Black's Nook Site Improvements

Fresh Pond Reservation

Cambridge, MA

Presentation to Black's Nook Stakeholders

Planting and Wildlife Subcommittee

4 October 2010

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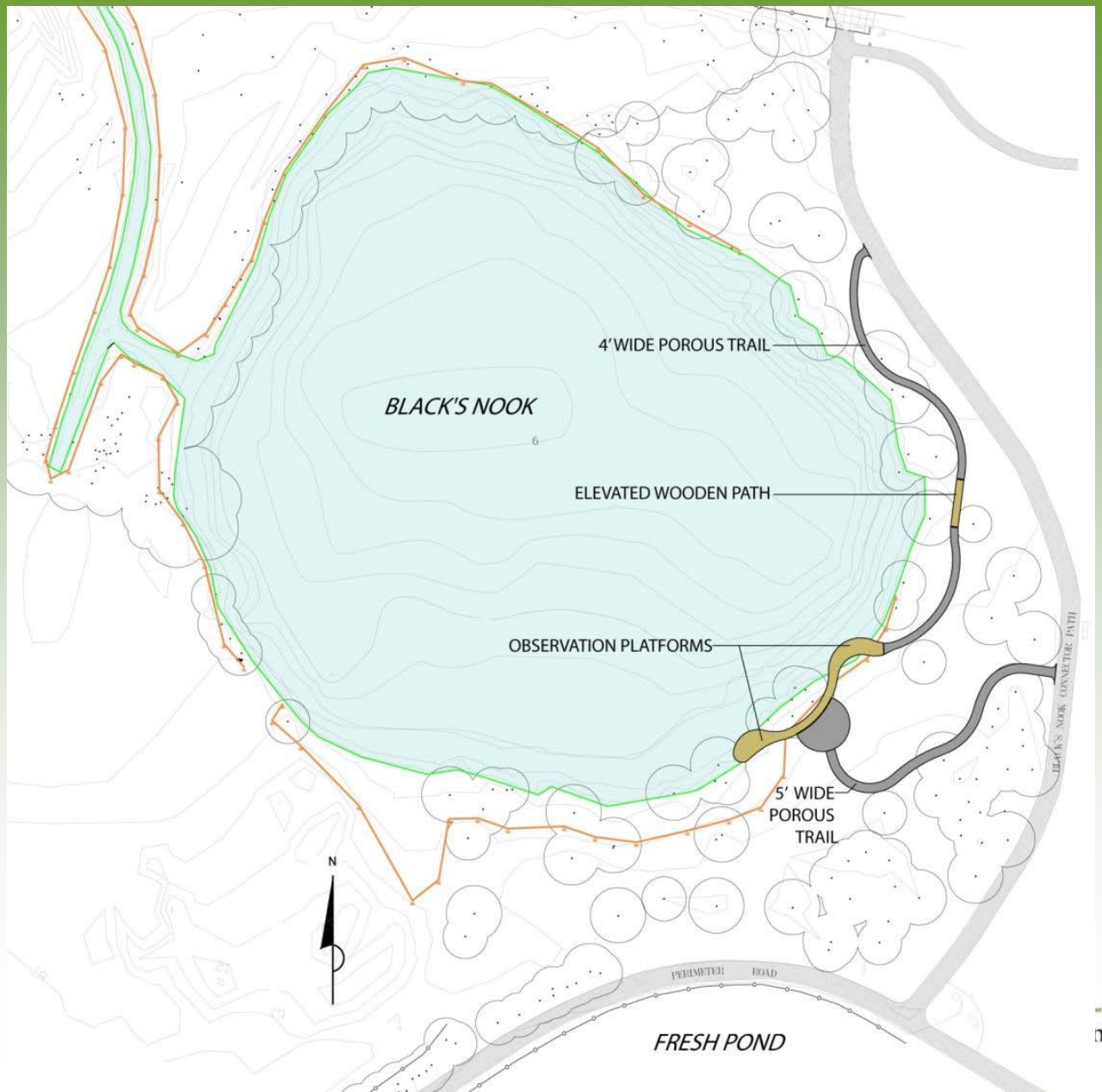
Agenda

- Introduction
  - Background
  - Project Updates (Phase I, NHESP findings)
  - Summary of January 2010 Meeting
- Planting Plan Review
  - Proposed communities
  - Proposed species
  - Soil sampling and analysis
- Vernal Pool Habitat Creation
- Schedule
- Discussion

Project Goals

- Improve/maximize wildlife habitat
- Restore by natural plant communities
- Enhance water quality
- Provide accessible route
- Enhance educational opportunities

