



Habitat Improvements to the Motor Island Shoreline in the Upper Niagara River, NY: A Collaborative Approach

Edward Alkiewicz¹, Stephen Schoenwiesner¹, Jeff Gerlach¹,
Morris Perot², Scott Ault², Mark Bowen², and Alan Haberstock²

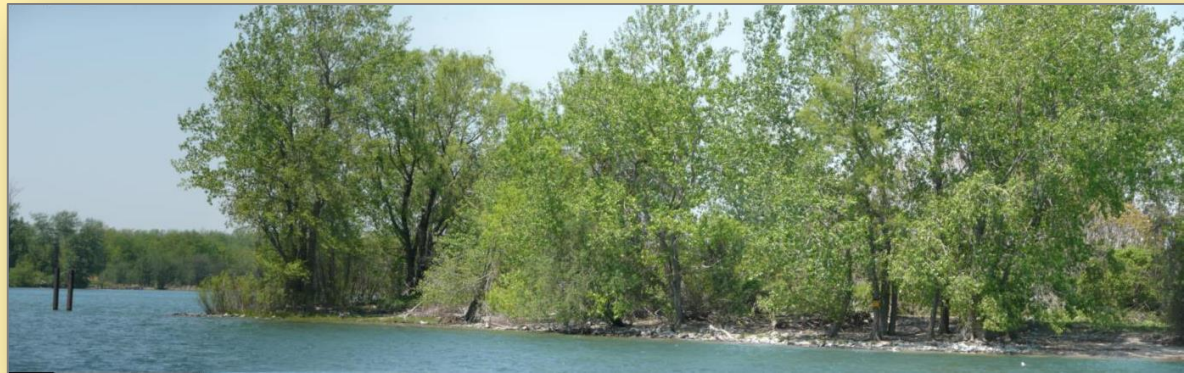
New York Power Authority¹ and Kleinschmidt Associates²

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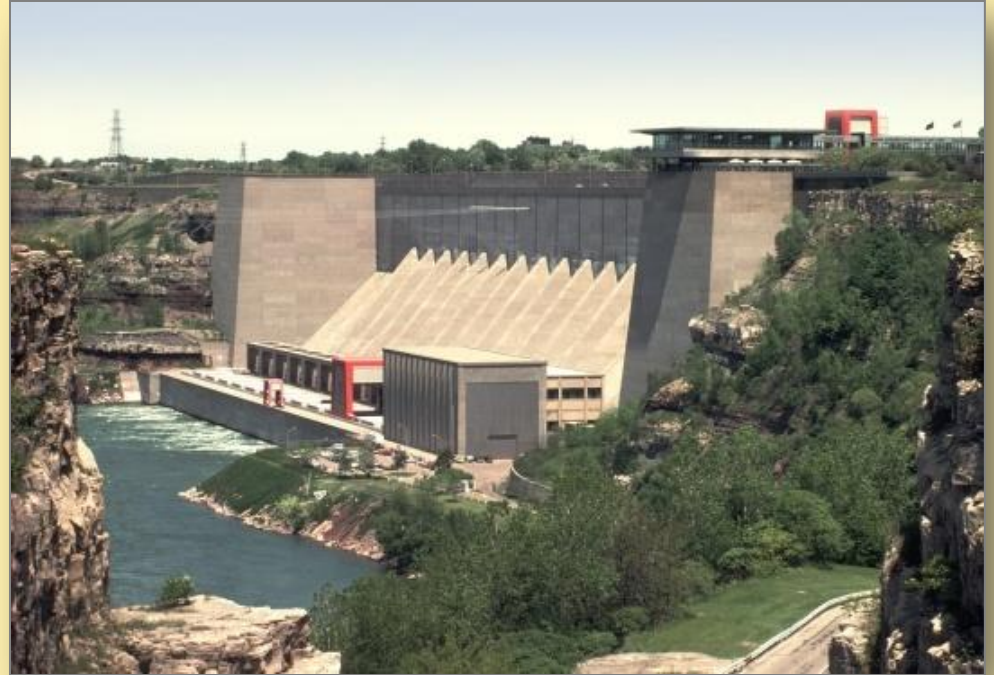
Motor Island – Outline

- Background
 - Impetus and collaborative approach
 - Project objective
 - Island history
- Collaborative design process
 - Design considerations
 - Basis for design
 - 3-Part design approach
 - Proposed habitat improvements
- Project status
- Take home



Impetus for the Project

- In 2005, the Niagara Power Project applied for a new FERC license (received 2007)
- Collaborative stakeholder process developed Settlement Agreement; calls for series of habitat improvement projects
- Ecological Standing Committee
 - NYPA, USFWS, NYSDEC, NYSDOS
 - Seneca Nation of Indians, Tuscarora Nation, Tonawanda Seneca Nation
 - New York Rivers United, Niagara Relicensing Environmental Coalition



