



- Soil & Wetland Studies
- Ecology • Application Reviews
- Listed Species Surveys • GPS
- Environmental Planning & Management
- Ecological Restoration & Habitat Mitigation
- Expert Testimony • Permitting

June 1, 2023

VIA E-MAIL

Town of Ledyard
Inland Wetlands & Water Courses Commission
Town Hall
741 Colonel Ledyard Highway
Ledyard, CT 06339

ATTN: Mr. Justin DeBrodt, Chairman

RE: COMPENSATORY WETLAND MITIGATION
Site Preparation for Future Industrial Development
1737 and 1761 Route 12, Gales Ferry (Ledyard), CT
REMA Job #23-2596-LED5

Dear Chairman DeBrodt and Commission Members:

At the request of the applicant, Gales Ferry Intermodal, LLC, REMA ECOLOGICAL SERVICES, LLC (REMA), has prepared this brief *Compensatory Wetland Mitigation* report, to be submitted as part of an application before the Town of Ledyard Inland Wetlands and Water Courses Commission.

Per our discussion with Commission and Town staff, an additional stand-alone compensatory wetland mitigation area was selected at the site, since the one previously proposed would have to be greatly reduced in size, likely by half, by not excavating within the existing paved area.

The newly proposed area would be located within a pie-shaped upland area, between two railroad tracks, and northerly of an existing tidal pond/marsh (see Figure A, attached). Under



existing conditions this area includes shrub and vine tangles, ruderal forest, and open moist meadow. Invasive plants are dominant throughout (see attached annotated photos).

Attached, we include implementation notes, and planting material tables. We should note that soil exploration would have to take place prior to finalizing the grading for this area, in order to ascertain the seasonal groundwater table. The hydrology of the created wetland will rely almost entirely on the fluctuations of groundwater, which is also to some extent influenced by the tidal regime of the river.

Please call us if you have any questions on the above or need further assistance.

Respectfully submitted,

REMA ECOLOGICAL SERVICES, LLC



George T. Logan, MS, PWS, CSE
Certified Senior Ecologist
Professional Wetland Scientist
Registered Soil Scientist

Attachments: Figure A; Annotated Photographs (1-6); Implementation Notes, Planting Materials Tables (1-4)



Legend

- Town Boundary
- State Boundary
- Town Boundary
- Coastline



Light Gray Canvas Base


Notes


0.0 0 0.02 0.0 Miles


	SITE/LOCATION: 1737 & 1761 Route 12 Gales Ferry, CT	REMA JOB NO.: 23-2596-LED5	ANNOTATED PHOTO LOG
	INVESTIGATOR(S): George T. Logan, MS, PWS, CSE		
DATE: May 25, 2023	FACING: SOUTHERLY	PHOTO NO.: 1	
		<i>Northern section of proposed compensatory wetland area; replete with invasives such as autumn olive, multiflora rose, mugwort, Asiatic bittersweet, black locust, etc.</i>	

DATE: May 25, 2023	FACING: SOUTHWESTERLY	PHOTO NO.: 2	
		<i>Dense thickets characterize the central and upper sections of the compensatory wetland mitigation area</i>	

	SITE/LOCATION: 1737 & 1761 Route 12 Gales Ferry, CT	REMA JOB NO.: 23-2596-LED5	ANNOTATED PHOTO LOG
	INVESTIGATOR(S): George T. Logan, MS, PWS, CSE		
DATE: May 25, 2023	FACING: NORTHERLY	PHOTO NO.: 3	
		<i>Southern section of proposed compensatory wetland area; young ruderal woods, also replete with invasives</i>	

DATE: May 25, 2023	FACING: SOUTHWESTERLY	PHOTO NO.: 4	
		<i>At the far southern edge of this area a higher earthen berm separates it from a wetland/tidal area; this berm will be left intact, roughly 20 to 25 feet in width</i>	

	SITE/LOCATION: 1737 & 1761 Route 12 Gales Ferry, CT	REMA JOB NO.: 23-2596-LED5	ANNOTATED PHOTO LOG
	INVESTIGATOR(S): George T. Logan, MS, PWS, CSE		
DATE: May 25, 2023	FACING: EASTERLY	PHOTO NO.: 5	
		<i>The proposed mitigation will expand the functions and values of existing wetlands, such as shown here to the south</i>	

DATE: May 25, 2023	FACING: SOUTHERLY	PHOTO NO.: 6	
		<i>Railroad tracks to the west of the proposed mitigation area with prominent bedrock knoll</i>	