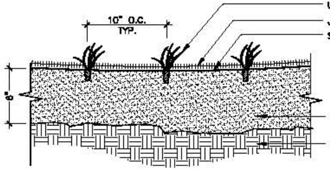
Phase I Site Improvements



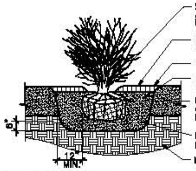
QTY	SYM.	SCIENTIFIC NAME	COMMON NAME	SIZE	COMMENTS
Deciduous Trees					
1	TA	Tilia americana	American Linden	3" cal.	B&B
2	UA	Ulmus americana 'Princeton'	Princeton American Elm	2.5" cal.	B&B
Evergreen Trees					
2	JV	Juniperus virginiana	Eastern Red Cedar	6' ht.	B&B
1	JV-1	Juniperus virginiana	Eastern Red Cedar	4' ht.	Container
5	PS	Pinus strobus	White Pine	8' ht.	B&B
Understory Trees					
1	CF	Cornus florida	Flowering Dogwood	5' ht.	B&B
Shrubs					
32	CA	Ceanothus americanus	New Jersey Tea	18–24" ht.	#2 container
9	LB	Lindera benzoin	Spicebush	36" ht.	Container
23	MP	Myrica pensylvanica	Northern Bayberry	36" ht.	Container
28	RA	Rhus aromatica 'Gro Low'	Gro Low Fragrant Sumac	18–24" ht.	#2 container
13	RM	Rhododendron maximum	Rosebay Rhododendron	36" ht.	Container
8	VD	Viburnum dentatum	Arrowwood Viburnum	36" ht.	Container
Upland Meadow Plug Planting					
50	AT	Asclepias tuberosa	Butterfly Milkweed	2" plug	Tray of 50
100	AP	Aster prenanthoides	Zigzag Aster	2" plug	Tray of 50
150	EH	Elymus hystrix	Eastern Bottlebrush Grass	2" plug	Tray of 50
150	SS	Schizachyrium scoparium	Little Bluestem	2" plug	Tray of 50
100	SSG	Solidago speciosa	Showy Goldenrod	2" plug	Tray of 50
50	ZA	Zizia aurea	Golden Zizia	2" plug	Tray of 50

NOTES:
1. SEE SPEC SECTION 02952 FOR SEED MIX COMPOSITIONS.
2. PLANT AND PLUG LOCATION TO BE VERIFIED IN THE FIELD BY OWNER'S REPRESENTATIVE.

