The Role of Wetlands in Reducing Pollutant Loading to Lakes: A Case Study in Wayne County, PA

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New York State Federation of Lake Associations
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Purpose of Presentation

- Provide information on the ecological value of wetlands and a case study on the benefits of conducting wetland enhancement

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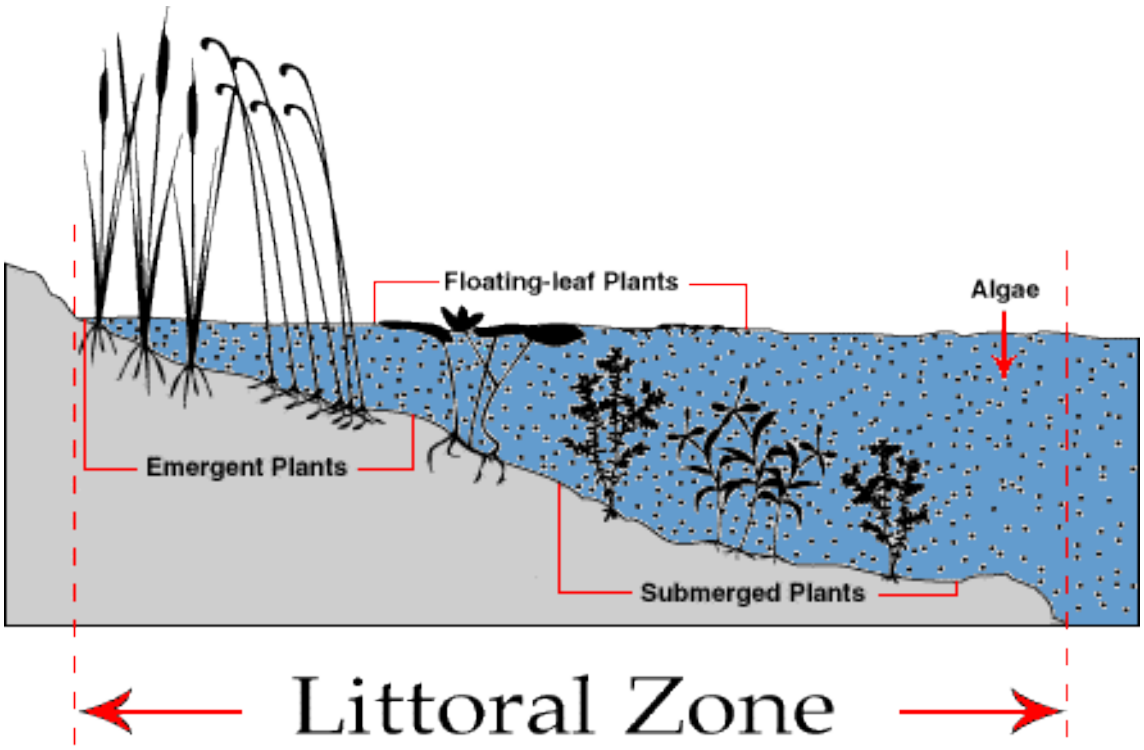
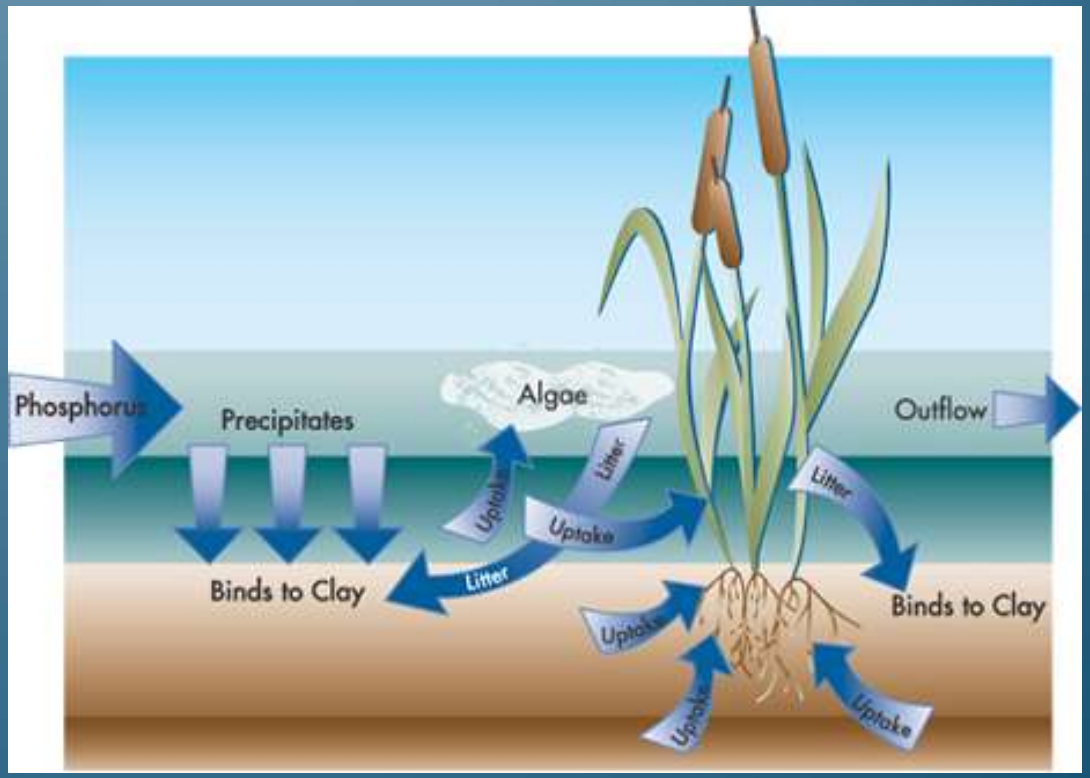
Littoral Zone of a Lake



