

# Public Information Session

## Hydrologic and Hydraulic Evaluation of the Lower South River

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# Issues and Concerns

- **Insufficient understanding of existing conditions to make informed decisions**
- **Hydrology and hydraulics on river are not well documented**
- **Hydrology and hydraulics are complex**
  - Chandler Pond Dam has two outlets
  - Low-gradient channel
  - Backwater effect from Veteran's Memorial Park Dam



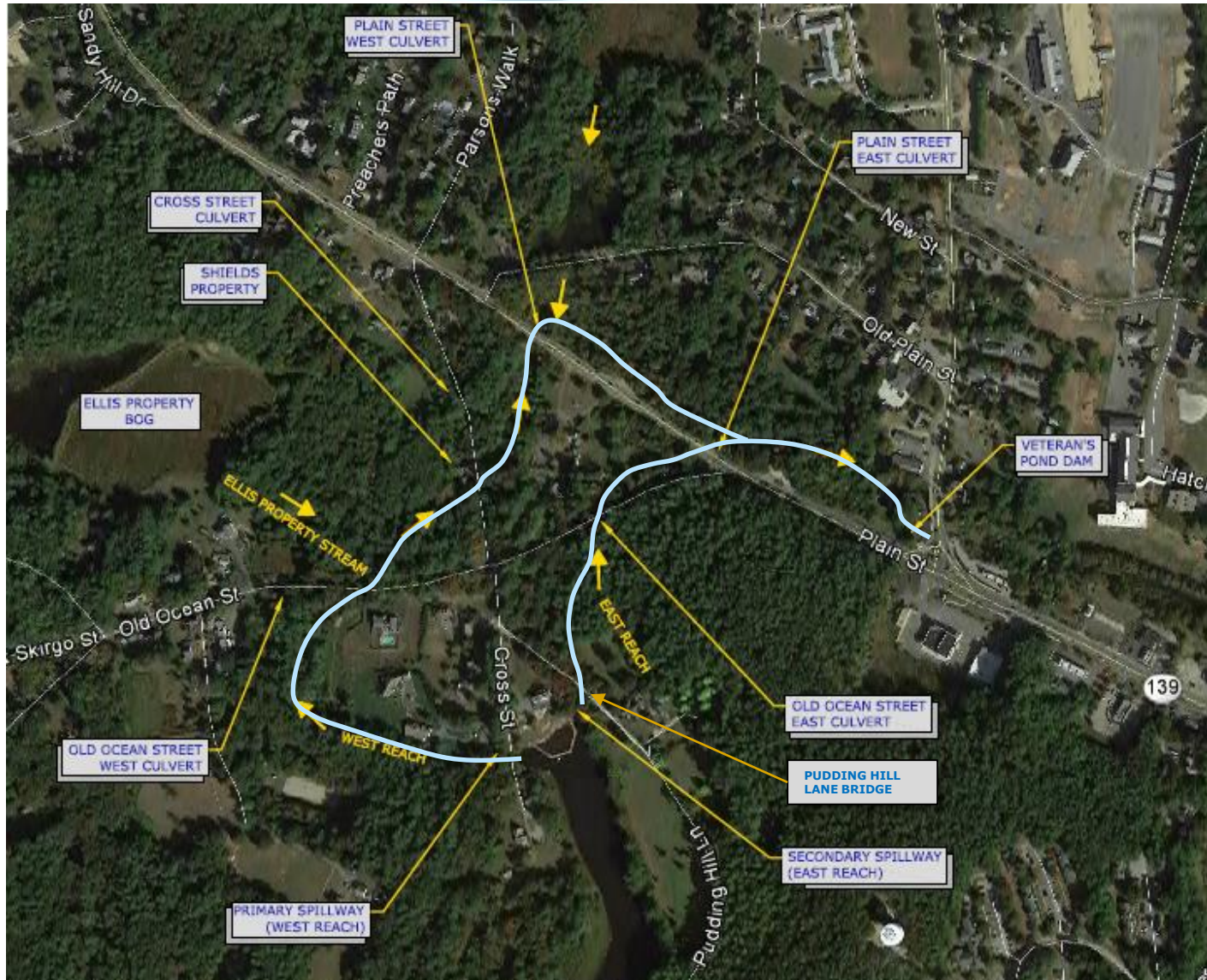
# Project Goals

- Obtain a better understanding of the hydrology and hydraulics of the river
- Evaluate the changes in river hydrology and hydraulics resulting from various hypothetical scenarios





# Study Area



# Scenarios Evaluated

1

Existing Conditions

2

Close the West Spillway

3

Remove West Spillway

4

Remove Chandler Pond Dam

5

Remove Chandler Pond and Veteran's  
Memorial Park Dams



# Precipitation Data

- Evaluated each scenario for 5, 10 and 100-year storm events
- Study uses rainfall using current data set

Frequency	24-hour Depth
5-year	4.19 inches
10-year	4.97 inches
100-year	8.79 inches



# Putting the Model Together



Land  
Use  
Cover

Watershed  
Storage

Bridges  
Dams  
Culverts

Channel  
Geometry

Channel  
Roughness

Channel  
Slopes

# Scenarios Evaluated

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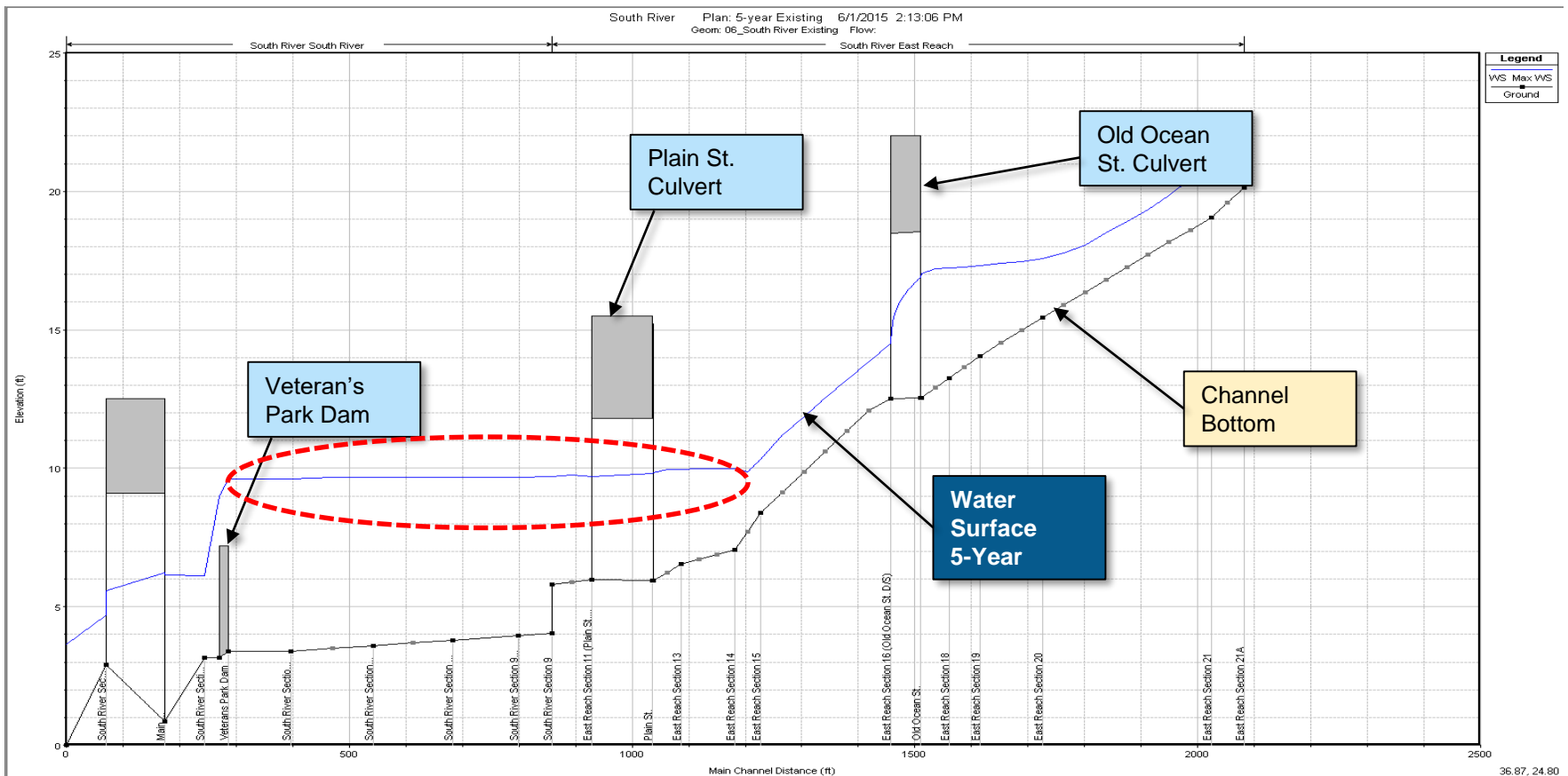
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Remove Chandler Pond and Veteran's  
Memorial Park Dams