MITIGATION PLAN FOR
CREATION OF WETLAND HABITATS
IMPLEMENTATION NOTES

1.0 INTRODUCTION

EMERGENT AND SCRUB-SHRUB WETLAND (I.E., WET MEADOW/MARSH AND SHRUB SWAMP) CREATION BY EXCAVATION, AND HERBACEOUS AND WOODY PLANTINGS, WILL TAKE PLACE AT AN ADDITIONAL LOCATION ON THE SUBJECT SITE, AT THE WESTERN PORTION OF THE OVERALL PROPERTY, A PIE-SHAPED AREA, BETWEEN TO RAILROAD TRACKS, AND EASTERLY OF A PROMINENT BEDROCK KNOLL.

SOILS RANGE FROM WELL DRAINED, TO MODERATELY WELL DRAINED FINE SANDY LOAMS TO LOAMY SAND. BASED ON PRELIMINARY SOIL EXPLORATION THE SITE AND REMOTE SENSING, THIS AREA APPEARS TO NO HAVE BEEN FILLED OR MANIPULATED TO A GREAT DEGREE, IN THE SUBSOILS.

THOUGH SOME BETTER-QUALITY NATIVE VEGETATION OF RUDERAL WOODS EXISTS WITHIN THIS AREA, FOR THE MOST PART IT IS REPLETE WITH INVASIVE PLANTS (E.G., MULTIFLORA ROSE, MUGWORT, ASIATIC BITTERSWEET, TREE OF HEAVEN, AUTUMN OLIVE, ETC.).

IN-KIND MITIGATION (I.E., CREATION) IS PROPOSED TO OFF-SET LOST FUNCTIONS & VALUES FROM THE CURRENTLY PROPOSED PERMANENT WETLAND IMPACT (I.E., +/- **1,700 SQUARE FEET**) (I.E., "WETLAND Z"), AND THE POTENTIAL HYDROLOGIC IMPACTS TO WETLANDS "Y" AND "X", THE GOAL IS TO CREATE ECOLOGICAL COMMUNITIES WITH AT LEAST COMPARABLE, AND PREFERABLY HIGHER, FUNCTIONS AND COMPLIMENTARY WETLAND COVER TYPES TO THE WETLANDS THAT WOULD BE IMPACTED. THE INITIAL TARGET COVER TYPE RATIO FOR THE WETLAND REPLICATION SHALL BE ½ EMERGENT (I.E., WET MEADOW, MARSH) AND ½ SCRUB SHRUB HABITATS. APPROXIMATELY **17,500 SQUARE FEET** OF PRODUCTIVE WETLAND CAN BE CREATED AT THIS LOCATION.

THE WETLAND CREATION GOAL IS 100% COVER, AND 95% COVER BY NATIVE SPECIES, BY THE END OF THE FIVE-YEAR (5) MONITORING PERIOD. PLANT SPECIES WERE SELECTED TO ENCOMPASS THE FOLLOWING CRITERIA: FOOD PLANTS FOR CATEPILLARS, BEETLES, AND OTHER INSECTS; FRUIT, SEED, AND NUT PRODUCTION IN DIFFERENT SEASONS, INCLUDING PERSISTENT WINTER FRUIT AND SPRING SEEDS; FORAGE FOR VERTEBRATE HERBIVORES; SUITABLE MICRO-HABITATS FOR OVERWINTERING INSECTS; AND NECTAR AND POLLEN THROUGHOUT THE GROWING SEASON (SEE TABLE 3). SPECIES ALREADY PRESENT IN NEARBY WETLAND HABITATS, ESPECIALLY WOODY SPECIES, WERE SELECTED FIRST, AS THEY ARE ALREADY USED BY THE LOCAL FAUNAL ASSEMBLAGE.

NOTE: ALL WETLAND REPLICATION WORK, SHALL BE SUPERVISED BY AN ECOLOGIST (OR WETLAND SCIENTIST), INCLUDING INITIAL GRADING, PLANTING, MARKING INVASIVES IN ADJACENT UPLAND BUFFER AREAS, AND MARKING ANY NATIVE MATERIALS FOR SALVAGE. A PRE-IMPLEMENTATION MEETING SHALL TAKE PLACE AT LEAST ONE MONTH PRIOR TO PLAN IMPLEMENTATION, BETWEEN THE WETLAND SCIENTIST, THE SITE CONTRACTOR, AND THE LANDSCAPER, AND THE TOWN'S WETLAND AGENT, AT THE TOWN'S DISCRETION.

