St. Mary's Watershed Model and Mitigation Planning

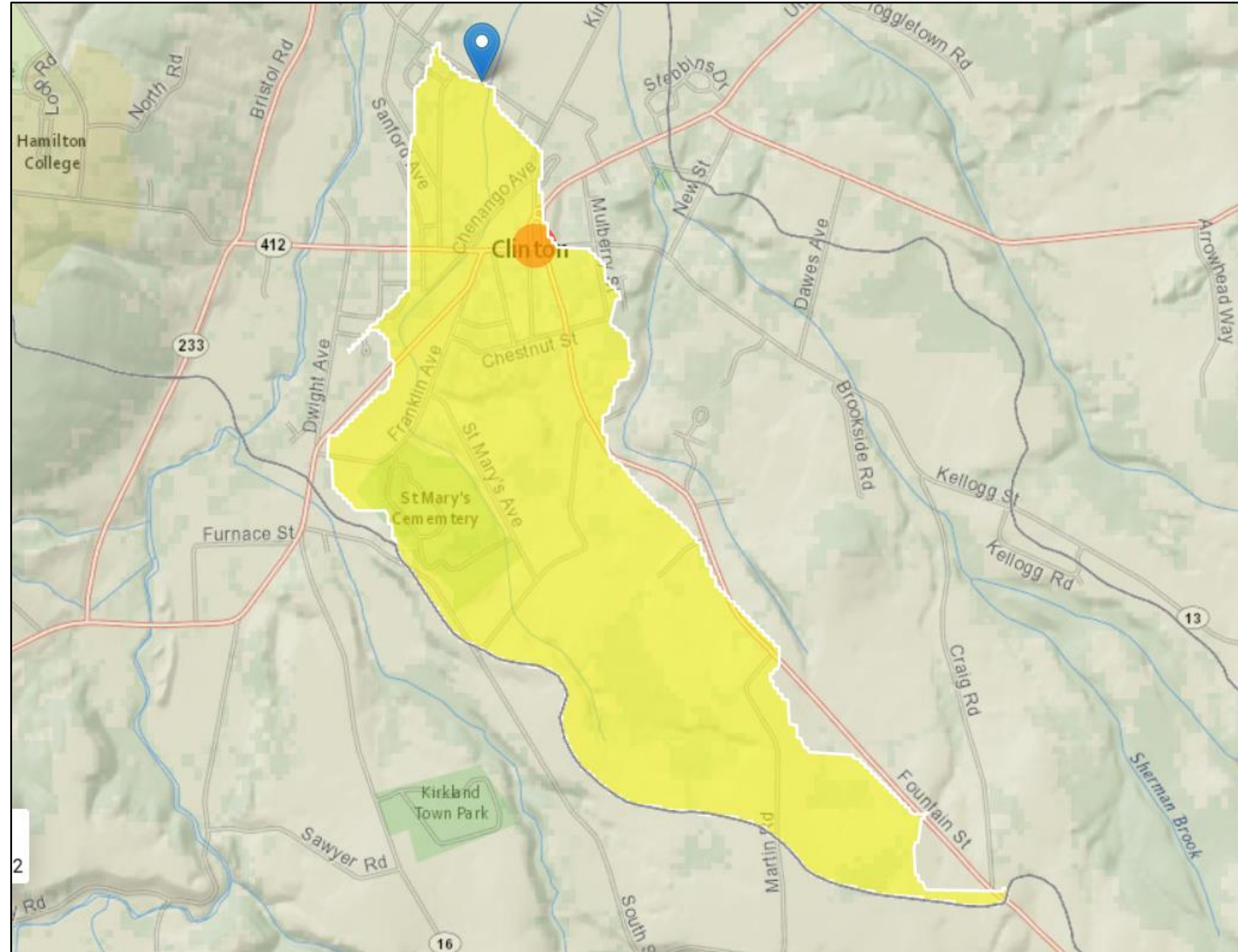## Town of Kirkland, New York

- ## Watershed Data

  Part of the greater 147 Sq. Mi. Oriskany Creek Watershed

  Area: 1.54 Sq. Miles*
 Mean Avg Precip: 39"
  Storage: 0%

  * As measured at the Norton Ave. Bridge

  Source: USGS Stream Stats™

Identified Problem Areas

Observed Problem Areas, St. Mary's Brook Watershed

Area Number	Description	Observed Issue	Perceived Corrective Action
1	South Street Detention Area	Low Area, Ponding, overtops Road	More upgradient detention/Lower Road
2	St. Mary's Cemetery Detention Area	Low Area for Detention, overtops structures	Increase Basin Size
3	Three driveways along St. Mary's Ave.	Driveway overtops, Erosion	Increase culvert size(s)
	Franklin Ave Crossing	Limited conveyance capacity	Upsize Channel and Culverts
	Chenango Avenue	Undersized culvert and channel	Upsize channel and culverts
