North Central Texas Council of Governments

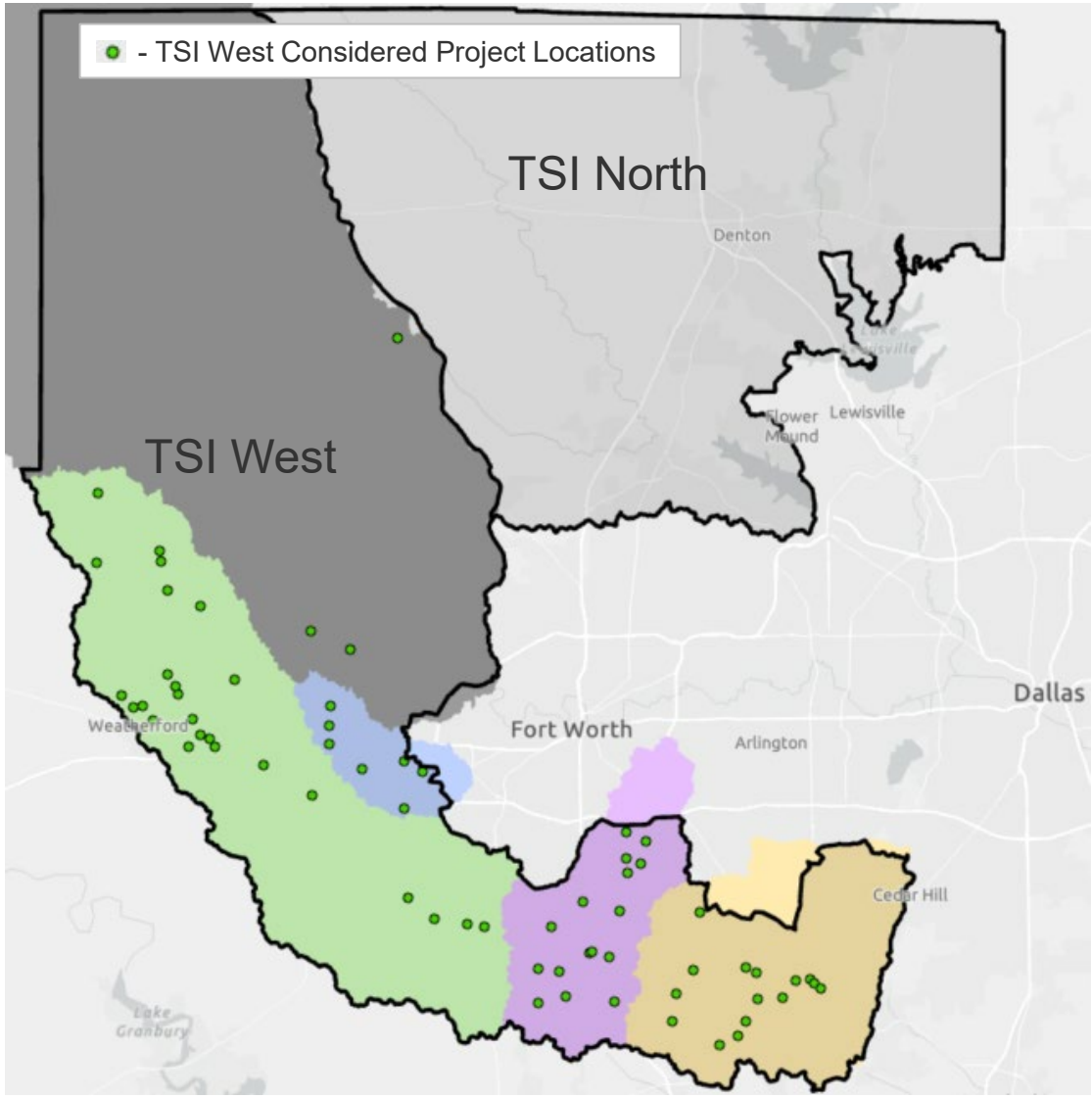
# Alternatives Analysis

Funded by the Texas General Land Office, Community Development Block Grant, Disaster Recovery Program.

Also Funded by the Texas Water Development Board and Texas Department of Transportation.

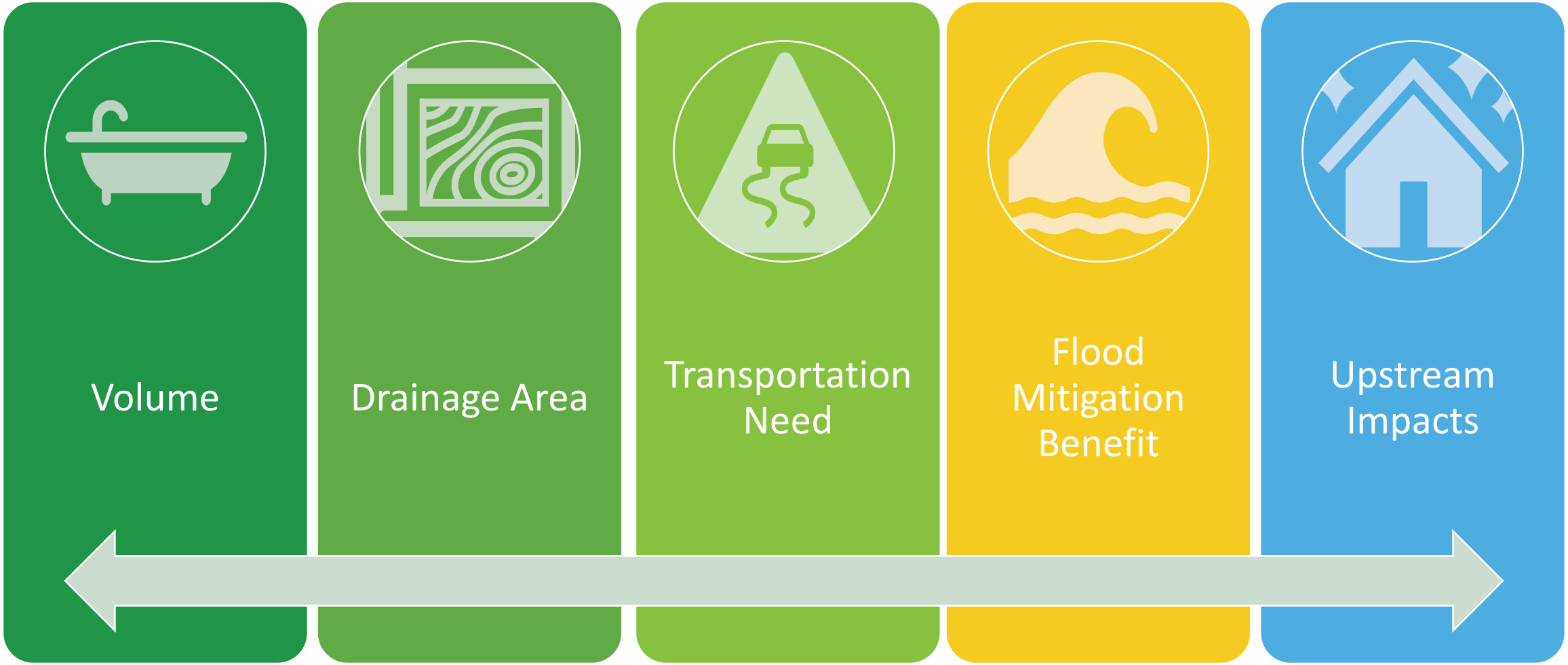
# Flood Mitigation Alternatives

- Goal of reducing current and future flows
- Considerations:
  - Effective flood reduction?
  - Avoids negative impacts?
  - Downstream flooding/Economic benefits?
  - Future transportation improvements?
- Highest Priority Locations
  - Clear Fork at Sarra Ln
  - Chambers Creek at Enon
  - South Mary's Creek at IH-20
  - Village Creek at FM 731