2.0 WETLAND CREATION

PREPARATION

1. ORDER THE TRAYS OF HERBACEOUS PLUGS AND THE SEED MIX, FOR DELIVERY RIGHT AFTER COMPLETION OF GRADING. STORE IN SHADE WHEN THEY ARRIVE.
2. EARTHWORK FOR THE WETLAND CREATION AREA WILL TAKE PLACE IN APRIL / MAY, OR IN AUGUST, SO THAT PLANTINGS CAN BE INSTALLED IMMEDIATELY AFTERWARDS, EITHER IN LATE SPRING OR VERY EARLY FALL SEASONS.
3. A MINIMUM OF 10 INCHES OF TOPSOIL (AFTER COMPACTION) SHALL BE USED. SOIL TEXTURE SHALL BE LOAM OR FINER. ORGANIC MATTER CONTENT SHALL BE A MINIMUM OF 10 PERCENT BY WEIGHT (I.E., LOSS AT IGNITION), AS TESTED AT A QUALIFIED LABORATORY (E.G., UNIVERSITY OF CONNECTICUT SOILS LAB).
4. IF NECESSARY, WELL-ROTTED LEAF COMPOST (I.E., TWO YEAR MINIMUM) WILL BE ADDED TO BRING THE PERCENT ORGANIC MATTER TO THE DESIRED SPECIFICATION.
5. A ONE TO TWO INCH THICK "TOP-DRESSING" SHALL BE APPLIED TO THE FINAL GRADE AT THE CREATION AREA, EXCEPT IN AREAS WITH PROPOSED INUNDATION, CONSISTING OF LEAF COMPOST (2-YEAR OLD, MINIMUM).
6. ADD ORGANIC, SLOW-RELEASE FERTILIZER OR OTHER AMENDMENT ONLY AS INDICATED BY THE SOIL TEST RESULTS. **NOTE** THAT NUTRIENT LEVELS SHOULD BE LOWER FOR NATURAL HABITATS THAN FOR AGRICULTURAL OR HORTICULTURAL SITES, TO PREVENT EXCESSIVE COMPETITION BY RANK WEEDS.
7. INSTALL PERIMETER EROSION CONTROLS AROUND THE MITIGATION AREAS AS SHOWN ON PLAN: CORRECTLY TRENCHED AND STAKED SILT FENCE PER THE 2002 CONNECTICUT EROSION & SEDIMENTATION CONTROL GUIDELINES (2002 GUIDELINES).

EARTHWORK

8. CLEAR AND GRUB THE WETLAND MITIGATION AREA.
 - i. REMOVE THE EXISTING TOPSOIL FROM THESE LOCATIONS & PLACE IN A DESIGNATED SOIL STOCKPILE AREA, AT LEAST FIFTY FEET AWAY. **IMPORTANT NOTE: THE TOPSOIL FROM THE MITIGATION AREA SHALL NOT BE USED, BECAUSE IT IS HEAVILY INFESTED WITH INVASIVE PLANT SPECIES.**

9. SUBSOIL FROM CERTAIN PORTIONS OF THE WETLAND REPLICATION AREA, WITH HIGHER POTENTIAL FOR INVASIVE SPECIES, WILL BE TRUCKED TO OTHER UPLAND PARTS OF THE SITE, AND COULD BE STOCKPILED FOR USE IN AREAS OF MAINTAINED LAWN.
10. **EXCAVATION, GRADING, AND TRANSPLANTING** WILL TAKE PLACE UNDER THE DIRECTION OF THE WETLAND SCIENTIST. GRADING WILL BE BASED ON CONDITIONS OBSERVED AT THE FIELD BY THE WETLAND SCIENTIST WHO MAY MAKE SMALL IN-FIELD ADJUSTMENTS TO ACHIEVE THE DESIRED WETLAND HYDROLOGY.
11. GRADING FOR THE WETLAND REPLICATION AREA WILL ENTAIL EXCAVATION TO DEPTHS THAT WILL BE WITHIN THE SEASONAL GROUNDWATER TABLE AND/OR WITHIN 12 INCHES OF IT. THE DEPTH OF EXCAVATION WILL BE ADJUSTED ACCORDINGLY AFTER A MINIMUM OF THREE DEEP HOLE SOIL TEST PITS ARE PERFORMED AT THE WETLAND REPLICATION AREA. DATA WILL BE LOGGED BY A WETLANDS PROFESSIONAL.
12. NO MACHINERY WILL BE ALLOWED WITHIN THE WETLAND CREATION AREAS WHERE TOPSOIL HAS BEEN PLACED.
13. THE CREATED WETLAND HABITAT WILL ONLY HAVE A SUBSURFACE HYDROLOGIC CONNECTION TO THE TIDAL WETLANDS TO THE SOUTH.

