MassDEP File No. SE 049-0635

New Bedford Regional Airport Runway Safety Improvements Project

Post Construction Monthly Wetlands Plantings Assessment – November 2014

To: Lisa Rhodes, MassDEP
Tom Maguire, MassDEP
Tena Davies, MassDEP
Sarah Porter, New Bedford Conservation Commission

From: Michael D. Howard, PWS, CWS, Epsilon Associates, Inc (EM)
Amanda Atwell, CPSS, Epsilon Associates, Inc (EM)

CC: Robert Mallard, P.E., ASG
Erick D'Leon, New Bedford Regional Airport Manager

Subject: **Special Condition 29(f); Post Construction Monthly Wetlands Planting Assessment; New Bedford Regional Airport Runway Safety Improvement Project; Variance Order of Conditions and Water Quality Certificate DEP File No. SE 049-0635.**

This Post Construction Monthly Wetlands Planting Assessment has been prepared in accordance with Special Condition 29(f) of the aforementioned Variance Order of Conditions and Water Quality Certificate. This is Epsilon's 15th vegetation monitoring report following substantial completion of the Mitigation Phase (Phase 2) of the New Bedford Regional Airport Runway Safety Improvements Project. This report covers the month of November 2014.

Requirements of Wetland Mitigation Monitoring

Special Condition 29(f) of the Variance requires (in part) the following:

> *The WS required in Special Condition 7 shall conduct inspections of the Replacement Areas during and after construction as follows … monthly between April and November for the first two growing seasons to determine vegetation development and regulatory compliance.*

The monthly vegetation assessment reports referenced in Special Condition 29(f) are in addition to comprehensive year end monitoring reports and twice-per-year soils, hydrology, and plant data collection efforts that are required over a 5 year period as per Special Conditions 30 through 33 of the Variance. Monitoring for invasive species, while described generally herein, is required under

Epsilon ASSOCIATES INC.

Special Condition 40 and the MassDEP-approved "Invasive Species Management Plan for Mitigation Sites" ("ISMP") prepared by Epsilon Associates dated January 24, 2011. Epsilon scientists also routinely inspect the wetland mitigation areas for the presence of invasive species as part of these 30-day reports. The annual ISMP report will be submitted to MassDEP under separate cover as part our Year 2 annual inspection report due in mid-December. The purpose of the initial monthly inspections required under Special Condition 29(f) is to primarily assess general vegetation growth and development during the early stages following construction of the mitigation areas.

Review of Wetland Mitigation Sites

Construction of the wetland mitigation sites described below was substantially complete by the site contractor (Manafort Construction) during the winter of 2012. Representative site photographs depicting vegetation development in each of the mitigation sites are provided in Attachment A. Please refer to the comprehensive year end monitoring report submitted in December 2013 for as-built plans of the mitigation sites (including eastern box turtle nesting habitat areas).

Wetland Mitigation Site 5

Wetland Mitigation Site 5 is approximately 1.6 acres. It is located at the north end of the Airport between Runway 23 and New Plainville Road. Site 5 was designed and constructed as a scrub-shrub wetland with pit-and-mound micro-topography and vernal pool habitat. A section of Site 5 contained a historically buried wetland that was restored as part of the mitigation efforts. Boulders and woody debris are scattered throughout the mitigation area. Site 5 adjoins a large wetland system (Wetland G) that extends to the west and north of New Plainville Road. Approximately 960 plants were installed in Wetland Mitigation Site 5.

Wetland Mitigation Site 6

Wetland Mitigation Site 6 is approximately 3.4 acres. It is located west of Runway 5 adjacent to the West Ditch. Site 6 was constructed as a scrub-shrub wetland with pit-and-mound micro-topography. It connects with Wetlands R, S and M. Boulders and woody debris are scattered throughout the mitigation area. Similar to Site 5 a section of Site 6 contained a historically buried wetland that was restored as part of the mitigation efforts. A portion of old Shawmut Avenue and a culvert crossing was removed during construction allowing the West Ditch to be "day-lighted" and flow unencumbered through and adjacent to Site 6. Wildlife Habitat Management Area 3 (eastern box turtle nesting habitat) was created in the uplands adjacent to the western boundary of Site 6. Approximately 2,000 plants were installed in Wetland Mitigation Site 6.

