

LINEAR RAIN GARDEN CONSTRUCTION SPECIFICATIONS
AND MAINTENANCE NOTES
120 TANNER HILL ROAD, WARREN, CONNECTICUT

1. THE RAIN GARDENS SHALL BE LOCATED ABOVE THE ZONE OF SOIL SATURATION.
2. TEMPORARY PONDING SHALL NOT EXCEED A DEPTH OF SIX INCHES.
3. PLANTING MEDIUM SHALL HAVE A LOAMY SAND TO SANDY LOAM TEXTURE WITH 20-30% WELL-ROTTED (THREE YEARS AT LEAST), CLEAN LEAF COMPOST. IF IN SITU TEXTURE IS NOT CORRECT, USE A HOMOGENEOUS MIX OF 50% CONSTRUCTION SAND, 20-30% TOPSOIL, AND 20-30% COMPOST. THE pH SHALL BE 5.5 TO 6.5 AND % ORGANIC MATTER AT LEAST 3%. TEXTURE SHALL BE DOCUMENTED PRIOR TO MEDIUM INSTALLATION WITH A COMPOSITE SAMPLE (THREE SUBSAMPLES) TESTED FOR TEXTURE AND PERCENT ORGANIC MATTER BY AN ACCREDITED SOILS LABORATORY (E.G. AT UCONN, STORRS OR THE CT AGRICULTURAL EXPERIMENT STATION IN NEW HAVEN OR WINDSOR, CT).
4. DEPTH OF PLANTING MEDIUM SHALL BE 10-12 INCHES. NOTE THAT MEDIUM IS TO BE PLACED IN THE TWO RAIN GARDENS, BUT NOT IN THE INTERMEDIATE CONVEYANCE SWALE (STILLING POOL).
5. LINEAR RAIN GARDENS SHALL BE 8-10 FEET WIDE.
6. THE CONVEYANCE SWALE BETWEEN THE WESTERN AND EASTERN RAINGARDENS SHALL BE 3 FEET WIDE AND NO MORE THAN SIX INCHES DEEP.
7. CUT SLOPES ON SOUTH SIDE OF SWALES SHALL BE STABILIZED WITH JUTE MATTING IF STEEPER THAN 3:1.
8. AVOID MANUAL COMPACTION DURING CONSTRUCTION, TO ENSURE ADEQUATE FILTRATION. ALLOW TIME FOR NATURAL SETTLEMENT AND RAKE AS NEEDED TO LEVEL OUT.
9. SOIL IN BED OF RAINGARDEN MUST BE COVERED WITH EITHER MULCH AND/OR GROUND COVER. INITIALLY SPREAD AN EVEN, 2-3 INCH LAYER (NO DEEPER) OF FRESH MULCH AROUND HERBACEOUS PLANTINGS. MULCH SHALL BE STANDARD LANDSCAPING MULCH, HARDWOOD CHIPS OR FINE SHREDDED HARDWOOD MULCH, NOT GRASS CLIPPINGS.
10. PLANT HERBACEOUS MATERIALS IN QUANTITIES SPECIFIED, IN SINGLE SPECIES GROUPINGS OF TWO TO FIVE.
