Connecticut Ecosystems LLC
• Wetland Delineation • Wetland & Aquatic Evaluation • Mitigation
• Natural Resource Inventory • Permit Assistance • Expert Testimony

MITIGATION REPORT

MIDDLETOWN HIGH SCHOOL

Middletown, Connecticut

December 23, 2003

CE Project 01-400 File c:\projects 2003\01-400\report.doc

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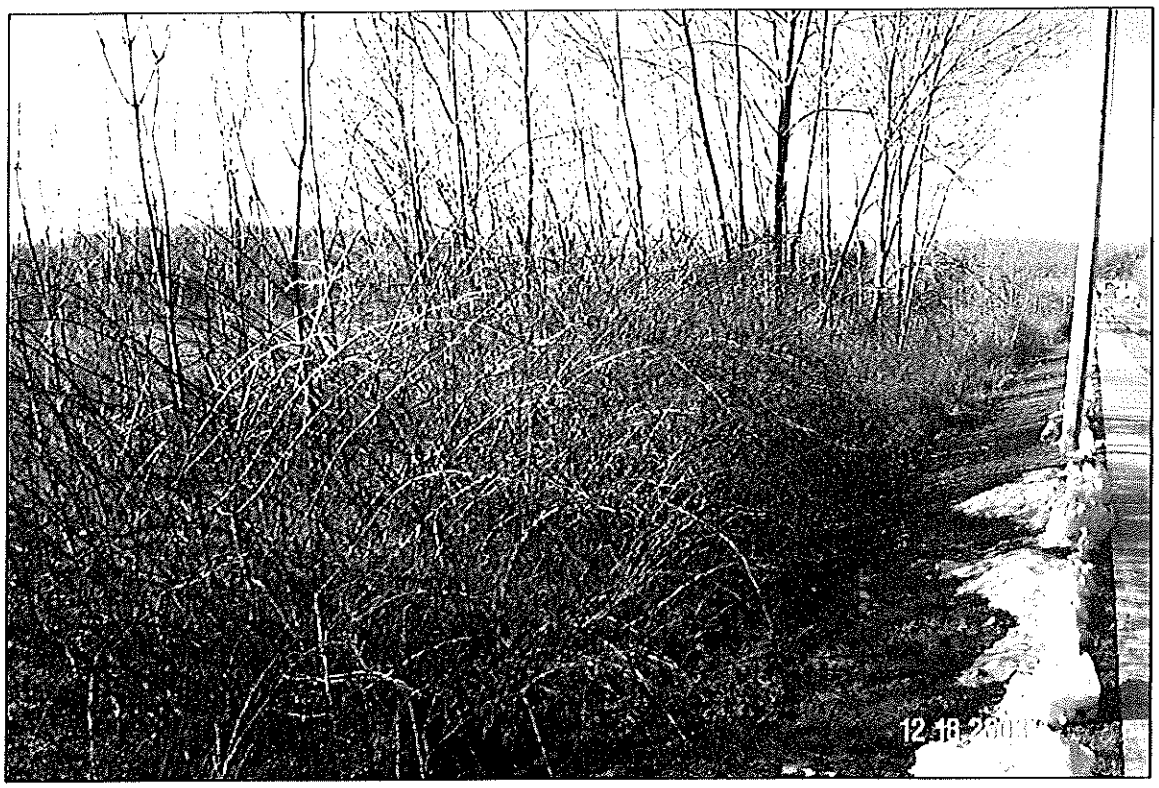

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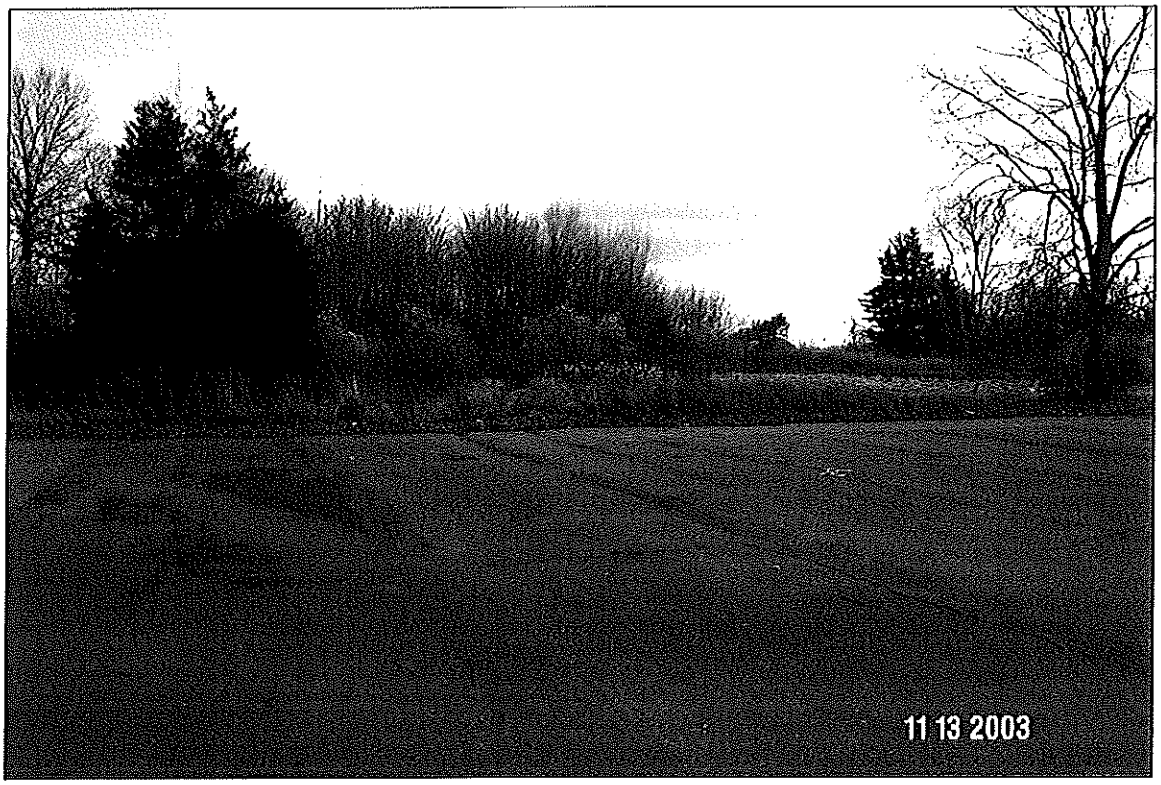

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1.0 INTRODUCTION

The construction of a new high school and athletic fields is proposed in Middletown, CT. The subject property contains a large amount of regulated wetlands, which are characterized in data sheets provided in Appendix 1 of this report. As part of this construction there will be an impact to 76,965 square feet (1.77 acres) of regulated wetlands (Table 1). Site plans went through several iterations in order to reduce the wetland impact to the greatest possible extent. The remaining impact is considered unavoidable, since the expansion is necessary to satisfy educational and program requirements.

In order to compensate for this unavoidable wetland impact, the creation of 91,066 square feet of new wetlands is proposed in eight non-wetland locations (Table 2). This creation will consist of forested, scrub-shrub and emergent wetland types to match the types of wetlands that will be eliminated by the project (Tables 1 and 2).

Stand pipes have been installed in most of the mitigation areas for the purposes of ground water monitoring, which began on December 9, 2003 and will continue in 2004. The data that will be collected will allow the refinement of the grading plans for these areas based upon measured ground water elevations.

All of the mitigation areas will be constructed in upland sites adjacent to existing wetlands. The mitigation areas will be excavated to approximately match the elevation of the adjacent wetland in order to establish a suitable hydrologic regime.

A thick clay layer at a depth of 2-3 feet was observed by HRP Associates, Inc. in test pits that were dug in or near the proposed mitigation areas (Appendix 2):

Test Pit #	Mitigation Area	Depth to Restrictive Layer
10	G	Silt & clay at 2.4' depth
11	D	Clay at 0.5' depth
13	A	Clay at 2.5' depth
14	B	Clay at 5'± depth
3A	E	Clay at 2' depth

These clay restrictive layers impede the downward movement of ground water, causing a perched seasonally high water table in wetlands. A similar condition will exist in the created mitigation wetlands.

Table 1. Classification of Wetland Impact Areas					
	Wetland Classification (*)				
Wetland Impact Area	**PFO1E**	**PSS1E**	**PEM5E**	**PEM3E**	**Total**
1	4,004	0	0		4,004
2	12,300	0	3,000	0	15,300
3	25,761	0	8,385	0	34,146
4	1,130	0	0	0	1,130
5	0	700	0	0	700
6	4,031	0	0	0	4,031
7	0	0	0	10,682	10,682
8	0	2,295	0	0	2,295
9	3,480	0	0	0	3,480
10	1,197	0	0	0	1,197
Total	**51,903**	**2,995**	**11,385**	**10,682**	**76,965**

Table 2. Proposed Wetland Mitigation				
	Wetland Classification			
Wetland Mitigation Area	**PFO1E**	**PSS1E**	**PEM3E/ PEM5E**	**Total**
A	7,838	0	0	7,838
B	12,645	0	0	12,645
C	26,251	2,995	0	29,246
D	6,590	0	0	6,590
E	0	0	9,701	9,701
F	0	0	3,505	3,505
G	0	0	19,284	19,284
H	0	0	2,257	2,257
Total	**53,324**	**2,995**	**34,747**	**91,066**

1. All values in table are area in square feet.
2. Cowardin et al. (1979) wetland classification system:
PFO1E = palustrine forested, broad-leaved deciduous, seasonally saturated
PSS1E = palustrine scrub/shrub, broad-leaved deciduous, seasonally saturated
PEM5E = palustrine emergent, narrow-leaved persistent, seasonally saturated
PEM3E = palustrine emergent, narrow-leaved non-persistent, seasonally saturated

2.0 WETLAND IMPACT AREAS

A total of 76,965 square feet (1.77 acres) of regulated wetland areas will be impacted by the project. These impacts will be to ten discrete areas, as described below.

2.1 Wetland Impact Area 1 (4,004 square feet)

Area 1 consists of three small isolated wooded wetland pockets that are referred to as Wetlands 6, 7 and 8 in the Wetlands Report prepared by Connecticut Ecosystems LLC. These wetlands will be inspected in the spring of 2004 to determine whether they are vernal pools. If one or more are found to be a vernal pool, this Impact Area will be removed from the wetland application. If not, a permit will be requested to fill these three wetlands in order to construct a softball field. If they are not vernal pools, then their sole principal function is Pollutant Removal. Their basin depression structure gives them the potential to provide this function. However, currently their small wooded watersheds contain stable soils, and likely export few pollutants to the wetlands. Hence, the wetlands currently have little opportunity to provide this function under existing conditions.

2.2 Wetland Impact Area 2 (15,300 square feet)

Area 2 is part of what is referred to as Wetland 1A in the Wetlands Report prepared by Connecticut Ecosystems LLC. This linear drainage feature is located between two athletic fields (Photo 1). An intermittent watercourse (8-10 foot wide channel), which originates at a culvert and headwall, flows north through the center of this area. Red maple, silky dogwood, gray dogwood, multiflora rose and common reed occur in this area. The linear flow pattern in the intermittent watercourse channel, and short runoff residence time, limit the potential of this wetland area to remove water-borne pollutants.

Impact Area 2 includes a section that lies parallel to Wildermans Way (Photo 2). This marsh receives and renovates runoff that drains into it from the curbless road. The dense stand of broadleaf cattail that grows in this area is an excellent water quality renovation feature.

2.3 Wetland Impact Area 3 (34,146 square feet)

Area 3 is part of what is referred to as Wetland 1A in the Wetlands Report prepared by Connecticut Ecosystems LLC. Bordered by Spruce Street to the east and an athletic field to the west, it consists of deciduous wooded swamp and marsh components (Photo 3). The former supports a dense growth of red maple, American elm, green ash, alder, silky dogwood and skunk cabbage.

The latter consists of a dense stand of common reed that measures approximately 180 feet by 75-100 feet (Photo 4). At its north end Area 3 consists of a narrow linear ditch adjacent to a road. The proximity of the road and athletic field, along with the dense stand of common reed (an invasive exotic plant) impairs the wildlife habitat value of this wetland area. However, the patch of common reed provides an important pollutant removal function. Active ground water discharges were also observed in the wooded swamp portions of this wetland area.

2.4 Wetland Impact Area 4 (1,130 square feet)

Area 4 is part of what is referred to as Wetland 1B in the Wetlands Report prepared by Connecticut Ecosystems LLC. This area is located along the edge of a deciduous wooded swamp that is bordered by Spruce Street (Photo 6). Red oak, shadbush, multiflora rose and red maple grow in a dense thicket at the edge of this wetland. Recent beaver activity is evident near this impact area (Photo 5).

This small area contributes minimally to the principal functions associated with Wetland 1B.

2.5 Wetland Impact Area 5 (700 square feet)

Area 5 is located at the northeast corner of what is referred to as Wetland 1C in the Wetlands Report prepared by Connecticut Ecosystems LLC (Photo 7). This small area supports a dense growth of saplings and shrubs (green ash and multiflora rose). To the south lies a large marsh containing cattail and purple loosestrife.

This small area contributes minimally to the principal functions associated with Wetland 1C.

2.6 Wetland Impact Area 6 (4,031 square feet)

Area 6 is located at the southwest corner of what is referred to as Wetland 1C in the Wetlands Report prepared by Connecticut Ecosystems LLC (Photo 8). This area is bordered to the south by a wet meadow in a utility right-of-way, and to the north by a chain link fence and athletic field. A dug ditch at the north end of this wetland area intercepts drainage and prevents it from flowing onto the athletic field. Red maple, American elm, Tartarian honeysuckle and alder grow in this densely vegetated area.

This small area contributes minimally to the principal functions associated with Wetland 1C.

2.7 Wetland Impact Area 7 (10,682 square feet)

This area is referred to as Wetland 10 in the Wetlands Report prepared by Connecticut Ecosystems LLC. This linear constructed swale intercepts runoff from the hillside to the southwest and prevents it from flowing onto an adjacent running track.

The principal function associated with this area is Pollutant Removal.

2.8 Wetland Impact Area 8 (2,295 square feet)

Area 8 is located at the northwest edge of what is referred to as Wetland 2 in the Wetlands Report prepared by Connecticut Ecosystems LLC (Photo 9). A constructed drainage swale located in this area intercepts runoff from the hillside to the south and directs it to a catch basin, preventing it from flowing onto a driveway to the north. Willows, soft rush, seedbox, woolgrass and monkey flower grow in this densely vegetated swale.

This small area contributes minimally to the principal functions associated with Wetland 2.

2.9 Wetland Impact Area 9 (3,480 square feet)

Area 9 is a small portion of what is referred to as Wetland 1A in the Wetlands Report prepared by Connecticut Ecosystems LLC (Photo 10). This narrow area is bordered to the east by an athletic field and to the west by a school driveway. It contains a constructed channel (1-3 feet wide) that receives water from a culvert and drains it to a large wooded swamp to the north. Runoff from the Middle School parking lot also discharges to this area via a culvert. Thick deposits of red sand lie on the banks of the linear watercourse channel. Willow, alder, silky dogwood, purple loosestrife and common reed grow in this area.

The linear flow pattern in the intermittent watercourse channel, and short runoff residence time, limit the potential of this wetland area to remove water-borne pollutants.

2.10 Wetland Impact Area 10 (1,197 square feet)

Area 10 is a small portion of what is referred to as Wetland 1B in the Wetlands Report prepared by Connecticut Ecosystems LLC. The wetland occurs on both sides of a paved path that leads from Keigwin School to a basketball court and open field (Photo 11). Silky dogwood, alder, swamp white oak and multiflora rose grow in this area.

This small area contributes minimally to the principal functions associated with Wetland 1B.

3.0 WETLAND MITIGATION AREAS

Mitigation Area site plans prepared by HRP Associates, Inc. are included in Appendix 1. Below is a discussion of each mitigation area.

3.1 Mitigation Area A (7,838 square feet)

3.1.1 Description of Existing Conditions

Area A is currently a very gently sloping upland meadow located between a palustrine emergent wetland and a paved path that leads from Keigwin School to a basketball court (Photo 12). The emergent wetland lies immediately adjacent to and north of Area A. Reed canary grass, plantain and redtop grow in this area.

3.1.2 Proposed Hydrology

Area A is immediately adjacent to a palustrine wetland whose elevation ranges from 18-20+ feet. Area A will be graded to a bottom elevation of 18.8 feet. The same hydrology that drives the adjacent wetland – a seasonal high ground water table – will also influence the mitigation wetland. Preliminary monitoring well data (Test Pit 13) shows a ground water elevation of 19.80 feet on 12/9/03.

