

6.0 MITIGATION MEASURES

The following measures are proposed to mitigate for unavoidable impacts to wetland resource areas and protect water quality during and following Project implementation. Descriptions of each are provided below with additional information provided on the project plans.

Table 12. Summary of Proposed Mitigation Measures

- Provide 80,000 SF of on-site IVW wetlands restoration
- Provide 5,000 SF of on-site BVW replication
- Participate in the ACOE In-Lieu Fee Program to provide off-site mitigation
- Manage Invasive Species within Wetlands H and I (IVW)
- Monitor wetlands mitigation areas twice annually for five years
- Remove 34,011 SF of Impervious Area
- Provide stormwater treatment using pervious pavement and bioretention areas for stormwater treatment in the auto parking area
- Create 36,000 SF of Coastal Dune habitat
- Implement Rare Species Protection Plans for construction phases
- Implement an Erosion and Sedimentation Control Plan for construction phases
- Implement a Construction Management Plan
- Continue existing Vegetation Management Plan to benefit rare species habitat

As discussed above, five of the CIP Project elements will result in unavoidable alterations to freshwater wetlands (isolated and/or bordering vegetated wetlands) as well as to coastal dunes and cultural grasslands (e.g., buffer zone habitat). Impacts will also occur within mapped *Estimated Habitat of Rare Wildlife*. The unique environmental setting of the Airport, specifically the abundance and proximity of resource and habitat areas to one another and their overlapping nature, have been considered during project design and avoidance of natural resources has been part of the design criteria. The Airport Project Team has designed all project elements to avoid and minimize impacts to natural resources to the fullest extent practicable in order to preserve and protect the functions and values of the resource areas and habitats, while still addressing the FAA, TSA, and MassDOT safety and security directives. Project impacts are unavoidable, primarily due to the fact that the improvements to the Airport must occur within discrete locations (i.e., the taxiway realignments must occur within a certain portion of the taxiway, rather than in an alternative location outside the vicinity of the airfield), and are held to FAA-safety and security standards.

The CIP projects contribute to the general public good and safety. The Airport has developed a comprehensive and integrated mitigation package through coordination with NPS, ACOE, MassDEP, NHESP, CCC, and the Provincetown Conservation Commission, along with aviation

regulatory entities in order to compensate for direct and indirect impacts to wetlands and other protected resource areas.

Proposed mitigation measures include on-site in-kind wetland restoration and replacement, implementation of an invasive species management plan, construction management including implementation of an erosion and sedimentation control program and rare species protection plans, stormwater management including a net reduction of impervious surface of approximately 0.78 acres (34,111 SF) (see Table 8), and implementation of an integrated vegetation management plan. No additional coastal floodplain will be impacted; there will be a net reduction of existing impervious surface at the Airport, which may provide additional flood storage during a major flooding event. These measures have been developed in order to address the various regulatory requirements for loss of wetland resource areas. As noted, site constraints limit the potential for on-site mitigation such that these are confined to areas of existing pavement that will be removed for the West End and East End Taxiway projects. In addition the presence of invasive species encourages the implementation of an invasive species management program and wetland enhancement program. A discussion of these various mitigation measures follows. Additional details are provided on the site plans and in the Attachments.

6.1 Wetland Mitigation – Restoration and Replacement

Wetland restoration plans have been developed in compliance with several regulations, performance standards, and guidance documents that relate to wetlands, including the Massachusetts Wetlands Protection Act, the Provincetown Wetland Bylaw, Sections 401 and 404 of the Clean Water Act, and the CCC Regional Policy Plan (RPP). Given the environmental constraints at the Airport, on-site wetland mitigation for direct impacts will occur primarily as wetland restoration in areas where existing impervious surfaces and fill will be removed. Indirect impacts, as well as secondary impacts associated with the cutting of vegetation and long-term maintenance of vegetation communities along the fence, will be mitigated through wetland enhancement, the integrated management of discrete populations of *Phragmites* and purple loosestrife, both identified invasive species in Massachusetts. Off-site mitigation will be provided through participation in the State’s ILF Program, a requirement of the ACOE permit for this Project.

