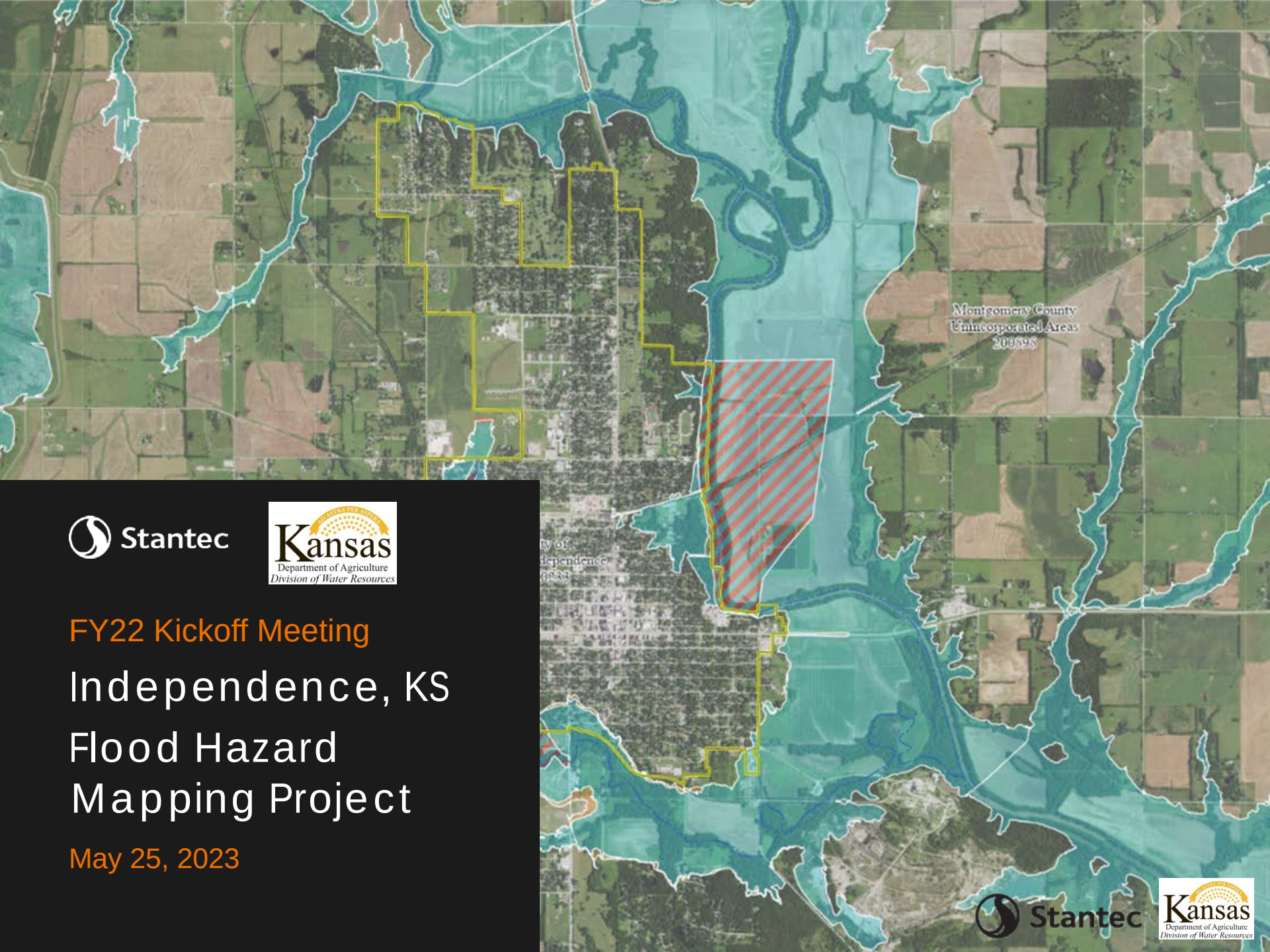


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FY22 Kickoff Meeting

# Independence, KS Flood Hazard Mapping Project

May 25, 2023

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# Introductions

- Kansas Department of Agriculture
- FEMA
- Stantec
- USACE
- Montgomery County
- City of Independence