The "Ecosystem Value" of Wetlands

- Wetlands provide valuable habitat, food and cover for a variety of organisms, including many gamefish
- Wetlands can "lock in" or bind up nutrients that would otherwise go to nuisance algae
- Infiltrate and absorb stormwater
- Wetlands settle out solids
- Stabilize the sediments and the shoreline
- Increase overall biodiversity of a lake ecosystem



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Natural, fringe wetlands

Constructed wetlands (pocket wetland)

Water Depth is Key in the Development of a Successful Stormwater Wetland Treatment System

Table H.1 Hydrologic Zones		
Zone #	**Zone Description**	**Hydrologic Conditions**
Zone 1	Deep Water Pool	1-6 feet deep Permanent Pool
Zone 2	Shallow Water Bench	6 inches to 1 foot deep
Zone 3	Shoreline Fringe	Regularly inundated
Zone 4	Riparian Fringe	Periodically inundated
Zone 5	Floodplain Terrace	Infrequently inundated
Zone 6	Upland Slopes	Seldom or never inundated

TP and TSS removal of Wetland Best Management Practices (BMPs)

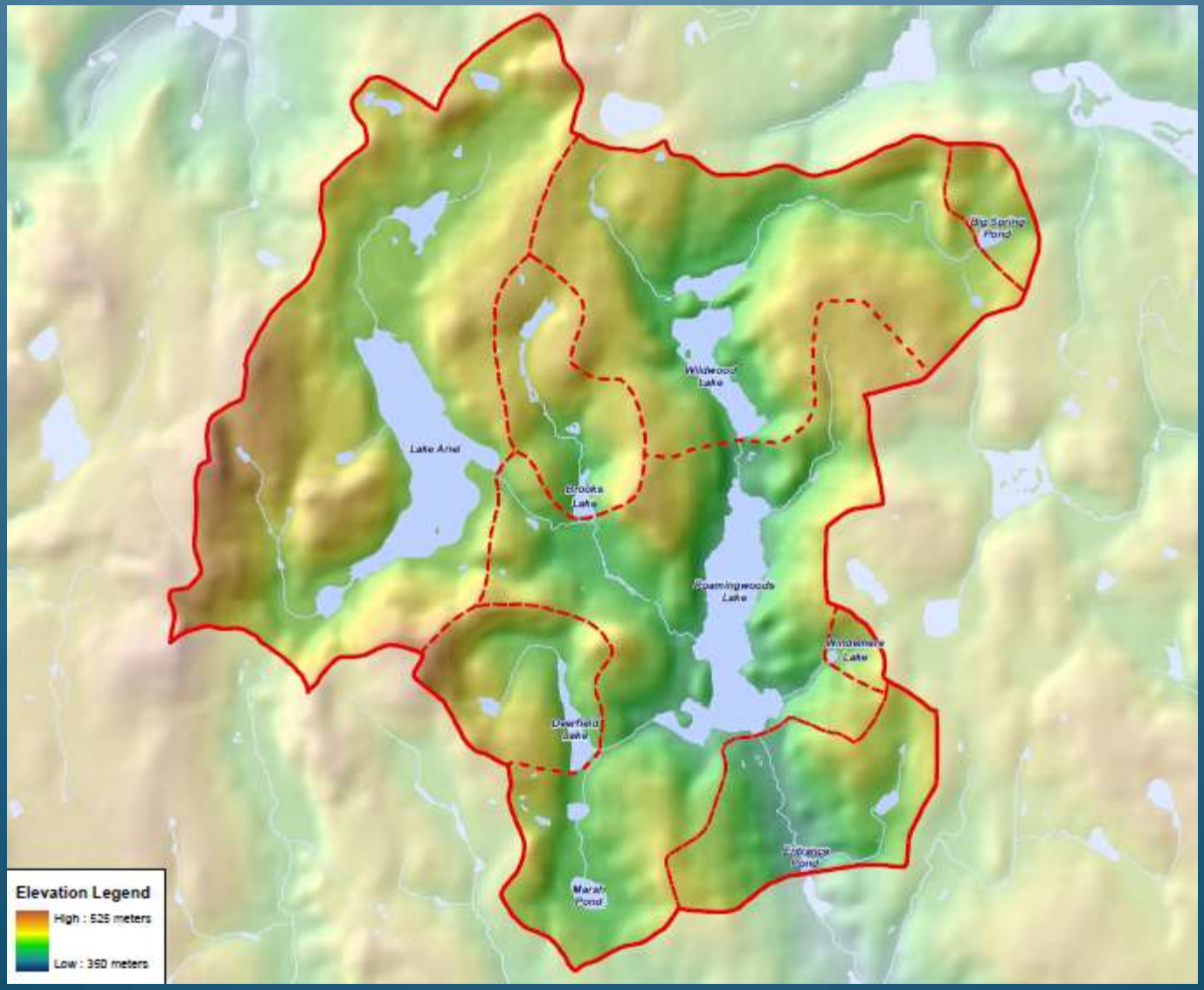
- **NYS DEC** – 50% for TP 80% for TSS
- **NJDEP** – 50% for TP 90% for TSS
- **PA DEP** – 85% for TP 85% for TSS
- **US EPA** – 39 to 64% for TP
  69 to 83% for TSS

