the storm-of-record. The road segments are elevated to a minimum of 6 inches above the predicted water surface during the modeled storm event. Current design plans are presented in Section 13.

To prevent over-topping, the road surfaces and culverts need to be elevated. Approximately 24,500 linear feet of roadway are included in the Project area. Of this, approximately 10,850 linear feet of road will be raised. Elevating these roads also requires widening the road bases and replacing six existing culverts and installing the Pole Dike Road water control structure with tide gate. The 10,850 linear feet (approximately two miles) of roadway is not continuous and is made of smaller road segments. While impacts to wetlands will be necessary to widen road bases, the impacts are far outweighed by the overall wetlands benefits of the Project. Additionally, a traffic management plan will be implemented to minimize disruption to residents and businesses. These issues are addressed in Section 4.0 of this application, consistency with RPP goals and objectives.

A geotechnical investigation of existing low-lying road segments and associated culverts was conducted to assist in the development of construction plans for the Project site, including the cut and fill operations. The existing road surface at low-lying areas ranges from 2.3 to 5.2 feet, which will be elevated to 4.25 to 7.5 feet. The goal is to elevate the existing roadway segments above the storm-of-record within the Project area (3.72 to 6.88 feet) including freeboard. Freeboard of 0.5 feet above the storm-of-record was selected to elevate these roadway segments. The actual increase in elevation varies throughout the Project area. About 0 to 4.5 feet of fill is required over existing ground elevations to achieve the final site grading. As part of the re-grading, existing culverts will be replaced with upgraded pipes and box culvert structures.

To accommodate the increase in road elevation, a side slope treatment of 3:1 (horizontal to vertical) ratio was selected to blend the side slopes into existing grades, and avoid abrupt, steep transitions between the road and adjacent land for the safety of pedestrians, cyclists, and equestrians. A 3:1 side slope provides a slope that can be stabilized with natural vegetation without concerns to slope stability,