4	Rt. 12B Box Culvert, circular culvert and Channel	Undersized culvert(s) and channel	Upsize channel and culverts
5	Box Culvert at Milk House Apartments	Undersized Culvert/plugging problem	Increase Culvert Capacity
6	College St. Culvert	Undersized Culvert - overflows Street	Add Parallel Culvert
	Clinton High School	Open Channel Capacity/overflows	Extend culvert /enclosed section
7	Box Culvert at Bus Loop	Culvert Undersized	Upsize Culvert
	Channels Through Athletic Fields	Channel Capacity	Increase channel capacity/flow rate or add underground detention.
8	Norton Ave Culvert(s)	Bridge/Culvert undersized	Replace to increase capacity
	Channel through Agricultural Fields	Confined Channel with low capacity	Increase channel capacity. Provide downgradient detention to mitigate increased flow rates
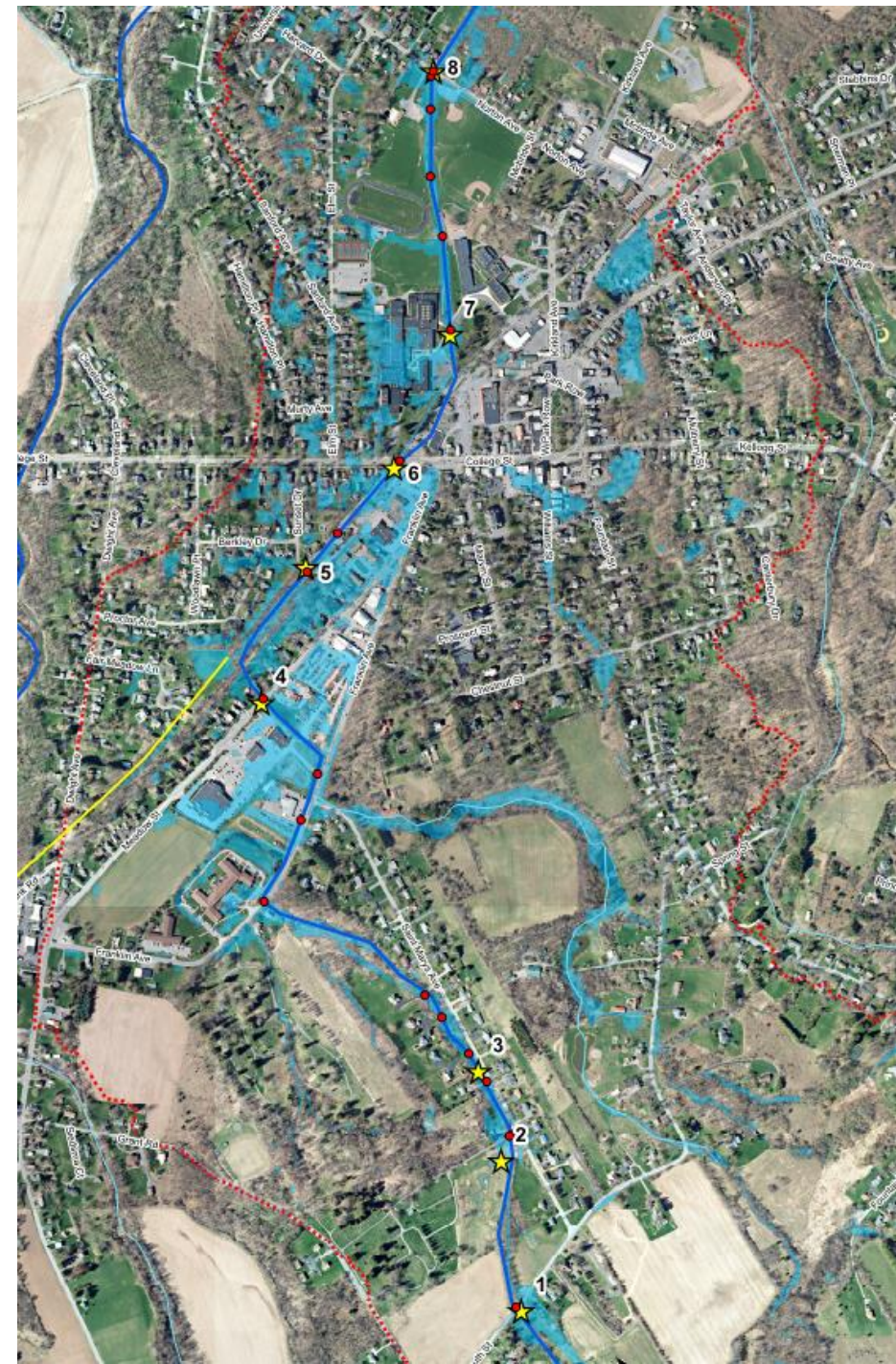
Data Collection Phase