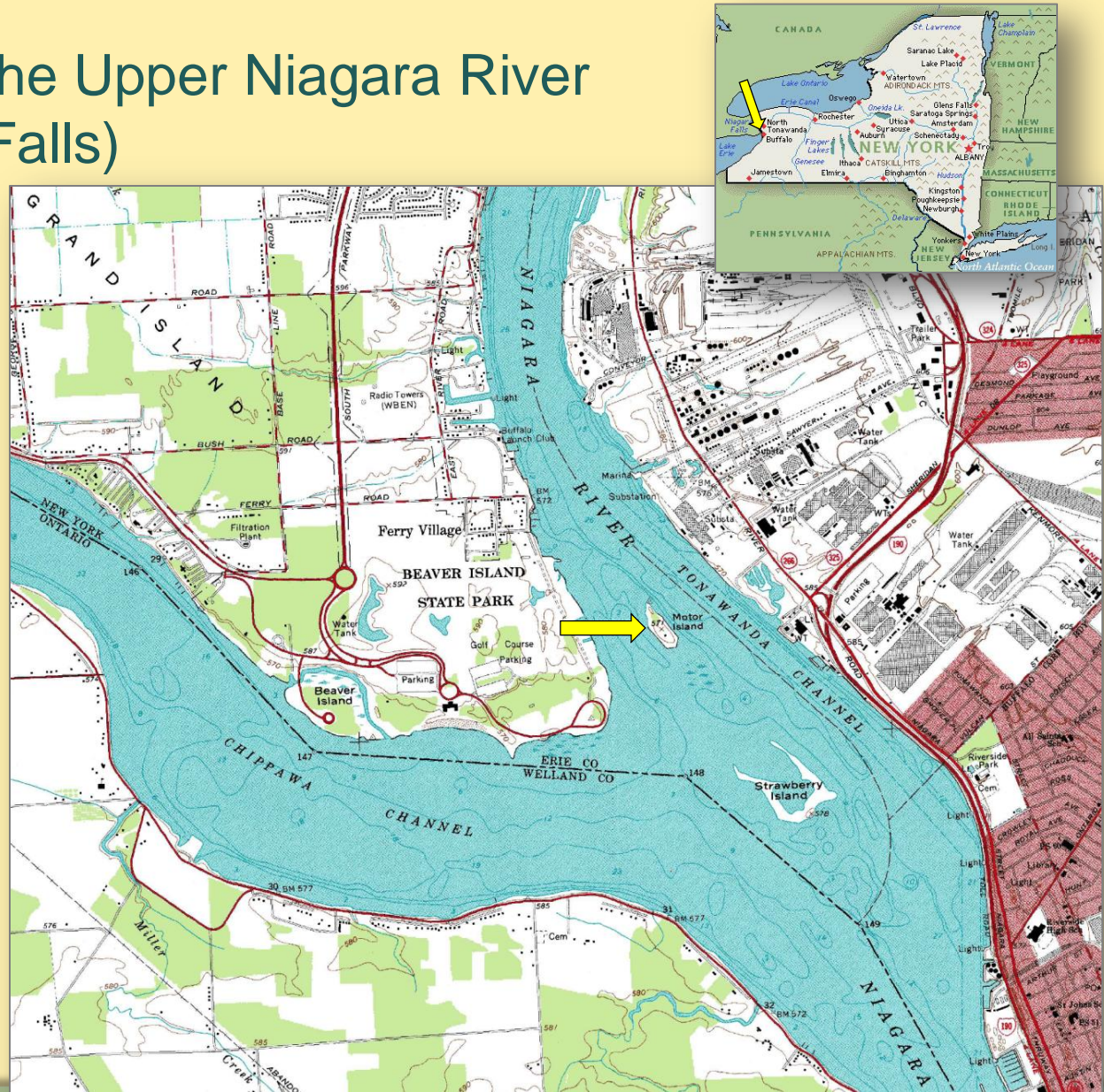
Collaborative Design Approach

- Continued collaborative stakeholder involvement
- ESC assigned advisory and design review role
 - Working meetings
 - Consultation
 - Consensus approval
- ESC/Agency involvement throughout the project
 - Establish and refine objectives
 - Local knowledge and expertise
 - Landowner and resource consultation – historic, RTE, etc.
 - Design review – 10%, 50%, 90% stages
 - Permitting



Motor Island Location

- 6-acre island in the Upper Niagara River (above Niagara Falls)
- Part of State-Designated Significant Coastal Fish and Wildlife Habitat area



Motor Island

- State-owned; managed by NYSDEC for wildlife habitat
- Used as boat club in early 1900s
 - Tennis courts
 - Boat slips
 - Chimney
 - Sidewalks
 - Building



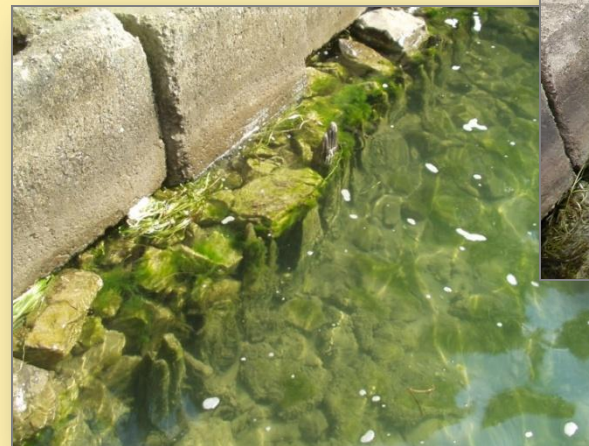
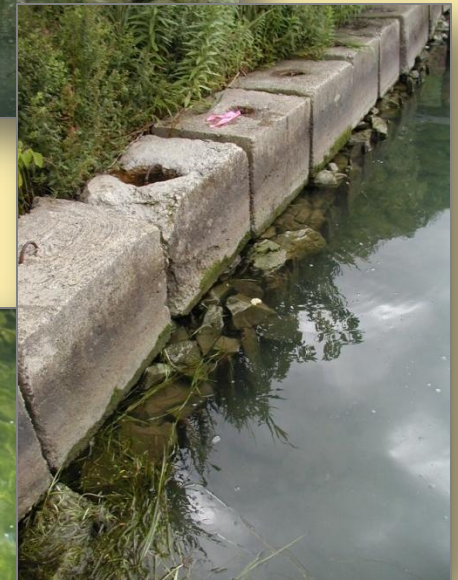
Erosional Forces