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# Agenda

1. Background
2. Project Scope
3. Path Forward

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# Background

- August 1977: hydrologic and hydraulic analysis for the City of Independence completed by Black & Veatch
- June 2019: County-wide flood insurance study of Montgomery County is published, leveraging the 1977 studies for the City of Independence
- January – May 2020: Verdigris Custom Watershed BLE Project kicked-off and review of 2D BLE results
- February 2023: KDA initiates new data development study to updated the hydrologic and hydraulic analysis of the Zone AE study streams in the City of Independence, KS
- Today (May 25, 2023): Kickoff Meeting with City of Independence and Montgomery County

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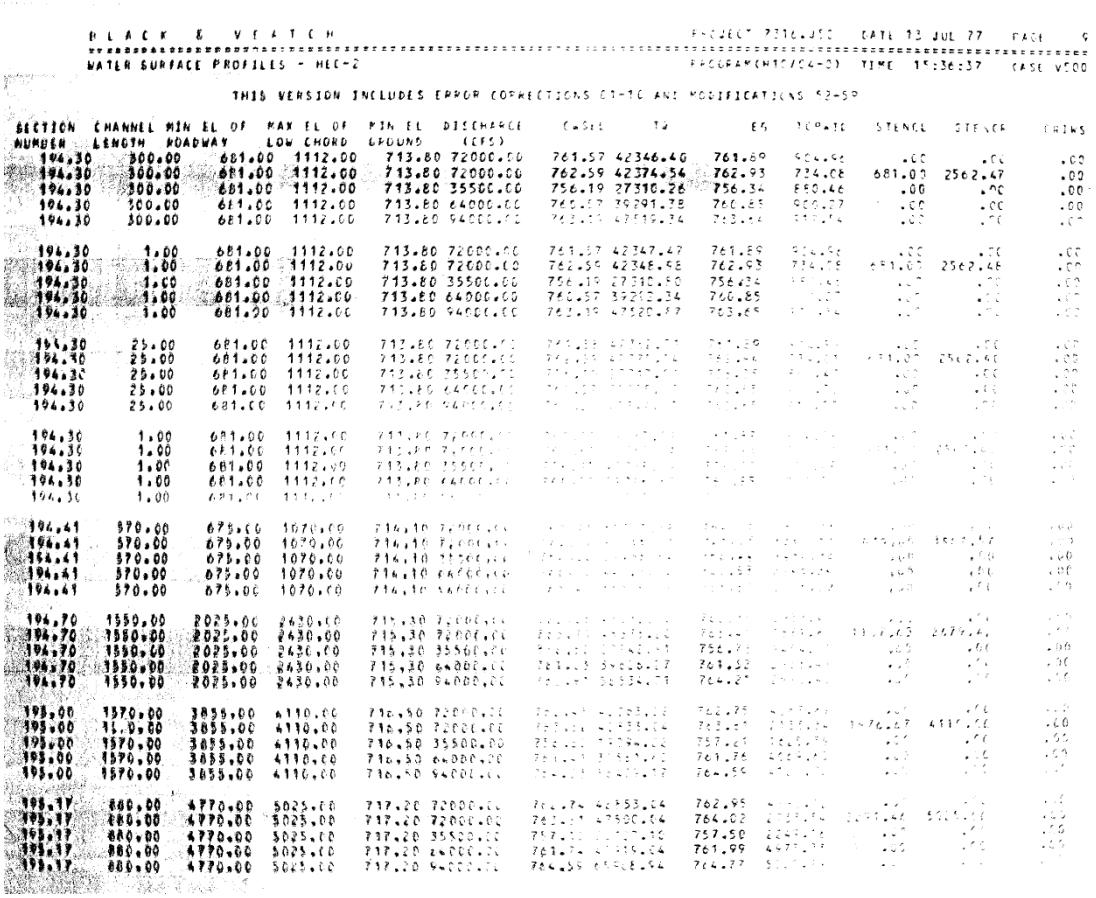
# Background

- The 1977 modeling was completed in HEC-2 and is only available as a scan of the results which are partially illegible and unusable.