The Hideout, Wayne County, PA

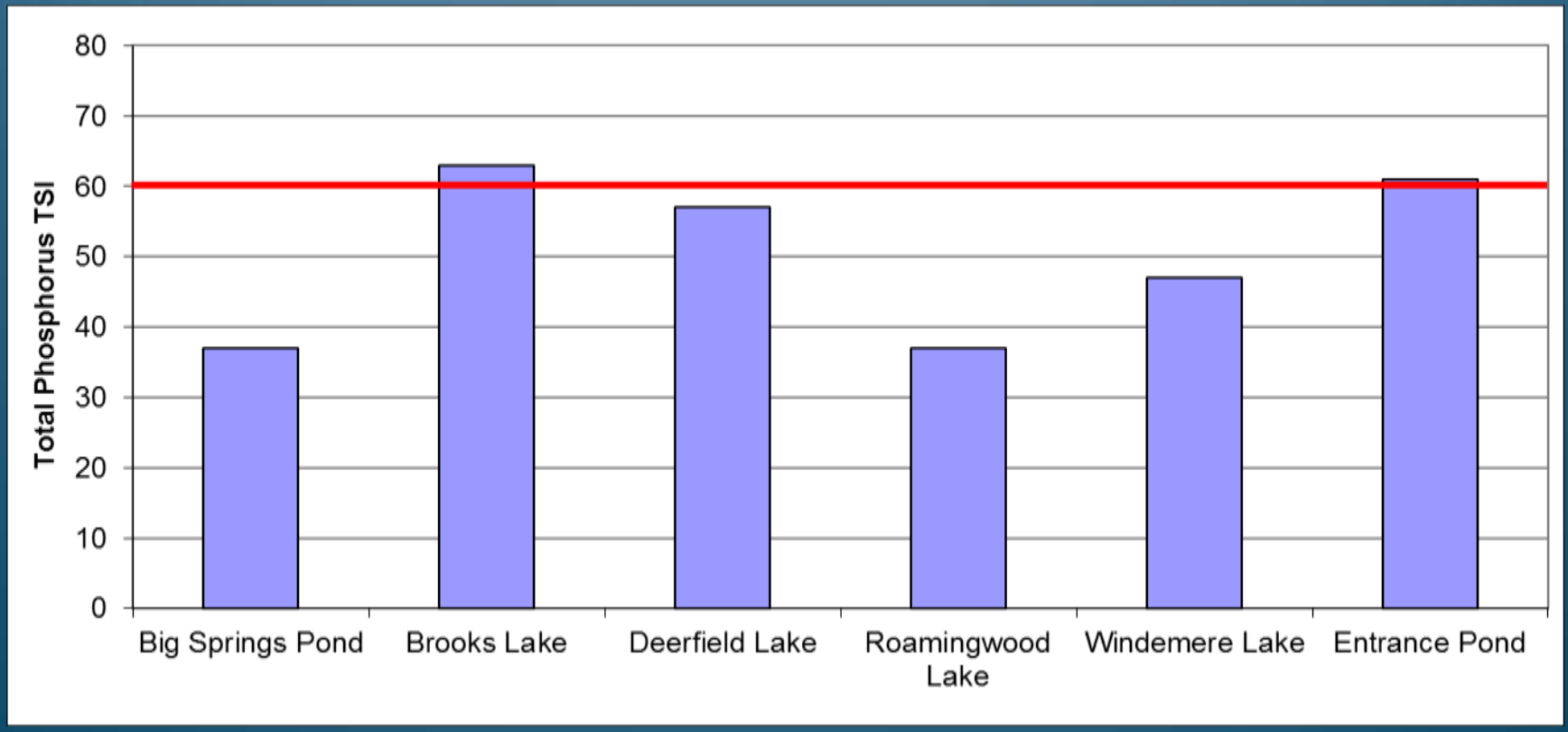
- The Hideout is a private community located in northeastern PA
- The community consists of approximately 3,000 families
- The community has a number of resources including a series of lakes and ponds
- Approximately 250 acres of woodlands
- Over 40 miles of roads to maintain

