Managing Flooding in Place

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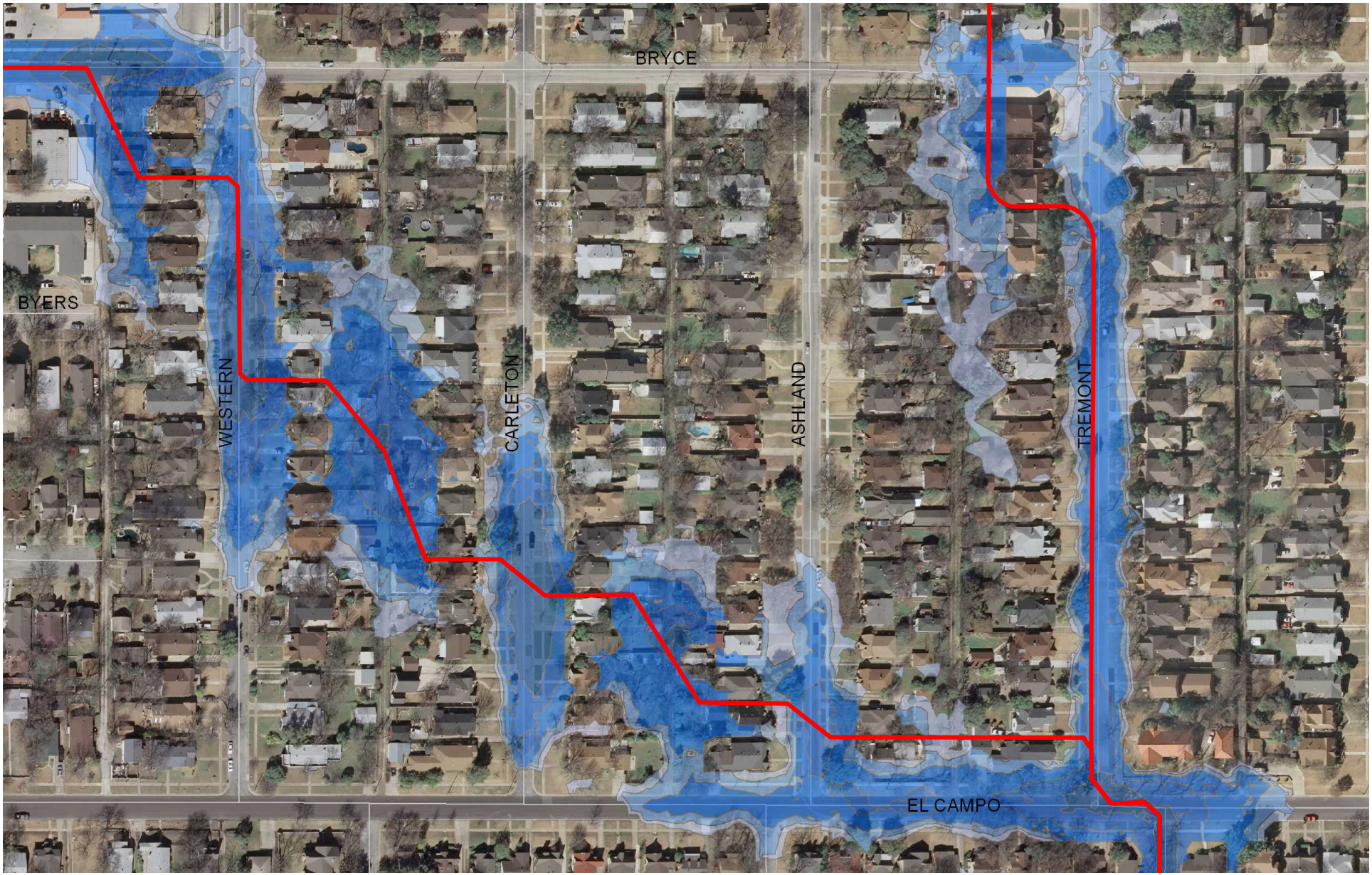
URBAN FLOODING

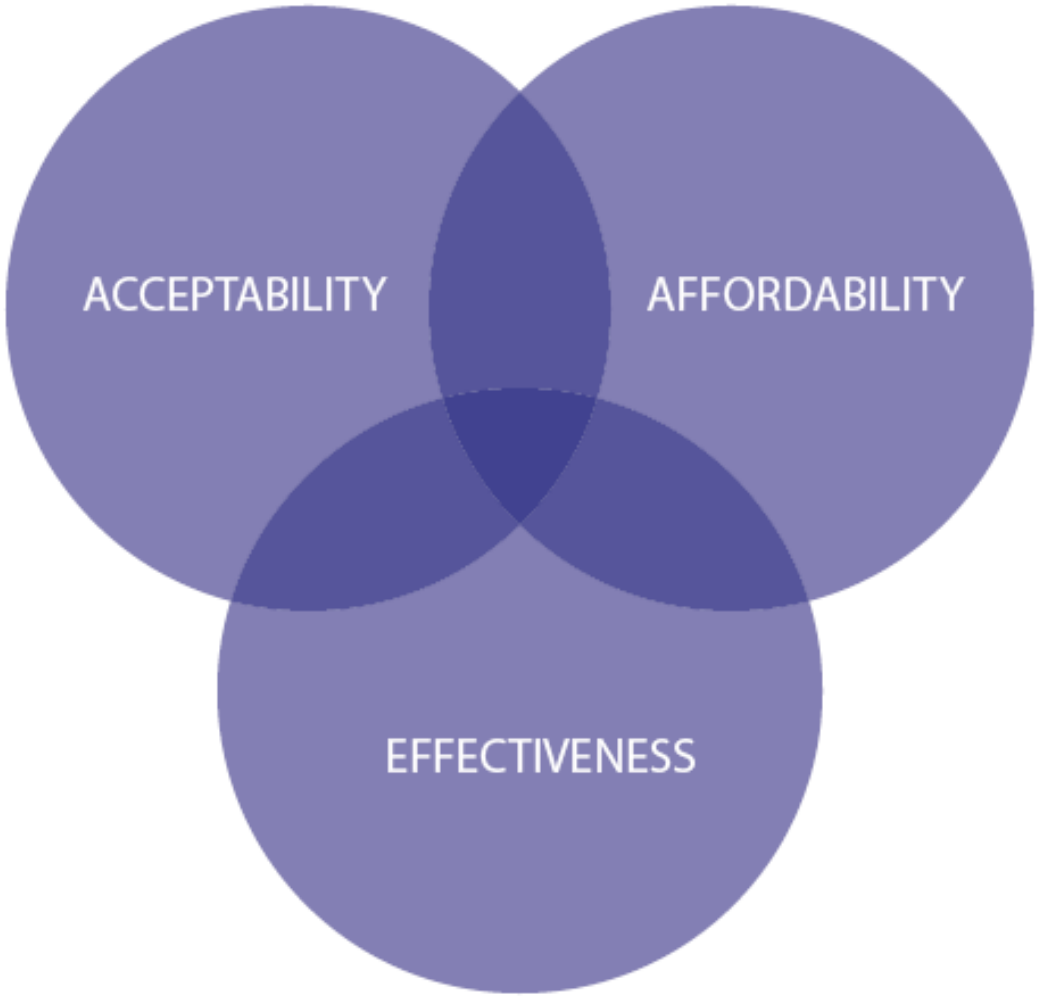
Main Causes of Urban Flooding

- Pre-1970, small creeks often enclosed in storm drains, usually severely undersized
- Street grid often ignored drainage patterns, leading to mid-block sumps
- Homes and buildings constructed over these creeks and storm drains, with overflow path running through them

