Bioswales (2010)
Partially funded by NDEQ & LPSNRD
District 1 Headquarters
302 Superior Street
Lincoln, Nebraska

Context:
Lynn Creek bisects property
Projects: cross between industry and business

Project Goals:
- Improve water quality
- Rapid establishment
- Low cost
- Low maintenance
- Experiment

Constraints:
- Institutional knowledge
- Inflexibility of contracting process
- Salt?
- Space

NDOR manages vegetated swales all over the state

Treat the first inch

South Bioswale
- 3 acres
- 5% at impervious, 20%
- 2 acres mowed, grass, 80%

North Bioswales
- 5 acres
- 2 acres impervious, 45%
- 2 acres semi-pervious, 45%
- 1 acre vegetated, 10%

NDOR manages vegetated swales all over the state
Permeable Soil Specification

Materials:
50% Construction Sand
10-20% salvaged topsoil
30-40% organic compost material

Mix pH between 5.5 – 7.0
Soil infiltration rates equal to or exceeding 1.5” per hour
Soil shall be placed in lifts and thoroughly wetted and allowed to settle
Permeable soil shall not be compacted

Areas to be cover by PS shall be loosened by tilling, harrowing or discing to a depth of at least 2”
Areas shall be backfilled to approximately 3-4” above the desired final grade to allow for natural settlement [rain]
Paid by cubic yard for mixing and placement and subgrade prep

PLANTS:
South Swale
Bottom (2,726 s.f.)
45 Swamp milkweed
22 NE aster
170 Turtleshead
22 Joe-pye weed
100 Va wildrye
90 Switchgrass
30 C. hystericina
90 C. comosa
509 total

Fringe (2,142 s.f.)
60 Big bluestem
60 Va wildrye
89 Mountain mint
88 Bee balm
52 Golden Alexander
51 Redding onion
20 Prairie phlox
496 total

Total Area: 4,868 s.f.

PLANTS:
Yard swale (385 plants, 1000 s.f.):
185 Cordgrass
200 Switchgrass

Pond Bottom (130 plants, 3900 s.f.)
50 Buttonbush
80 Redosier dogwood

Pond Fringe (4,580 s.f.)
80 Swamp milkweed
160 Bee balm
40 Swamp aster
20 New England aster
20 Joe-Pye weed

Bottom:
60 Virginia wildrye
164 River oats
44 Coreopsis
15 Carex hystericina
18 Cardinal flower

Fringe:
88 Narrow
44 Columbine
22 Joe-Pye weed
88 Wild geranium
18 False Solomon’s seal
18 Virginia bluebells
44 Golden Alexander
18 Virginia wildrye

Total: 10,550 s.f., 1400 plants, “3.5’” spacing
Percolation testing:
South swale: Easily drained 1" per hour.
North swale: ok except for slope between pond curb inlet.

pH testing of soil mix over 8:
Adjusted mix 7.5:
40% sand, pH 8
40% topsoil, pH 7
20% compost, pH 8
Topsoil was alluvial material, no heavy clay (Judson silt loam, Nodaway silt loam).

Construction Issues: South Swale

Unmarked pipes

Construction Issues: North Swale & Pond

Missing survey information
Undersized culvert pipe
Erosion control (2" event, several smaller events)

South Swale Parking Lot

October 19, 2010 completion

June 27, 2011 after 1.9" multi-day rain event

June 27, 2011 1.9" rainfall
Maintenance Issues: Capacity
April 15, 2011 – 1”

Lowered pipe 1 foot
Drilled drain weeps 1 foot above ground
April 14” 1 inch rain event, flowed over creek bank

Maintenance Issues: Snow Management

Maintenance Issues: Sediment Load

Maintenance Issues: Volunteer Vegetation
Volunteer Vegetation

Project Evaluation

Improve water quality: no data
Rapid establishment: yes
Low cost: not sure
   North Swale: $40,000, South Swale: $20,000
Low maintenance: yes, with reservations

Lessons Learned

• Do not replace area by stacking volume!!!
• Seeding works: Black-eyed Susan, Tickseed Coreopsis, Yarrow
• Shrubs may not be suitable for all sites
• Manage volunteer vegetation, encourage/remove some species
• Consider snow removal and storage
• Biomass removal

Future Management Activities

Thriving Plants

Carex grayi
Carex comosa
Carex hystericina
Nodding onion
Phlox pilosa
Joe-pye weed
Black-eyed Susan
Canada & Va Wildrye
Coreopsis tinctoria
Achillea millefolium
Thank you!
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