Wetland Mitigation Site 10

Wetland Mitigation Site 10 is the largest of the three wetland mitigation sites and is nearly 14 acres in size. Site 10 is located at the extreme southern end of the Airport property. Site 10 is surrounded on all sides by a large scrub-shrub wetland system and large floodplain area associated with the Paskamansett River. Site 10 was primarily created for the purpose of providing compensatory flood storage to offset fill that was placed in the floodplain during construction. Site 10 contains three vernal pool habitat areas located along the southern and eastern boundaries. Fairly substantial boulders, ledge outcrops and woody debris are scattered throughout the mitigation area. The temporary access road that was used during construction of Site 10 also contains a restored wetland complete with native plantings, microtopographic features, small stream channels and woody debris. Approximately 8,100 plants were proposed to be installed in Wetland Site 10.

Paskamansett River Plantings

Approximately 1,020 native shrubs were planted on either side of the Paskamansett River as mitigation for obstruction removal work. The shrubs were installed in a "zig zag" fashion within roughly 10 feet of the river banks over a distance of approximately 2,500 feet.

West Ditch

Approximately 1,100 linear feet of the West Ditch was relocated to facilitate construction of the Runway 5 Safety Area. The West Ditch was historically a relatively straight, man-made channel designed to collect and convey stormwater runoff from the west side of the Airport to the southeast side of the Airport across the existing Runway 5 Safety Area. The relocated West Ditch has greater sinuosity when compared to the original ditch and incorporates a network of pool complexes, low flow channels, channel constrictions, cross vane structures and submerged shelters to create enhanced habitat opportunities. Approximately 600 native shrubs and a seed mix were planted / sown on the banks of the reconstructed West Ditch.

Vegetation Assessment

In order to assess the relative health and vigor of the plantings installed in the aforementioned mitigation sites Epsilon conducted a series of meander surveys and an overall qualitative visual assessment of each site. General observations regarding plant species composition and health were made, along with representative photographs, and other relevant observations including but not limited to evidence of deer browse, bud/stem/leaf development, insect damage, readily observable plant disease, hydrologic conditions and other similar factors that could contribute to the success or decline of the plantings.

Findings

Vegetation Development

Plants located within the Wetland Mitigation areas have undergone senescence. The dense herbaceous cover has died back significantly. Shrubs were generally healthy. No major storms of note took place in the month of November; however there was a fair amount of rain. As a result, water levels within the vernal pools , West Ditch and Paskamansett River were at bankfull (according to previous water lines on trees, plants and rocks). The ground was saturated and standing water was present in many pits. Epsilon conducted this plant meander survey on November 21, 2014.

Many planted species, part of the sown New England Wetland Mix, are in seeding or die back. Some plants were identified by persistent vegetation including green bulrush *(Scirpus atrovirens) (OBL),* soft rush *(Juncus effusus) (OBL),* blue vervain *(Verbena hastata) (FACW),* sedge *(Carex spp)* soft-stem bulrush *(Schoenoplectus tabernaemontani) (OBL),* manna grass *(Glyceria spp.),* grass *(Poacea),* common boneset *(Eupatorium perfoliatum) (FACW),* Joe-pye weed *(Eutrochium purpureum) (FAC)*, beggarticks *(Bidens spp.) (FACW/OBL),* sensitive fern *(Onoclea sensibilis),* swamp milkweed *(Asclepias incarnata)* and woolgrass *(Scirpus cyperinus) (OBL*).