- Wind
 - Fetch = 1.25 miles from SW
 - Winds >50 mph every year
- Waves
 - >2 ft trough to crest
 - Storm surge ~4 ft above normal water levels
 - Large vessel wakes
- Ice
 - 2 – 3 ft thick



Motor Island Shoreline Stabilization History

- Early 1900's – crib wall built
 - Vertical timber face backfilled with riprap
- 1980s –
 - Concrete blocks placed along top of crib wall

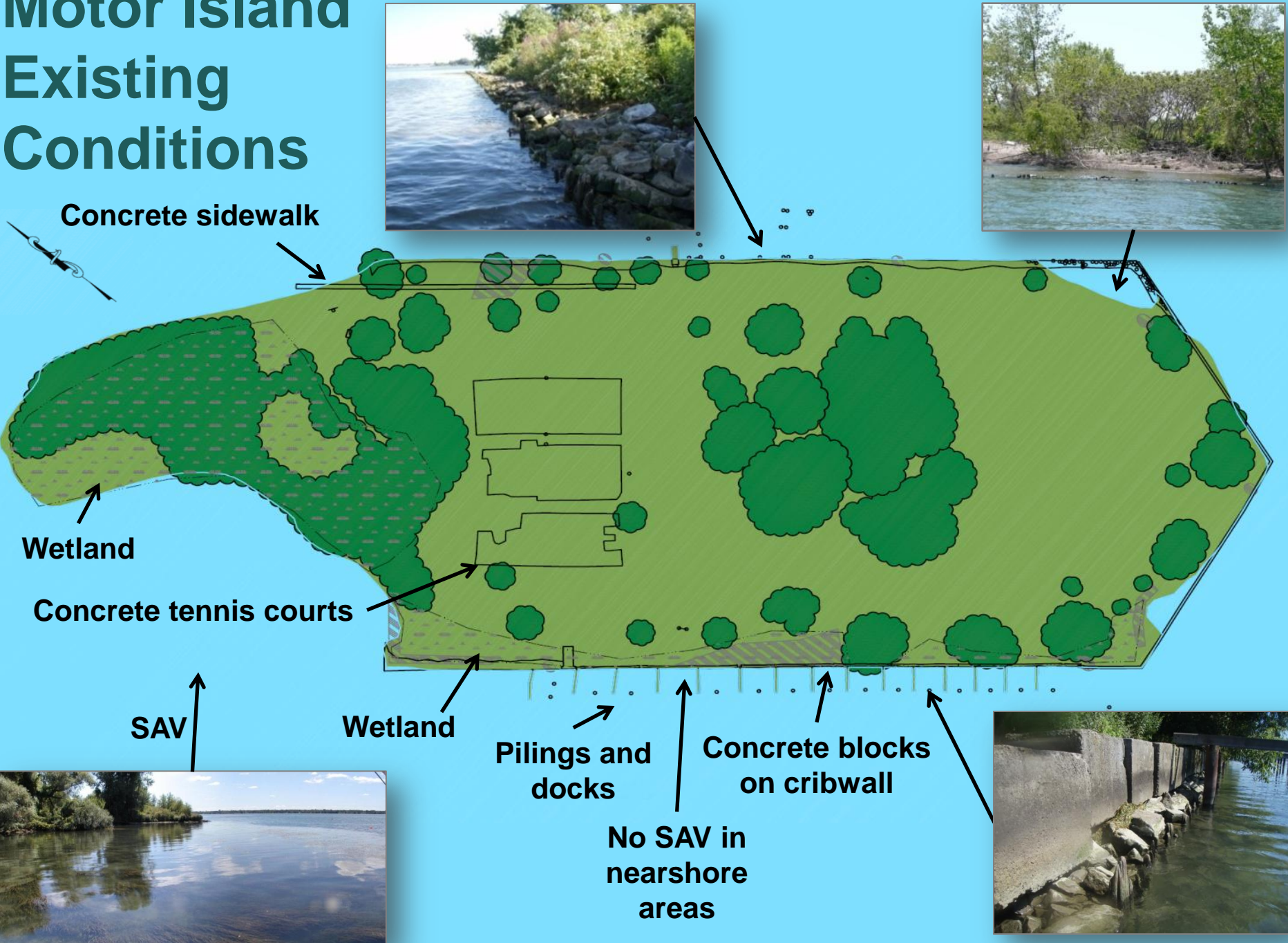


Motor Island Existing Conditions

- Protected habitat for colonial nesting birds (egret, heron)
- Wild celery beds valuable for water birds, muskellunge, smallmouth bass
- Managed wildlife habitat
- Limited public use