3.1.3 Proposed Wetland Type

Area A is designed as a palustrine forested, broad-leaved deciduous, seasonally saturated wetland (PFO1E). Accordingly, 80 trees, 220 shrubs and 860 herbs will be planted in this mitigation area (Table 3).

3.1.4 Proposed Function

The primary function of Area A will be Wildlife Habitat.

Table 3. Mitigation Plantings									
Mitigation Area	**A**	**B**	**C1**	**C2**	**D**	**E**	**F**	**G**	**H**
Area (square feet)	7,838	12,645	26,251	2,995	6,590	9,701	3,505	19,284	2,257
	PFO1	PFO1	PFO1	PSS1	PFO1	PEM3/5	PEM3/5	PEM3/5	PEM3/5
Design Function	Habitat	Habitat	Habitat	Habitat	Habitat	Water Quality	Water Quality	Water Quality	Water Quality
Plantings									
Trees									
Acer rubrum	20	35	65		20				
Fraxinus pensylvanica	20	30	65		15				
Nyssa sylvatica	20	30	65		15				
Quercus palustris	20	30	65		15				
Total Trees	***80***	***125***	***260***	***0***	***65***	***0***	***0***	***0***	***0***
Shrubs									
Alnus rugosa	55		105	10	30				
Clethra alnifolia	55		70	10	30				
Cornus amomum		75	70	10					
Cornus sericea			70	10	30				
Ilex verticillata		70	70	10					
Rosa palustris	55		70	10	35				
Sambucus canadensis	55		70	10					
Spiraea latifolia		70	70	10	30				
Vaccinium corymbosum		70	70	10	30				
Viburnum dentatum		70	70	10					
Total Shrubs	***220***	***355***	***735***	***100***	***185***	***0***	***0***	***0***	***0***
Herbaceous									
Acorus calamus	100		290						
Alisma plantago-aquatica	60		290						
Asclepias incarnata		140		55	100				
Aster novae-angliae	100	140		55					
Carex crinita			290		100				
Carex lurida		140			125				
Carex stricta	100		290	55					
Carex vulpinoidea			290		100				
Eleocharis palustris		140	290						
Eupatorium maculatum	100	140		55					
Iris versicolor	100	140							
Juncus canadensis		140	290	55					
Juncus effusus	100				100				
Onoclea sensibilis		140	290						
Scirpus atrovirens		140	290		100				
Scirpus cyperinus	100		290		100				
Verbena hastata	100	130		55					
Total Herbaceous	**860**	**1390**	**2,900**	**330**	**725**	**0**	**0**	**0**	**0**

Note:
1. Plant materials available from New England Wetland Plants, Inc. (413-256-1752), or equal.
2. All Areas will be seeded with New England WetMix at a rate of 1 pound/2,500 square feet, or equal.

3.2 Mitigation Area B (12,645 square feet)

3.2.1 Description of Existing Conditions

Area B is currently a very gently sloping upland shrub thicket/meadow, along with part of a paved basketball court, located immediately south and west of a palustrine scrub-shrub wetland (Photo 13). A mature red cedar tree, along with a gray dogwood thicket, lie along the north end of this area. Goldenrods, milkweed and grasses grow in the upland meadow.

3.2.2 Proposed Hydrology

Area B is immediately adjacent to a palustrine wetland. Area B will be graded to a bottom elevation of 24.25 feet. The same hydrology that drives the adjacent wetland – a seasonal high ground water table – will also influence the mitigation wetland. Preliminary monitoring well data (Test Pit 14) shows a ground water elevation of 25.27 feet on 12/9/03.

3.2.3 Proposed Wetland Type

Area B is designed as a palustrine forested, broad-leaved deciduous, seasonally saturated wetland (PFO1E). Accordingly, 125 trees, 355 shrubs and 1,390 herbs will be planted in this mitigation area (Table 3).

3.2.4 Proposed Function

The primary function of Area B will be Wildlife Habitat.

3.3 Mitigation Area C (29,246 square feet)

3.3.1 Description of Existing Conditions

Area C is currently the southwest corner of a gently sloping upland mowed grass field located immediately west of a palustrine emergent wetland (wet meadow). It is bordered to the south and west by an upland mixed hardwoods forest (Photo 14).

3.5.4 Proposed Function

The primary function of Area E will be Pollutant Removal.

3.6 Mitigation Area F (3,505 square feet)

3.6.1 Description of Existing Conditions

Area F is currently a very gently sloping upland forest located immediately east and north of a palustrine forested wetland (Photo 17). The access driveway leading to Keigwin School lies immediately to the north. Average tree sizes in this wooded area are six inches diameter at breast height (DBH). Red maple, American elm, red oak, Tartarian honeysuckle and multiflora rose grow in this area. The latter two species are undesirable invasive exotic species.

3.6.2 Proposed Hydrology

Area F is designed as a water quality basin that will receive runoff from Area E, as well as on-site and off-site areas. It is located at the inlet end of a 3'x10' box culvert that conveys on-site and off-site drainage from north and southwest, respectively, below a road.

Area F is immediately adjacent to a palustrine wetland. Area F will be graded to a bottom elevation of 20 feet. The same hydrology that drives the adjacent wetland – a seasonal high ground water table and stream flow – will also influence the mitigation wetland.

3.6.3 Proposed Wetland Type

Area F is designed as a palustrine emergent wetland (PEM). Accordingly, New England Wet-Mix (or similar) will be seeded in this area at a rate of 1 pound/2,500 square feet.

3.6.4 Proposed Function

The primary function of Area F will be Pollutant Removal.

3.7 Mitigation Area G (19,284 square feet)

3.7.1 Description of Existing Conditions

Area G is located at the southeast corner of a very gently sloping mowed athletic field (Photo 18). A palustrine forested wetland lies to the south and east of Area G, separated by an extremely dense shrub thicket (multiflora rose, honeysuckle, autumn olive, staghorn sumac).

3.7.2 Proposed Hydrology

Area G is designed as a water quality basin that will receive runoff from a large parking lot to the north, and from other on-site and off-site areas. Hence, part of its hydrology will be due to periodic storm water runoff inputs.

Area G is immediately adjacent to a palustrine wetland whose elevation ranges from 22.5 to 24 feet. Area G will be excavated to a bottom elevation of 22 feet. The same hydrology that drives the adjacent wetland – a seasonal high ground water table – will also influence the mitigation wetland. Preliminary monitoring well data (Test Pit 10) shows a ground water elevation of 23.71 feet on 12/9/03.

3.7.3 Proposed Wetland Type

Area G is designed as a palustrine emergent wetland (PEM). Accordingly, New England Wet-Mix (or similar) will be seeded in this area at a rate of 1 pound/2,500 square feet.

3.7.4 Proposed Function

The primary function of Area G will be Pollutant Removal.

3.8 Mitigation Area H (2,257 square feet)

3.8.1 Description of Existing Conditions

Area H is located along the tree line of an upland forest. This gently sloping area lies on the north side of a driveway that leads to Keigwin School.

3.8.2 Proposed Hydrology

Area H is designed as a "biofilter swale" that will receive runoff from Mitigation Area F and convey it to a palustrine forested wetland to the east. It is located at the outlet of the previously referenced 3'x10' box culvert. Hence, part of its hydrology will be due to periodic storm water runoff inputs. The adjacent wooded wetland boundary lies near the 20 foot contour, and the biofilter swale will be excavated to a bottom elevation of 19.5-19.2 feet. Thus, the same hydrology that drives the adjacent wetland – a seasonal high ground water table – will also influence the mitigation wetland, along with stream flow and storm water runoff.

3.8.3 Proposed Wetland Type

Area H is designed as a palustrine emergent wetland (PEM). Accordingly, New England Wet-Mix (or similar) will be seeded in this area at a rate of 1 pound/2,500 square feet.

3.8.4 Proposed Function

The primary function of Area H will be Pollutant Removal.

4.0 MITIGATION SOILS

The applicant proposes to fill 76,965 square feet of wetlands in conjunction with the project. Where feasible, topsoil will be stripped from these wetland areas and stockpiled for use in the mitigation areas. The primary concern is to avoid transporting seeds, roots and rhizomes of invasive and/or exotic flora along with the soil. Common reed (*Phragmites australis)* and purple loosestrife (*Lythrum salicaria*) grow in at least one of the proposed wetland impact areas (#2). Topsoil from a wetland impact area that contains invasive and/or exotic flora will not be used in the mitigation areas.

Topsoil will also be stripped from the mitigation areas, stockpiled, and used along with any stockpiled wetland soil in the final grading of the mitigation areas. A minimum of 12 inches of topsoil will be placed on the surface of each mitigation area during final grading.

The organic carbon content of the topsoil that will be used in the mitigation areas will be a minimum of 4-12 percent on a dry weight basis, as determined by lab testing. If necessary, clean leaf mulch or similar will be added to the topsoil in order to achieve the desired organic carbon content.

Every effort will be made to minimize the compaction of soil by heavy machinery in the mitigation areas, since this can impede the growth and vigor of planted flora.

5.0 CONSTRUCTION & PLANTING DETAILS

Construction and planting of the mitigation areas will be supervised by a qualified Professional Wetland Scientist and/or Soil Scientist.

The optimal wetland mitigation planting time is spring (mid-April to mid-June), after plants have broken dormancy. This is a period when ground water and precipitation levels are generally high. If that is not feasible, a fall planting (September through mid-October) is recommended. In either case, too much or too little water can cause high plant mortality. Herbaceous plants established entirely below water will die due to lack of oxygen. Alternately, plants can desiccate during dry conditions. Plans will be made for supplemental irrigation (watering) in the event of extended dry weather following planting.

The on-center planting spacing and plant size in the mitigation areas will be as follows:

Type	On-Center Spacing (ft.)	Size
Tree	10	3-4'
Shrub	6	2-3'
Herbaceous	3	2" plug

Woody plants will be mulched (3' diameter circle, 2" deep) with a leaf mulch or similar to help conserve water. If necessary, planted trees and shrubs will be sprayed with a deer repellant in the event of heavy browsing.

6.0 SEED MIXES

New England WetMix (or equal) will be seeded in all mitigation areas at a rate of 1 pound/2,500 square feet to ensure rapid revegetation of exposed soils and deter colonization by invasive and/or exotic flora. Ideally this seeding will be done in mid to late spring (May-June). However, if the construction schedule requires mitigation area grading in the late summer/early fall then WetMix will be seeded prior to October 15, and other plantings will be established during the subsequent May/June. The mitigation areas must not contain surface water at the time of seeding, since the seeds would float and not germinate. Moist surface soils provide the optimal germination substrate.

7.0 MONITORING WELLS

A monitoring well (perforated PVC stand pipe) will be installed in each mitigation area to allow for periodic determinations of the ground water level.

8.0 AS-BUILT PLANS

Once constructed and planted, the mitigation areas will be surveyed and as-built plans will be prepared and submitted to regulatory agencies. One-foot contour intervals will be used to depict topography within the mitigation areas. These plans will confirm that the mitigation areas were created as designed, and will serve as the basis for monitoring inspections and reports.

9.0 CONTROL OF INVASIVE PLANTS

It should be recognized that the mitigation areas will present an ideal substrate for the establishment of invasive plants, nearly all of which are non-native. A comprehensive list of these plants is found in the U.S. Army Corps of Engineers New England Division publication, "Performance Guidelines and Supplemental Information on the Checklist for Review of Mitigation Plan". Unfortunately, several of these plants (e.g., *Phragmites australis, Lythrum salicaria*) are prevalent on the subject property, and in some cases immediately adjacent to mitigation areas. These plants favor disturbed, exposed wet or moist soils. None of the plants on this list are included in the planting plan or seed mix.

Invasive plants discovered in small numbers in the mitigation areas during monitoring inspections will be removed by hand. Eradication of large patches of invasive plants may require spraying with an herbicide such as Rodeo by a licensed applicator.

The rapid establishment of native flora through plantings and seed mixes offers the best safeguard against colonization by nuisance invasive species.

10.0 COARSE WOODY DEBRIS

It is recommended that woody debris in the form of cut logs and branches be scattered across mitigation areas designed to provide wildlife habitat (i.e., Areas A-D).

11.0 LONG-TERM MONITORING

The mitigation areas will be monitored for a period of five years following their creation. The first year of monitoring shall be the first year that the mitigation areas have been through a full growing season following construction and planting. The mitigation areas will be inspected at least twice each year (middle and end of growing season) to collect data for the annual monitoring report. The contents of the annual monitoring reports will include the four success standards contained in the Army Corps mitigation guidelines document (Appendix 4):

1. The site will have at least 500 trees and shrubs per acre, of which at least 350 per acre are trees for proposed forested cover types, that are healthy and vigorous and are at least 18" tall in 75% of each planned woody zone, and the recommended number of non-exotic species (planted and volunteer).

2. Each mitigation site will have at least 80% areal cover by noninvasive species. Planned emergent areas will have at least 80% cover by noninvasive hydrophytes. Planned scrub-shrub and forested cover types will have at least 60% cover by noninvasive hydrophytes, of which at least 15% are woody species.

3. Common reed, purple loosestrife, Russian and autumn olive (*Eleagnus* spp.), buckthorn (*Rhamnus frangula*) and/or multiflora rose (*Rosa multiflora*) at the mitigation sites are being controlled.

4. All slopes, soils, substrates, and constructed features within and adjacent to the mitigation sites are stabilized.

Additional items in the monitoring reports will include:

- description of monitoring inspections
- soils data collected after construction and every alternate year throughout the monitoring period
- monitoring well data
- description of any remedial actions taken during the monitoring year to meet the four success standards
- report on status of erosion control measures
- visual estimates of percent vegetative cover of non-invasive and invasive species at each mitigation site
- observed fish and wildlife at mitigation sites
- by species, a description of general health/vigor of surviving plants, the prognosis for their future survival and a diagnosis of the cause(s) of morbidity or mortality
- description of recommended remedial measures

12.0 ASSESSMENT INSPECTION & REPORT

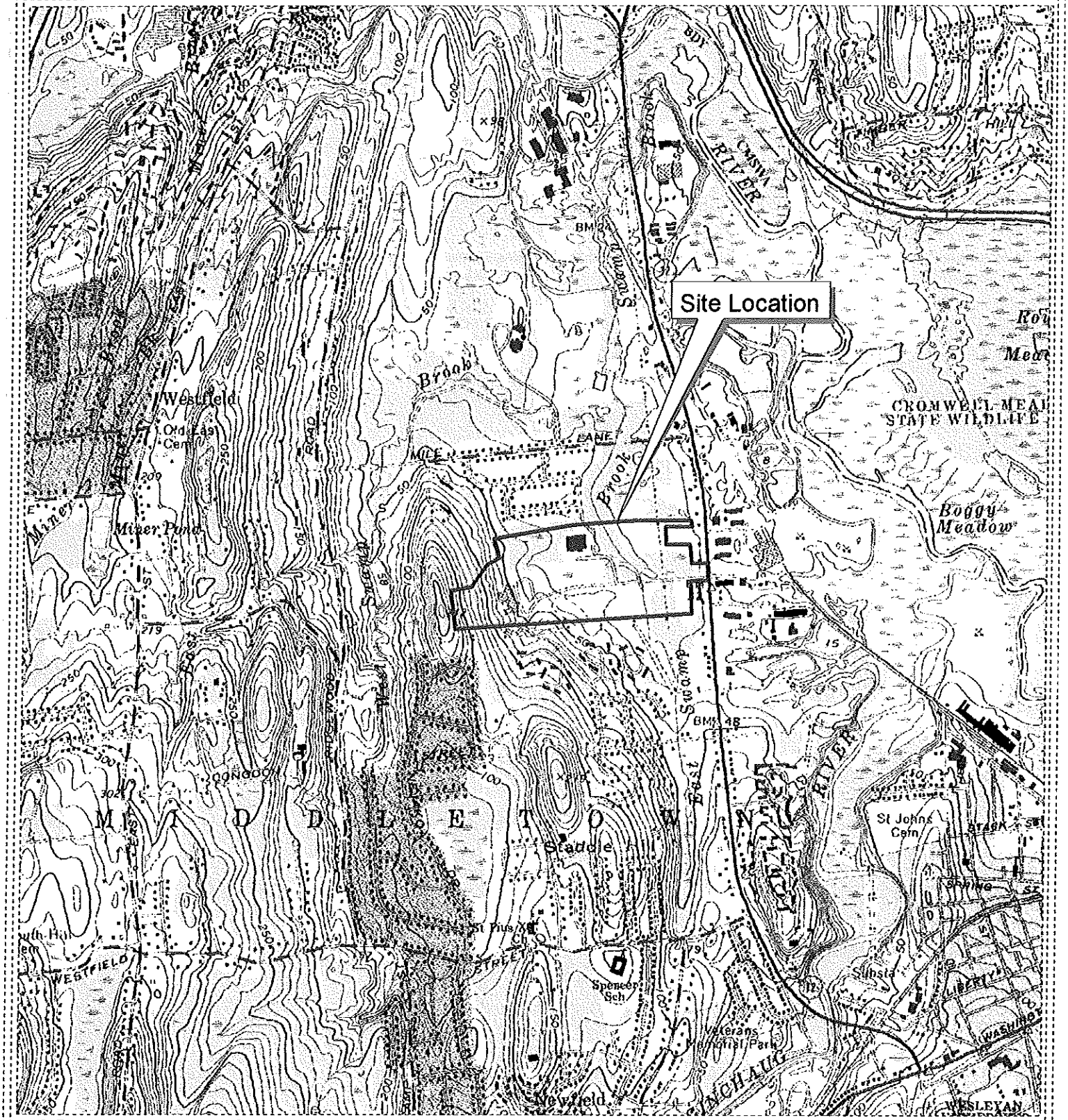
At the end of the 5-year monitoring period an assessment of the mitigation areas will be conducted by a Professional Wetland Scientist and/or Soil Scientist who did not conduct the monitoring. The Assessment Report will:

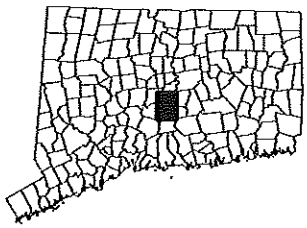
- summarize the original or modified mitigation goals and discuss the level of attainment of these goals at each mitigation site
- describe significant problems and solutions during construction and monitoring
- identify agency procedures/policies that encumbered implementation of the mitigation plan
- recommend measures to improve the efficiency, reduce the cost, or improve the effectiveness of similar future projects

Additionally, the Assessment Report will include the four appendices described in the Army Corps mitigation manual (see Appendix 4 of this report):

Appendix A – Functions and values assessment of mitigation sites using the same methodology used to assess the impacted wetlands
Appendix B – Calculation of the area of wetlands in each mitigation site using the 1987 Wetlands Delineation Manual
Appendix C – Comparison of the area and extent of delineated mitigation wetlands with the area and extent of wetlands proposed in the mitigation plan
Appendix D – Photos of each mitigation site taken from the same locations as the monitoring photos

APPPENDIX 1. MITIGATION PLANS PREPARED BY HRP ASSOCIATES, INC.