Early volunteer species such as barnyard grass *(Echinochloa crus-galli) (FAC)* and smart weed *(Polygonum pensylvanicum) (FACW)* are still observed, but as previously noted in lower numbers. Additionally, other annuals that are generally found more in uplands such as clovers, mullin, and ragweed continue to be less dominant then this time last year. Other species identified throughout the year-one survey that were observed include native cattail *(Typha latifolia) (OBL),* lady's-thumb *(FAC),* willow-herb *(Epilobium coloratum) (OBL),* large barnyard grass, foxtail *(Alopecurus pratensis) (FAC),* marsh horsetail *(Equisetum palustre) (FACW), Cyperus spp. (FACW/OBL), A*sters, annual sowthistle *(Sonchus oleraceus) (FACU),* spike rush (*Eleocharis spp.),* jewelweed *(Impatiens capensis) (FACW),* st. johns wort *(Hypericum* spp.*),* Goldenrods (*Solidago spp),* and rye grass *(Lolium spp.).* Some common upland weeds were observed in small quantities on the higher elevations of some of the hummocks, these species again included potentilla (*Potentilla spp.*), clover (*Trifolium spp.*), pennycress (*Thlaspi arverense*), bittercress (*Cardamine hirsute*), geranium (*Geranium spp.*), bindweed (*Convolvulus arvensis*), mullein (*Verbascum thapsus*), blue-eyed grass (*Sisyrinchium spp.*), curly dock (*Rumex crispus*), black-eyed susan (*Rudbeckia hirta*) and evening primrose (*Oenothera biennis*).

Since Aquatic Control Technology (ACT) conducted common reed *(Phragmites australis),* purple loosestrife (*Lythrum salicaria*) and multiflora rose (*Rosa multiflora*) control herbicide management no new growth was evident. These plants appear to be yellowing and senescencing. As vegetated growth thins during fall additional understory phragmites was observed at low concentrations.

These plants may have been sprayed, however if they were missed, ACT is under contract to re-spray late next year to hit any juvenile plants that may have been missed. Phragmites presence based on visual estimates is holding steady between trace and 10% cover.

The areas of native cattail *(Typha latifolia)* seem to be stabilized and appeared to remain essentially in the same locations as previously described in October's report although they have encroached further into the vernal pool(s), particularly at Site 5. This area was re-quantified during the November 2014 meander survey and will be presented in the year end mitigation report. The cattails are generally interspersed in the lower elevations of the three mitigation sites among other herbaceous cover types, woody plantings, micro-habitat features (boulders, pits-and-mounds, large woody debris) and areas of open water / vernal pools resulting in good horizontal habitat diversity.

Woody Plantings and Other Site Features

Wetland Mitigation Site 5

The following woody plantings were observed in Site 5 at the time of inspection: silky dogwood *(Cornus amomum),* buttonbush *(Cephalanthus occidentalis),* swamp rose *(Rosa palustris),* winterberry holly *(Ilex verticillata),* maleberry *(Lyonia ligustrina),* red chokecherry (*Aronia arbutifolia*), black chokecherry (*Aronia melanocarpa*), grey dogwood *(Cornus racemosa*), and northern arrow-wood *(Viburnum recognitum)*. Additionally, one quaking aspen volunteer was observed (*Populus tremuloides*). These shrubs appeared healthy and senesced. A moderate amount of deer browse was observed in the newly planted shrubs. Groundcover at the time of inspection included the mix of mostly wetland plants noted above; the density of ground cover was quite high (100 to 115%), but was dying back or dead. The vernal pool was holding water and the wetland was saturated. The cattails migrating towards the center of the vernal pool remain stunted but are taking advantage of fluctuating water conditions. Phragmites was trace to ~2%.

Wetland Mitigation Site 6

The following woody shrub species were observed in Site 6 at the time of inspection: winterberry holly, sweet pepperbush *(Clethra alnifolia),* red chokeberry, American elderberry *(Sambucus canadensis),* silky dogwood, buttonbush and northern arrowwood. These shrubs appeared healthy and senesced. Groundcover at the time of inspection included the mix of mostly wetland plants noted above; the density of ground cover was quite high (100 to 115%) but was dying back or dead. Standing water was present in pits and lower elevations. Phragmites was trace to ~10%.

