



# **Flood Reduction in the Black Dirt Region of New York State**

## **Orange County Soil and Water Conservation District**

November 7, 2019

- **Introduction**
- **Background**
  - Location
  - Define the Problem
  - History
  - Alternative Analysis
- **Floodplain Bench Project**
  - Permitting Requirements
  - Design
  - Construction



# Background-Location



MIDDLETOWN

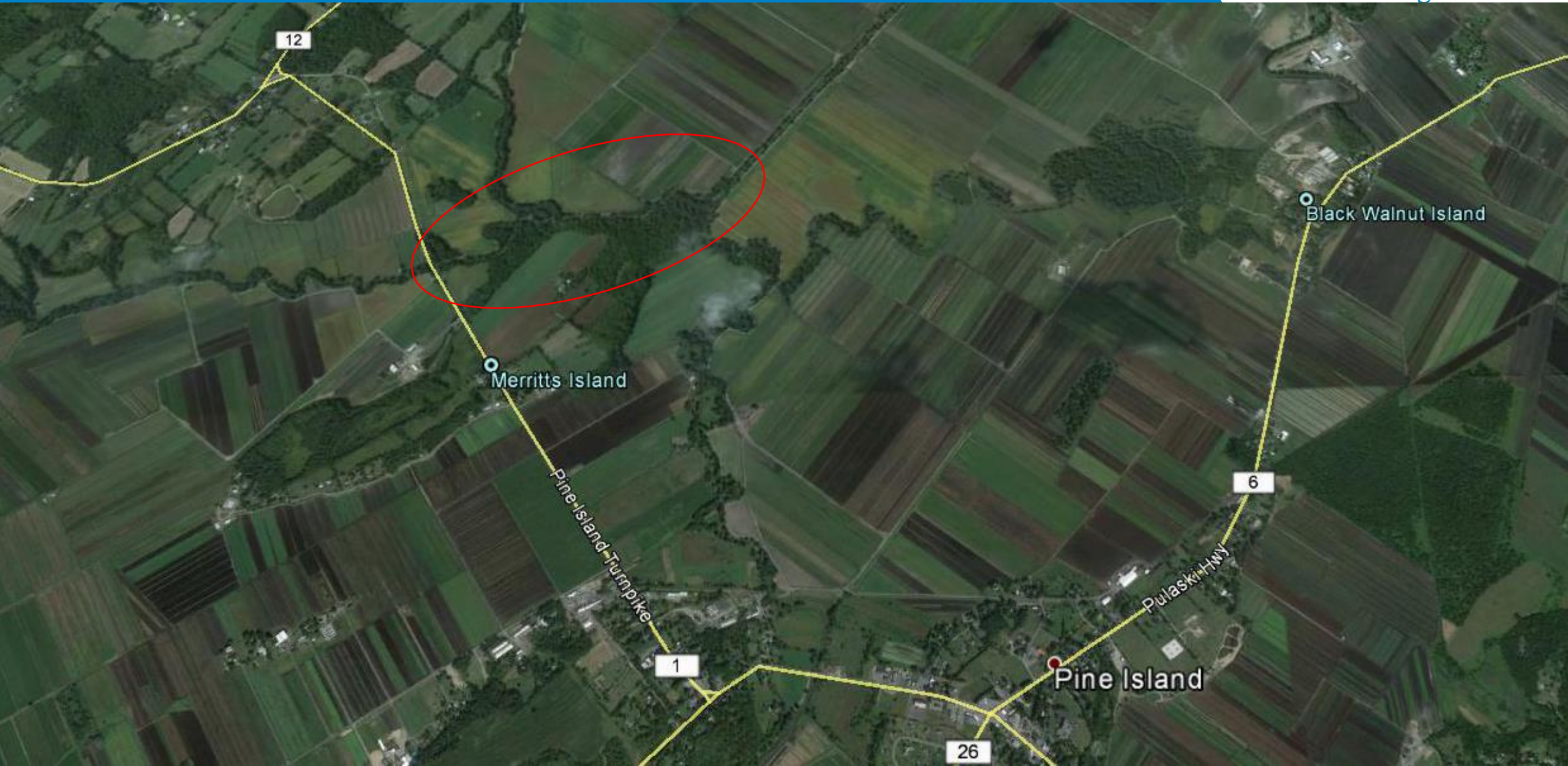
NEWBURGH

Orange

PROJECT

NJ/NYS LINE

# Background-Location



# Define the Problem

- Extremely flat topography
- Less than 25 feet of elevation drop in the main channel through the 12.5 mile Black Dirt region ( $s_{ave} = 0.0004$  ft/ft)
- Farm fields supply produce to NYC
- Minimize time lost on fields