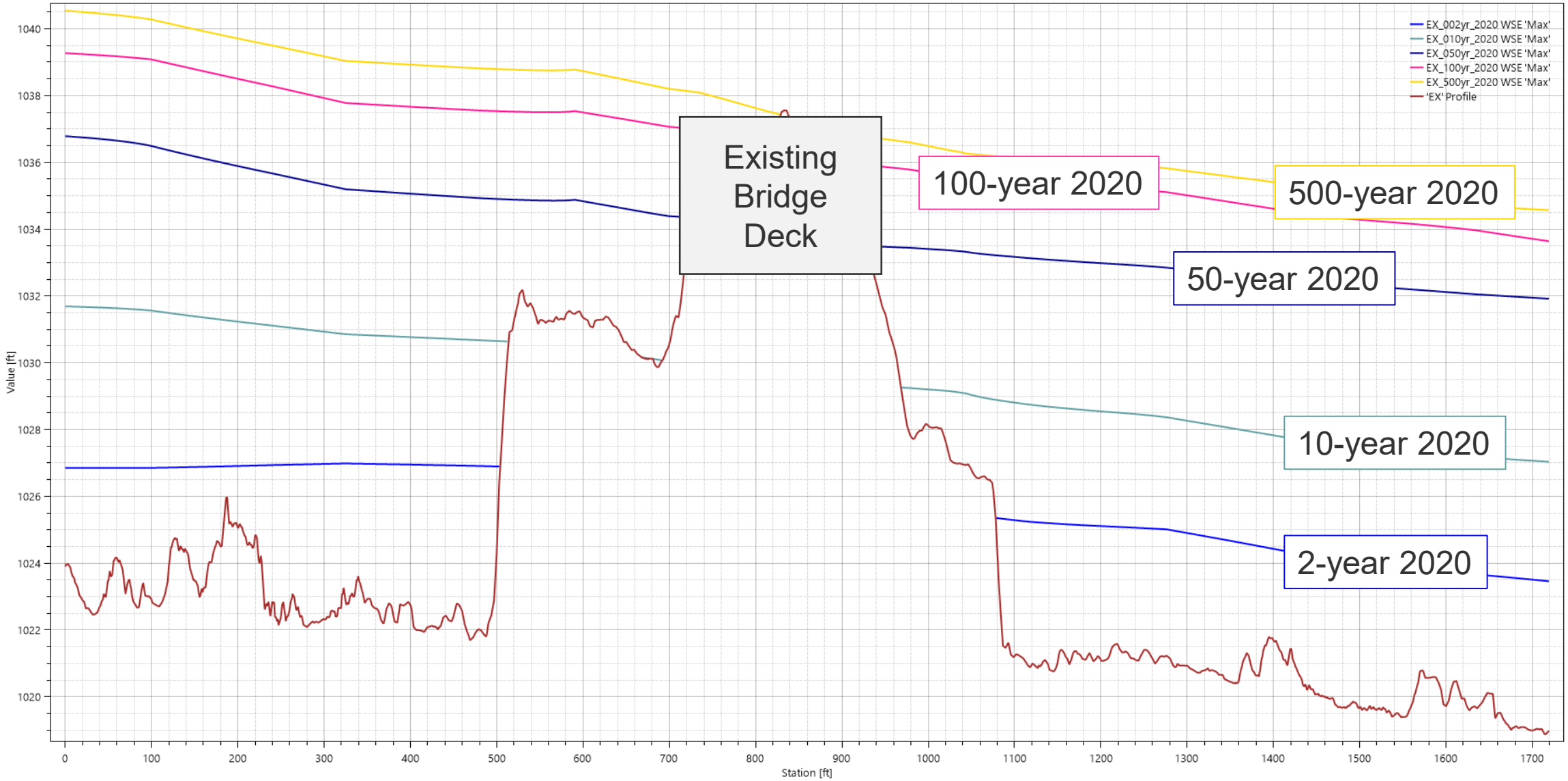

integrating Transportation & Stormwater Infrastructure

# Project Identification Process

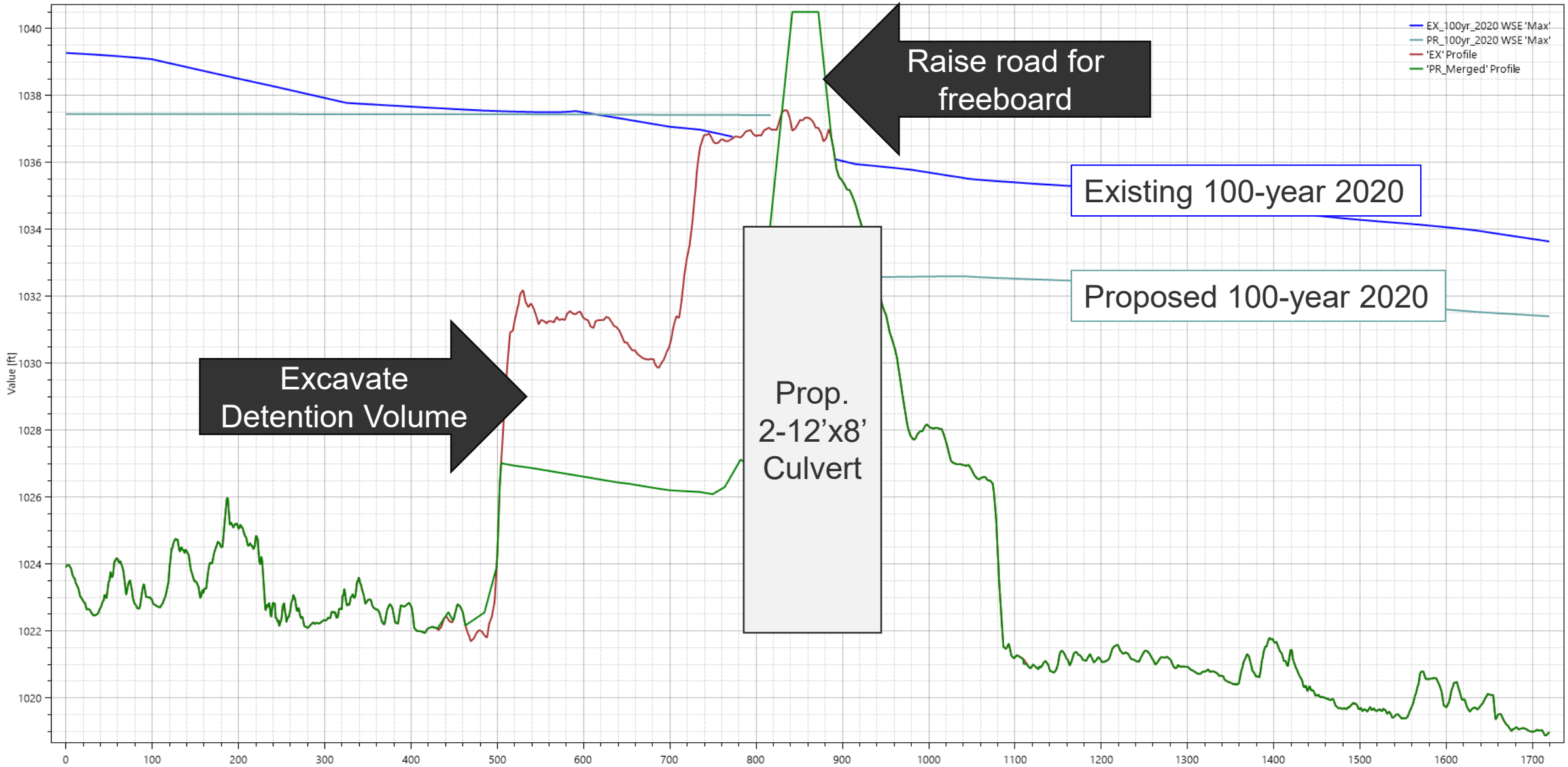



integrating **Transportation & Stormwater Infrastructure**

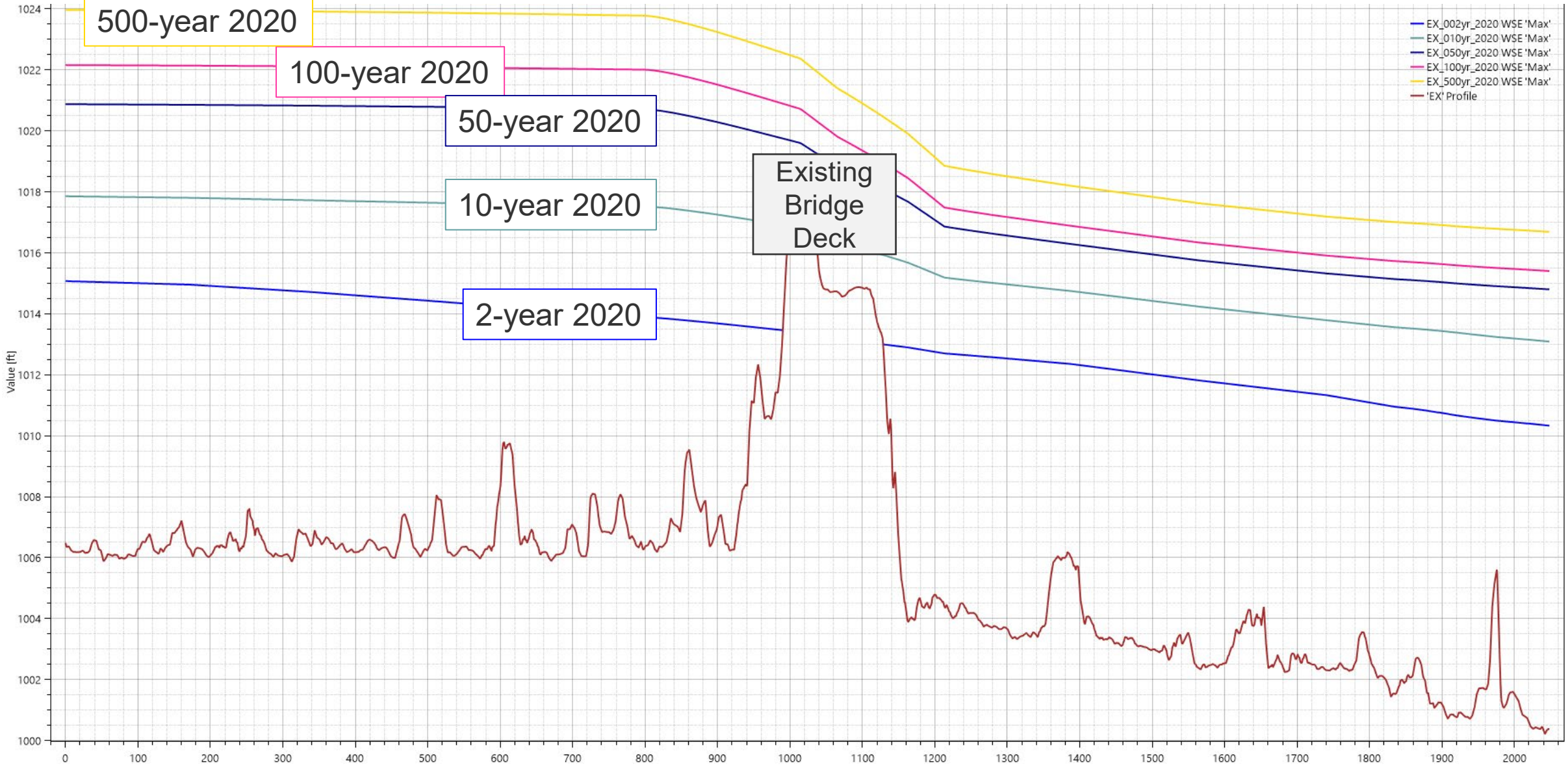
# Town Creek at Bowie Drive



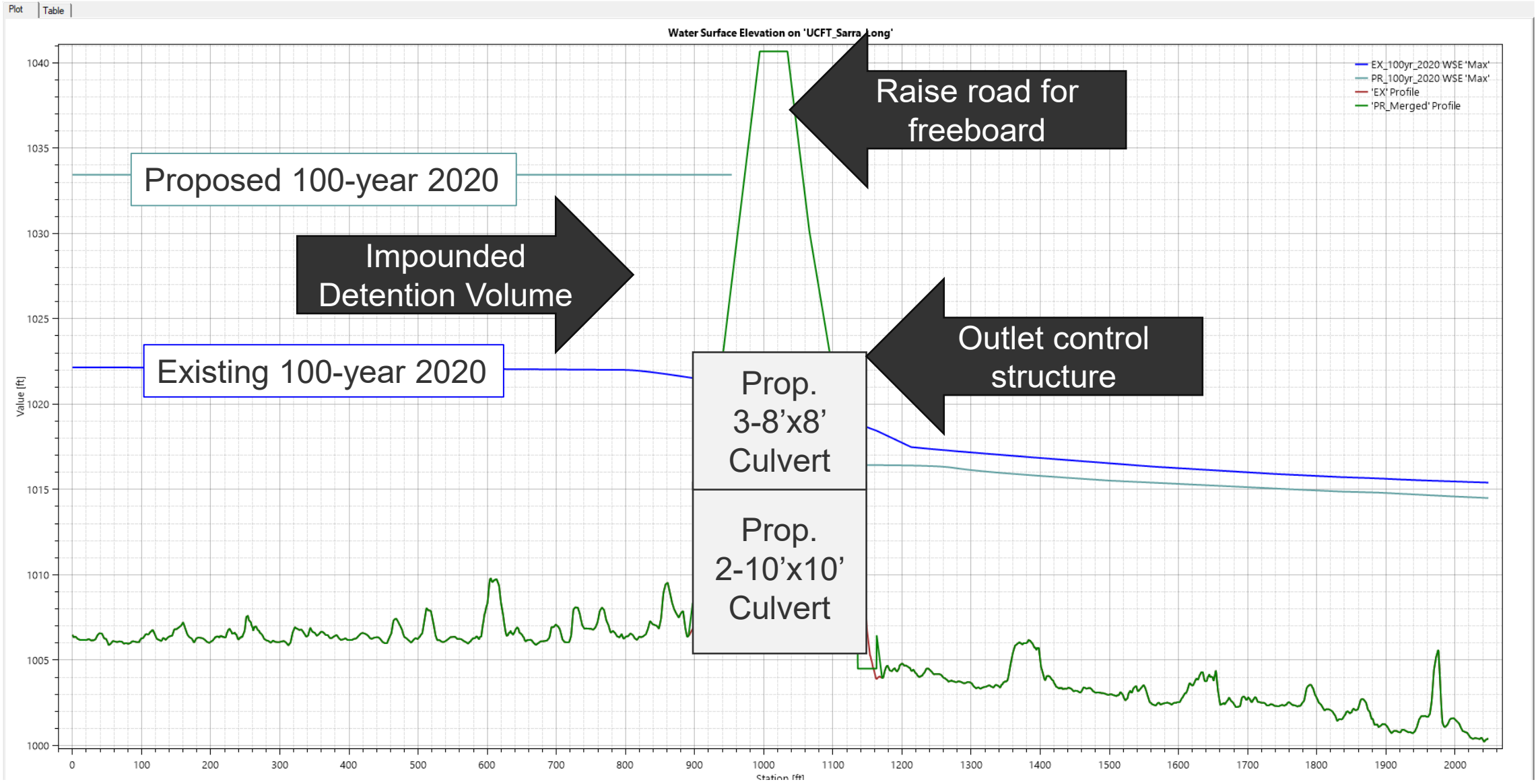
# Town Creek at Bowie Drive



# Clear Fork at Sarra Lane

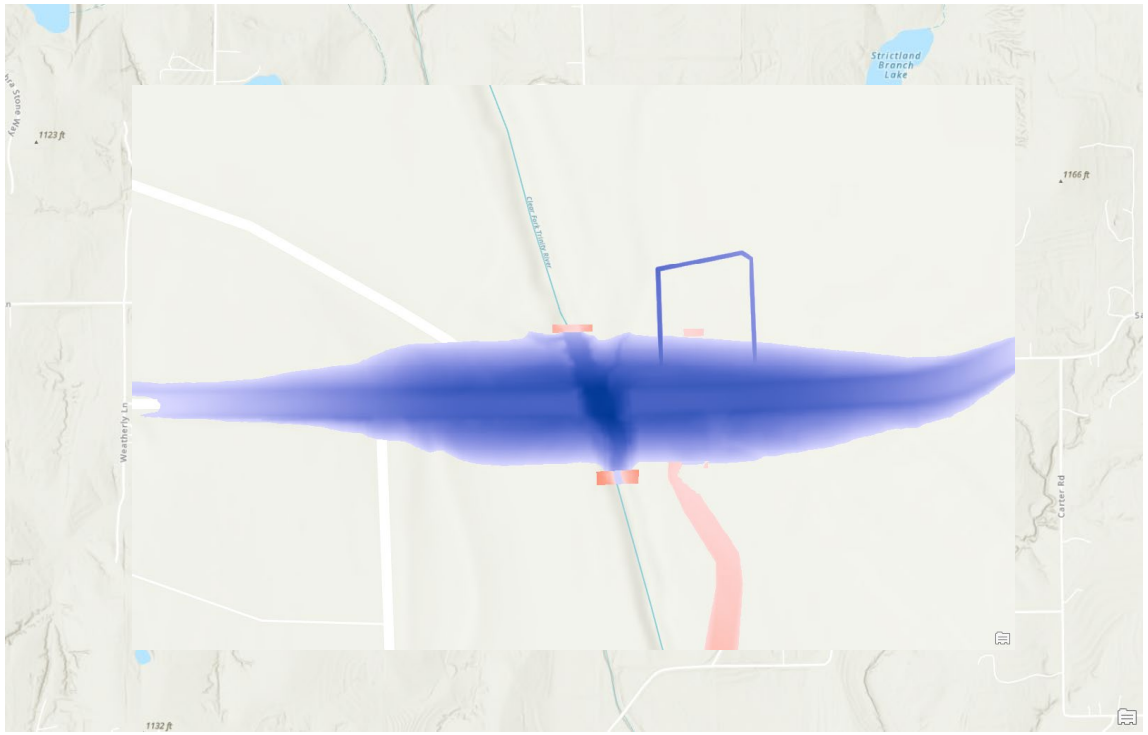


# Clear Fork at Sarra Lane

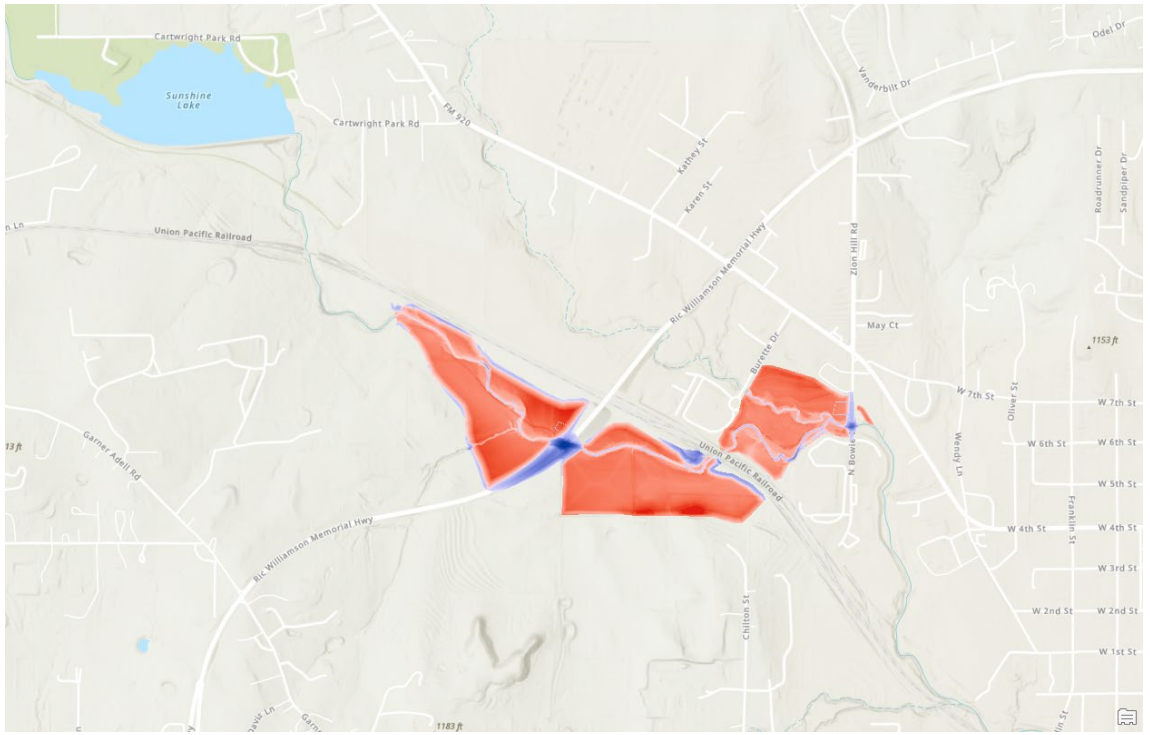


# Excavation vs Impoundment

## Sarra Lane (Impoundment)




## RWMH & Bowie Drive (Excavation)

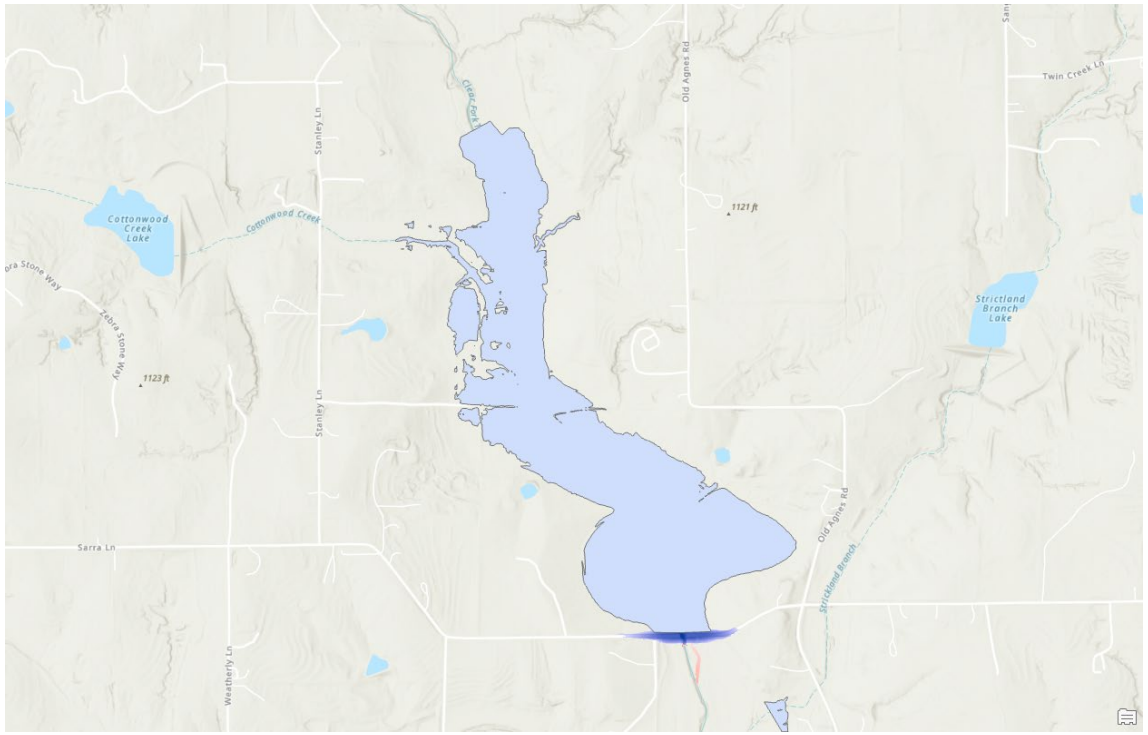