Typical Older Neighborhood



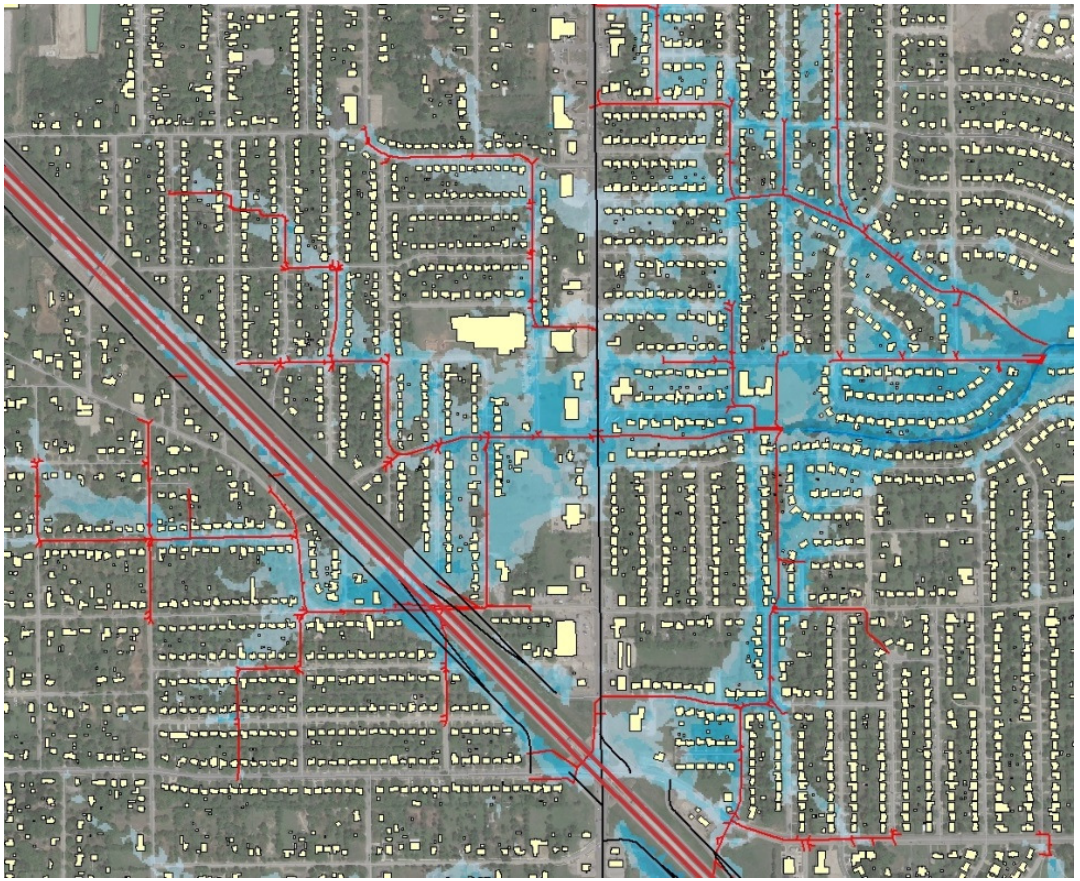
The Challenge



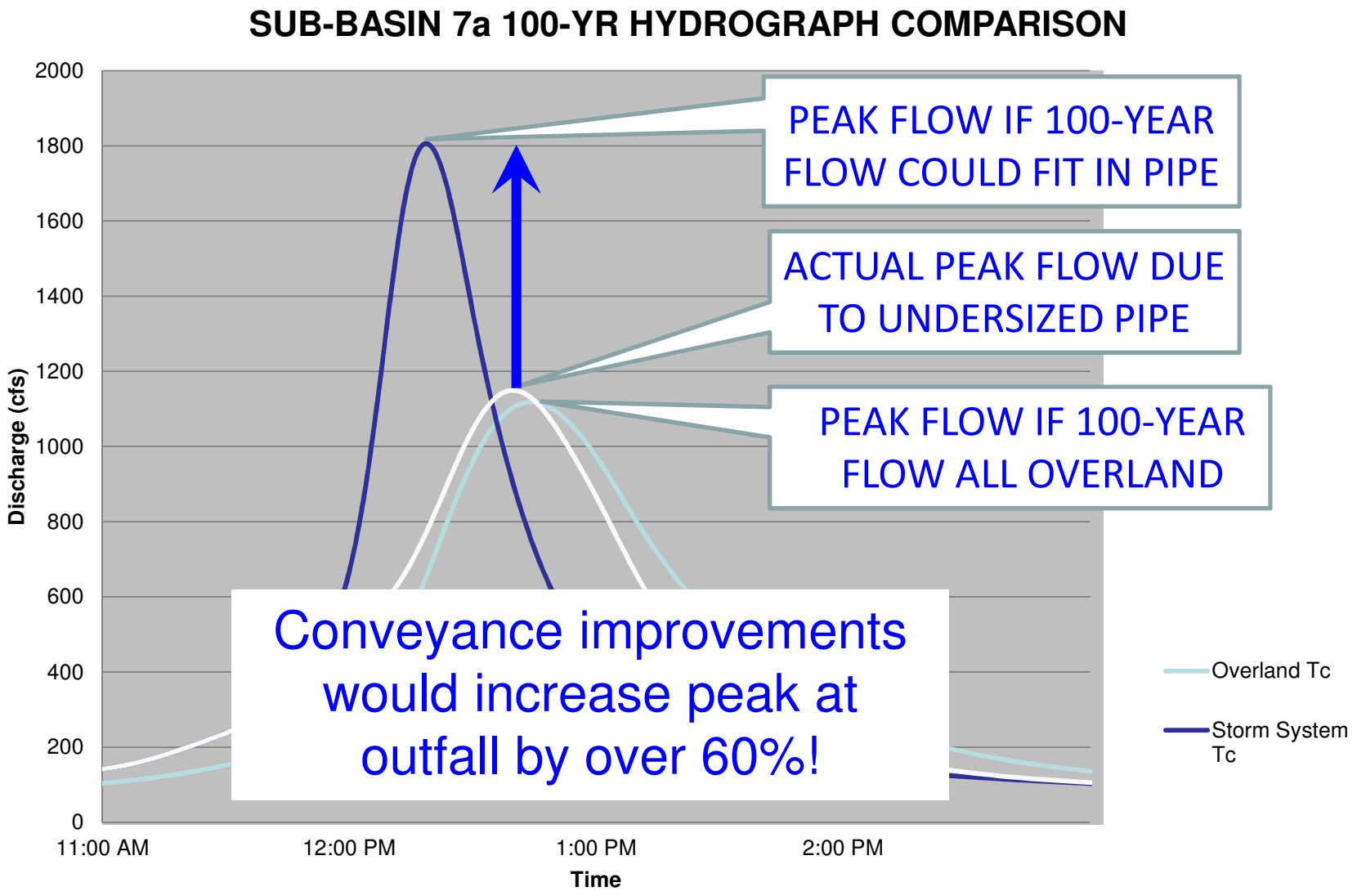
In most situations we must find a bit of compromise in all three elements.

Volume Issues

Valley Storage:
Undersized pipes cause floodwater to be stored in neighborhoods, decreasing the peak flows downstream.



Timing Issues



No Adverse Impact

- *"No Adverse Impact floodplain management takes place when the actions of one property owner are not allowed to adversely affect the rights of other property owners."* (ASFPM, 2008)

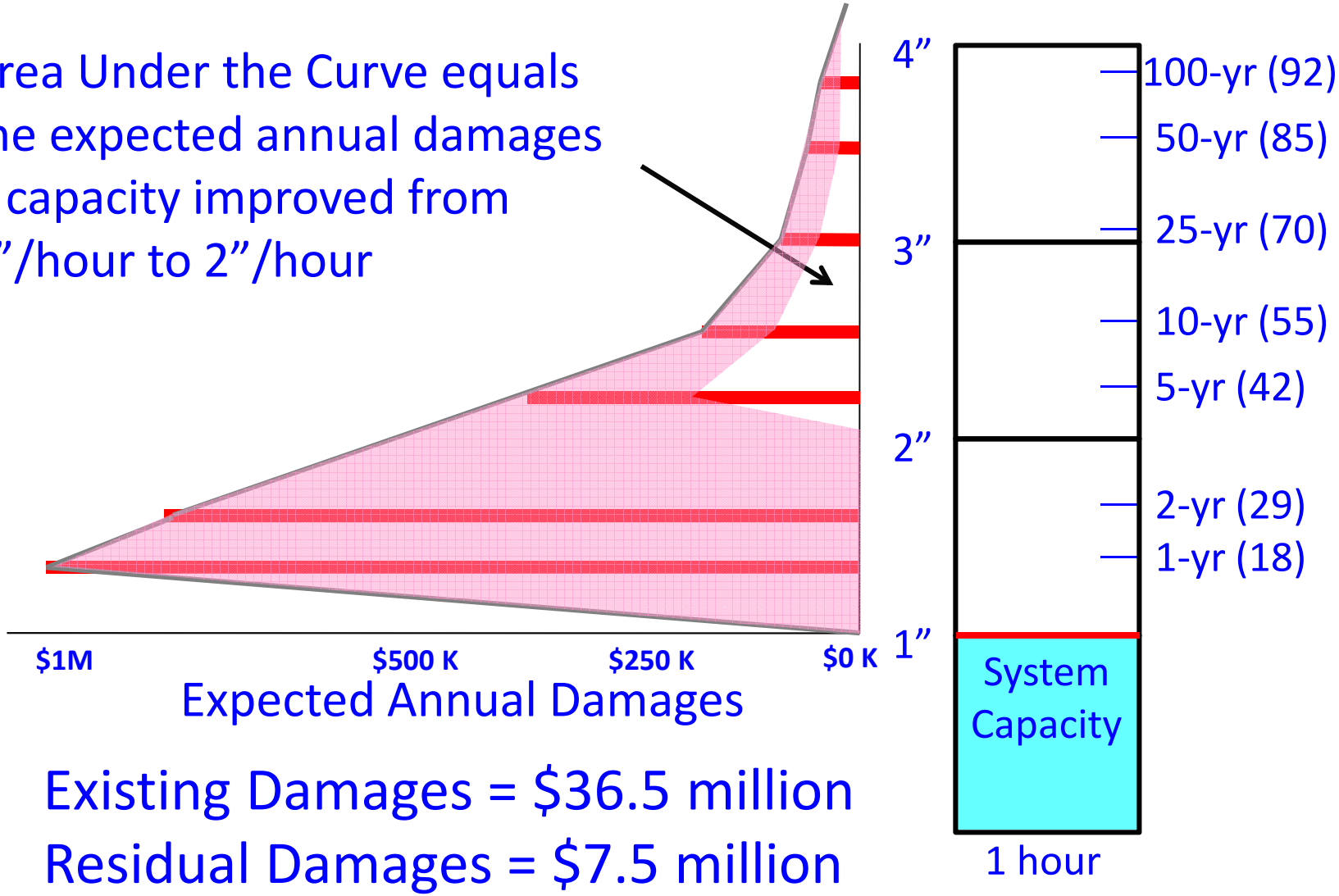
- Consistent with Texas Water Code §11.086 and similar laws in other states.

Understanding Risk

- Usually public safety not a major threat
- Zone X: nothing hinders rebuilding
- Chronic flooding vs. periodic flooding
- Manage flooding like other risks in life
- Flood risk management:
  - Avoidance: move out
  - Coping: minor prevention and repair
  - Insurance: limit economic losses

Net Present Value of Damages

Area Under the Curve equals the expected annual damages if capacity improved from 1”/hour to 2”/hour



Existing Damages = $36.5 million

Residual Damages = $7.5 million

Benefit = $29 million

Challenge of Urban Flooding

- Urban flooding solutions must be **EFFECTIVE, AFFORDABLE & ACCEPTABLE**
- **NO ADVERSE IMPACT** principles require evaluating downstream impacts
- **INCREMENTAL** improvements may be the only cost-effective option
- **MANAGING FLOODING IN PLACE** is likely to be most feasible solution

