

Upper Turkey Creek Merriam, Kansas

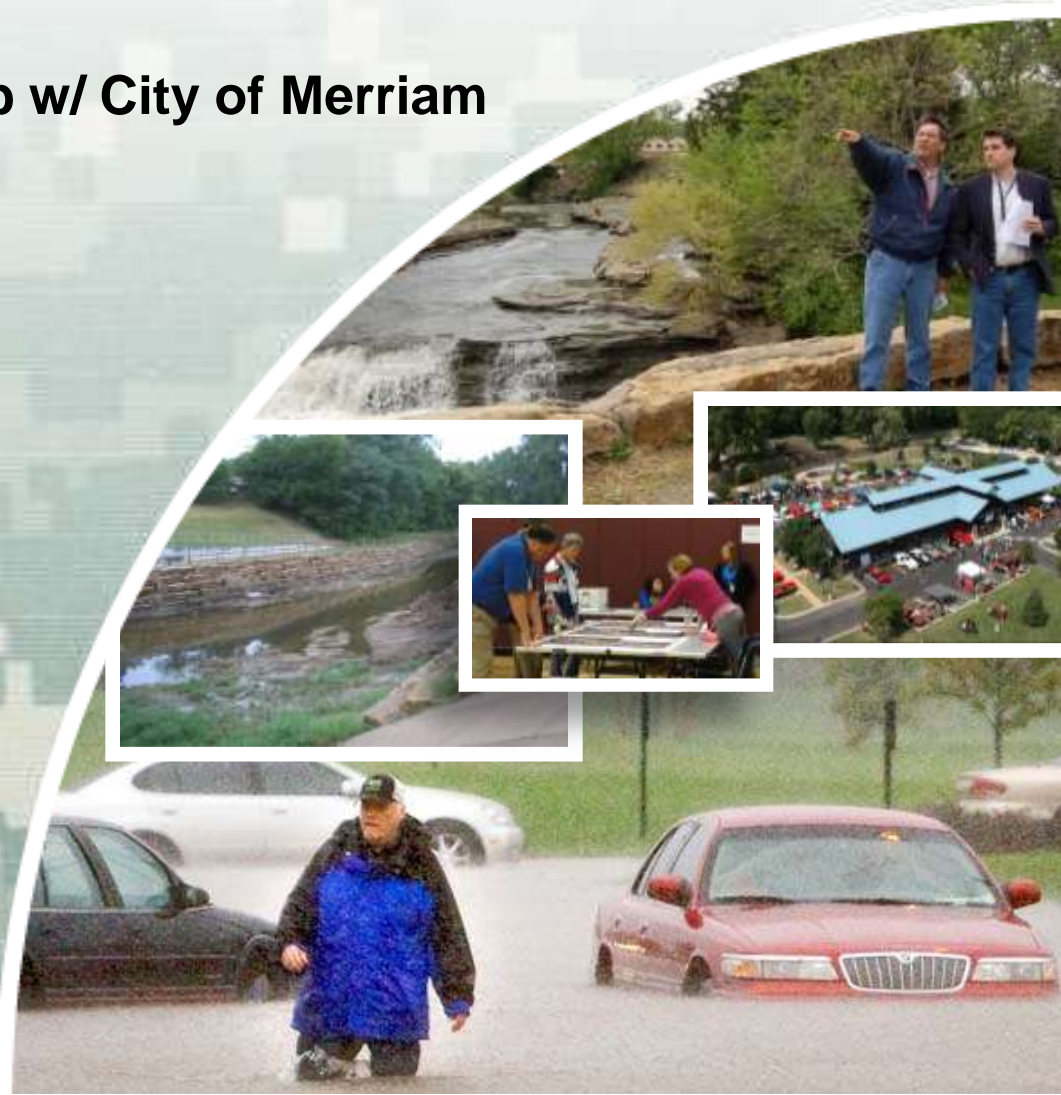
Flood Risk Management Project

Corps of Engineers Partnership w/ City of Merriam

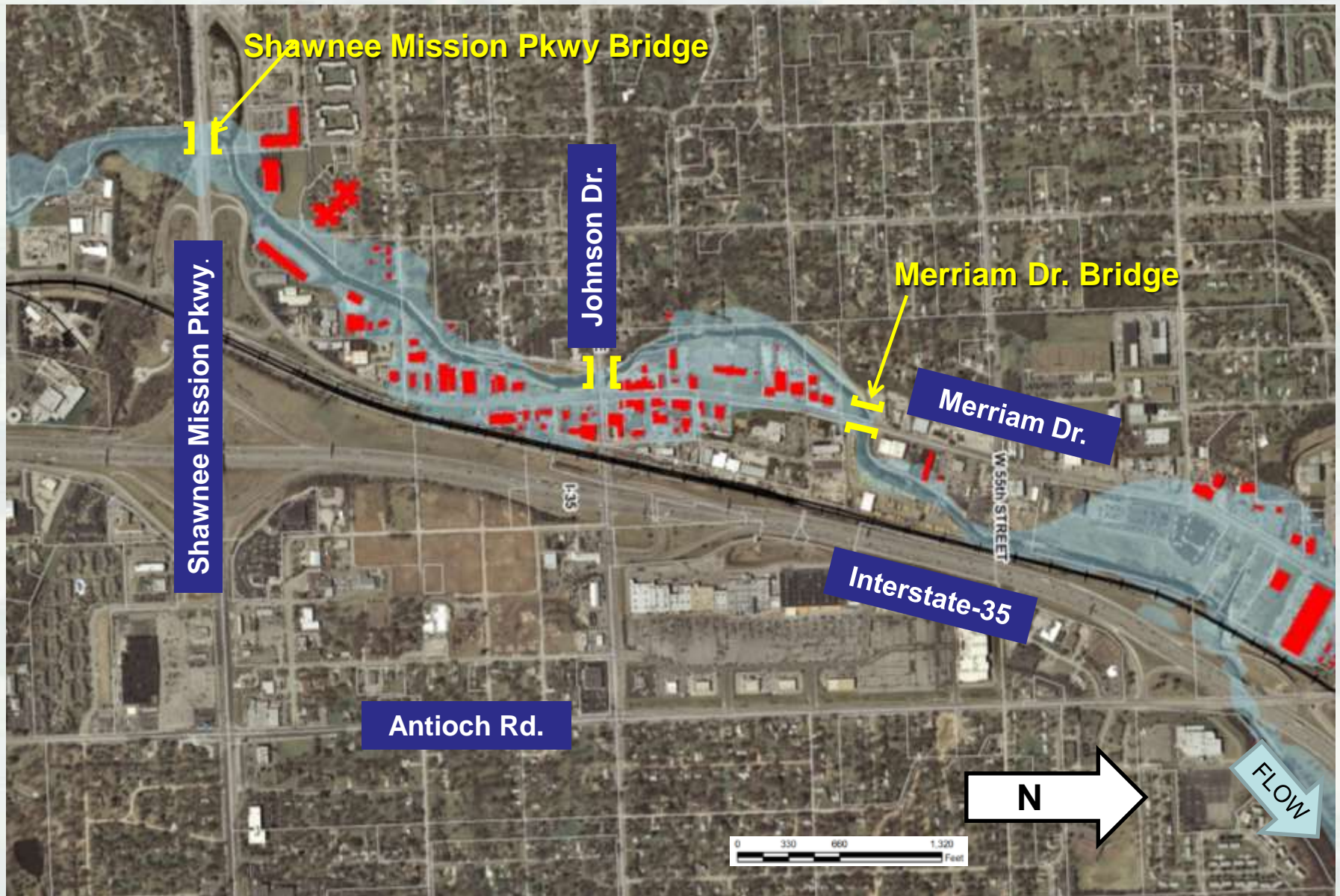
KC Urban Stormwater Conference

23 January 2017

John J. Grothaus
Chief, Plan Formulation



Project Area – Downtown Merriam



Flood Problem

Problems:

- Heavily urbanized watershed
- Limited channel conveyance (10% ACE event or less)
- Severe flash flood risk – low response time
- Risk to loss of life
- Property damages commercial/ industrial & infrastructure
- \$3.5 million in estimated annual damages