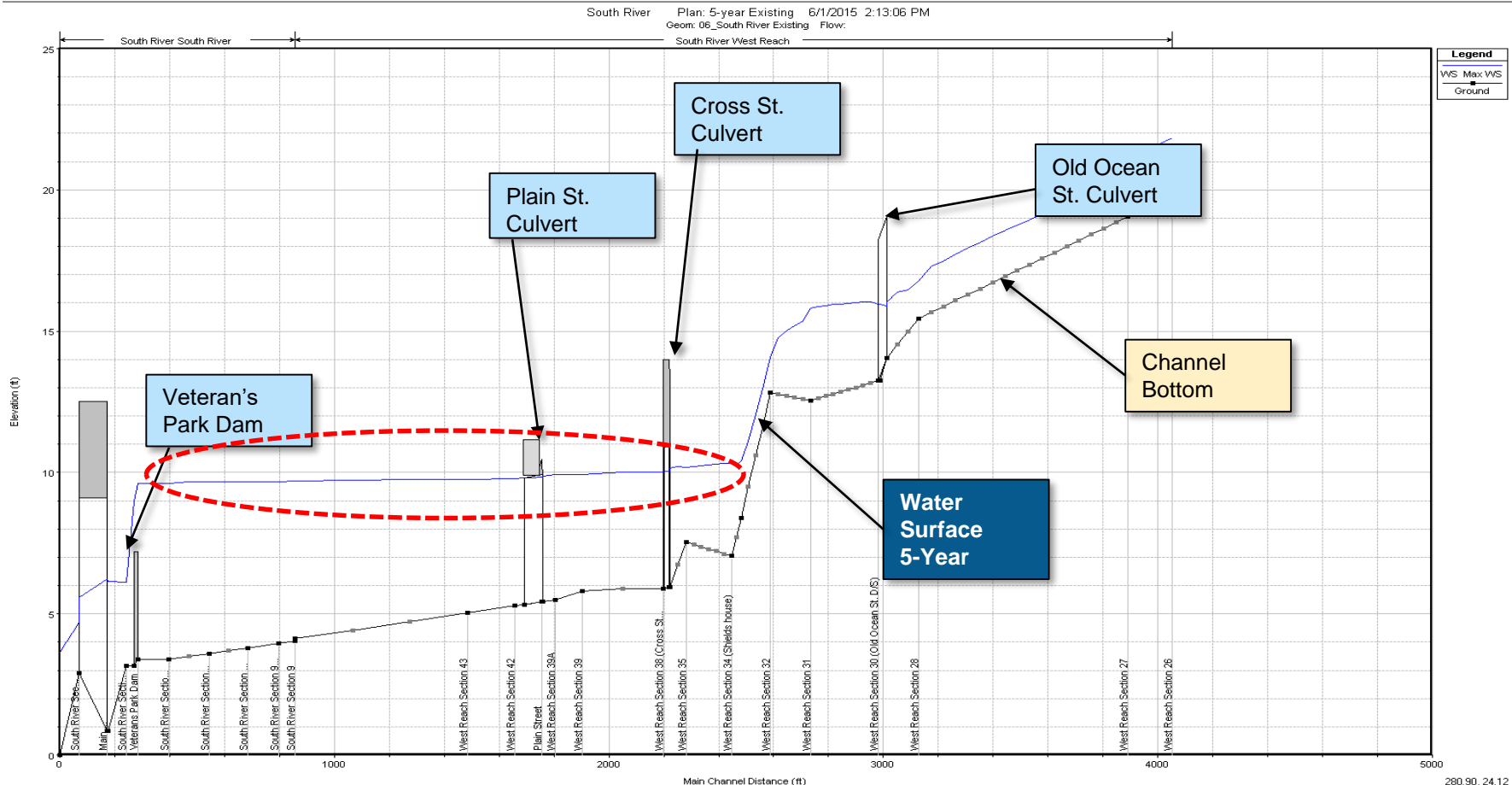
# Existing Conditions

- Backwater effect associated with Veteran's Memorial Park Dam extends to near Old Ocean Street (east)



# Existing Conditions

## ■ Backwater effect associated with Veteran's Memorial Park Dam extends to Cross Street



# Scenarios Evaluated

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Existing Conditions

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# Closure of West Spillway

- **West Spillway would be closed to prevent flow over the spillway**
- **East Spillway would remain operational**
- **Existing culvert crossings and bridges would remain unaltered**
- **No channel improvements**