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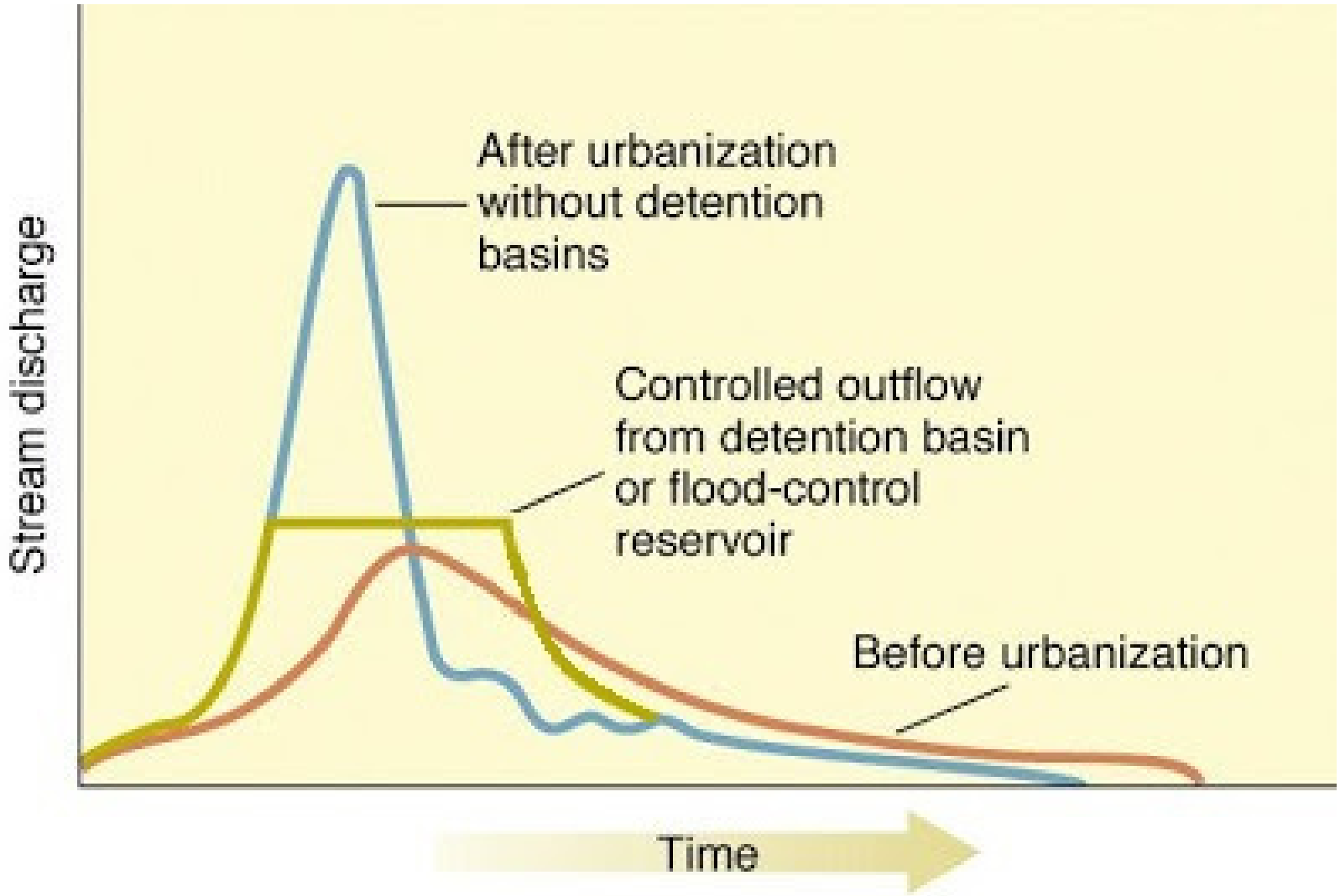
DETENTION OVERVIEW

Mimicking Pre-Developed Hydrology



Detention Advantages

- Detention and valley storage decrease flooding impacts continuously
- Much cheaper to build (except for land costs)

Local vs. Regional Detention

- Many small detention basins can cancel each other out by stacking peaks
- One regional basin is more economical than several smaller basins
  - Smaller total footprint (less land)
  - Less total maintenance cost
  - Larger enough for multiple public uses
- Several regional basins easier to model together than numerous small basins

NOT THIS!

- Historically, detention viewed as fenced-off drainage facility
- End up as eyesores and wasted land

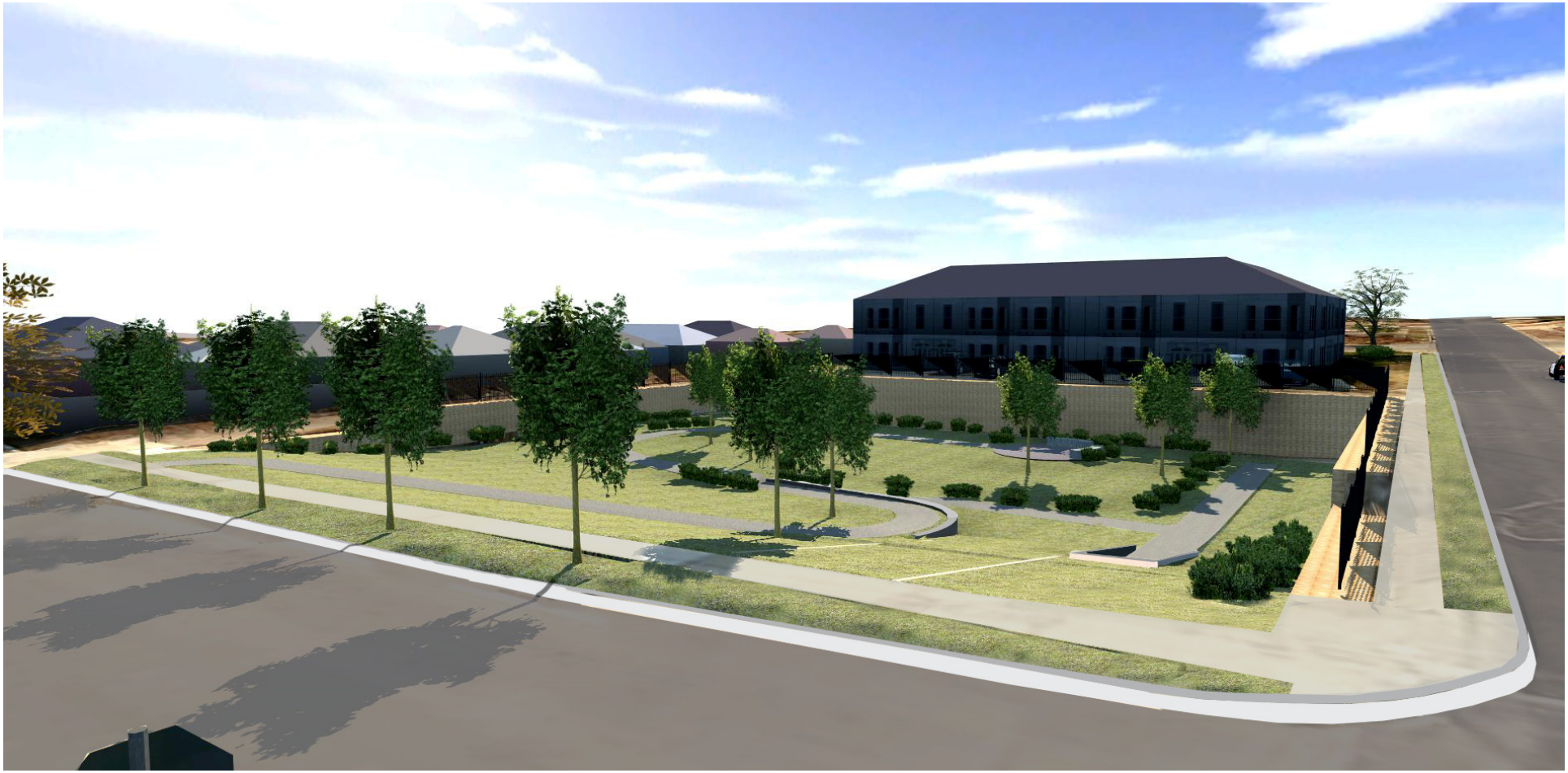
Multi-Use Detention

Detention areas can be used for aesthetics and water quality

Multi-Use Detention

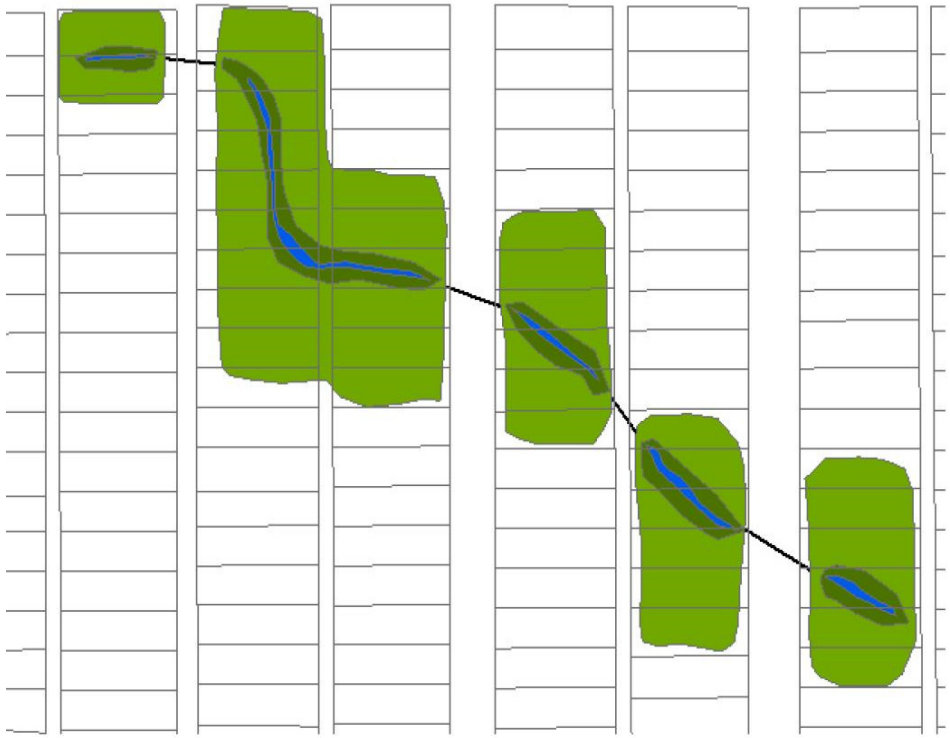
Detention areas can be used for recreation and open space

