



APPENDIX E

**MITIGATION REPORT
TRANSMITTAL AND SELF-CERTIFICATION**

DEPARTMENT OF THE ARMY PERMIT NUMBER: NAE-2009-462
PROJECT TITLE: Woodstock Academy Athletic Complex Expansion

PERMITTEE: Woodstock Academy
MAILING ADDRESS: 57 Academy Road, Woodstock, CT 06281

TELEPHONE: 860 928-6575

AUTHORIZED AGENT: CME Associates, Inc.
MAILING ADDRESS: 32 Crabtree Lane, Woodstock, CT 06281

TELEPHONE: 860 928-7848

ATTACHED MITIGATION REPORT
TITLE: Woodstock Academy Mitigation Report

PREPARERS: Richard Canavan

DATE: 12/10/13

CERTIFICATION OF COMPLIANCE: I certify that the attached report is accurate and discloses that the mitigation required by the Department of the Army Permit is [is not] in full compliance with the terms and conditions of that permit.

CORRECTIVE ACTION: A need for corrective action is [is not] identified in the attached report.

CONSULTATION: I do [do not] request consultation with the Corps of Engineers to discuss a corrective strategy or permit modification.

CERTIFIED: _____

(Signature of permittee)

12/13/2013

Date

Mitigation Report

Project Overview Form

Corps Permit Number: NAE-2009-462

Project Name: Woodstock Academy Athletic Complex Expansion

Mitigation Site Names: Stream Channel Enhancement, Wet Meadow Enhancement

Monitoring Report Number: 1 of 6

Permittee Contact Information:

Woodstock Academy, 57 Academy Road, Woodstock, CT 06281

Joseph Campbell, Assistant Headmaster

Email: jcampbell@woodstockacademy.org Phone: (860) 928-6575 ext:114

Monitoring Contact Information:

CME Associates, Inc., 32 Crabtree Lane, Woodstock, CT 06281

Richard Canavan, Senior Environmental Scientist

Email: rcanavan@cmeengineering.com Phone: (860) 928-7848

Dates of Inspections: 5/30/2013, 6/13/2013, 9/16/2013, 10/12/2013

Locations and Directions to Mitigation Sites: The project site is the Woodstock Academy Bentley Athletic Facility located at 475 Route 169 in Woodstock CT. The Wet Meadow Mitigation Area (WMMA) is west of the track and the Stream Channel Enhancement Area (SCEA) is west of the softball field.

Start and Completion of Mitigation: The mitigation work for the project began in March of 2012 and was completed in August 2012. This year is the first growing season for the mitigation plantings in the SCE.

Performance Standards: The permitted Mitigation Plan performance standards are being met at the WMMA. Performance standards are not being met at the SCEA. In that area the mitigation goal is biological control of *Phalaris* with a woody shrub canopy, which is still developing following planting. Complete attainment of that performance standard was not anticipated in one growing season and did progress in 2013.

Maintenance Activities: The WMMA area requires annual mowing which was conducted between 9/16 and 10/12 of 2013.

Recommendations: No remedial actions are recommended at this time. Monitoring will track shrub growth in the Stream Channel Enhancement area. If areas lag in canopy development, additional plantings may be recommended in 2014.

Requirements

Conservation Easement: A conservation easement on the WMMA was issued to the Trustees of Roseland Park as required by the special conditions of this permit.

Performance Bonding: Bonding was conducted prior to the construction of project as required by the permit special conditions. The applicant may request that the portions of the bond related to construction be released while maintaining the monitoring portion.

Erosion and Sedimentation Controls: Erosion and sedimentation control monitoring was conducted throughout the project construction in compliance with local permit requirements. Connecticut Department of Energy and Environmental Protection (DEEP) Inland Water Resources Division (IWRD) and NAE staff were copied on erosion control reporting and visited the site during construction. The project is complete and all areas of disturbed soil have been stabilized. All erosion and sediment controls have been removed (e.g. silt fence) or dispersed (e.g. hay bales) as appropriate.

Monitoring Reporting: Copies of this monitoring report will be sent to the Town of Woodstock Inland Wetlands and Watercourses Agency and DEEP IWRD.