integrating **Transportation & Stormwater Infrastructure**

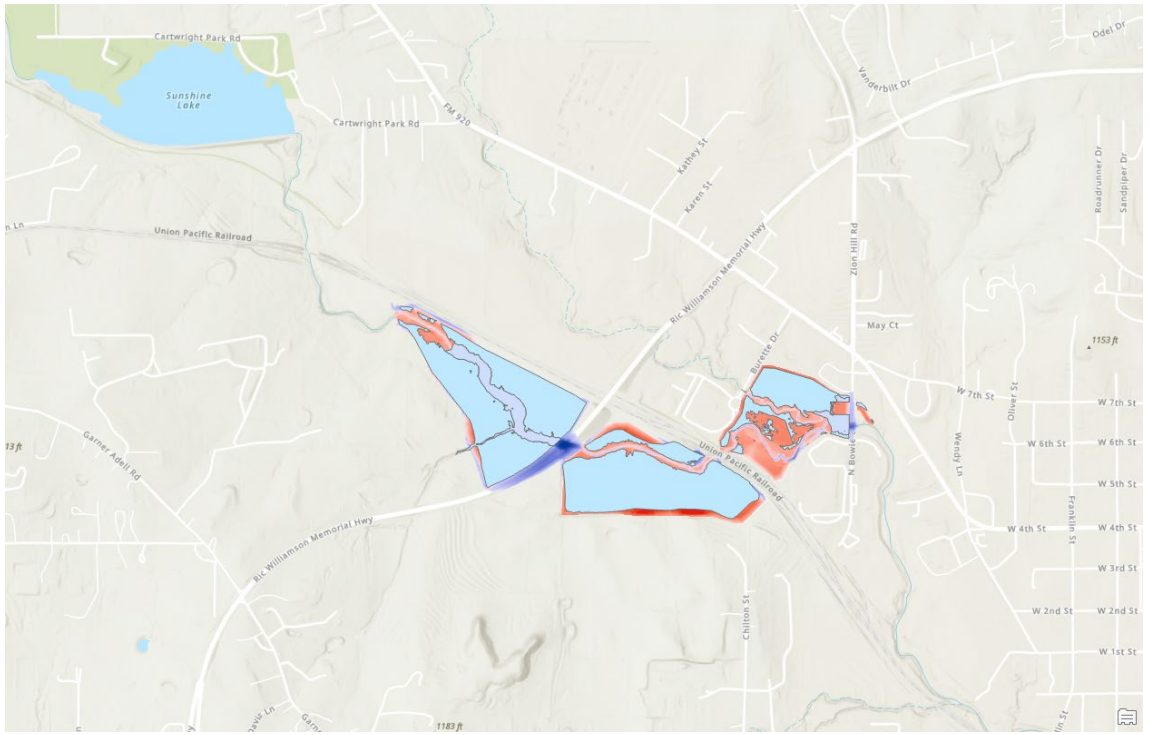
Fill Cut

# Excavation vs Impoundment

## Sarra Lane (Impoundment)




## RWMH & Bowie Drive (Excavation)




integrating Transportation & Stormwater Infrastructure

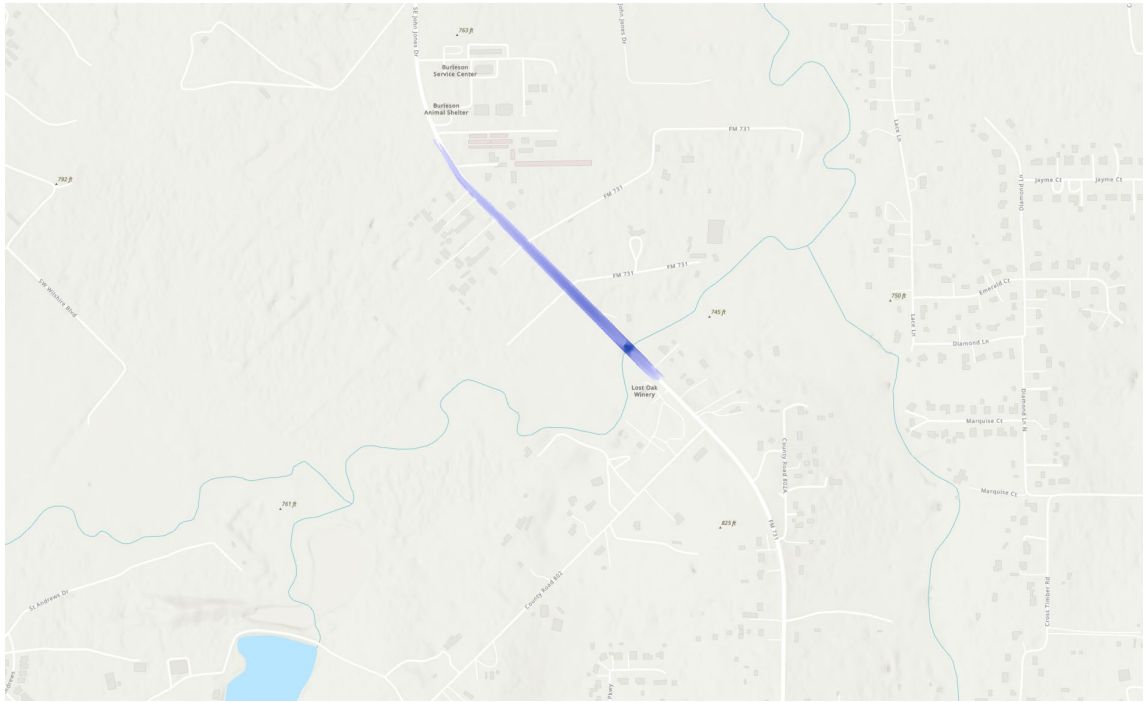
Fill

Cut

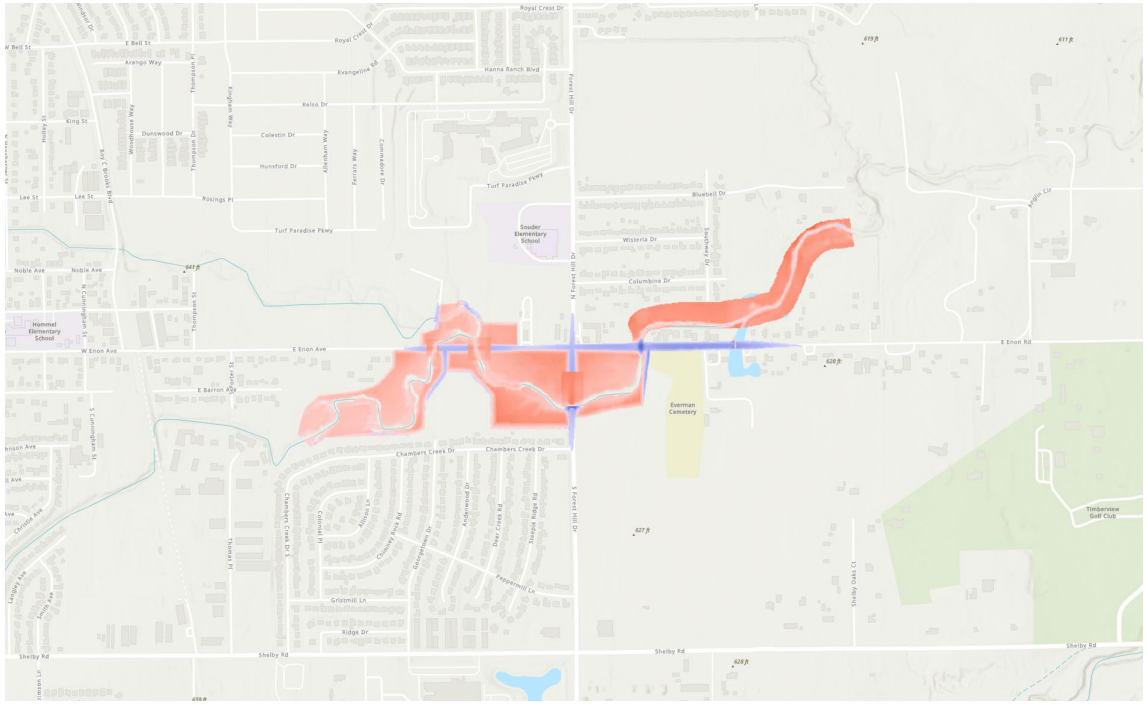
Inundation Zone

# Excavation vs Impoundment

## Village Creek at FM 731 (Impoundment)




## Chambers Creek at Enon (Excavation)




integrating **Transportation & Stormwater Infrastructure**

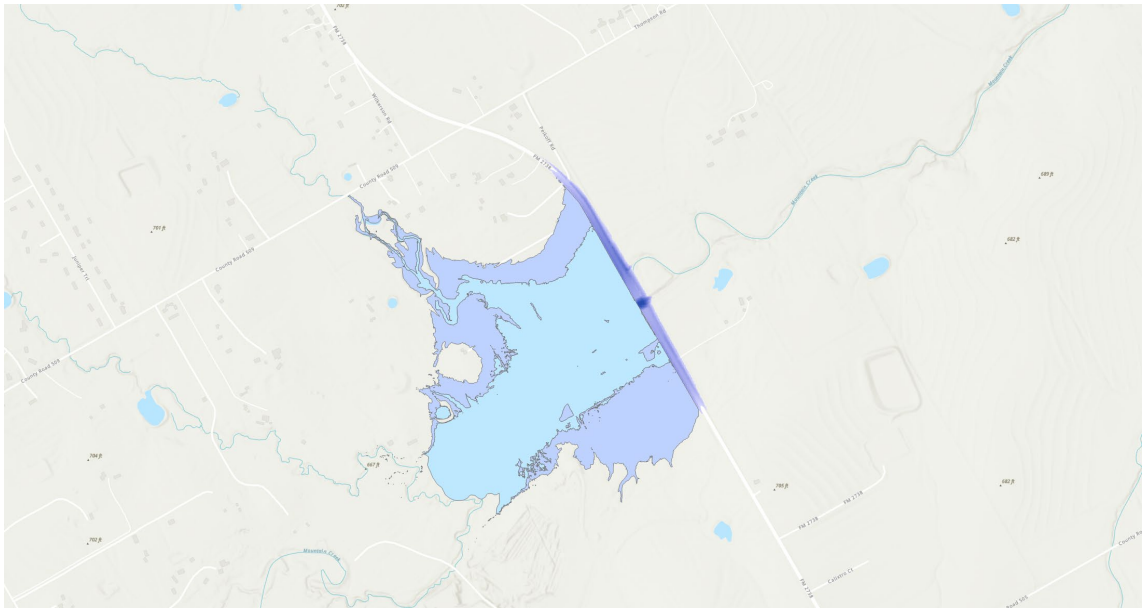
Fill Cut

# Projects in Series

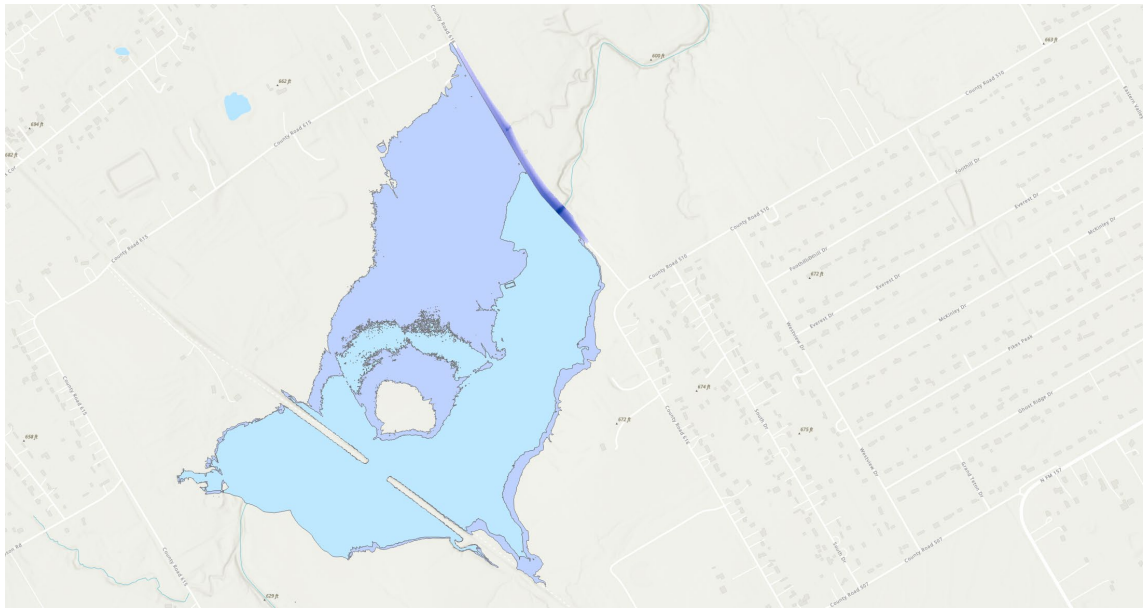

