

# Storm Water Master Plan



City of Norman  
Cleveland County,  
Oklahoma

Public Meeting  
May 28, 2008



# Presentation Overview

- Introductions
  - » Team Organization
  - » Key Project Leaders
- Key Project Work Elements
  - » Storm Water (MS4) Permit Compliance
  - » Greenbelt Master Plan
  - » Watershed/Stream Assessments
  - » Hydrologic & Hydraulic Analyses
  - » Problems Identified
  - » Solutions Evaluated
  - » Funding
- Issues to Resolve
- Questions & Comments



# Project Approach – Key Issues: The City's Vision

- Build consensus and support
- Address water and drainage challenges
- Comply with storm water quality requirements (Phase II)
- Define **funding** solutions



# Project Team Meetings and Coordination

- Bi-weekly conference calls with City staff
- Public Forum Meetings
  - » September 18, 2007
  - » February 21, 2008
  - » **May 28, 2008**
  - » **September 25, 2008**
- SWMP Task Force Meetings
  - » September 18, 2007
  - » November 7, 2007
  - » November 28, 2007
  - » February 22, 2008
  - » April 17, 2008
  - » **May 27, 2008**
  - » **June 19, 2008**
  - » **July 31, 2008**
  - » **September 26, 2008**



# Norman Priority Study Areas



## Legend

### Study Streams

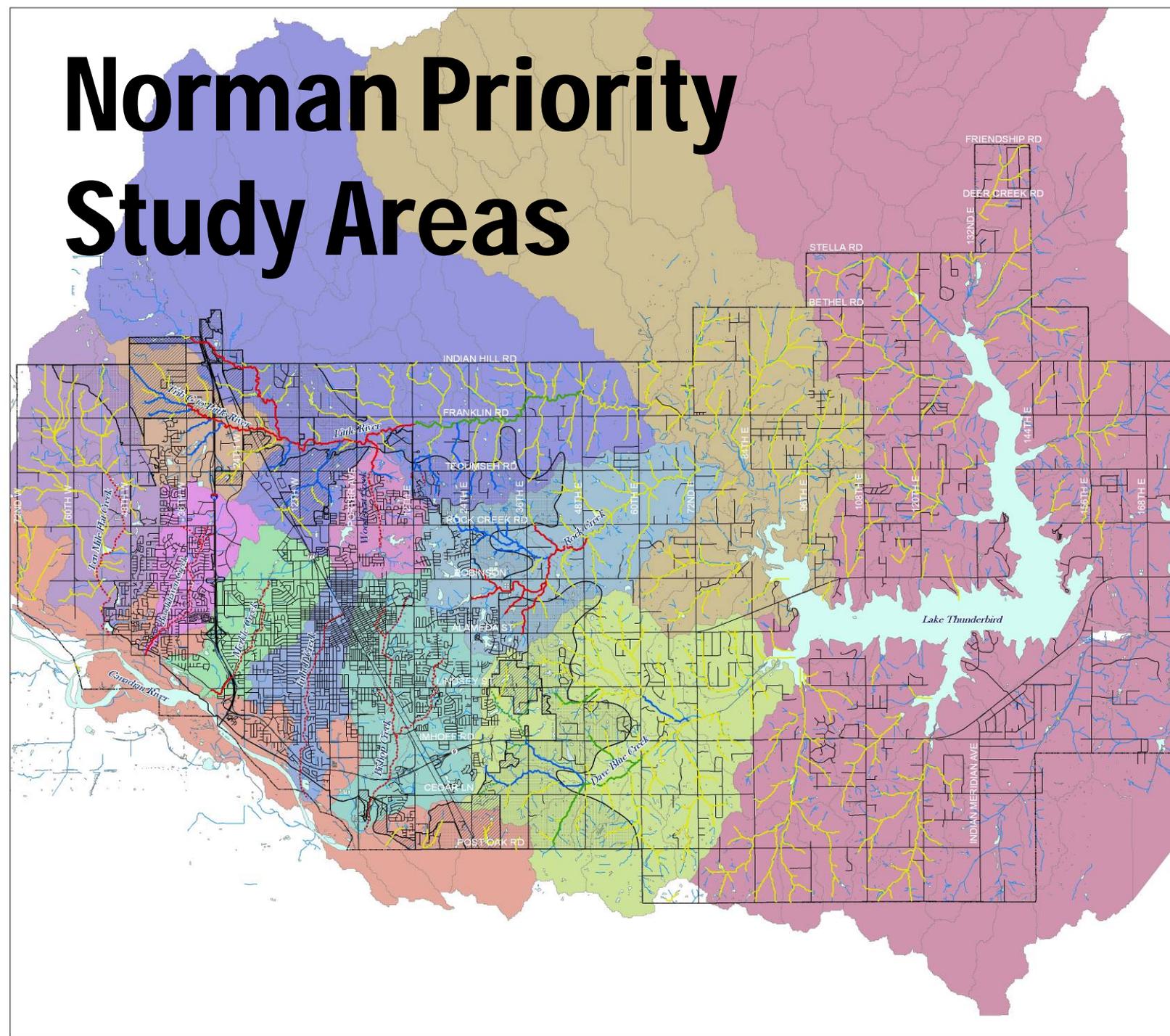
- New Detailed (L1)
- - - Existing Detailed (L2)
- Future Detailed (L3)
- Stream Planning Corridor (L4)
- Alt. A - Detailed
- - - Alt. A - Existing Detailed

### Development Category

- Current Urban
- Future Urban
- Northern Loop
- Suburban Residential
- City\_Boundary
- Roads
- Base Drainage Layer

### Watershed

- Bishop Creek
- Brookhaven Creek
- Canadian River Tribs
- Dave Blue Creek
- Imhoff Creek
- Lake Thunderbird
- Little River
- Lower Little River
- Merkle Creek
- Rock Creek
- Ten Mile Flat Creek
- Trib G to Little River
- Woodcrest Creek