Summary Data

The discussion of performance standard compliance and monitoring observations from 2013 will be divided by mitigation area for the summary data section below with the WMMA first followed by the SCEA. Note that the summary data does not include information on soils, hydrology or erosion controls because the restoration efforts at the two mitigation sites is limited to vegetation management. Mitigation work did not include any grading, hydric soil creation or modification of existing hydrology.

Wet Meadow Mitigation Area

As stated in the project mitigation plan as referenced in the permit, the performance standard for this area is, “*the maintenance of this area as a sedge dominated wet meadow. Woody species should remain less than 5% cover of the area.*”

The Mitigation Plan lists the following elements for monitoring:

- Identify woody shrubs in the area (by species and % cover or number of individuals)
- Identify the presence of herbaceous invasive/colonial species in the area and assess whether their presence appears to threaten the existing plant diversity
- Identify any bare soil or other areas that may have been damaged by mowing

Additionally, changes in mowing frequency were noted as possible adaptive management techniques. Currently the Mitigation Plan calls for annual mowing of this area between September 1st and October 31st.

Currently, the WMMA are meets the mitigation plan performance standards. Prior to the initial mowing for the project in August 2012 the site development contractors and their subcontractors were attempting to mow this area with a tractor mounted brush hog but conditions in the wet meadow remained too wet to allow for grass and shrub cutting with that method. Eventually a tracked skid steer with a front mounted brush hog attachment was used and was very successful in cutting the grass and shrubs that were establishing themselves in the wet meadow (*Spirea*, *Cornus*, *Salix*).

Mitigation monitoring in this area found some stump regrowth of shrubs but regrowth was limited to water sprouts from the cut stumps and do not significantly contribute to the percent cover of the area. In the upland buffer of this mitigation area; *Rosa multiflora* and *Lonicera* sp. were cut and treated during the initial mowing. Herbicide treatment limited regrowth and continued annual mowing is expected to limit the establishment of all woody species.

No bare soil from mowing was observed during any of the field inspections. During the June 2013 monitoring some of the areas of cut and treated multiflora were sparsely vegetated. Occasional presence of *Phalaris arundinacea* and *Lythrum salicaria* were noted in 2013 monitoring. These invasives were not dominant and present as occasional individual plants similar to conditions before mowing in 2012. They do not appear to threaten the dominance of native plants in the wet meadow based on the 2013 monitoring.

Woodstock Academy contracted for mowing with a tracked skidsteer for the first annual mowing following the establishment of the mitigation area. The mowing was conducted in early October and was successful, cutting woody regrowth in the area with no ground disturbance.

Other vegetation notes from 2013 monitoring include the following:

- The dominant sedge in the wet meadow was not identified to species in the Mitigation Plan. Investigation in 2013 found that it may be *Carex stricta* in a non-tussock growth habit or *Carex haydenii*.
- Cattail (*Typha latifolia*) is present in patches in the mitigation area, particularly toward the northern end of the wet meadow. This continues a growth pattern present before mowing in 2012.
- In autumn, other Aster-family and fall-flowering herbaceous wetland species were more conspicuous such as Joe Pye-weed.
- An approximately 200 sq. ft. area of mowed grass at the margin of the mitigation at its southeast corner was identified with the Woodstock Academy grounds staff to be allowed to grow up and be managed as part of the mitigation mowing rather than maintained as lawn.

See Appendix C for photos of the Wet Meadow Mitigation Area.

Stream Channel Enhancement Area

The goal of the SCEA mitigation as described in section 9.1 of the Mitigation Plan is quoted for reference.

Currently, the Stream Channel Enhancement Area includes a dominant invasive species - reed canary grass (*Phalaris arundinacea*) and a significant amount of multiflora rose (*Rosa multiflora*). The control of these species includes cutting and removing invasive plants, herbicide treatment and the dense planting of shrubs including fast growing native species of willow and dogwood. The development of the shrub canopy is proposed as the long-term control for reed canary grass and will also limit suitable sites for woody invasives. Shading by woody plants is the preferred invasive species control measure at this area because it is low maintenance, it helps restore values lost at the wetland impact area, and it is complimentary to the forested wetland present to the north and west.