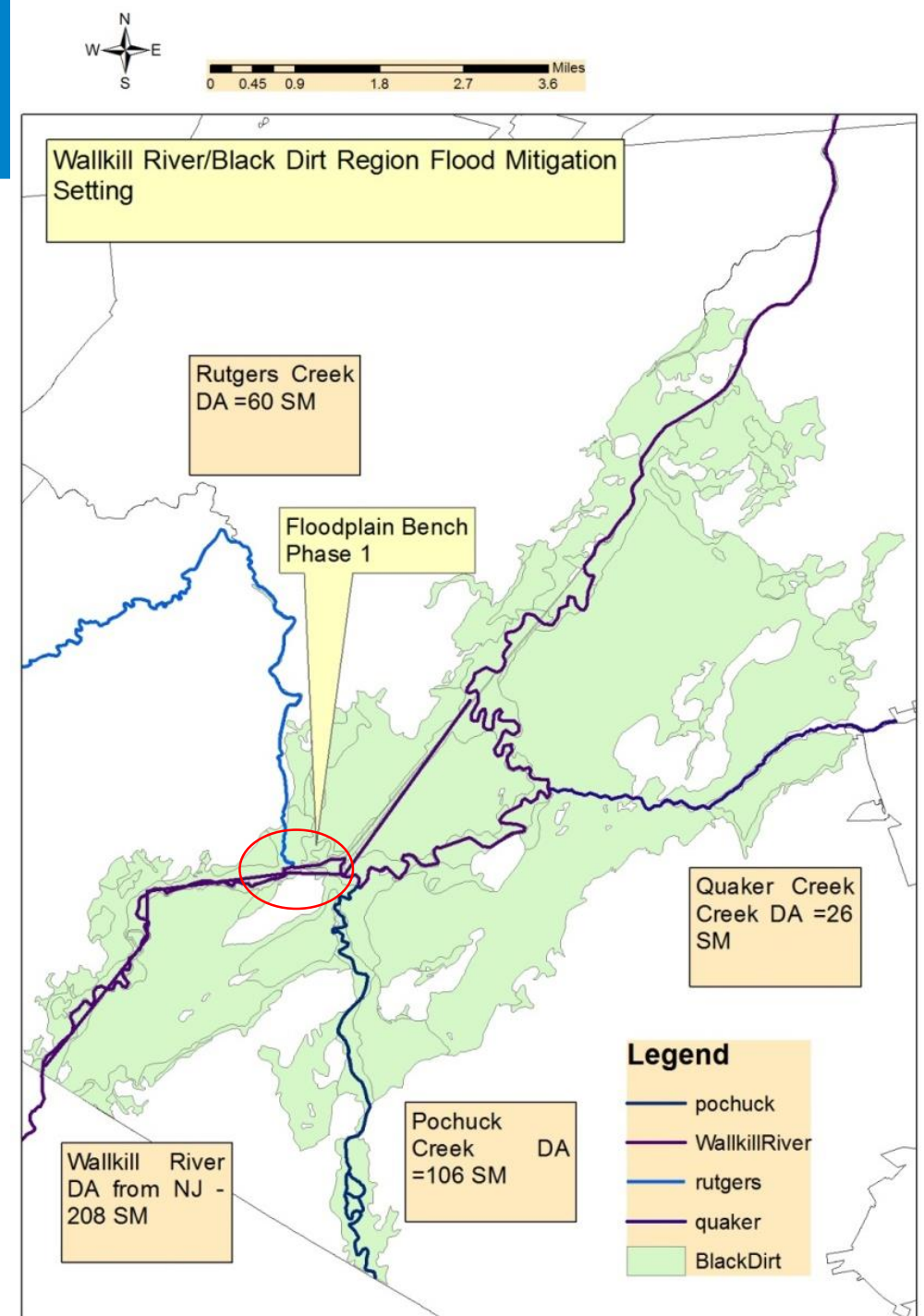
# Define the Problem

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# History

- Black Dirt
  - What is it?
  - Why is it significant?
- Drainage District
- 1930's ACoE Project
- 1980's ACoE Project



# History

- Orange County Soil and Water Conservation District obtained grant to address flooding after Irene
- Created Committee of local farmers to assist in administering
- Alternative Analysis
- Implementation of Priority Projects