# **Storm Water Quality Compliance Program**

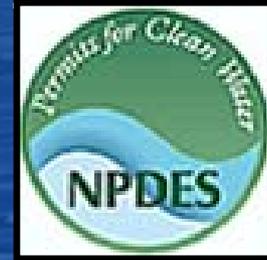
**Michael Bloom, P.E.  
PBS&J**



# Clean Water Act

- National Discharge Permitting System

- » Municipal Wastewater
- » Industrial Wastewater
- » Storm Water
  - Construction Runoff
  - Municipal Runoff
  - Industrial Runoff



- Civil and Criminal Penalties

- » Up to \$27,500 per day
- » Jail time for "knowing violations"



# Storm Water Requirements

- Develop and implement:  
**Storm Water Management Program**
- Reduce pollutant discharges to  
the *Maximum Extent Practicable*



# Program Components

## "SIX MINIMUM CONTROL MEASURES"

- Public Education and Outreach
- Public Involvement/Participation
- Illicit Discharge Detection and Elimination



# Program Components

## "SIX MINIMUM CONTROL MEASURES"

- Construction Site Storm Water
- New Development and Redevelopment
- Pollution Prevention & Good Housekeeping



# Program Components

- For each “MCM,” identify:
  - » Best Management Practices (BMPs)
  - » Measurable Goals
  - » Schedule - timing and frequency of actions
  - » Responsible persons



# Timeline

- Completed

- » Oklahoma DEQ issues permit in 2005
- » City applies for permit 2005
- » City begins program implementation 2005
- » City reviews and plans program adjustments in 2008

- Planned

- » Permit renewal required in 2009
- » Implement next permit program 2010-2015



# Program Costs

February 20, 2008 (FINAL)

## SUMMARY OF ALL COSTS (ROUNDED)

## FIRST PERMIT CYCLE

MINIMUM CONTROL MEASURES	2006	2007	2008	2009	2010
MCM-1 - PUBLIC EDUCATION AND OUTREACH	\$ 108,000	\$ 106,000	\$ 112,000	\$ 109,000	\$ 108,000
MCM-2 - PUBLIC PARTICIPATION AND INVOLVEMENT	\$ 11,000	\$ 21,000	\$ 21,000	\$ 11,000	\$ 11,000
MCM-3 - ILLICIT DISCHARGE DETECTION AND ELIMINATION	\$ 16,000	\$ 10,000	\$ 12,000	\$ 17,000	\$ 17,000
MCM-4 - CONSTRUCTION SITE RUNOFF CONTROL	\$ 91,000	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000
MCM-5 - POST CONSTRUCTION RUNOFF CONTROLS	\$ -	\$ -	\$ -	\$ -	\$ 98,000
MCM-6 - GOOD HOUSEKEEPING IN MUNICIPAL OPERATIONS	\$ 375,000	\$ 181,000	\$ 181,000	\$ 181,000	\$ 181,000
ADMINISTRATIVE COSTS (Annual Reporting, etc.)	\$ 88,000	\$ 56,000	\$ 56,000	\$ 56,000	\$ 67,000
<b>EXISTING COSTS:</b>	<b>\$ 678,000</b>	<b>\$ 444,000</b>	<b>\$ 446,000</b>	<b>\$ 434,000</b>	<b>\$ 436,000</b>
<b>NEW COSTS:</b>	<b>\$ 10,000</b>	<b>\$ 10,000</b>	<b>\$ 16,000</b>	<b>\$ 21,000</b>	<b>\$ 127,000</b>
<b>PHASE II COMPLIANCE TOTAL COSTS:</b>	<b>\$ 688,000</b>	<b>\$ 453,000</b>	<b>\$ 462,000</b>	<b>\$ 455,000</b>	<b>\$ 563,000</b>
<b>PHASE II COMPLIANCE TOTAL COSTS (w/ 5% annual inflation):</b>	<b>\$ 688,000</b>	<b>\$ 453,000</b>	<b>\$ 485,000</b>	<b>\$ 501,000</b>	<b>\$ 651,000</b>



# Program Costs

February 20, 2008 (FINAL)

SUMMARY OF ALL COSTS (ROUNDED)	SECOND PERMIT CYCLE				
	2011	2012	2013	2014	2015
<b>MINIMUM CONTROL MEASURES</b>					
MCM-1 - PUBLIC EDUCATION AND OUTREACH	\$ 108,000	\$ 106,000	\$ 116,000	\$ 113,000	\$ 116,000
MCM-2 - PUBLIC PARTICIPATION AND INVOLVEMENT	\$ 15,000	\$ 15,000	\$ 20,000	\$ 20,000	\$ 20,000
MCM-3 - ILLICIT DISCHARGE DETECTION AND ELIMINATION	\$ 28,000	\$ 28,000	\$ 28,000	\$ 28,000	\$ 28,000
MCM-4 - CONSTRUCTION SITE RUNOFF CONTROL	\$ 109,000	\$ 85,000	\$ 82,000	\$ 85,000	\$ 82,000
MCM-5 - POST CONSTRUCTION RUNOFF CONTROLS	\$ 60,000	\$ 13,000	\$ 14,000	\$ 14,000	\$ 15,000
MCM-6 - GOOD HOUSEKEEPING IN MUNICIPAL OPERATIONS	\$ 191,000	\$ 269,000	\$ 637,000	\$ 755,000	\$ 984,000
ADMINISTRATIVE COSTS (Annual Reporting, etc.)	\$ 96,000	\$ 71,000	\$ 100,000	\$ 73,000	\$ 84,000
<b>EXISTING COSTS:</b>	<b>\$ 466,000</b>	<b>\$ 525,000</b>	<b>\$ 527,000</b>	<b>\$ 525,000</b>	<b>\$ 527,000</b>
<b>NEW COSTS:</b>	<b>\$ 141,000</b>	<b>\$ 62,000</b>	<b>\$ 469,000</b>	<b>\$ 563,000</b>	<b>\$ 801,000</b>
<b>PHASE II COMPLIANCE TOTAL COSTS:</b>	<b>\$ 607,000</b>	<b>\$ 587,000</b>	<b>\$ 996,000</b>	<b>\$ 1,088,000</b>	<b>\$ 1,328,000</b>
<b>PHASE II COMPLIANCE TOTAL COSTS (w/ 5% annual inflation):</b>	<b>\$ 738,000</b>	<b>\$ 749,000</b>	<b>\$ 1,335,000</b>	<b>\$ 1,531,000</b>	<b>\$ 1,963,000</b>