integrating Transportation & Stormwater Infrastructure

# Projects in Series

## Mountain Creek at FM 2738



## Mountain Creek at CR 616



integrating Transportation & Stormwater Infrastructure

Fill

Cut

Inundation Zone

# Optimization Overview

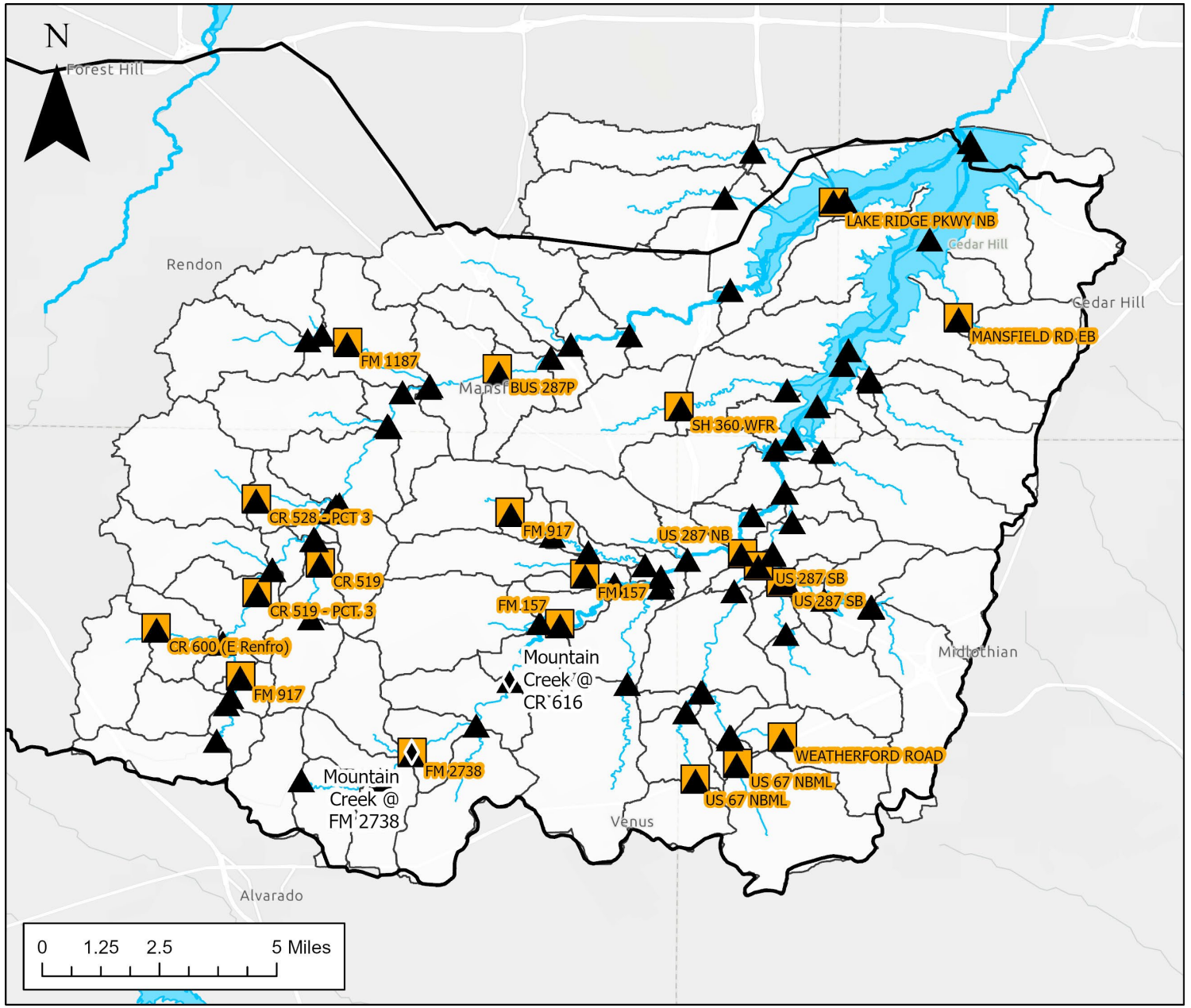
- The optimization study aims to model ideal **location and sizing** for storage and consider potential alternatives (e.g., detention, GSI/NBS) **to reduce future (2070) flows to current levels** due to anticipated land use changes.
- Collaboration with Study Partners:
  - Transportation: Locations for flow limits
  - Environmental: GSI/NBS alternatives for storage allocation