Detention Basin—Neighborhood Park

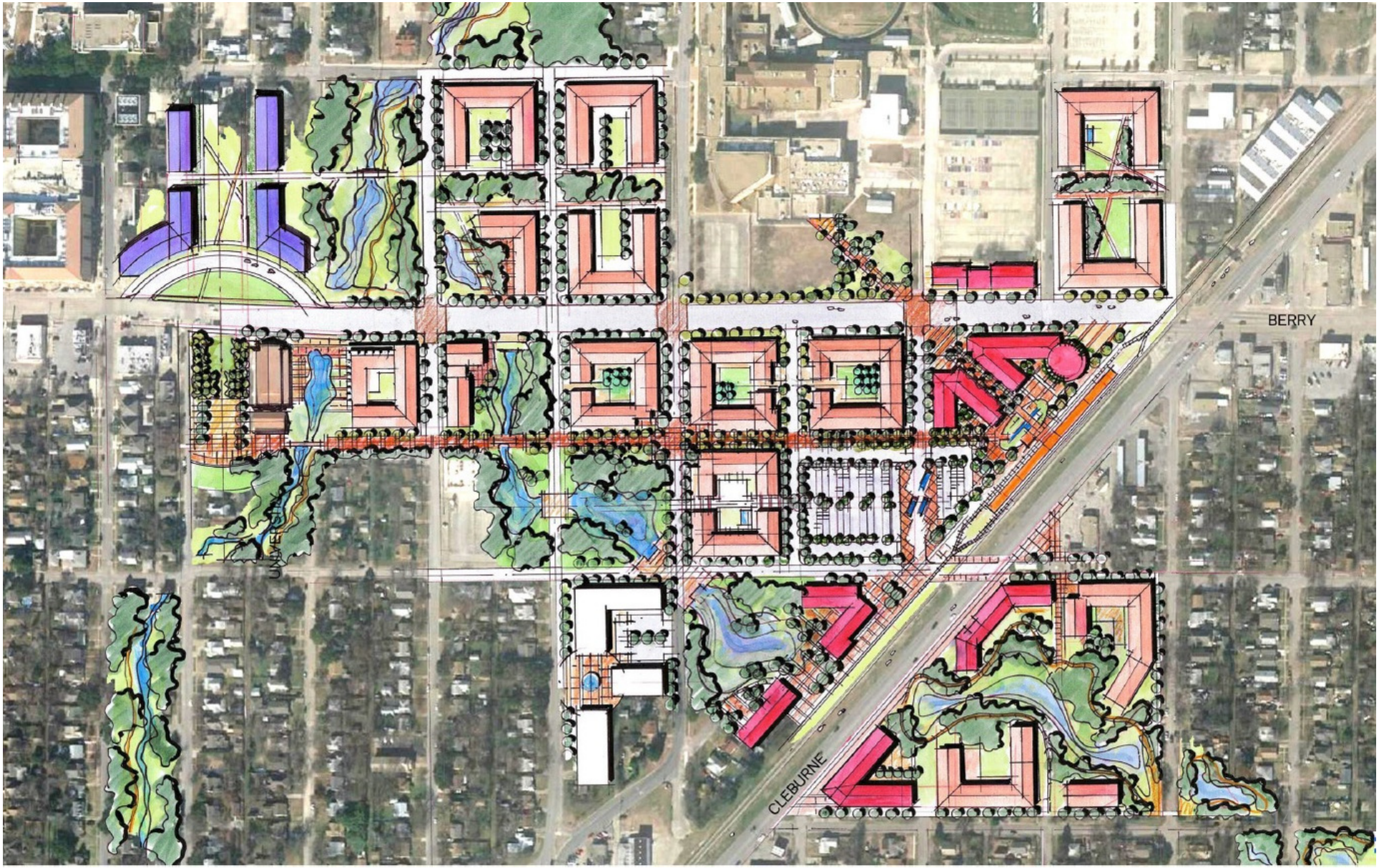


Neighborhood Integrity

- Empty lots destroy neighborhood integrity
- Linear parks, greenways and pocket parks enhance neighborhoods



Integrated with Redevelopment Plans



Daylighting Streams

Storm Drain with Overflow Swale

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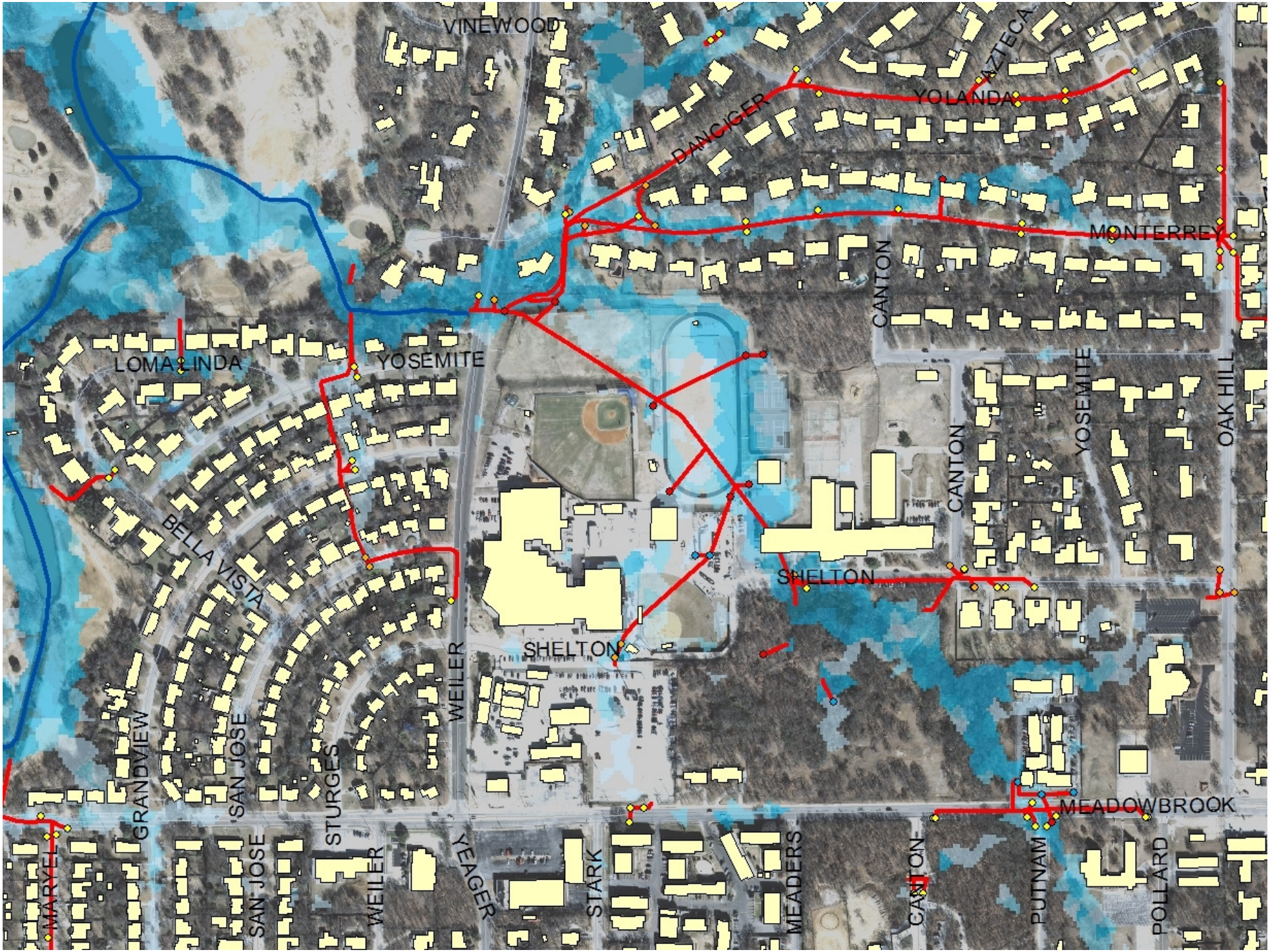
HOW DO YOU APPLY IT?

Look for Opportunity

- Know where your flooding is
- Identify available land
- Look for partners:
  - Parks department
  - School districts
  - Developers
  - HOAs or POAs (formal organizations)
  - Business development groups
  - Neighborhood associations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WEILER
GRANDVIEW
SAN JOSE
STURGES
YEAGER
STARK
MEADERS
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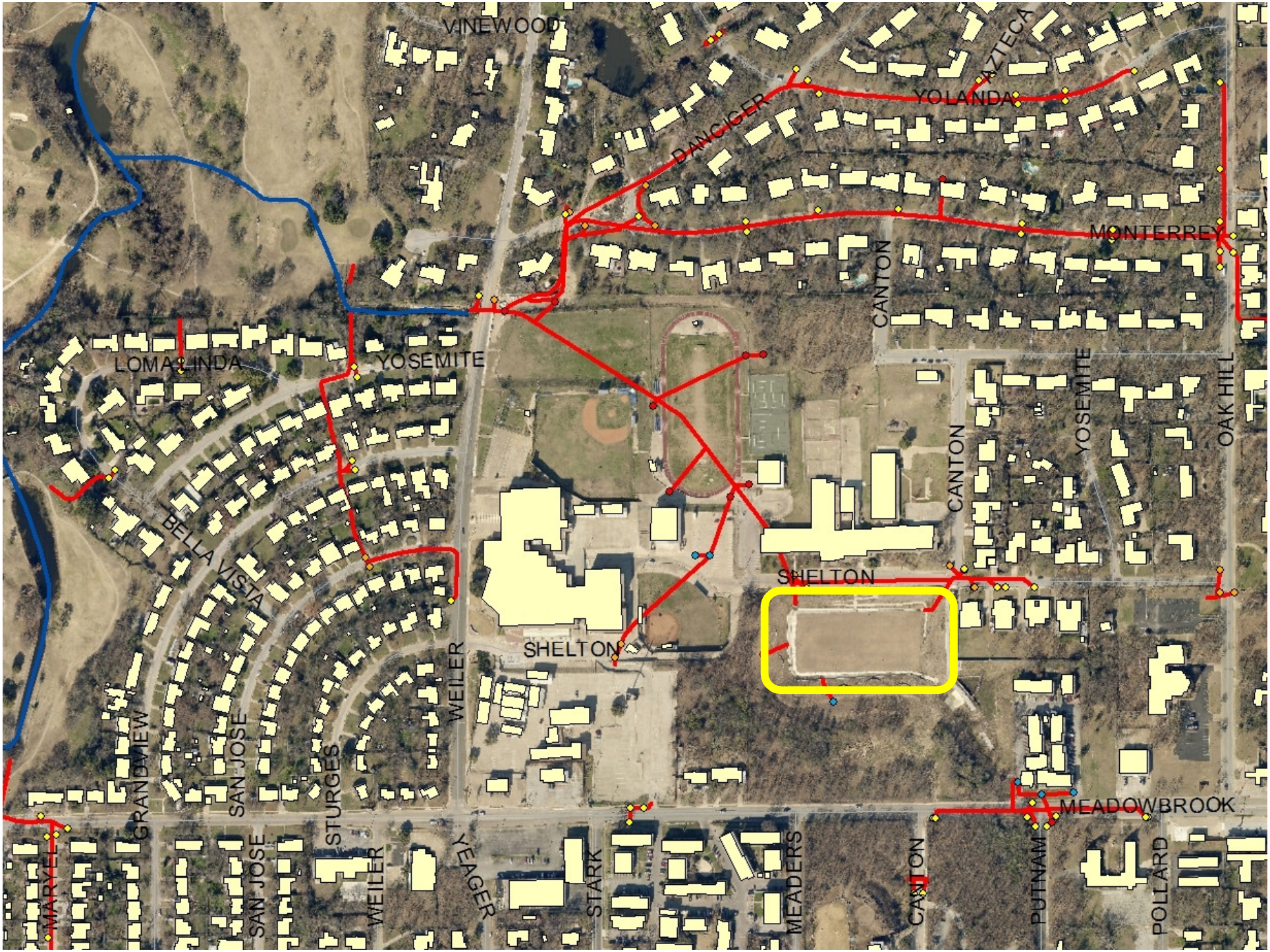
POLLARD
MEADOWBROOK
MARVEL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CANTON
PUTNAM
MEADOWBROOK
POLLARD
MARVEL