# Closure of the West Spillway

## Potential Benefits

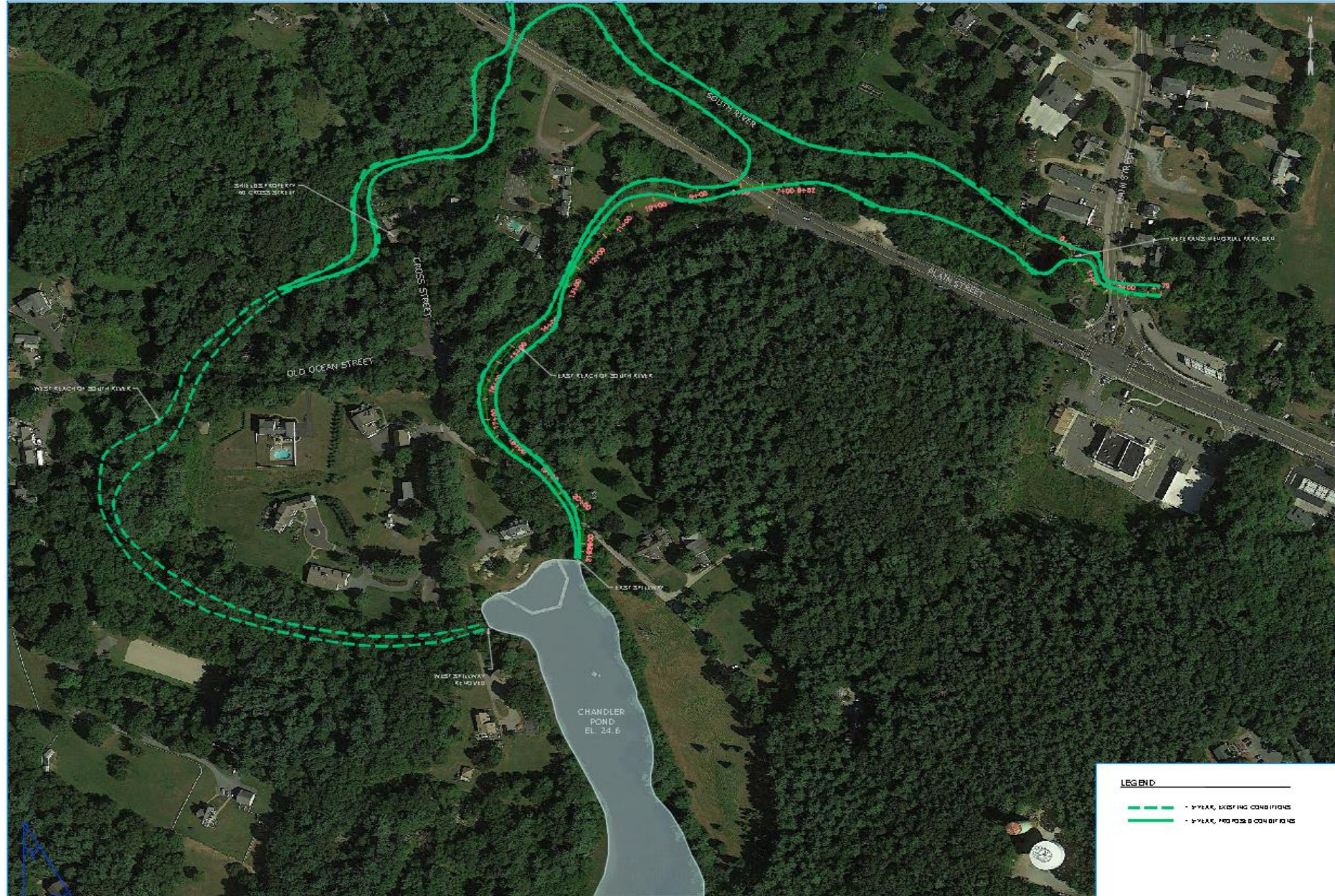
- Flood elevations reduced along western reach (2 to 11 inches for 100-year event)
- No conversion of existing pond uses
- Improvement in flooding conditions at 60 Cross Street

## Key Considerations

- Dam overtops for 100-year event, additional dam modifications may be required
- Western reach of river dewatered
- Water surface elevations increased along eastern reach (2 to 3 inches for 100-year event)
- Ecological function of the river not restored
- Flooding conditions at 60 Cross Street not eliminated
- West spillway owner retains ownership responsibility