Motor Island Existing Conditions



Project Objective

- Original objective – maintain shoreline protection and avoid SAV and fish impacts
 - Sheet pile design concept



- Since 2007 – ESC and NYSDEC broadened focus to include gradual shoreline transitions to increase ecological diversity

Design Considerations

- Shoreline Protection
 - Dissipate wave energy
 - Prevent ice damage
- **Habitat Goals (Collaborative)**
 - Increase topographic variability
 - Greater habitat diversity and complexity in aquatic, wetland and riparian areas
 - Control invasive plants
- Construction Limitations
 - Limit environmental impact
 - Ice and severe winter weather
 - Biological exclusion period (April to July 15)
 - Benefit/cost

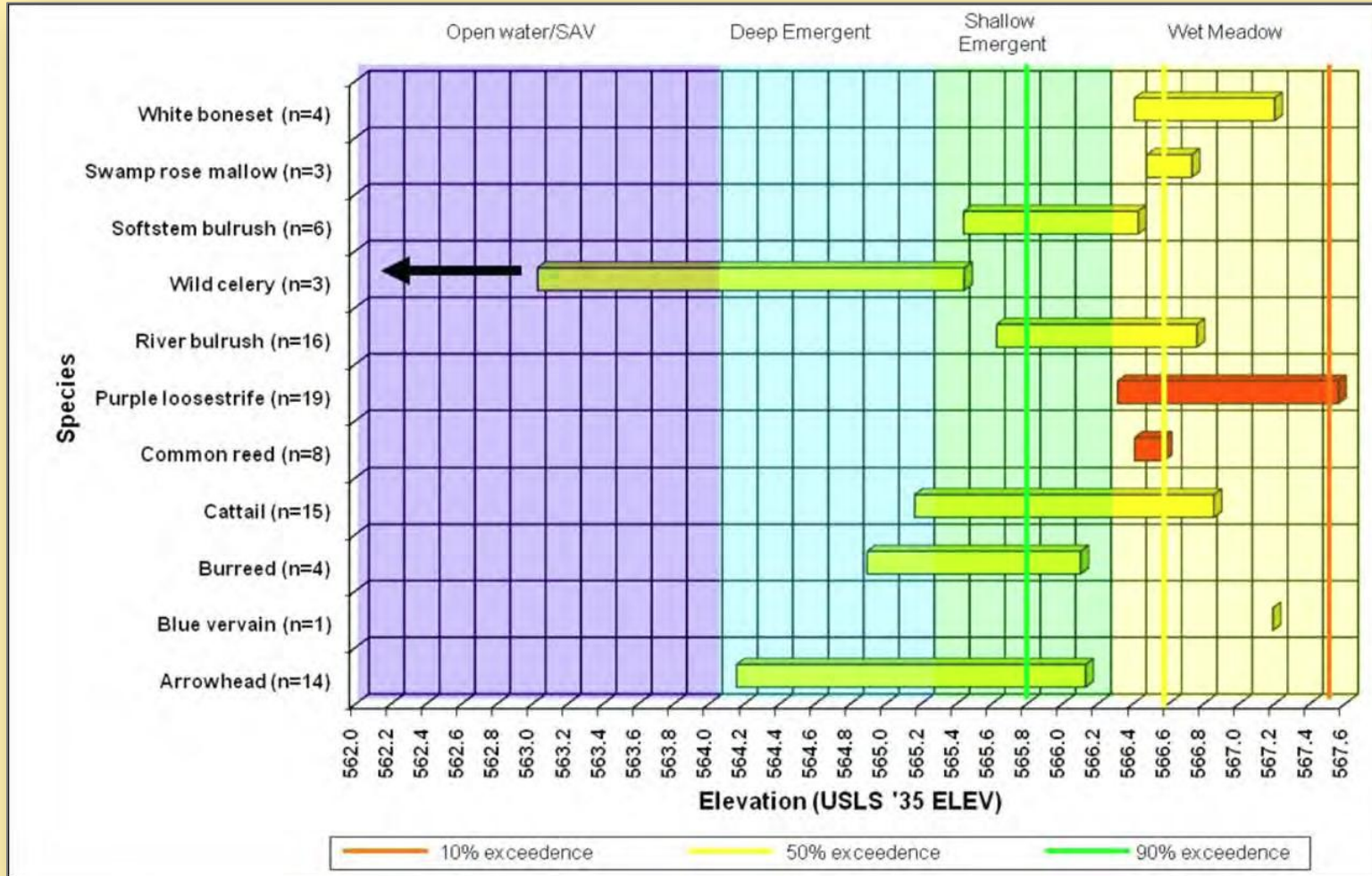


Basis for Design

- Ice damage is largest threat to the design
- Field surveys to identify
 - Reference conditions
 - Existing conditions
 - Wetlands and SAV
 - Invasives
 - RTE species
 - Soils/geotechnical survey
 - Archaeological Phase 1B survey
 - Appropriate armor size
- Small shoreline scallops for protected transitional habitat
- **ESC and NYSDEC input to refine design**
 - Expertise and local knowledge