11. SEED 5% TO 20% OF RAIN GARDEN BED (VARIABLE SIZE PATCHES), AND ALSO DISTURBED ADJACENT SOILS ON THE BANKS OF THE RAINGARDEN AND ALONG THE CONVEYANCE SWALE. USE THE RAIN GARDEN SEED MIX (ERNMX 122), FORTIFIED WITH CT GRASS MIX #9 FOR PROMPT EFFECTIVE SOIL STABILIZATION. ERNMX 122 CONSISTS OF HERBACEOUS SPECIES TOLERANT OF TEMPORARY INUNDATION. SPREAD A THIN LAYER OF HAY MULCH OVER ALL SEEDED AREAS, OR THIN JUTE MATTING ON STEEP SLOPES.
12. PLANT 48 SHRUBS IN SINGLE SPECIES CLUSTERS OF TWO TO FOUR INDIVIDUALS ON BOTH BANKS OF THE RAINGARDENS AND UPPER STILLING BASIN. MEDIUM TO TALL SHRUBS SHALL BE AT LEAST 24" INCHES IN HEIGHT; PLANT 5-8 FEET APART. LOW SHRUBS SHALL BE AT LEAST 18 INCHES IN HEIGHT; PLANT 2-3 FEET APART. PLANT TALL SHRUBS ONLY ON NORTH SIDE OF SWALE, BY STONE WALL.
13. FOR SHRUB PLANTINGS ON STEEP SOUTH SIDE OF SWALES, EXCAVATE A WEDGE, 2' WIDE, FROM SLOPE, TO CREATE A FLAT PLANTING AREA.
14. FIVE OF THE FOLLOWING EIGHT WOODY SPECIES SHALL BE PLANTED, INCLUDING ONE LOW SHRUB SPECIES. PLANT APPROXIMATELY EQUAL NUMBERS OF EACH SPECIES CHOSEN. DENSITY SHALL BE AS SHOWN IN TABLE 1, AT LEAST FOUR TALL OR MEDIUM SHRUBS PER TWENTY-FIVE LINEAR FEET OF RAINGARDEN, A TOTAL OF 48 SHRUBS. SPECIES CHOICES: (MEDIUM TALL): Arrowwood (*Viburnum dentatum*); Winterberry (*Ilex verticillata*); Highbush blueberry (*Vaccinium corymbosum*); Mountain Laurel (*Kalmia latifolia*); (MEDIUM): Silky Dogwood (*Cornus amomum*); Pink Azalea (*Rhododendron nudiflorum*); or Hawthorn (*Crataegus* spp.); (LOW): Meadowsweet (*Spiraea latifolia*) or Dwarf Black Chokeberry (*Aronia melanocarpa*).
15. PLACE BARK/HARDWOOD MULCH AROUND ALL SHRUB PLANTINGS, A TWO-FOOT DIAMETER CIRCLE, BUT LEAVE SEVERAL INCHES OF SPACE AROUND TRUNKS TO PREVENT RODENT DAMAGE. FORM A MOAT TO RETAIN WATER.
16. IRRIGATE AS NEEDED DURING FIRST GROWING SEASON.