The performance standard for this area is derived from the NAE Mitigation Standards and is 60% cover by noninvasive hydrophytes of which 15% are woody species. Currently portions of the SCEA do not meet that standard because reed canary grass (*Phalaris arundinacea*) has a coverage of greater than 60% of areas lacking shrub cover. The goal of this mitigation is to provide a biological control which should be more effective than continued herbicide treatment on a long-term basis. Portions of the SCEA contain mature alder and willow shrub stands which have little or no reed canary grass, thus the goal is to allow the remaining areas to achieve similar vegetation coverage. The planted areas are developing toward that goal after the first growing season but have not yet achieved sufficient canopy coverage.

Construction Notes:

The SCEA was planted on 6/15/2012. The number and species of shrubs planted were as listed on the plan sheet for the mitigation area (attached). Some field modifications were made to the placement of shrubs based on the area available for planting. This lead to greater planted shrub densities in some areas. Prior to planting, the chain link fence between the shrub and woods area at the western margin of the mitigation area was removed and breaks in the stonewall were made to facilitate wildlife movement. The *Phalaris* was cut prior to planting in 2012 and *Rosa multiflora* was cut and herbicide treated. Although invasive species were cut and removed during planting, invasive species remain beyond the mitigation area at its edges. This is particularly a problem with burning bush (*Euonymus alatus*) at the north end of the mitigation area where this remains a dominant shrub species under the remaining forest canopy. Additional invasive plant species observed near the mitigation area in the adjacent woods include *Rosa multiflora*, *Celastrus orbiculatus* and *Frangula alnus*.

Monitoring included vegetation plots at a reference and mitigation plot areas shown on the attached plan and included in plant information in Appendix B. The reference area has complete shrub canopy coverage with speckled alder (*Alnus incana*) and willow (*Salix* sp.) dominants and silky dogwood (*Cornus amomum*), northern arrowwood (*Viburnum recognitum*) and highbush blueberry (*Vaccinium corybosum*) present. The herb layer is dominated by jewelweed (*Impatiens capensis*). In the mitigation plot the dominant coverage is reed canary grass (*Phalaris arundinacea*). The planted shrubs in the plot area include *Alnus incana*, *Salix sericea*, *Cornus amomum*, *Vaccinium corybosum*, and *Viburnum recognitum*. During the September 16, 2013 monitoring, several planted *Alnus* and one *Salix* individual were greater than six feet tall.

In a general assessment of planted shrub health most shrubs appeared healthy in 2013. Some shoot dieback had occurred due to water stress following planting in late summer of 2012. Shrubs generally covered in 2013 and particularly the alder, willow and dogwoods produced taller shoots during 2013 (up to 6 feet tall). *Phalaris* continues to dominate the open canopy areas; however, string trimming and/or herbicide treatment was not conducted in 2013 to avoid damage to the developing shrubs. Monitoring in the future will continue to assess the progress of the biocontrol of the herbaceous layer. The intermittent channel remains stable in this mitigation area and no scour was observed.

Photos of this mitigation area are provided in Appendix C. It was difficult to capture the planted shrub growth emerging from the surrounding *Phalaris* in the images. In 2014, monitoring photos will seek to establish photos from the adjacent softball field edge toward the mitigation area to hopefully provide better visual documentation of the changes in shrub canopy cover as the planted shrubs mature.

Conclusions

The WMMA is successfully meeting the project performance standards. Following the successful cutting of larger woody species during the initial establishment of the area in August 2012 and the first maintenance cutting of the area managed by Woodstock Academy in October 2013, it appears that this area can be maintained in compliance with the performance standards of the permit's Mitigation Plan. This mitigation area provides for the maintenance of an uncommon wetland vegetation cover type, wet meadow.

The SCEA is not yet meeting the project performance standards. The area proposes a biocontrol of reed canary grass (*Phalaris arundinacea*) which is progressing but has not established enough to fully meet the performance standards. This is expected based on the project approach and no specific remedial actions are suggested at this time. Monitoring in 2014 will assess the continued coverage of shrubs in the planted areas to ensure the biocontrol is progressing to provide a shrub canopy. Remedial actions may result in response to future monitoring results.

Appendix A – As-built plan (not required)

An as-built plan is excluded from this project as stated the approved Mitigation Plan. The mitigation on this project avoided grading or alteration of soil and the existing wetlands hydrology at the mitigation sites.