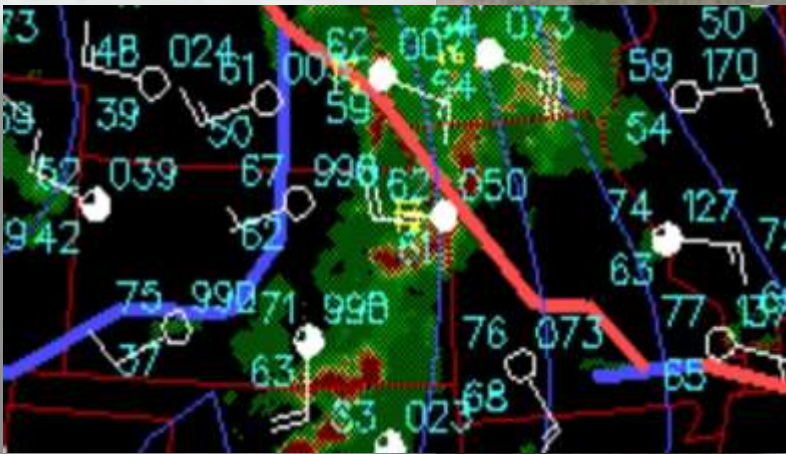
Opportunities:

- Enhance community flood risk awareness
- Improve local, state and federal partnership