Eastern Hills Detention Basin

Partner project with Fort Worth ISD


BONNIE
KERMIT
HIGHWAY 377 KERMIT
BENBROOK
OLD BENBROOK
FAIRFAX
KERMIT
GARZA
FAIRFAX
GARZA SOUTHWEST
BRAZOS
SOUTHWEST


BONNIE
KERMIT
HIGHWAY 377 KERMIT
BENBROOK
OLD BENBROOK
FAIRFAX
KERMIT
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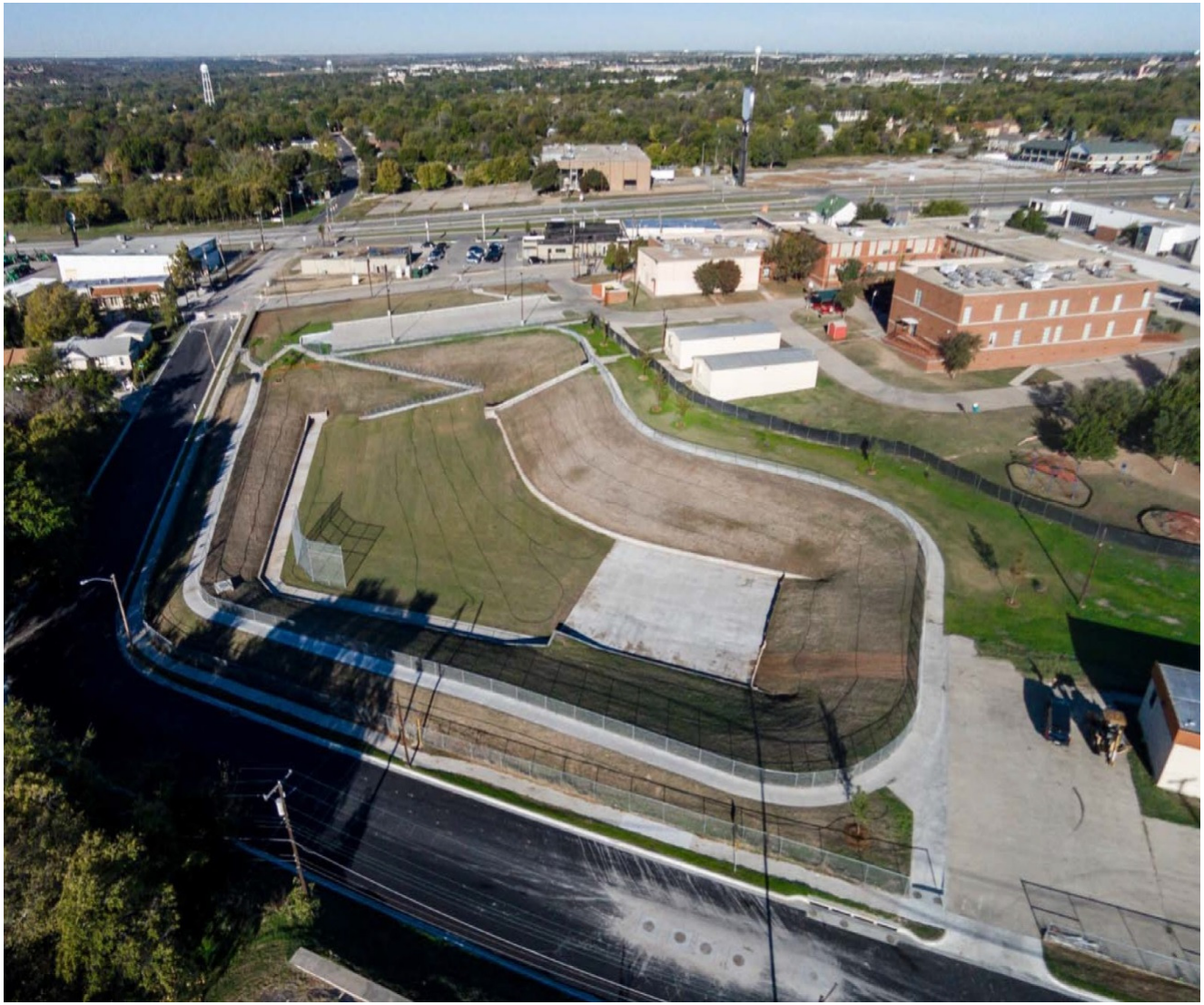
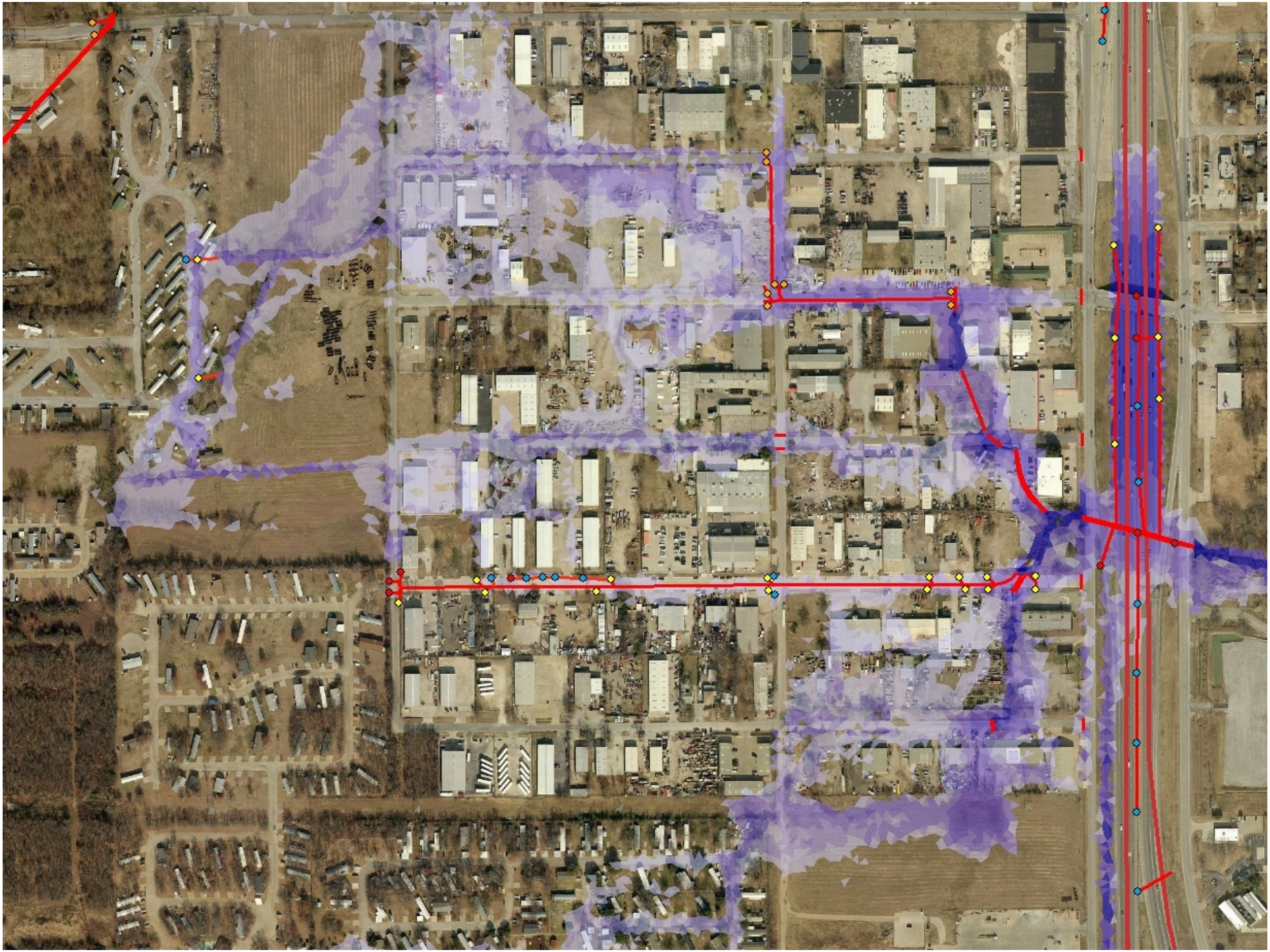
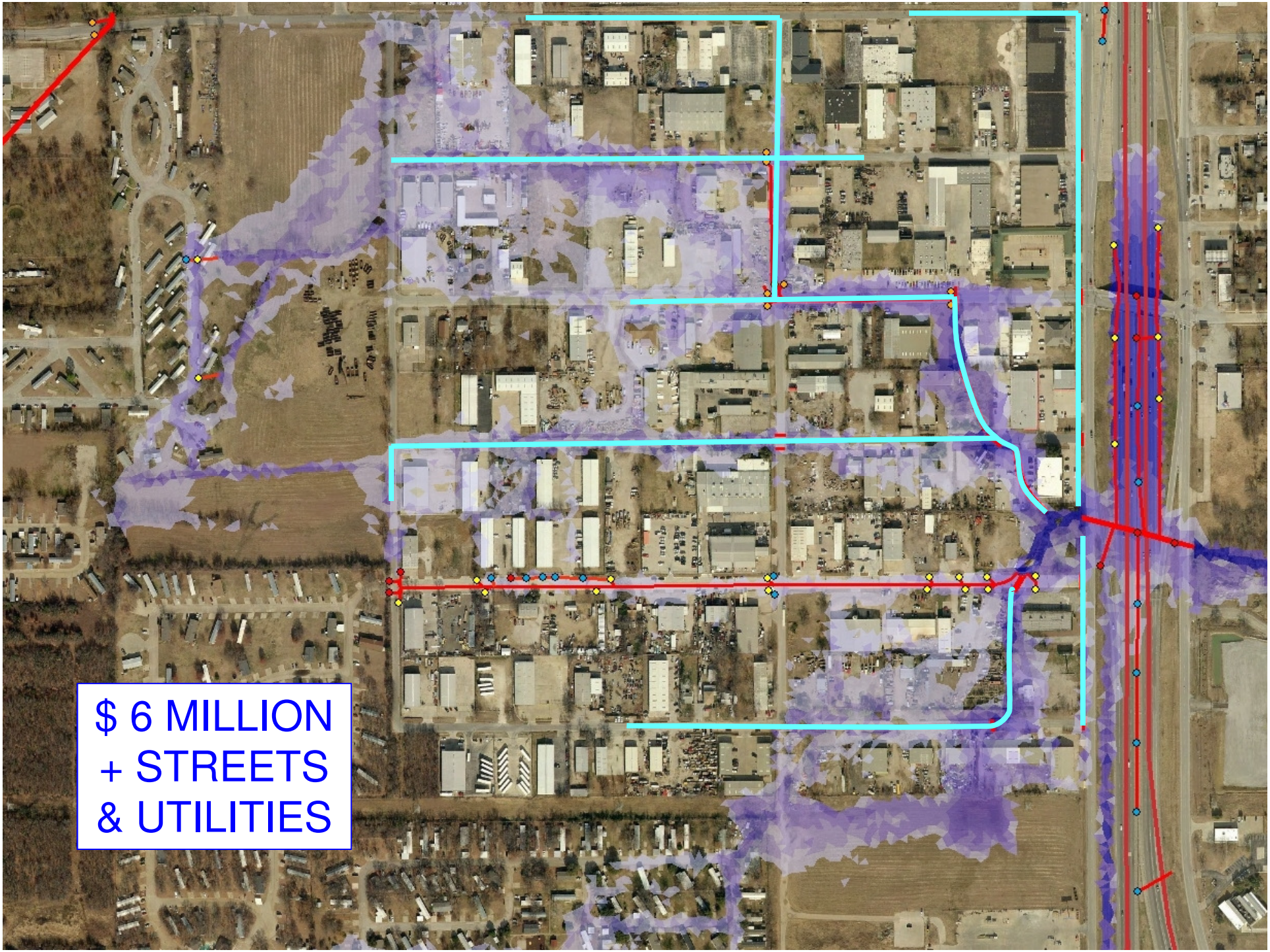
FAIRFAX
GARZA SOUTHWEST
BRAZOS
SOUTHWEST

