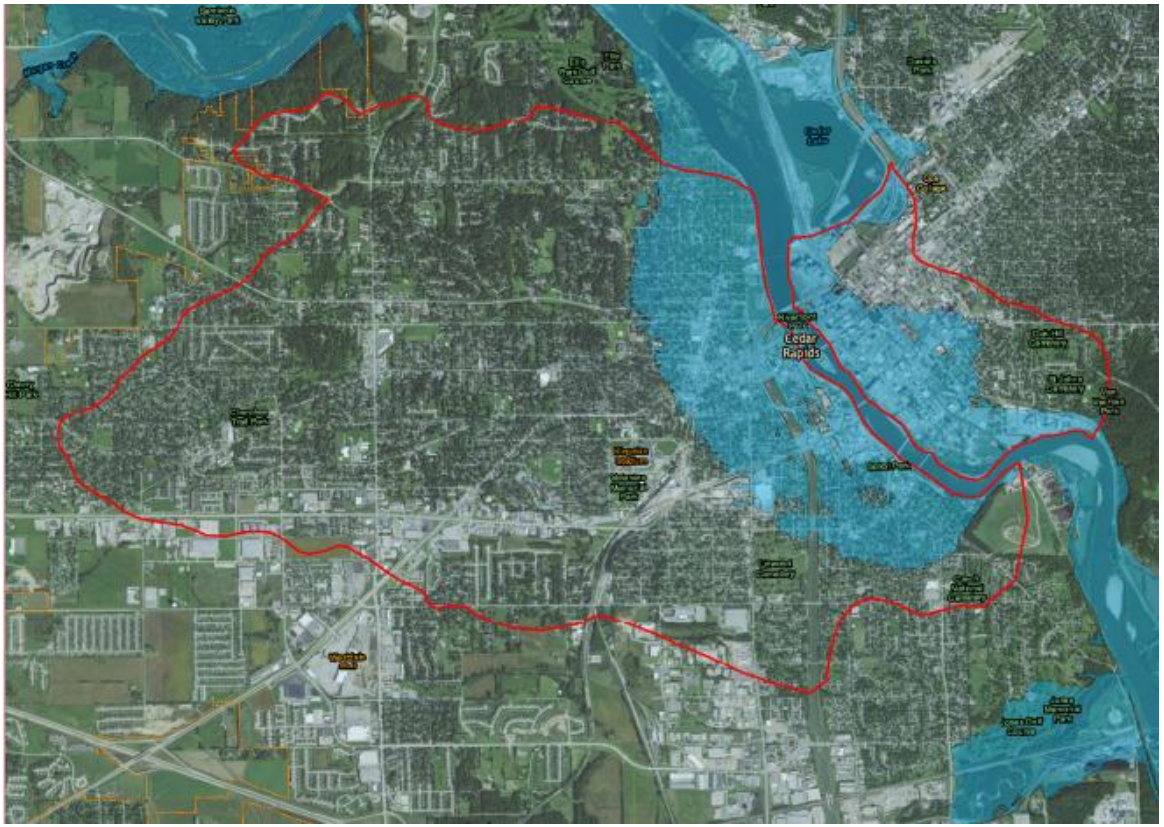
Interior Drainage Update



CEDAR RAPIDS
FLOOD CONTROL SYSTEM
STRENGTHENING OUR COMMUNITY

Basis of Design

Designing for the **volume** of rainfall discharging into the river.