# Next Steps – Stormwater Quality

- Continue existing implementation actions
- Continue reporting to DEQ
- Refine new activities and programs after completion of “Stormwater Master Plan”
- Update stormwater quality plan and renew permit with DEQ
- Implement 2010-2015 programs



# Greenbelt & Trails Master Plan

**Jim Carrillo, ASLA, AICP**  
**Halff Inc.**



# Purpose of A Greenbelt Master Plan

- A greenbelt plan will provide guidance for the preferred locations of trail corridors.
- A greenbelt plan will help the city acquire corridors for trail use.
- A greenbelt plan would provide a framework for the City of Norman and the private sector to work together to create beautiful and meaningful trail corridors.
- A greenbelt plan will help the city make informed decisions as to how to fund trail development.

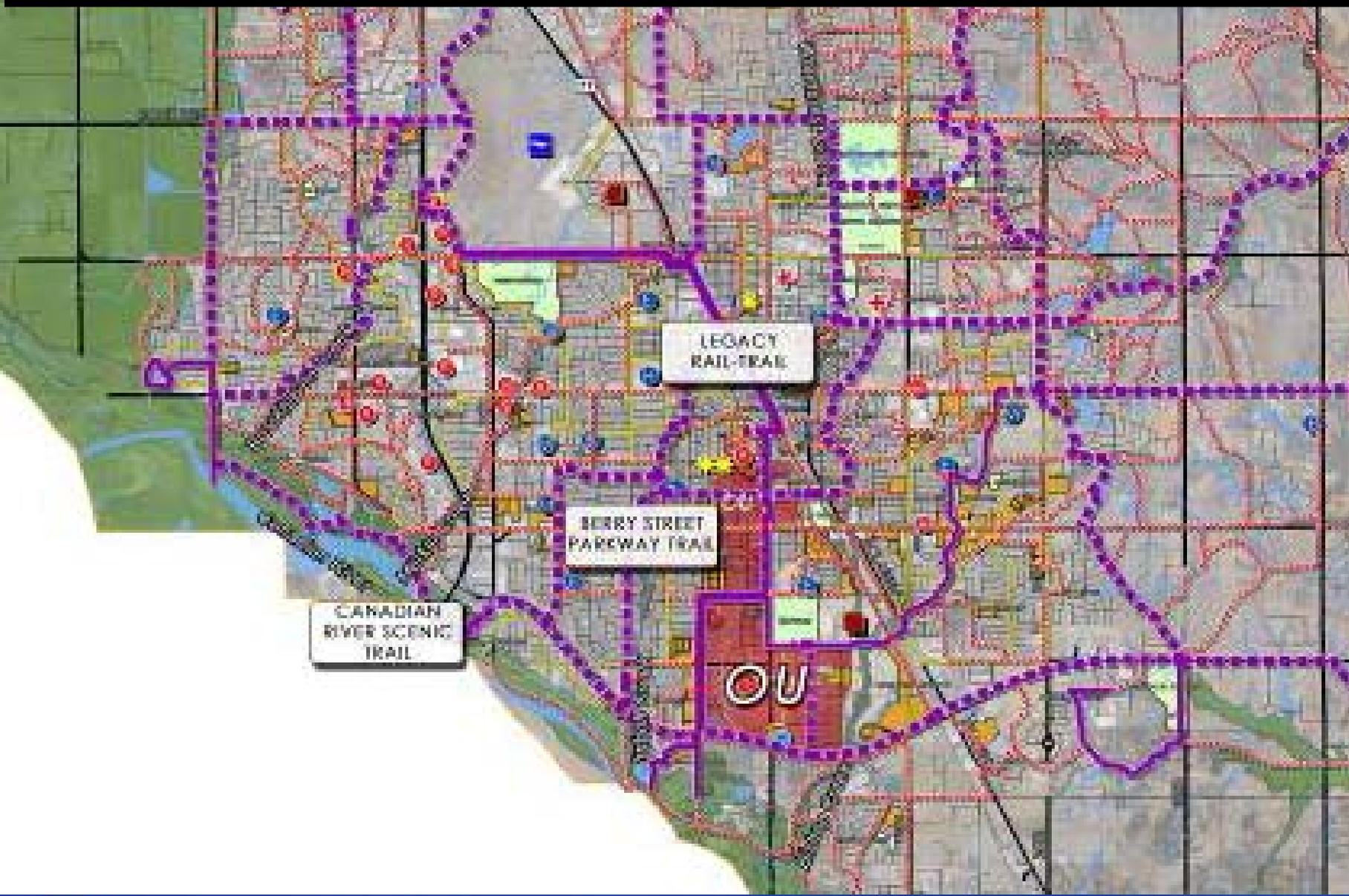


# Key Guiding Principles for the Norman Greenways Plan

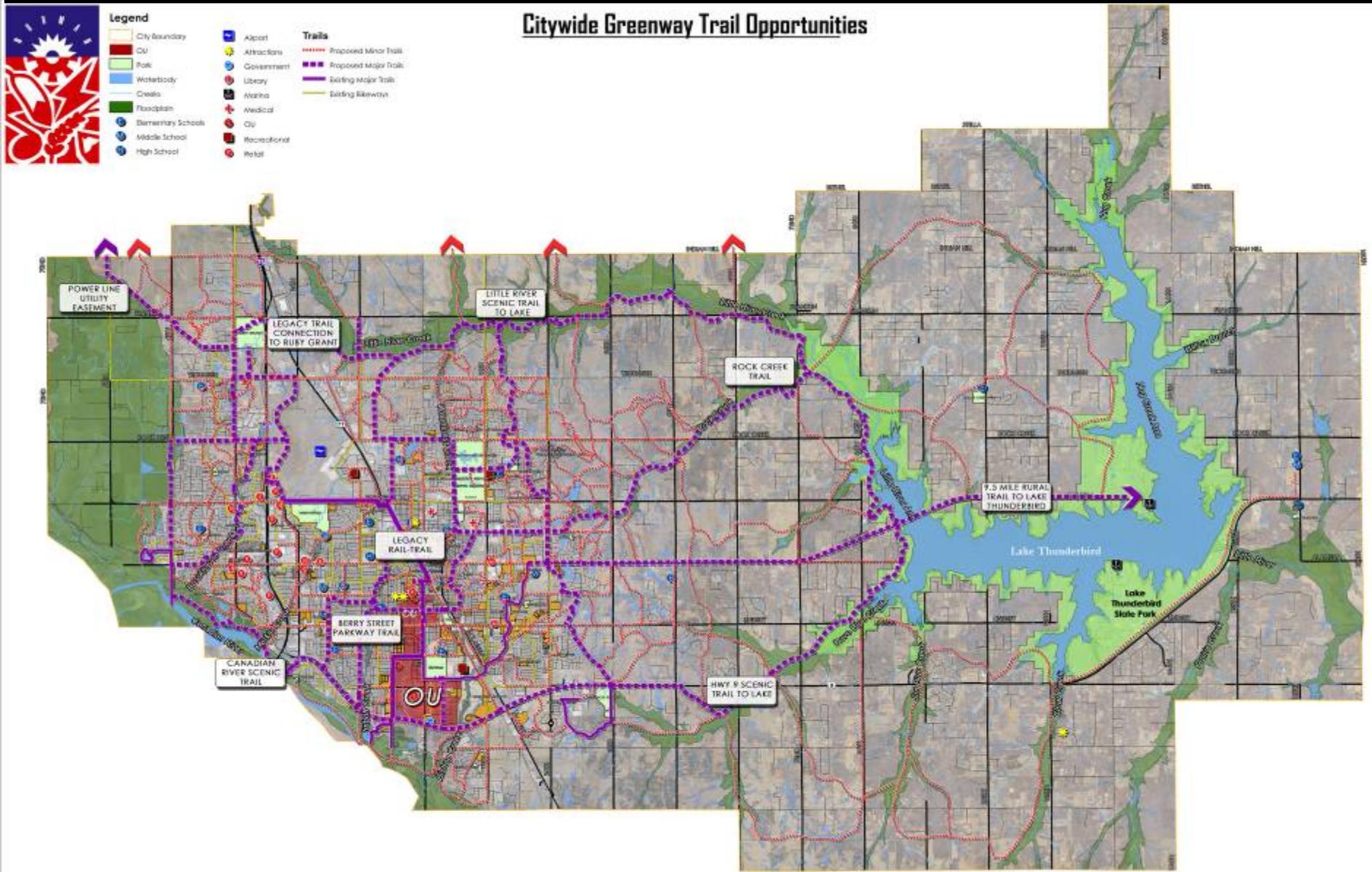
1. **Focus on the eventual creation of an interconnected system throughout the city** – focus on the goal of a balance system that provides access to and from all parts of the city. Eventually, link the urban areas to the rural sector of the city.
2. **Provide for a variety of trail opportunity types** – provide trails that are suitable for a variety of activities, including running, walking, cycling and in-line skating. Create nature trail opportunities, and consider equestrian opportunities where feasible. Use a variety of trail types, such as greenbelt trails, wide “parkway” sidewalks, and even bicycle lanes to connect all parts of the urban area of Norman.
3. **Consider both recreational and transportation uses for trail corridors** – create facilities that closely link neighborhoods to key destinations such as schools, parks, employment, and other destinations
4. **Use greenbelts to preserve “green” corridors throughout Norman** – emphasize the preservation of existing natural corridors, or the re-introduction of green areas into urbanized areas of the city. Use greenbelts to promote the benefits of preserving green areas.
5. **Make greenbelt corridors aesthetically pleasing corridors that add to the beauty of Norman** – whether through preservation or through added enhancement, ensure that greenbelt corridors include features that help to beautify the City, and through their repetition help make greenbelts one of the signature features of Norman.