The Hideout – Property Boundaries

The Hideout – Watersheds



Total Phosphorus TSI for the Lakes at the Hideout



Projects at Deerfield Lake (2010 – 2014)

- Planting of trees northern end of lake
- Aeration system
- Installation of three Floating Wetland Islands
- Stocking with sterile grass carp (2011 and 2014)
- Selective use of Truxor to harvest vegetation not grazed by carp
- Limited use of PhosLock
- Limited use of aquatic pesticides
- Selective dredging of approx. 3,000 cubic yards

Projects at Brooks Lake (2010 – 2014)

- Planting of trees northern end of lake
- Aeration System
- Installation of Floating Wetland Islands
- Use of PhosLock
- Limited harvesting of shoreline reed Canary grass
- Selective dredging in 2015

Projects at Roamingwood Lake (2010 – 2014)

- Selective use of Truxor for nuisance vegetation
- Stocked the lake with sterile grass carp (2012 and 2014)
- Limited use of aquatic pesticides
- Fishery surveys (conducted on all three lakes)
- Shoreline / streambank stabilization project (partially grant funded)

Stocking Lakes at the Hideout with Sterile Grass Carp

Mechanical Harvesting (Truxor DM5000)

Mechanical Harvesting (Truxor DM5000) – The Hideout

Hydraulic Dredging at Deerfield Lake

Floating Wetland Island at Brooks Lake (2012)

Roamingwood Lake Shoreline Stabilization (PALMS grant)

Roamingwood Lake Shoreline Stabilization (PALMS grant)