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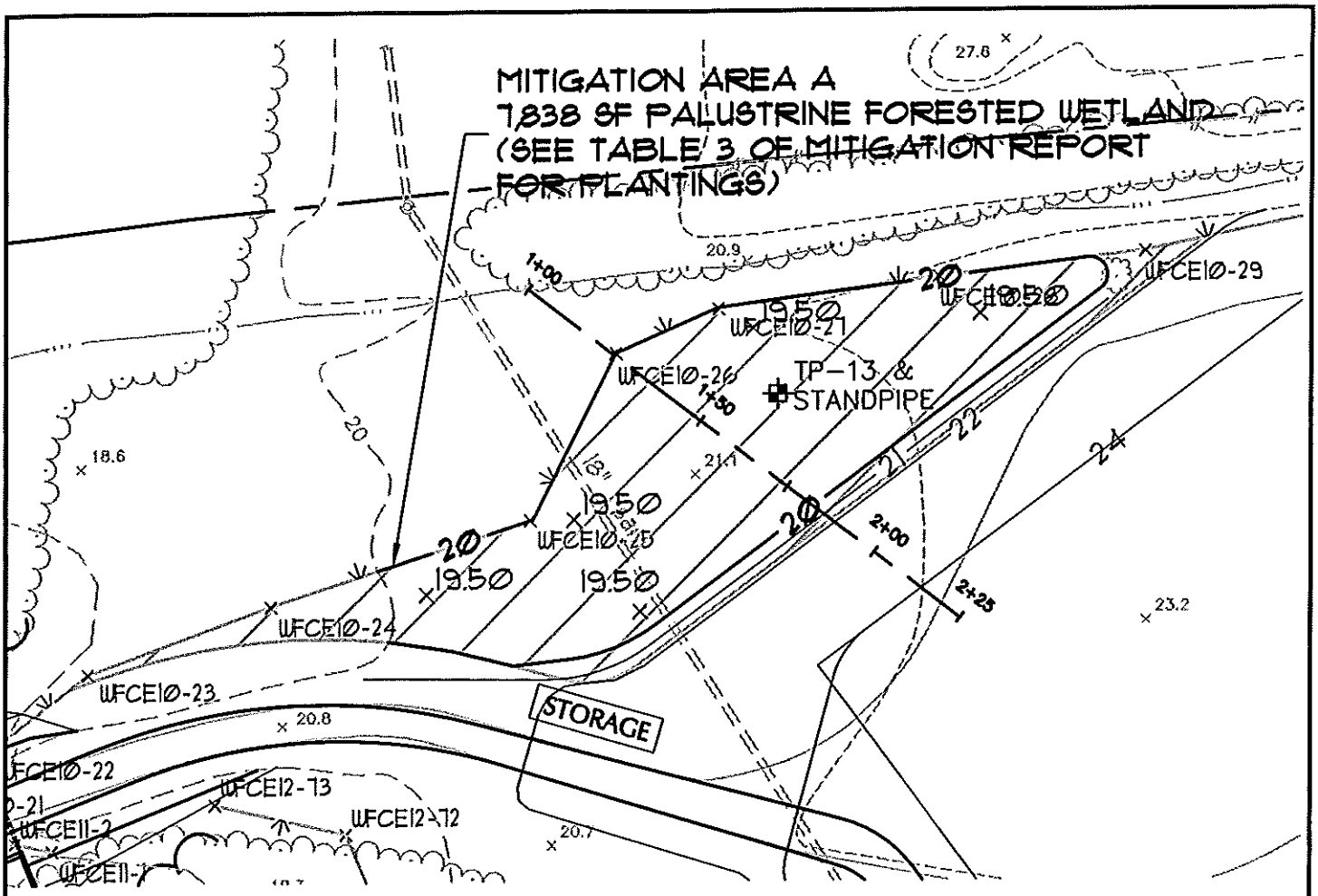
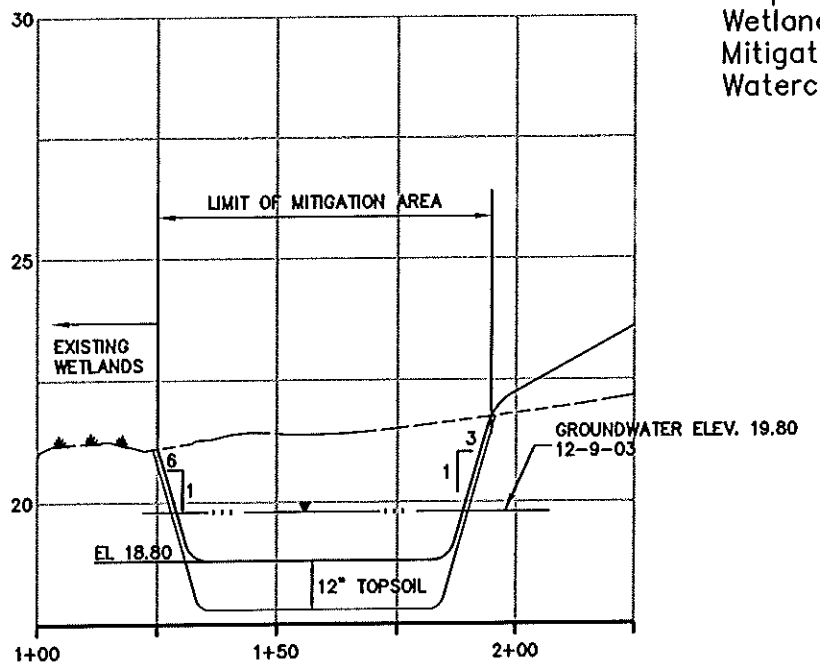
1965
PHOTOREVISED 1992
DMA 6467 II SW-SERIES V816

Figure 1
Site Location Map
Proposed Middletown High School
Wilderman's Way
Middletown, CT 06457
HRP# DEC0002.PC
23 December 03



LEGEND

Existing Contour	20
Proposed Contour	20
Proposed Spot Grade	21.5
Wetland Limit	
Mitigation Area	
Watercourse	



Vertical Scale

4 0 2 4

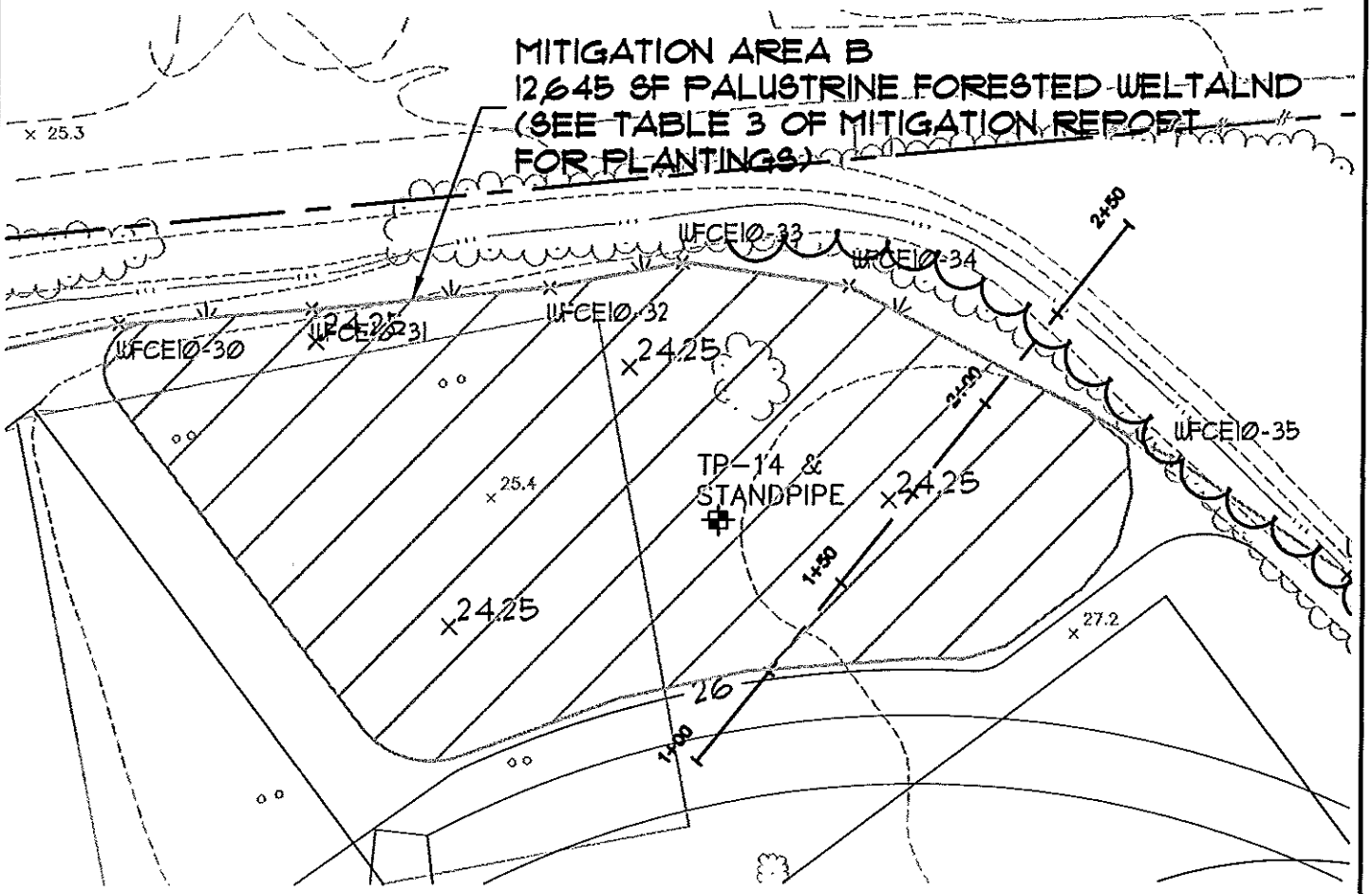
1 inch = 4 ft.

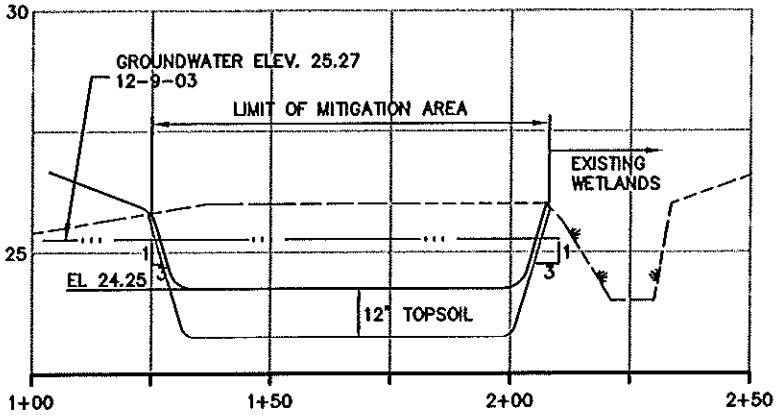
Horizontal Scale

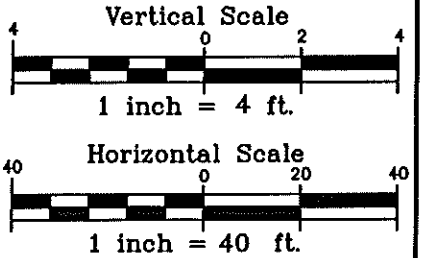
40 0 20 40

1 inch = 40 ft.

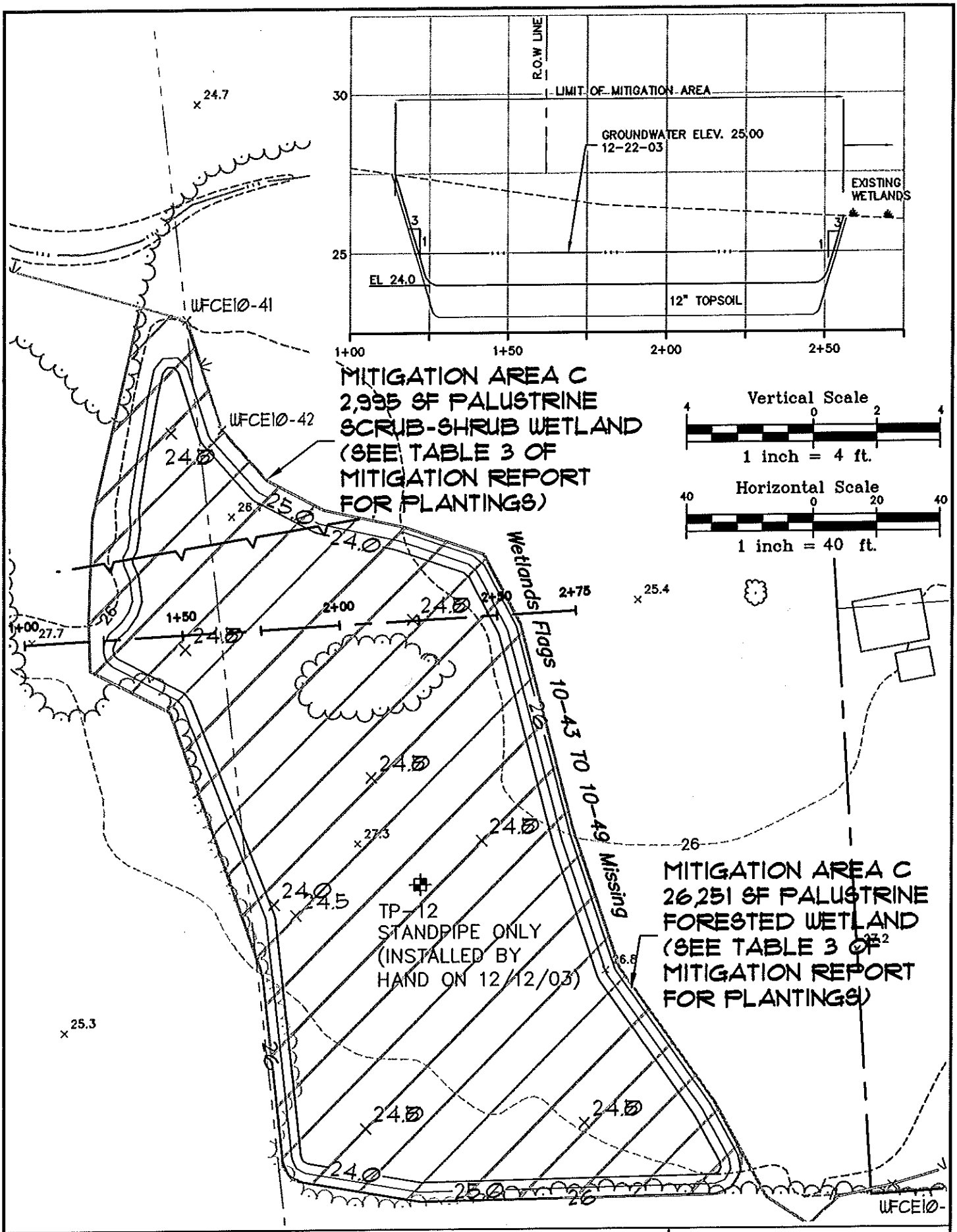
HRP ASSOCIATES, INC. Environmental/Civil Engineering and Hydrogeology Plainville, CT 06062	MIDDLETOWN HIGH SCHOOL & VO-AG CENTER MITIGATION AREA A	DATE DECEMBER 22, 2003
	APPLICANT: MIDDLETOWN HIGH SCHOOL BUILDING COMMITTEE	HRP PROJECT NO. DEC0002.PC 1/10