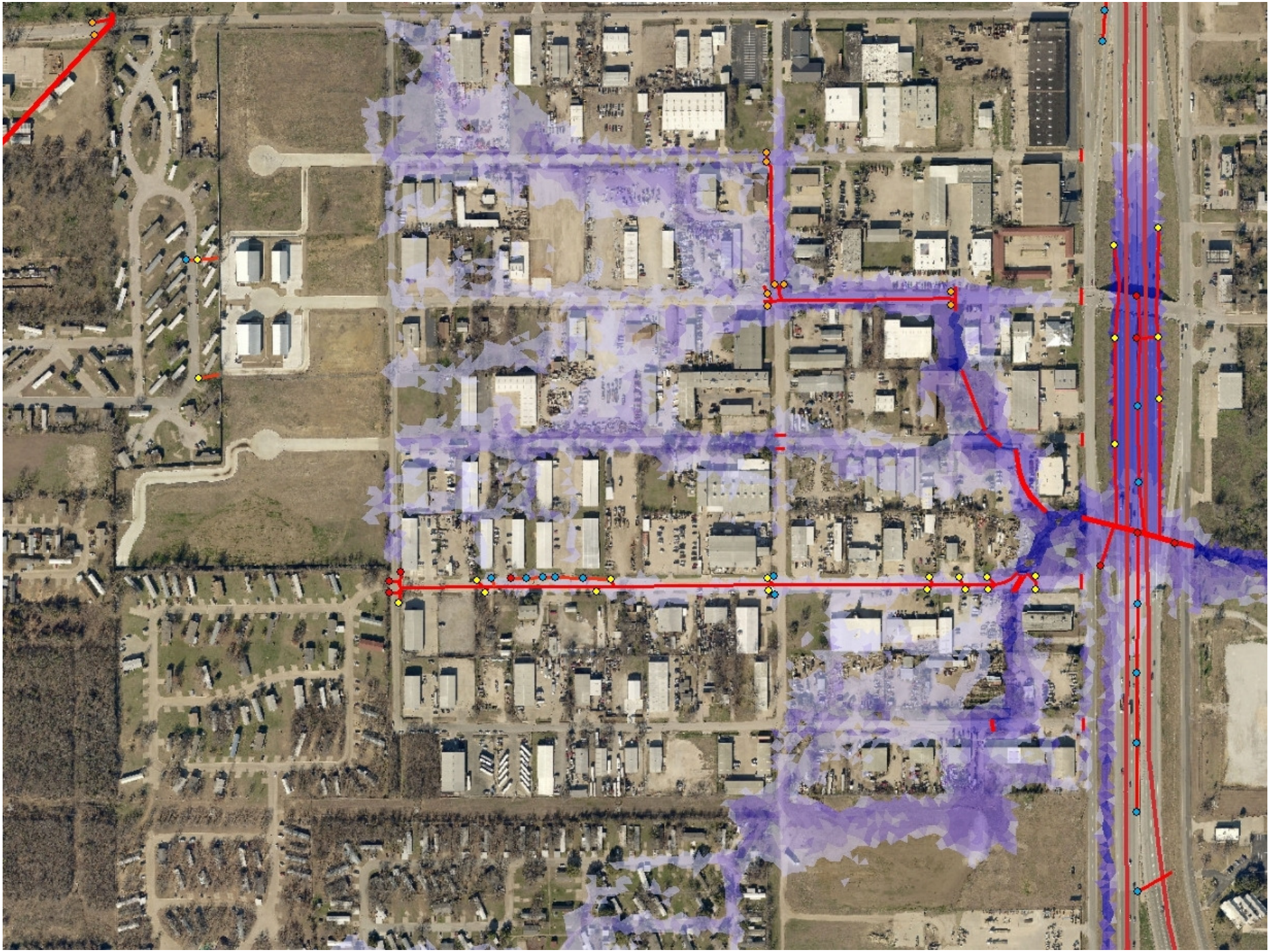
Luella Merrett Detention Basin

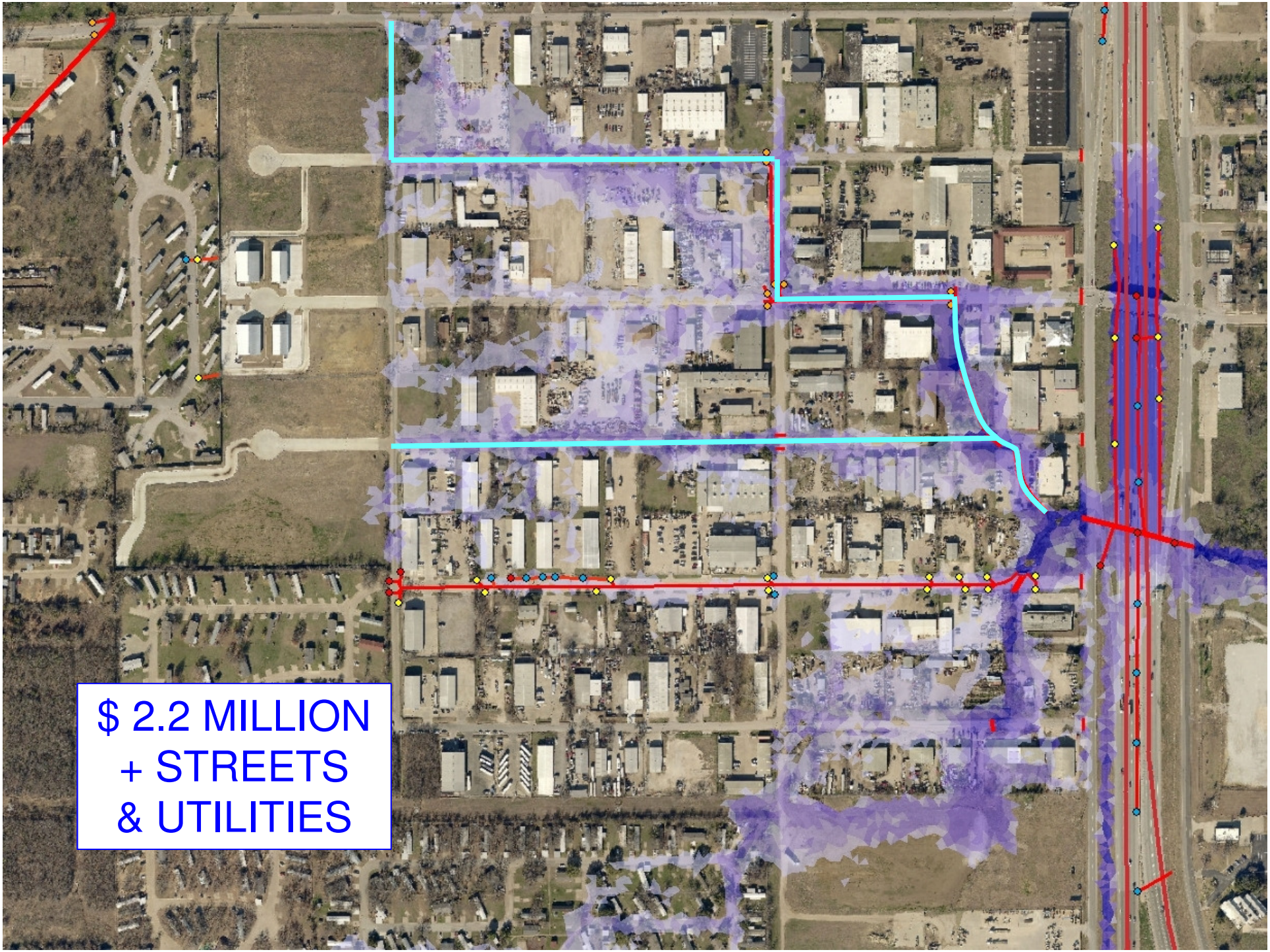
Another partner project with Fort Worth ISD