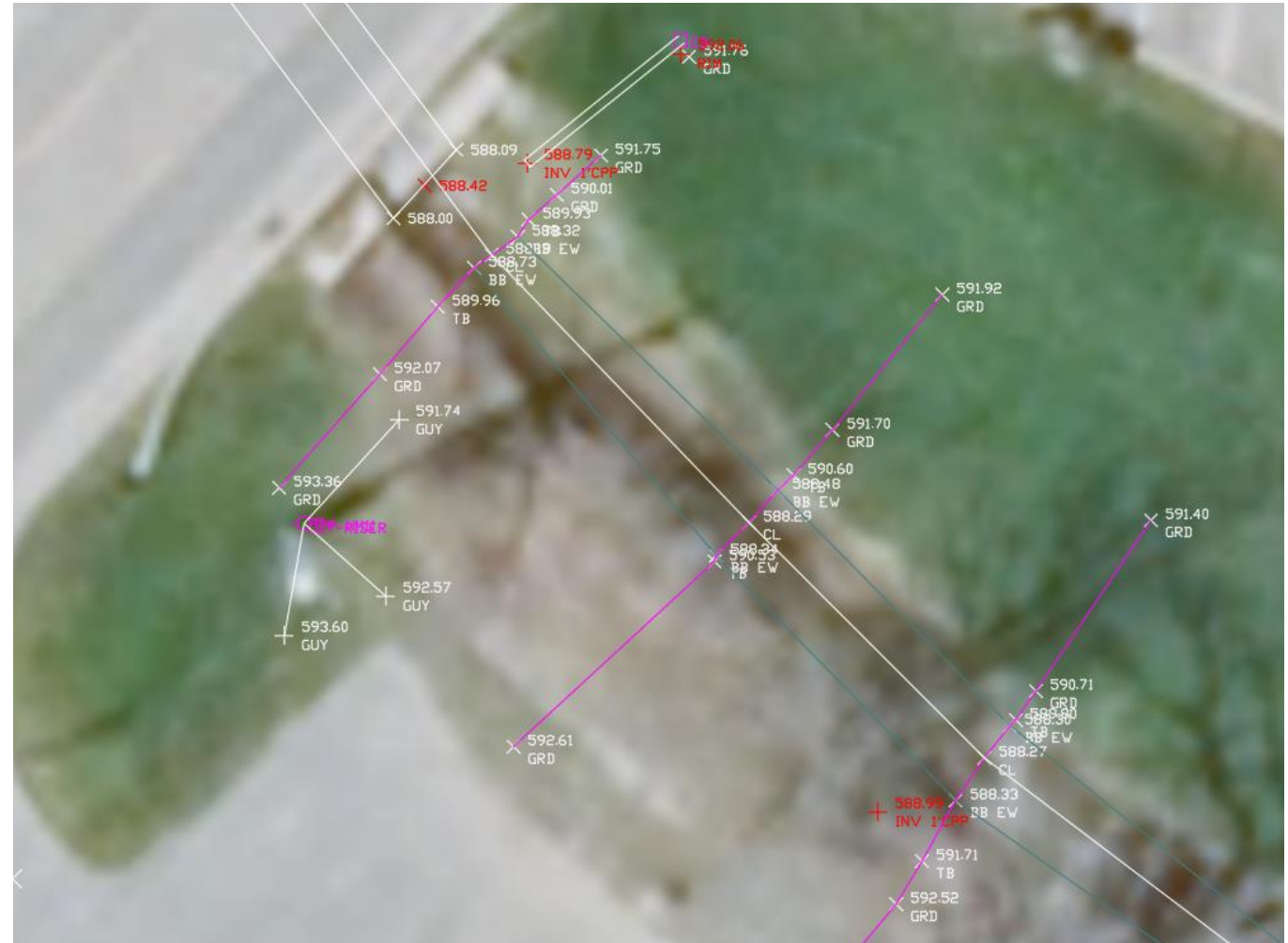- **Compilation and review of available mapping and aerial photography**
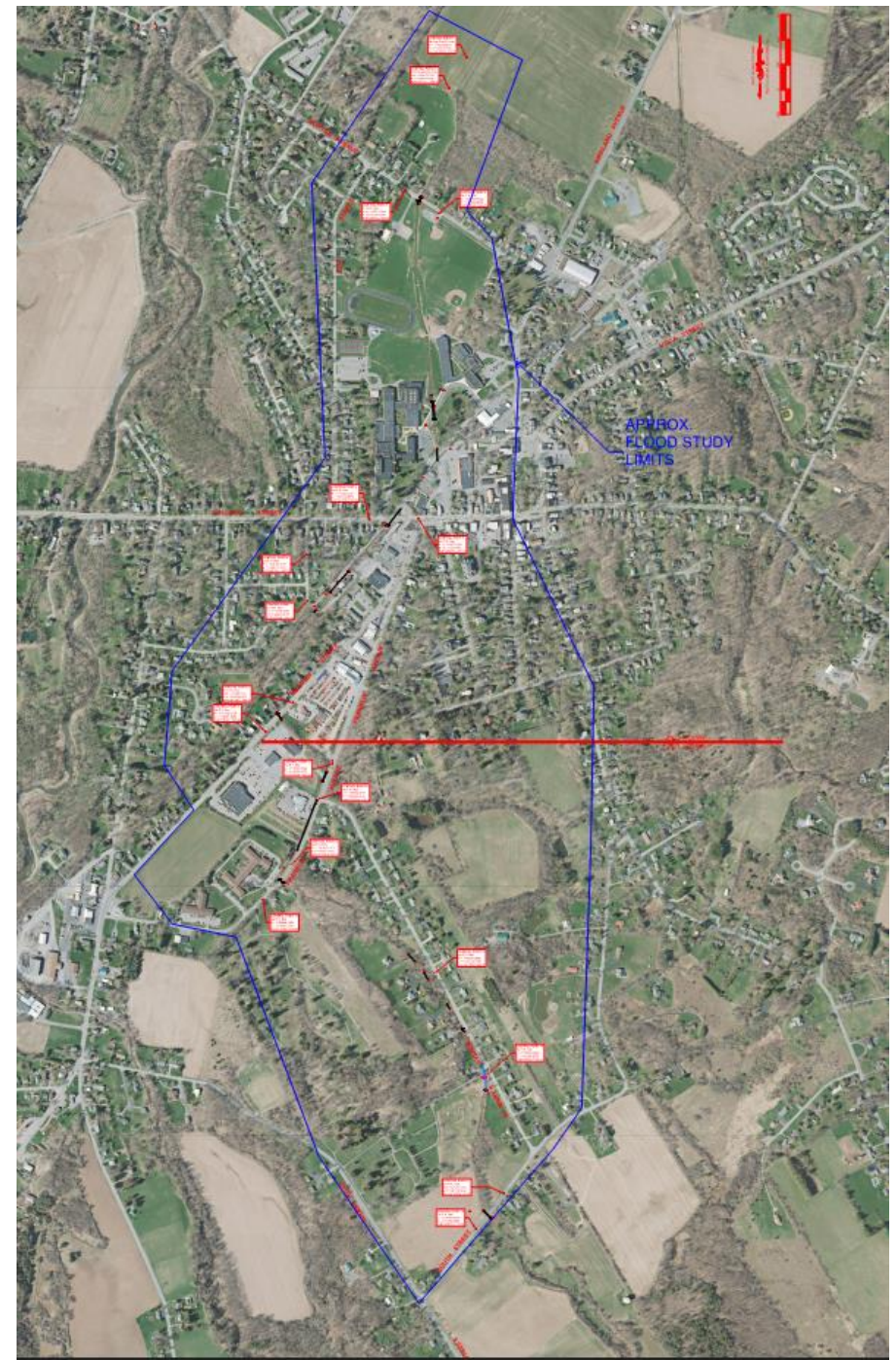
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- Compilation and review of available mapping and aerial photography