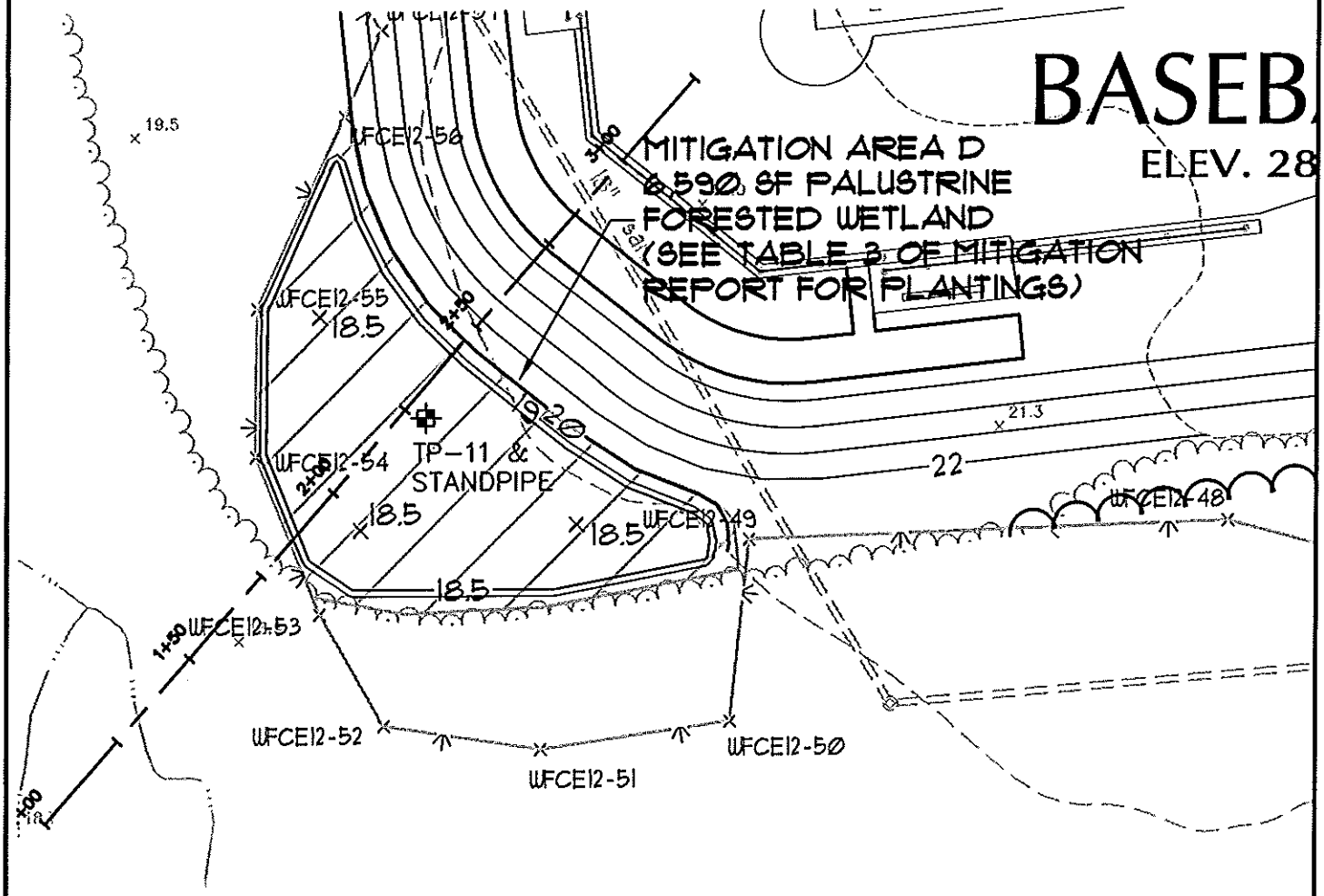


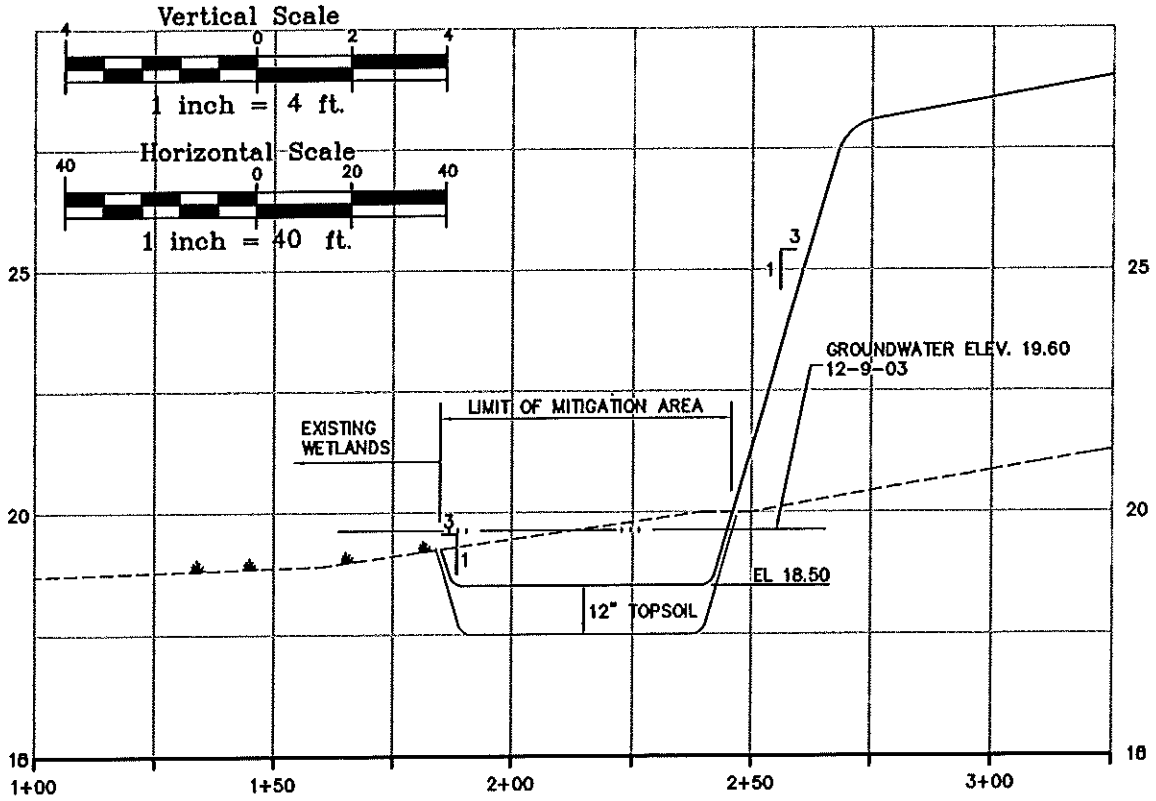


HRP ASSOCIATES, INC. Environmental/Civil Engineering and Hydrogeology Plainville, CT 06062	MIDDLETOWN HIGH SCHOOL & VO-AG CENTER MITIGATION AREA B	DATE DECEMBER 22, 2003
	APPLICANT: MIDDLETOWN HIGH SCHOOL BUILDING COMMITTEE	HRP PROJECT NO. DEC0002.PC 2/10

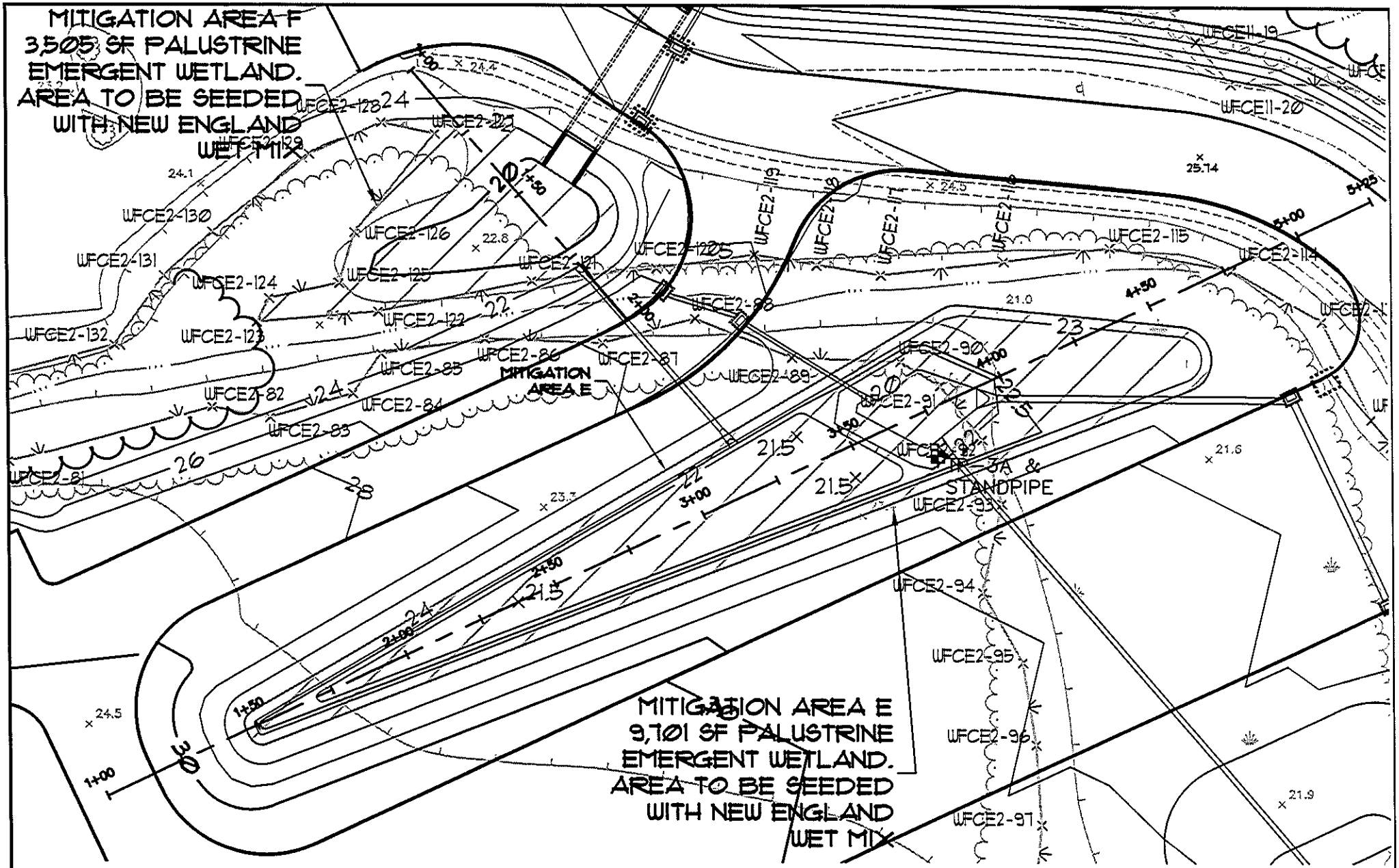


HRP ASSOCIATES, INC. Environmental/Civil Engineering and Hydrogeology Plainville, CT 06062	MIDDLETOWN HIGH SCHOOL & VO-AG CENTER MITIGATION AREA C	DATE DECEMBER 22, 2003
	APPLICANT: MIDDLETOWN HIGH SCHOOL BUILDING COMMITTEE	HRP PROJECT NO. DEC0002.PC
		3/10

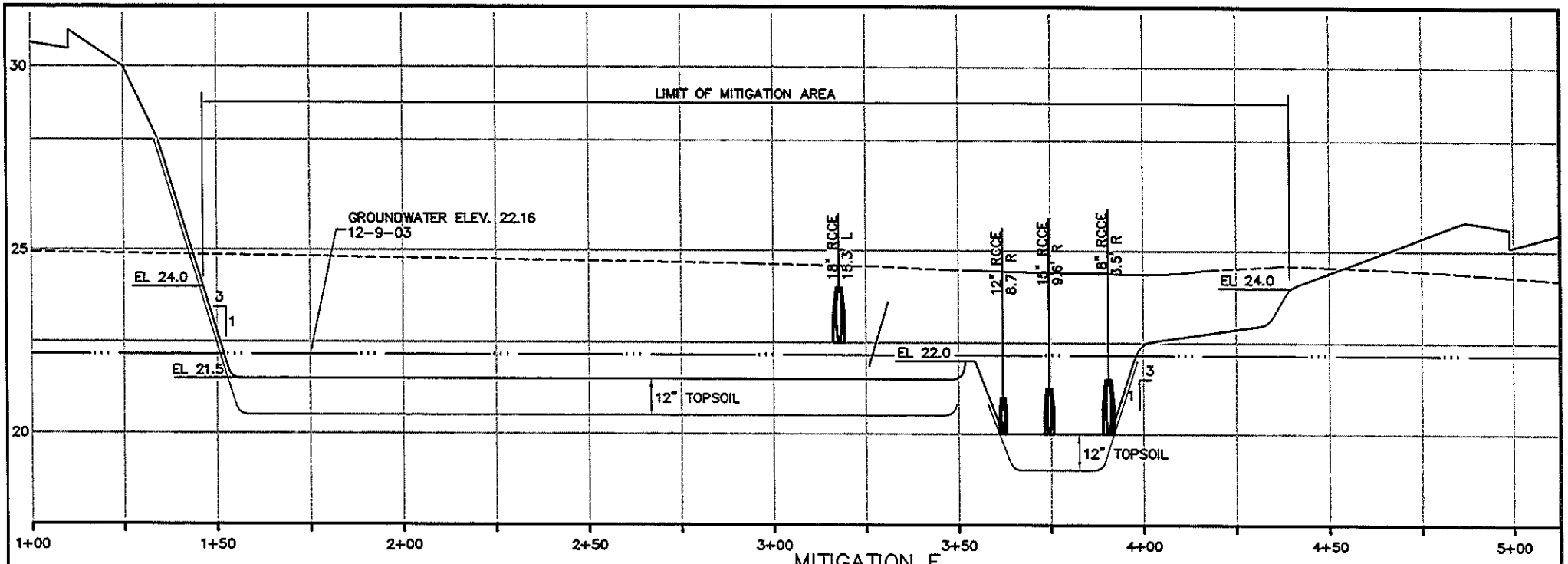




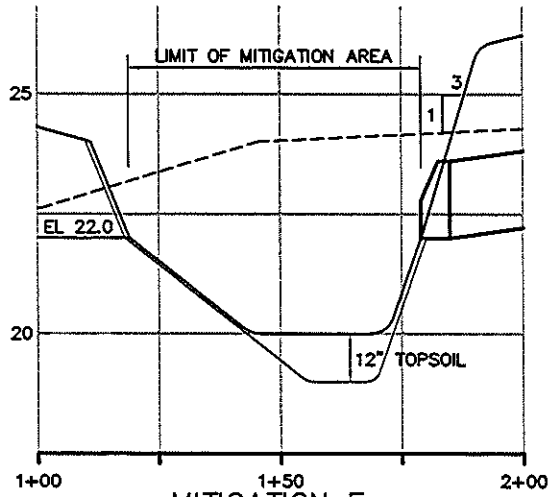
HRP ASSOCIATES, INC. Environmental/Civil Engineering and Hydrogeology Plainville, CT 06062	MIDDLETOWN HIGH SCHOOL & VO-AG CENTER MITIGATION AREA D	DATE DECEMBER 22, 2003
	APPLICANT: MIDDLETOWN HIGH SCHOOL BUILDING COMMITTEE	HRP PROJECT NO. DEC0002.PC
		4/10