# Mountain Creek Watershed

- Theoretical Storage Required (to keep current flows from increasing):
  - **21,000 acre-ft**


**Legend**

- TSI Study Area
- HEC-HMS Subbasins
- HEC-HMS Reaches
- HEC-HMS Main Reaches
- Waterbodies
- HEC-HMS Junctions
- Prioritized Junctions (TxDOT Bridges)
- Potential Projects

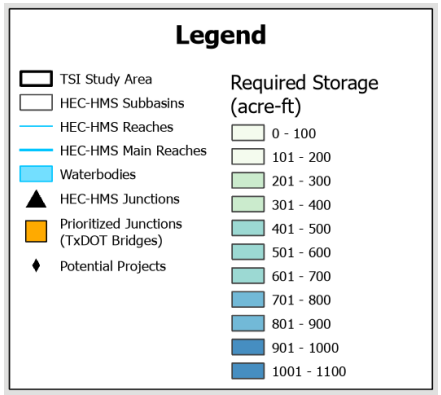


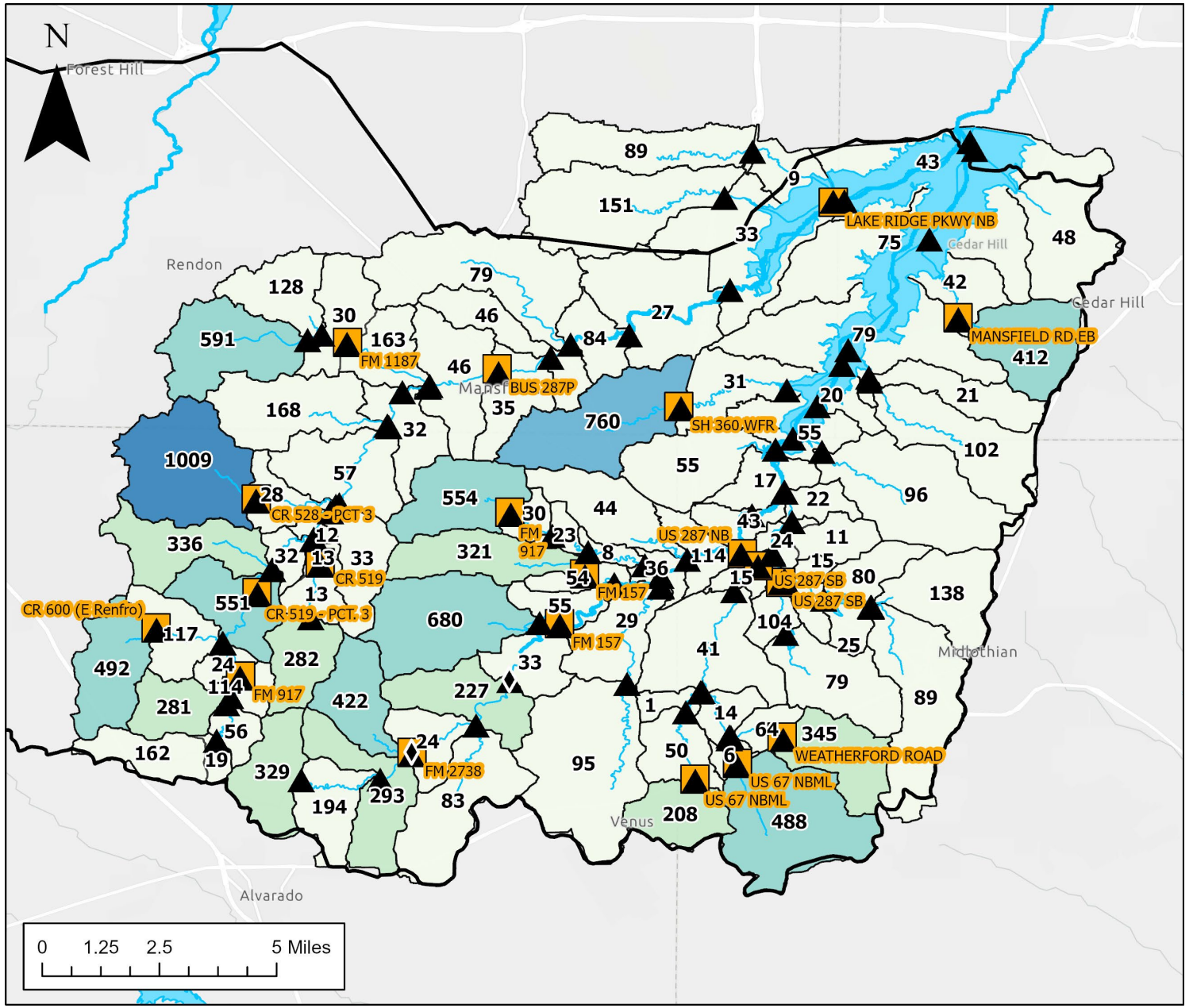

integrating **Transportation & Stormwater Infrastructure**

Note: All results are considered preliminary and are subject to change.

# Mountain Creek Watershed

- Theoretical Storage Required (to keep current flows from increasing):
  - **21,000 acre-ft**
- Scenario 1 (local) Storage Required:
  - **12,710 acre-ft**