2 year storm

5 year storm

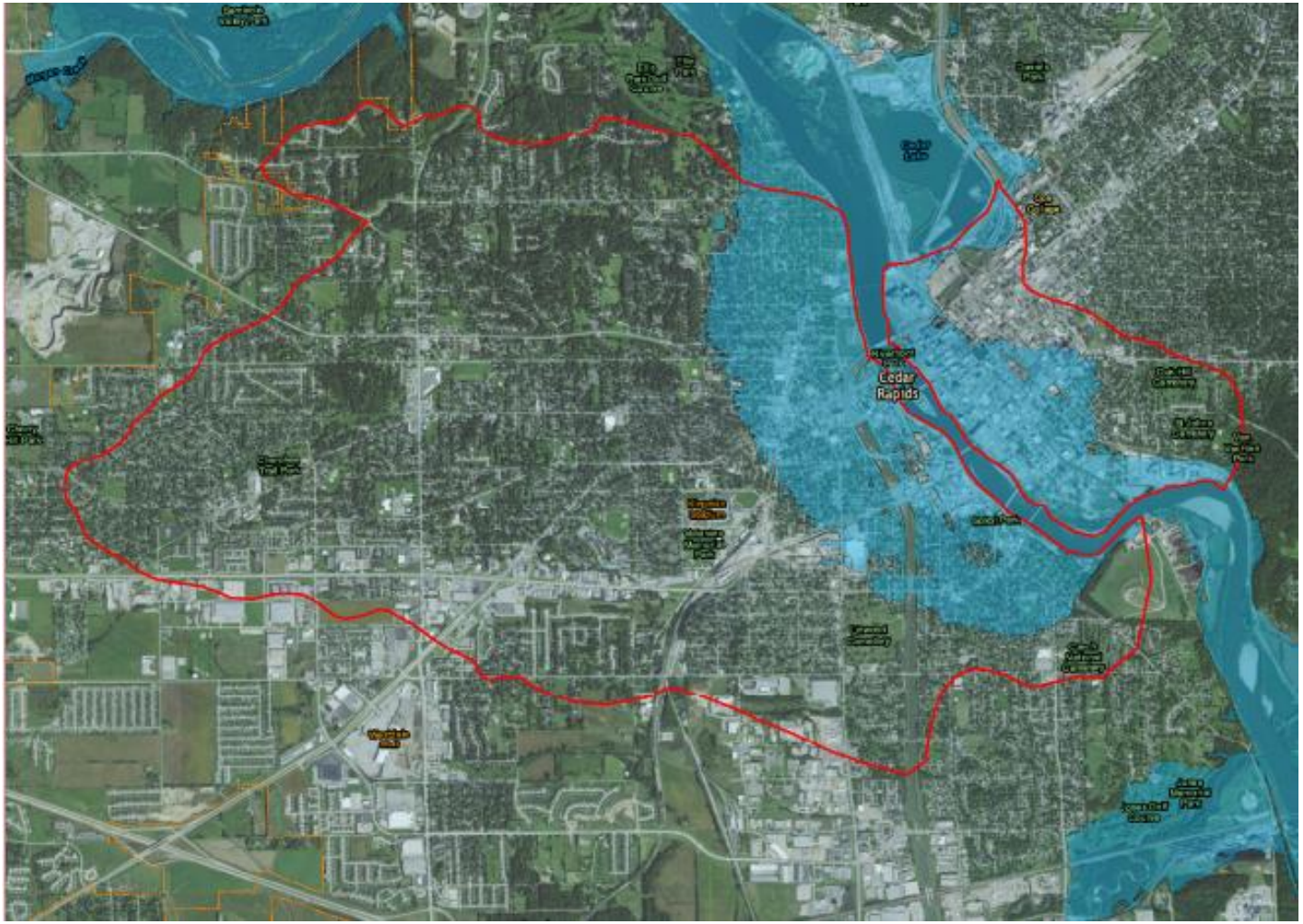
100 year storm

CEDAR RAPIDS
FLOOD CONTROL SYSTEM
STRENGTHENING OUR COMMUNITY

Basis of Design

Designing for the **intensity**: how fast the volume of runoff discharges into the river.