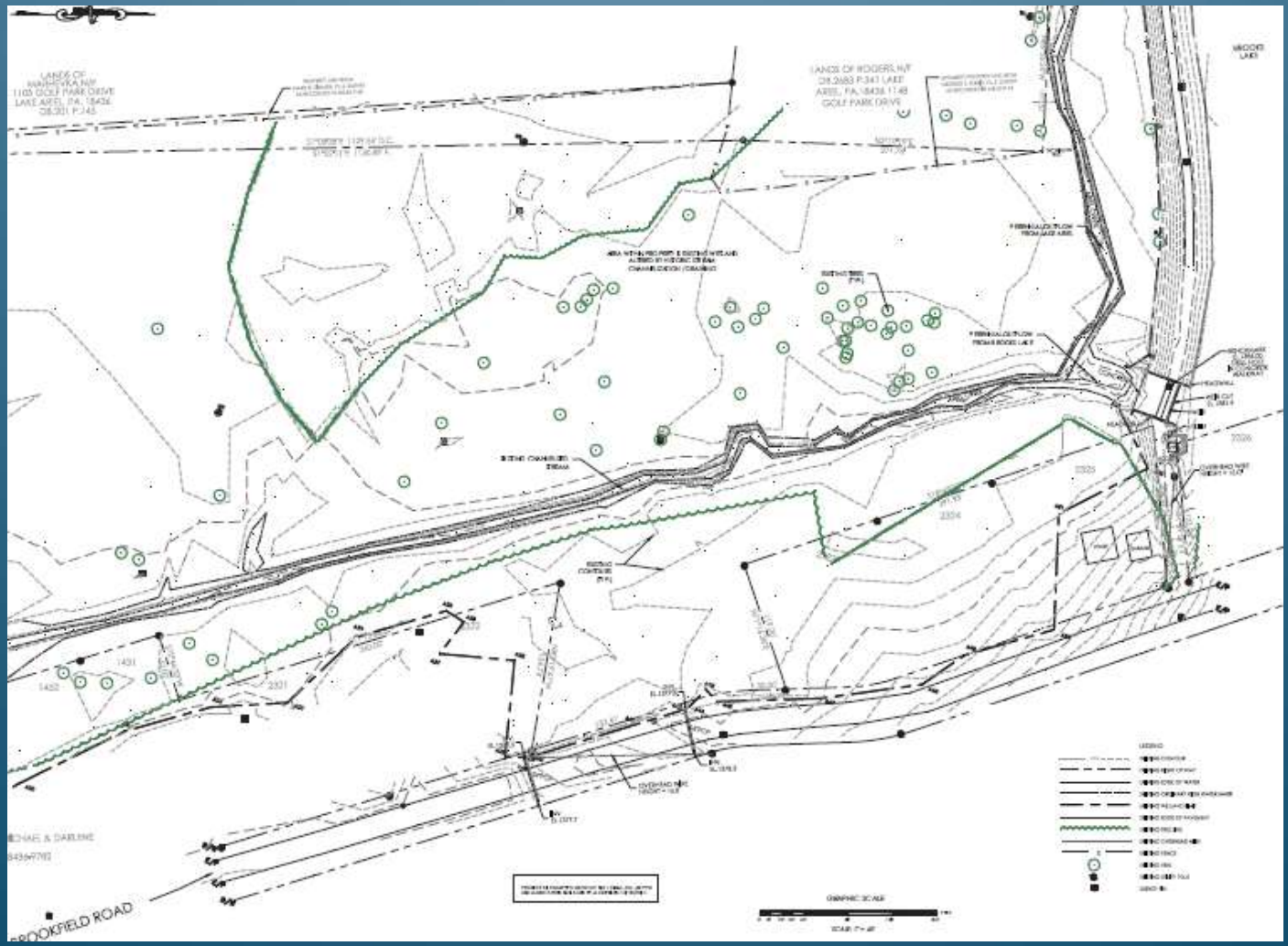

S1
B1
B2
S2
S3
R1
R2
R3
R4
S4
R5
D1
R8
R6
R7
D2

Proposed Wetland Enhancement Project

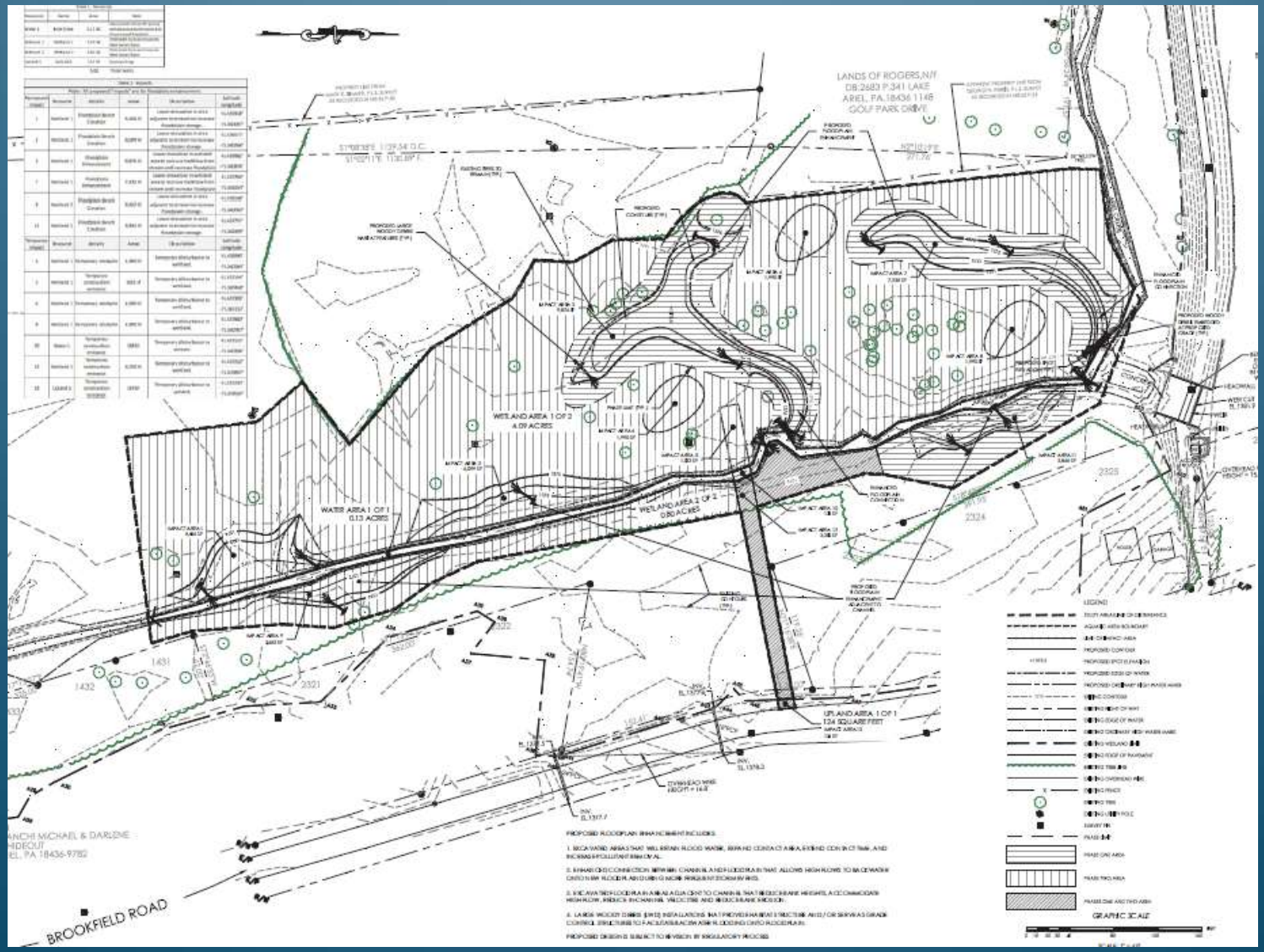