Appendix B – Plant lists

As noted in the Mitigation Plan the Wet Meadow flora is diverse and contains multiple sedge species that are difficult to classify to species. A complete botanical inventory of this area is beyond the scope of this mitigation report as described in the Mitigation Plan; however, plants observed in that area are listed below.

Plant List – Wet Meadow Mitigation Area
<i>Carex stricta</i> and/or <i>Carex haydenii</i>
<i>Symplocarpus foetidus</i>
<i>Onoclea sensibilis</i>
<i>Typha latifolia</i>
<i>Phalaris arundinacea</i>
<i>Lythrium salicaria</i>
<i>Impatiens capensis</i>
<i>Gallium tinctorium</i>
<i>Iris versicolor</i>
<i>Thelypteris palustris</i>
<i>Agrostis stolonifera</i> .
<i>Solidago</i> sp.
<i>Ranunculus</i> sp.
<i>Salix</i> sp.
<i>Spiraea latifolia</i>
<i>Cornus amomum</i>
<i>Chelone glabra</i>
<i>Eleocharis</i> sp.
<i>Scripus cyperinus</i>
<i>Eutrochium</i> sp.
<i>Rumex crispus</i>
<i>Polygonum sagittatum</i>

Appendix B (continued)

Stream Channel Enhancement Area Vegetation Plot Data 6/13/2013

Reference Plot		Mitigation Plot	
Species	% cover	Species	% cover
Tree Stratum: The plot areas were truncated to fit within the mitigation area. No trees were present in either the reference or mitigation plot area. The area to the west is dominated by red maple trees			
Shrub/sapling (15 ft radius)		Shrub/sapling (15 ft radius)	
<i>Alnus incana</i>	50	<i>Salix sp.</i>	10
<i>Salix sp.</i>	40	(from existing shrub coverage near plot, planted shrubs not yet included in shrub stratum)	
<i>Cornus amomum</i>	25		
<i>Viburnum recognitum</i>	5		
<i>Vaccinium corybosum</i>	5		
<i>Ulmus (rubra?)</i>	5		
Herbaceous (5 ft radius)		Herbaceous (5 ft radius)	
<i>Impatiens capensis</i>	75	<i>Phalaris arundinacea</i>	90
Unidentified aster family member	5	Unidentified aster family member	5
		<i>Carex scoparia</i>	15
		<i>Onoclea sensibilis</i>	10
		<i>Toxicodendron radicans</i>	5
		<i>Carex vulpinoidea</i>	2
		<i>Juncus effuses</i>	2
		<i>Iris versicolor</i>	2
		<i>Equisetum sp.</i>	1

Observed Plant List – Stream Channel Enhancement Area	
<i>Alnus incana</i>	<i>Iris versicolor</i>
<i>Salix sp</i> and <i>Salix sericea</i>	<i>Onoclea sensibilis</i>
<i>Cornus sericea</i>	<i>Equisetum sp.</i>
<i>Cornus amomum</i>	<i>Toxicodendron radicans</i>
<i>Viburnum recognitum (dentatum)</i>	<i>Juncus effusus</i>
<i>Vaccinium corybosum</i>	<i>Impatiens capensis</i>
<i>Ilex verticillata</i>	<i>Aster sp.</i>
<i>Ulmus rubra</i>	<i>Eutrochium sp.</i>
<i>Acer rubrum</i>	<i>Polygonum sagittatum</i>
<i>Phalaris arundinacea</i>	<i>Lythrium salicaria</i>
<i>Carex stricta</i>	<i>Typha latifolia</i>
<i>Carex scoparia</i>	<i>Symplocarpus foetidus</i>
<i>Carex vulpinoidea</i>	<i>Solidago sp.</i>

Appendix C – Photos

Wet Meadow Area



Photo at WMMA #1 (see plan sheet for photo location) on 6/13/2013



For reference a photo from 7/10/2009 from approximately WMMA#1 showing the shrub grow in the area prior to the establishment of the mitigation mowing.