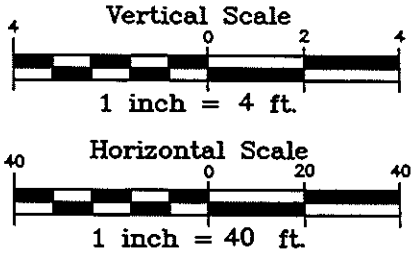
HRP ASSOCIATES, INC. Environmental/Civil Engineering and Hydrogeology Plainville, CT 06062		MIDDLETOWN HIGH SCHOOL & VO-AG CENTER PLAN VIEW MITIGATION AREA E & F	DATE DECEMBER 22, 2003
		APPLICANT: MIDDLETOWN HIGH SCHOOL BUILDING COMMITTEE	HRP PROJECT NO. DEC0002.PC 5/10



MITIGATION E



MITIGATION F



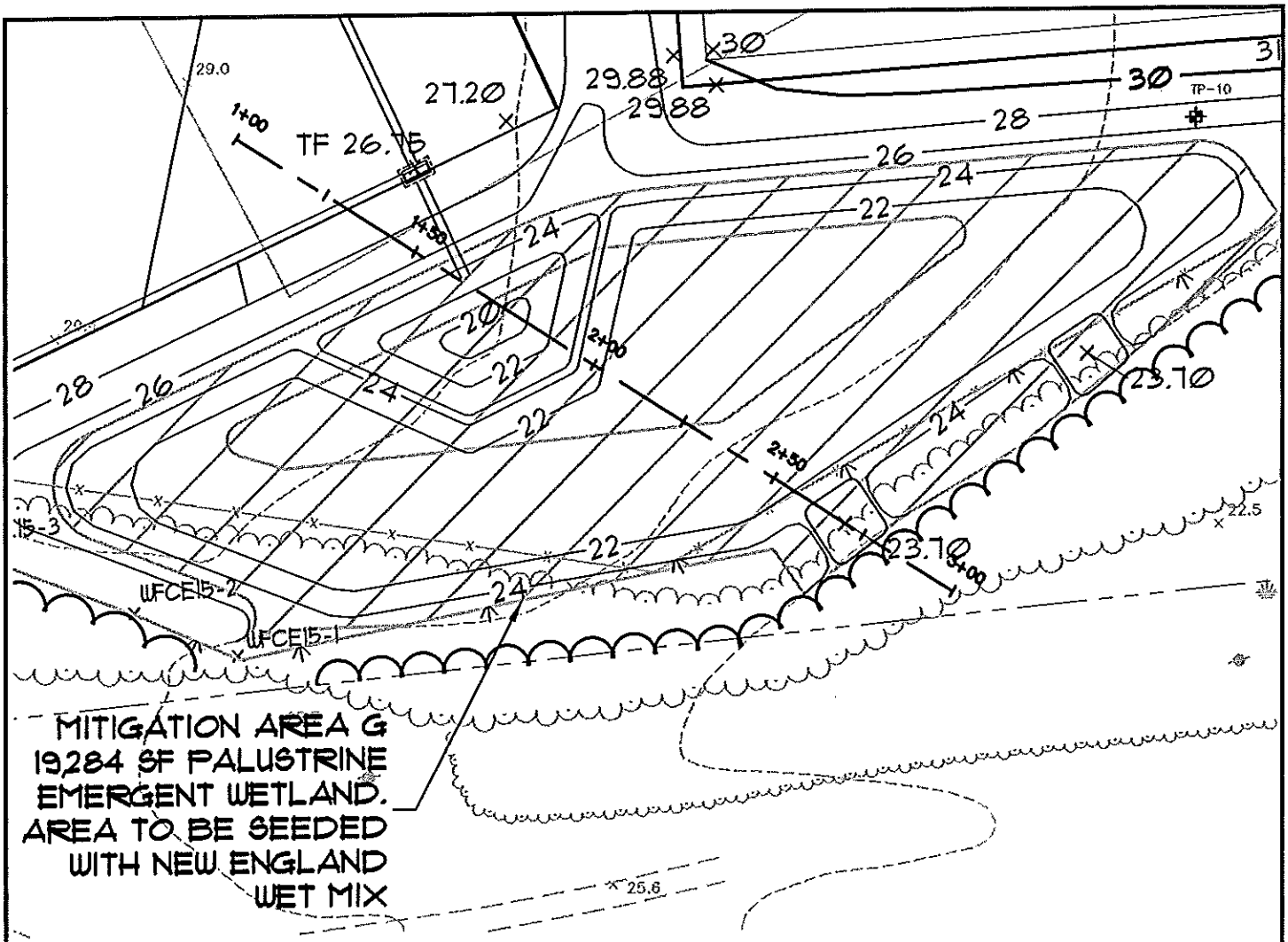
HRP
ASSOCIATES, INC.
Environmental/Civil Engineering
and Hydrogeology
Plainville, CT 06062

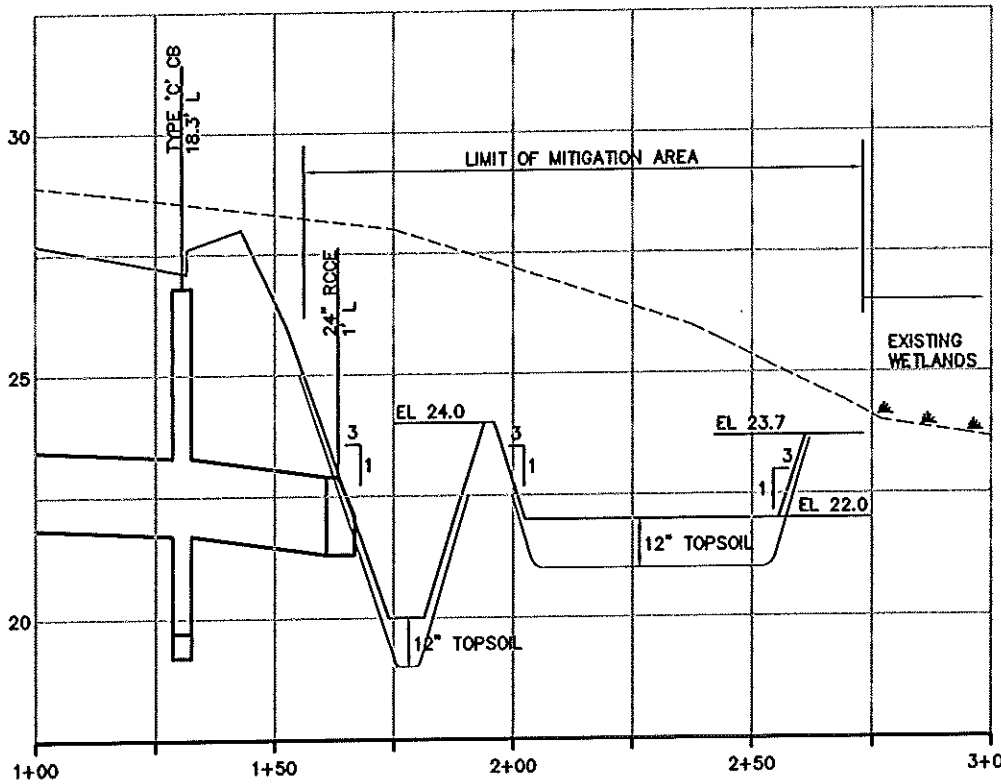
MIDDLETOWN HIGH SCHOOL & VO-AG CENTER
PROFILE VIEW MITIGATION AREA E & F

APPLICANT:
MIDDLETOWN HIGH SCHOOL BUILDING COMMITTEE

DATE
DECEMBER 22, 2003

HRP PROJECT NO.
DEC0002.PC





Vertical Scale

4 0 2 4

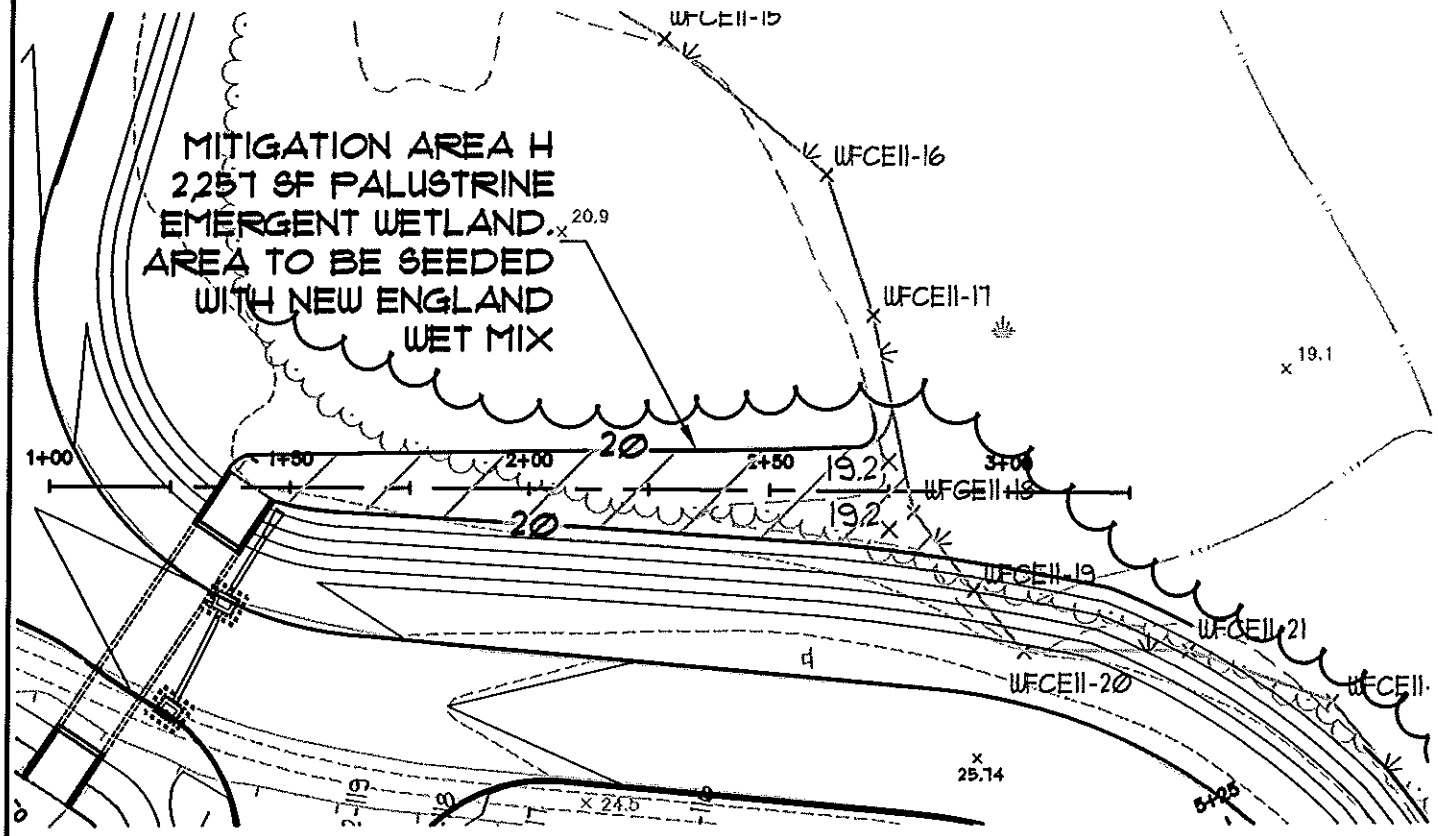
1 inch = 4 ft.

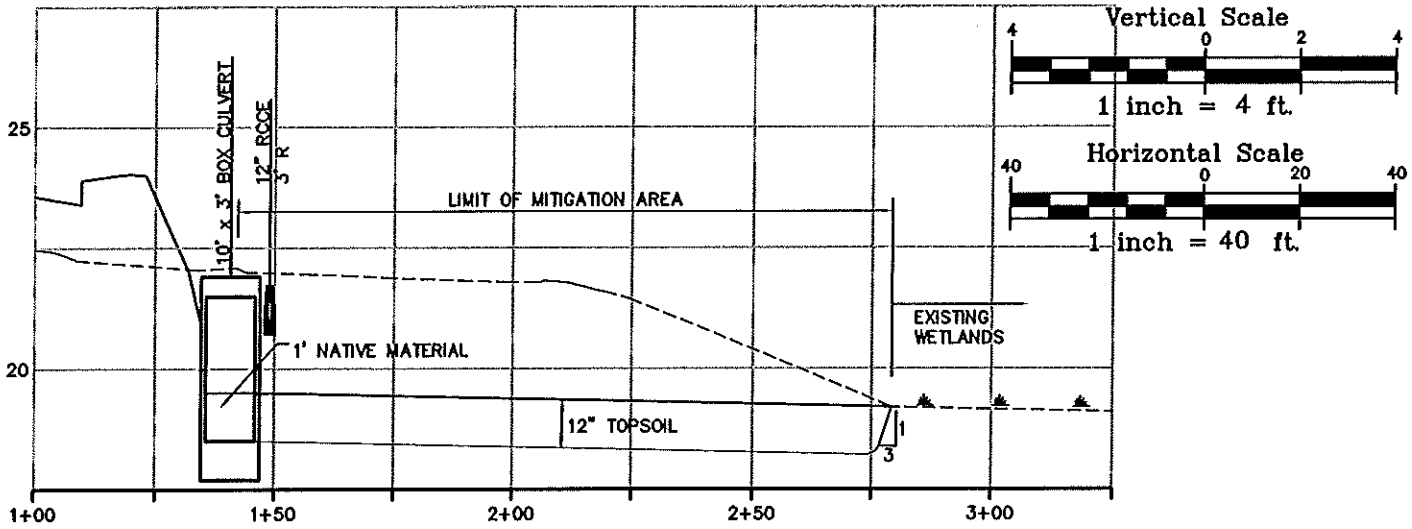
Horizontal Scale

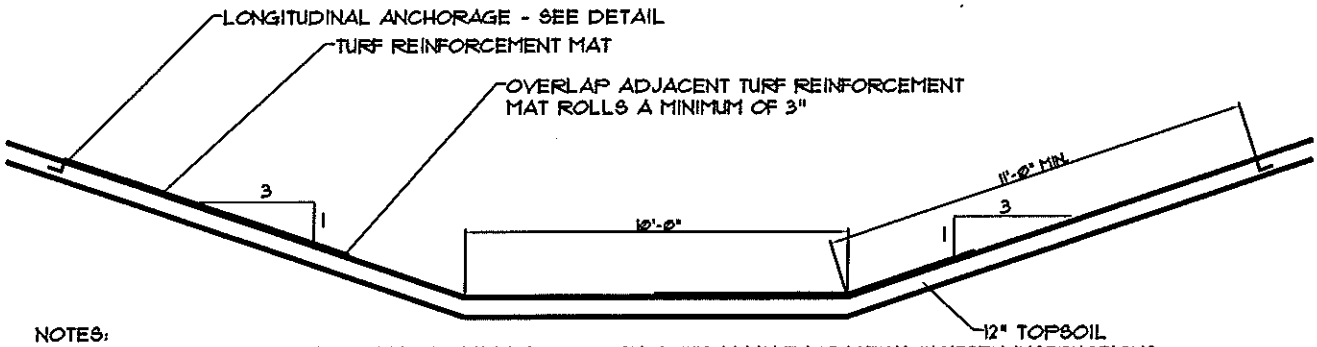
40 0 20 40

1 inch = 40 ft.

HRP ASSOCIATES, INC. Environmental/Civil Engineering and Hydrogeology Plainville, CT 06062	MIDDLETOWN HIGH SCHOOL & VO-AG CENTER MITIGATION AREA G	DATE DECEMBER 22, 2003
	APPLICANT: MIDDLETOWN HIGH SCHOOL BUILDING COMMITTEE	HRP PROJECT NO. DEC0002.PC 7/10







NOTES:
1. INSTALL TURF REINFORCEMENT MAT (TRM) IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.
2. AFTER INSTALLATION OF TRM, FILL DEPRESSIONS IN TRM WITH SCREENED TOPSOIL AND SEED.

BOX CULVERT OUTLET CHANNEL DETAIL

SCALE: N.T.S.

HRP ASSOCIATES, INC. Environmental/Civil Engineering and Hydrogeology Plainville, CT 06062	MIDDLETOWN HIGH SCHOOL & VO-AG CENTER MITIGATION AREA H	DATE DECEMBER 22, 2003	
	APPLICANT: MIDDLETOWN HIGH SCHOOL BUILDING COMMITTEE	HRP PROJECT NO. DEC0002.PC	8/10

Mitigation Area General Construction Notes

1. A wetland scientist will be on-site to monitor construction of the wetland mitigation areas to ensure compliance with the mitigation plan.
2. At least 12 inches of natural or manmade topsoil shall be installed in wetland mitigation areas. Natural topsoil shall consist of at least 4-12% organic carbon content measured by dry weight basis, as determined by lab testing.
3. To reduce the immediate threat and minimize the long-term potential of degradation, the species included on the invasive plant species list in the current Corps mitigation "Introduction: Performance Standards and Supplemental information" are not included as planting stock in the overall project. Only plant materials native and indigenous to the region shall be used. Species not specified in the mitigation plan shall not be used without written approval from the Corps.
4. During planting, a qualified wetland professional may relocate up to 50 % of the plants in each community type if as-built site conditions would pose an unreasonable threat to the survival of the plantings installed according to the mitigation plan. The plantings shall be relocated to locations with suitable hydrology and soils and where appropriate structural context with other planting can be maintained.
5. A supply of dead and dying woody debris shall cover at least 2% of the ground through mitigation sites after the completion of construction of the Mitigation Areas A-D. These materials should not include species shown on the attached list of invasive species.
6. Temporary devices and structures to control erosion and sedimentation in and around mitigation sites shall be properly maintained at all times. The devices and structures shall be disassembled and properly disposed of no later than November 1 three full growing seasons after planting. Sediment collected by these devices will be removed and placed upland in a manner that prevents its erosion and transport to a waterway or wetland.