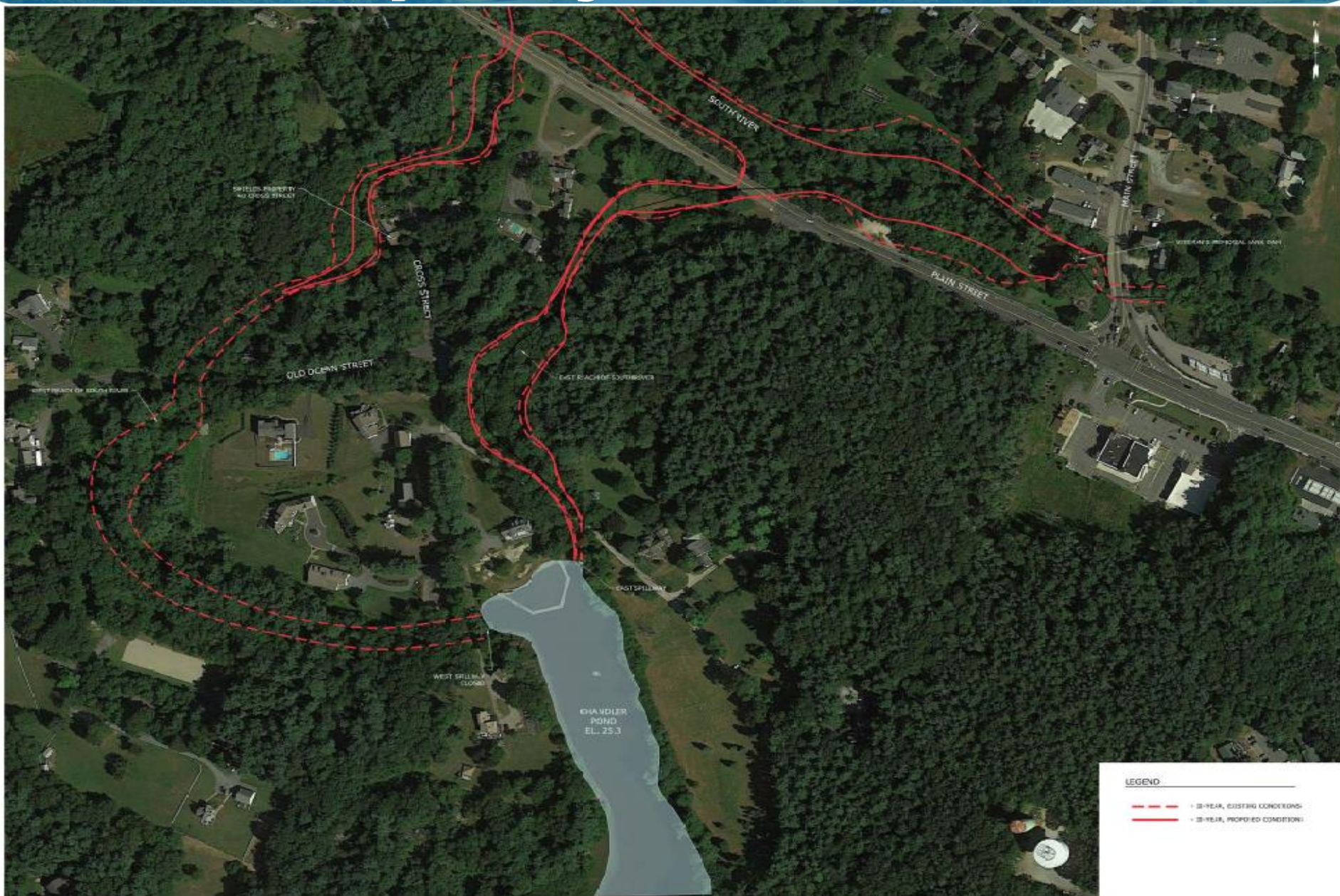


# West Spillway Closure – 5 Year



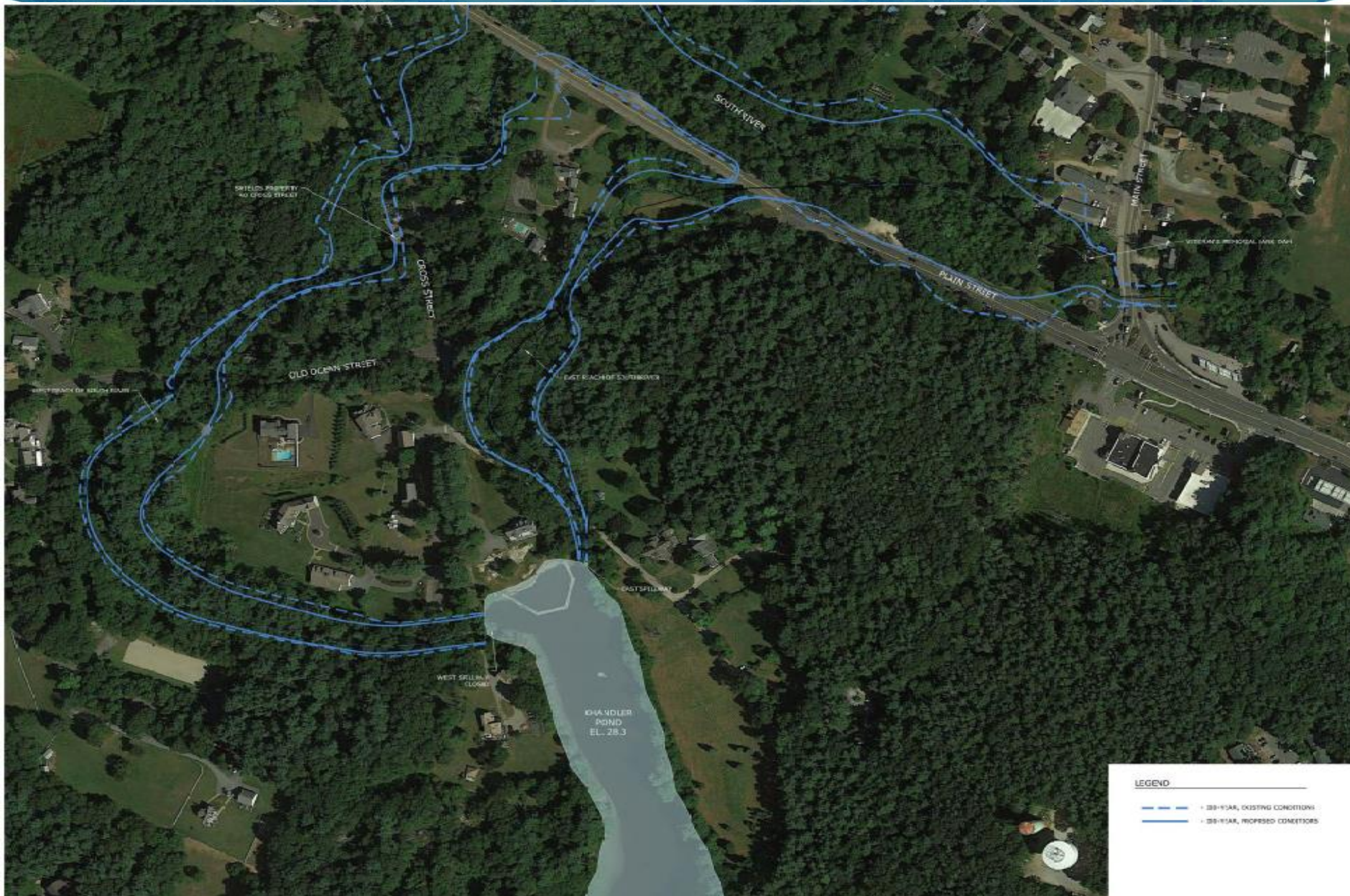


# West Spillway Closure – 10 Year





# West Spillway Closure – 100 Year



# Scenarios Evaluated

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Existing Conditions

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Close the West Spillway

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Memorial Park Dams



# Remove West Spillway

- Spillway would be removed in its entirety with no material put back in its place
- Bridge would be needed to maintain access to private property
- No changes to East Spillway, Veteran's Memorial Park Dam, stream channels



An aerial photograph of a river winding through a green, forested landscape. A large, curved structure, likely a spillway or dam, is visible in the middle of the river. The water is a deep blue, and the surrounding land is covered in dense green trees and fields.

# Remove West Spillway

## Potential Benefits

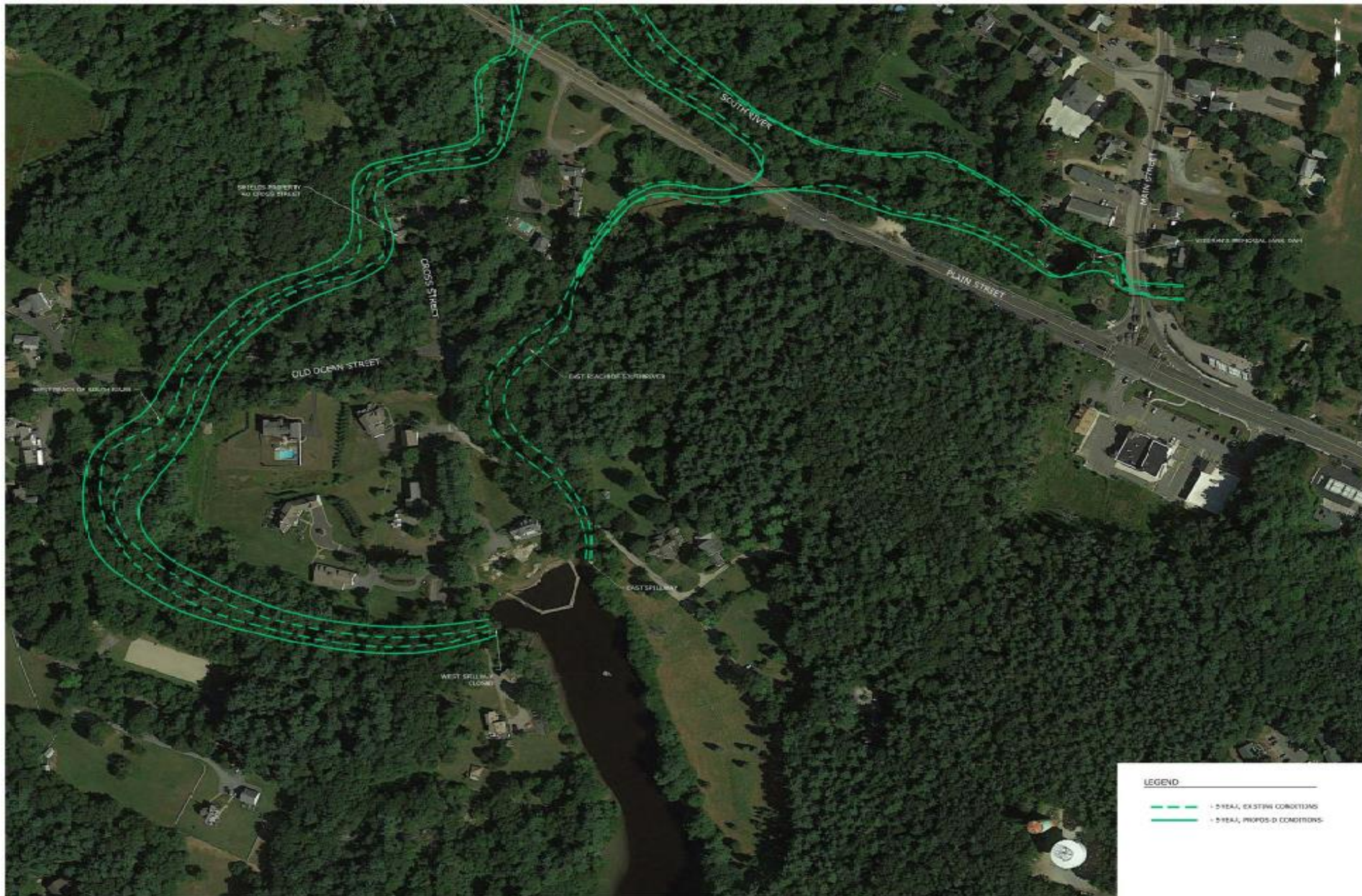
- Reduces flood elevations on east reach of river
- Ecological function of west reach restored
- West spillway owner relieved of dam ownership responsibility