B L A C K  &  V E A T C H

WATER SURFACE PROFILES - HEC-2

THIS VERSION INCLUDES ERROR CORRECTIONS 01-10 AND MODIFICATIONS 52-59

| SECTION NUMBER | CHANNEL LENGTH | MIN EL OF ROADWAY | MAX EL OF LOW CHORD | MIN EL GROUND | DISCHARGE (CFS) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 194.30 | 300.00 | 681.00 | 1112.00 | 713.80 | 72000.00 | 761.57 | 42346.46 | 761.89 | [illegible] | .00 | .00 |
| 194.30 | 300.00 | 681.00 | 1112.00 | 713.80 | 72000.00 | 762.59 | 42374.54 | 762.93 | 734.08 | 681.00 | 2562.47 |
| 194.30 | 300.00 | 681.00 | 1112.00 | 713.80 | 35500.00 | 756.19 | 27310.26 | 756.34 | 650.46 | .00 | .00 |
| 194.30 | 300.00 | 681.00 | 1112.00 | 713.80 | 64000.00 | 760.57 | 39791.78 | 760.85 | 900.27 | .00 | .00 |
| 194.30 | 300.00 | 681.00 | 1112.00 | 713.80 | 94000.00 | 763.19 | 47519.34 | 763.44 | [illegible] | .00 | .00 |
| 194.30 | 1.00 | 681.00 | 1112.00 | 713.80 | 72000.00 | 761.57 | 42347.47 | 761.89 | [illegible] | .00 | .00 |
| 194.30 | 1.00 | 681.00 | 1112.00 | 713.80 | 72000.00 | 762.59 | 42348.98 | 762.93 | 734.08 | 681.00 | 2562.48 |
| 194.30 | 1.00 | 681.00 | 1112.00 | 713.80 | 35500.00 | 756.19 | 27310.50 | 756.34 | [illegible] | .00 | .00 |
| 194.30 | 1.00 | 681.00 | 1112.00 | 713.80 | 64000.00 | 760.57 | 39210.34 | 760.85 | [illegible] | .00 | .00 |
| 194.30 | 1.00 | 681.00 | 1112.00 | 713.80 | 94000.00 | 763.19 | 47520.57 | 763.45 | [illegible] | .00 | .00 |
| 194.30 | 25.00 | 681.00 | 1112.00 | 713.80 | 72000.00 | [illegible] | | [illegible] | [illegible] | .00 | .00 |
| 194.30 | 25.00 | 681.00 | 1112.00 | 713.80 | 72000.00 | [illegible] | | [illegible] | [illegible] | [illegible] | 2562.40 |
| 194.30 | 25.00 | 681.00 | 1112.00 | 713.80 | 35500.00 | [illegible] | | [illegible] | [illegible] | .00 | .00 |
| 194.30 | 25.00 | 681.00 | 1112.00 | 713.80 | 64000.00 | [illegible] | | [illegible] | [illegible] | .00 | .00 |
| 194.30 | 25.00 | 681.00 | 1112.00 | 713.80 | 94000.00 | [illegible] | | [illegible] | [illegible] | .00 | .00 |
| 194.30 | 1.00 | 681.00 | 1112.00 | 713.80 | 72000.00 | [illegible] | | [illegible] | [illegible] | .00 | .00 |
| 194.30 | 1.00 | 681.00 | 1112.00 | 713.80 | 72000.00 | [illegible] | | [illegible] | [illegible] | [illegible] | .00 |
| 194.30 | 1.00 | 681.00 | 1112.00 | 713.80 | 35500.00 | [illegible] | | [illegible] | [illegible] | .00 | .00 |
| 194.30 | 1.00 | 681.00 | 1112.00 | 713.80 | 64000.00 | [illegible] | | [illegible] | [illegible] | .00 | .00 |
| 194.30 | 1.00 | 681.00 | 1112.00 | 713.80 | 94000.00 | [illegible] | | [illegible] | [illegible] | .00 | .00 |
| 194.41 | 370.00 | 675.00 | 1070.00 | 714.10 | 72000.00 | [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] |
| 194.41 | 370.00 | 675.00 | 1070.00 | 714.10 | 72000.00 | [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] |
| 194.41 | 370.00 | 675.00 | 1070.00 | 714.10 | 35500.00 | [illegible] | | [illegible] | [illegible] | .00 | .00 |
| 194.41 | 370.00 | 675.00 | 1070.00 | 714.10 | 64000.00 | [illegible] | | [illegible] | [illegible] | .00 | .00 |
| 194.41 | 370.00 | 675.00 | 1070.00 | 714.10 | 94000.00 | [illegible] | | [illegible] | [illegible] | .00 | .00 |
| 194.70 | 1550.00 | 2025.00 | 2430.00 | 715.30 | 72000.00 | [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] |
| 194.70 | 1550.00 | 2025.00 | 2430.00 | 715.30 | 72000.00 | [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] |
| 194.70 | 1550.00 | 2025.00 | 2430.00 | 715.30 | 35500.00 | [illegible] | | 752.71 | [illegible] | .00 | .00 |
| 194.70 | 1550.00 | 2025.00 | 2430.00 | 715.30 | 64000.00 | [illegible] | | 761.52 | [illegible] | .00 | .00 |
| 194.70 | 1550.00 | 2025.00 | 2430.00 | 715.30 | 94000.00 | [illegible] | | 764.42 | [illegible] | .00 | .00 |
| 195.00 | 1370.00 | 3855.00 | 4110.00 | 716.50 | 72000.00 | [illegible] | | 762.25 | [illegible] | .00 | .00 |
| 195.00 | 1370.00 | 3855.00 | 4110.00 | 716.50 | 72000.00 | [illegible] | | [illegible] | [illegible] | [illegible] | .00 |
| 195.00 | 1370.00 | 3855.00 | 4110.00 | 716.50 | 35500.00 | [illegible] | | 757.61 | [illegible] | .00 | .00 |
| 195.00 | 1370.00 | 3855.00 | 4110.00 | 716.50 | 64000.00 | [illegible] | | 761.76 | [illegible] | .00 | .00 |
| 195.00 | 1370.00 | 3855.00 | 4110.00 | 716.50 | 94000.00 | [illegible] | | 764.59 | [illegible] | .00 | .00 |
| 195.17 | 880.00 | 4770.00 | 5025.00 | 717.20 | 72000.00 | [illegible] | | 762.95 | [illegible] | .00 | .00 |
| 195.17 | 880.00 | 4770.00 | 5025.00 | 717.20 | 72000.00 | [illegible] | | 764.02 | [illegible] | [illegible] | [illegible] |
| 195.17 | 880.00 | 4770.00 | 5025.00 | 717.20 | 35500.00 | [illegible] | | 757.50 | [illegible] | .00 | .00 |
| 195.17 | 880.00 | 4770.00 | 5025.00 | 717.20 | 64000.00 | [illegible] | | 761.99 | [illegible] | .00 | .00 |
| 195.17 | 880.00 | 4770.00 | 5025.00 | 717.20 | 94000.00 | [illegible] | | 764.77 | [illegible] | .00 | .00 |