# Create an interconnected system... both in the Urbanized Area of the City...



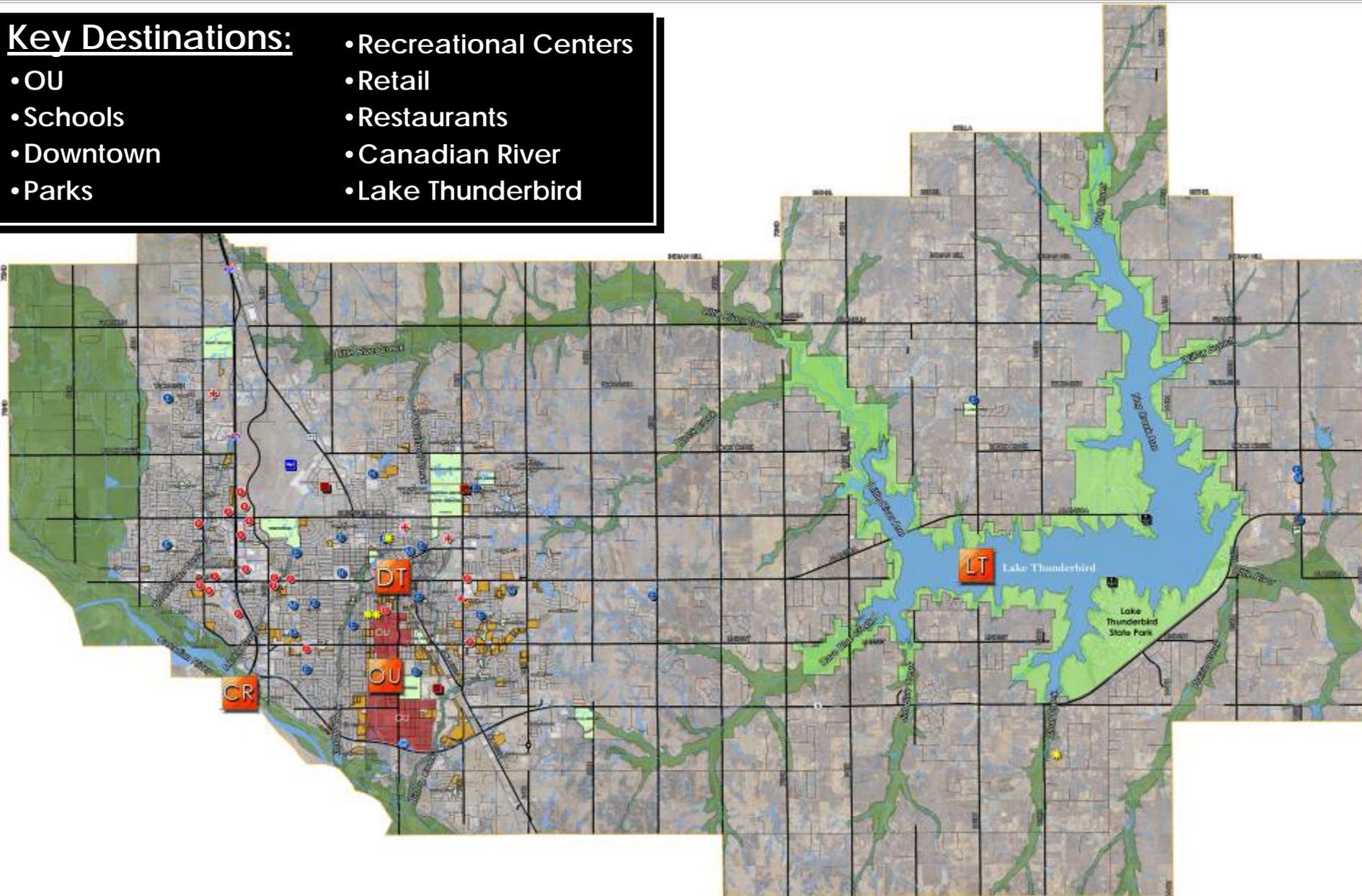
# And eventually throughout all of Norman...



# Greenbelt Destinations

## Key Destinations:

- OU
- Schools
- Downtown
- Parks
- Recreational Centers
- Retail
- Restaurants
- Canadian River
- Lake Thunderbird



# Evaluation of Trail Corridors....

- Five key areas to evaluate the “suitability” of each corridor
- Intent is not to disallow any corridors, but to highlight opportunities or constraints associated with each corridor.
- Score from 1 to 5, with 5 having the best suitability, and 1 having constraints that will have to be addressed before using the corridor as a greenbelt