## Key Considerations

- Dewatering of east reach of river
- Increase in flood elevations along west reach of river (1 to 2 feet)
- Exceedance of downstream structure capacity
- Conversion of pond to river uses
- Bridge crossing required



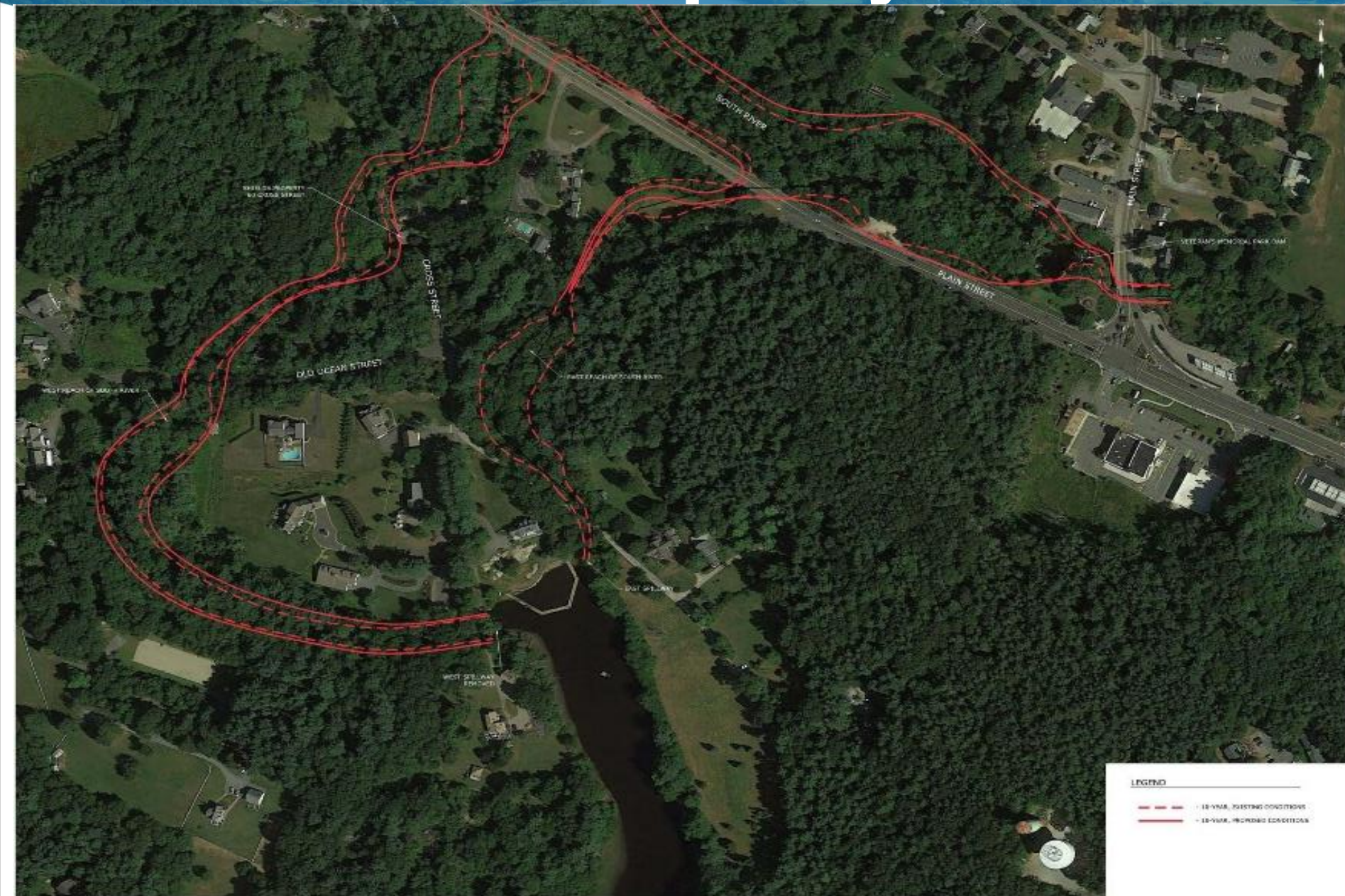
# Remove West Spillway 5-Year







# Remove West Spillway 10-Year





# Remove West Spillway 100-Year





# Scenarios Evaluated

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Remove Chandler Pond and Veteran's  
Memorial Park Dams



# Removal of Chandler Pond Dam

- Dam would be removed in its entirety
- Flow would be split proportionately based on existing channel widths
- Existing culvert crossings and bridges would remain unaltered
- No channel improvements





# Removal of Chandler Pond Dam

## Potential Benefits

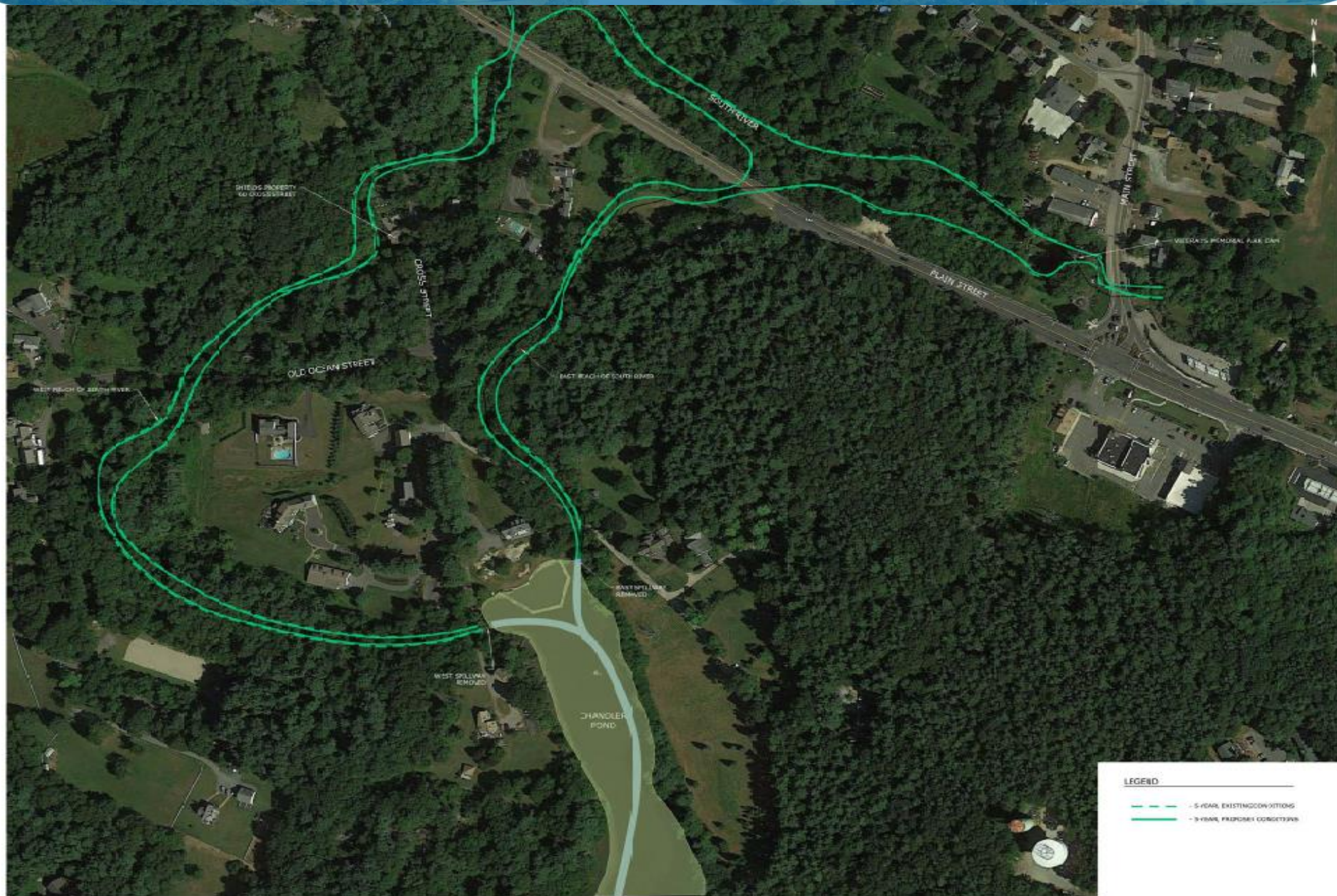
- Restores natural and ecological function of river
- Water surface elevations decreased for a 5-year storm event (1 to 3 inches on average)
- West spillway owner relieved of dam ownership responsibilities