6.1.1 Wetland Restoration Overview

Relocation of the taxiways and subsequent reduction of the existing paved areas allow for resource area restoration within the approximate footprint of existing developed and paved areas. As proposed, wetland mitigation will result in a total of approximately 1.84 acres (80,000 SF) of restored freshwater wetlands (transitional emergent marsh/shrub swamp) at the Airport in two locations (Mitigation Areas A and C). Mitigation Area A will be located within the curved footprint of the existing West End TW adjacent to portions of Wetland C/J/FK and contiguous with Wetland I, while Mitigation Area C will be located within the footprint of the existing East

End TW, south of the terminal apron and contiguous with Wetland H, as shown on the site plans. A third location, Mitigation Area B, would be located adjacent to the access road to the approach lights, to the southwest of the (abandoned) West End TW. Mitigation Area B would be contiguous with Wetland C/J/FK and would restore or replace approximately 0.11 acres (5,000 SF) of BVW, resulting in a net gain of 0.06 acres (2,888 SF). Each of these areas is highly suitable for wetland restoration due to their proximity to existing wetlands and the existing shallow groundwater table, and will result in a total of 85,000 of restored wetlands at the Airport, to mitigate for direct fill of 58,088 SF of freshwater wetlands (approximately a 1.5:1 ratio), with additional measures designed to address direct cutting of vegetation within wetlands, as discussed further below.

The wetland mitigation methodology is modeled from the Massachusetts Inland Wetland Replication Guidelines (March 2002) prepared by the Massachusetts MassDEP, as well as the performance standards for wetland replacement in accordance with the Massachusetts Wetlands Protection Act regulations at 310 CMR 10.55(4)(b)(1 through 7), the Town of Provincetown Wetlands Bylaw (Chapter 12 of the General By-Laws of Provincetown), and the ACOE's New England District Compensatory Mitigation Guidance and Mitigation Plan Checklist.

Wetland restoration activities will generally involve removal of existing pavement and gravel sub-base, excavation to appropriate sub-grade to intercept existing hydrology, incorporation of pit and mound microtopography to mimic existing conditions within lost wetland areas, re-introduction of native wetland vegetation (salvaged from lost areas and supplemented with native nursery stock), and long-term monitoring to ensure the successful establishment of a wetland plant community. A qualified wetland scientist will oversee wetland restoration efforts.

6.1.2 Wetland Restoration Process

Given the environmental constraints at the Airport, on-site wetland mitigation will occur primarily as wetland restoration in areas where existing impervious surfaces and fill will be removed. The draft wetland mitigation plans have been developed to be in compliance with several regulations, performance standards, and guidance documents that relate to wetlands, including the Massachusetts Wetlands Protection Act, the Provincetown Wetland Bylaw, Section 401 (Water Quality Certification) and Section 404 (Individual Permit) of the Clean Water Act. Additional mitigation measures are included in the mitigation for the CIP projects, including the incorporation of a bioretention system for the auto parking area and management of invasive species within certain areas of natural resources to preserve the water quality and habitat values of these wetland systems.

Wetland restoration proposed at the Airport is described below and shown on Sheets 12-14 of the project plans. On-site mitigation measures represent a balance of freshwater wetland restoration to allow for no net loss of wetlands, as well as addressing the need to mitigate for

impacts to other natural resources (e.g., coastal dunes and rare species habitat). Table 2 in Section 1 summarizes the direct wetland impacts and proposed mitigation measures.

6.1.3 Wetland Restoration Methodology

The following draft mitigation plan for wetland mitigation is developed from the Massachusetts Inland Wetland Replication Guidelines (March 2002) prepared by the Massachusetts DEP, as well as the performance standards for wetland replacement in accordance with the Massachusetts Wetlands Protection Act Regulations at 310 CMR 10.55(4)(b)(1 through 7), the Town of Provincetown Wetlands Bylaw (Chapter 12 of the General By-Laws of Provincetown), and the new federal Compensatory Mitigation Rule, as well as the New England District Compensatory Mitigation Guidance (July 2010)⁷.

Wetland restoration activities will generally involve removal of existing pavement and gravel sub-base, excavation to appropriate sub-grade to intercept available hydrology, planting of native wetland vegetation and over-seeding with a native seed mixture to stabilize disturbed soils, and implementation of monitoring plans to ensure the successful establishment of a wetland plant community. A qualified wetland scientist with experience in wetland creation or restoration will oversee all aspects of the wetland restoration efforts. Draft details of these activities are provided below.

Site Preparation, Excavation, and Grading of Mitigation Areas

Prior to the commencement of any mitigation activities, a sedimentation and erosion control barrier, such as silt socks or a combination of staked siltation fencing and strawbales (as prescribed by NHESP), will be installed along the wetland boundary to protect the adjacent areas during earth-moving activities. Following installation of this sedimentation barrier, impervious surfaces (asphalt and gravel sub-base) will be broken apart with heavy equipment, removed, and transported off-site to a suitable disposal facility or else re-used on-site as a sub-base for the projects..