# Alternative Analysis

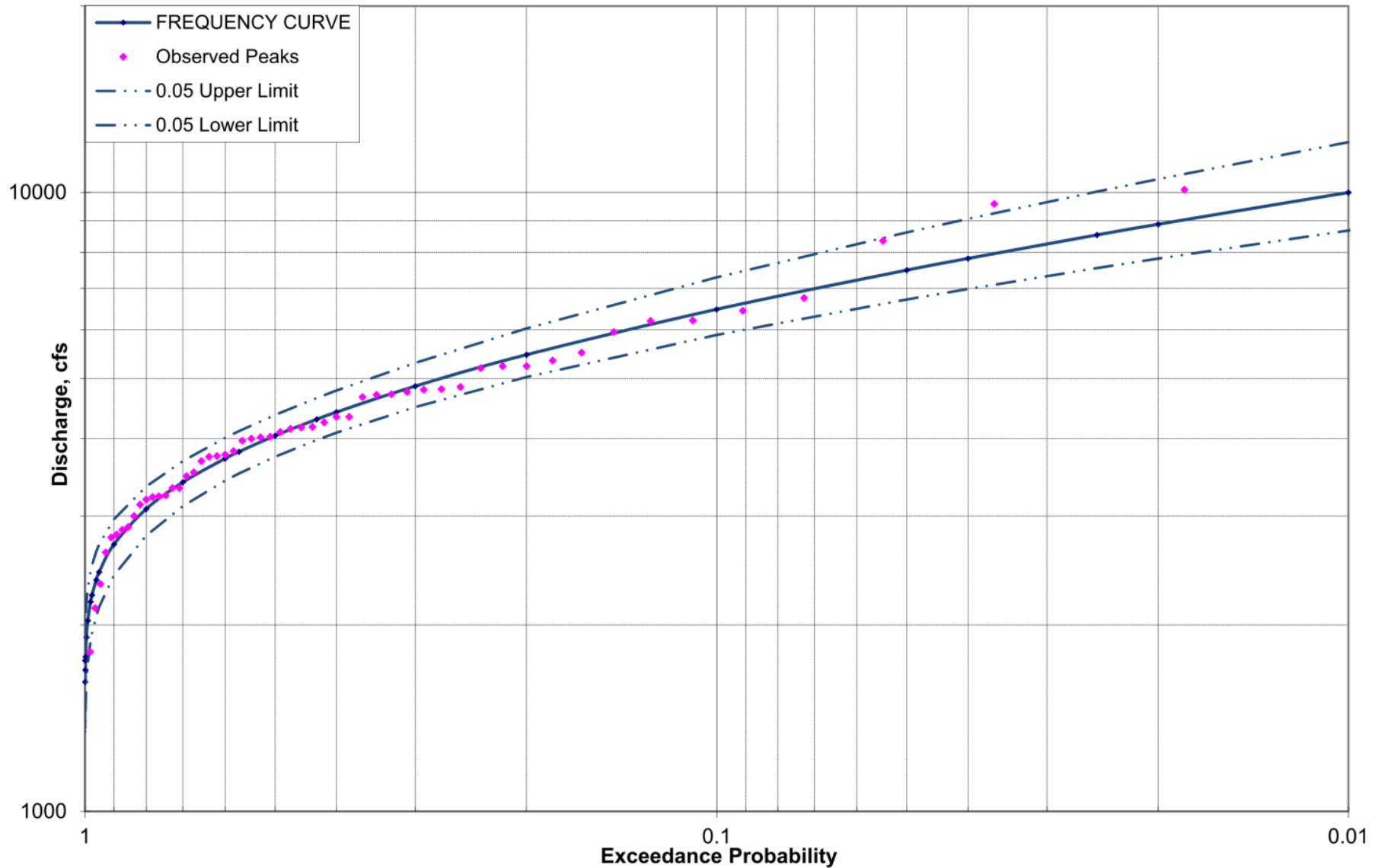
- Comprehensive Hydraulic Model
  - Hydrology
  - HEC-RAS Model
- Series of Stakeholder Meetings
- 20+ Alternatives evaluated
- Priority Projects



- Gage Station Data
  - Wallkill River near Pellets Island Road
  - Pochuck Creek near Newport Bridge Road
  - Rutgers Creek near Carter Road
  - Quaker Creek in Florida, NY
- Log Pearson Type III Frequency Analysis
- Hydrographs