LINEAR RAIN GARDEN MONITORING NOTES:

17. THE HOMEOWNER SHALL MAINTAIN THE LINEAR RAIN GARDEN PER THESE NOTES. THE TOWN WETLANDS ENFORCEMENT OFFICER MAY INSPECT AT ANY TIME, UNANNOUNCED. IF SUBSTANTIAL REMEDIAL MEASURES AND MAINTENANCE ARE REQUIRED (UNLIKELY UNLESS CAUSED BY WILLFUL DESTRUCTION), THE HOMEOWNER MUST PAY THE COST OF THESE MEASURES AS WELL AS COST OF GUIDANCE BY A WETLANDS CONSULTANT AND REPORTING TO THE WARREN INLAND WETLANDS COMMISSION.

LINEAR RAIN GARDEN MAINTENANCE NOTES
FOR THE HOMEOWNER:

18. OVER TIME, HERBACEOUS GROUND COVER MAY BE ALLOWED TO SPREAD. REFRESH BARK/HARDWOOD MULCH AROUND PERENNIALS, AS NEEDED, EVERY YEAR, WHERE HERBACEOUS VEGETATIVE COVER IS LACKING. BARE SOIL SHALL NOT BE EXPOSED. ADDITIONAL PERENNIAL SPECIES OR SHRUBS MAY BE ADDED FOR A MORE ATTRACTIVE APPEARANCE.
19. MOW BEDS OF RAIN GARDENS ANNUALLY IN MID FALL, AFTER BLOOM OF JOE PYE, AND RAKE AWAY CUTTINGS, SO THAT THEY DO NOT DECOMPOSE AND EXPORT NUTRIENTS.
20. WOODY SHRUB OR TREE SPECIES OTHER THAN INVASIVES MAY BE ALLOWED TO COLONIZE BANKS OF LINEAR RAIN GARDENS. SHRUB AND TREE ROOTS EFFECTIVELY TAKE UP NUTRIENTS.
21. LIQUID ORGANIC FERTILIZER MAY BE APPLIED TO WOODY PLANTINGS, IF INITIAL GROWTH IS SLOW.
22. INSPECT BANKS ANNUALLY AT A MINIMUM FOR CERTAIN INVASIVE SEEDLINGS (BITTERSWEET, BUCKTHORN, MORROWS HONEYSUCKLE, FIREBUSH, JAPANESE BARBERRY) AND HAND-PULL. HAND PULL AESTHETICALLY UNDESIRABLE "WEEDS" AS WELL. NO USE OF HERBICIDES, FUNGICIDES, OR INSECTICIDES. MOWING WILL CONTROL INVASIVES IN BEDS OF GARDENS.
23. REMOVE EXCESS LEAVES FROM THE GARDENS ANNUALLY IN LATE FALL AND REMOVE LEAVES FROM IN FRONT OF THE MOUTH OF THE EASTERN OUTLET PIPE. A THIN (1" TO 1.5") LAYER OF LEAF LITTER AT BOTTOM OF RAINGARDEN IS DESIRABLE FOR RUNOFF FILTRATION, BUT LEAVES SHOULD NOT BE SO DEEP AS TO PREVENT SIX INCHES PONDING AND CAUSE SWALE TO OVERFLOW.
24. REMOVE OBSTRUCTIONS SUCH AS FALLEN BRANCHES FROM THE RAINGARDEN.
25. USE HAND TOOLS TO REMOVE SEDIMENT DEPOSITS IN UPPER STILLING BASIN OR IN LINEAR RAINGARDEN, IF THEIR DEPTH EXCEEDS 3 INCHES (UNLIKELY IF UPGRADIENT SOILS ARE STABLE).
26. CHECK AFTER MAJOR RAIN STORMS, PARTICULARLY DURING THE FIRST YEAR AFTER ESTABLISHMENT. REPAIR ANY BREACH OR SHORT CIRCUITS FROM THE LINEAR RAINGARDEN TOWARDS TANNER ROAD (QUITE UNLIKELY); FILL BREACH, SEED, AND MULCH.



TABLES OF PLANTING MATERIALS FOR LINEAR RAINGARDENS 120 Tanner Hill Road, Warren, Connecticut				
Table 1: Shrubs for Banks of Rain Gardens and Stilling Basin				
HYDROLOGY: MOIST SOIL, BRIEF FLOODING IN LARGER RAINS				
TALL SHRUBS (North bank only, by wall)		Short Western Rain Garden	Long Eastern Rain Garden	Upper Stilling Basin
Scientific Name	Common Name			
<i>Kalmia latifolia</i>	Mountain laurel			
<i>Ilex verticillata</i>	Winterberry			
<i>Viburnum dentatum</i>	Arrowwood			
<i>Vaccinium corymbosum</i>	Highbush blueberry			
		Select at least 4 species of 7		
MEDIUM SHRUBS				
<i>Cornus amomum</i>	Silky dogwood			
<i>Crataegus</i> spp.	Hawthorn			
<i>Rhododendron nudiflorum</i>	Pink azalea			
TOTAL (Tall & Medium)		4	24	6
LOW SHRUBS				
<i>Aronia melanocarpa</i>	Low black chokeberry			
<i>Spiraea latifolia</i>	Meadowsweet			
		Select at least one species		
TOTAL (Low)		3	8	4
GRAND TOTAL (woody plants)		49		
Sources: Summer Hill Nurseries, Madison, CT New England Wetland Plants (NEWP), Amherst, Mass, and others.				