Photo at WMMA#1 on 9/16/2013



Photo taken 10/12/2013 north of the WMMA#1 photo location showing detail of ground surface following mowing



Detail of an herbicide treated multiflora rose area on 6/13/2013



Detail of *Spirea* regrowth from cut stem in wet meadow area (6/13/2013)



Detail of vegetation on 9/16/2013. Note greater volume of *Salix* stem regrowth at the foreground left and golden rod along a ditch.

Photos – Stream Channel Enhancement Area



Photo in mitigation area under mature alders in the SCEA which has 100%+ woody canopy cover and the herbaceous layer is dominated by the native *Impatiens capensis*. This photo is at the reference plot. (Photo 6/13/2013)



Photo at SCEA#1 (see plan for location) an open canopy area which was planted in 2012 dominated by reed canary grass in the spring of 2013 (6/13/13)



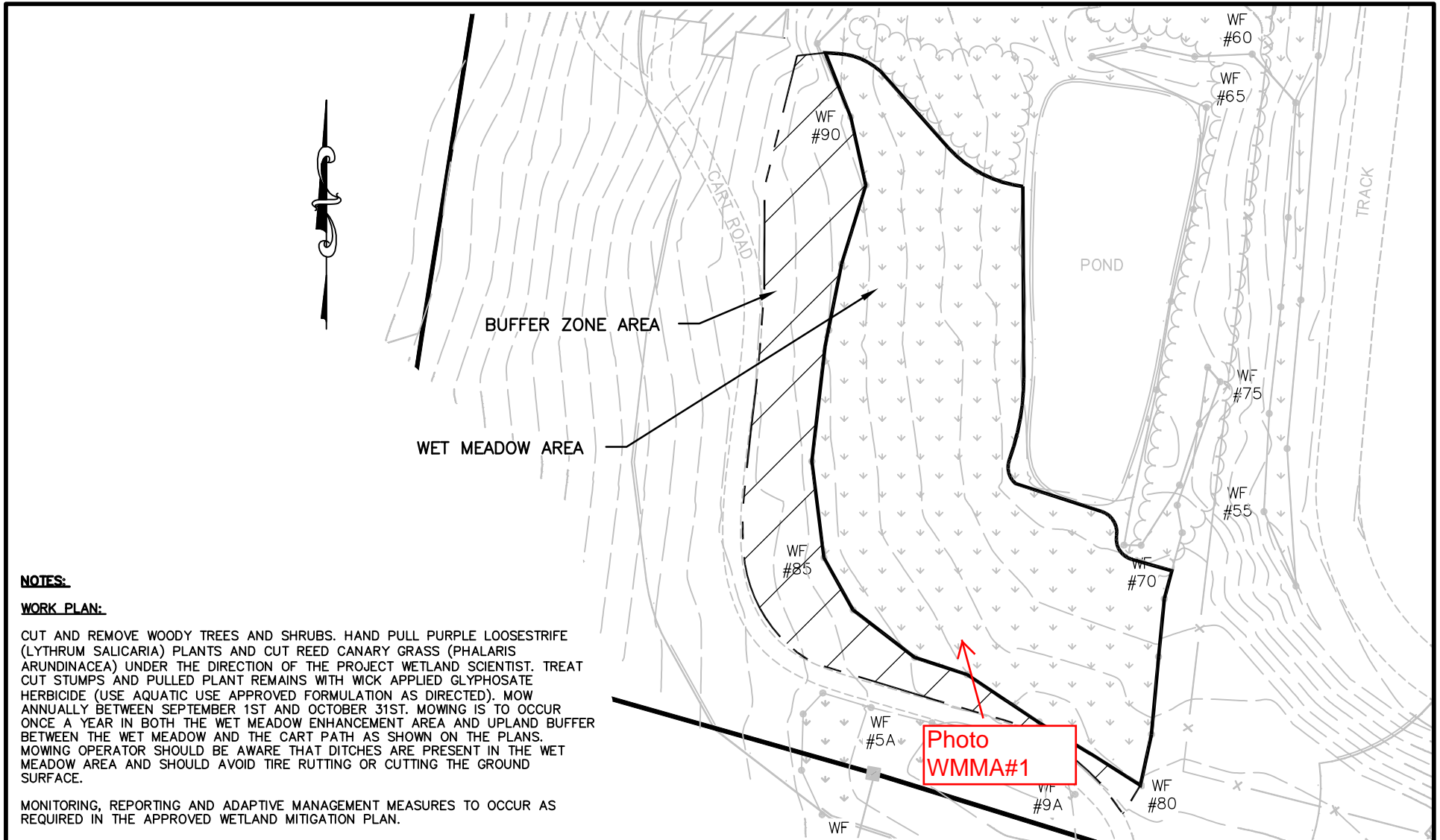
Photo at SCEA#1 on 9/16/2013, native herbaceous cover has increase in the fall, also a single flower stalk of purple loosestrife is visible (left center). Planted alder has increased its height although it is difficult to make out in the photo