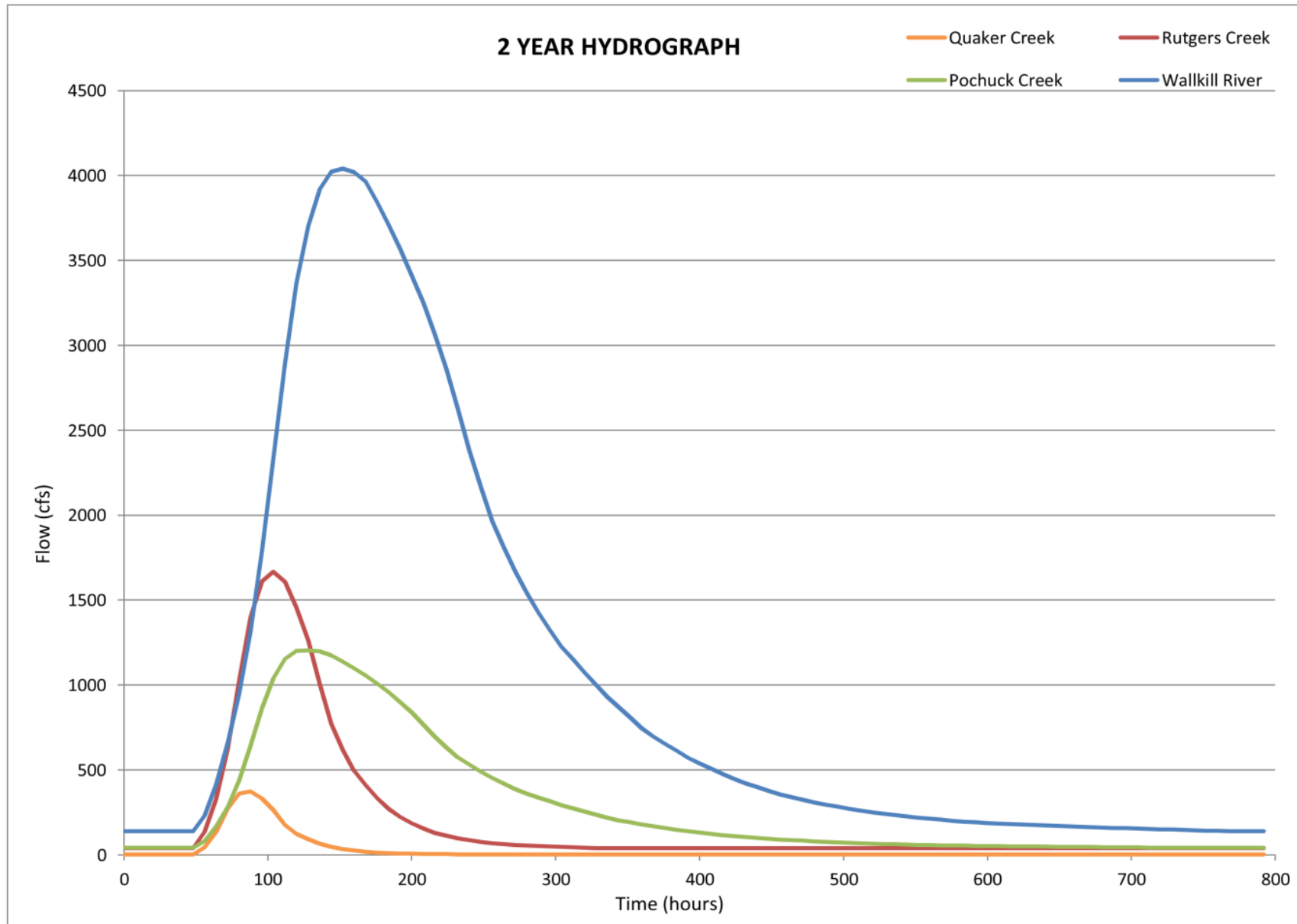
## FREQUENCY CURVE - WALLKILL RIVER



## Peak Discharges (cfs)

Event	Gage Station			
	Wallkill River	Pochuck Creek	Quaker Creek	Rutgers Creek
2 Year	4,045	1,207	376	1,667
5 Year	5,466	1,721	553	2,438
10 Year	6,473	2,109	684	3,037
25 Year	7,488	2,518	817	3,681
50 Year	8,882	3,105	1,005	4,627
100 Year	9,993	3,593	1,156	5,428
500 Year	12,811	4,901	1,547	7,640

# Hydrology



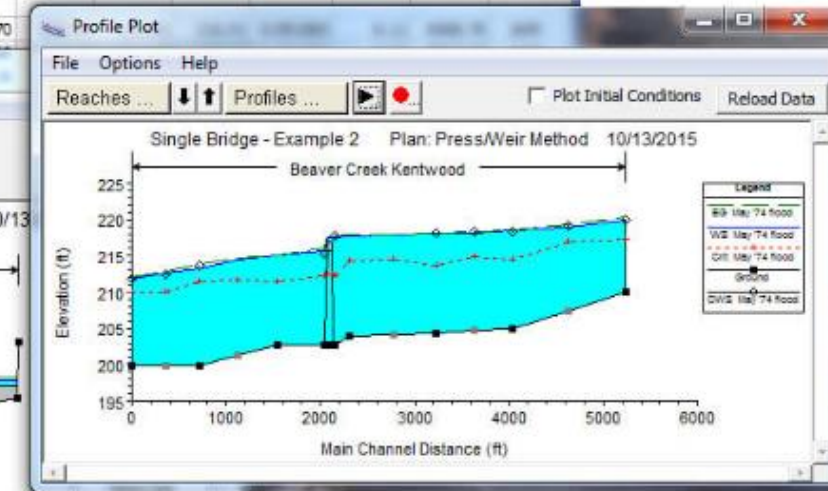
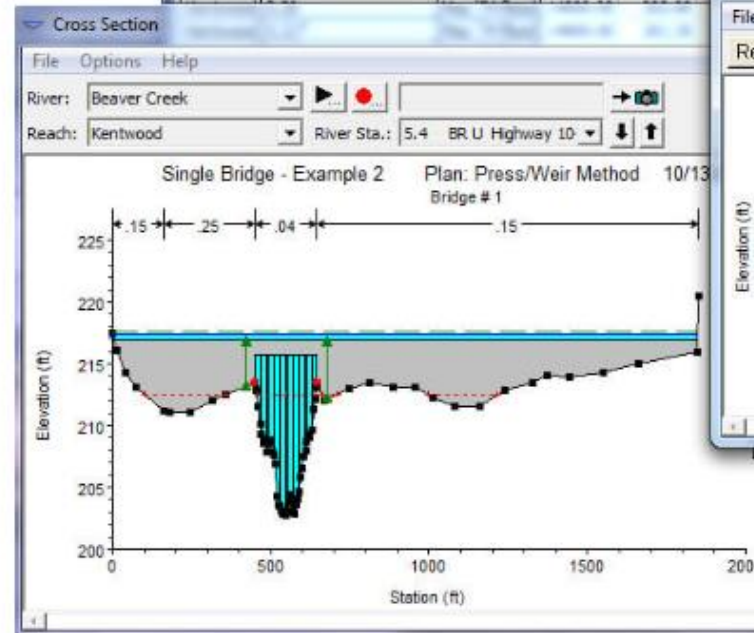
# Hydraulic Model