Reference Vegetation Survey



3-Part Design Approach

Location Specific Enhancements

1. Grade shoreline to dissipate wave energy, create habitat pools and transitional slopes
 - Low-profile berms, scallops, wave runup zone, riparian pockets
2. Bioengineering to protect soils
 - Stone, coconut fiber coir logs and matting, live stakes and posts, ice protection boulders
3. Habitat features
 - Willow logs, rootwads, protected pools
 - Native plantings – seed, herbaceous plugs, shrubs, and trees based on localized observations of species and elevation ranges

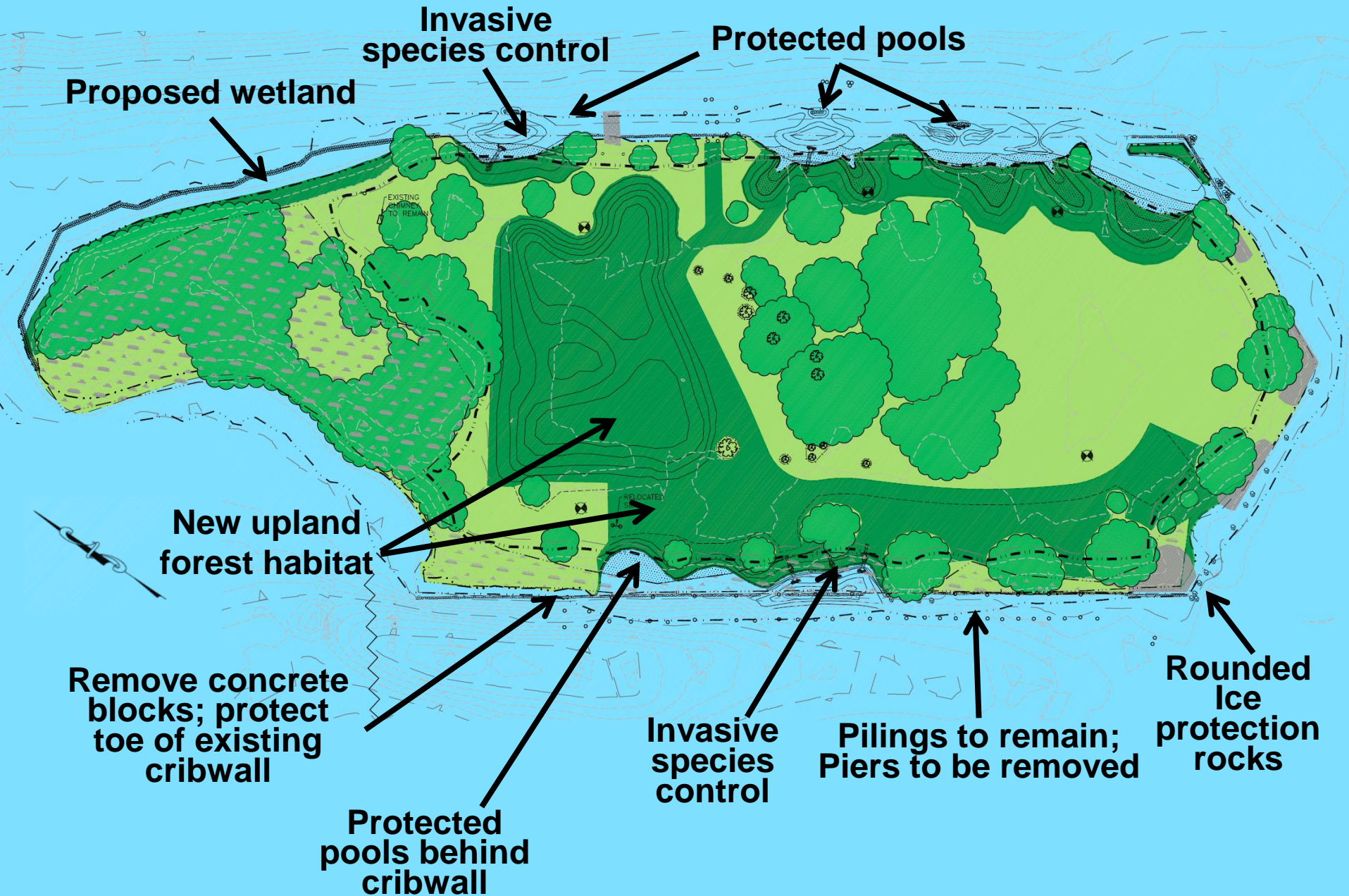


Habitat Enhancement Zones

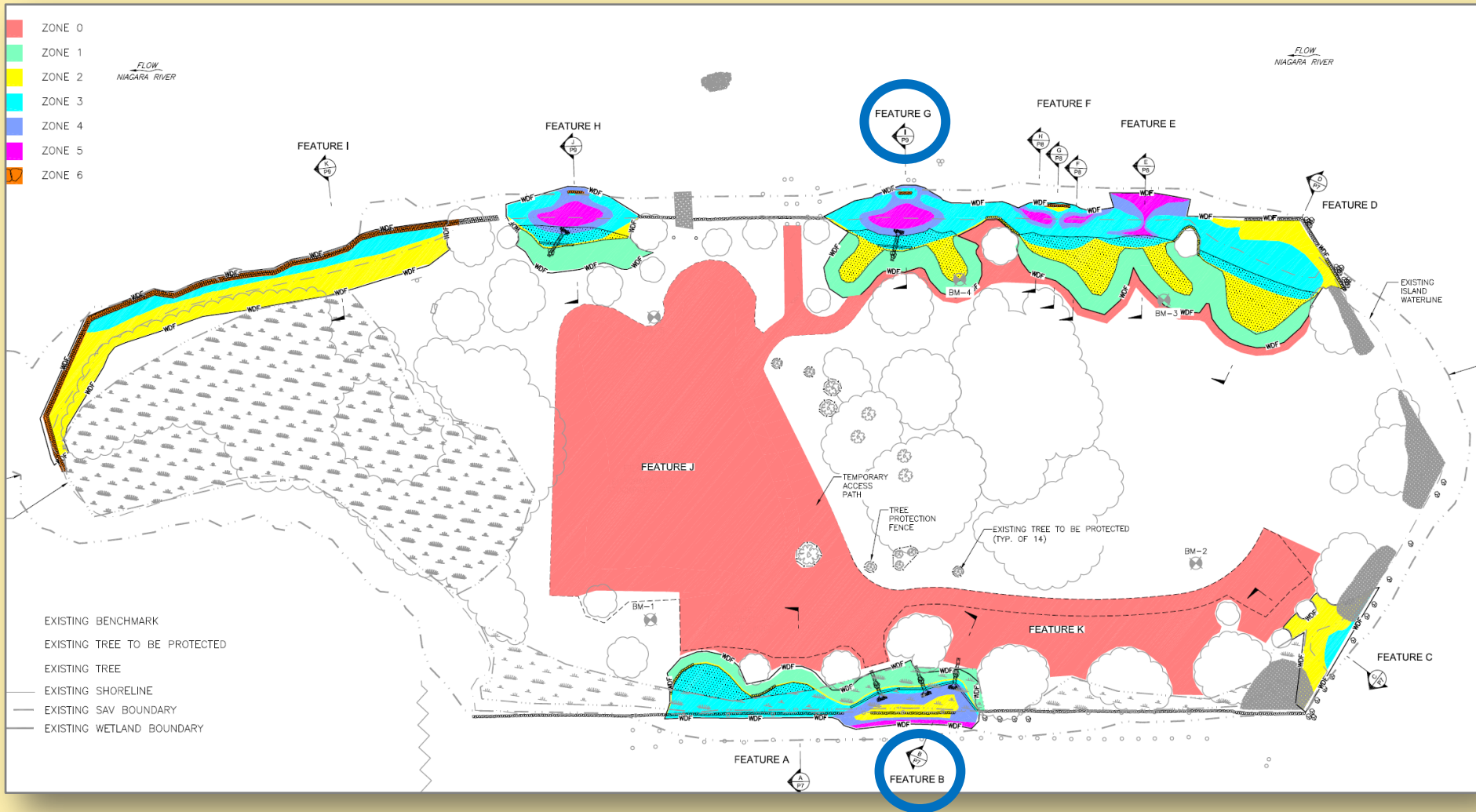
Location Specific Enhancements

ZONE		HABITAT	REPRESENTATIVE SPECIES
0	UPLAND	Upland trees and grasses over spoils/tennis court	Staghorn sumac, box elder, red oak
1	RIPARIAN	Native riparian trees, shrubs, herbs	Red and silver maple, chokeberry, bayberry
2	SHORELINE	Wetland shrub vegetation in cobble substrate along shoreline and in breakwaters	Willows and red-osier dogwood
3	SHALLOW EMERGENT	Shallow emergent marsh and cobble beach.	Hardstem & softstem bulrush, giant bur-reed
4	DEEP EMERGENT	Deep emergent marsh and cobble beach.	Pickerel weed, arrowhead, hardstem bulrush
5	DEEP POOL	Deep pool	Natural colonization
6	LOW-PROFILE BERM	Unvegetated low-profile berm	Natural colonization