Interior Drainage Areas



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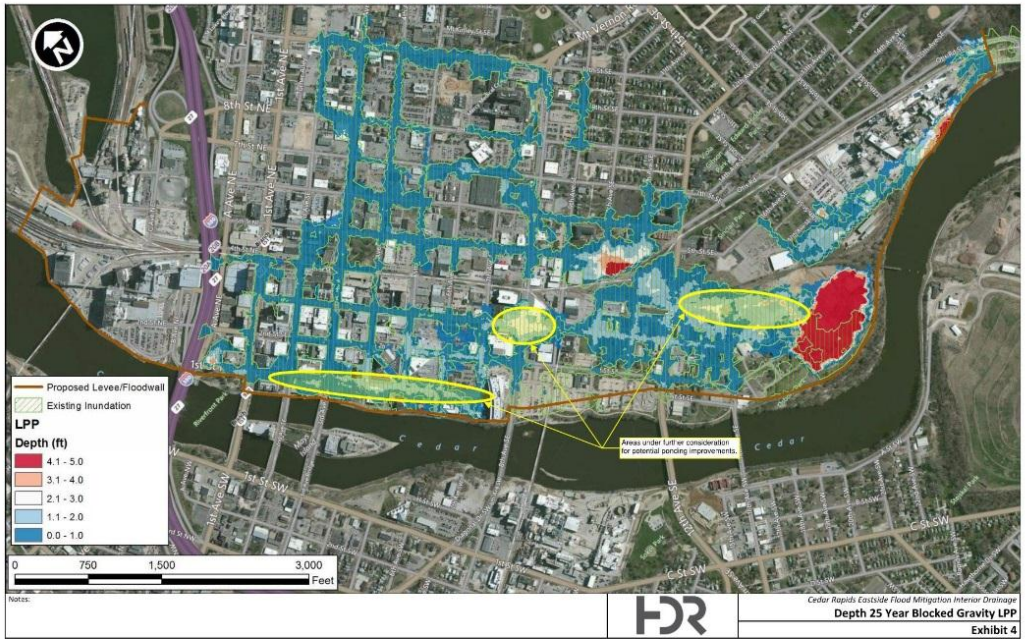
East Side Interior Drainage

- ISSUE : Runoff exceeding storm system capacity causes interior ponding
- IMPORTANCE: Safety, property damage, floodplain mapping implications
- RECOMMENDATION:
  Storm Water Master Plan and FCS
  - Review sites to improve flows
  - Other storm water improvements
    - upland detention
    - infiltration
    - green infrastructure



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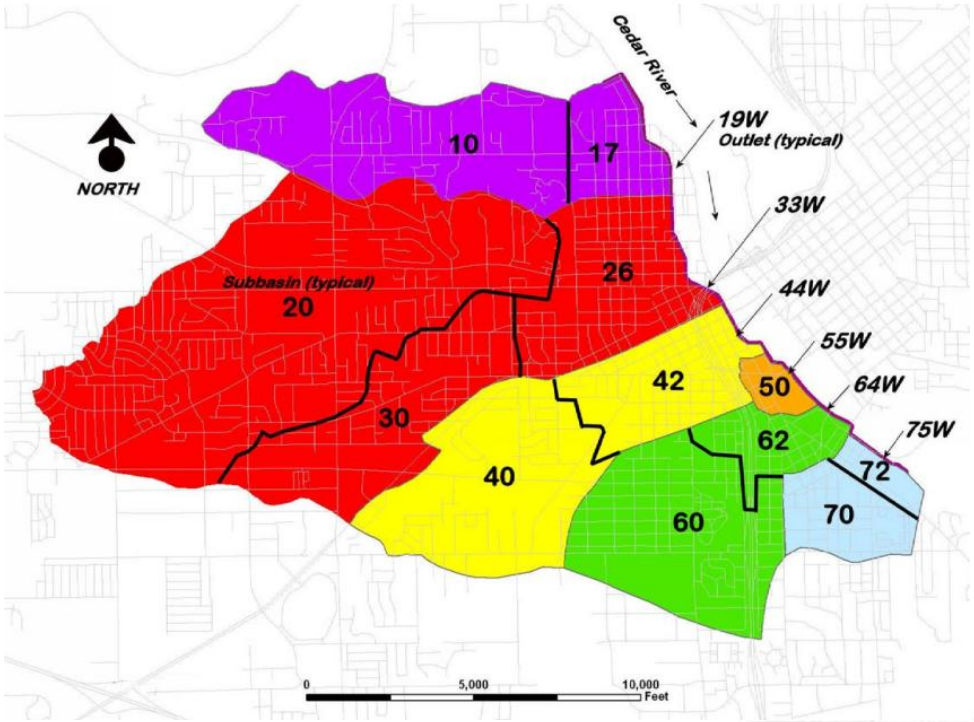
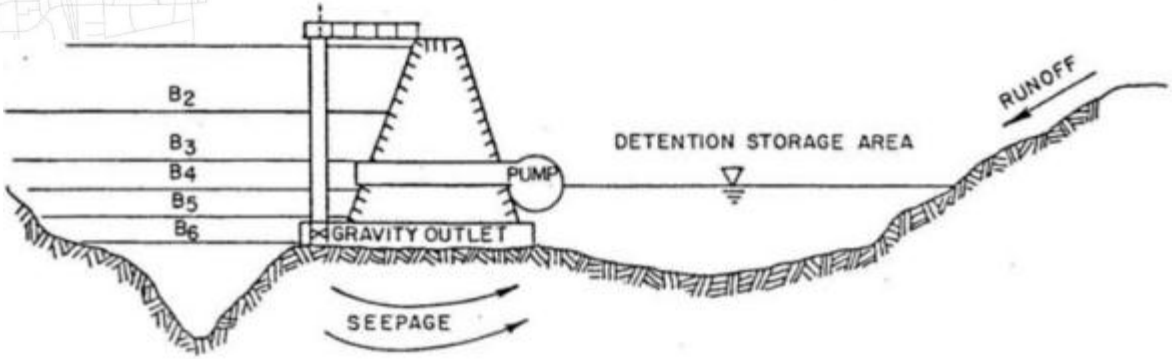
West Side Interior Drainage