- **Visual inspection (North Atlantic Aquatic Connectivity Collaborative (NAACC) protocols)**

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- **Topographic survey of stream crossings and cross sections**

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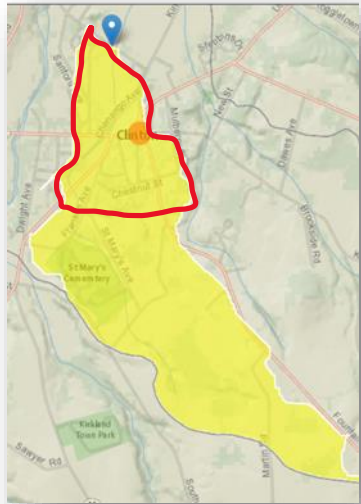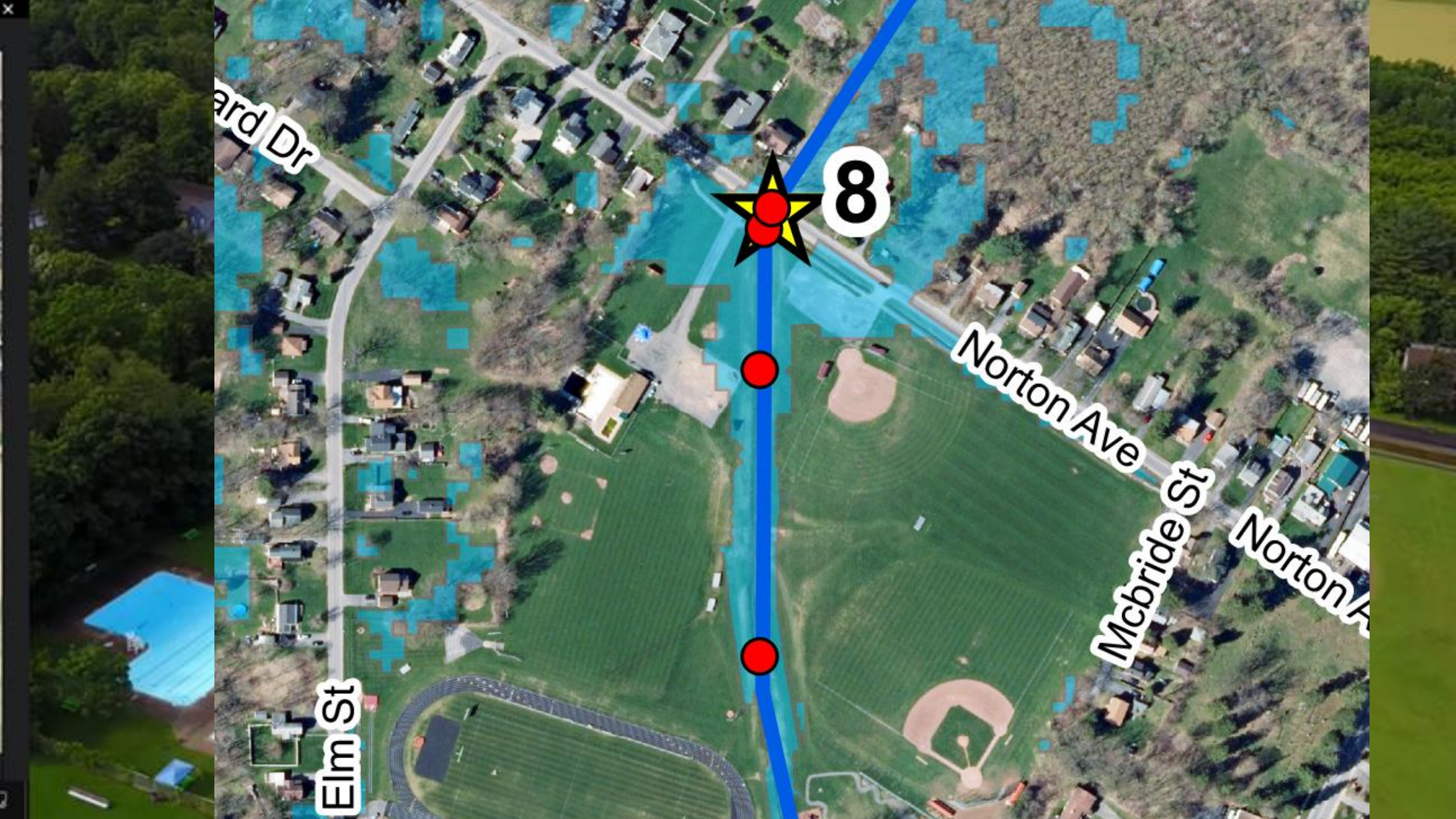- **Detailed topographic survey of specific study areas**