# Evaluation of Trail Corridors...

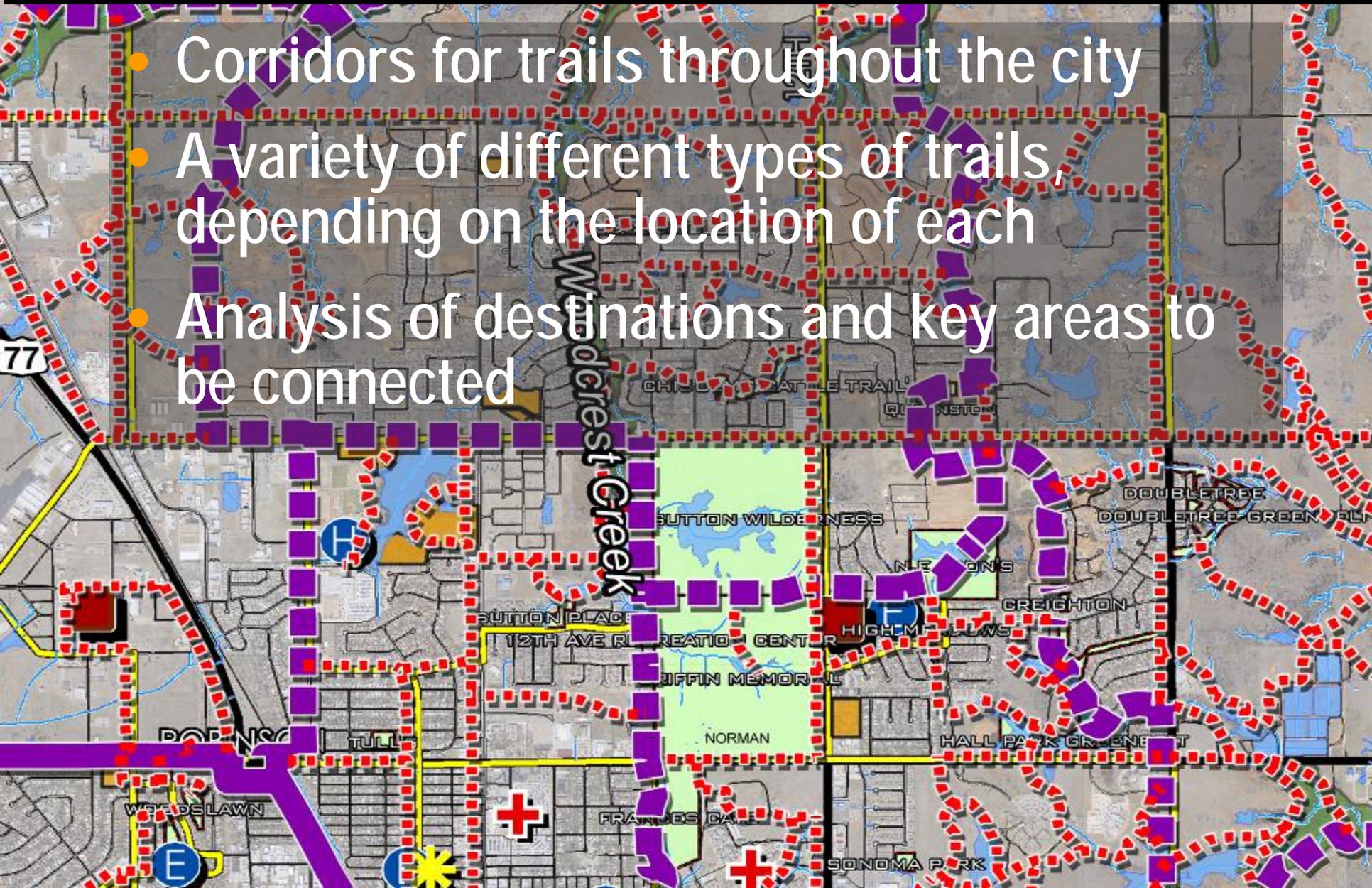
- **Criteria include:**

- » **Connectivity** – number of schools, parks, businesses or civic destinations that could be linked by this corridor
- » **Ownership** – public control of the corridor, or will permission to allow access be required?
- » **Compatibility** – will this trail work with adjacent land uses?
- » **Physical Characteristics** – in an attractive natural area? Does this corridor help preserve a needed drainage corridor?
- » **Public Support** – is there voiced support for this trail? Any specific citizen input?



# Development of Opportunities Maps...

- Corridors for trails throughout the city
- A variety of different types of trails, depending on the location of each
- Analysis of destinations and key areas to be connected



# Public Review of Opportunity Corridors...

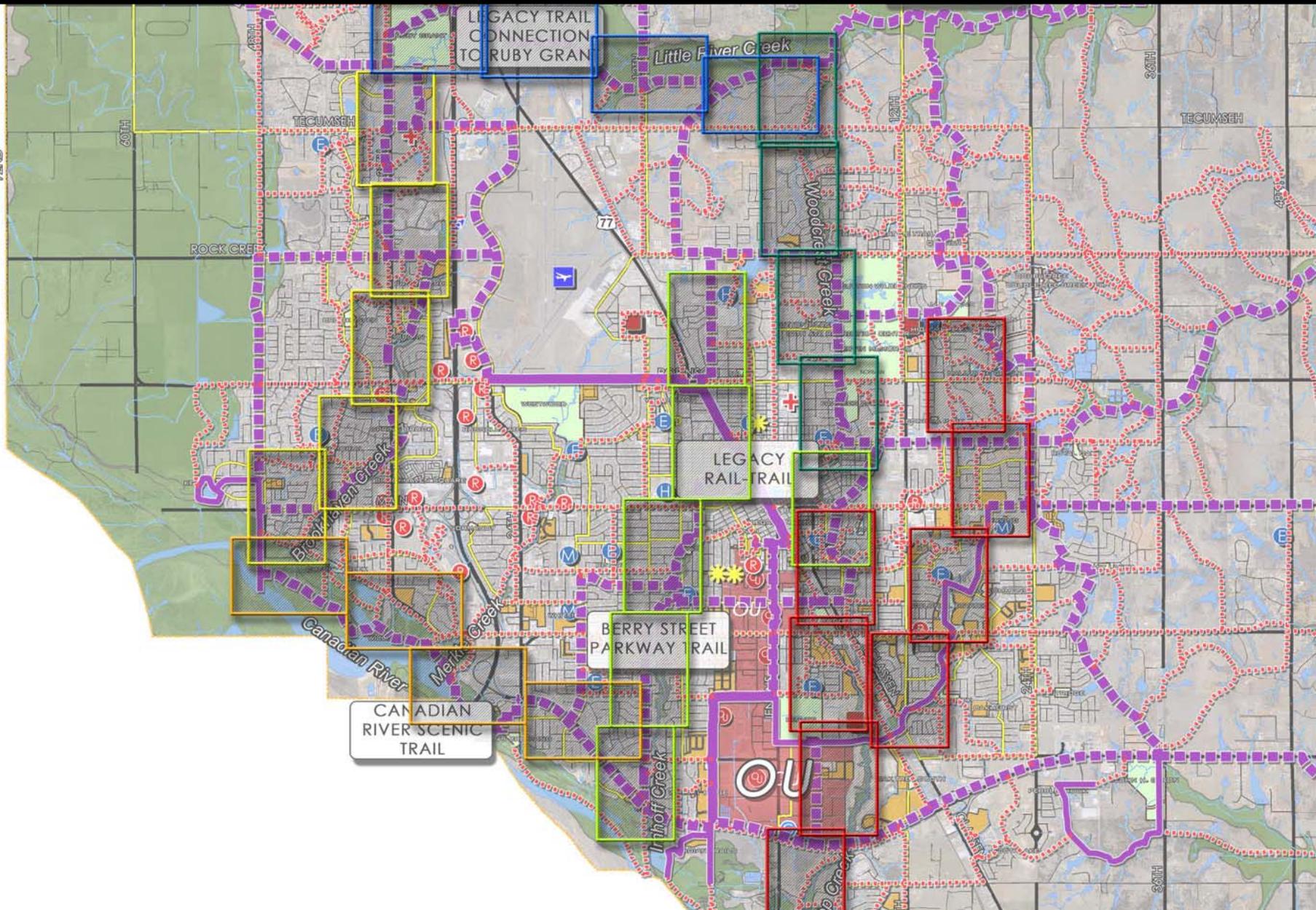


# Preliminary Prioritization Criteria...

- **Eight Key Criteria to help assess Prioritization**
  1. Suitability Evaluation Score
  2. Level of Connectivity from Evaluation
  3. Potential Level of Use
  4. Contribution to Greenway and Open Space Network
  5. Presents a Critical Immediate Opportunity
  6. Integration with Storm Water Master Plan
  7. Funding Availability
  8. Project Readiness