6 PLANT SCHEDULE

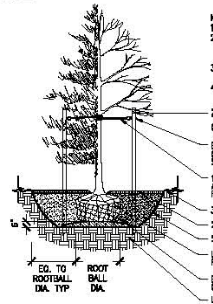


5 UPLAND MEADOW PLUG PLANTING
NOT TO SCALE

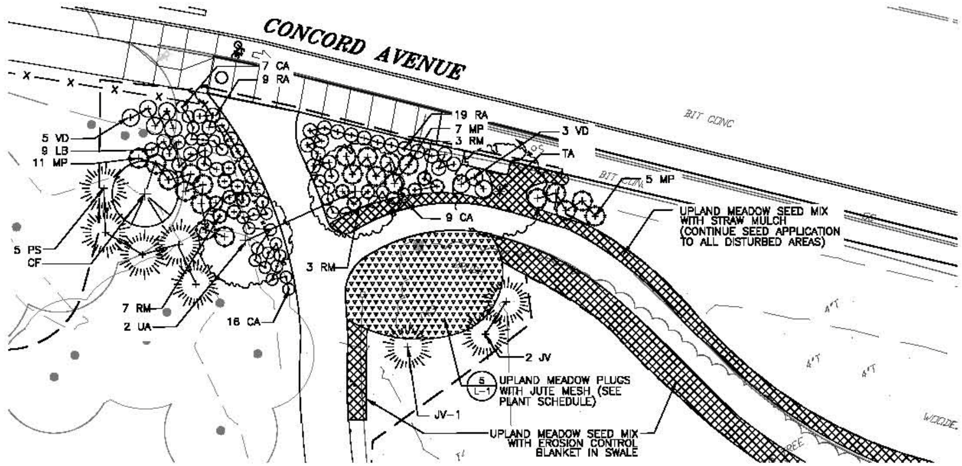


4 SHRUB PLANTING
NOT TO SCALE

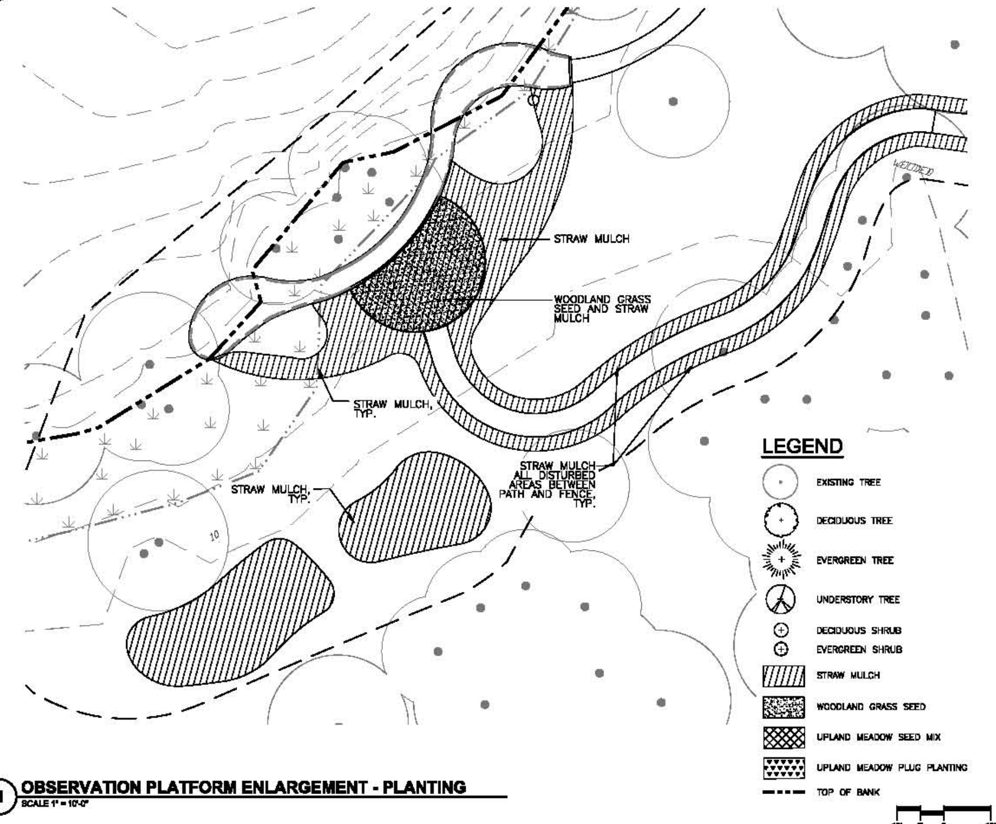
NOTES:
1. CLEANLY PRUNE ALL DAMAGED BRANCHES.
2. TREE SHALL HAVE STRAIGHT TRUNK AND BE PLUMB AFTER SETTLEMENT. CONTRACTOR SHALL ADJUST AS REQUIRED OR AS DIRECTED BY OWNER'S REPRESENTATIVE.
3. TREE SHALL BEAR SAME RELATION TO FINISH GRADE AS TO NURSERY EXISTING GRADE. DO NOT COVER ROOT FLARE.
4. ALL TREES SHALL BE FLOODED TWICE WITHIN 24 HOURS OF PLANTING.



3 TREE PLANTING
NOT TO SCALE



2 CONCORD AVENUE ENLARGEMENT - PLANTING
SCALE 1" = 10'-0"



1 OBSERVATION PLATFORM ENLARGEMENT - PLANTING
SCALE 1" = 10'-0"

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18 Commercial St. Salem, MA 01970

Client:
Cambridge Water Department
250 Fresh Pond Parkway
Cambridge, MA 02138

City of Cambridge Water Department
250 Fresh Pond Parkway
Cambridge, MA 02138
617.349.4770

BLACK'S NOOK SITE IMPROVEMENTS (PHASE 1)
BID DOCUMENTS
CAMBRIDGE, MA

NORTH

Job Number: 80015
Drawn By: BF/DD

Rev'd By:		Date:
S. Sangameswaran	ITR	8/5/10
D. Bitsko	PIC	7/20/10
K. Bradford	Design	5/22/10
J. Colucci	Structural	5/22/10
J. Rowan	Ecology	6/2/10
R. Garner	Engineering	5/22/10

Revisions

Rev'd By:	Description:	Date:

Sheet Title:
PLANTING PLAN, SCHEDULE, AND DETAILS

Sheet No:
L-1

Restoration Strategies

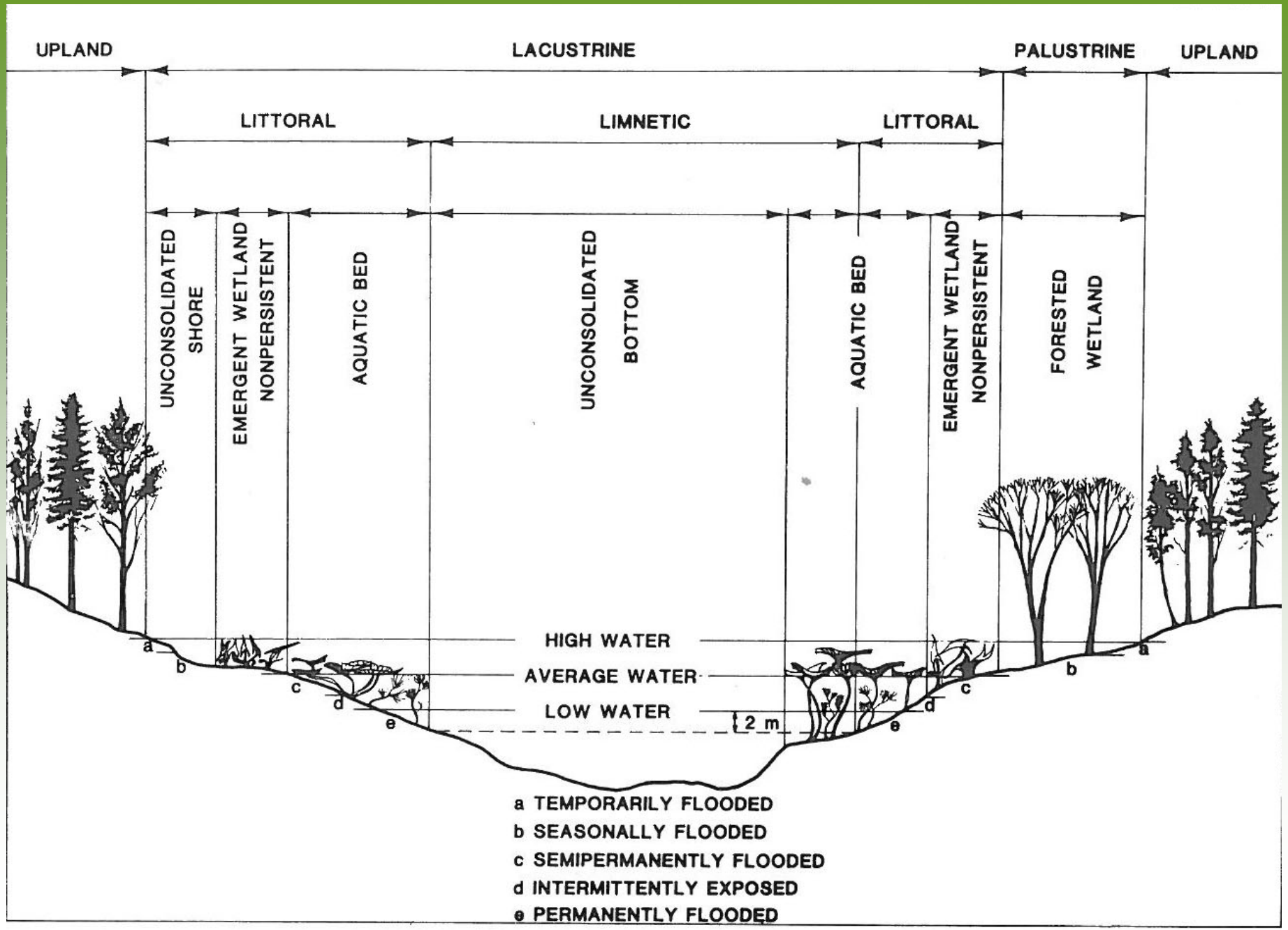
- Build on existing natural characteristics
  - Restore riparian and wetland zone by community type
    - Natural soil chemistry characteristics
    - Eliminate non-native, improve site conditions for natives
    - Add community components
  - Sculpt pond edge and littoral zone

Restoration Strategies

Plant Communities based on:

- Classification of Natural Communities of Massachusetts – Natural Heritage & Invasive Species Program, Division of Fisheries & Wildlife
- US Fish and Wildlife Services Classification of Wetlands and Deepwater Habitats in the US