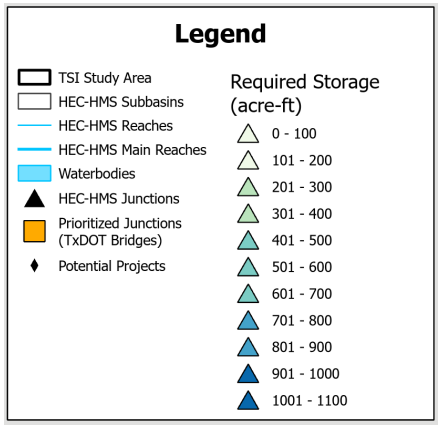



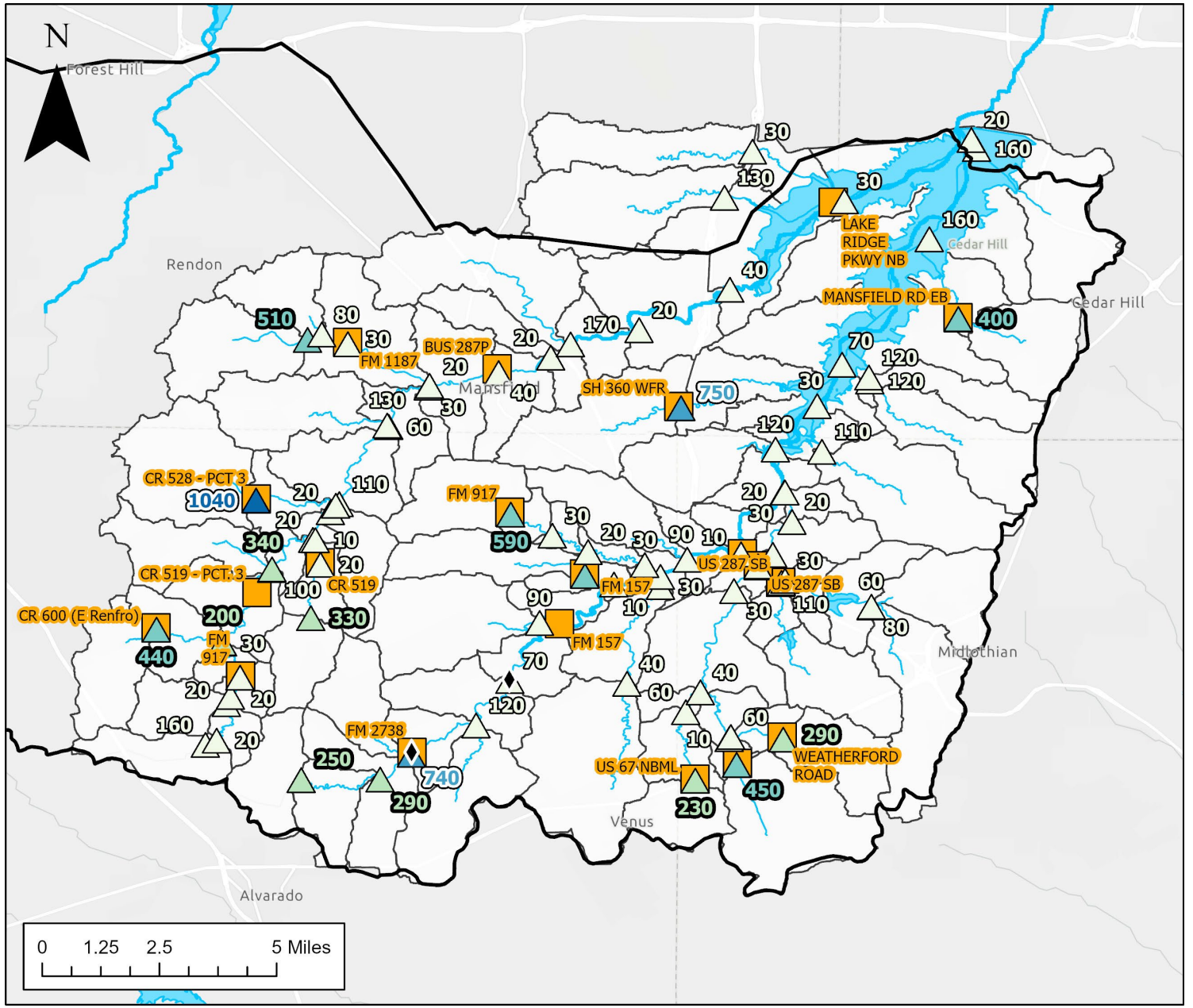




Note: All results are considered preliminary and are subject to change.

# Mountain Creek Watershed

- Theoretical Storage Required (to keep current flows from increasing):
  - **21,000 acre-ft**
- Scenario 2 (regional) Storage Required:
  - **10,970 acre-ft**

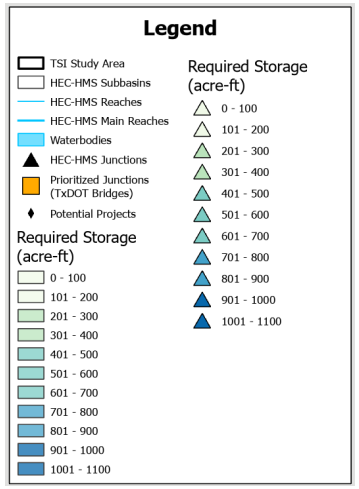



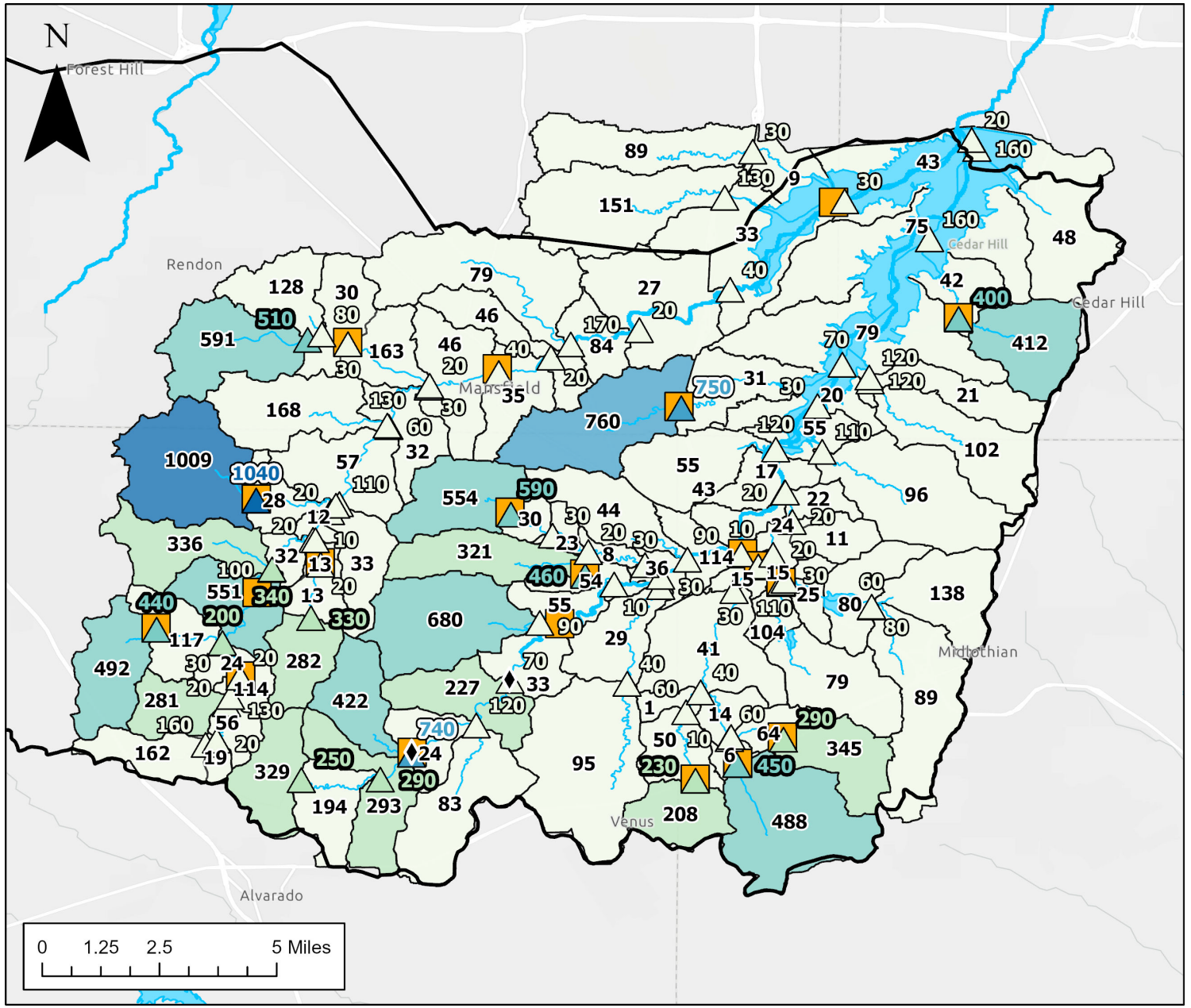




Note: All results are considered preliminary and are subject to change.

# Mountain Creek Watershed

- Theoretical Storage Required (to keep current flows from increasing):
  - **21,000 acre-ft**
- Scenario 1 (local) Storage Required:
  - **12,710 acre-ft**
- Scenario 2 (regional) Storage Required:
  - **10,970 acre-ft**
- **Regional Reduction: 1,740 acre-ft**

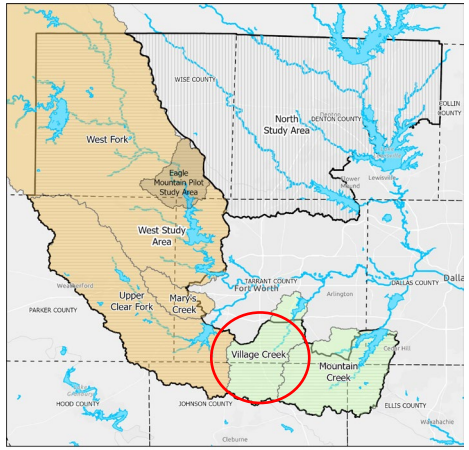




integrating **Transportation & Stormwater Infrastructure**

Note: All results are considered preliminary and are subject to change.

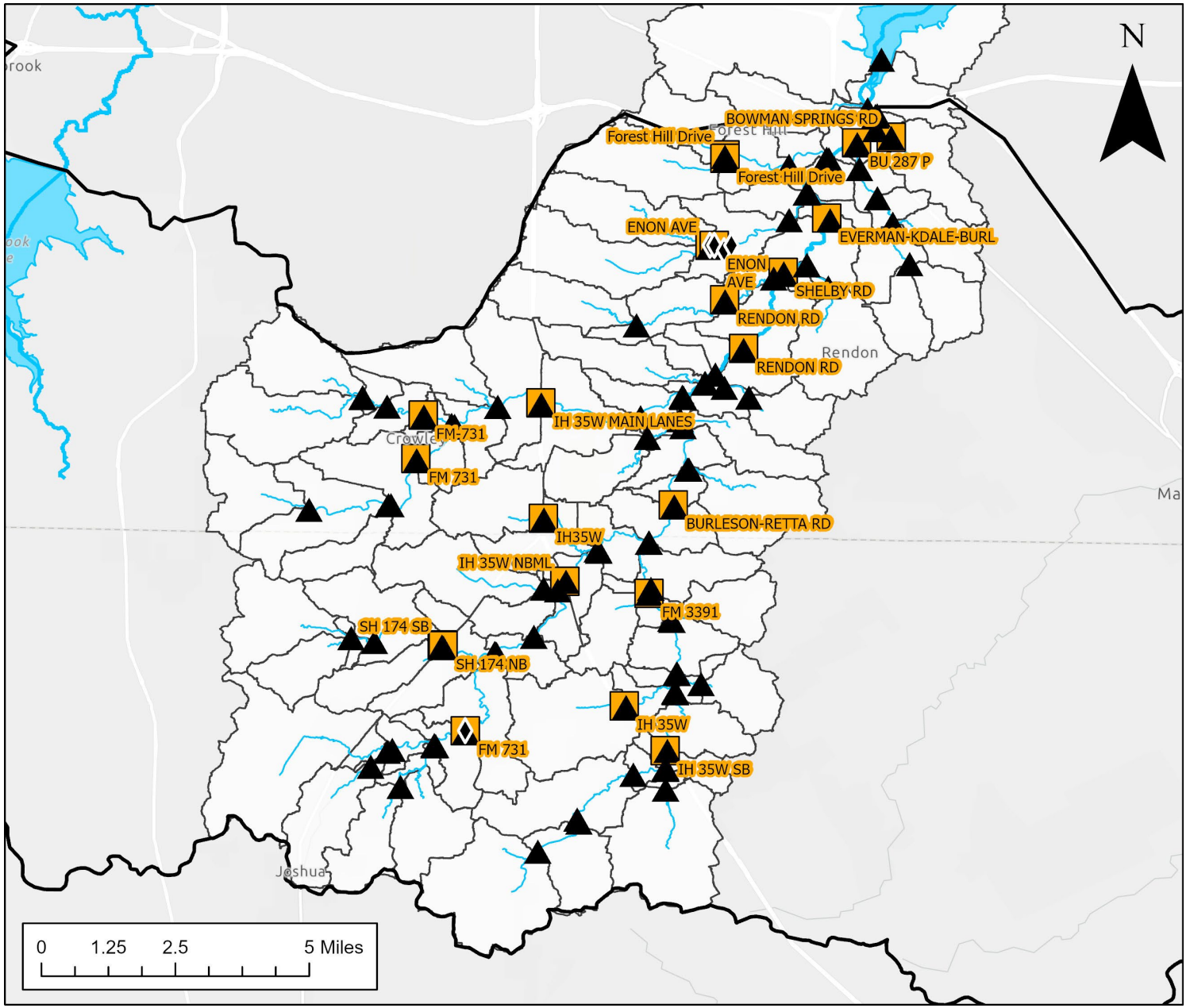
# Village Creek Watershed

- Theoretical Storage Required (to keep current flows from increasing):
  - **13,540 acre-ft**




**Legend**

- TSI Study Area
- HEC-HMS Subbasins
- HEC-HMS Reaches
- HEC-HMS Main Reaches
- Waterbodies
- HEC-HMS Junctions
- Prioritized Junctions (TxDOT Bridges)
- Potential Projects

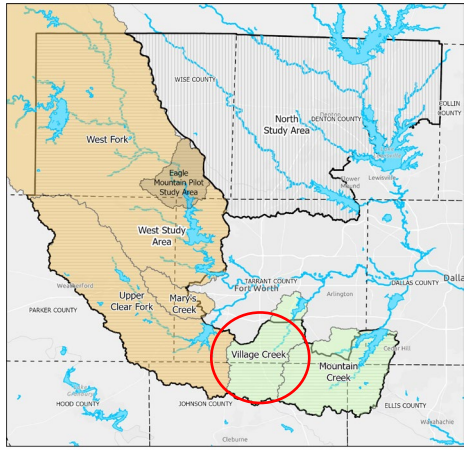



integrating **Transportation & Stormwater Infrastructure**

Note: All results are considered preliminary and are subject to change.