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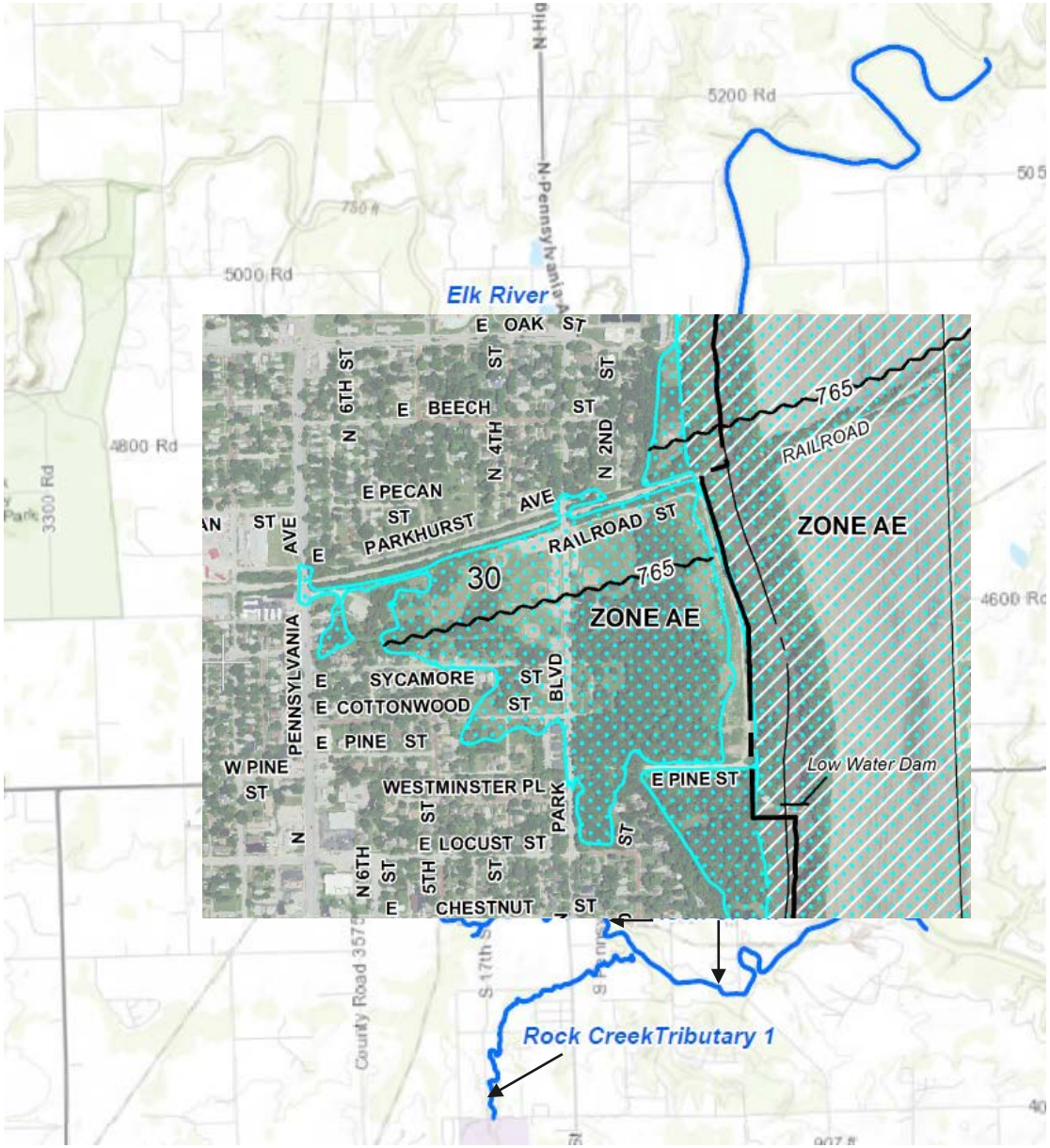
# Project Scope