This photo is looking approximately westward across the channel in the mitigation area. Several planted shrubs are visible including and alder (foreground left) dogwood (foreground right) and additional plants in the rear of the photo. This photo was take 9/16/2013 and shows that the planted shrubs have gained in height over 2013.



For reference this photo is from 6/15/2012 showing a portion of the mitigation area immediately following planting




NOTES:

WORK PLAN:


CUT AND REMOVE WOODY TREES AND SHRUBS. HAND PULL PURPLE LOOSESTRIFE (LYTHRUM SALICARIA) PLANTS AND CUT REED CANARY GRASS (PHALARIS ARUNDINACEA) UNDER THE DIRECTION OF THE PROJECT WETLAND SCIENTIST. TREAT CUT STUMPS AND PULLED PLANT REMAINS WITH WICK APPLIED GLYPHOSATE HERBICIDE (USE AQUATIC USE APPROVED FORMULATION AS DIRECTED). MOW ANNUALLY BETWEEN SEPTEMBER 1ST AND OCTOBER 31ST. MOWING IS TO OCCUR ONCE A YEAR IN BOTH THE WET MEADOW ENHANCEMENT AREA AND UPLAND BUFFER BETWEEN THE WET MEADOW AND THE CART PATH AS SHOWN ON THE PLANS. MOWING OPERATOR SHOULD BE AWARE THAT DITCHES ARE PRESENT IN THE WET MEADOW AREA AND SHOULD AVOID TIRE RUTTING OR CUTTING THE GROUND SURFACE.

MONITORING, REPORTING AND ADAPTIVE MANAGEMENT MEASURES TO OCCUR AS REQUIRED IN THE APPROVED WETLAND MITIGATION PLAN.



CME Associates, Inc.
 32 Crabtree Lane, Woodstock, CT 06281
 55 Main Street, Suite 340 Norwich, CT 06360
 333 East River Drive, East Hartford, CT 06108
 50 Elm Street, Southbrkkje, MA 01550
 Phone 888-291-3227
 www.cmeengineering.com