A total of 34,011 Sf of impervious surfaces are proposed for removal associated with several CIP Project elements: implementation of the west end taxiway improvements, including relocation of Taxiway D and reconfiguration of Taxiway C; relocation of the east end taxiway (Taxiway B), and reconstruction of the easterly end of Taxiway A. Adjacent areas of cultural grasslands located between the paved surfaces to be removed and the adjacent wetland areas will also be removed; the underlying sediments may be reused to provide grassed shoulders once the new taxiways have been constructed and paved.

Establishment of Supporting Hydrology

Successful wetland restoration will require sufficient hydrologic conditions, and in keeping with the groundwater-supported, seasonally flooded wetlands on site, the wetland areas will be

⁷ A more comprehensive Mitigation Plan formatted to address the Federal Mitigation Rule is also in preparation.

established at an elevation that will allow for soil saturation within one foot of the final elevation during the growing season. These elevations should provide a minimum of 4 to 12 inches of standing water during the winter and spring, as observed within other seasonally flooded wetland areas at the Airport to ensure that the hydrology of the proposed restoration areas will mimic that of the impacted wetlands.

For Mitigation Area A, the approximate elevations of the adjacent wetlands, Wetlands C/J/FK and H, are 4.0 and 6.3 feet on average; for Mitigation Area C, the approximate elevations of the adjacent wetlands, Wetlands H and B, are approximately 6.5 feet. Spot elevations along the existing West-End Taxiway range from 8.1 to 8.4 feet. Spot elevations along the existing East-End Taxiway range from 8.8 to 9.4 feet. The locations selected for the restoration areas are desirable because the areas will not need to be lowered or substantially regraded once the existing pavement and gravel sub-base are removed. Monitoring wells had been installed to observe groundwater elevations within the existing wetland areas, sited as close as possible to the proposed restoration areas (Mitigation Areas A and C). To date, depth to groundwater measurements have been recorded on two separate dates (September 21, 2007, and April 3, 2008). No appreciable difference in groundwater depth was observed among all six wells. Groundwater data suggest that removal of existing impervious materials alone would result in sufficient hydrological conditions within the mitigation areas. Additional measurements will be taken as necessary prior to commencement of restoration activities, and all restoration activities will be closely tied to on-the-ground survey to ensure that appropriate elevations are reached within the restoration areas. Schematic cross sections for Wetland Restoration Areas A and C are shown on the plans.

Wetland Soils

It is anticipated that the original soil profile may be intact beneath the impervious surfaces and grassy areas to be removed, and that only minor grading within the restoration areas would be necessary to obtain elevations that would provide suitable hydrology to support a wetland plant community and to create pit and mound microtopography as exists within the lost wetlands. As such, care will be taken to avoid removal of any original soil materials encountered beneath the impervious surfaces. The rough-graded mitigation areas will be allowed to settle for a minimum of 48 hours prior to introducing plants.

Introduction of Wetland Vegetation in Mitigation Areas

Following removal of fill materials, shrubs and herbaceous groundcover will be planted within the restoration areas. As all construction activities are proposed to occur within the Airport's "off-season" (after Labor Day and before Memorial Day), restoration activities would occur either during the beginning or the latter part of the growing season for Barnstable County (April 26 to October 23; USDA, 2002), depending on the construction timing.

As much as practicable, vegetation within Wetlands I, H, and C/J/FK will be salvaged for re-use in the mitigation areas. This would involve removing large patches of the "lost wetland" with a

front-end loader or other suitable large equipment and introducing these vegetation patches in the mitigation areas, allowing for intact and relatively contiguous patches of established vegetation within the mitigation areas and for greater success in the establishment of the mitigation area plant communities. Based upon HW's recent observations of the proposed areas for impact (April-May 2015), we have conservatively estimated that approximately half of the vegetation within Wetland I (approximately 14,000 SF) could be salvaged for reintroduction within Mitigation Area A (or possibly other mitigation areas as appropriate). However, Wetlands C/J/FK and Wetland B currently support populations of invasive *Phragmites* and may not be suitable for transplantation within the mitigation areas. Conservatively, it has been estimated that 5,000 SF of wetland B vegetation could be reused within the mitigation areas. Salvaging vegetation from these lost areas will need to be field-determined.

Mitigation Sequencing and Introduction of Wetland Vegetation

Ideally, site preparation for the mitigation areas would occur prior to construction of the new taxiways and MALSF turnaround, such that all impervious surfaces and grassy areas would be removed from the restoration areas and the areas would be excavated to the appropriate grade, at which point salvaged vegetation from the lost areas would be excavated and placed directly into the prepared restoration area(s), minimizing the temporal loss of wetlands during construction. If this construction sequencing proves to be impractical, the smallest possible lag time between construction of the new taxiway entrances and the creation of the mitigation areas is desirable (within a week or two). Under this construction scenario, vegetation from the lost areas would be excavated and stockpiled nearby for later re-introduction within the mitigation area(s). Salvaged plant materials would be covered and maintained (watered) in good condition until the restoration areas have been prepared.