$ 6 MILLION
+ STREETS
& UTILITIES




$ 2.2 MILLION
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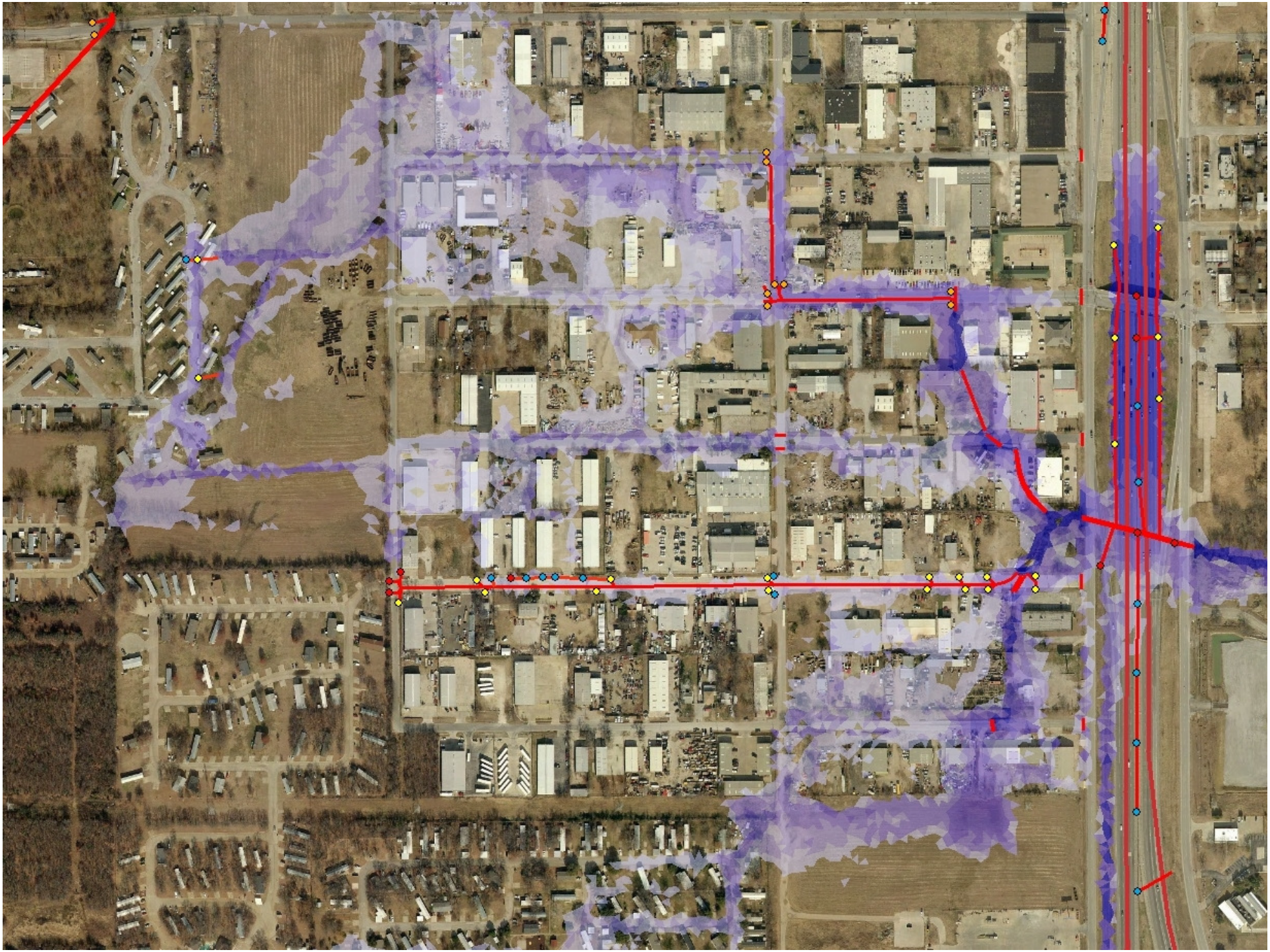

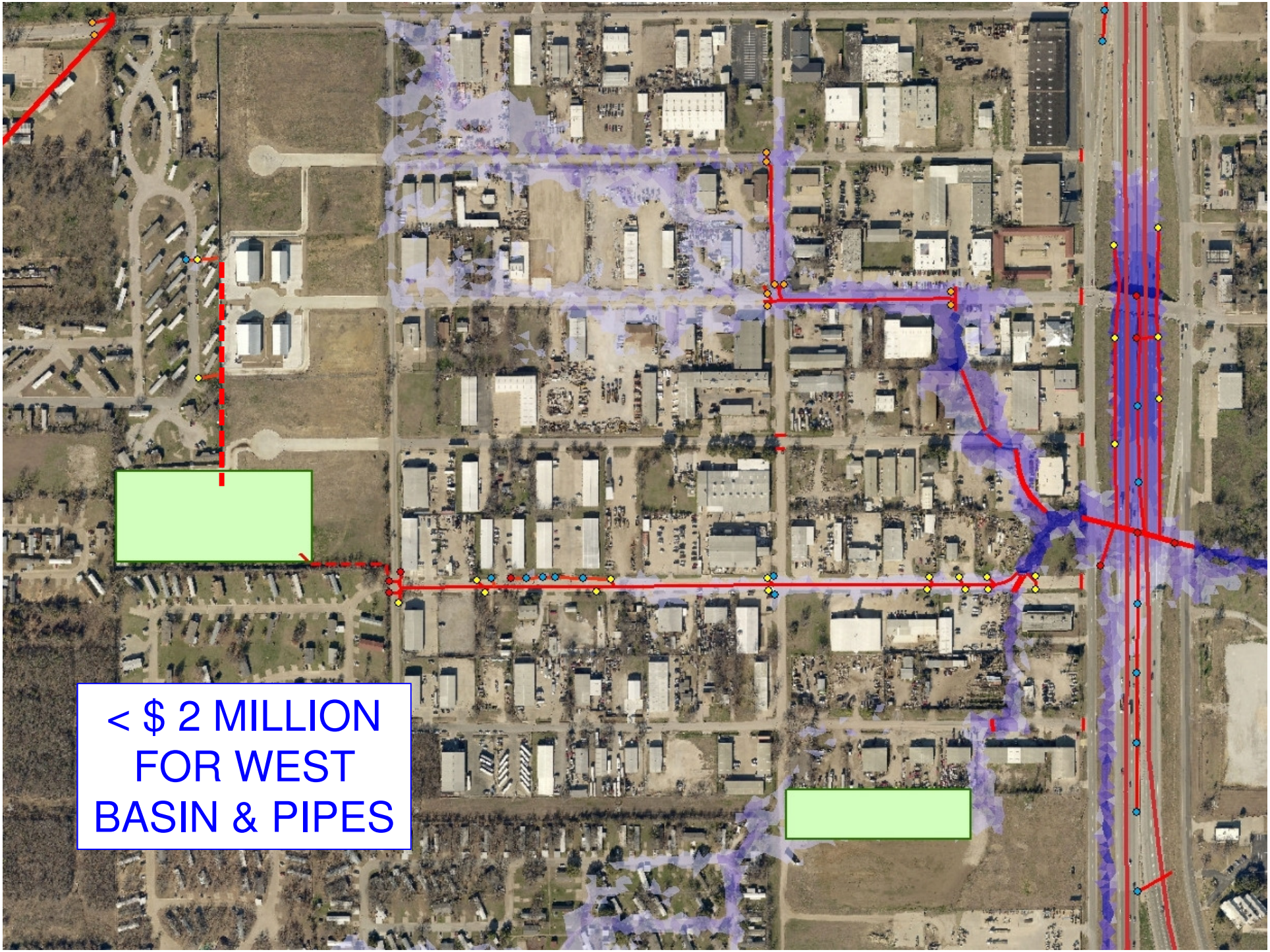
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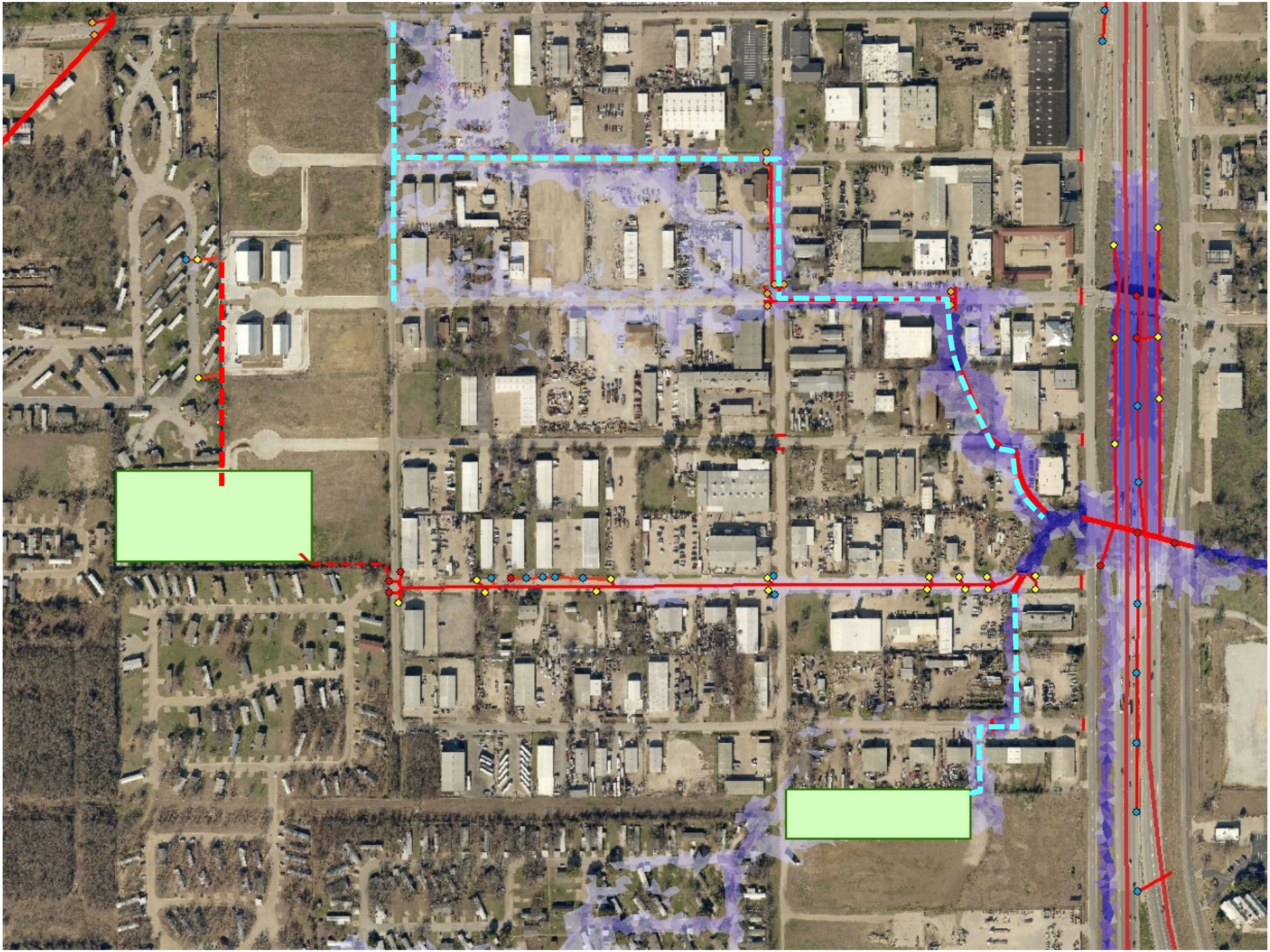