Proposed Habitat Improvements



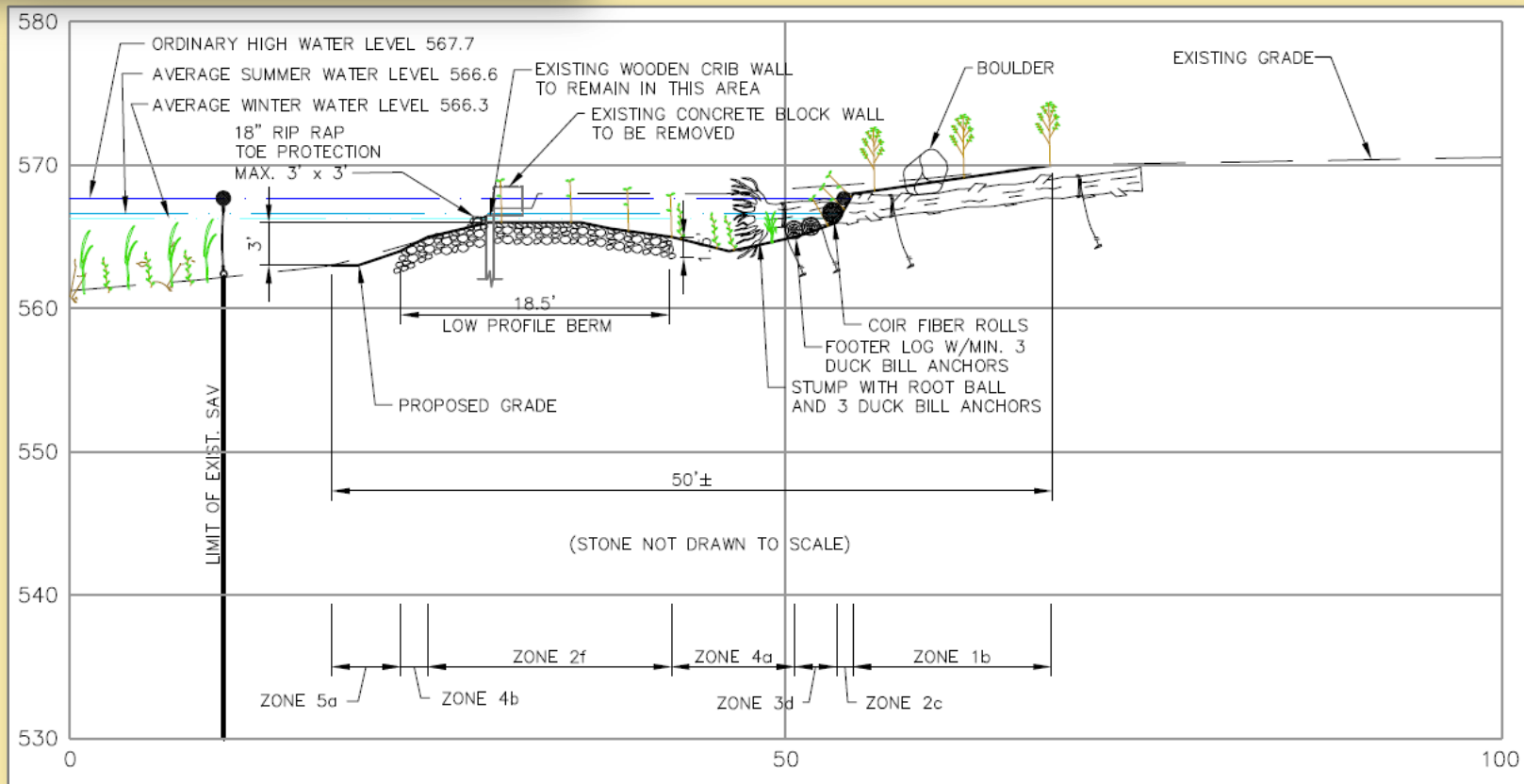
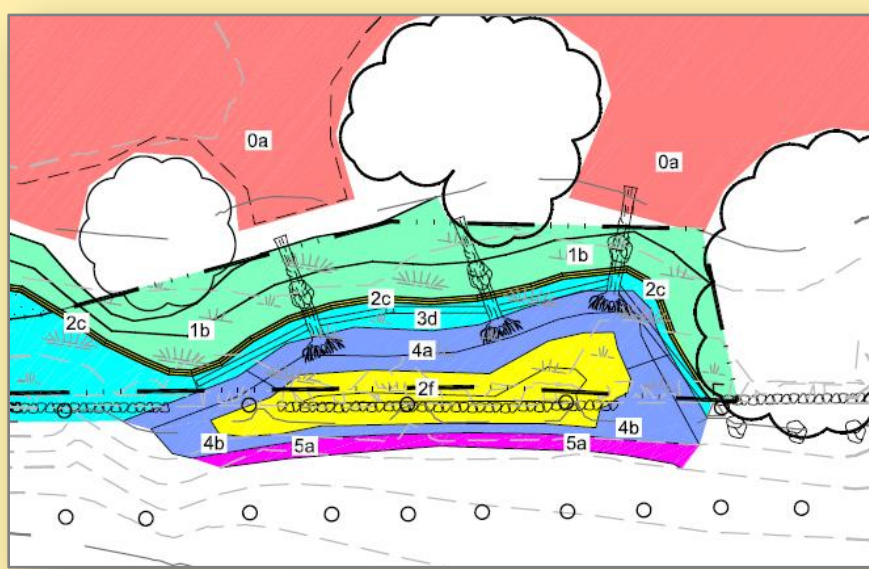
Motor Island Proposed Design



- 11 habitat features (2.52 acres) – deep pool, emergent, wetland, riparian, meadow and reforestation