1959

2005

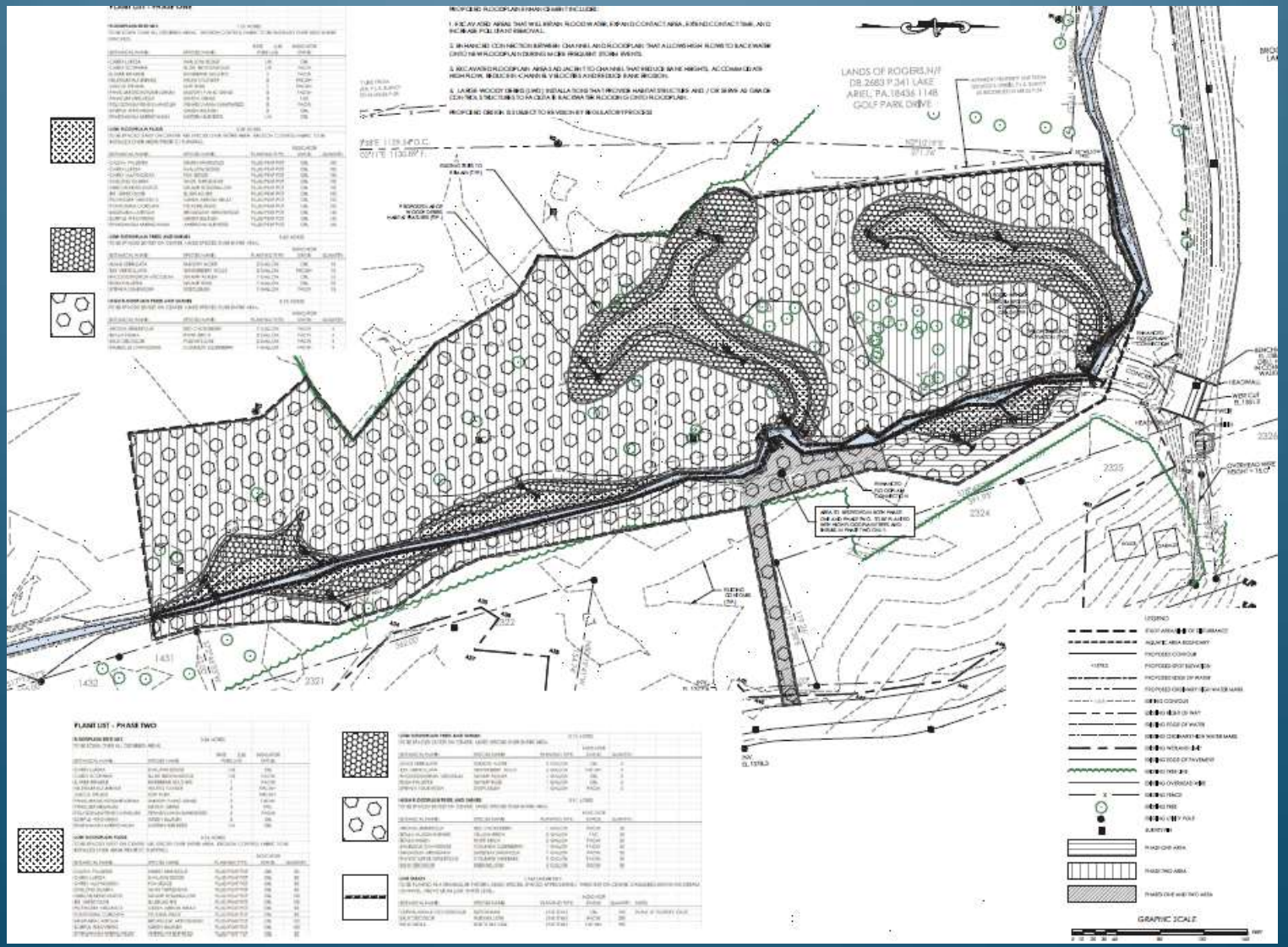
Existing Conditions



Proposed Conditions



Proposed Planting Plan



After first Set of Treatments (spring 2013)