Mitigation Area General Construction Notes – Cont'

7. Every effort should be made to minimize the compaction of soil by heavy machinery in the mitigation areas.
8. Plans should be made for supplemental irrigation (watering) in the event of extended dry weather following planting.
9. Woody plants should be mulched (three foot diameter circle, two inches deep) with a leaf mulch or similar to help conserve water.
10. It may be necessary to spray planted trees and shrubs with a deer repellant in the event of heavy browsing.

APPENDIX 2. TEST PIT DATA COLLECTED BY HRP ASSOCIATES, INC.

TEST PIT # TP-3A

TEST PIT LOG

HRP Associates, Inc.

167 PROPOSED BRITAIN AVENUE

PLAINVILLE, CONNECTICUT 06062

Project/Client:

Location: Proposed Middletown High School

Job No.: DEC0002.GT, T02

Date: 11/24/03

Photos Taken: #2, #3

Excavator Type: John Deere 310C

Contractor: B&M Excavating

Ground Water Level (if observed): see below

No. Samples Taken: 2

PID: ---

Sample Storage: ---

Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

See Figure

Test Pit Location Description:

Proposed wetland Mitigation Area

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.3			SM	Brown silt and sand, vegetation (topsoil)
TP-3 Fill	0.3	2.0		Bucket	SM	Brown silt, some clay, trace m-vf sand (fill)
TP-3 Br. Clay	2.0	8.5		Bucket	SM	Brown clay
						END OF TEST PIT @ 8.5' b.g.
						No infiltrating ground water observed.
						~0.3' process stone placed in pit bottom. Installed 10' section of Schedule 40 PVC (4" D) with screw cap.
						Backfilled to grade and covered with hay.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-10

TEST PIT LOG

HRP Associates, Inc.

167 PROPOSED BRITAIN AVENUE

PLAINVILLE, CONNECTICUT 06062

Project/Client:
Location: Proposed Middletown High School
Job No.: DEC0002.GT, T02
Date: 11/24/03
Photos Taken: ---
Excavator Type: John Deere 310C
Contractor: B&M Excavating
Ground Water Level (if observed): see below
No. Samples Taken: 2
PID: ---
Sample Storage: ---
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

See Figure

Test Pit Location Description:
Proposed Wetland Mitigation Area

Sample Number	Depth From Surface (feet) From	Depth From Surface (feet) To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.3			SM	Brown silt and m-vf sand, trace vegetation (topsoil)
	0.3	2.4			SM	Brown silt and clay, trace m-vf sand, trace cobble, trace gravel, trace organics
TP-10 Org. Clay	2.4	4.3			SM	Brown-dark gray silt and organic clay, little organics
TP-10 Gray Clay	4.3	5.6			SM	Dark gray organic clay, some organics
TP-10 Br. Clay	5.6	7.6			SM	Brown clay
						END OF TEST PIT @ 7.6' b.g.
						Perched ground water at 2.4', 4.3' b.g.
						~0.3' process stone placed in pit bottom. Installed 10' section of 4"-diameter Schedule 40 PVC with screw cap.
						Backfilled to grade and covered with hay.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
SM = Slightly Moist
VM = Very Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

J\DECAD\test pit logs

TEST PIT # TP-11

TEST PIT LOG

HRP Associates, Inc.

167 PROPOSED BRITAIN AVENUE

PLAINVILLE, CONNECTICUT 06062

Project/Client:

Location: Proposed Middletown High School

Job No.: DEC0002.GT, T02

Date: 11/24/03

Photos Taken: —

Excavator Type: John Deere 310C

Contractor: B&M Excavating

Ground Water Level (if observed): see below

No. Samples Taken: –

PID: —

Sample Storage: —

Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

See Figure

Test Pit Location Description:

Proposed Wetland Mitigation Area

Sample Number	Depth From Surface (feet) From	Depth From Surface (feet) To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.5			SM	Dark brown loamy silt and m-vf sand, trace vegetation.
	0.5	7.0			SM	Brown clay
						END OF TEST PIT @ 7.0' b.g.
						~0.3' process stone placed in pit bottom. Installed 10' section of 4"-diameter Schedule 40 PVC with screw cap.
						Backfilled to grade and covered with hay.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
SM = Slightly Moist
VM = Very Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT # TP-13

TEST PIT LOG

HRP Associates, Inc.

167 PROPOSED BRITAIN AVENUE

PLAINVILLE, CONNECTICUT 06062

Project/Client:
Location: Proposed Middletown High School
Job No.: DEC0002.GT, T02
Date: 11/24/03
Photos Taken: —
Excavator Type: John Deere 310C
Contractor: B&M Excavating
Ground Water Level (if observed): —
No. Samples Taken: 2
PID: —
Sample Storage: —
Geologist/Technician: JMC

TEST PIT LOCATION SKETCH MAP

See Figure

Test Pit Location Description:
Proposed Wetland Mitigation Area

Sample Number	Depth From Surface (feet) From	To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
	0	0.3			SM	Brown silt and m-vf sand, trace clay (topsoil)
	0.3	2.5			SM	Brown silt and clay, trace m-vf sand (fill)
	2.5	7.6			SM	Brown clay
						END OF TEST PIT @ 7.6' b.g.
						No perched ground water infiltration observed.
						~0.3' process stone placed in pit bottom. Installed 10' section of 4"-diameter Schedule 40 PVC with screw cap.
						Backfilled to grade and covered with hay.

SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
VM = Very Moist
SM = Slightly Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

TEST PIT LOG

HRP Associates, Inc.

167 PROPOSED BRITAIN AVENUE

PLAINVILLE, CONNECTICUT 06062

Project/Client:

Location: Proposed Middletown High School

Job No.: DEC0002.GT, T02

Date: 11/24/03

Photos Taken: #10, #11

Excavator Type: John Deere 310C

Contractor: B&M Excavating

Ground Water Level (if observed): see below

No. Samples Taken: --

PID: —

Sample Storage: —

Geologist/Technician: JMC

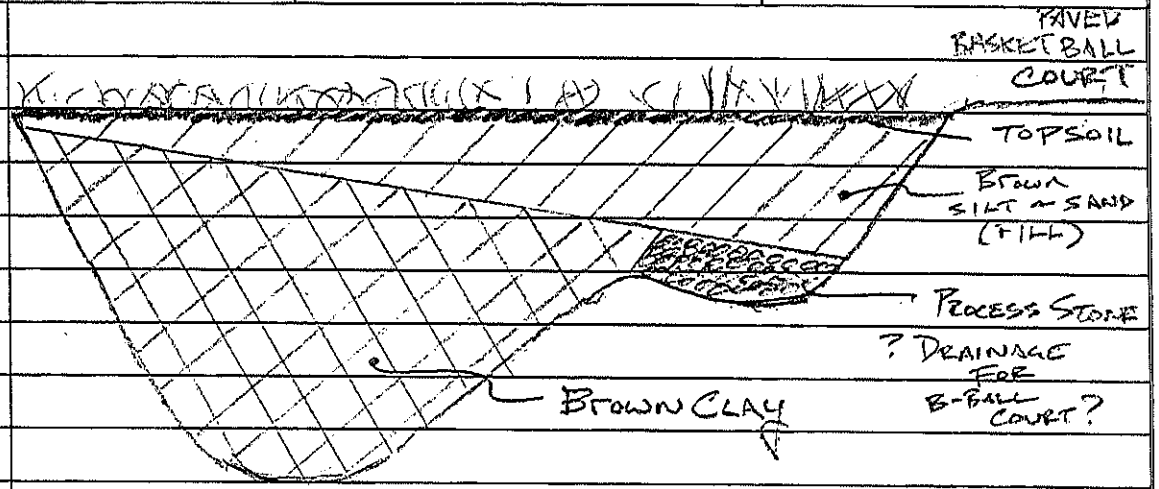
TEST PIT LOCATION SKETCH MAP

See Figure

Test Pit Location Description:

Proposed Wetland Mitigation Area

Sample Number	Depth From Surface (feet) From	Depth From Surface (feet) To	Sample Location Within Test Pit	Sample Type	Moisture	Remarks (color, structure, grain size, staining, odor, PID)
			TEST PIT	PROFILE:		
					GRADE	
					-2'	
					-4'	
					-6'	
					-8'	
						~0.3' process stone placed in pit bottom. Installed 10' section of 4"-diameter Schedule 40 PVC with screw cap.
						Backfilled to grade and covered with hay.



SAMPLE TYPE

Bucket = Excavator Bucket
G = Grab
HA = Hand Auger
Comp = Composite Sample
GW = Ground Water

MOISTURE

D = Dry
SM = Slightly Moist
VM = Very Moist
W = Wet (saturated)

PROPORTIONS USED

0 – 10% Trace
10 – 20% Little
20 – 35% Some
35 – 50% And

APPENDIX 3. ARMY CORPS DATA SHEETS

PROJECT TITLE: *Middletown High School* TRANSECT: *1* PLOT: *U*
DELINEATOR: *Edward M. Pawlak, PWS* DATE: *8/14/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Shrubs	*Rosa multiflora*	38/75	51%	FACU
Herbs	*Solidago sp.*	10.5/24	44%	FACU
	Grasses	10.5/24	44%	---

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

____	____	____	____		____	2____	____
OBL	FACW	FAC	Other Hydrophytes		FAC-	FACU	UPL

Hydrophytes Subtotal: 0___ Non-hydrophytes Subtotal: 2___

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 0/2=0%

HYDROLOGY

___ RECORDED DATA
- Stream, lake or tidal gate — Identification:
- Aerial photograph — Identification:
- Other — Identification:

___ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water:
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" ___ Water Marks ___ Drift Lines
___ Sediment Deposits ___ Drainage Patterns in Wetland ___ Other:

SOIL
Sketch Landscape Position

Depth (inches)	Horizon	Matrix Color	Redoximorphic Features	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-20	A	7.5R 3/3	---	

HYDRIC SOIL INDICATOR(S):
REFERENCE: NEHSTC. 1998, 2nd Edition. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission. Wilmington, MA. pp 76.

Optional Soil Data
Taxonomic Subgroup:
Soil Drainage Class:
Depth to Active Water Table:
NTCHS Hydric Soil Criterion:

References:

CONCLUSIONS
Greater than 50% Hydrophytes? No Is this datapoint a wetland? No
Hydric Soils Criterion Met? NO
Wetland Hydrology Met? NO

Remarks/Plot Location: Plot is located 27 feet on a 290 degree bearing from Plot 1W.

PROJECT TITLE: *Middletown High School* TRANSECT: 1 PLOT: U

PROJECT TITLE: *Middletown High School* TRANSECT: *1* PLOT: *W*
DELINEATOR: *Edward M. Pawlak, PWS* DATE: *8/14/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Shrubs	*Cornus amomum*	20.5/47.5	43	FACW
	Lonicera tartarica	10.5/47.5	22	FACU
	Fraxinus Americana	10.5/47.5	22	FACU
Herbs	*Lythrum salicaria*	38/85	45	FACW+
	Carex lurida	38/85	45	OBL

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

_1____	_2____	_____	_____	_____	2____	_____
OBL	FACW	FAC	Other Hydrophytes	FAC-	FACU	UPL

Hydrophytes Subtotal: 3____ Non-hydrophytes Subtotal: 2____

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 3/5=60%

HYDROLOGY

__ RECORDED DATA
- Stream, lake or tidal gate — Identification:
- Aerial photograph — Identification:
- Other — Identification:

_x__ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water:
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" ___ Water Marks ___ Drift Lines
___ Sediment Deposits ___ Drainage Patterns in Wetland ___ Other:

SOIL
Sketch Landscape Position

Depth (inches)	Horizon	Matrix Color	Redoximorphic Features	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-5	A	7.5YR 3/1		Fine sandy loam; moist
5-20	B	7.5YR 4/2	7.5YR 4/6 mottles	Fine sandy loam; moist

HYDRIC SOIL INDICATOR(S): IIID
REFERENCE: NEHSTC. 1998, 2nd Edition. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission. Wilmington, MA. pp 76.

Optional Soil Data
Taxonomic Subgroup:
Soil Drainage Class:
Depth to Active Water Table:
NTCHS Hydric Soil Criterion:

References:

CONCLUSIONS
Greater than 50% Hydrophytes? yes
Hydric Soils Criterion Met? yes
Wetland Hydrology Met? yes

Is this datapoint a wetland? yes

Remarks/Plot Location: Plot is located 15' on a 114 degree bearing from flag 17-8.

PROJECT TITLE: *Middletown High School* TRANSECT: 1 PLOT: W

PROJECT TITLE: *Middletown High School* TRANSECT:*2* PLOT:*U*
DELINEATOR: *Edward M. Pawlak, PWS* DATE:*8/15/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Trees	*Quercus rubra*	390/879	44%	FACU-
	Acer rubrum	190/879	22%	FAC
	Quercus palustris	299/879	34%	FACW
Saplings	*Acer rubrum*	3/13.5	22%	FAC
	Ostrya virginiana	10.5/13.5	78%	FACU-
Shrubs	*Ilex verticillata*	10.5/16.5	64%	FACW+
Herbs	*Toxicodendron radicans*	38/38	100%	FAC

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL: FACW:2 FAC:3 Other Hydrophytes: FAC-: FACU:2 UPL:

Hydrophytes Subtotal: Non-hydrophytes Subtotal:

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 5/7=71%

HYDROLOGY

___ RECORDED DATA
- Stream, lake or tidal gate Identification:
- Aerial photograph Identification:
- Other Identification:

__x_ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water:
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" ___ Water Marks ___ Drift Lines
___ Sediment Deposits ___ Drainage Patterns in Wetland ___ Other:

PROJECT TITLE: *Middletown High School* TRANSECT:*2* PLOT:*W*
DELINEATOR: *Edward M. Pawlak, PWS* DATE:*8/15/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Trees	Quercus palustris	1652/1947	85%	FACW
Shrubs	Cephalanthus occidentalis	20.5/23/5	87%	OBL

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL:1 FACW:1 FAC: Other Hydrophytes: FAC-: FACU: UPL:

Hydrophytes Subtotal: 2 Non-hydrophytes Subtotal:0

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 2/2=100%

HYDROLOGY

__ RECORDED DATA
- Stream, lake or tidal gate Identification:
- Aerial photograph Identification:
- Other Identification:

_x__ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water:
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" ___ Water Marks ___ Drift Lines
___ Sediment Deposits __x_ Drainage Patterns in Wetland ___ Other:

SOIL
Sketch Landscape Position

Depth (inches)	Horizon	Matrix Color	Redoximorphic Features	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-12	A1	10YR 2/1	Oxidized rhizospheres	Fine sandy loam
12-18	A2	10YR 3/1		Fine sandy loam
18+	B	10YR 4/1		Fine sandy loam

HYDRIC SOIL INDICATOR(S): IIIE
REFERENCE: NEHSTC. 1998, 2nd Edition. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission. Wilmington, MA. pp 76.

Optional Soil Data
Taxonomic Subgroup:
Soil Drainage Class:
Depth to Active Water Table:
NTCHS Hydric Soil Criterion:

References:

CONCLUSIONS
Greater than 50% Hydrophytes? yes
Hydric Soils Criterion Met? yes
Wetland Hydrology Met? yes

Is this datapoint a wetland? yes

Remarks/Plot Location: Plot is located 15' on a 68 degree bearing from flag 3-1.