PLANTINGS

14. **ORDER** THE **WOODY PLANTING MATERIALS** FOR DELIVERY DURING THE PLANTING WINDOWS LISTED ABOVE (MID TO LATE SPRING OR EARLY FALL). STORE IN SHADE WHEN THEY ARRIVE AND INSTALL WITHIN THREE DAYS OF DELIVERY. MAKE SURE THAT ALL DESIRED SPECIES ARE AVAILABLE AT TIME OF ORDERING. WETLAND SCIENTIST SHALL APPROVE ANY SUBSTITUTIONS.
15. **CHECK DELIVERY**. MAKE SURE SPECIES, SIZES, AND QUANTITIES ARE AS SPECIFIED.
16. **A WETLAND PROFESSIONAL OR ECOLOGIST** SHALL SPECIFY PLANTING AND SEEDING LOCATIONS. THE PROFESSIONAL WILL DIRECT THE INSTALLATION, EITHER BY STAKING PLANTING LOCATIONS WITH A WIRE FLAG OR BAMBOO STAKE LABELED WITH THE SPECIES NAME OR CODE; OR POTTED STOCK MAY ALSO BE DIRECTLY PLACED AT PLANTING LOCATION.
17. **INSTALL THE PURCHASED WOODY MATERIALS FIRST, THEN THE HERBACEOUS PLUGS.**
18. **WOODY PLANTINGS AND LARGE HERBACEOUS PERENNIALS** (SEE TABLE 1 THROUGH TABLE 3) SHALL BE PLANTED IN SAME-SPECIES CLUSTERS, TWO TO THREE FEET APART FOR HERBACEOUS PERENNIALS, FIVE TO SIX FEET APART, FOR SHRUBS, TEN FEET APART FOR SMALL TREE SEEDLINGS/SAPLINGS. LARGER TREES SHALL BE NO CLOSER THAN EIGHT FEET FROM A SHRUB OR SMALL TREE.
19. DIG HOLES *BY HAND* TO *MINIMIZE COMPACTION* OF SOIL (MECHANICAL AUGERS ARE PROHIBITED). WATER HOLES BEFORE PLANTING, UNLESS SOIL IS ALREADY MOIST. ADD *SLOW-RELEASE FERTILIZER* (OSMACOTE, MILORGANITE OR EQUIVALENT) TO PLANTING HOLE. PLACE PLANTS INTO HOLES AND REPLACE SOIL, SO THAT THERE IS FULL

COVERAGE OF ROOTS, WITH *NO AIR SPACES* AND LEVEL SOIL AROUND THE PLANT. HOLES SHALL BE OVERSIZED (2X THE ROOT MASS DIAMETER) AND BACKFILLED WITH LOCAL TOPSOIL OR EXTRA TOPSOIL IN AN OVERSIZED TRANPLANT POT (NOT SUBSOIL REMOVED FROM BOTTOM PART OF HOLE).