## Key Considerations

- Increase in water surface elevations for 100-year storm event (up to 15 inches)
- Conversion of pond to river uses
- Splitting of the incoming flow of the South River differently than assumed would alter the flow and water surface elevations

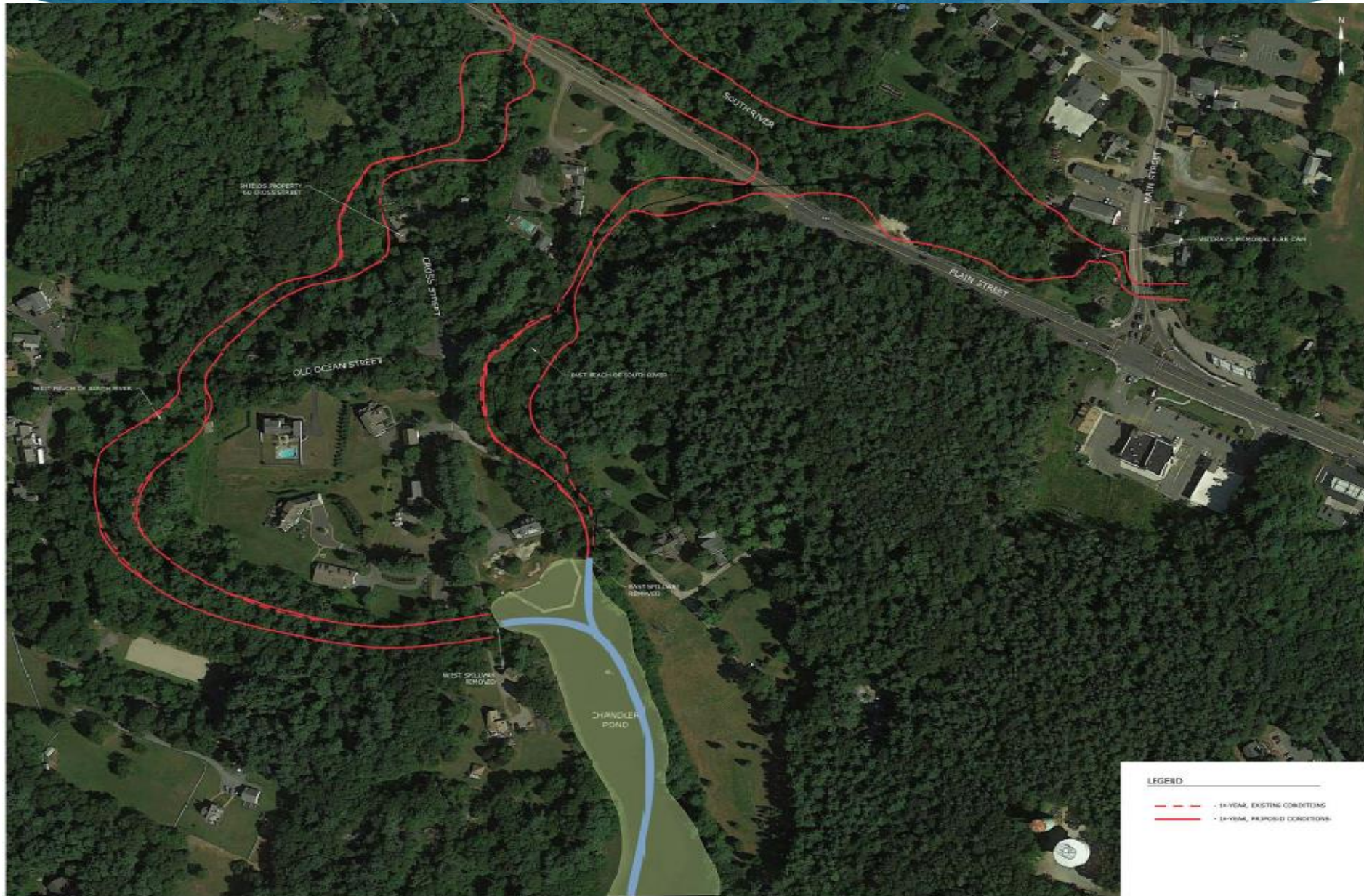


# Chandler Pond Dam Removed 5-Year





# Chandler Pond Dam Removed 10-Year





# Chandler Pond Dam Removed 100-Year



# Scenarios Evaluated

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Memorial Park Dams



# Removal of Both Dams

- Dams would be removed in their entirety
- Flow from former Chandler Pond Dam would be split proportionately based on existing channel widths
- Existing culvert crossings and bridges would remain unaltered
- No channel improvements