- HEC-RAS Model
  - LiDAR
  - Field Verification
  - Unsteady State

Profile Output Table - Standard Table 1

HEC-RAS Plan: PressWeir M. River: Beaver Creek. Reach: Kentwood. Profile: May '74 flood. Reload Data

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top W (ft)
Kentwood	5.61	May '74 flood	14000.00	204.40	218.07	213.62	218.12	0.000556	4.05	9450.15	1985
Kentwood	5.525*	May '74 flood	14000.00	204.15	217.92	214.37	217.99	0.000473	3.99	9433.28	1941
Kentwood	5.44	May '74 flood	14000.00	203.90	217.79	214.23	217.88	0.000401	3.80	9260.93	1845
Kentwood	5.41	May '74 flood	14000.00	202.70	217.43	212.24	217.67	0.000727	4.72	8975.03	1847
Kentwood	5.4	Highway 1049 Bridge									
Kentwood	5.39	May '74 flood	14000.00	202.70							

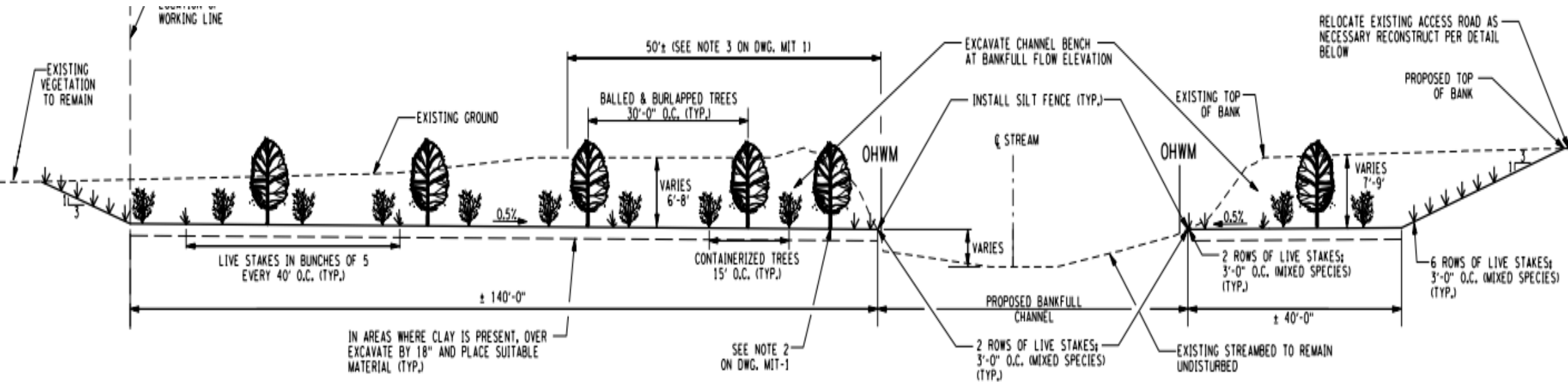


# Floodplain Bench Project

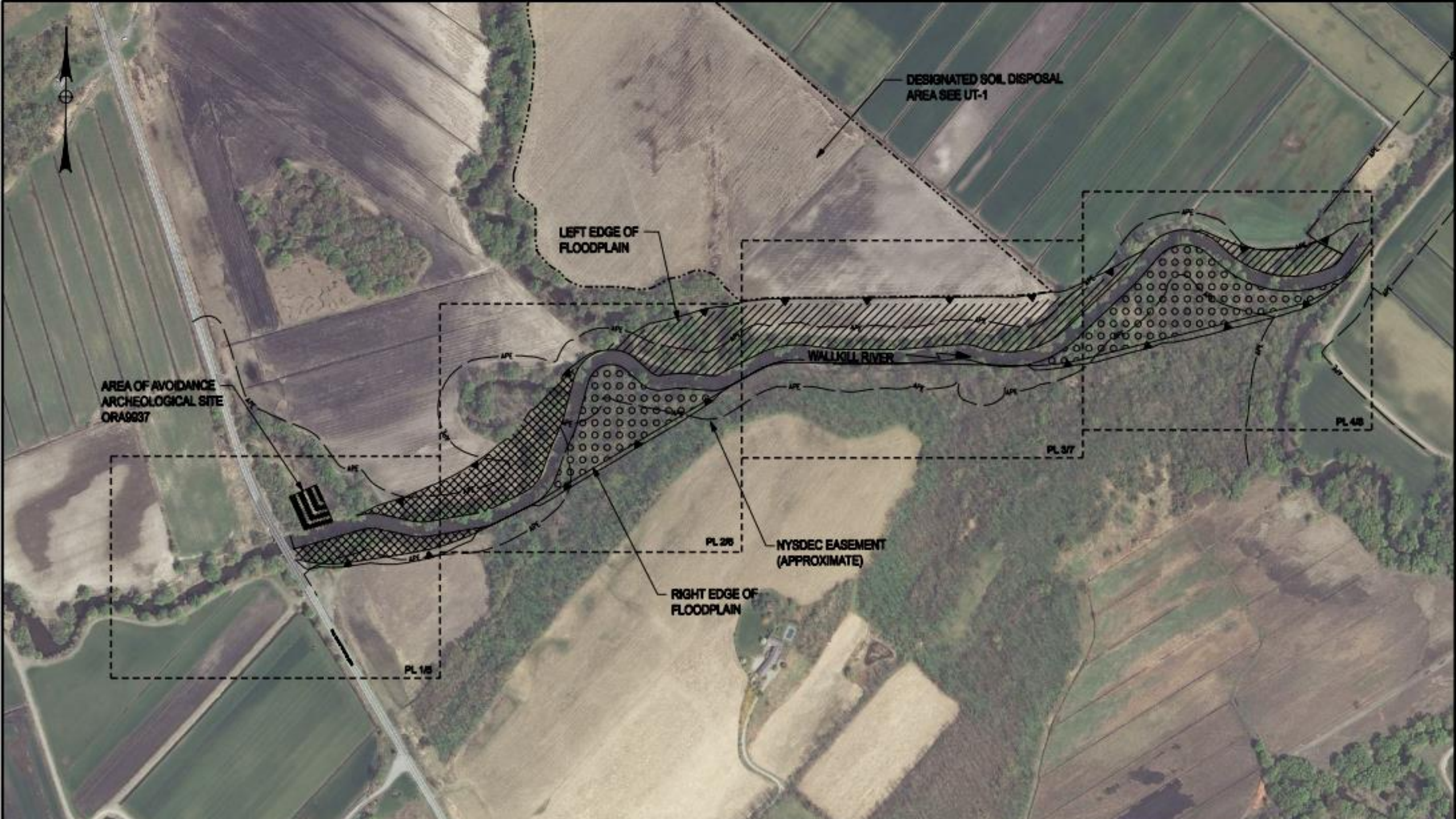
- **Objective:**  
Add conveyance while restoring and preserving the natural character of the stream.