Tract 29 Project Site (early October 2013)

Pre-construction site conditions (October 2013)

During construction – grading floodplain enhancement channels

During construction –stabilizing floodplain enhancement channels

Post-construction – adjacent low-lying floodplain areas working as designed

Post-construction planting of trees in upland areas (2013)

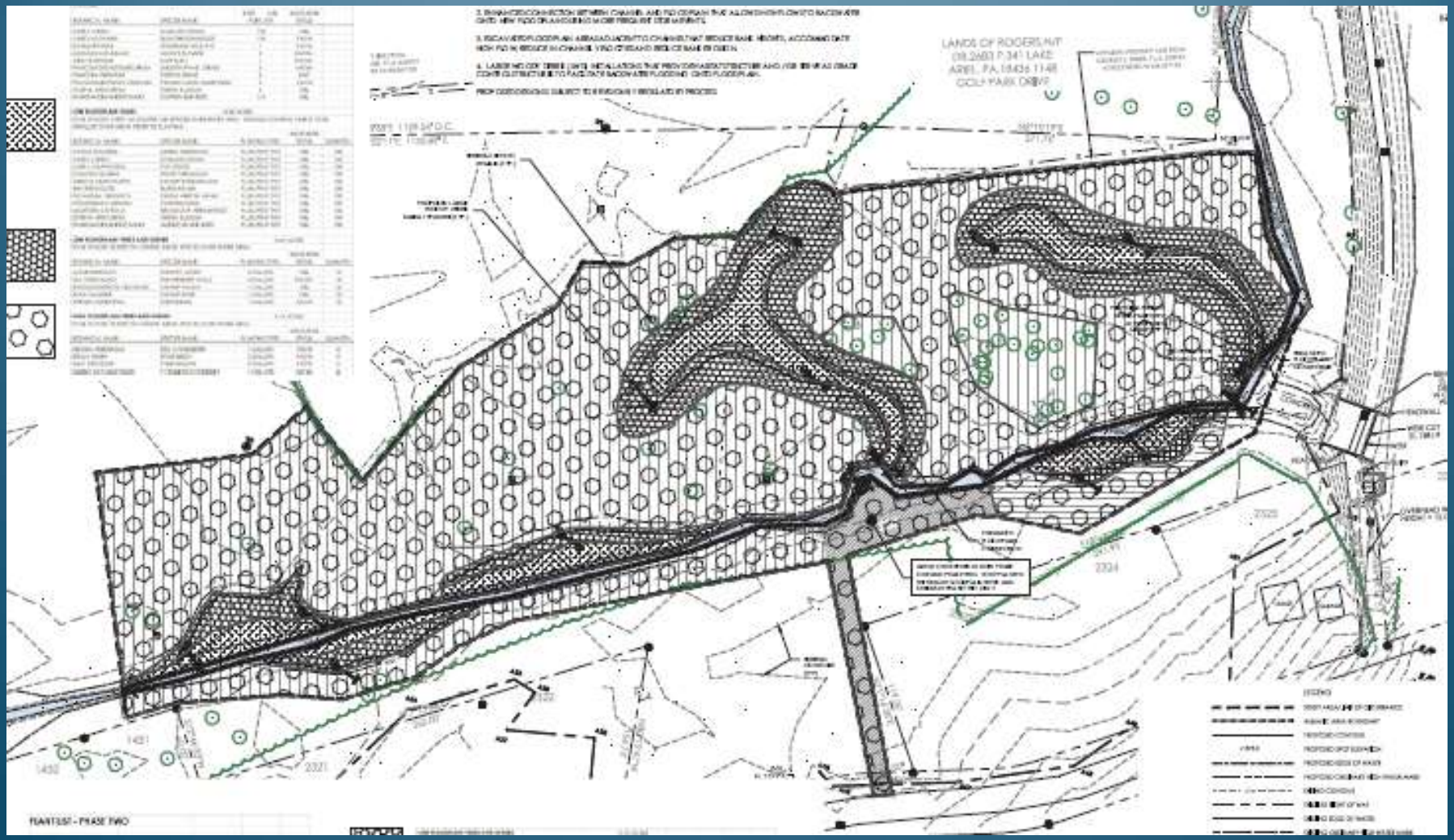
Planting of Live Stakes (April 2014)