# Removal of Both Dams

## Potential Benefits

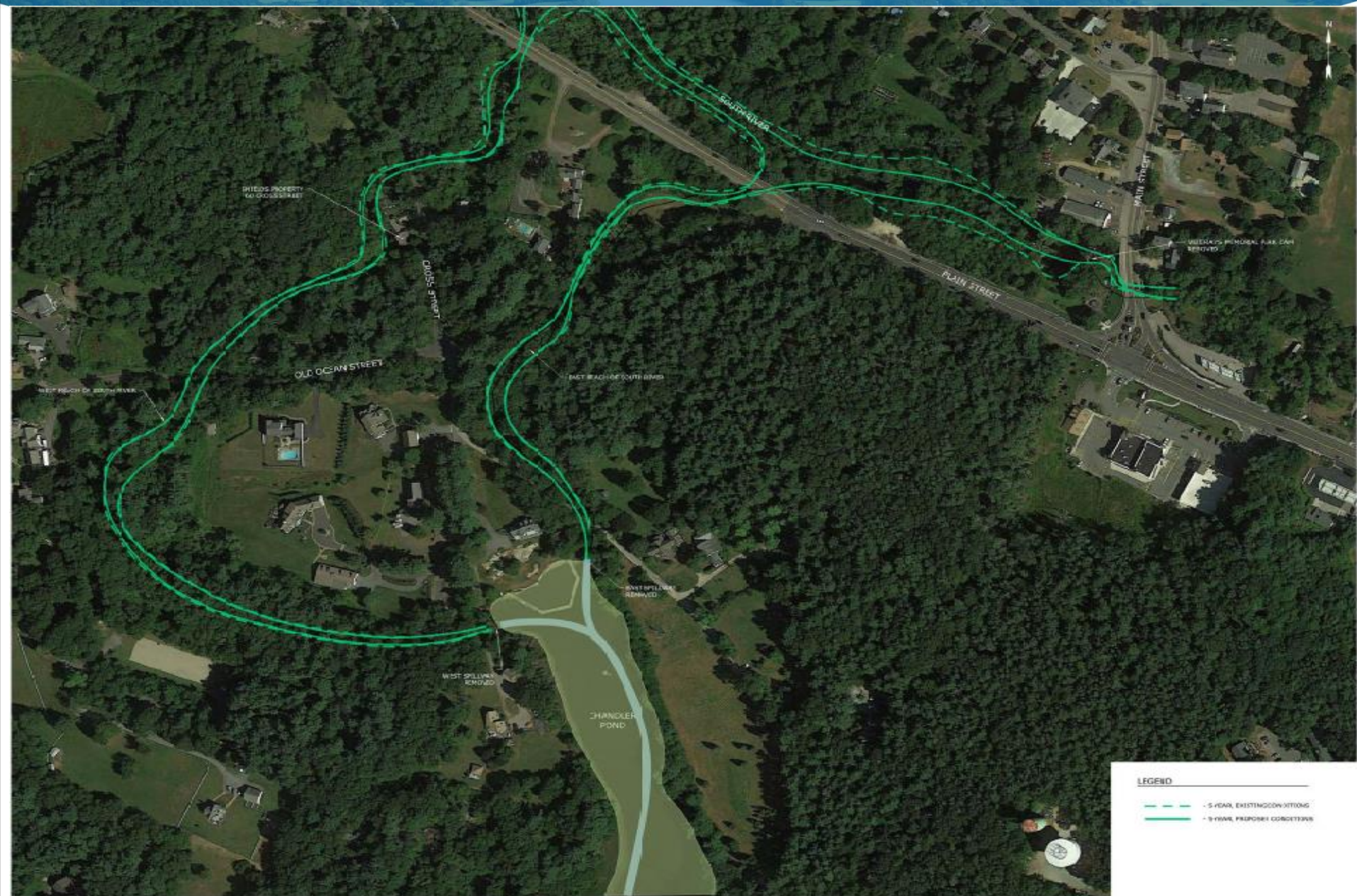
- Reduces flood elevations for 5 and 10 year events by up to one foot.
- Eliminates backwater effect at Plain Street culverts
- Eliminates barrier to natural sediment transport

## Key Considerations

- Dam is a focal point for an important community park
- Conversion of pond to river uses