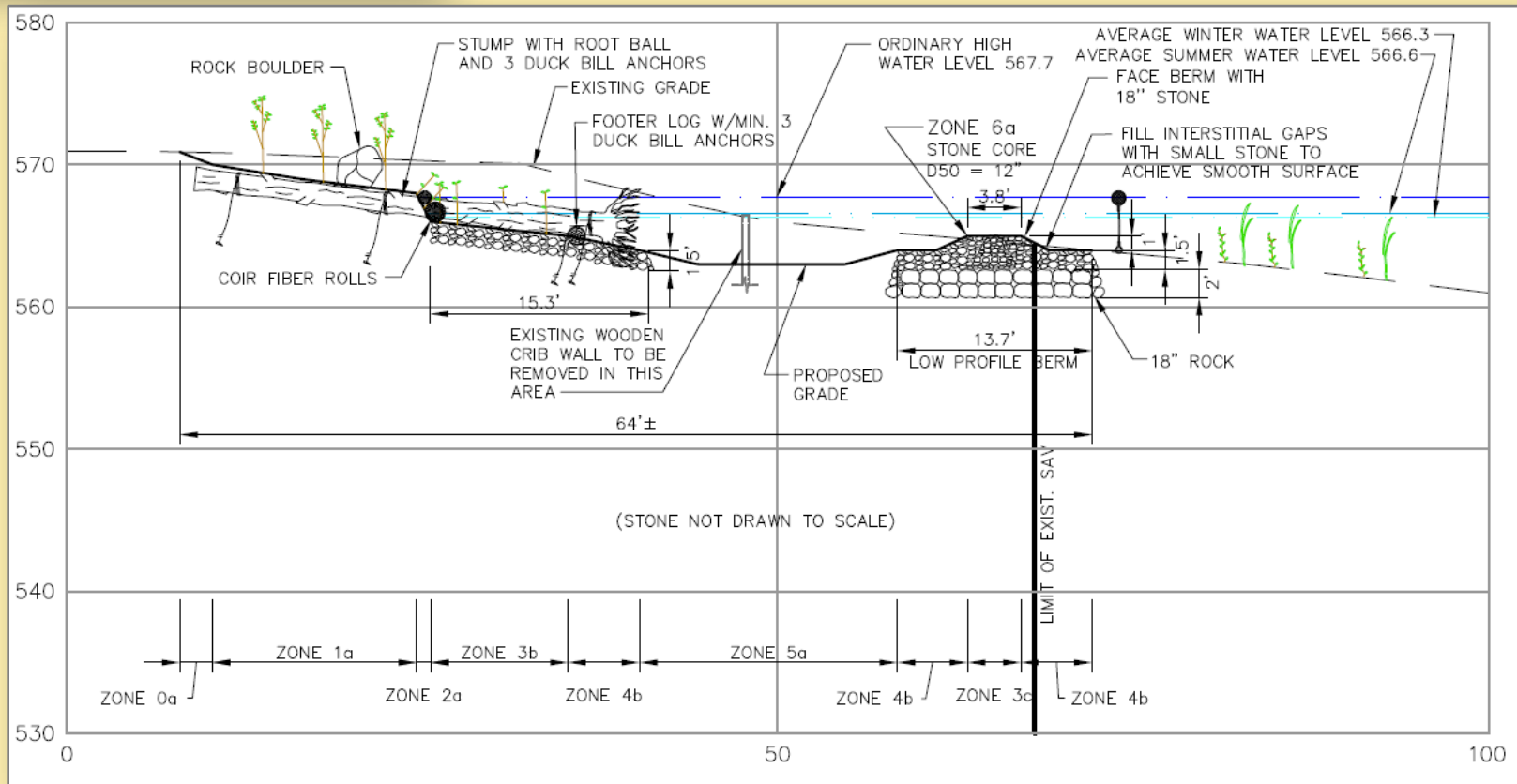
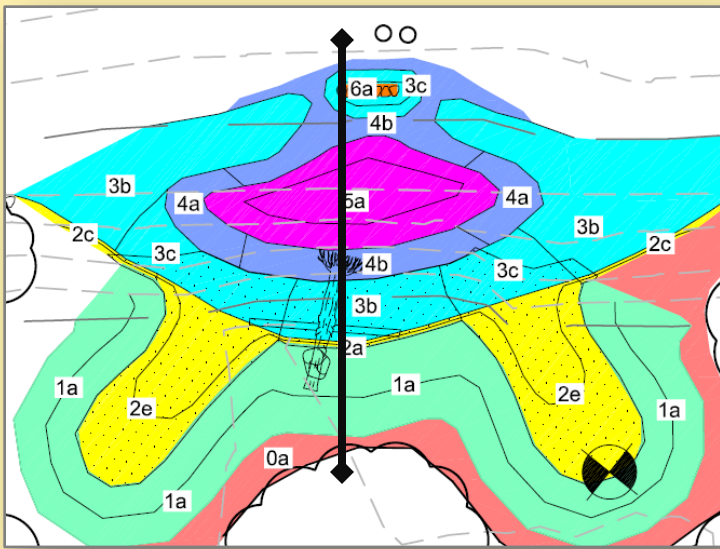
Motor Island – Feature B

- Protected pool with emergent habitat
- Root wads, coir fiber logs, live stakes



Motor Island – Feature G

- Protected pool with deep pool and emergent habitat
- Wetland and riparian habitat
- Root wads, coir fiber logs, live stakes



Project Status

- Project will benefit 2.52 acres of open water, existing and created wetland, riparian reforestation, and upland shrub meadow habitat
- Submitted Joint Permit Application May 2011
 - USACE, Buffalo District
 - NYSDEC
 - NYSDOS
- Preparing specifications and RFP package
- Target construction dates
 - Excavation – late-July to October 2012
 - Planting – mid-March to mid-July 2013



Take Home

- Collaborative design process:
 - Takes longer
 - Coordination and manage focus
 - Leads to much better projects (greater ecological benefits)
 - Vast resource of local knowledge, history, and experiences
 - Extensive expertise contributed by resource managers
 - Fosters greater stakeholder buy-in