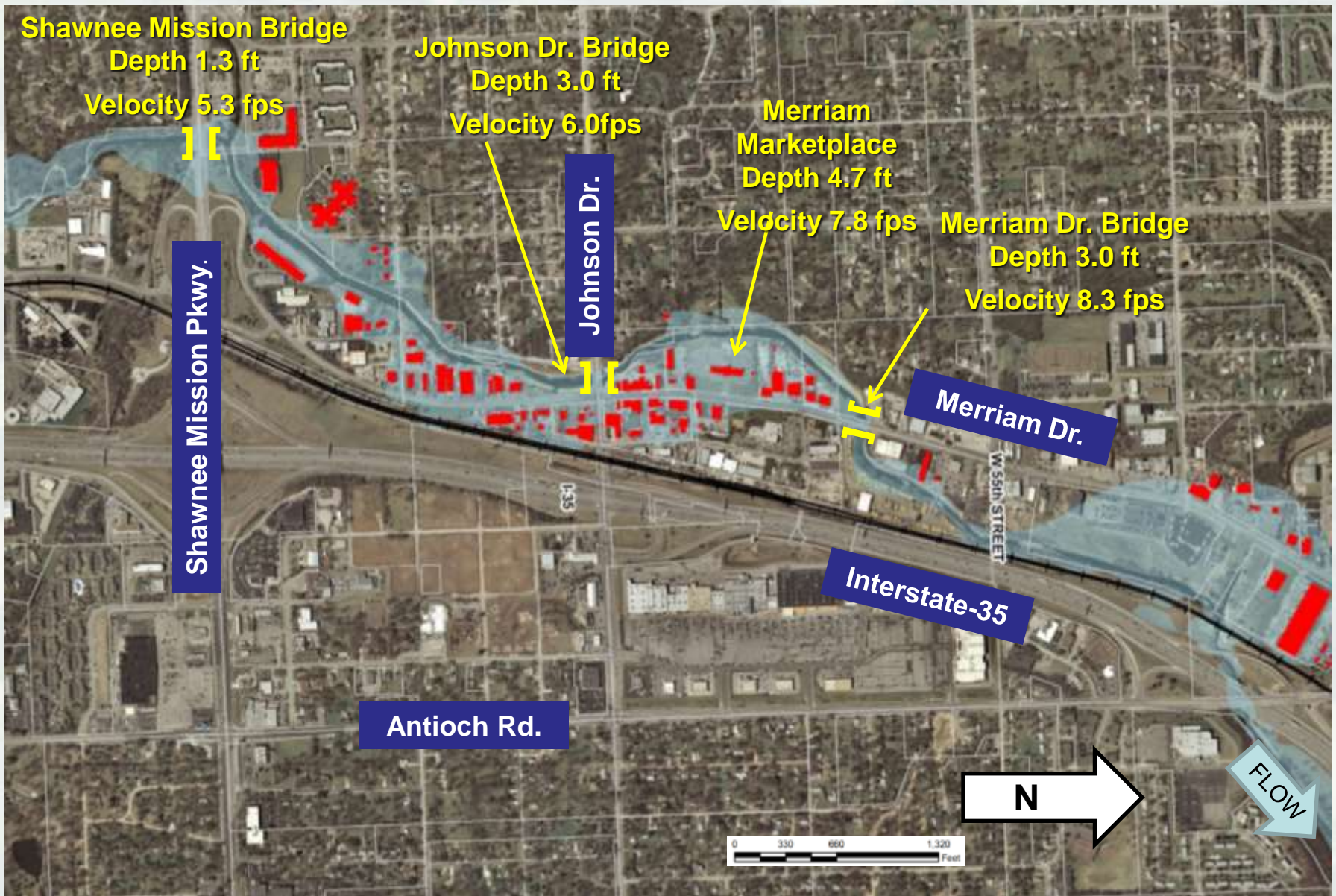


Flood Problem

- The flood of **September 1993** caused \$3.4 million in Merriam and \$20 million in the lower basin
- The **October 1998** event caused over \$12 million in damages to Merriam businesses
- The 1998 storm event **approximates the 1-percent ACE event frequency for the 1-hour duration storm.**



Risk Factors 1-percent ACE Event