PROPOSED CONDITIONS



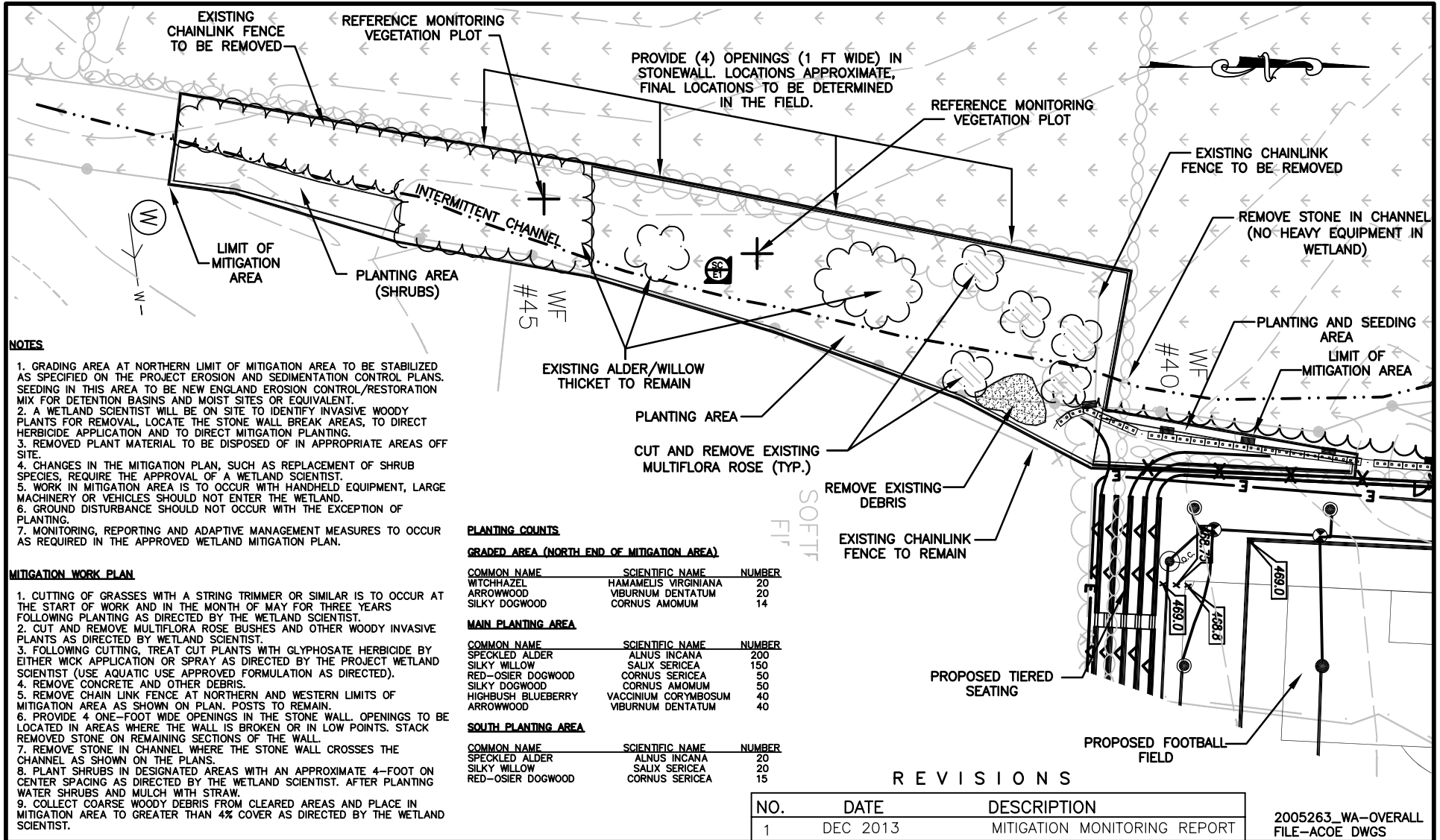
GRAPHIC SCALE IN FEET
 1"=80'

WET MEADOW ENHANCEMENT-MITIGATION

ATHLETIC COMPLEX EXPANSION AT: ROUTE 169, WOODSTOCK, CT
APPLICATION BY: WOODSTOCK ACADEMY

DATE:
FEBRUARY 2010

SHEET
8 OF 12



NOTES

1. GRADING AREA AT NORTHERN LIMIT OF MITIGATION AREA TO BE STABILIZED AS SPECIFIED ON THE PROJECT EROSION AND SEDIMENTATION CONTROL PLANS. SEEDING IN THIS AREA TO BE NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS AND MOIST SITES OR EQUIVALENT.
2. A WETLAND SCIENTIST WILL BE ON SITE TO IDENTIFY INVASIVE WOODY PLANTS FOR REMOVAL, LOCATE THE STONE WALL BREAK AREAS, TO DIRECT HERBICIDE APPLICATION AND TO DIRECT MITIGATION PLANTING.
3. REMOVED PLANT MATERIAL TO BE DISPOSED OF IN APPROPRIATE AREAS OFF SITE.
4. CHANGES IN THE MITIGATION PLAN, SUCH AS REPLACEMENT OF SHRUB SPECIES, REQUIRE THE APPROVAL OF A WETLAND SCIENTIST.
5. WORK IN MITIGATION AREA IS TO OCCUR WITH HANDHELD EQUIPMENT, LARGE MACHINERY OR VEHICLES SHOULD NOT ENTER THE WETLAND.
6. GROUND DISTURBANCE SHOULD NOT OCCUR WITH THE EXCEPTION OF PLANTING.
7. MONITORING, REPORTING AND ADAPTIVE MANAGEMENT MEASURES TO OCCUR AS REQUIRED IN THE APPROVED WETLAND MITIGATION PLAN.