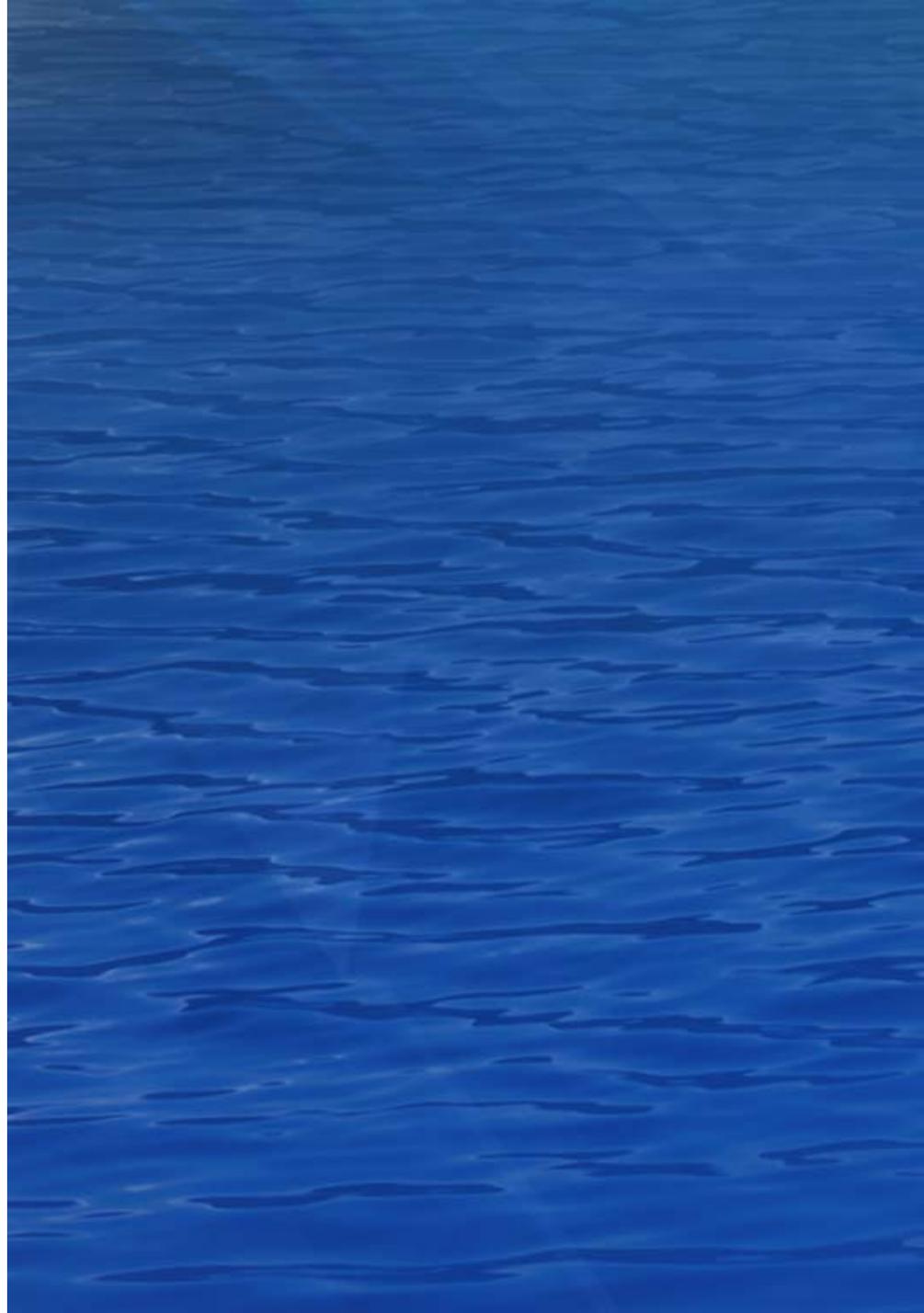
# Preliminary Prioritization Criteria...