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Table 2: Wet/Moist Meadow Species for Linear Raingardens				
HYDROLOGY: MOIST SOIL, BRIEF FLOODING IN LARGER RAINS				
Zone B is somewhat wetter than Zone C.				
Scientific Name	Common name	Patch size & Spacing	Size	Zone
<i>Andropogon virginicus</i> *	Broomsedge	large, 2' OC	2" plug	B
<i>Asclepias incarnata</i> *	Red milkweed	small, 1.5' OC	2" plug	B
<i>Carex crinita</i>	Fringed Sedge	small, 1.5' OC	2" plug	B
<i>Eupatorium purpureum</i> **	Joe Pye	large, 2' OC	2" plug	B
<i>Hemerocallis</i> spp.**	**Day Lily	large, 2' OC	quart	B,C
<i>Monarda didyma</i> **	**Beebalm	med. 1.5' OC	quart	B,C
<i>Panicum virgatum</i> *	Switchgrass	small, 2' OC	2" plug	B,C
TOTAL		310	80	230
NOTES: * Locally available, * Order flats of 50 plugs from NEWP or comparable source. Plant plugs in single species patches of 5 to 20. ** Plant seed mix between plug clusters and on side slopes of swale. Lightly rake seed into moist soil. Spread thin layer of straw mulch, do not bury plugs. Apply thin jute matting over seed on slopes steeper than 3:1. Irrigate as needed, side slopes need more irrigation than basin bottoms.				
Source: New England Wetland Plants (NEWP), 820 West Street, Amherst, Mass. 01002 413 548 8000, or equivalent.				

TABLES OF PLANTING MATERIALS FOR LINEAR RAINGARDENS		
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Table 3a: CTDEP Mix #9, Shade-tolerant, mowing optional		
40%	Creeping Red Fescue (Pennlawn Wintergreen)	
50%	Red top (Streeter, Common)	
10%	Tall Fescue	
Do not include semi-invasive crownvetch in mix or any nitrogen fixing legume.		
Seeding Rate: Mix 1:3 with ERNMX 122		
Table 3b: FACW WETLAND MEADOW MIX ERNMX-122		
13%	<i>Elymus virginicus</i>	Virginia Wild Rye
13%	<i>Carex vulpinoidea</i>	Fox sedge
11%	<i>Poa palustris</i>	Fowl Bluegrass
9%	<i>Verbena hastata</i>	Blue Vervain
8%	<i>Juncus effusus</i>	Soft Rush
5%	<i>Aster novae-angliae</i>	New England Aster
4%	<i>Zizia aurea</i>	Golden Alexanders
4%	<i>Asier prænanthoides</i>	Cooked stem asler
4%	<i>Helianthus autumnalis</i>	Common Sneezeweed
4%	<i>Rudbeckia hirta</i>	Black-eyed Susan
3%	<i>Agrostis perennans</i>	Autumn Bentgrass
3%	<i>Nimulus rignens</i>	Monkey Flower
3%	<i>Pentstemon digitalis</i>	Tall White Beardgrass
2%	<i>Asclepias incarnata</i>	Swamp milkweed
2%	<i>Desmodium canadense</i>	Showy Tick Trefoil
2%	<i>Gium bacillatum</i>	Rough Avena
2%	<i>Monarda fistulosa</i>	Wild Bergamot
1%	<i>Chelone glabra</i>	Turtlehead
1%	<i>Ludwigia alternifolia</i>	Seedbox
1%	<i>Penthorum sedoides</i>	Ditch Stonewort
Note: Request that <i>Aster prænanthoides</i> , the shaded species, state-listed in CT, not be included in mix.		

REVISION Δ : MOVED STONE WALL 7-11-08

FRONT YARD DRAINAGE PLAN		
JAMES & ANNE ORSI RESIDENCE		
120 TANNER HILL ROAD WARREN, CONNECTICUT		
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