Lacustrine System - USFWS Zones



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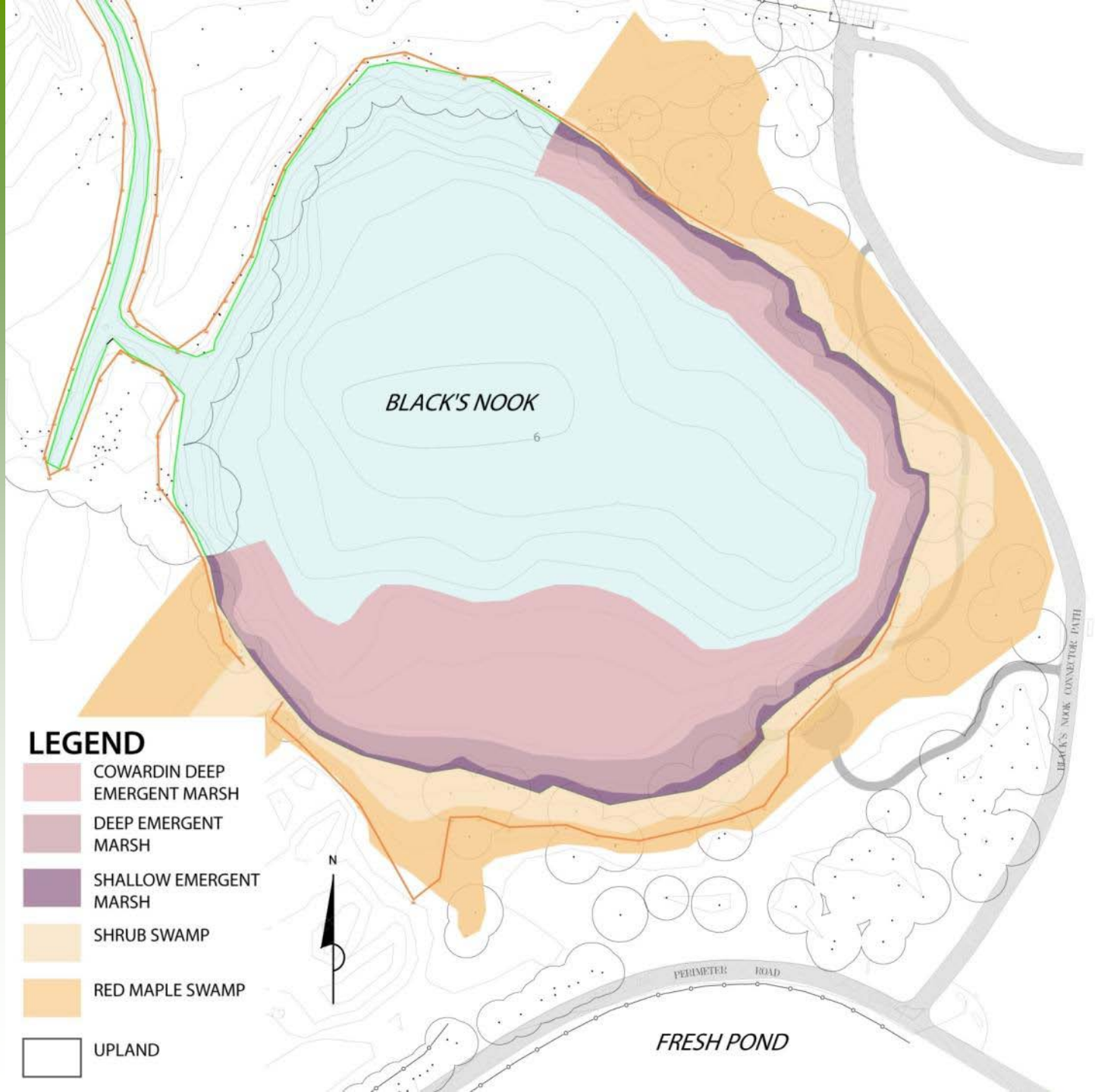
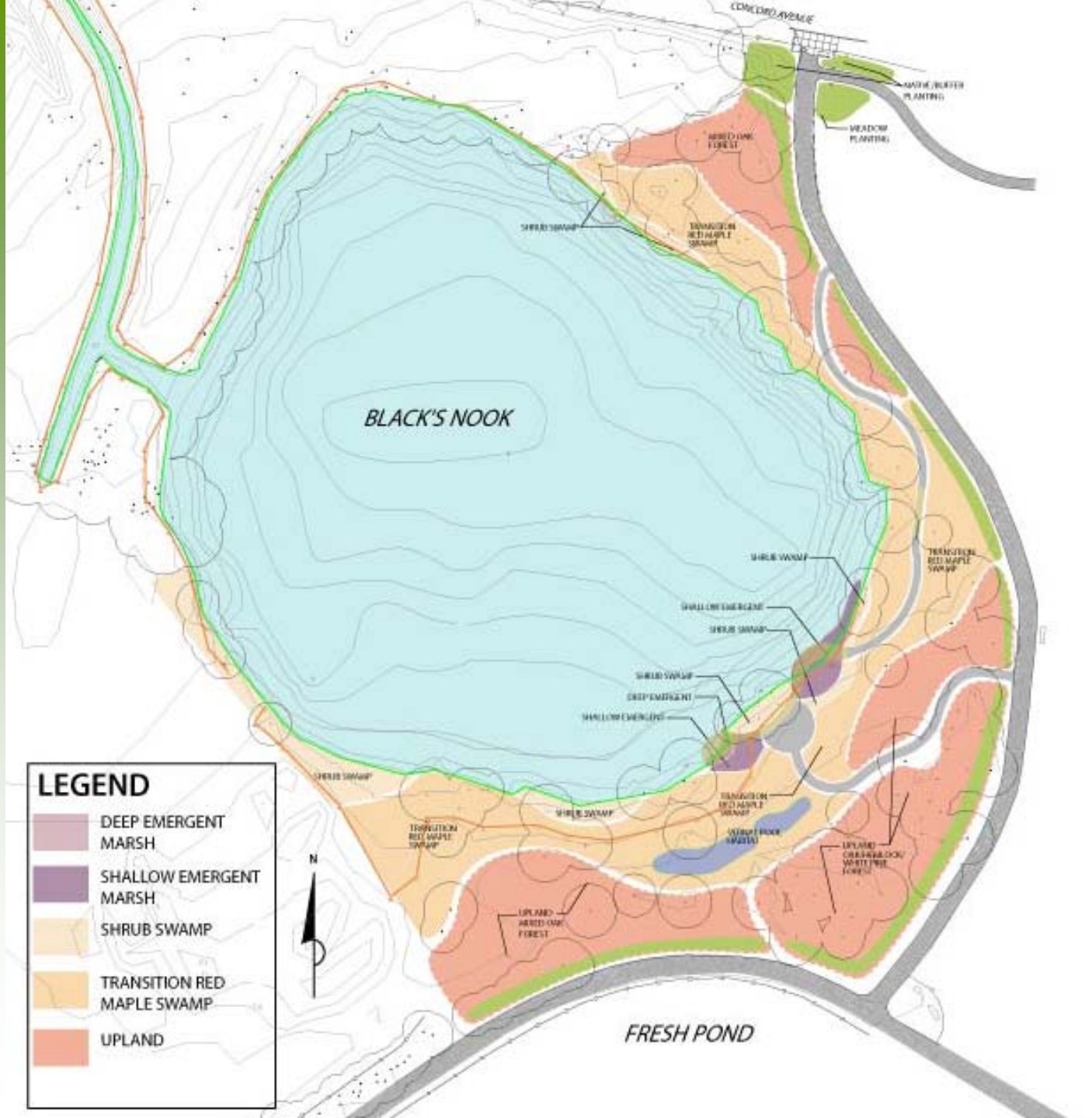
Design Strategy: Identify Appropriate Plant Communities