Wetland Mitigation Site 10

The following woody shrub species were observed in Site 10 at the time of inspection: winterberry holly, northern arrowwood, swamp rose, highbush blueberry *(Vaccinium corymbosum),*

buttonbush and maleberry, steeplebush (*Spirea tomentosa*), meadowsweet (*Spirea latifolia*). There was evidence of some deer browse throughout the mitigation area, especially on the dogwoods. Some of the newly planted shrubs were also subject to deer browse. Generally shrubs appeared healthy and senesced. Groundcover at the time of inspection included the mix of mostly wetland plants noted above; the density of ground cover was quite high (100 to 115%) but was dying back or dead. Standing water was present in all three vernal pools, and the vernal pools were generally at bankfull, based on water rings. Standing water was also present in pits and lower elevations. Phragmites was trace to roughly 5 to 8%. As always, significant bird activity and deer browse was noted during the inspection.

West Ditch

Shrubs within the West Ditch are healthy and senesced. As reported in the first EM report for Phase 4, a portion of the West Ditch restoration area (approximately 450 linear feet) was disturbed during erosion control installation. Nine shrubs were planted along the West Ditch. The side slopes that were seeded are now exhibiting growth including some species identifiable from the erosion seed mix. Except where noted, the side slopes were well vegetated with a robust and established mixed layer of herbaceous vegetation. Silt fence was removed. Rooted aquatic vegetation remained persistent on the bottom of the West Ditch. The following species were identified along the West Ditch at the time of inspection: silky dogwood, winterberry holly, buttonbush, maleberry, pussy willow *(Salix discolor),* highbush blueberry, red chokeberry, and northern arrowwood. There are some common reed "popping up" through the bank and bed of the West Ditch; there is a fair amount of common reed located at either end of the West Ditch, where the ditch ties into common reed monocultures (approximately 40 feet on south end and 20 feet on north end), this encroachment was not noted to increase. The erosion seed mix is robust and established at the time of inspection.

Paskamansett River

The banks of the Paskamansett River remain thickly vegetated with native wetland plants which was the goal following completion of obstruction removal activities. Shrubs were senesced but appeared to generally be approximately five to seven feet tall.

AA/MH

View looking north at Site 6.

View of replacement dogwood shrub in Site 6.

View of highest concentration of Phragmites in Site 6.

View of senescing alder shrub in Site 6.

Overview of Site 5 from entrance.

Typical view of deer browse on replacement shrub.

Typical view of replacement shrub in Site 5.

View of winterberry in Site 5.

View of cattail fringe on vernal pool, Site 5.

View of central portion of Site 5, water has not increased as significantly as in the other mitigation areas.

View of smaller northern vernal pool in Site 10. Water was at least 2 feet deep.

View of newly placed large woody debris within vernal pool, for basking and attachment sites.

View of western vernal pool in Site 10. Water appears relatively full.

View of southern vernal pool in Site 10. Water was relatively high.

Based on prior water rings on rock in center of southern vernal pool, water is almost at bankfull.

View of replacement blueberry shrub in Site 10.

Typical view of southern portion of Site 10.

View of winterberry in Site 10.

View of Site 10 looking west from the southernmost portion of the site.

View of Paskamansett River, water is high.

View of vegetated banks of Paskamansett River, many of the planted shrubs are 5 to 7 feet tall.

View of southern portion of West Ditch during high water condition.

View of newly installed large rocks as part of channel constrictor to shore up design.

View of planted Aronia shrub along West Ditch.

View of straw wattle installation along West Ditch.

View of newly installed large rocks as part of 2nd channel constrictor to shore up design.

View of West Ditch and mallards utilizing resource.