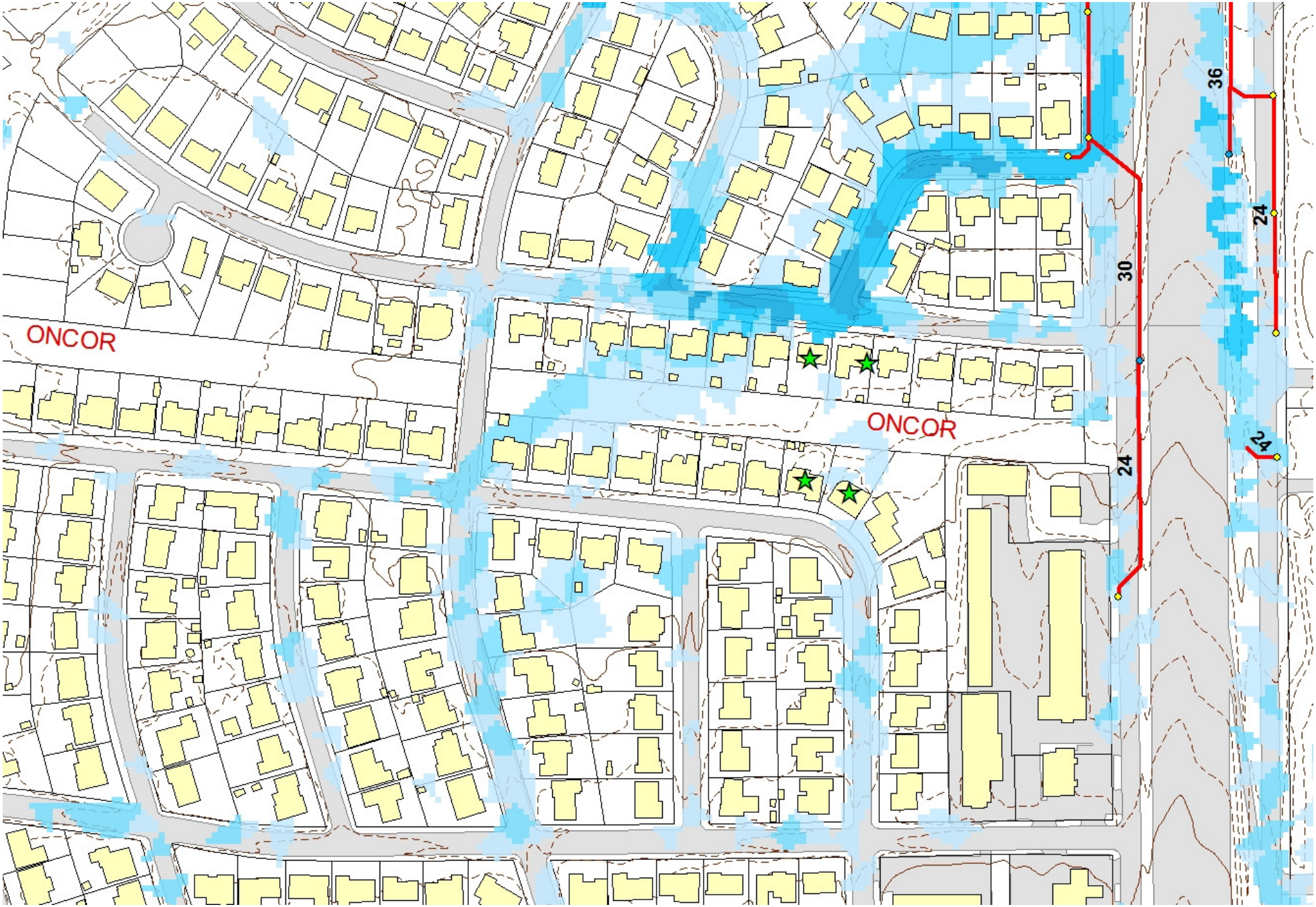
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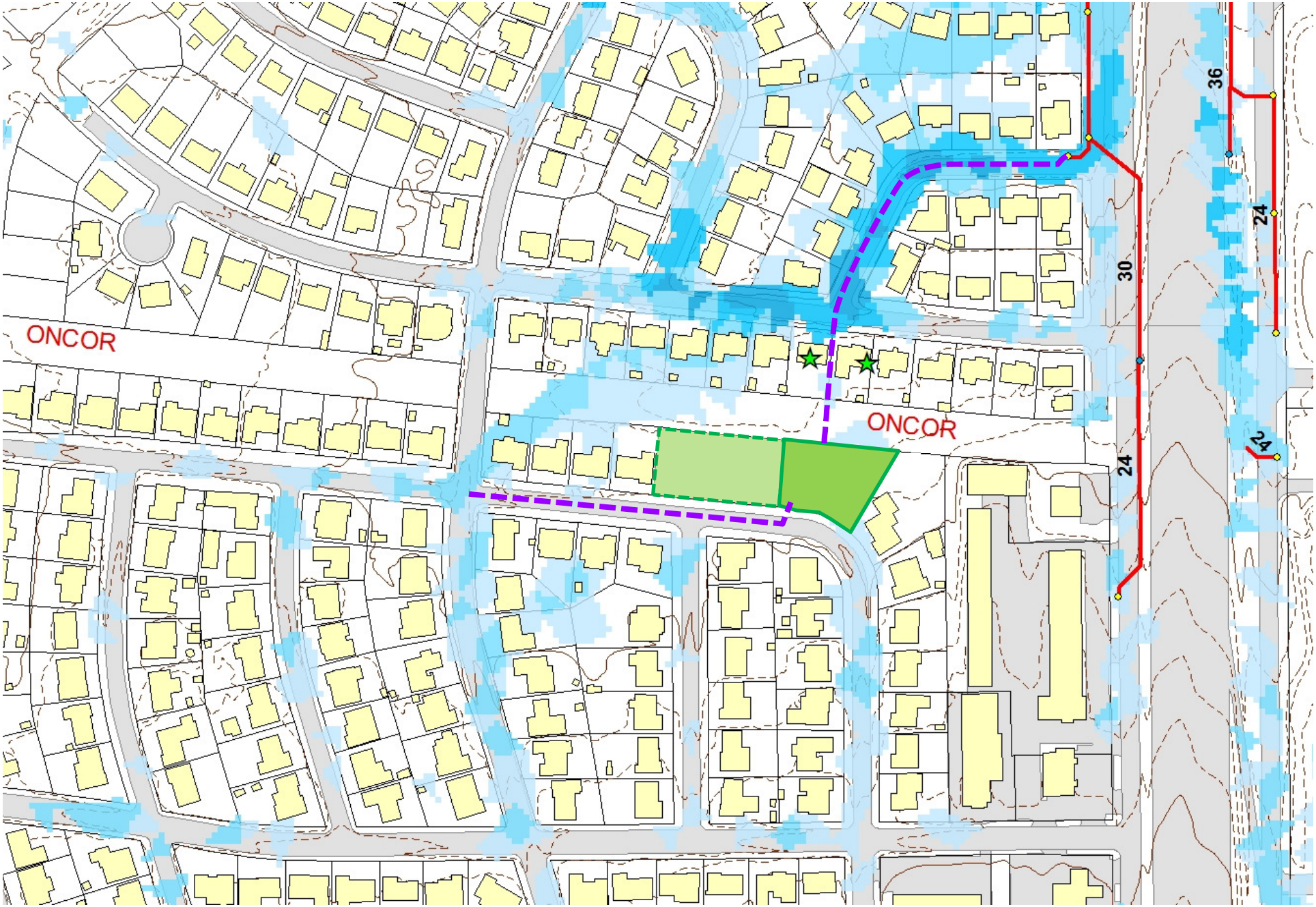
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QUESTIONS?