- Upland
  - Mixed Oak
  - Oak-Hemlock-White Pine
- Riparian
  - Red Maple Swamp
  - Scrub/Shrub Swamp
- Littoral
  - Shallow Emergent Marsh
  - Deep Emergent Marsh
  - Cowardin Deep Marsh

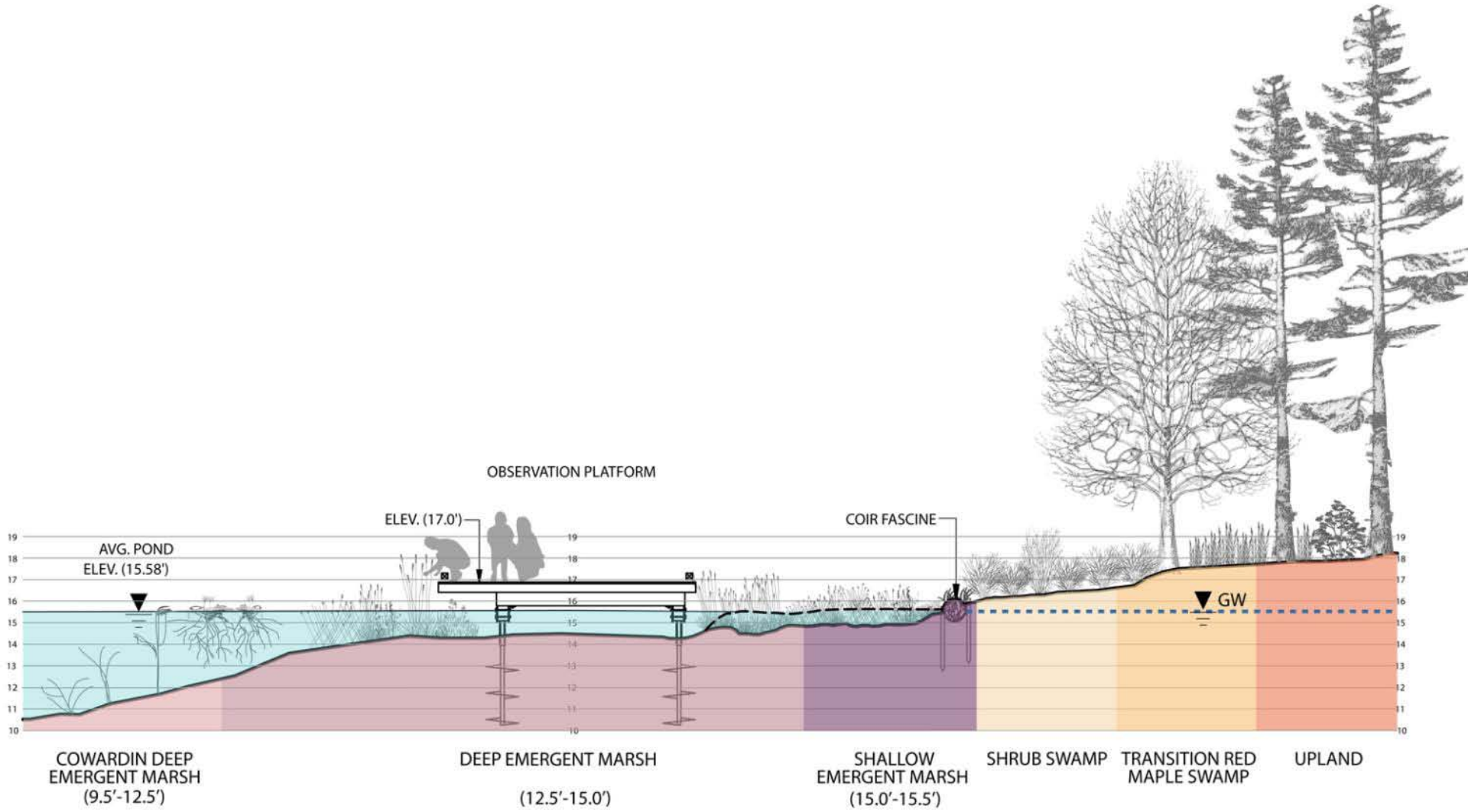
Existing Hydrologic Zones



Proposed Plant Communities



Proposed Section - Restoration Zones



Plant Material – Mixed Oak

Oak/Hemlock/White Pine

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Red Maple Swamp

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Shrub Swamp

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Shallow Emergent Marsh





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Deep Emergent Marsh

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Cowardin Deep Emergent

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Soil Analysis

- Three samples collected and submitted to Umass soil lab for chemical and biological analysis
- Findings:
  - Low organic matter
  - High potassium
  - Good nitrogen levels
  - Poor drainage
  - pH range from 5.7 to 6.5
- Recommendations
  - Compost to be mixed
  - Mulch to hold in moisture and nutrients
  - 10-6-4 fertilizer

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Soil Restoration and Planting Approach

- Remove existing mulch
- Scarify to depth of compaction (6” plus)
- Plant and/or seed
  - Quick establishing, cool season grass seed mix (bottlebrush grass) in flood plain
  - Groundcover cells in upland areas
- Apply good mulch (2” depth) to keep invasives from getting established
- Continually monitor and manually remove invasive species