PROJECT TITLE: *Middletown High School* TRANSECT: 2 PLOT: W

PROJECT TITLE: *Middletown High School* TRANSECT: *3* PLOT: *U*
DELINEATOR: *Edward M. Pawlak, PWS* DATE: *8/15/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Trees	*Carya sp.*	552/814	58%	FACU
Saplings	*Carpinus caroliniana*	10.5/52	20%	FAC
	Acer rubrum	10.5/52	20%	FAC
	Carya sp.	10.5/52	20%	FACU
Shrubs	*Fraxinus Americana*	3/3	100%	FACU
Herbs	*Acer saccharum*	3/9	33%	FACU
	Parthenocissus quinquefolia	3/9	33%	FACU
	Arisaema triphyllum	3/9	33%	FACW-

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL: FACW:1 FAC:2 Other Hydrophytes: FAC-: FACU:5 UPL:

Hydrophytes Subtotal:3 Non-hydrophytes Subtotal:5

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 3/8=38%

HYDROLOGY

___ RECORDED DATA
- Stream, lake or tidal gate Identification:
- Aerial photograph Identification:
- Other Identification:

_x__ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water:
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" ___ Water Marks ___ Drift Lines
___ Sediment Deposits ___ Drainage Patterns in Wetland ___ Other:

PROJECT TITLE: *Middletown High School* TRANSECT:*3* PLOT:*W*
DELINEATOR: *Edward M. Pawlak, PWS* DATE:*8/15/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Trees	*Fagus grandifolia*	299/1123	27%	FACU
	Carya ovata	299/1123	27%	FACU
	Carya sp.	454/1123	40%	FACU
Herbs	*Toxicodendron radicans*	3/6	50%	FAC
	Parthenocissus quinquefolia	3/6	50%	FACU

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL: FACW: FAC:1 Other Hydrophytes: FAC-: FACU:4 UPL:

Hydrophytes Subtotal: Non-hydrophytes Subtotal:

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 1/5=20%

HYDROLOGY

__ RECORDED DATA
- Stream, lake or tidal gate Identification:
- Aerial photograph Identification:
- Other Identification:

__x_ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water: 12"
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated __x_ Saturated in upper 12" _x_ Water Marks ___ Drift Lines
___ Sediment Deposits ___ Drainage Patterns in Wetland ___ Other:

SOIL
Sketch Landscape Position

Depth (inches)	Horizon	Matrix Color	Redoximorphic Features	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-9	A	7.5YR 4/2		Silt loam; moist
9-14	B1	7.5YR 5/3		Silt loam; saturated
14-20	B2	5YR 5/4	10YR 4/6 mottles abundant	Silt loam; saturated

HYDRIC SOIL INDICATOR(S): IV
REFERENCE: NEHSTC. 1998, 2nd Edition. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission. Wilmington, MA. pp 76.

Optional Soil Data
Taxonomic Subgroup:
Soil Drainage Class:
Depth to Active Water Table:
NTCHS Hydric Soil Criterion:

References:

CONCLUSIONS
Greater than 50% Hydrophytes? No
Hydric Soils Criterion Met? Yes
Wetland Hydrology Met? Yes

Is this datapoint a wetland? Yes

Remarks/Plot Location: Plot is located 12 feet on a 314 degree bearing from flag 4-1.

PROJECT TITLE: *Middletown High School* TRANSECT: 3 PLOT: W

PROJECT TITLE: *Middletown High School* TRANSECT:*4* PLOT:*U*
DELINEATOR: *Edward M. Pawlak, PWS* DATE:*8/15/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Trees	*Carya sp.*	624/672	93%	FACU
Saplings	*Carpinus caroliniana*	10.5/13.5	78%	FAC
	Ostrya virginiana	3/13.5	22%	FACU
Shrubs	*Prunus serotina*	10.5/21	50%	FACU
	Acer saccharum	10.5/21	50%	FACU
Herbs	*Acer saccharum*	10.5/37.5	28%	FACU
	Viola sp.	10.5/37.5	28%	---
	Prunus serotina	10.5/37.5	28%	FACU

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL: FACW: FAC:1 Other Hydrophytes: FAC-: FACU:6 UPL:

Hydrophytes Subtotal:1 Non-hydrophytes Subtotal:6

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 1/7=14%

HYDROLOGY

__ RECORDED DATA
- Stream, lake or tidal gate Identification:
- Aerial photograph Identification:
- Other Identification:

__x_ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water:
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" ___ Water Marks ___ Drift Lines
___ Sediment Deposits ___ Drainage Patterns in Wetland ___ Other:

SOIL

Sketch Landscape Position

Depth (inches)	Horizon	Matrix Color	Redoximorphic Features	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-6	A	5YR 4/3		Fine sandy loam
6-20	B	5YR 4/4		Fine sandy loam

HYDRIC SOIL INDICATOR(S):

REFERENCE: NEHSTC. 1998, 2nd Edition. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission. Wilmington, MA. pp 76.

Optional Soil Data

Taxonomic Subgroup:

Soil Drainage Class:

Depth to Active Water Table:

NTCHS Hydric Soil Criterion:

References:

CONCLUSIONS

Greater than 50% Hydrophytes? no

Hydric Soils Criterion Met? no

Wetland Hydrology Met? no

Is this datapoint a wetland? no

Remarks/Plot Location: Plot is located 15 feet on a 132 degree bearing from Plot 4W.

PROJECT TITLE: *Middletown High School* TRANSECT: 4 PLOT:U

SOIL

Sketch Landscape Position

Depth (inches)	Horizon	Matrix Color	Redoximorphic Features	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-9	A	10YR 2/1		Fine sandy loam; moist
9-20	B	5YR 4/4	10YR 4/6 mottles abundant	Fine sandy loam; saturated

HYDRIC SOIL INDICATOR(S): IV

REFERENCE: NEHSTC. 1998, 2nd Edition. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission. Wilmington, MA. pp 76.

Optional Soil Data
Taxonomic Subgroup:
Soil Drainage Class:
Depth to Active Water Table:
NTCHS Hydric Soil Criterion:

References:

CONCLUSIONS

Greater than 50% Hydrophytes? no
Hydric Soils Criterion Met? yes
Wetland Hydrology Met? yes

Is this datapoint a wetland? yes

Remarks/Plot Location: Plot is located 12 feet on a 358 degree bearing from flag 5-7.

PROJECT TITLE: *Middletown High School* TRANSECT:4 PLOT:W

PROJECT TITLE: *Middletown High School* TRANSECT: *5* PLOT: *U*
DELINEATOR: *Edward M. Pawlak, PWS* DATE:*8/15/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Trees	*Fagus grandifolia*	434/2111	21%	FACU
	Carya sp.	687/2111	32%	FACU
	Quercus rubra	990/2111	47%	FACU-
Saplings	*Fagus grandifolia*	20.5/34	60%	FACU
	Acer saccharum	10.5/34	31%	FACU
Shrubs	*Fagus grandifolia*	3/13.5	22%	FACU
	Acer saccharum	10.5/13.5	78%	FACU
Herbs	*Acer saccharum*	3/3	100%	FACU

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL: FACW: FAC: Other Hydrophytes: FAC-: FACU: 8 UPL:

Hydrophytes Subtotal: 0 Non-hydrophytes Subtotal: 8

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 0/8=0%

HYDROLOGY

___ RECORDED DATA
- Stream, lake or tidal gate Identification:
- Aerial photograph Identification:
- Other Identification:

__x__ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water:
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" ___ Water Marks ___ Drift Lines
___ Sediment Deposits ___ Drainage Patterns in Wetland ___ Other:

SOIL

Sketch Landscape Position

Depth (inches)	Horizon	Matrix Color	Redoximorphic Features	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-12	A	10YR 3/2		Fine sandy loam
12-20	B	10YR 4/4		Fine sandy loam

HYDRIC SOIL INDICATOR(S):

REFERENCE: NEHSTC. 1998, 2nd Edition. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission. Wilmington, MA. pp 76.

Optional Soil Data

Taxonomic Subgroup:

Soil Drainage Class:

Depth to Active Water Table:

NTCHS Hydric Soil Criterion:

References:

CONCLUSIONS

Greater than 50% Hydrophytes? no

Hydric Soils Criterion Met? no

Wetland Hydrology Met? no

Is this datapoint a wetland? no

Remarks/Plot Location: Plot is located 24 feet on a 128 degree bearing from Plot 5W.

PROJECT TITLE: *Middletown High School* TRANSECT: 5 PLOT: U

PROJECT TITLE: *Middletown High School* TRANSECT:*6* PLOT: *U*
DELINEATOR: *Edward M. Pawlak, PWS* DATE:*8/25/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Trees	*Acer rubrum*	377/811	46%	FAC
	Fagus grandifolia	434/811	54%	FACU
Saplings	*Fagus grandifolia*	38/62	61%	FACU
Shrubs	*Fagus grandifolia*	20.5/29.5	69%	FACU

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL: FACW: FAC: 1 Other Hydrophytes: FAC-: FACU: 3 UPL:

Hydrophytes Subtotal: 1 Non-hydrophytes Subtotal: 3

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = ¼=25%

HYDROLOGY

__ RECORDED DATA
- Stream, lake or tidal gate Identification:
- Aerial photograph Identification:
- Other Identification:

__x__ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water:
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" ___ Water Marks ___ Drift Lines
___ Sediment Deposits ___ Drainage Patterns in Wetland ___ Other:

SOIL

Sketch Landscape Position

Depth (inches)	Horizon	Matrix Color	Redoximorphic Features	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-8	A	5YR 4/2		Silt loam
8-20	B	5YR 5/4		Silt loam

HYDRIC SOIL INDICATOR(S):

REFERENCE: NEHSTC. 1998, 2nd Edition. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission. Wilmington, MA. pp 76.

Optional Soil Data

Taxonomic Subgroup:

Soil Drainage Class:

Depth to Active Water Table:

NTCHS Hydric Soil Criterion:

References:

CONCLUSIONS

Greater than 50% Hydrophytes? no

Hydric Soils Criterion Met? no

Wetland Hydrology Met? no

Is this datapoint a wetland? no

Remarks/Plot Location: Plot is located 27 feet on a 136 degree bearing from Plot 6W.

PROJECT TITLE: *Middletown High School* TRANSECT: 6 PLOT: U

PROJECT TITLE: *Middletown High School* TRANSECT: *6* PLOT: *W*
DELINEATOR: *Edward M. Pawlak, PWS* DATE:*8/25/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Trees	*Acer rubrum*	188/423	44%	FAC
	Carya ovata	143/423	34%	FACU
Saplings	*Carpinus caroliniana*	63/73.5	86%	FAC
Shrubs	*Ilex verticillata*	38/44	86%	FACW+
Herbs	*Arisaema triphyllum*	3/6	50%	FACW-
	Parthenocissus quinquefolia	3/6	50%	FACU

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL: FACW: 2 FAC: 2 Other Hydrophytes: FAC-: FACU: 2 UPL:

Hydrophytes Subtotal: 4 Non-hydrophytes Subtotal: 2

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 4/6=67%

HYDROLOGY

__ RECORDED DATA
- Stream, lake or tidal gate Identification:
- Aerial photograph Identification:
- Other Identification:

__x_ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water: 13"
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" _x__ Water Marks ___ Drift Lines
___ Sediment Deposits ___ Drainage Patterns in Wetland ___ Other:

SOIL
Sketch Landscape Position

Depth (inches)	Horizon	Matrix Color	Redoximorphic Features	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-10	A	10YR 3/1	Oxidized rhizospheres	Silt loam; moist
10-20	C	10YR 6/1	10YR 5/6 mottles abundant	Silt loam; moist

HYDRIC SOIL INDICATOR(S): IIID
REFERENCE: NEHSTC. 1998, 2nd Edition. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission. Wilmington, MA. pp 76.

Optional Soil Data
Taxonomic Subgroup:
Soil Drainage Class:
Depth to Active Water Table:
NTCHS Hydric Soil Criterion:

References:

CONCLUSIONS
Greater than 50% Hydrophytes? yes
Hydric Soils Criterion Met? yes
Wetland Hydrology Met? yes

Is this datapoint a wetland? yes

Remarks/Plot Location: Plot is located 15 feet on a 322 degree bearing from flag 7-2.

PROJECT TITLE: *Middletown High School* TRANSECT: 6 PLOT: W

PROJECT TITLE: *Middletown High School* TRANSECT: *7* PLOT: *U*
DELINEATOR: *Edward M. Pawlak, PWS* DATE:*8/25/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Trees	*Carya sp.*	780/1013	77%	FACU
Saplings	*Acer saccharum*	38.5/41.5	93%	FACU
Shrubs	*Acer saccharum*	63/63	100%	FACU
Herbs	*Viburnum acerifolium*	20.5/64.5	32%	NI (UPL)
	Aster sp.	38/64.5	59%	---

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL: FACW: FAC: Other Hydrophytes: FAC-: FACU: 3 UPL: 1

Hydrophytes Subtotal: 0 Non-hydrophytes Subtotal: 4

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 0/4=0%

HYDROLOGY

__ RECORDED DATA
- Stream, lake or tidal gate Identification:
- Aerial photograph Identification:
- Other Identification:

__x_ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water:
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" ___ Water Marks ___ Drift Lines
___ Sediment Deposits ___ Drainage Patterns in Wetland ___ Other:

SOIL

Sketch Landscape Position

Depth (inches)	Horizon	Matrix Color	Redoximorphic Features	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-8	A	5YR 4/3		Silt loam
8-20	B	5YR 4/4		Silt loam

HYDRIC SOIL INDICATOR(S):
REFERENCE: NEHSTC. 1998, 2nd Edition. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission. Wilmington, MA. pp 76.

Optional Soil Data
Taxonomic Subgroup:
Soil Drainage Class:
Depth to Active Water Table:
NTCHS Hydric Soil Criterion:

References:

CONCLUSIONS

Greater than 50% Hydrophytes? no
Hydric Soils Criterion Met? no
Wetland Hydrology Met? no

Is this datapoint a wetland? no

Remarks/Plot Location: Plot is located 15feet on a 168 degree bearing from Plot 7W.

PROJECT TITLE: *Middletown High School* TRANSECT: 7 PLOT: U

PROJECT TITLE: *Middletown High School* TRANSECT: *7* PLOT: *W*
DELINEATOR: *Edward M. Pawlak, PWS* DATE:*8/25/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Trees	*Carya ovata*	780/1036	75%	FACU
	Acer rubrum	212/1036	20%	FAC
Saplings	*Acer saccharum*	38/48.5	78%	FACU
	Carpinus caroliniana	10.5/48.5	22%	FAC
Shrubs	*Carpinus caroliniana*	3/6	50%	FAC
	Fraxinus americana	3/6	50%	FACU

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL: FACW: FAC: 3 Other Hydrophytes: FAC-: FACU: 3 UPL:

Hydrophytes Subtotal: 3 Non-hydrophytes Subtotal: 3

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 3/6=50%

HYDROLOGY

__ RECORDED DATA
- Stream, lake or tidal gate Identification:
- Aerial photograph Identification:
- Other Identification:

_x__ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water: 10"
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" ___ Water Marks ___ Drift Lines
___ Sediment Deposits ___ Drainage Patterns in Wetland ___ Other:

SOIL

Sketch Landscape Position

Depth (inches)	Horizon	Matrix Color	Redoximorphic Features	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-7	A	10YR 2/1		Silt loam; moist
7-20	C	10YR 3/1		Silt loam; moist

HYDRIC SOIL INDICATOR(S): IIID

REFERENCE: NEHSTC. 1998, 2nd Edition. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission. Wilmington, MA. pp 76.

Optional Soil Data

Taxonomic Subgroup:

Soil Drainage Class:

Depth to Active Water Table:

NTCHS Hydric Soil Criterion:

References:

CONCLUSIONS

Greater than 50% Hydrophytes? no

Hydric Soils Criterion Met? yes

Wetland Hydrology Met? yes

Is this datapoint a wetland? yes

Remarks/Plot Location: Plot is located 9 feet on a 342 degree bearing from flag 8-4.

PROJECT TITLE: *Middletown High School* TRANSECT: 7 PLOT: W

PROJECT TITLE: *Middletown High School* TRANSECT:*8* PLOT: *U*
DELINEATOR: *Edward M. Pawlak, PWS* DATE:*8/25/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Trees	*Acer rubrum*	570/614	93%	FAC
Shrubs	*Prunus serotina*	20.5/34	60%	FACU
	Lindera benzoin	10.5/34	31%	FACW

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL: FACW: 1 FAC: 1 Other Hydrophytes: FAC-: FACU: 1 UPL:

Hydrophytes Subtotal: 2 Non-hydrophytes Subtotal: 1

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 2/3=67%

HYDROLOGY

__ RECORDED DATA
- Stream, lake or tidal gate Identification:
- Aerial photograph Identification:
- Other Identification:

_x_ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water:
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" ___ Water Marks ___ Drift Lines
___ Sediment Deposits ___ Drainage Patterns in Wetland ___ Other:

SOIL

Sketch Landscape Position

Depth (inches)	Horizon	Matrix Color	Redoximorphic Features	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-3	A	5YR 2.5/1		Fine sandy loam
3-20	B	5YR 4/4		Fine sandy loam

HYDRIC SOIL INDICATOR(S):

REFERENCE: NEHSTC. 1998, 2nd Edition. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission. Wilmington, MA. pp 76.