Plan Formulation – Measures Evaluated

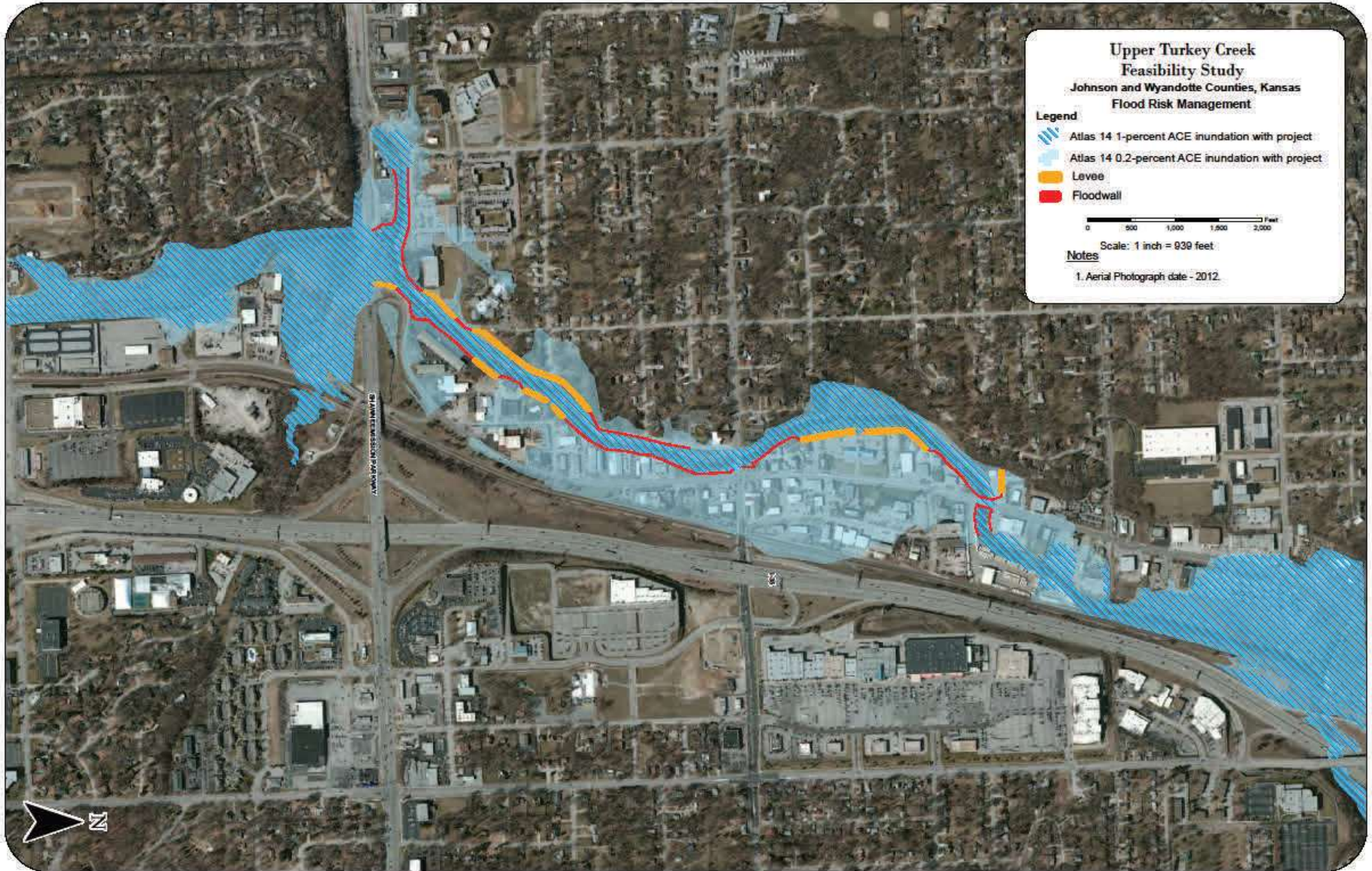
- Levee and floodwall
 - ▶ Works well with space constraints
 - ▶ Floodwalls have smaller footprint for constrained areas
- Channel widening
 - ▶ Efficient conveyance
 - ▶ Lower risk of non-performance
- Detention
- Diversion
- Floodproofing
- Buyouts / relocations
 - ▶ Structures removed eliminating risk