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Upland - Groundcover Cells

•Specialized plantings of native woodland groundcovers that are not available in seed (i.e. ferns, Carex sp., wintergreen, Canada mayflower)

•Individual cells are approximately 10'x10' in size, to be located in field at time of construction

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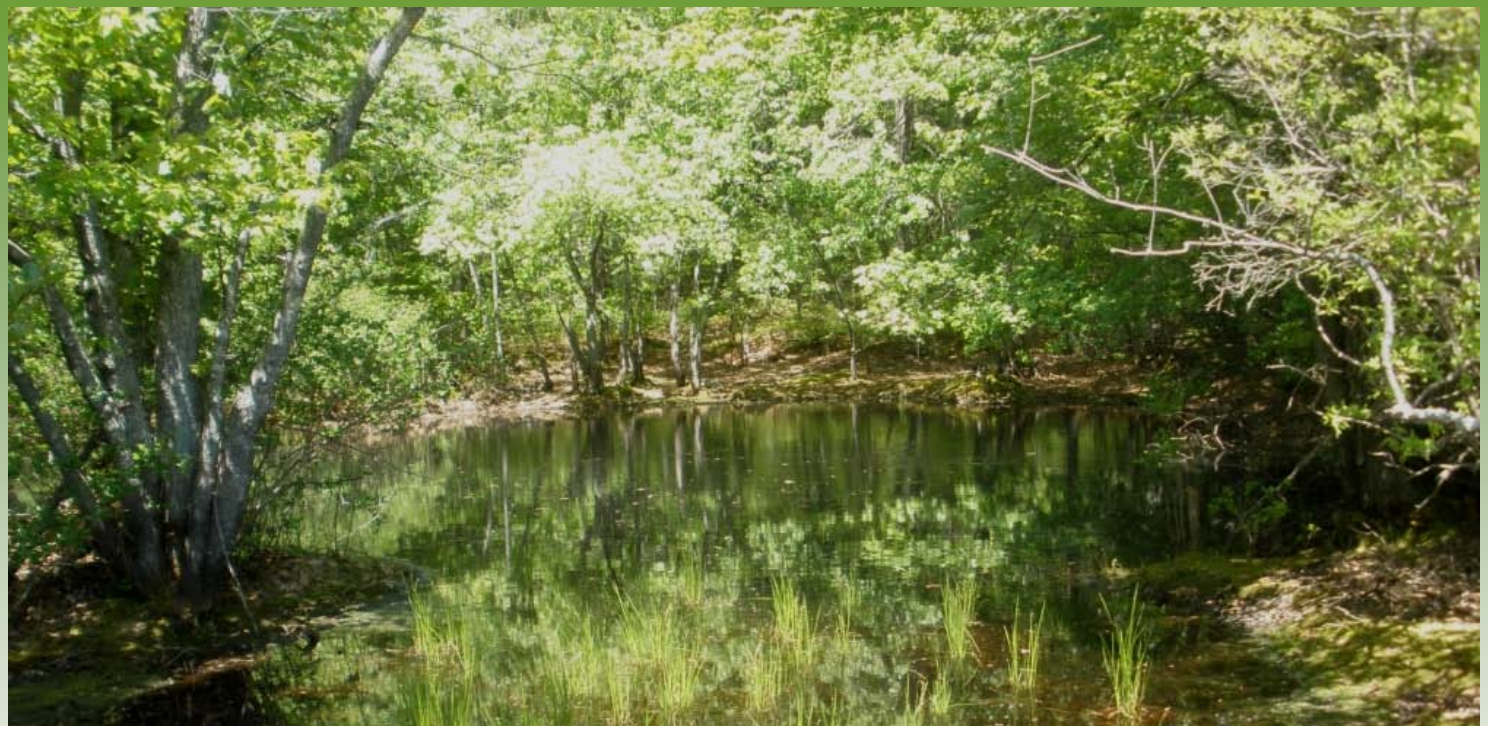
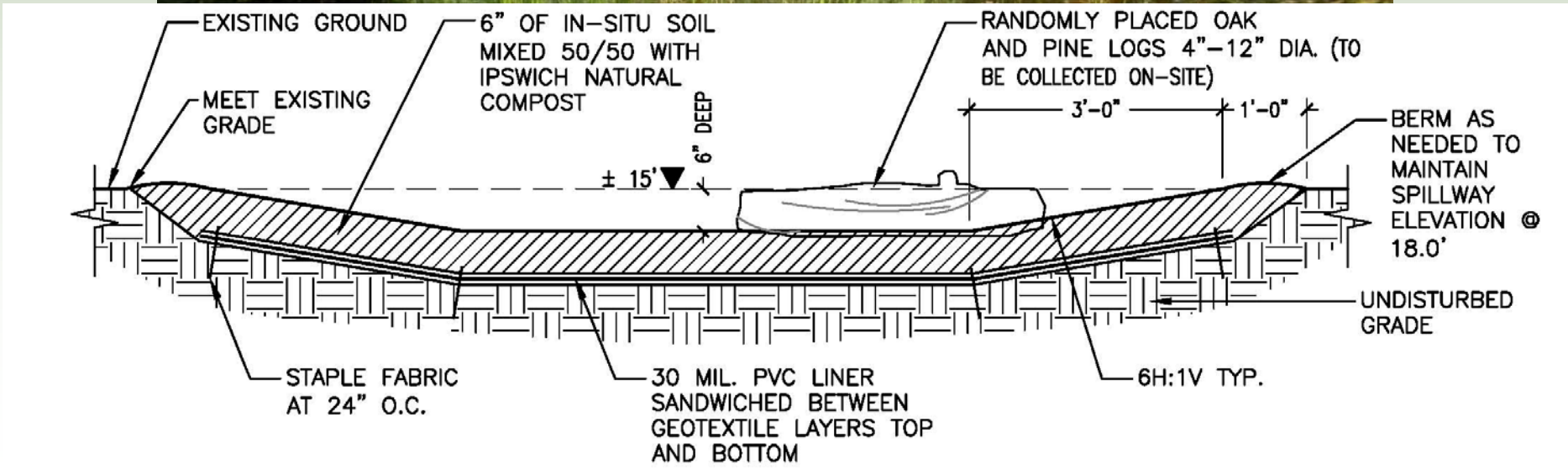
Design Strategy: Vernal Pool Habitat