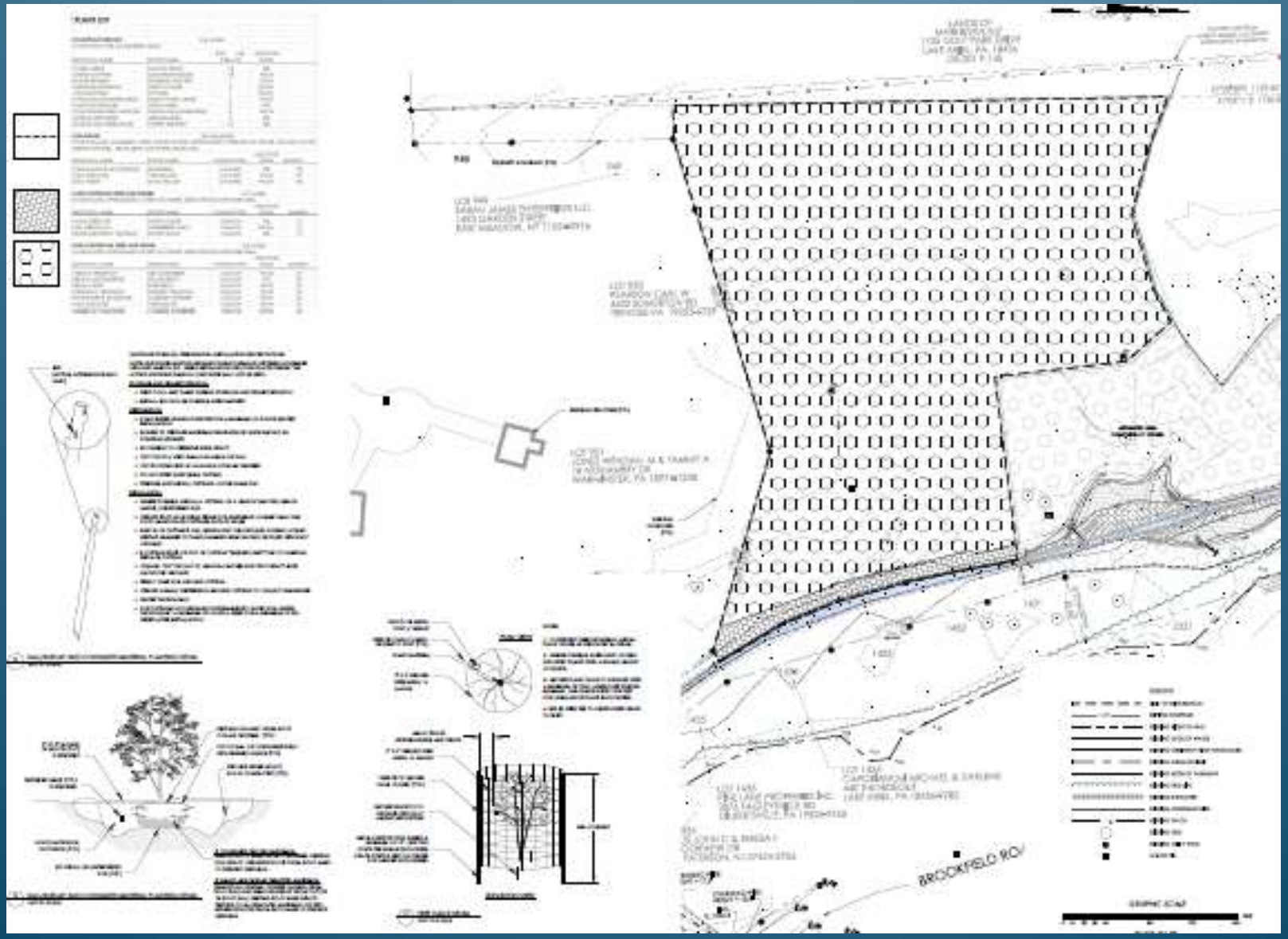
Permits / Approvals

- Wayne County Conservation District
- PA DEP, Northeast Regional office
- US Army Corp of Engineers
- Strongly recommend a pre-application meeting
- Plan for approximately a year for completed designs and permit approvals

Budget and Costs

- Design, permitting and implementation for total cost of approximately $250,000.00 (5.0 acre project site.
- Awarded a PA Growing Greener grant, partnering with the LWWMD
- Will expand the project from 5 acres to 8.5 acres
- Additional $76,000.00 is provided through the grant for the project


LANDS OF ROGERS, INT
DB 2483 P 341 LAKE
ARIEL, PA 18436 1148
GOLF PARK DRIVE
PLANTING - PHASE TWO


BROCKFIELD RD

CONCLUSIONS

- Remaining plantings will be completed in 2014
- Treat the additional 3.5 acres and plant in fall 2014
- Conduct the hydrologic / pollutant analysis
- Quantify the pollutant removal capacity of the wetland treatment system
- Long-term maintenance of site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