20. MULCH WITH A THREE-INCH LAYER OF WELL-ROTTED HARDWOOD MULCH TO REDUCE COMPETITION FROM MEADOW VEGETATION IN A THREE-FOOT DIAMETER CIRCLE. LEAVE A GAP OF THREE INCHES AROUND EACH TRUNK. FORM SAUCERS AROUND ALL MULCHED TREE AND SHRUB PLANTINGS, TWO TO THREE INCHES HIGH, 36" ACROSS FOR NURSERY STOCK. WATER RIGHT AFTER PLANTING.
21. **HERBACEOUS PLUGS:** PLANT IN MID TO LATE AFTERNOON, OR UNDER SHADY CONDITIONS, *WATER* IMMEDIATELY AFTER PLANTING. SPACE PLUGS 24 TO 36 INCHES APART, PER PLAN (SEE TABLE 3) IN THE BARE SOIL AREAS, AND SPREAD SHREDDED LEAF MULCH IN A SIX-INCH CIRCLE AROUND EACH PLUG. PLANT IN SAME-SPECIES GROUPINGS OF VARIABLE SIZE AND SHAPE.
22. **SEEDING:** AFTER MIXING 1:1 WITH NON-CLUMPING KITTY LITTER (CLAY BASED), SPREAD SEED OVER BARE SOIL AREAS, AVOIDING MULCHED CIRCLES AROUND PLUGS. SEEDING RATE SHALL BE HALF THAT SPECIFIED FOR THE MIX. IF GERMINATION RATES ARE LOW, OVER-SEED IN FALL IN YEAR 2.
23. FOR SPRING SEEDING IN MOIST, BUT NOT SATURATED SOIL, LIGHTLY RAKE IN SEED (LESS THAN ½ INCH DEEP), TAMP DOWN, AND LIGHTLY MULCH WITH STRAW (FREE OF SEEDS) TO HOLD MOISTURE FOR GERMINATION. FOR FALL SEEDING, WAIT UNTIL AFTER HARD FROST; SEED MAY SIMPLY BE SOWN. SNOW AND FROST WILL INCORPORATE INTO THE SOIL. NOTE THAT COLD STRATIFICATION WILL INCREASE GERMINATION RATES OF SOME SPECIES IN A FALL SEEDING, BUT MORE SEEDS WILL ALSO BE EATEN BY WILDLIFE OR WASHED AWAY. IF SOIL IS SATURATED, BROADCAST ON SOIL SURFACE WITHOUT RAKING.
24. SPREAD A THIN LAYER OF WEED-FREE *STRAW MULCH* OVER ALL SEEDED AREAS WITHOUT STANDING WATER, ALLOWING FOR SOME LIGHT PENETRATION
25. FOR PLUGS IN THE WET MEADOW AND FOR SEED GERMINATION, WATERING SEVERAL TIMES A WEEK IS ESSENTIAL, IN DRY WEATHER. FOR IRRIGATION, SET UP A PUMP DRAWING ON LOCAL WATER, OR FROM A WATER TANK BROUGHT TO THE SITE.

3.0 PROTECTION FROM HERBIVORY

1. WOODY PLANTINGS WILL BE MONITORED DURING THE FIRST AND SECOND GROWING SEASONS AFTER PLAN IMPLEMENTATION FOR EXCESSIVE HERBIVORY. IF OBSERVED, THE WETLAND ECOLOGIST MAY PROPOSE ADDITIONAL CONTROLS/METHODS TO REDUCE HERBIVORY. DEER FENCE MAY BE CONSIDERED, AS THE MITIGATION AREA IS RELATIVELY SMALL.
2. AS AN INITIAL CONTROL, THE ORGANIC, SLOW-RELEASE FERTILIZER MILORGRANITE SHALL BE USED AT EACH SHRUB/TREE PLANTING, AND ALONG THE PERIMETER OF EACH OF THE

MITIGATION AREAS. THIS FERTILIZER IS A MILD TO MODERATE DETERENT TO HERBIVORY BY DEER. APPLICATION OF MILOGRANITE SHALL TAKE PLACE THREE TIMES DURING THE FIRST GROWING SEASON, SHOULD A DETERRENT BE NECESSARY.

4.0 INITIAL FOLLOW-UP AND MAINTENANCE

1. PROMPT SEEDING AND HAY MULCH APPLICATION FOLLOWING INITIAL GRADING IS KEY, TO PREVENT EROSION OF EXPOSED, RECENTLY GRADED SOILS. GRADING OF WETLAND CREATION AREAS SHOULD BE TIMED TO PRECEDE A FORECAST RAIN-FREE PERIOD, ENCOMPASSING THE SCHEDULED PLANTING DAY.
2. PERIMETER SEDIMENT CONTROLS. MAINTAIN PER THE 2002 CT E&S GUIDELINES, CHECK AFTER EACH RAIN MORE THAN ONE INCH. REMOVE SILT FENCE AS SOON AS GROUND IS VEGETATED (>80% COVER) TO PREVENT IMPEDING ANIMAL MOVEMENT TO AND FROM ADJACENT SEASONALLY FLOODED AND SATURATED WETLANDS. 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.
3. IRRIGATION: WATER ALL SEEDED AREAS, PLANTINGS AND/OR TRANSPLANTS AT LEAST WEEKLY IN DROUGHTY PERIODS. MORE FREQUENT WATERING WILL INCREASE PLANTINGS' SUCCESS. FOR PLUGS, MORE FREQUENT WATERING COULD BE NEEDED.