BACKGROUND

- USACE Feasibility Study HEC-HMS model
- 9.2 square mile watershed
- Six recommended pump stations



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West Side Interior Drainage

Modeling Updates

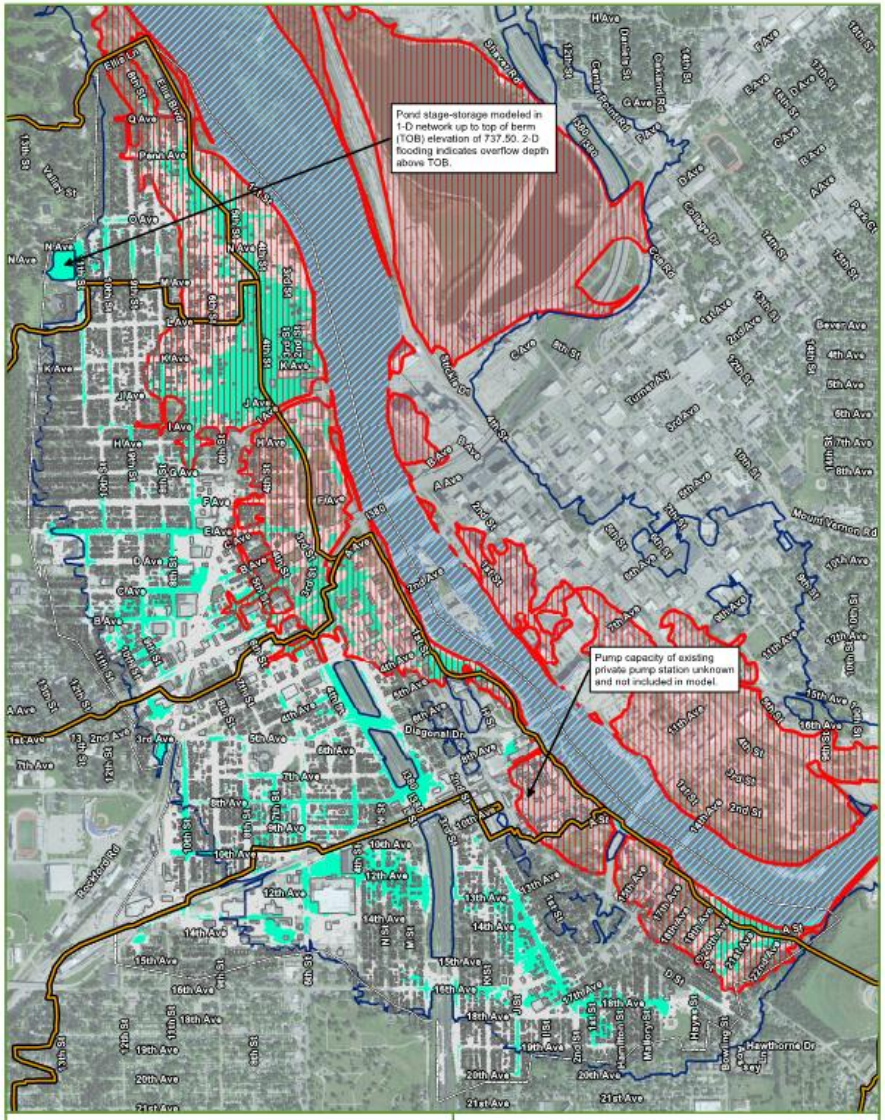
- Urban drainage model
  - Major pipes, channels and detention
  - 2D surface flow and ponding
- Update Rainfall Data - NOAA Atlas 14 Precipitation
- Nested Atlas high peak intensity rainfall distribution