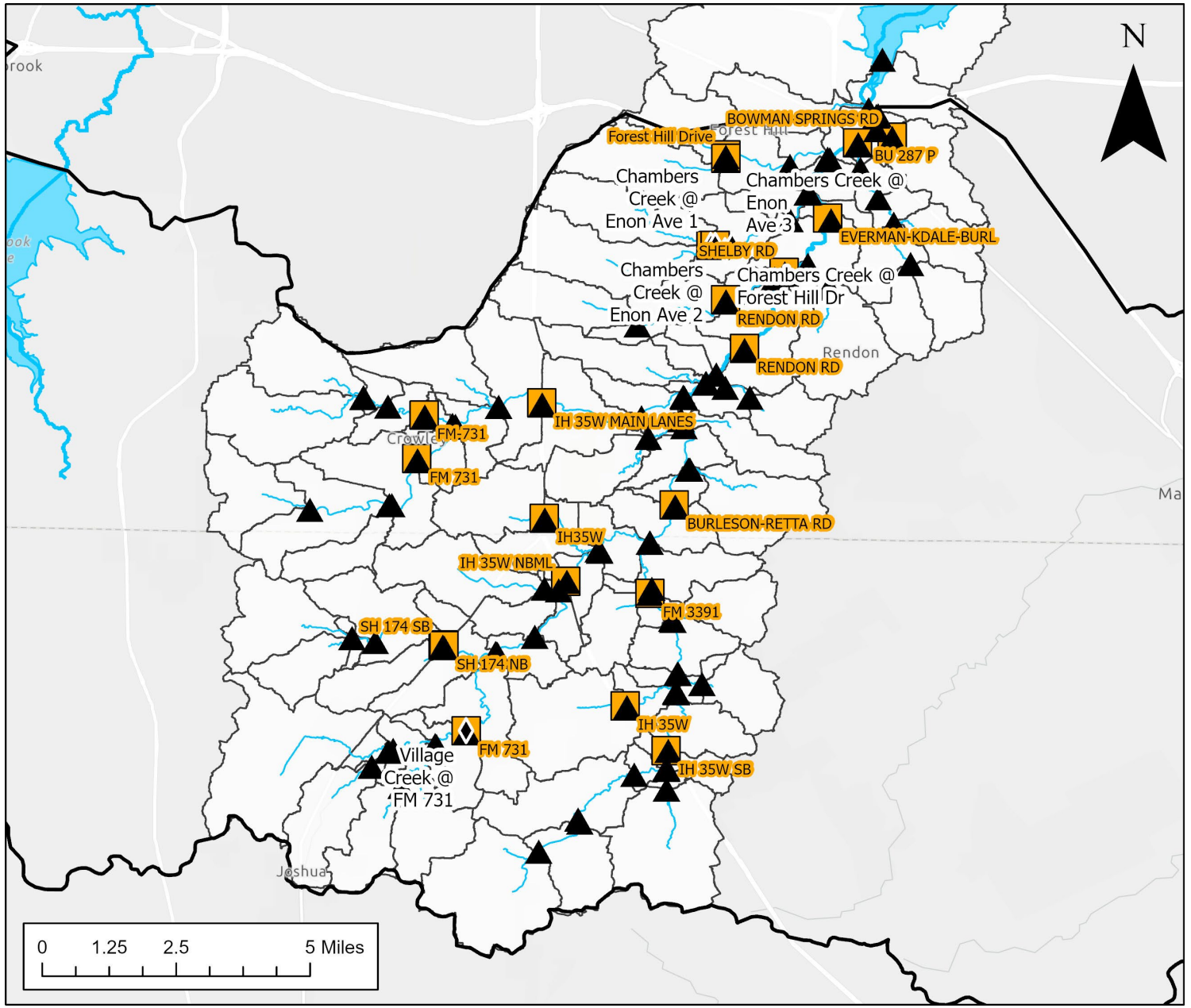
# Village Creek Watershed

- Theoretical Storage Required (to keep current flows from increasing):
  - **13,540 acre-ft**




**Legend**

- TSI Study Area
- HEC-HMS Subbasins
- HEC-HMS Reaches
- HEC-HMS Main Reaches
- Waterbodies
- HEC-HMS Junctions
- Prioritized Junctions (TxDOT Bridges)
- Potential Projects

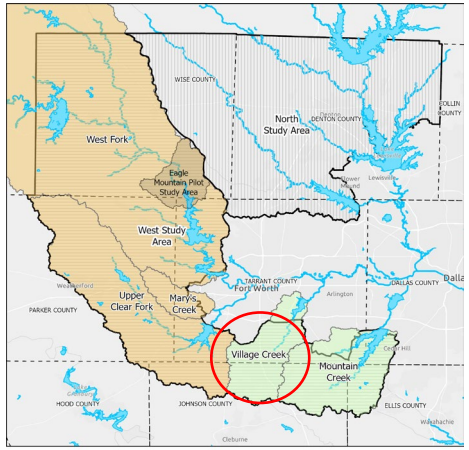


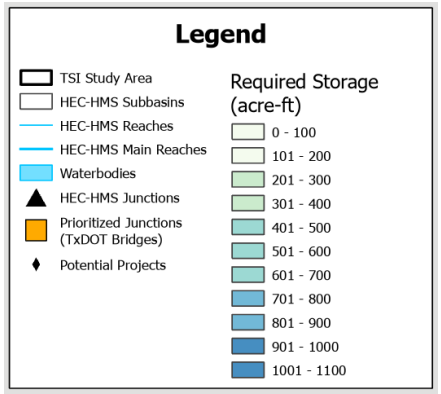

integrating **Transportation & Stormwater Infrastructure**

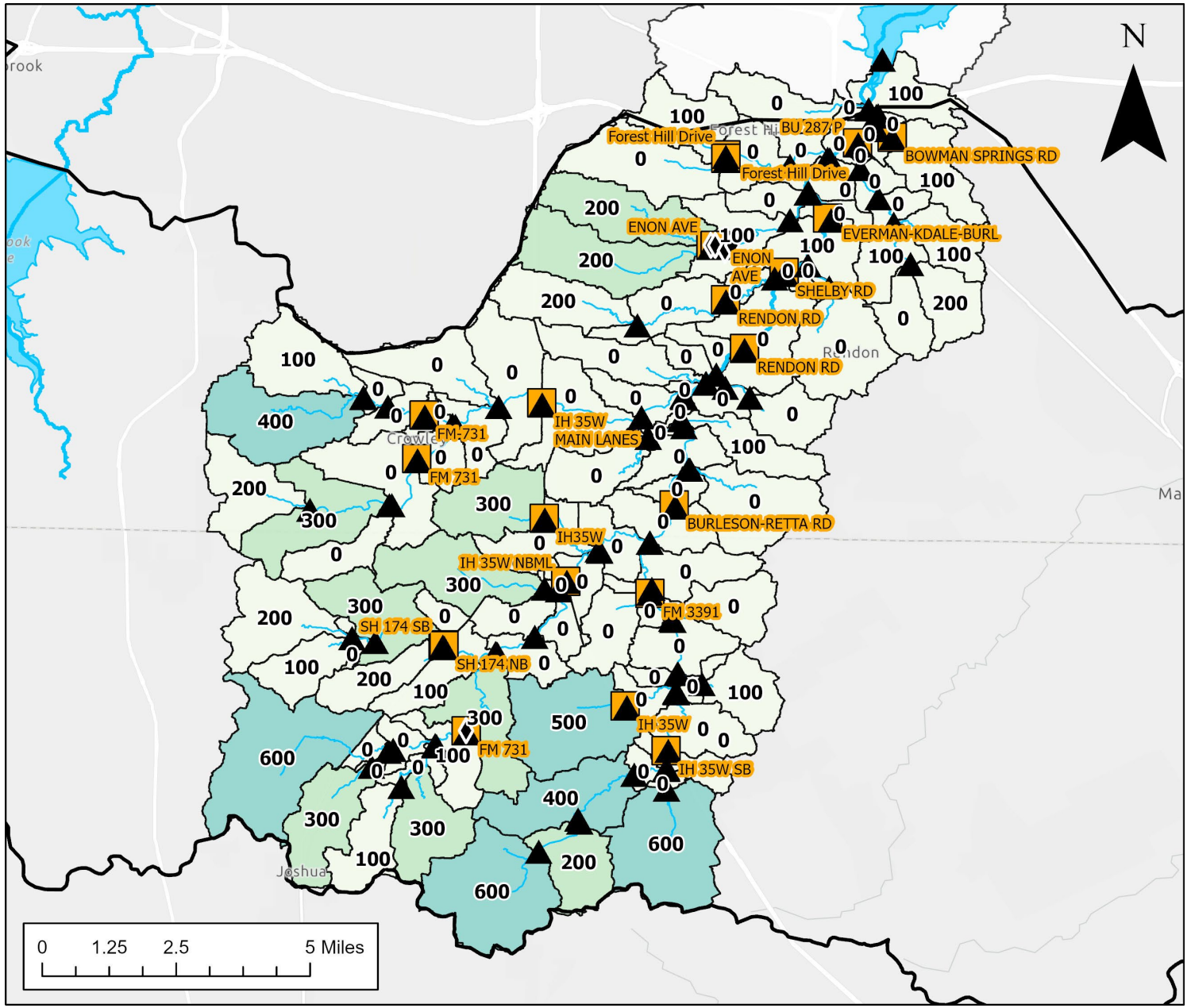
Note: All results are considered preliminary and are subject to change.