Baseline Model- South End

Existing Conditions
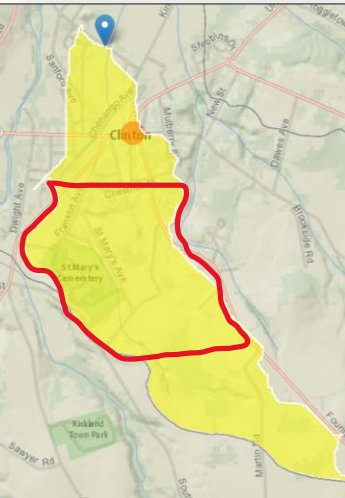
Baseline Model- North End

Existing Conditions

8

ard Dr

Norton Ave

Mcbride St

Norton A

Elm St

College St

Sunset Dr

Franklin Ave

Berkley Dr

Marvin St

Prospect St

6

5

Marvin

Franklin Ave

Sunset Dr

5

9

Mitigation Measures

- **Maximize Upland Detention**

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- **Re-Size culverts**

Mitigation Measures

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- Re-Size culverts
- **Re-Size channels and choke-points**

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- **Maximize benches, where possible**

Mitigation Measures

- Maximize Upland Detention
- Re-Size culverts
- Re-Size channels and choke-points
- Maximize benches, where possible
- **Rehabilitate open channels**

Mitigation Difficulties

- Low Overall Slope
  0.0069 ft/ft

- Localized channel slopes as low as
  0.0035 ft/ft

- Low-lying roadways limiting depth of culverts and channels to less than 4'.