5.0 WEED CONTROL

1. FOR 2-3 SEASONS FOLLOWING PLAN IMPLEMENTATION, CONTROL WEEDS IN A THREE-FOOT DIAMETER CIRCLE AROUND WOODY PLANTINGS. NECESSARY FREQUENCY WILL DEPEND ON RAINFALL AND SOIL SEED BANK, BUT AT LEAST MONTHLY FROM MAY TO JULY. MULCH HELPS CONTROL WEEDS, BUT IS NOT SUFFICIENT. THE SEED MIX AND OTHER NATURAL COLONIZERS NEEDS TO GERMINATE AND SPROUT IN THE MATRIX AROUND THE WOODY PLANTINGS.
2. AT TIME OF PLANTING MARK EACH PLANTED SHRUB OR TREE WITH A FOUR-FOOT TALL "SNOW STAKE" OR "DRIVEWAY MARKER" WITH REFLECTOR TAPE. THESE SHALL BE REMOVED AT THE END OF THE MONITORING PERIOD, BUT WILL ASSIST IN FINDING THEM, SHOULD TALL HERBACEOUS VEGETATION BEGIN TO OBSCURE THEM.
3. FOR CONTROL OF SMALL SEEDLINGS USE A HOE.
4. FOR LARGER WEEDS USE A WEED WHACKER (POLE HEDGE TRIMMER).
5. LANDSCAPER SHALL FOLLOW DIRECTION OF WETLAND SCIENTIST WHO SHALL PROVIDE INITIAL GUIDANCE, BUT NEED NOT REMAIN ON SITE DURING MAINTENANCE.
6. THE WETLANDS PROFESSIONAL WILL POINT OUT TO THE LANDSCAPER CERTAIN WEEDS LIKE MUGWORT, WHICH IS PREVALENT IN PORTIONS OF THE SITE, WHICH ARE BEST PULLED, TO WEAKEN ROOT SYSTEM AND REDUCE NEEDED FREQUENCY FOR WEEDING.

7. OUTSIDE THE THREE-FOOT DIAMETER CIRCLE, WEED ONLY SELECTED UNDESIRABLE COLONIZING PLANTS, INCLUDING INVASIVE SPECIES. THE WETLANDS PROFESSIONAL SHALL TRAIN THE LANDSCAPER TO RECOGNIZE AND AVOID NATIVE SPECIES SUCH AS GOLDENRODS, SUMACS, AND VIRGINIA CREEPER. INITIALLY, FLAG DESIRABLE NATIVE SPECIES AS A TRAINING AID; ALSO, FOLLOWING ANY PERSONNEL CHANGES.

6.0 INVASIVE PLANT CONTROL

1. THE ECOLOGIST/WETLANDS PROFESSIONAL WILL FLAG WOODY INVASIVES TO BE REMOVED IN THE VICINITY OF THE WETLAND REPLICATION AREA (I.E., WITHIN 25 FEET) AT THE TIME OF PLAN IMPLEMENTATION, AND PREFERABLY JUST PRIOR TO ANY EARTHWORK.
2. AS NEEDED, CONTROL USING TARGETED, RATHER THAN BROADCAST HERBICIDE APPLICATION METHODS. FOR SPRING TREATMENT, CUT EARLY IN GROWING SEASON (LATE APRIL TO MID MAY) AND TREAT SMALL RESPROUTS IN EARLY SUMMER USING A LOW VOLUME SPRAYER. IN EARLY FALL USE THE CUT-AND-PAINT METHOD, APPLYING HERICIDE TO A RECENTLY CUT STEM (WITHIN 10 MINUTES) ON BROADLEAF INVASIVES. USE A SELECTIVE HERBICIDE LIKE TRICLOPYR (FOUND IN BRUSH-B-GON, GARLON 3A OR 4A, AND OTHER PRODUCTS), RATHER THAN BROAD-SPECTRUM GLYPHOSATE, TO MINIMIZE IMPACTS ON NON-TARGET PLANTS AND SOIL FAUNA.
3. INVASIVE PLANT CONTROL WITHIN THE AREAS OF WETLAND REPLICATION SHALL TAKE PLACE FOR **FOUR (4) YEARS** FOLLOWING THE YEAR OF PLAN IMPEMENTATION (I.E., YEAR 2 THROUGH YEAR 5), FOLLOWING THE PROCEDURES PROMULGATED BY THE CT DEEP'S CONNECTICUT INVASIVE PLANT WORKING GROUP (CIPWG), AND/OR THE NATURE CONSERVANCY.