# Village Creek Watershed

- Theoretical Storage Required (to keep current flows from increasing):
  - **13,540 acre-ft**
- Scenario 1 (local) Storage Required:
  - **9,350 acre-ft**



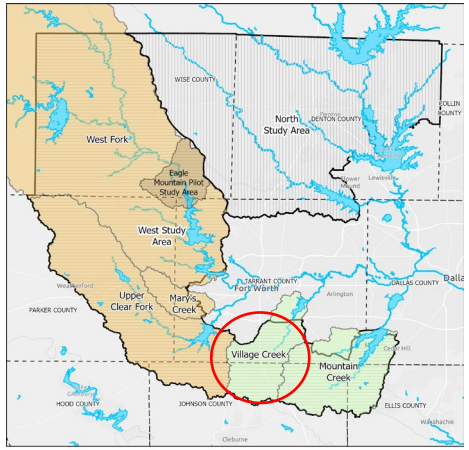



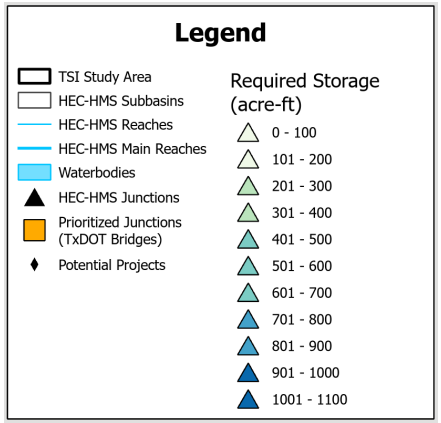

integrating **Transportation & Stormwater Infrastructure**

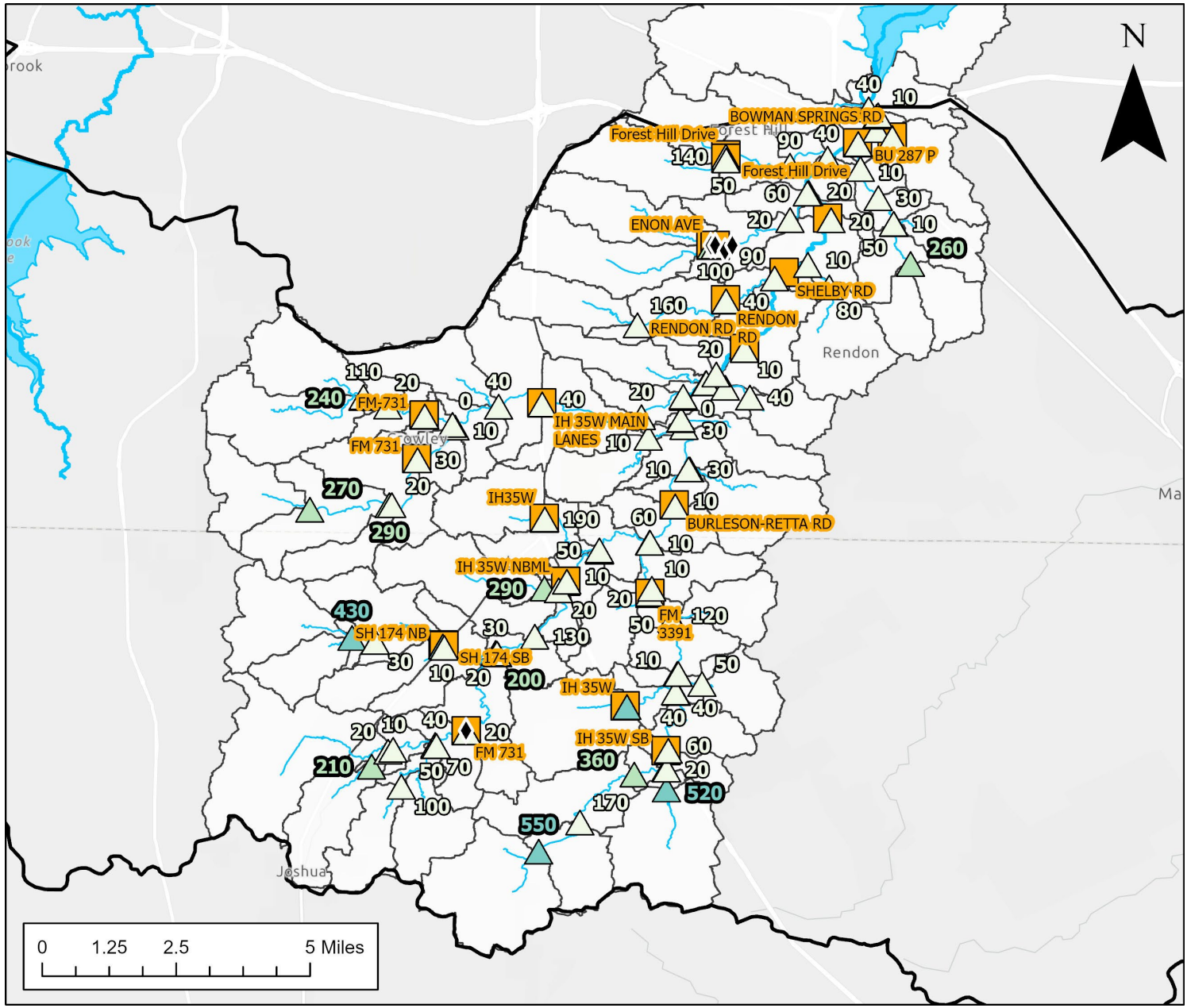
Note: All results are considered preliminary and are subject to change.

# Village Creek Watershed

- Theoretical Storage Required (to keep current flows from increasing):
  - **13,540 acre-ft**
- Scenario 2 (regional) Storage Required:
  - **8,210 acre-ft**



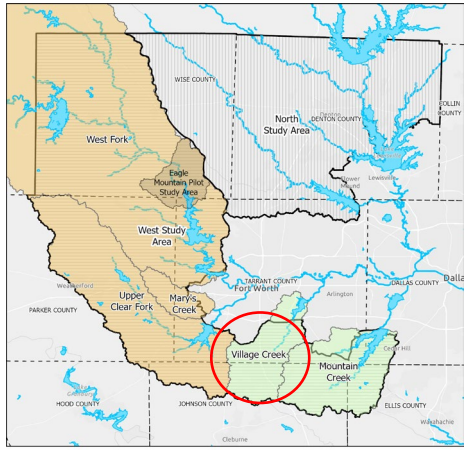



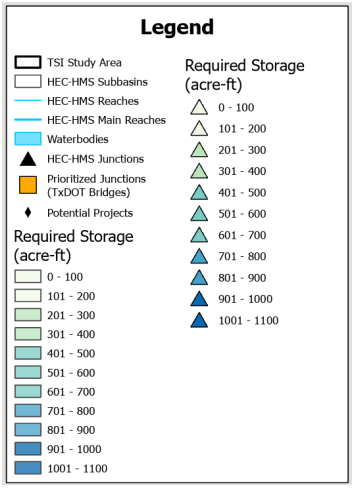

integrating **Transportation & Stormwater Infrastructure**

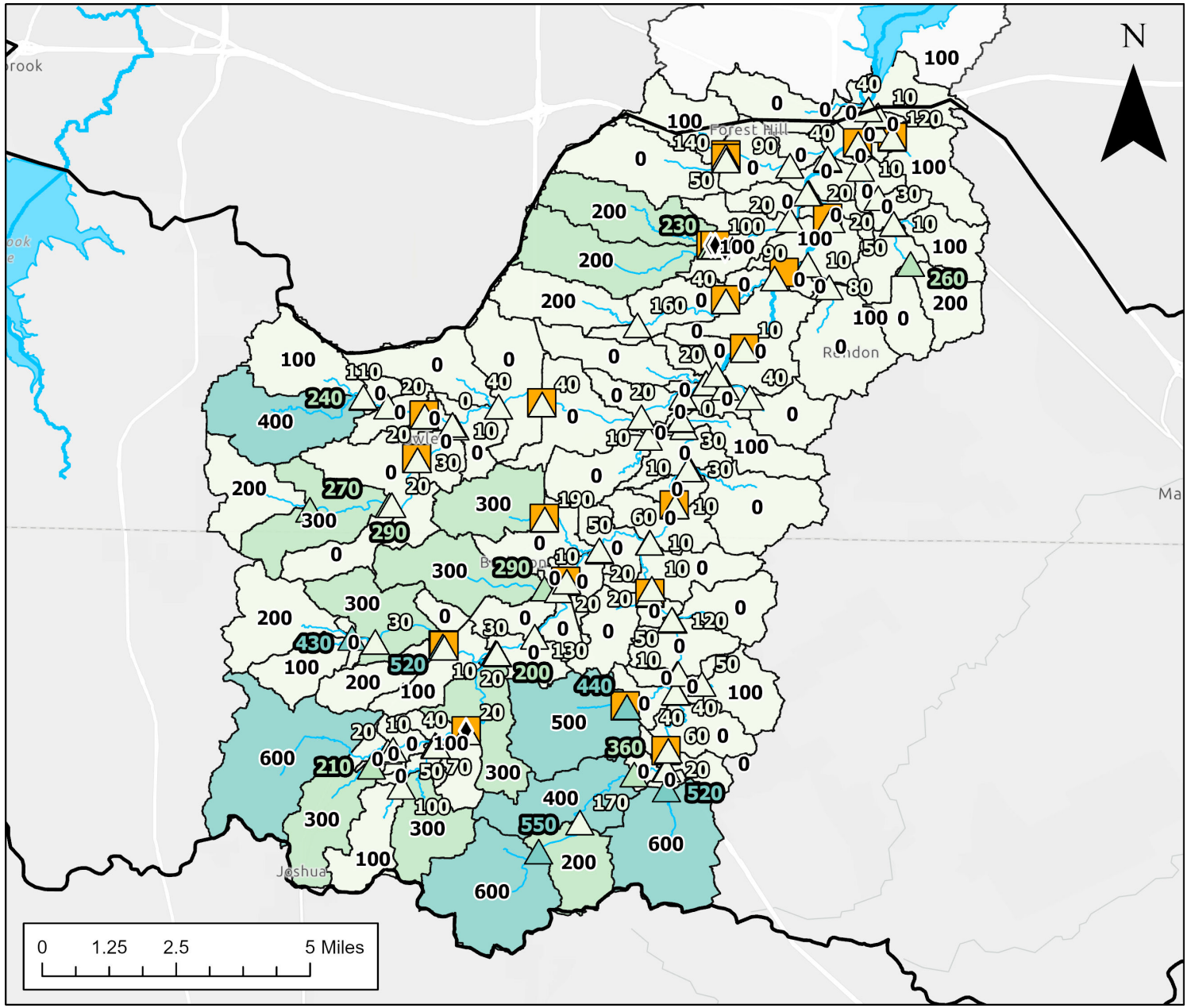
Note: All results are considered preliminary and are subject to change.

# Village Creek Watershed

- Theoretical Storage Required (to keep current flows from increasing):
  - **13,540 acre-ft**
- Scenario 1 (local) Storage Required:
  - **9,350 acre-ft**
- Scenario 2 (regional) Storage Required:
  - **8,210 acre-ft**
- **Regional Reduction: 1,140 acre-ft**




integrating Transportation & Stormwater Infrastructure

Note: All results are considered preliminary and are subject to change.

# Contact


**Nick Z. Fang, Ph.D. P.E.**
Robert S. Gooch Endowed Professor,
Director of the Water Engineering
Research Center (WERC)
The University of Texas at Arlington
817-272-5334
**nickfang@uta.edu**

Kelli Greenwood, E.I.T.
Graduate Research Assistant, WERC

Sugam Mahat
Graduate Research Assistant, WERC

**Jerry Cotter, P.E.**
Program Director, WERC

**Matt Lepinski, P.E., M.S.**
Assistant Program Director, WERC


WERC
Water Engineering
Research Center