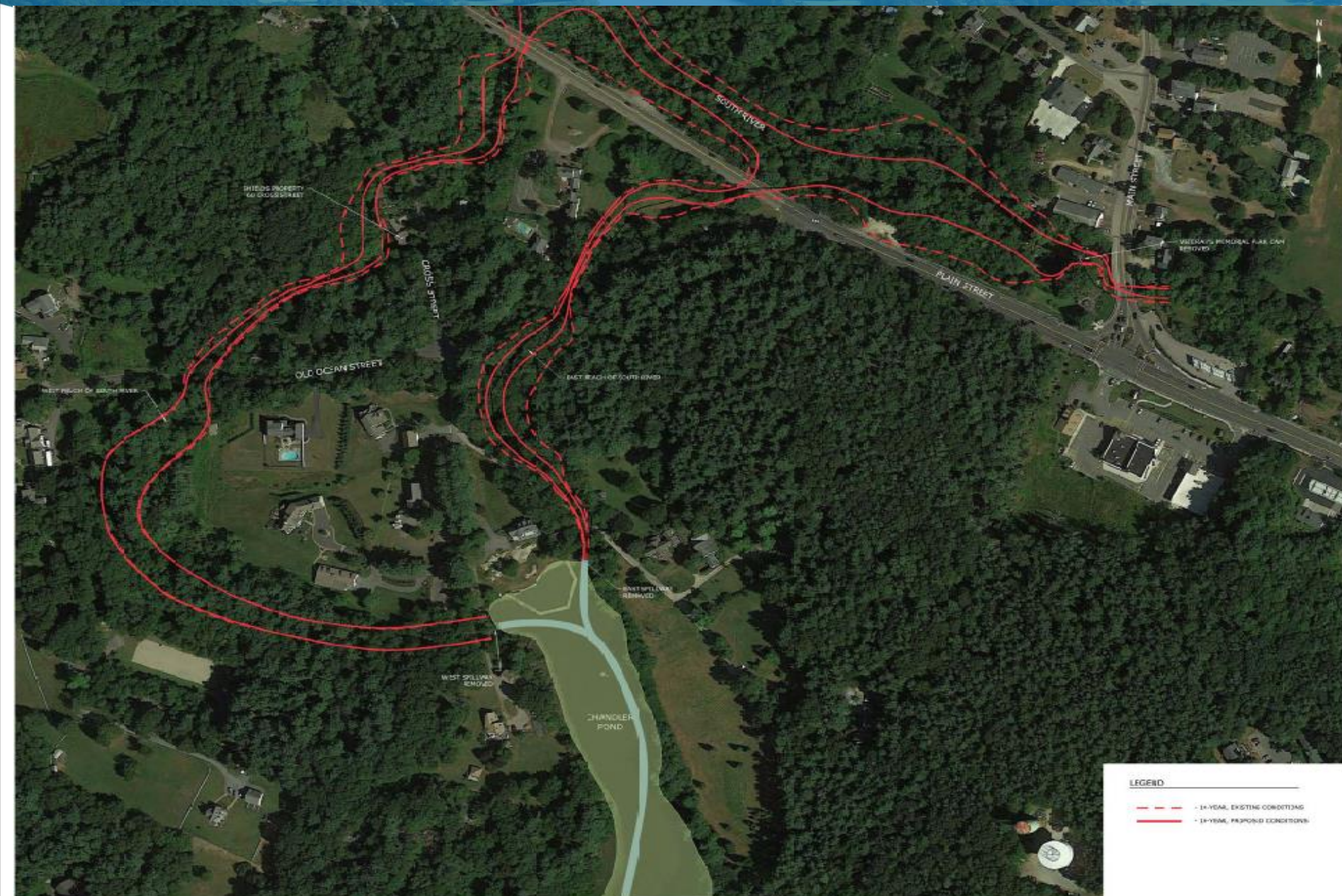


# Remove Both Dams 5-Year



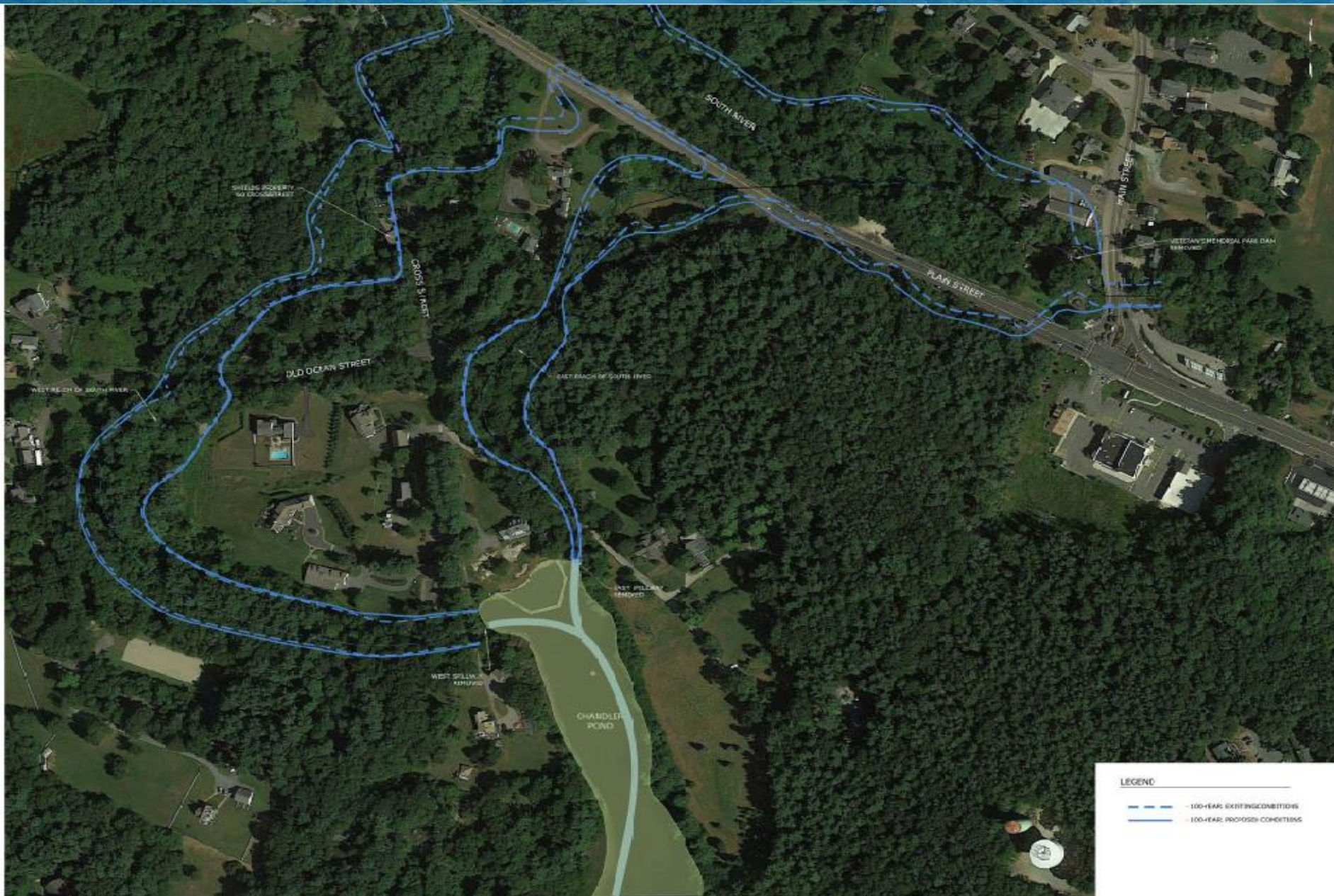


# Remove Both Dams 10-Year





# Remove Both Dams 100-Year





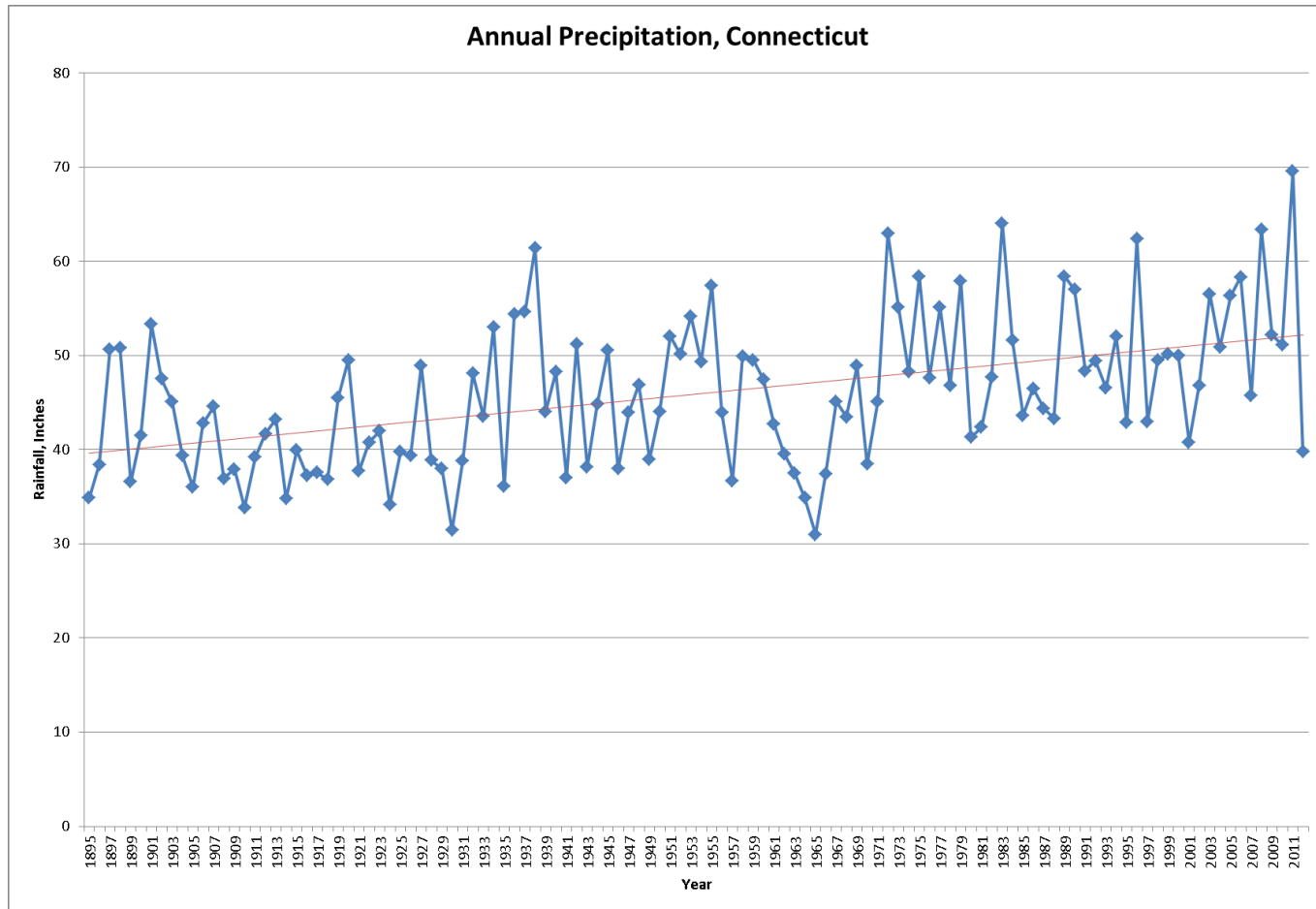
# Impact of Climate Change

- Precipitation values used in modeling are based upon historical climatic data
- Precipitation depth has been trending upward
- Sea levels have been increasing





# Impact of Climate Change



# Impact of Climate Change

- Analyzed mid-range scenarios to middle of century for 100-year storm event
- Projected 100-year 24 hour rainfall depth = 9.54 inches
- Water surface elevations increase for all scenarios





An aerial photograph of a river flowing through a green, forested landscape. A dam is visible in the distance, creating a reservoir. The image is partially obscured by a blue curved overlay at the top.

# Summary

- **Veteran's Park Dam exerts a backwater effect that significantly affects the 5 and 10-year water surface elevations**
- **All scenarios have benefits and key considerations which must be carefully weighed**
- **No scenario prevents 100-year flooding at 60 Cross Street, some scenarios reduce flood height**
- **Ellis Bog contributes to flooding at 60 Cross Street**

**Thank you!**