- Flood Plains documented at key locations may prohibit some measures.
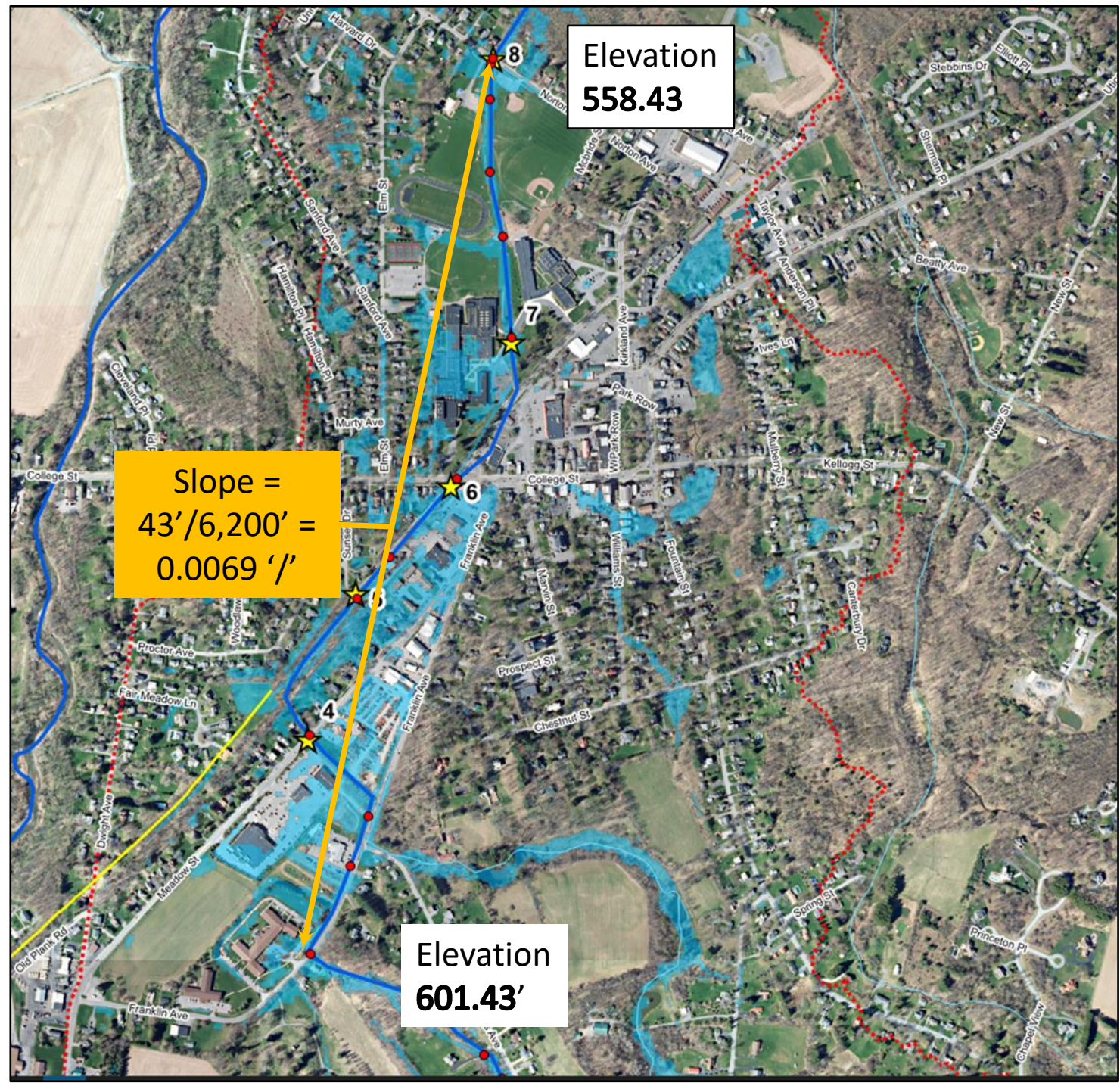
# Preliminary Mitigation Effectiveness – 100 Yr Periodicity Storm

Scenario 1: Upland Areas

1. Expand/Modify Detention Basin(s) at St. Mary's Cemetery
2. Add 48" overflow culvert at South Street to prevent overtopping
3. Lower South Street by approx. 3' to 1980's elevation
4. Increase all driveway culverts to 5' diameter Corrugated Metal Pipe
5. At VFW, replace single 4' CMP to 10'x4' Concrete Box Culvert with headwall

Location ID	Existing Flow	Modeled Flow	% Reduction
Outlet of St. Mary's Cemetery	586 CFS	241 CFS	59%
Franklin Ave Cross-Culvert	623 CFS	228 CFS	63%
Culvert at VFW	597 CFS	190 CFS	68%

Scenario 1

Graphical Model Results

New VFW Culvert 10'x4'