West Side Interior Drainage

- ISSUE 1: Runoff exceeding storm system capacity causes interior ponding, <u>independent of the flood control system or river flooding</u>

- IMPORTANCE: Safety, property damage, floodplain mapping implications

- RECOMMENDATION: Stormwater Master Plan policies to reduce runoff and peak flow rates:
  - upland detention
  - infiltration
  - green infrastructure



Cedar Rapids Flood Control System
West Side Interior Drainage

Existing Storm Sewer With 2-Year River Stage

Ponding Depth Greater than or Equal to 1-ft for 100-Year Storm

Exhibit 14B

Legend
Basin
2D Modeling Extent
Buildings
2008 Flooding Extents
Floodplain Zone
Floodway Zone
Ponding Depth (ft)
Less than 1-ft
Greater than or Equal to 1-ft
N
0 1,000 Feet
HRGreen

CEDAR RAPIDS FLOOD CONTROL SYSTEM
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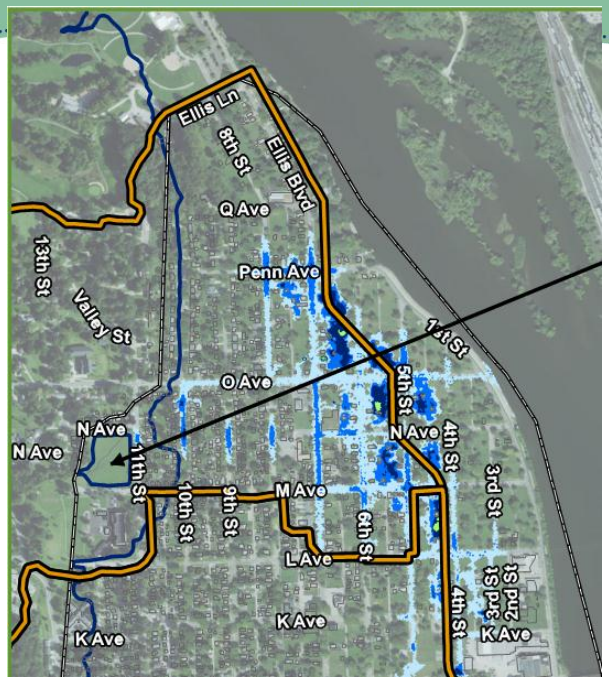
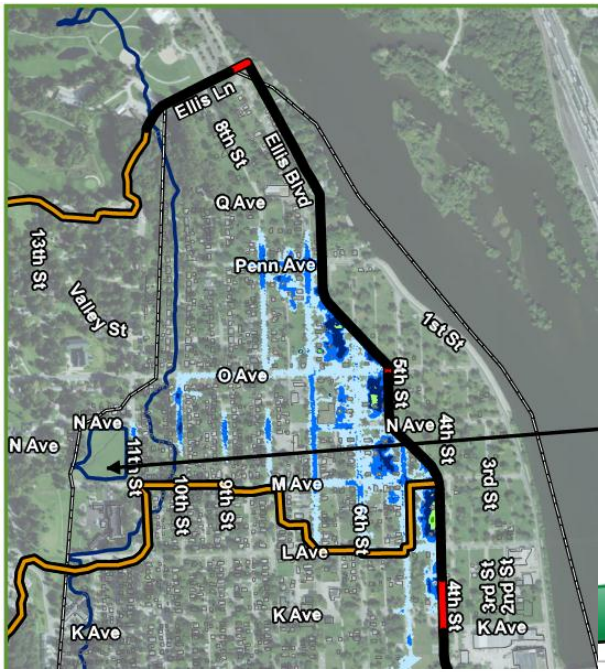
West Side Interior Drainage

- ISSUE 2: Increased ponding where levee blocks overland flow
- IMPORTANCE: Safety, property damage, floodplain mapping implications
- RECOMMENDATIONS:
  1. Increase pipe capacity from levee to river
  2. Add dry side detention near pump stations