7.0 MONITORING

1. INSPECTIONS AT THE WETLAND REPLICATION AREA SHALL BE CONDUCTED BY A QUALIFIED WETLANDS PROFESSIONAL OR ECOLOGIST DURING THE GROWING SEASON, THE THREE MONTHS FOLLOWING INSTALLATION (I.E., YEAR ONE), AND TWICE DURING EACH OF THE **FOUR (4) NEXT GROWING SEASONS**, ONCE IN LATE MAY THROUGH JUNE, AND ONCE IN EARLY FALL. ADDITIONAL INSPECTIONS MAY BE NECESSARY AT THE DISCRETION OF THE WETLANDS PROFESSIONAL TO ENSURE THE SUCCESS OF THE WETLAND CREATION.
2. DURING INSPECTIONS, CHECK MITIGATION AREA FOR SEEDLINGS OF THE FOLLOWING *INVASIVE SPECIES* AND MECHANICALLY REMOVE: JAPANESE KNOTWEED, COMMON REED, MORROW'S HONEYSUCKLE, AUTUMN OLIVE, MULTIFLORA ROSE, ASIATIC BITTERSWEET, JAPANESE BARBERRY, GLOSSY BUCKTHORN, BURNING BUSH, TREE-OF-HEAVEN, MUGWORT, AND GARLIC MUSTARD. INSPECTIONS SHALL BE DONE BY THE WETLANDS PROFESSIONAL, WHO COULD ALSO IDENTIFY OTHER INVASIVE PLANT SPECIES, BUT

PERSONNEL TRAINED BY THE PROFESSIONAL IN IDENTIFICATION OF INVASIVE SEEDLINGS MAY ASSIST WITH MECHANICAL REMOVAL (WEEDING).

3. COMPETING PLANTS: IF THE WETLANDS PROFESSIONAL DETERMINES THAT EXCESSIVE NUMBERS OF SEEDLINGS OF A PARTICULAR NATIVE SPECIES HAVE GERMINATED ON SITE (E.G., CATTAIL), REMOVE THEM BY HOEING OR HAND PULLING. COLONIZATION BY A VARIETY OF NATIVE SPECIES IS EXPECTED AND IS DESIRABLE.
4. REMEDIAL MEASURES SUCH AS REPLACEMENT PLANTINGS, HYDROLOGIC ADJUSTMENTS, AND DEER BROWSING PROTECTION, MAY BE RECOMMENDED AND SUPERVISED BY THE WETLANDS PROFESSIONAL AND IMPLEMENTED BY THE PROPERTY OWNER/MANAGER, FOR SIGNIFICANT PROBLEMS.
5. A BRIEF REPORT TO THE TOWN'S INLAND WETLANDS AND WATERCOURSES AGENCY WILL SUBMITTED BY NOVEMBER 30TH OF THE MONITORING YEAR.

TABLES OF PLANTING MATERIALS FOR WETLAND MITIGATION AREA
1737 & 1761 Route 12, Gales Ferry, Connecticut

Table 1. Trees							Wetland Creation Area	TotalS
Hydrologic Zones: Zone A: Saturated/Shallow inundation; Zone B: seasonally saturated, moist Zone C: moderately well drained, usually moist; Zone D: well-drained								
Scientific Name	Zone	Common Name	Size	Shade tolerant?	NWI*	Form		
FULL SIZE TREES								
Nyssa sylvatica	B,C	Black gum	4'-6'	Y	FAC	nursery pot	4	4
Quercus palustris	B,C	Pin Oak	4'-6'	Y	FACW	nursery pot	4	4
Acer rubrum	D	Red maple	4'-6'	Y	FACU-	nursery pot	7	7
Total:							15	15
SMALL TREES/LARGE SHRUBS								
Amelanchier canadensis	C,D	Shadblow	3'-4'	Y/N	FAC	nursery pot	4	4
Salix discolor	B,C	Pussy willow	3'-4'	N	FACW	nursery pot	8	8
Juniperus virginiana	C,D	Red cedar	3'-4'	Y	UPL	nursery pot	16	16
Total:							28	28