Immediately following introduction of salvaged vegetation, additional native plant materials obtained from local nurseries and possessing native genotypes (local genetic stock) would be planted in the mitigation areas to augment the salvaged vegetation. Using local nursery stock will minimize the possibility that plant genotypes from other regions are imported to the area. Augmentation with nursery stock will allow for the immediate establishment of a relatively dense plant community throughout the mitigation area, discouraging encroachment by non-native species. Shrub and herbaceous species obtained from local nurseries will be representative of the existing vegetation communities within the isolated wetlands. Tree species will not be incorporated in the restoration areas because the proposed mitigation areas (as well as the lost areas) occur within obstacle-free areas and need to be maintained by the Airport as low-growing shrub swamp communities.

Proposed shrub species obtained from nursery stock may include arrowwood, highbush blueberry, winterberry, red chokeberry, bayberry, meadowsweet, steeplebush, American cranberry, and Virginia rose, or acceptable equivalent species. Shrubs will be planted in clusters of two to three, placed five to six feet on center, while herbaceous species will be planted in masses, 18 to 24 inches on center. It is anticipated that several hundred nursery-grown shrubs

and herbaceous plants will be needed to achieve the desired plant density within the mitigation areas. The planting distribution of American cranberry will depend upon the hydroperiod of each area. In shallow ephemeral wetlands, the cranberry will be planted at the lowest elevations of the wetland. In deeper, more permanent wetlands, the cranberry will be planted along the periphery. The elevation of the restoration plantings will be similar to the existing plant distribution observed within the wetlands at the Airport.

Planting specifications are provided on the project plans. Proposed plantings are designed to provide a densely vegetated transitional emergent marsh/shrub swamp community in each wetland mitigation area. It is anticipated that the details of the planting specifications will be refined during the permitting phase and in consultation with various regulatory agencies and ecological experts at NPS.

In addition to nursery-grown shrubs and herbaceous species, a wetland seed mix may be used to stabilize soils within the mitigation areas. A commercially available or custom seed mix that contains native grasses and wildflower species similar to those observed within the existing wetland areas will be used. Species contained within the seed mix may include: switchgrass (*Panicum virgatum*), Virginia wild rye (*Elymus virginicus*), creeping red fescue (*Festuca rubra*), fox sedge (*Carex vulpinoidea*), creeping bentgrass (*Agrostis stolonifera*), soft rush (*Juncus effusus*), New England aster (*Aster novae-angliae*), grass-leaved goldenrod (*Euthamia graminifolia*), nodding bur marigold (*Bidens cernua*), green bulrush (*Scirpus atrovirens*), Joe-Pye weed (*Eupatorium maculatum*), boneset (*Eupatorium perfoliatum*), and blue vervain (*Verbena hastata*).

It is anticipated that removal of existing paved areas will expose the underlying seed bank and rootstock which would contain additional species tolerant of the local ecological conditions. The presence of the underlying seed bank is anticipated to further lend to the successful generation of a wetland plant community within the restored wetland areas. However, certain invasive species, specifically purple loosestrife and *Phragmites*, are known to have exceptionally long seed dormancy capabilities, more so than most native species. Thus, exposing the seed bank may allow for the germination and establishment of non-native species over native, slower-growing vegetation. As part of the long-term monitoring of the restoration areas, particular attention will be paid to remove invasive seedlings as soon as detected to manage emerging non-native species and bolster the success of desired native species. Additional details regarding invasive species management are provided in Attachment 14.

Upon completion of the restoration area plantings, siltation fencing will be placed along the upgradient side of the restoration areas. As noted above, efforts will be made to plant the mitigation areas near the beginning or the end of the growing season to reduce the dependency on maintenance (e.g., watering) during the anticipated two to three week grow-in period and to ensure greater plant survival.

Wetland Monitoring Program

A qualified wetland scientist with experience in wetland mitigation will be engaged to ensure compliance with the mitigation plan and to make field adjustments when appropriate. This individual will oversee all aspects of the wetland restoration activities including installation of sedimentation control barriers, removal of impervious surfaces and excavation of sub-base materials, excavation of salvaged plant materials, installation of monitoring wells, revegetation, and implementation of a monitoring plan.

During and immediately following the creation of the mitigation areas, monitoring will occur on a weekly basis to ensure the initial establishment of introduced plantings. Following the grow-in period and in accordance with the regulatory guidance, wetland mitigation areas will be monitored twice annually for a minimum of five growing seasons to determine the relative success of the restored wetlands. Semi-annual site inspections conducted during late spring and late summer will include an assessment of the relative health and integrity of the salvaged vegetation and newly planted individuals, percent cover of vegetation, percent cover of wetland species, general compliance with the performance standards under 310 CMR 10.55(4)(b)(1 through 7), in accordance with the Federal Compensatory Mitigation Guidance and regional supplement.