The National Levee Database(NLD) has a levee system LMG-0012 (Independence) Levee System ID 280005000705 within the project footprint. This system is non-accredited the updated hydraulic analysis will also perform a Natural Valley analysis on this levee system.

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# Project Scope

- Period of Performance is 2/1/2023 – 9/30/2024

- Terrain Data Capture
  - Acquire 2018 LiDAR for project footprint
  - Format to meet FEMA's Data Capture Standards (DCS)

- Survey Data Capture

| Stream Name | Number of Structures | Number of Cross-sections |
|---|---|---|
| Elk Creek | 1 | 3 |
| Verdigris River | 2 | 7 |
| Rock Creek | 8 | 5 |
| Rock Creek Tributary 1 | 5 | 0 |
| Whiskey Creek | 15 | 0 |

  - Format to meet FEMA's Data Capture Standards (DCS)

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# Project Scope

- Hydrology Data Capture
  - Develop flows for the 10-, 2-, 4-, 1-, 1plus-, and 0.2-percent annual chance flood events
  - Rock Creek Watershed
    - HEC-HMS
  - Verdigris River
    - Bulletin 17C Gage Analysis
    - USGS Gage 071705000 Verdigris River at Independence, KS
  - Elk River
    - USACE Operations of Elk City Lake
  - Format to meet FEMA's Data Capture Standards (DCS)