Table 2. Shrubs								Totals
Scientific Name	Zone	Common Name	Size	Shade tolerant?	NWI*	Form		
MEDIUM TO LOW SHRUBS								
<i>Aronia arbutifolia</i>	B,C	Chokeberry	3'-4'	N	FACW	pot	12	12
<i>Clethra alnifolia</i>	B,C	Sweet pepperbush	3'-4'	Y	FAC+	pot	16	16
<i>Corylus americana</i>	C,D	American hazelnut	3'-4'	Y	FACU-	pot	12	12
<i>Ilex verticillata</i>	B,C	Winterberry	3'-4'	Y	FACW+	pot	15	15
<i>Lyonia ligustrina</i>	B,C	Maleberry	3'-4'	Y/N	FACW	pot	15	15
<i>Morella pensylvanica</i>	C,D	Bayberry	3'-4'	N	FAC	pot	20	20
<i>Vaccinium corymbosum</i>	B	Highbush blueberry	3'-4'	Y	FACW	pot	20	20
<i>Viburnum lentago</i>	B,C	Nannyberry	3'-4'	Y	FAC	pot	25	25
<i>Spiraea latifolia</i>	B,C	Meadowsweet	3'-4'	N	FAC+	pot	50	50
<i>Swida racemosa</i>	B,C	Gray dogwood	3'-4'	Y	FAC	pot	30	30
<i>Rosa palustris</i>	A	Swamp rose	3'-4'	Y	OBL	pot	15	15
Total:							230	230

Table 3. Herbs						Wetland Creation Area	Totals
Hydrologic Zones: Zone A: Saturated/Shallow inundation; Zone B: seasonally saturated, moist Zone C: moderately well drained, usually moist; Zone D: well-drained							
Scientific Name	Zone	Common Name	Form	NWI*	Spacing		
<i>Asclepias incarnata</i>	A,B	Swamp milkweed	2"plug	OBL	2'OC	100	100
<i>Carex lupulina</i>	B	Hop sedge	2" plug	FACW	2'OC	100	100
<i>Eutrochium purpureum</i>	B	Purple Joe Pye weed	2" plug	FAC	3'OC	100	100
<i>Juncus canadensis</i>	A,B	Canada rush	2" plug	OBL	2'OC	50	50
<i>Mimulus ringens</i>	B	Monkey-flower	2" plug	OBL	2'OC	50	50
<i>Monarda fistulosa</i>	C	Wild bergamot	2" plug	UPL	3'OC	100	100
<i>Panicum virgatum</i>	C	Switchgrass	2" plug	FAC	3'OC	150	150
<i>Onoclea sensibilis</i>	B	Sensitive fern	6" pot	FAC	2'OC	50	50
<i>Verbena hastata</i>	B	Blue vervain	2" plug	FACW	3'OC	100	100
<i>Vernonia noveboracensis</i>	B	New York Ironweed	2" plug	FACW	3'OC	100	100
<i>Zizia aurea</i>	B	Golden alexanders	2" plug	FAC	3'OC	100	100
Total:						1000	1000

* NWI Status (National Wetland Inventory; National Wetland Plant List: Northcentral & Northeast)

NOTES:

1. Plant between May 15 and June 30 for herbaceous species. July planting will need watering through end of August.
2. Purchased woody material may be installed either in the spring (April 15 to June 15), or in the fall (August 15 to October 15)
3. Plant in same species groupings of three to six shrubs, ten to twenty for herbs
4. Use seed mixes from New England Wetland Plants, Inc., South Hadley, MA (see Table 4), at specified seeding rate.
5. No seeding or plants in 3' diameter circle around each shrub and tree, 1' around plugs; mulch with shredded bark
6. Water and weed as needed during first growing season.

Table 4: Seed Mixes for Wetland Mitigation Area

COMMENTS:

See notes accompanying each seed mix for additional guidance pertaining to the season that seed mix is applied. Implementation notes also include a section on seeding.

		Total (lbs per seed mix)
<i>NEWP Seed Mix #1</i>	<i>Wetland Creation Area</i>	
<i>New England Wetmix</i> 1 lb/2,500 sf	<i>(in seasonally saturated to moist areas)</i>	6
<i>NEWP Seed Mix #2</i>	<i>Wetland Creation Area (moist edges)</i>	4
<i>New England Conservation/Wildlife Mix</i> 1 lb/1,750 sf	<i>(also on 3:1 slopes above wetland)</i>	
TOTAL:		10

Notes:

1. Mix 1:1 with filler (coarse sand, kitty litter) to help correctly divide seed packages and for even spreading.
2. Mixes contain seeds with a range of hydrologic tolerances, so different species will thrive in different areas.
3. Plants will set seed and spread further, increasing in density, becoming concentrated in most suitable areas.
4. Mulch (do not seed) areas under and around plug & shrub clusters, to exclude weeds and hold moisture.
(Coverage specified assumes area occupied by mulched woody plantings has been subtracted.)
5. A late fall seeding will require 20% more seed, because some seed will be lost to wash off and herbivory, but germination rates will actually be higher the following spring, due to the cold winter stratification of the seed.

Source:

New England Wetland Plants, 14 Pearl Lane, South Bradley, Massachusetts; phone: 413-548-8000