# Floodplain Bench Project

- Typical Section







DESIGNATED SOIL DISPOSAL  
AREA SEE UT-1

LEFT EDGE OF  
FLOODPLAIN

AREA OF AVOIDANCE  
ARCHEOLOGICAL SITE  
ORA9937

WALLKILL RIVER

PL 4B

PL 37

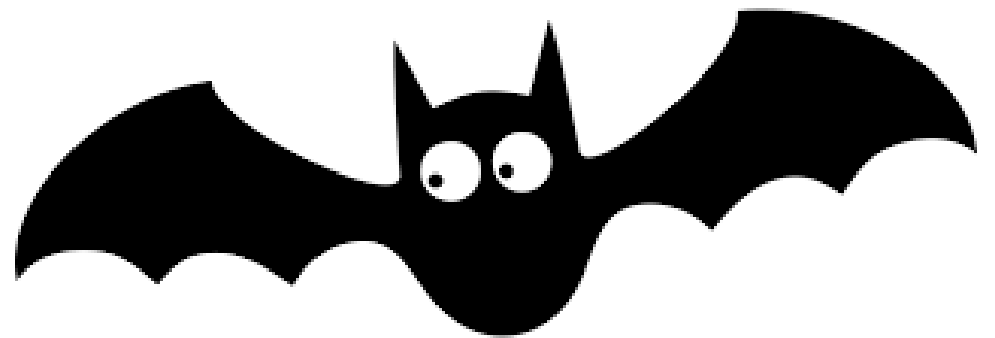
PL 2B

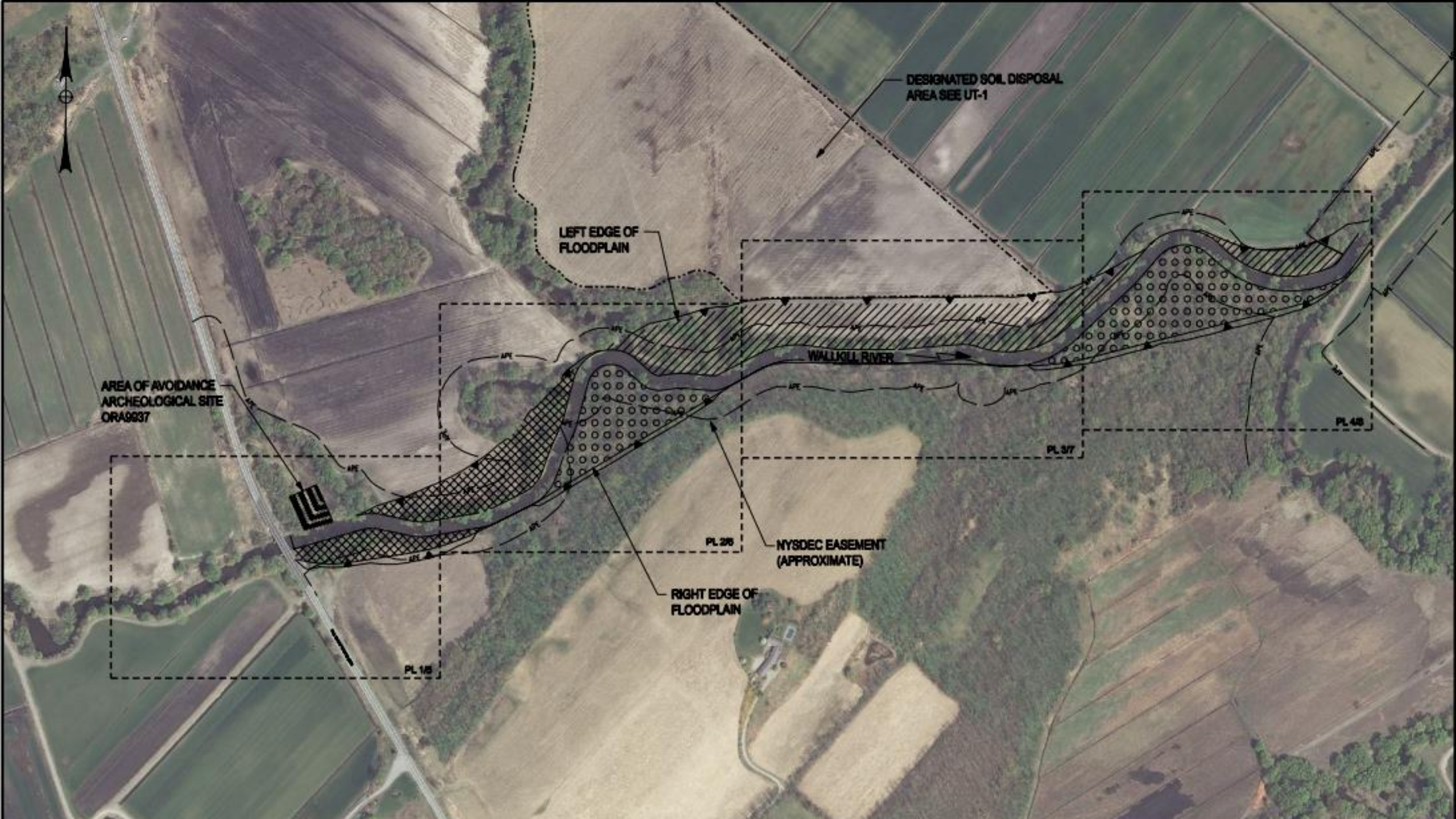
NYSDEC EASEMENT  
(APPROXIMATE)