In addition to the overall assessment of the monitoring areas, additional data regarding the vegetation will be collected within study plots distributed randomly throughout the mitigation areas to provide data to determine the relative success of the wetland plant communities. Data collected from the study plots will be compared to test plots within nearby undisturbed reference wetlands. Specific measures will be taken during construction and monitoring of wetland restoration areas to discourage establishment of invasive species within the newly disturbed soils, as described in Attachment 14. Additional details of the monitoring efforts will be developed during the permitting phase in cooperation with various regulatory agencies.

Written reports detailing the findings of each monitoring event will be submitted on an annual basis for five years to the Provincetown Conservation Commission, MassDEP, ACOE, CCC, and NPS, overseeing the wetland restoration activities. Monitoring reports will provide details on the assessment of the mitigation areas, including any remedial actions recommended or taken during a given year. Photographic documentation taken from established photo points will be incorporated within the monitoring reports.

6.2 Coastal Dune Mitigation

Coastal Dunes will be created by placing mounded sands in areas formerly occupied by impervious surfaces or grasslands followed by revegetation with pioneer species such as American beachgrass to stabilize the sand. Dune habitat will be created with on-site sands

(from areas of proposed projects), supplemented as necessary with sediments compatible with existing aeolian sands at the Airport⁸.

Randomly spaced mounds of sand will be placed at elevations one to three feet above the existing grade, representative of the existing mosaic dune habitat encountered among the coastal interdunal swales at the Airport and within the airfield. The alignment and orientation of the created dunes will also be consistent with the configuration of the existing dune systems that currently run in a series of bands from east to west.

Following the placement of sands, these areas will be planted primarily with American beachgrass and supplemented with additional herbaceous material and low-growing shrubs as observed within undisturbed dune areas interspersed among the isolated wetlands at the Airport. When feasible, vegetation within the existing dune habitat to be impacted will be salvaged and transferred to the created dune habitat, providing an existing natural seedbank and rootstock. Proposed species to be planted along the lower elevations of the created dunes include switch grass, beach pea (*Lathyrus japonicus*), beach heath, Virginia rose, and bayberry, or other acceptable equivalents. Planting specifications are provided on the project plans. This assemblage of species observed within other dunes at the Airport, will provide wildlife habitat value, replacing lost habitat due to implementation of the CIP projects. Planting specifications are provided on the site plans.

In locations where dunes will be created immediately adjacent to restored wetlands, the dune area will be created and planted prior to the creation of the wetland pit and mound microtopography and introduction of plantings to mitigation area and a row of erosion control material (siltation fencing or straw wattles) will be placed at the toe of the newly created dune area to protect the wetland from sedimentation while vegetation becomes established enough to stabilize the created dunes. Once the dunes are stabilized, the siltation barrier will be removed, minor raking and supplemental plantings (if deemed necessary) will be performed.

As with the wetland mitigation areas, a qualified professional will oversee all phases of the dune creation to ensure that all dune creation activities are carried out in accordance with the permitted mitigation plan. This individual will have experience in coastal geomorphology or in dune creation, and will have the discretion to make site-specific adjustments during construction to ensure that the resultant coastal dune will function as designed upon full growth. A record of any adjustments would be on file. A monitoring plan similar to that for the wetland restoration areas will be implemented to ensure the successful establishment of the created dune communities. The monitoring plan for the created dune areas will entail annual monitoring and reporting as required by the various regulatory agencies, to occur in conjunction with other monitoring activities, and will include provisions for implementation of corrective measures, if necessary, to ensure the successful establishment of dune habitat.

⁸ If additional material is needed, the contract documents will require that the source of the sand be compatible with existing sediments at the Airport and the source will be certified that it does not contain archaeological resources or non-native plant seeds.

6.3 Cultural Grassland Mitigation Methodology

Areas of Cultural Grassland are located along the shoulders of Runway 7-25, and the taxiways with more substantial areas near the glide slope approach (southeast of Runway 7; see Photo 5). Following reconfiguration of the taxiways, these areas will be restored or replaced in kind as shown on the project plans and in Figure 17. Re-establishment of Cultural Grassland will generally involve the reseeded of graded shoulders along each of the reconfigured paved areas and re-seeding with a native seed mix, such as the “New England Coastal Salt Tolerant Grass Mix,” or a similar custom seed mix that contains a variety of native grasses that are similar in species or growth form to that which exists currently. Custom seed mixes are commercially available⁹ and includes native species similar to those found within the existing Cultural Grasslands at the Airport, including Canada wild rye (*Elymus canadensis*), creeping red fescue (*Festuca rubra*), big bluestem (*Andropogon gerardii*), little bluestem, Indian grass (*Sorghastrum nutans*), side oats grama (*Bouteloua curtipendula*), switch grass, and sand dropseed (*Sporobolus cryptandrus*). The seed mix will be applied at the recommended application rate and will be lightly raked in and covered with a light mulching of seed-free straw to conserve moisture during germination.