MITIGATION WORK PLAN

1. CUTTING OF GRASSES WITH A STRING TRIMMER OR SIMILAR IS TO OCCUR AT THE START OF WORK AND IN THE MONTH OF MAY FOR THREE YEARS FOLLOWING PLANTING AS DIRECTED BY THE WETLAND SCIENTIST.
2. CUT AND REMOVE MULTIFLORA ROSE BUSHES AND OTHER WOODY INVASIVE PLANTS AS DIRECTED BY WETLAND SCIENTIST.
3. FOLLOWING CUTTING, TREAT CUT PLANTS WITH GLYPHOSATE HERBICIDE BY EITHER WICK APPLICATION OR SPRAY AS DIRECTED BY THE PROJECT WETLAND SCIENTIST (USE AQUATIC USE APPROVED FORMULATION AS DIRECTED).
4. REMOVE CONCRETE AND OTHER DEBRIS.
5. REMOVE CHAIN LINK FENCE AT NORTHERN AND WESTERN LIMITS OF MITIGATION AREA AS SHOWN ON PLAN. POSTS TO REMAIN.
6. PROVIDE 4 ONE-FOOT WIDE OPENINGS IN THE STONE WALL. OPENINGS TO BE LOCATED IN AREAS WHERE THE WALL IS BROKEN OR IN LOW POINTS. STACK REMOVED STONE ON REMAINING SECTIONS OF THE WALL.
7. REMOVE STONE IN CHANNEL WHERE THE STONE WALL CROSSES THE CHANNEL AS SHOWN ON THE PLANS.
8. PLANT SHRUBS IN DESIGNATED AREAS WITH AN APPROXIMATE 4-FOOT ON CENTER SPACING AS DIRECTED BY THE WETLAND SCIENTIST. AFTER PLANTING WATER SHRUBS AND MULCH WITH STRAW.
9. COLLECT COARSE WOODY DEBRIS FROM CLEARED AREAS AND PLACE IN MITIGATION AREA TO GREATER THAN 4% COVER AS DIRECTED BY THE WETLAND SCIENTIST.

PLANTING COUNTS

GRADED AREA (NORTH END OF MITIGATION AREA)

COMMON NAME	SCIENTIFIC NAME	NUMBER
WITCHHAZEL	HAMAMELIS VIRGINIANA	20
ARROWWOOD	VIBURNUM DENTATUM	20
SILKY DOGWOOD	CORNUS AMOMUM	14

MAIN PLANTING AREA

COMMON NAME	SCIENTIFIC NAME	NUMBER
SPECKLED ALDER	ALNUS INCANA	200
SILKY WILLOW	SALIX SERICEA	150
RED-OSIER DOGWOOD	CORNUS SERICEA	50
SILKY DOGWOOD	CORNUS AMOMUM	50
HIGHBUSH BLUEBERRY	VACCINIUM CORYMBOSUM	40
ARROWWOOD	VIBURNUM DENTATUM	40

SOUTH PLANTING AREA

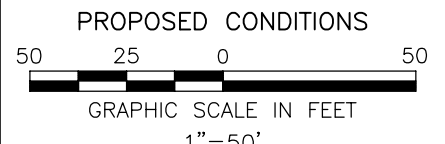
COMMON NAME	SCIENTIFIC NAME	NUMBER
SPECKLED ALDER	ALNUS INCANA	20
SILKY WILLOW	SALIX SERICEA	20
RED-OSIER DOGWOOD	CORNUS SERICEA	15

REVISIONS

NO.	DATE	DESCRIPTION
1	DEC 2013	MITIGATION MONITORING REPORT

2005263_WA-OVERALL
FILE-ACOE DWGS

CME Associates, Inc.
32 Crabtree Lane, Woodstock, CT 06281
333 East River Drive, East Hartford, CT 06108
50 Elm Street, Southbury, MA 01550
Phone 886-291-3227
www.cmeengineering.com



CHANNEL ENHANCEMENT-MITIGATION

ATHLETIC COMPLEX EXPANSION AT: ROUTE 169, WOODSTOCK, CT
APPLICATION BY: WOODSTOCK ACADEMY

DATE:
FEBRUARY 2010

SHEET
9 OF 12