3 Driveways

St. Mary's Detention Area

South Street
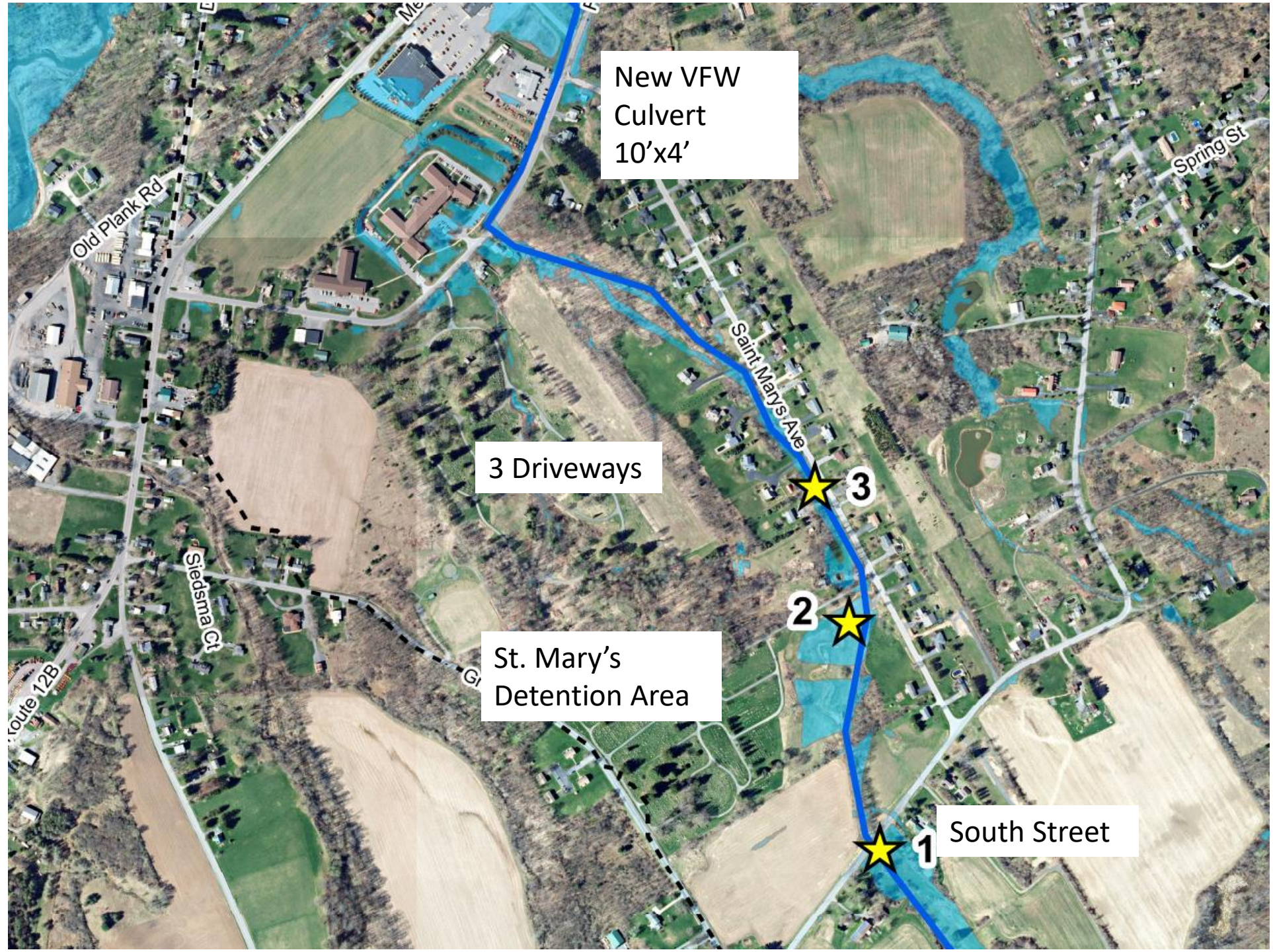
Software Utilized

- HEC-RAS™ - Primary Modeling Software

- Bentley CulvertMaster™ - Existing and Proposed Culvert Analysis

- FHWA HY-8 – Existing and Proposed Culvert Analysis

- HydroCad™ - Channel Capacity Analysis, minor runoff calculations

Questions?