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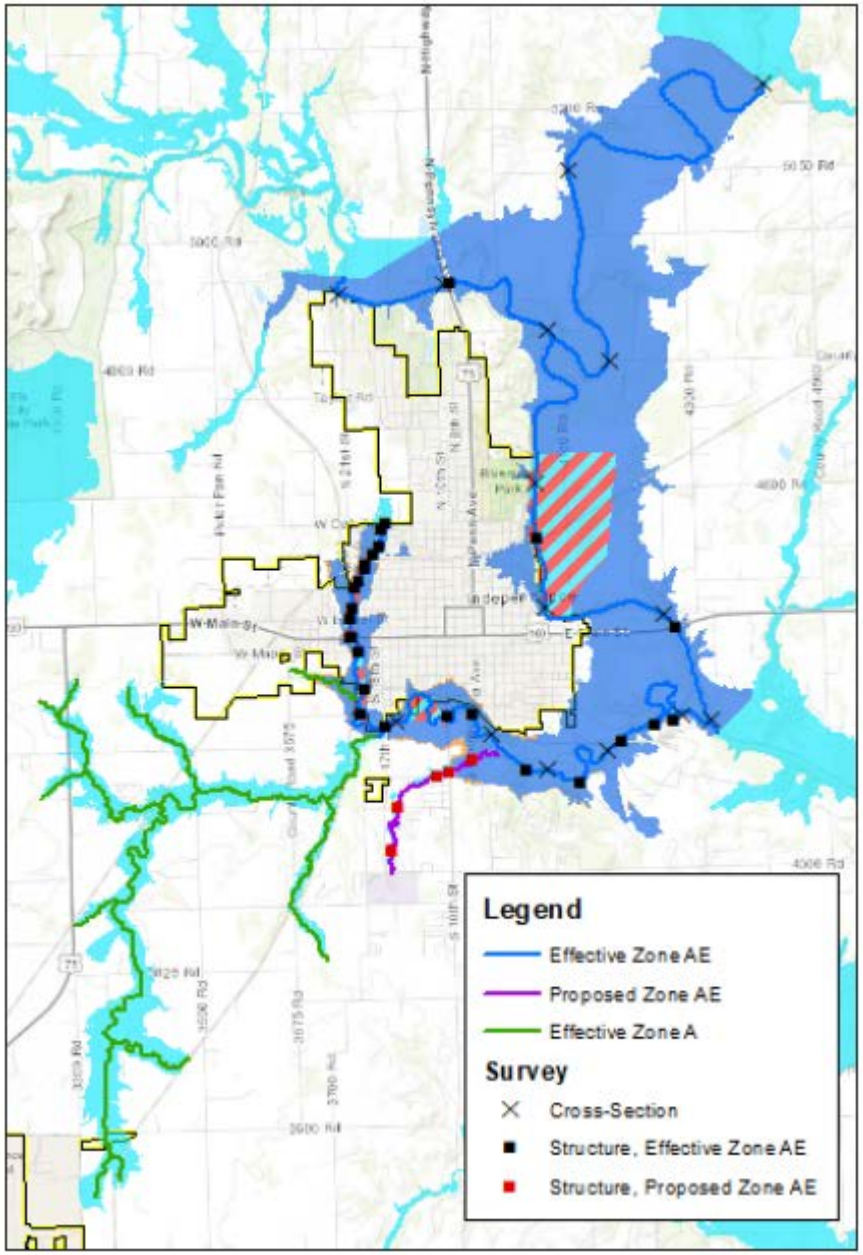
# Project Scope

- Hydraulic Data Capture
  - Develop 2D HEC-RAS models for Verdigris River, Elk River, Rock Creek, Whiskey Creek, and Rock Creek Tributary 1
    - Perform ‘with levee’ and Natural Valley Analysis along the Verdigris River and NLD Levee LMG-0012 (Independence) Levee
  - 2D floodway analysis to comply with FEMA guidance
  - Format to meet FEMA’s Data Capture Standards (DCS)