Following successful re-establishment of the created grasslands there will be no net loss of cultural grassland or the potential habitat it provides.

6.4 Invasive Species Integrated Management Plan and Resource Enhancement

As noted within the wetland descriptions, both *Phragmites* and purple loosestrife are currently present in some of the wetland areas. In addition, spotted knapweed has been observed within some of the coastal dune areas within the airfield areas and near the parking lot. These species, identified as invasive or likely invasive within the state of Massachusetts, are required to be addressed as part of the DRI Technical Bulletin 01-001: Guidelines for Invasive Plant Species Management Plan as well as part of the overall Mitigation Plan.

Details of the management approach for these invasive species are provided in the Draft Invasive Species Management Plan (Attachment 14), which provides a background on the biology of each species, a discussion of the various methods of management based upon studies conducted by research scientists and land managers throughout the U.S. and worldwide, and identifies the preferred management technique at the Airport. The Plan identifies the most appropriate and preferred method of control for each species that ensures greater success in management, and that also comply with NPS policies on land management and other regulatory agency requirements. The Plan also discusses restoration of the native plant communities.

The proposed wetland enhancement plan is in addition to the invasive species management that is required within areas of wetland restoration. Wetland enhancement activities are

⁹ e.g., New England Wetland Plants, Inc. (www.newp.com)

specifically tied to the management of *Phragmites*, within Wetlands H and I, and will involve implementation of the preferred management method, overplanting with native species, and long-term monitoring to track the successful regeneration of native plant communities within wetland areas currently supporting populations of *Phragmites*. Figure 18 depicts previously surveyed locations of existing *Phragmites* populations within the inner airfield.

6.5 In-Lieu Fee program

The full suite of mitigation measures will also include participation in the Corps' ILF Program. The Massachusetts Department of Fish and Game (DFG) is the sponsor of a state-wide program that will provide in-lieu fee compensatory mitigation associated with Corps permits under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899 and the related Federal rule at 33 C.F.R. Part 332 (the Mitigation Rule). The ILF Program allows Corps permittees (e.g., applicants) to make a monetary payment in-lieu of undertaking permittee-required mitigation as compensation for their project impacts to aquatic resources of the U.S. In turn, as the ILF Program sponsor, DFG assumes legal responsibility for implementing the required mitigation. The ILF Program applies aggregated ILF funds to then undertake mitigation projects that permanently protect aquatic resources and upland buffers and/or restore impacted aquatic resources within identified bio-regions across the State of Massachusetts (known as Service Areas). A map of the Service Areas, borrowed from the Corps ILF Fact Sheet, is shown in Photo 14. The Airport is located in the Coastal – Central Sub-area.

DFG will select ILFP mitigation projects through its application of detailed prioritization criteria as outlined in the ILF Program Instrument. Selection criteria include consideration of a potential project's ability to achieve multiple mitigation objectives and its support or compatibility with broader conservation or management initiatives using a watershed planning framework as described in Section X [10] of the ILF Program Instrument (Attachment 15). It is presumed that the Airport's participation in the ILF Program will contribute to the protection of natural resources in the Coastal Central Sub-area in Massachusetts.