RIGHT EDGE OF  
FLOODPLAIN

PL 1B

- Habitat Requirements
  - Phase the project to reduce temporary impacts
  - Tree Cutting Restrictions
- Flood Control Permit
- Modification of DEC Easement
- Landowner Agreements





DESIGNATED SOIL DISPOSAL  
AREA SEE UT-1

LEFT EDGE OF  
FLOODPLAIN

AREA OF AVOIDANCE  
ARCHEOLOGICAL SITE  
ORA9937

WALLKILL RIVER

PL 4/8

PL 3/7

PL 2/6

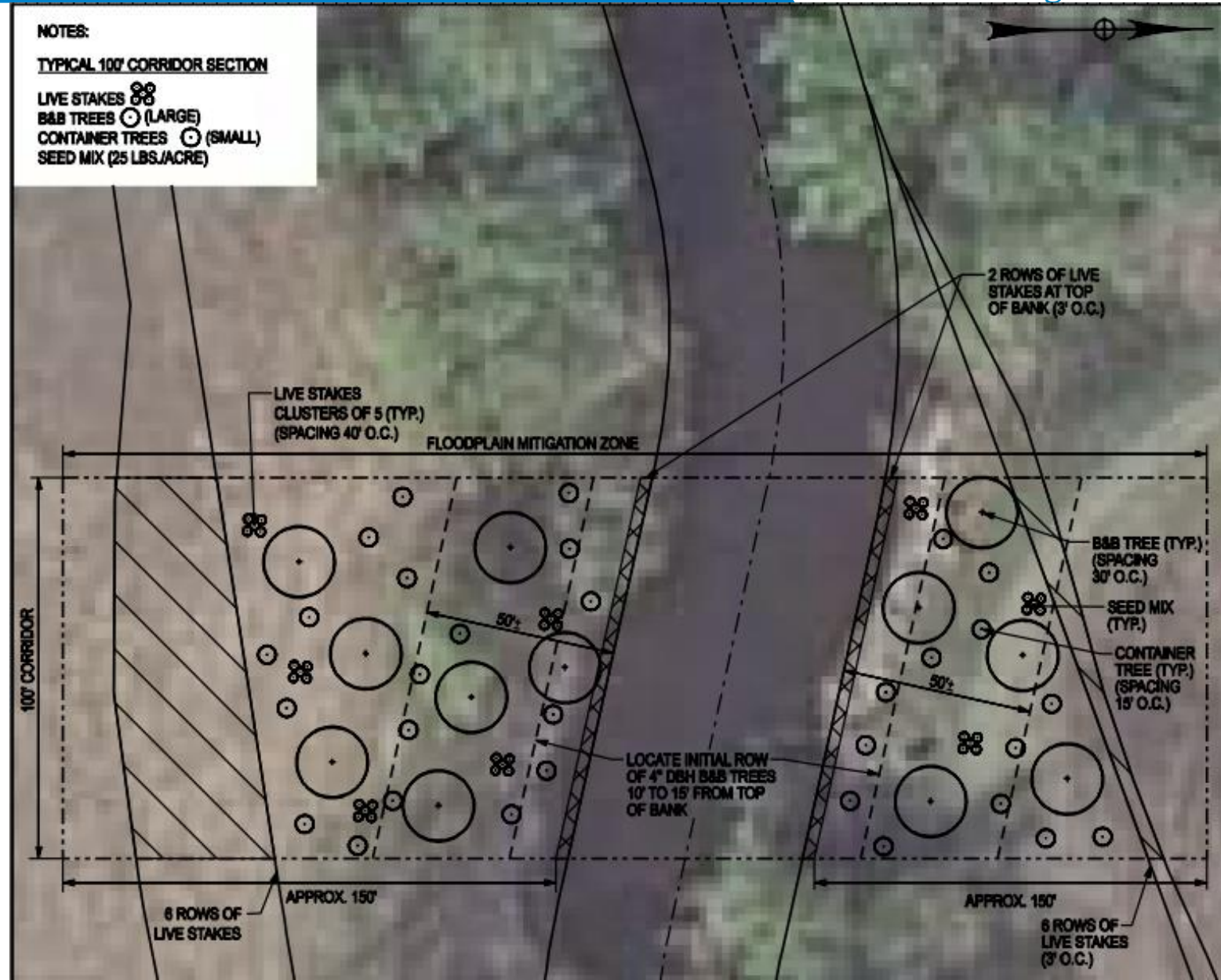
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RIGHT EDGE OF  
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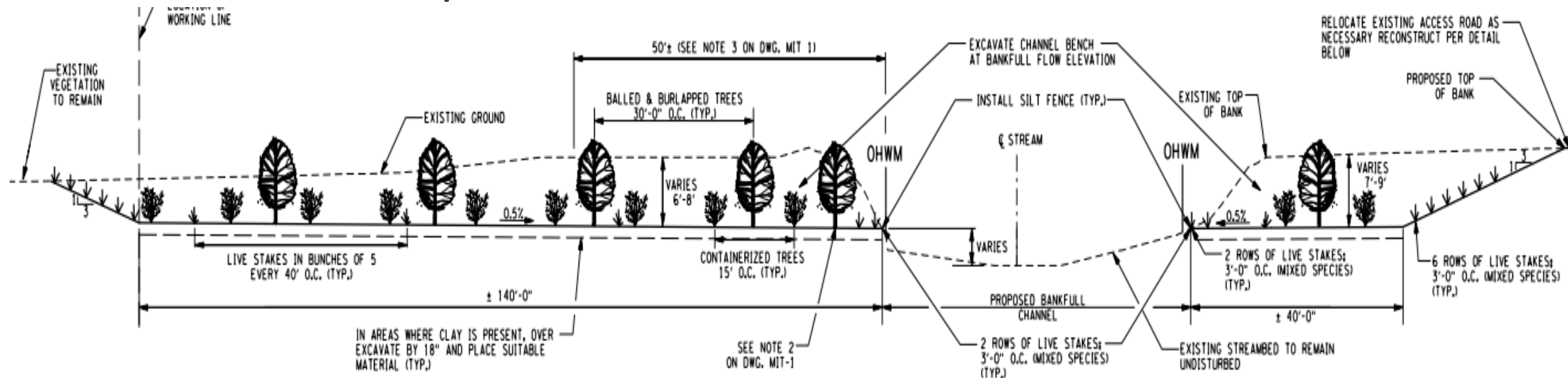
PL 1/5

# Design

- Planting Plan
  - B&B Trees
  - Container Trees
  - Live Stakes
  - Wetland Seed Mix



- Benefits
  - Reduce magnitude of flooding upstream
  - Reduce duration of flooding upstream (particularly smaller events)
  - Increased habitat along river
  - Increased Riparian Buffer



# Phase 1 - Tree cutting

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# Phase 1 - Tree cutting

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# Phase 1 – Soil Removal

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# Phase 1 – Soil Removal

**Barton & Loguidice**



# Phase 1 – Soil Removal

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# Phase 1 – Challenging Conditions

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# Phase 1 – GPS Grading

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# Phase 1 – Soil Placed on Adjacent Field

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# Phase 1 – Soil Placed on Adjacent Field

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# Phase 1 – Soil Removal

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# Phase 1 – Access Road Maintenance

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# Phase 1 – Access Road Maintenance

**Barton & Loguidice**



# Phase 1 – Access Road Maintenance

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# Phase 1 – Soil Segregation

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# Phase 1 – Salvaged Some Trees

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# Phase 1 – Wet Conditions

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# Phase 1 – Planting

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# Phase 2 – Soil Removal

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# Phase 2 – Soil Removal

**Barton & Loguidice**





# Phase 2 – Soil Removal

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# Phase 2 – Erosion Control

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# Phase 2 – Staked Trees

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# Phase 2 – Completed Bench

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# Phase 2 – Completed Bench

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# Phase 2 – Completed Bench

**Barton & Loguidice**



*Project Fully flooded on 1/12/18*

# Phase 2 – Completed Bench

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*Project Fully flooded on 1/12/18*

# Phase 2 – Completed Bench

- Phase 1 Complete in 2017 (\$1,200,000)
- Phase 2A Complete in 2018 (\$210,000)
- Phase 2B Completed in 2019 (\$260,000)
- Phase 3 to be Completed in 2020?

*The experience to*  
**listen**  
*The power to*  
**solve**<sup>SM</sup>

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