Vernal Pool Habitat

- Ideal location based on topography and proximity to upland habitat
- Avoid dense emergent vegetation
- Mix soils with inoculant
  - Invertebrates and bacteria present in naturally functioning vernal pool habitat
- Place detritus and limbs from site

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Next Steps

- 95% Drawings and Specifications to CWD and Conservation Commission
- Presentation to Fresh Pond Advisory Board
- Bid Documents in Winter 2010/2011
- Invasive plant monitoring - Spring 2011
- Phase II Restoration plantings – Spring 2011

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Upland Forest Plant Communities

- 17.5 MSL and above
  - Mixed Oak Forest
    - Uplands south-southwest and north-northeast of the pond
  - Oak-Hemlock-White Pine Forest
    - Uplands in the vicinity of existing pine grove

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Mixed Oak Forest

- Moderate nutrient availability
- Typical tree species:
  - Northern Red Oak, Sugar Maple, Beech, Black Birch, White Pine, Hemlock
- Typical shrub/groundcover species: Viburnums, lowbush blueberry, laurel, ferns, wood asters, woodland wildflowers, grasses
- Maximize value-native forest species
  - Manage forest for native bird species (breeding, feeding and resting)
  - Locate random forest openings, snags

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Oak-Hemlock-White Pine Forest

- Shallow soils, nutrient-poor soils
- Typical tree species:
  - Oaks, black birch, black cherry, red maple, hemlock, white pine
- Typical shrub species
  - Blueberries, laurels, winterberry, pipsissewa, native orchids, Canada mayflower, starflower, ferns
- Ideal vernal pool location
  - Migratory birds, small mammals, amphibians

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Riparian Plant Communities

- Red Maple Swamp
  - 15.5 – 17.5 MSL
- Shrub Swamp
  - 15.5 – 16.5 MSL

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Red Maple Swamp

- Shallow to thick organic layer
- Typical plant species:
  - Trees: Red maple dominate; yellow birch; black gum; green ash; white pine; American elm; hemlock; pin oak; and swamp white oak
  - Shrubs: sweet pepperbush and swamp azaleas dominate; highbush blueberry; winterberry; spicebush; speckled/smooth alder
  - Herbaceous: skunk cabbage, cinnamon fern, royal fern
- Dense and well-developed shrub layer provides valuable habitat for wildlife (food, nesting, resting, hiding)

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Shrub Swamp

- Transition between emergent marshes and swamp forests

- Typical shrubs:
  - Speckled alder; smooth alder; highbush blueberry; meadowsweet; sweet gale; swamp azalea; silky dogwood; redosier dogwood; northern arrow-wood; buttonbush; winterberry; maleberry

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Littoral Zone - Shallow Emergent Marsh

- 15.0-16.0 MSL – 0”- 6” water depth
- Hummocky, undulating surface
- Typical plant species:
  - Tussock-sedge; blue flag, Canada blue-joint; bur-reeds; sedges; rice-cut grass; water-lilies; pondweeds
- Excellent habitat for wetland/upland mammals; shorebirds; important habitat for amphibians/reptiles

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Deep Emergent Marsh

- 6-inch to 3-foot water depth
- Typical plant species:
  - Monocots: cattail; woolgrass, common threesquare; Canada bluejoint, rice-cut grass, and tussock-sedge, pickerelweed, arrow arum
  - Dicots: Arrow-leaf hearthumb; bulbet water-hemlock; swamp candles; beggar-ticks; bedstraw; common arrowhead slender-leaved goldenrod; and marsh-fern
- Excellent waterfowl habitat, important reptiles, amphibians, marsh/wading birds and ducks

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Cowardin Deep Emergent Marsh

- Named according to Cowardin classification (USFWS – Classification of Wetlands and Deepwater Habitats in the United States)
- 3-foot to 6-foot water depth
- Aquatic plants: floating leaved, rooted submergent, unrooted submergent
  - White pond lily, Spadderdock, *Potomogeton*

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