Optional Soil Data

Taxonomic Subgroup:

Soil Drainage Class:

Depth to Active Water Table:

NTCHS Hydric Soil Criterion:

References:

CONCLUSIONS

Greater than 50% Hydrophytes? yes

Hydric Soils Criterion Met? no

Wetland Hydrology Met? no

Is this datapoint a wetland? no

Remarks/Plot Location: Plot is located 21 feet on a 162 degree bearing from Plot 8W.

PROJECT TITLE: *Middletown High School* TRANSECT: 8 PLOT: U

PROJECT TITLE: *Middletown High School* TRANSECT: *8* PLOT: *W*
DELINEATOR: *Edward M. Pawlak, PWS* DATE:*8/25/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Trees	*Acer rubrum*	499/567	88%	FAC
Saplings	*Acer rubrum*	38/38	100%	FAC
Shrubs	*Lindera benzoin*	38/59	64%	FACW

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL: FACW: 1 FAC: 2 Other Hydrophytes: FAC-: FACU: UPL:

Hydrophytes Subtotal: 3 Non-hydrophytes Subtotal:

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 3/3=100%

HYDROLOGY

___ RECORDED DATA
- Stream, lake or tidal gate — Identification:
- Aerial photograph — Identification:
- Other — Identification:

___ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water: >18"
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" _x__ Water Marks ___ Drift Lines
___ Sediment Deposits ___ Drainage Patterns in Wetland ___ Other:

SOIL

Sketch Landscape Position

Depth (inches)	Horizon	Matrix Color	Redoximorphic Features	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-6	A	5YR 4/3		Silt loam
6-20	B	5YR 3/3		Silt loam

HYDRIC SOIL INDICATOR(S): IV

REFERENCE: NEHSTC. 1998, 2nd Edition. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission. Wilmington, MA. pp 76.

Optional Soil Data
Taxonomic Subgroup:
Soil Drainage Class:
Depth to Active Water Table:
NTCHS Hydric Soil Criterion:

References:

CONCLUSIONS

Greater than 50% Hydrophytes? yes
Hydric Soils Criterion Met? yes
Wetland Hydrology Met? yes

Is this datapoint a wetland? yes

Remarks/Plot Location: Plot is located 12 feet on a 0 degree bearing from flag 9-4.

PROJECT TITLE: *Middletown High School* TRANSECT: 8 PLOT: W

PROJECT TITLE: *Middletown High School* TRANSECT:*9* PLOT: *U*
DELINEATOR: *Edward M. Pawlak, PWS* DATE:*8/25/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Trees	*Quercus rubra*	990/1308	76%	FACU
Saplings	*Carpinus caroliniana*	20.5/41	50%	FAC
	Acer saccharum	20.5/41	50%	FACU
Shrubs	*Lonicera tartarica*	63/85.5	74%	FACU
Herbs	*Arisaema triphyllum*	20.5/69	30%	FACW-
	Lonicera tartarica	38/69	55%	FACU

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL: FACW: 1 FAC: 1 Other Hydrophytes: FAC-: FACU: 4 UPL:

Hydrophytes Subtotal: 2 Non-hydrophytes Subtotal: 4

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 2/6=33%

HYDROLOGY

__ RECORDED DATA
- Stream, lake or tidal gate Identification:
- Aerial photograph Identification:
- Other Identification:

__x_ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water:
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" ___ Water Marks ___ Drift Lines
___ Sediment Deposits ___ Drainage Patterns in Wetland ___ Other:

SOIL

Sketch Landscape Position

Depth (inches)	Horizon	Matrix Color	Redoximorphic Features	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-7	A	5YR 4/2		Fine sandy loam
7-20	B	5YR 4/4		Silt loam; manganese concretions

HYDRIC SOIL INDICATOR(S):
REFERENCE: NEHSTC. 1998, 2nd Edition. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission. Wilmington, MA. pp 76.

Optional Soil Data
Taxonomic Subgroup:
Soil Drainage Class:
Depth to Active Water Table:
NTCHS Hydric Soil Criterion:

References:

CONCLUSIONS

Greater than 50% Hydrophytes? no
Hydric Soils Criterion Met? no
Wetland Hydrology Met? no

Is this datapoint a wetland? no

Remarks/Plot Location: Plot is located 42 feet on a 36 degree bearing from Plot 9W.

PROJECT TITLE: *Middletown High School* TRANSECT: 9 PLOT: U

PROJECT TITLE: *Middletown High School* TRANSECT: *9* PLOT: *W*
DELINEATOR: *Edward M. Pawlak, PWS* DATE:*8/25/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Trees	*Acer rubrum*	404/496	81%	FAC
Saplings	*Ulmus Americana*	38/48.5	78%	FACW-
	Acer rubrum	10.5/48.5	22%	FAC
Shrubs	*Lonicera tartarica*	63/85.5	74%	FACU
Herbs	*Arisaema triphyllum*	20.5/34	60%	FACW-
	Parthenocissus quinquefolia	10.5/34	31%	FACU

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL: FACW: 2 FAC: 2 Other Hydrophytes: FAC-: FACU: 2 UPL:

Hydrophytes Subtotal: 4 Non-hydrophytes Subtotal: 2

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 4/6=67%

HYDROLOGY

__ RECORDED DATA
- Stream, lake or tidal gate Identification:
- Aerial photograph Identification:
- Other Identification:

___ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water:
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" ___ Water Marks ___ Drift Lines
___ Sediment Deposits __x_ Drainage Patterns in Wetland ___ Other:

SOIL
Sketch Landscape Position

Depth (inches)	Horizon	Matrix Color	Redoximorphic Features	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0-10	A	5YR 3/2		Silt loam
10-20	B	5YR 4/3		Silt loam

HYDRIC SOIL INDICATOR(S): IV
REFERENCE: NEHSTC. 1998, 2nd Edition. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission. Wilmington, MA. pp 76.

Optional Soil Data
Taxonomic Subgroup:
Soil Drainage Class:
Depth to Active Water Table:
NTCHS Hydric Soil Criterion:

References:

CONCLUSIONS
Greater than 50% Hydrophytes? yes
Hydric Soils Criterion Met? yes
Wetland Hydrology Met? yes

Is this datapoint a wetland? yes

Remarks/Plot Location: Plot is located 27 feet on a 230 degree bearing from flag 2-161.

PROJECT TITLE: *Middletown High School* TRANSECT: 9 PLOT: W

PROJECT TITLE: *Middletown High School* TRANSECT: *10* PLOT: *U*
DELINEATOR: *Edward M. Pawlak, PWS* DATE: *8/26/03*

VEGETATION				
Stratum	Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI Status
Shrubs	*Rosa multiflora*	38/63	60%	FACU
Herbs	*Plantago lanceolata*	38/58.5	65%	NI (UPL)
	Trifolium pretense	20.5/58.5	35%	FACU-

Note 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology, which should be considered as "other hydrophytes" in the tally below.
Note 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL: FACW: FAC: Other Hydrophytes: FAC-: FACU: 2 UPL: 1

Hydrophytes Subtotal: 0 Non-hydrophytes Subtotal: 3

100 x Subtotal Hydrophytes

Subtotal Hydrophytes + Subtotal Non-hydrophytes = Percent Hydrophytes = 0/3=0%

HYDROLOGY

__ RECORDED DATA
- Stream, lake or tidal gate Identification:
- Aerial photograph Identification:
- Other Identification:

__x_ NO RECORDED DATA

___ OBSERVATIONS:
- Depth to Free Water:
- Depth to Saturation (including capillary fringe):
- Describe Altered Hydrology:

___ Inundated ___ Saturated in upper 12" ___ Water Marks ___ Drift Lines
___ Sediment Deposits ___ Drainage Patterns in Wetland ___ Other:

of the date it was recorded. The conservation easement or deed restriction shall enable the site or sites to be protected in perpetuity from any future development. The conservation easement or deed restriction shall expressly allow for the creation, restoration, remediation and monitoring activities required by this permit on the site or sites. It shall prohibit all other filling, clearing and other disturbances (including vehicle access) on these sites except for activities explicitly authorized by the Corps of Engineers in these approved documents.

K. Monitoring Plan:

Once the final mitigation plan is incorporated into the permit, the permit will require full implementation of the mitigation plan, including remedial measures during the first five growing seasons to ensure success. Typically, sites proposed to be emergent-only wetlands will be monitored for five years and sites proposed to be scrub-shrub and/or forested wetlands will be monitored for five to ten years, as extended periods for monitoring may be appropriate in some cases. Unsuccessful mitigation does not, in and of itself, constitute permit non-compliance. Failure to implement the plan and remedial measures, however, does.

[ ] The following language is included in the narrative portion of the mitigation plan:

MONITORING

If mitigation construction is initiated in, or continues throughout the year, but is not completed by December 31 of any given year, the permittee will provide the Corps, Policy Analysis and Technical Support Branch, a letter providing the date mitigation work began and the work completed as of December 31. The letter should be sent no later than January 31 of the following year. The letter must include the Corps permit number.

For each of the first [specify] full growing seasons following construction of the mitigation site(s), the site(s) shall be monitored and monitoring reports shall be submitted to the Corps, Regulatory Division, Policy Analysis and Technical Support Branch, no later than December 15 of the year being monitored. Failure to submit monitoring reports constitutes permit non-compliance. Each report coversheet shall indicate the report number (Monitoring Report 1 of 5, for example). The reports shall answer the following four success-standard questions and shall address in narrative format the items listed after the four questions. The reports shall also include the four monitoring-report appendices listed below. The first year of monitoring

shall be the first year that the site has been through a full growing season after completion of construction and planting. For these special conditions, a growing season starts no later than May 31. However, if there are problems that need to be addressed and if the measures to correct them require prior approval from the Corps, the permittee shall contact the Corps by phone (1-800-362-4367 in MA or 1-800-343-4789 in ME, VT, NH, CT, RI) or letter as soon as the need for corrective action is discovered.

Remedial measures shall be implemented to attain the four success standards described below within [specify] growing seasons after completion of construction of the mitigation site(s). Measures requiring earth movement or changes in hydrology shall not be implemented without written approval from the Corps.

1) Does the site have at least 500 trees and shrubs per acre, of which at least 350 per acre are trees for proposed forested cover types, that are healthy and vigorous and are at least 18" tall in 75% of each planned woody zone AND at least the following number of non-exotic species including planted and volunteer species? Volunteer species should support functions consistent with the design goals. To count a species, it must be well represented on the site (e.g., at least 50 individuals of that species per acre).

# species planted	minimum # species required (volunteer and planted)
2	2
3	3
4	3
5	4
6	4
7	5
8	5
9 or more	6

Vegetative zones consist of areas proposed for various types of wetlands (shrub swamp, forested swamp, etc.). The performance standards for density can be assessed using either total inventory or quadrat sampling methods, depending upon the size and complexity of the site.

2) Does each mitigation site have at least 80% areal cover, excluding planned open water areas or planned bare soil areas (such as for turtle nesting), by noninvasive species? Do planned emergent areas on each mitigation site have at least 80% cover by noninvasive hydrophytes? Do planned shrub-shrub and forested cover types have at least 60%

cover by noninvasive hydrophytes, of which at least 15% are woody species? For the purpose of this success standard, invasive species of hydrophytes are:

Cattails -- *Typha latifolia, Typha angustifolia, Typha glauca*;
Common Reed -- *Phragmites australis*;
Purple Loosestrife -- *Lythrum salicaria*; and
Reed Canary Grass -- *Phalaris arundinacea*
Buckthorn – *Rhamnus frangula.*

3) Are Common Reed (*Phragmites australis*), Purple Loosestrife (*Lythrum salicaria*), Russian and Autumn Olive (*Eleagnus* spp.), Buckthorn (*Rhamnus frangula*), and/or Multiflora Rose (*Rosa multiflora*) plants at the mitigation site(s) being controlled?

4) Are all slopes, soils, substrates, and constructed features within and adjacent to the mitigation site(s) stabilized?

Items for narrative discussion:

Describe the monitoring inspections that occurred since the last report.

Soils data, commensurate with the requirements of the soils portion of the 1987 Delineation Manual New England District data form, should be collected after construction and every alternate year throughout the monitoring period. If monitoring wells or gauges were installed as part of the project, this hydrology data should be submitted annually.

Concisely describe remedial actions done during the monitoring year to meet the four success standards – actions such as removing debris, replanting, controlling invasive plant species (with biological, herbicidal, or mechanical methods), regrading the site, applying additional topsoil or soil amendments, adjusting site hydrology, etc. Also describe any other remedial actions done at each site.

Report the status of all erosion control measures on the compensation site(s). Are they in place and functioning? If temporary measures are no longer needed, have they been removed?

Give visual estimates of (1) percent vegetative cover for each mitigation site and (2) percent cover of the invasive species listed under Success Standard No. 2, above, in each mitigation site.

What fish and wildlife use the site(s) and what do they use it for (nesting, feeding, shelter, etc.)?

By species planted, describe the general health and vigor of the surviving plants, the prognosis for their future survival and a diagnosis of the cause(s) of morbidity or mortality.

What remedial measures are recommended to achieve or maintain achievement of the four success standards and otherwise improve the extent to which the mitigation site(s) replace the functions and values lost because of project impacts?

IF MITIGATION INCLUDES VERNAL POOL CREATION ATTEMPT(S):

Does the vernal pool creation attempt(s) take into account the critical need for unobstructed access to and from the pool, as well as an adequate extent of upland habitat to ensure success?

Pool(s) are monitored for obligate and facultative vernal pool species weekly for four weeks from the beginning of the vernal pool activity in the spring (will vary throughout New England) and then biweekly until the end of July for the entire monitoring period. The period of monitoring is specified. Data identify frog species, salamander genera, and the presence/absence of fairy shrimp. Macroinvertebrates can be to the order.

In addition, photographs of the pool(s) taken monthly during the pool monitoring period (March/April-July) from a set location(s) will be included. Photographs will include panoramas of surrounding habitat.

Other data required: pH and temperature of water at beginning and end of each monitoring cycle; pool depth at deepest point(s) (or state if >3') to nearest inch or centimeter; substrate of pool(s) (dead leaves, herbaceous vegetation, bare soil—organic or mineral, etc.); plant species noted in and around the perimeter of the pool(s).

If the state has a vernal pool register, the pool(s) is registered prior to the final monitoring report submission.

MONITORING-REPORT APPENDICES:

Appendix A -- A copy of this permit's mitigation special conditions and summary of the mitigation goals.

Appendix B -- An as-built planting plan showing the location and extent of the designed plant community types (e.g., shrub swamp).

Within each community type the plan shall show the species planted. This is only needed in the first monitoring report unless there are additional plantings of different species in subsequent years.

Appendix C – A vegetative species list of volunteer species in each plant community type. The volunteer species list should, at a minimum, include those that cover at least 5% of their vegetative layer.

Appendix D -- Representative photos of each mitigation site taken from the same locations for each monitoring event.

L. Assessment Plan:

[ ] The following language is included in the narrative portion of the mitigation plan:

ASSESSMENT

Following completion of the construction of the mitigation site(s), a post-construction assessment of the condition of the mitigation site(s) shall be performed after the first five growing seasons or by the end of the monitoring period, whichever is later. "Growing season" in this context begins no later than May 31st. To ensure objectivity, the person(s) who prepared the annual monitoring reports shall not perform this assessment without written approval from the Corps. The assessment report shall be submitted to the Corps by December 15 of the year the assessment is conducted.

The post-construction assessment shall include the four assessment appendices listed below and shall:

Summarize the original or modified mitigation goals and discuss the level of attainment of these goals at each mitigation site (include vernal pool creation if that is a component of the mitigation).

Describe significant problems and solutions during construction and maintenance (monitoring) of the mitigation site(s).

Identify agency procedures or policies that encumbered implementation of the mitigation plan. Specifically note procedures or policies that contributed to less success or less effectiveness than anticipated in the mitigation plan.

Recommend measures to improve the efficiency, reduce the cost, or improve the effectiveness of similar projects in the future.

ASSESSMENT APPENDICES:

Appendix A -- Summary of the results of a functions and values assessment of the mitigation site(s), using the same methodology used to determine the functions and values of the impacted wetlands.

Appendix B -- Calculation of the area of wetlands in each mitigation site using the 1987 Wetlands Delineation Manual (Technical Report Y-87-1). Supporting documents shall include (1) a scaled drawing showing the wetland boundaries and representative transects and (2) datasheets for corresponding data points along each transect.

Appendix C -- Comparison of the area and extent of delineated constructed wetlands (from Appendix B) with the area and extent of created wetlands proposed in the mitigation plan. This comparison shall be made on a scaled drawing or as an overlay on the as-built plan. This plan shall also show the major vegetation community types.

Appendix D -- Photos of each mitigation site taken from the same locations as the monitoring photos, including photos of vernal pools, if applicable.

M. Other Comments:

ERS Scientist: _____ Date Plan Reviewed: _____