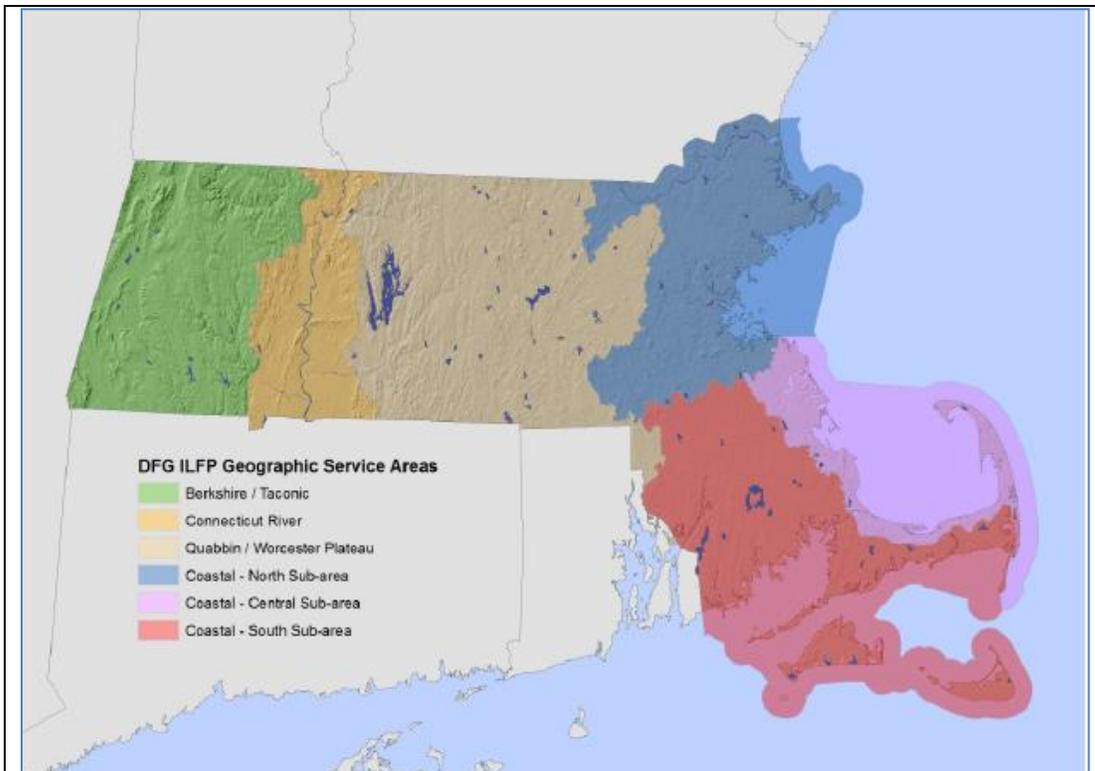


Photo 14. Map of In-Lieu Fee Program Service Areas in Massachusetts. Credit U.S. Army Corps of Engineers

6.6 Stormwater Management

6.6.1 *Existing Conditions*

Approximately six percent of the 331-acre airport site is paved. Stormwater runoff from the facility is discharged on site through runoff infiltration. The Airport is located within the CCNS, and as such all waters (and wetlands) in and adjacent to the CCNS are designated Outstanding Resource Waters (ORW) pursuant to the regulations at 314 CMR 4.06, Cape Cod Coastal Drainage Area. Stormwater runoff from the runway, taxiways, GA paved apron, and most of the terminal apron drains via sheet flow to surrounding grass areas, and infiltrates to underlying sandy soils. Salt and sand are not applied by the Airport to these paved areas.

Roof drains from the terminal building, hangar, and equipment garage all flow to the ground and either drain off the pavement and infiltrate into the ground or flow into the catch basins. The stormwater drainage system on the terminal apron towards the ARFF/SRE garage consists of two catch basins, associated outfalls, and a trench drain, which drains into the outflow pipe for one of the catch basins. These structures collect sheet flow from small areas of the apron in front of the terminal and ARFF/SRE garage to prevent flooding and/or icing. The catch basins and trench drain have been fitted with a filtration system to intercept petroleum-based pollutants from the stormwater runoff. The filtration system contains adsorbent material that

is an inert blend of minerals known as amorphous alumina silicate, which removes pollutants. There are two automobile parking lots on the Airport property. The main parking lot, located on the north side of the terminal building, has paved traffic aisles with the parking spaces and median unpaved. The median is also equipped with a gravel swale to facilitate drainage. The smaller lot, for employee parking was constructed in a similar manner.

6.6.2 Proposed Conditions

The Phase 1 parking area is designed to meet the Massachusetts Stormwater Management Standards for new development. Stormwater from the proposed expansion of the main parking lot will be managed with porous pavement and a bioretention facility with pre-treatment forebays. The proposed drive aisle will be paved in porous asphalt and the parking stalls will be constructed of a porous gravel paver system. These features have been incorporated to directly infiltrate water where it falls on the pavement surface and temporarily store it in the stone reservoir prior to infiltration to the underlying sandy soils. A bioretention system with two forebays will serve for stormwater management and treatment for larger storms that do not infiltrate directly through the porous pavement system and will serve as backup to the porous pavement system. Runoff that does not infiltrate directly through the porous pavement system will be conveyed via overland flow to forebays and a bioretention cell for treatment. The bioretention system has also been sized to manage runoff from the portion of existing Airport Drive draining to the site.