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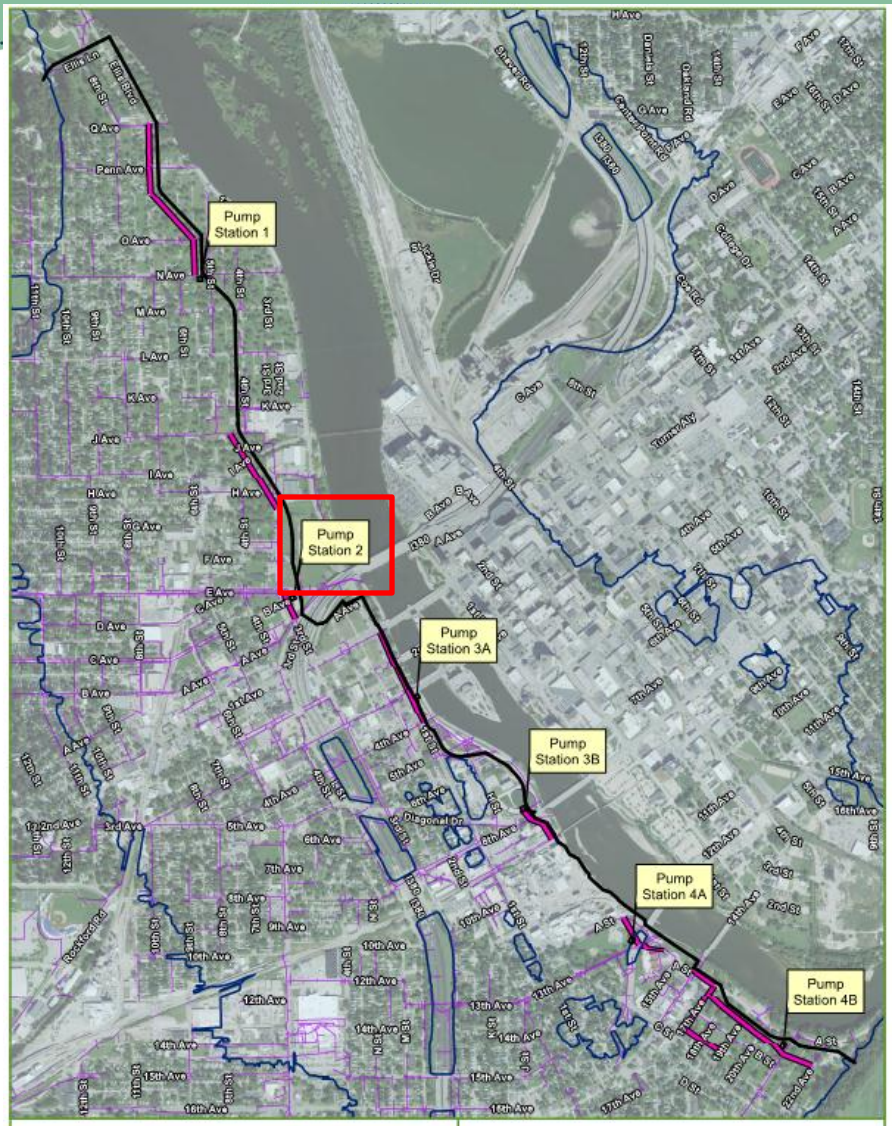
West Side Interior Drainage

- ISSUE 3: Estimated cost to pump current flows from 1% coincident probability rainfall event is $39-$47M; Total budgeted for all stations $7.4M.

- BACKGROUND:
  Previous work assumed
  - 3-month storm, average intensity
  - no pump station building

- OPTIONS:
  1. Build pump stations for current flows at additional cost
  2. Accept greater risk and build smaller pump stations
  3. Adopt aggressive stormwater runoff reduction policy to reduce flows and pump station sizes



Cedar Rapids Flood Control System

West Side Interior Drainage

Proposed Flood Control System

Legend

- Proposed Storm Pump Stations
- Proposed Flood Control
- 2008 Flooding Extents
- Proposed Storm Sewer
- Existing City Storm Sewer

N

0 1,000 Feet

HRGreen

Exhibit 8

CEDAR RAPIDS FLOOD CONTROL SYSTEM

STRENGTHENING OUR COMMUNITY

Interior Drainage

Moving Forward

- Risk and impacts to existing structures
- Coordination with Storm Water Master Plan
- Minimum building elevation for redevelopment
- Alternatives for Vinton Ditch