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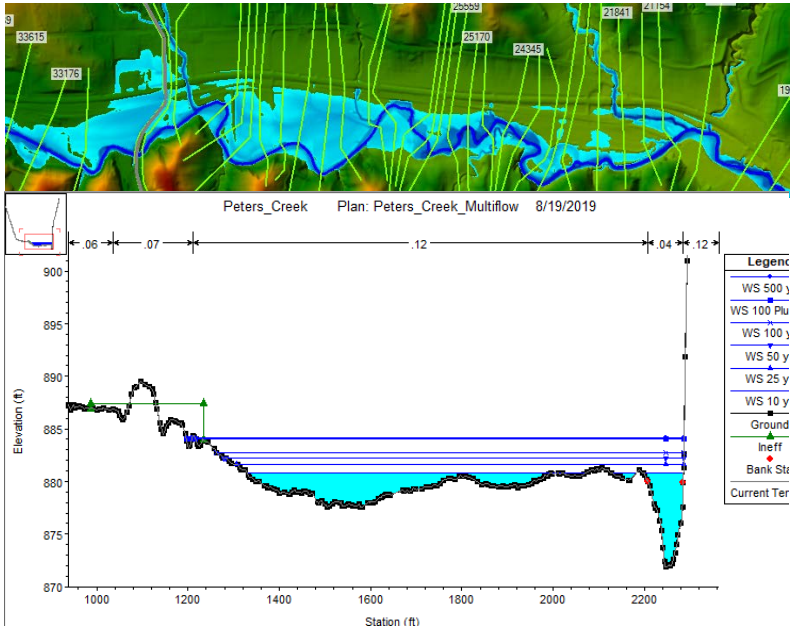
# 2D Modeling

## 1D Modeling

Modeling driven by Cross-sections

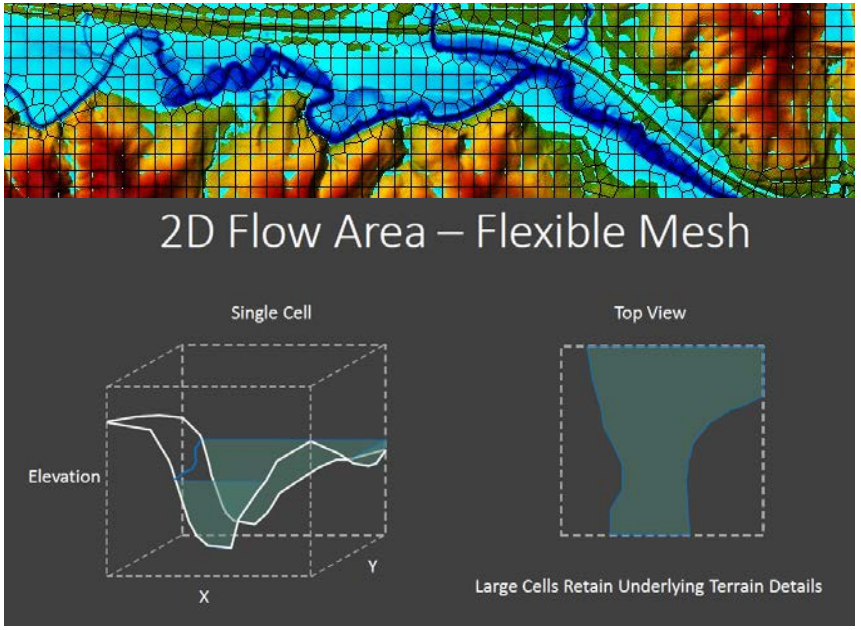
- Drawn perpendicular to flow direction
- Major Assumption – flow in single direction




## 2D Modeling

Modeling driven by Mesh/Grid

- Drawn over entire study area
- Major Assumption – flow in multiple directions, driven by terrain

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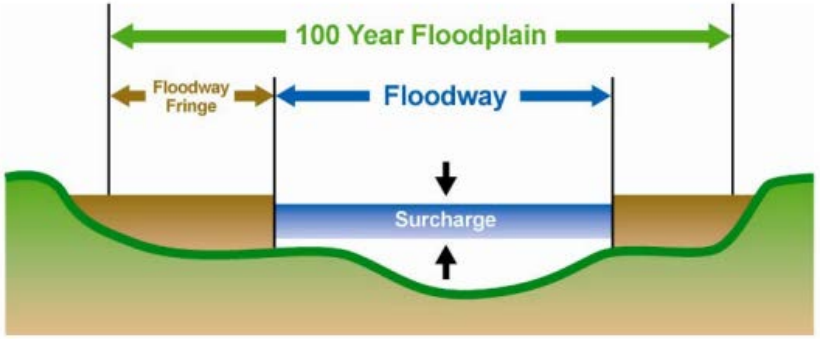
# 2D Floodways