The bioretention area will be planted with a combination of native species compatible with the surrounding landscape to enable the bioretention area to blend into the surrounding coastal dune area. Species tolerant of occasional inundation, and well drained soils, including but not limited to, bayberry, Virginia rose, switch grass (*Panicum virgatum*), and dwarf huckleberry, will be planted within the bioretention area, with American beachgrass, bearberry, seaside goldenrod (*Solidago sempervirens*), beach heath and little bluestem (*Schizachyrium scoparius*) planted along the side slopes. In addition, landscape plantings will be introduced within the surrounding dune areas to screen the expanded parking area from Park users along Race Point Road and the nearby CCNS bike path. Landscape plantings were also selected to blend into the surrounding dune areas, and include pitch pine, eastern red cedar (*Juniperus virginiana*), sea myrtle, bayberry, beach plum, American beachgrass, and bearberry.



Photo 14. Example of a bioretention area constructed within a coastal dune setting. Sandy Neck Beach Park, Barnstable, MA. Photo credit Horsley Witten Group.

Details of the proposed stormwater management are provided within the project plans (Sheets 9 through 11). Attachment 6 contains the MA Stormwater Checklist, stormwater report, and a discussion of how the project is designed to meet the MA Stormwater Management Standards.

6.7 Erosion and Sedimentation Control

The Airport proposes to implement an Erosion and Sedimentation Control program for each project element to protect adjacent undisturbed resources during and immediately following construction activities. Erosion controls consisting of silt sock will be installed and staked in place prior to commencement of any work associated with a given project element. Erosion controls will serve as the limit of work. Alternative erosion control barriers may be required, such as siltation fencing and/or straw bales, to serve as wildlife diversions in accordance with rare species protection measures, and will be coordinated through NHESP. Erosion control measures will remain in place and maintained in good condition until all disturbed areas are stabilized with vegetation.

6.8 Rare Species Protection Plans

As discussed above in Section 2, the Airport is mapped for three State-listed rare species, whose habitat requirements overlap with the habitat provided within the natural resources at this site. The Airport has undergone a MESA Project Review with NHESP and has been issued a conditional “no take” approval from NHESP. Attachment 10 provides additional information on the rare species habitat, including a copy of the MESA letter, copies of the NHESP Fact Sheets for the three species, and draft Rare Species Protection Plans, which will be further developed and refined in conjunction with NHESP in order to ensure the short- and long-term protection of rare species and their habitats.

6.9 Construction Management Plan

All construction other than paving operations will be conducted during the Airport’s off season, approximately after the first week of September (Labor Day) and prior to April 15th to minimize disruption to rare species during their most active times of year. Paving is anticipated to be conducted in the fall, as the availability of asphalt plants is tied to the typical schedule for asphalt plants in the region, which typically do not begin production until mid-April and extend until late November/early December.

A Construction Management Plan for Environmental Compliance will be developed with bid specifications, and will include specifics on construction timing and methodology, as well as additional measures designed to protect the natural resources at the Airport prior to, during, and immediately following construction. Elements to be included within the Construction Management Plan would include the following:

- Construction timing (as discussed);
- Rare Species Protection Plans for each Project element – a draft of these plans is provided, and will be finalized in conjunction with NHESP (Attachment 10);
- Implementation of an Erosion and Sedimentation Control program (see Stormwater Management Report (Attachment 5));
- Construction Methods such as the use of hand equipment, driving of fence posts with an air compressor and elimination of the concrete footing for the posts where feasible, the use of wetland mats (“swamp mats’), designated construction access, stockpile locations, etc.; and
- Oversight by an Environmental Monitor with a schedule for overseeing construction activities and monitoring.

Prior to construction, the Airport anticipates attending pre-construction site walk(s) with regulatory authorities and other appropriate individuals to review construction details. Also anticipated is a pre-construction refinement of the exact location of the proposed fence. These measures are intended to further ensure the protection of natural resources and rare species habitat.

6.10 Vegetation Management Plan

Critical areas for aviation are managed at the Airport with a schedule for mowing and brush hog cutting as shown on Figure 17. At present, grass areas adjacent to the paved surfaces of the runway, taxiways, along the glide slope area and approach areas at the runway ends, and along an approximately 400-foot wide swath of *Phragmites* along the MALSF lights are mowed as needed, typically three to four times annually. Beyond the grass areas, woody vegetation between the taxiways and runway and to the south of the runway is mowed with a brush hog every one to three years to maintain the object-free zone around the critical areas.

The mowing plan was reviewed as requested by NHESP to see if there were any grassland areas outside of the Airport’s critical areas that could be mowed on a less-frequent schedule to enhance grassland bird habitat. Given the unique location of the Provincetown Municipal Airport and the small percentage of grassland at the Airport, the mowing schedule under proposed conditions is similar to the current schedule (Figure 17) although some of the areas will have shifted slightly.