

MassDEP File No. SE 049-0635

New Bedford Regional Airport Runway Safety Improvements Project

Post Construction Monthly Wetlands Plantings Assessment – September 2014

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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 13th 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 September 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

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 later in the fall. 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. A locus map depicting the locations of the wetland mitigation sites is provided in Attachment A. Representative site photographs depicting vegetation development in each of the mitigation sites are provided in Attachment B. 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 are growing vigorously; the majority of shrubs are fruiting while others are starting to undergo senescence. The majority of herbaceous plants are fruiting while others are flowering. The overall result is a dense herbaceous cover in all three mitigation areas. Shrubs were generally healthy. No major storms of note took place in the month of September. As a result, water levels were drawn down, as is typical during summer months. The ground was dry, as well as two of the four created vernal pools. Epsilon conducted this plant meander survey during shrub replacement planting and herbicide application activities from September 15 through 22, 2014.

Many planted species, part of the sown New England Wetland Mix, are in flower or vegetative stages. Dominant plants observed in all three mitigation areas include those plants included in the wetland seed mix including green bulrush (*Scirpus atrovirens*) (OBL), soft rush (*Juncus effusus*) (OBL), blue vervain (*Verbena hastata*) (FACW), broom sedge (*Carex scoparia*) (FACW), fox sedge (*Carex vulpinoidea*) (OBL), shallow sedge (*Carex lurida*) (OBL), blunt broom sedge (*Carex tribuloides*) (FACW), soft-stem bulrush (*Schoenoplectus tabernaemontani*) (OBL), fowl bluegrass (*Poa palustris*) (FACW), fowl manna grass (*Glyceria striata*) (OBL), rattlesnake grass (*Glyceria canadensis*) (OBL), 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) blueflag (*Iris versicolor*) (OBL) and mud plantain (*Alisma subcordatum*) (OBL).

Early volunteer species such as barnyard grass (*Echinochloa crus-galli*) (FAC) and smart weed (*Polygonum pensylvanicum*) (FACW) are still observed, but in lower numbers. Additionally, other annuals that are generally found more in uplands such as clovers, mullin, and ragweed continue to be less dominant than this time last year. Other species identified throughout the year-one survey that were observed include native cattail (*Typha latifolia*) (OBL), smart weed, 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), Asters, 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.*). Water horehound (*Lycopus americanus*) (OBL) was noted as a pioneer during this month's survey. Some common upland weeds were observed in small quantities on the higher elevations of some of the hummocks, these species included potentilla (*Potentilla spp.*), clover (*Trifolium spp.*), pennycress (*Thlaspi arvense*), 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*).

Epsilon was onsite during the week of September 15th to review and accept 1,565 supplemental shrub plantings from the Phase 2 mitigation contractor. Twenty (20) replacement plants were planted within the West Ditch, 75 replacement shrubs were planted within Site 5, 570 replacement shrubs were planted within Site 6, and 900 replacement shrubs were planted within Site 10. These plants were given filter fabric treatment around the base of each shrub to suppress plant growth in the immediate area.

Epsilon was also onsite to assist Aquatic Control Technology (ACT) with logistics for their common reed (*Phragmites australis*) control herbicide management. ACT applied herbicide treatment for Sites 5, 6 and 10 and Area 1 and 3. The proper permits were obtained and the Board of Health was previously notified as per MassDEP approved protocols. Phragmites and multiflora rose (*Rosa multiflora*) were treated throughout these areas as plants were encountered. At the time of the treatment the concentration of common reed has not increased as compared to what was reported in July and August:

Based on visual estimates there is between 90% and 95% cover with primarily native herbaceous wetland plant species throughout the vast majority of all Site 6 and Site 10 mitigation sites. The encroachment of common reed at these in Site 10 appears to be slightly increased at this point as compared to observations made in November of last year (trace amounts to 5% throughout); the highest concentration of common reed is located in the southernmost section of Site 10. Common reed in the southern 1/3rd of Site 6 appears to have a similar concentration as compared with June observations; some areas within this southern lobe are up to 10% common reed. The common reed was interspersed amongst cattails and other native wetland plant species.

The areas of native cattail (*Typha latifolia*) seem to be stabilized and appeared to remain essentially in the same locations as described and the area quantified in the 2013 end of year 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. As a result of the dry conditions, cattail plants at the Site 5 vernal pool and the northern vernal pool in Site 10 have increased inward by vegetative growth.

Epsilon confirmed the presence of purple loosestrife (*Lythrum salicaria*) within Wetland Mitigation Site 6 and Site 10 (approximately 12 plants in Site 6 and less than 5 individual plants in Site 10). These plants were also included as targets in the foliar herbicide treatment by ACT.

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 were vigorously growing, many were observed approximately three to four feet high. In Site 5, a few select buttonbush shrubs were suffering from minor insect damage. Some shrubs are starting to senesce. 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%). Herbaceous vegetation was vigorously growing and generally two feet tall. Cattail and blue vervain was larger; many plants were from four to six feet tall. The wetland and vernal pool were dry. The cattails have encroached further towards the center of the vernal pool taking advantage of opportunistic fluctuating water conditions.

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 were vigorously growing. 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%). Cattail and vervain plants were up to six feet tall. No standing water was evident.

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. Generally shrubs appeared healthy and were vigorously growing, around 3 to 5 feet. 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%). One vernal pool was dry, while the other two vernal pools had a small pool of water at the deepest elevation. No standing water was observed at lower elevations. Significant bird activity was noted during the inspection.

West Ditch

Shrubs within the West Ditch are vigorously growing and appear healthy. 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. The contractor has implemented the restoration work and monitoring is ongoing. Many of the affected shrubs look good and are vigorously growing, especially in light of the impact they withstood. Some of the shrubs are growing less vigorously than their unaffected neighbors or exhibiting signs of stress. We reassessed these plants, in addition to ten additional plants identified by the WS. Two plants were dead, while seven additional plants were in poor condition and were unlikely to develop well over time. As such, we recommend that these nine shrubs are replaced this growing season utilizing the recommended hay mulching discussed in Dan Nitzsche, GZA (IO) September 25, 2014 email. We have informed the site contractor accordingly. 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. 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 to 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). 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.

AA/MH



View of Site 5.



View of healthy silky dogwood in Site 5.



View of vernal pool, Site 5 (note further encroachment of cattail towards center of the pool).



View of nest found within cattail area of Site 5 vernal pool. Likely red wing blackbird nest.



View of buttonbush at vernal pool fringe, Site 5 (some insect damage).



View of mud plantain (*Heteranthera* spp.) at Site 6.



View of Site 6.



View of Site 6, post herbicide treatment of phragmites.



Praying mantis found at Site 6.



View of healthy Ilex at Site 6.



View of Site 6, newly planted shrubs were flagged with pink surveyors ribbon.



View of West Ditch.



View of newly planted shrub along West Ditch.



Crayfish found at West Ditch while watering newly planted shrubs.



View looking south over Site 10 from restored access road to Site 10.



View of a healthy alder and scat.



View of algal crust and water horehound, a pioneer to the site.



View of Ilex in Site 10.



View of western vernal pool in Site 10 (downgradient behind cattail fringe). The Vernal Pool is almost dry.



View of cattail fringe around perimeter of northern vernal pool in Site 10. No water was present within vernal pool.



View of algal crust in southern vernal pool.



View of southern vernal pool in Site 10. Vernal pool is almost dry.



View of animal burrow in Site 10.



View of buttonbush at edge of vernal pool (south) in Site 10.