**Guidance for Flood Risk Analysis and Mapping**

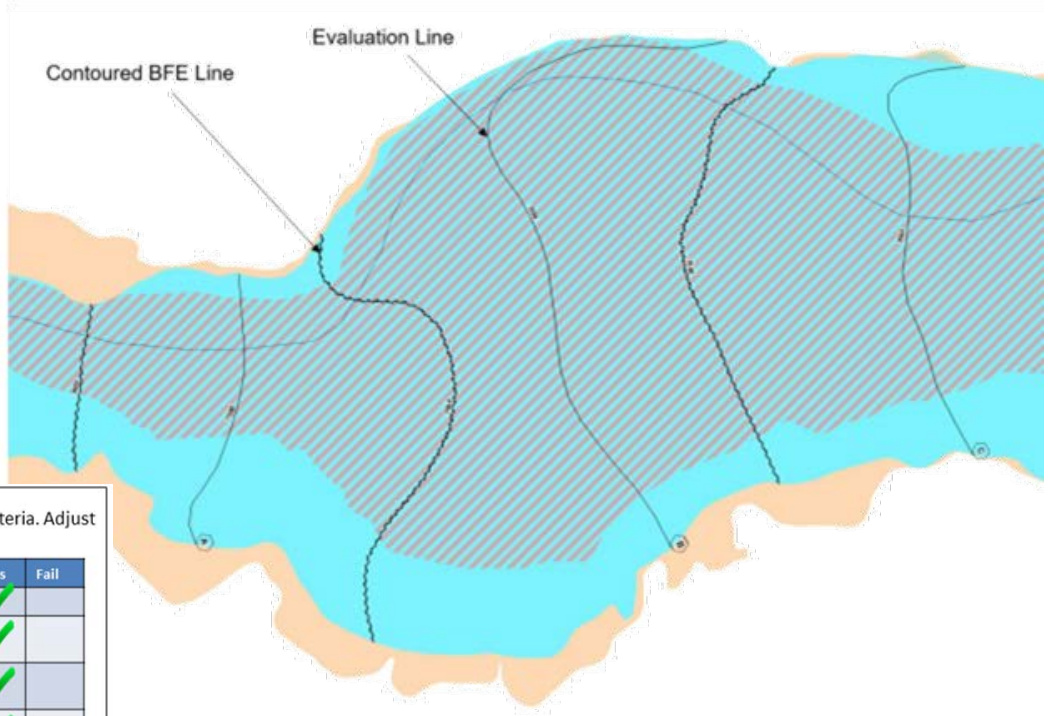
Floodway Analysis and Mapping

November 2021

FEMA




*Source: FEMA Guidance for Flood Risk Analysis and Mapping*




(1) Evaluate weighted surcharge average and individual cell surcharges against criteria. Adjust criteria where more restrictive state surcharge requirements exist.

| Criteria | Description | Pass | Fail |
|---|---|---|---|
| 1 | BFE average is within allowable surcharge range of 0.0 to 1.0 feet. | ✓ | |
| 2 | All cells overlapping insurable structures are within the allowable surcharge range of 0.0 to 1.0 feet. | ✓ | |
| 3 | All cells considered in the BFE average are within the allowable surcharge range ± 0.5 feet (-0.5 to 1.5 feet) | ✓ | |
| 4 | All cells ***not*** considered in the BFE average are within the allowable surcharge range ± 0.5 feet (-0.5 to 1.5 feet) | ✓ | |

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# Project Scope

- Draft DFIRM Database
  - 1% and 0.2% flood boundary delineations for “with levee” and Natural Valley
  - Floodway delineation
  - Base flood elevations (BFEs) and evaluation lines mapped
  - Flood Risk Review (FRR) meeting with community showing mapping results for community review

- Flood Risk Products
  - Flood depth grids
  - Water surface elevation grids
  - Percent annual chance & Percent 30-year chance grids
  - Supplemental Changes Since Last FIRM (CSLF)

# Path Forward

**Schedule**

- May 2023 – Complete Terrain Data (Completed)
- June 2023 – Complete Survey Data
- September 2023 – Complete Hydrologic Data
- May 2024 – Complete Hydraulic Data
- August 2024 – Complete Flood Risk Products
- August 2024 – Complete DFIRM
- September 2024– Flood Engineering Review Meeting

**Data will be hosted on KDA's web viewer as it becomes available**

https://gis2.kda.ks.gov/gis/independence/

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# Questions?


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