Inundation Maps – Future Without Project



Authorized Project Overview



Authorized Project

Project Primary Features:

- Shawnee Mission Pkwy Bridge to Merriam Drive Bridge
- 6,820 ft of floodwall 3 – 6.5 ft high
- 3,380 ft of levee 3 – 6 ft high
- 4 ft high parapet wall on Merriam Drive Bridge
- 2.1 acre drainage detention pond
- Replacement of pedestrian bridge
- Storm sewer pipe & outfall modifications
- Sanitary, water, gas, & 1 overhead electric relocation

Project Performance:

- 73% reduction in expected annual damages
- 83% probability of containing the 1-percent ACE event – Atlas 14 based flows
- Net Annual Benefits: \$ 1.71M
- Benefit/Cost Ratio: 2.0 to 1



Authorized Project: Merriam Drive Bridge thru Marketplace Reach



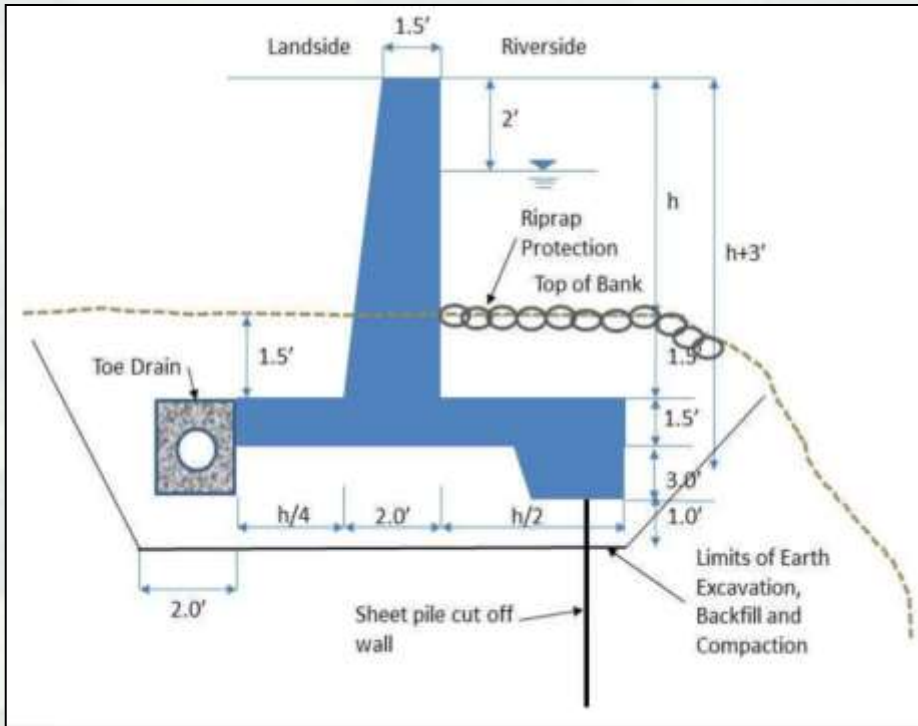
Authorized Project: Merriam Marketplace to W. 61st Street



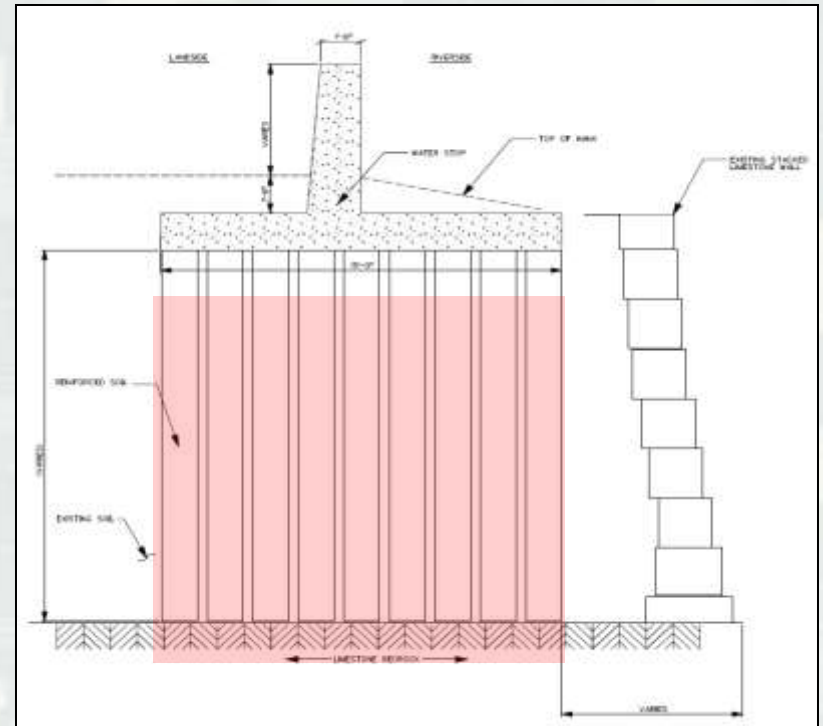
Authorized Project: W. 61st Street to Shawnee Mission Pkwy



Floodwall Foundation



Conventional T-wall foundation



Auger-grout pile foundation



Project Cost & Cost Sharing

| Cost Account | 2016 Price Level |
|---|----------------------|
| Lands, Easements, Rights of Way, & Relocations (real estate type costs) – “LERRD” | \$10,162,000 |
| - Lands and Easements | \$ 4,873,000 |
| - Relocations | \$ 5,289,000 |
| Levee & Floodwalls | \$ 22,670,000 |
| Planning, Engineering and Design | \$ 3,137,000 |
| Construction Management | \$ 1,853,000 |
| Project First Cost Total | \$ 37,822,000 |

| Cost Sharing | 2016 Price Level |
|------------------------------|------------------|
| Federal Share | \$ 24,584,000 |
| Non-Federal Share (Total) | \$ 13,238,000 |
| Non-Federal Cash | \$ 3,548,000 |
| Non-Federal LERRD Creditable | \$ 9,690,000 |



Project Residual Risk & Climate Change

Residual Risk

- Exceedance probability of 5.1% in 10 years
- Exceedance probability of 23% over 50-yr period
- Floodplain Management Plan – Partner & Corps develop & maintain improved flood preparedness & response plans

Climate Change

- Evaluation conducted using USACE guidance
- NOAA future conditions model showed slightly wetter conditions
- Sensitivity analyses conducted to evaluate effects, no trend shown for storm durations used for design
- No changes to authorized project

Potential Implementation Schedule

- **2015 Project Approved** by Corps of Engineers
- **2016 Project Authorized** by Congress (“WIIN” Bill)

| Milestone | Start Date | Finish Date |
|----------------------|------------|-------------|
| Design | 2018 | 2020 |
| Land Acquisition | 2018 | 2020 |
| Project Construction | | |
| Contract 1 | 2020 | 2022 |
| Contract 2 | 2022 | 2024 |
| Contract 3 | 2024 | 2026 |