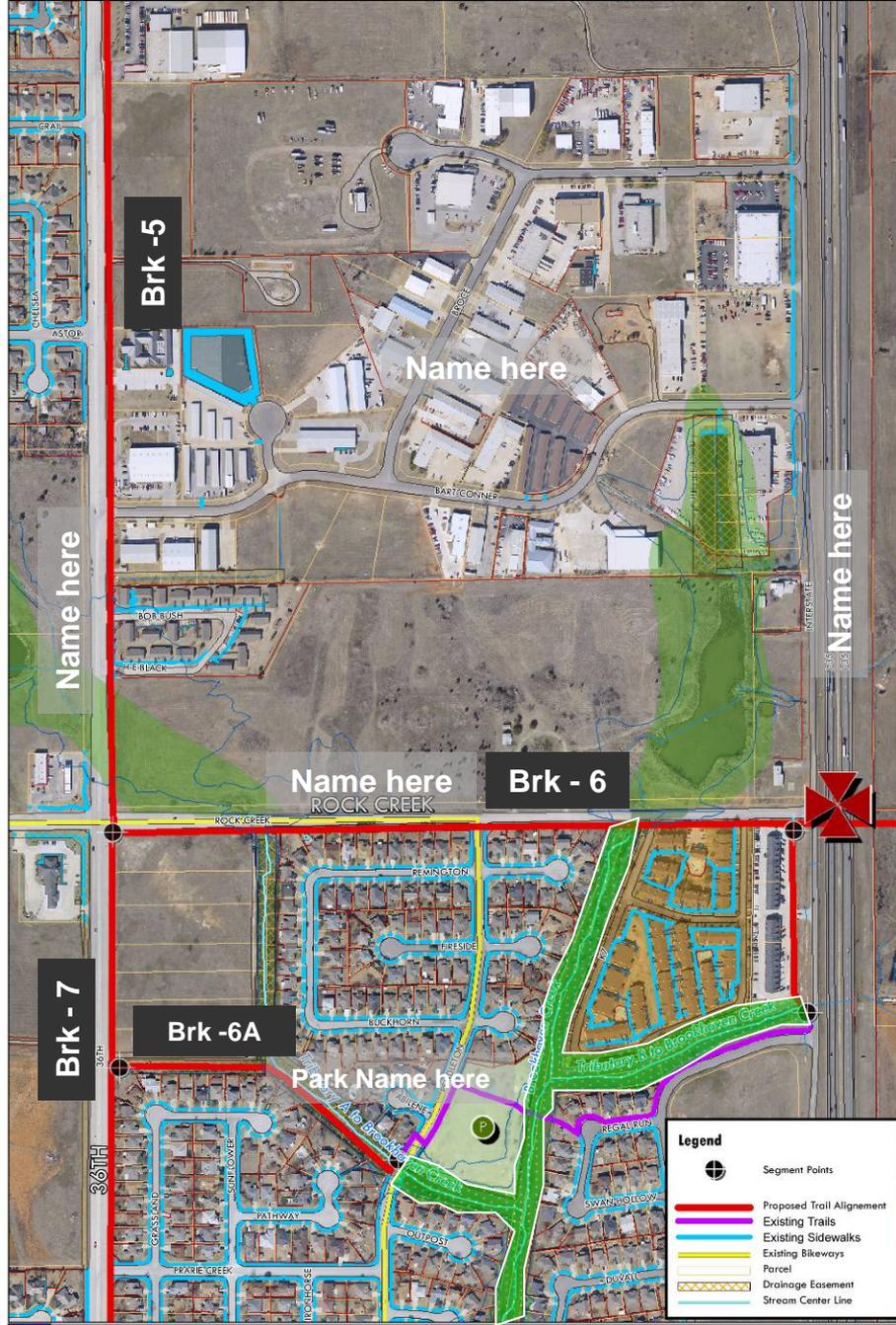






# Brookhaven - 1



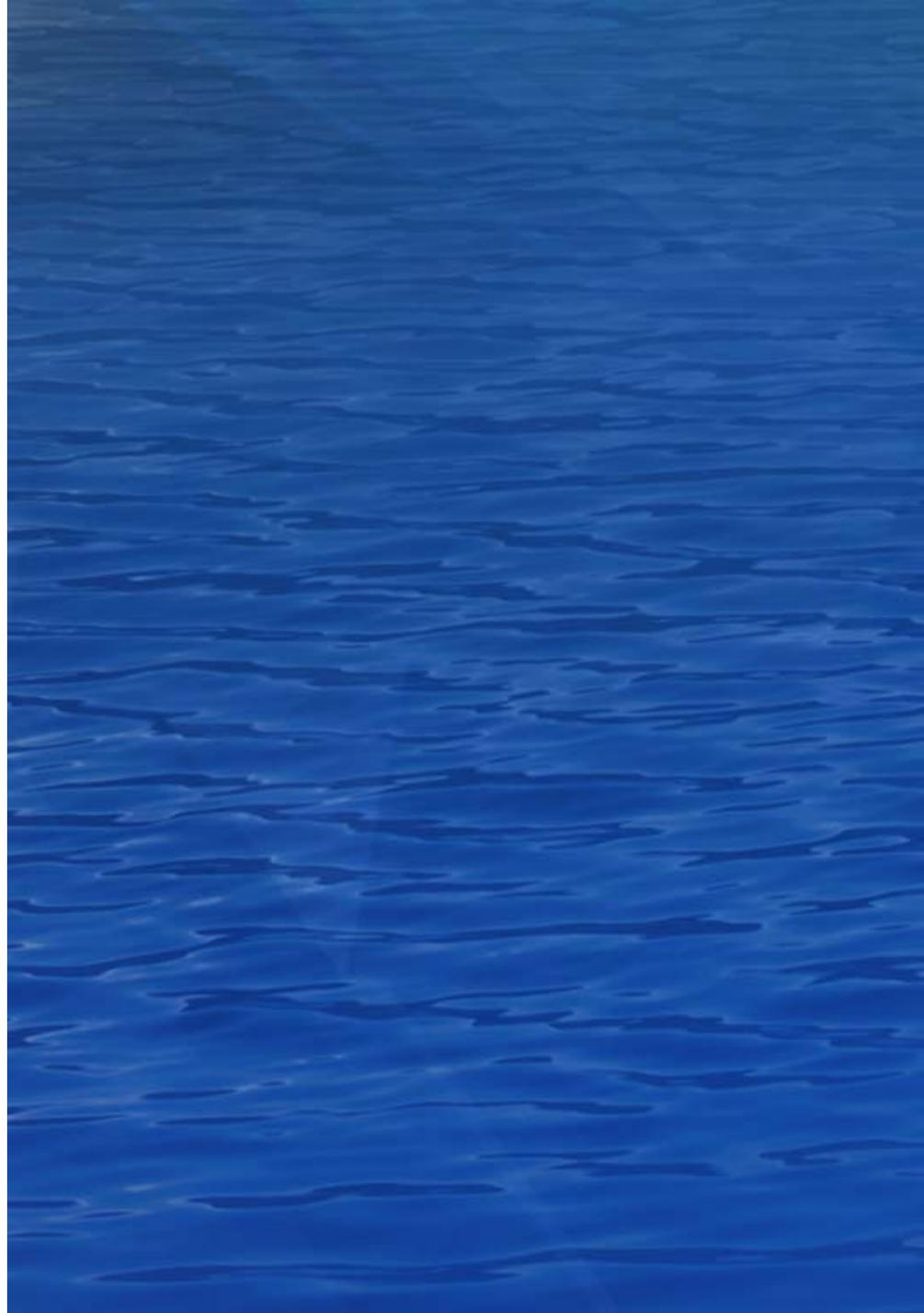


# Brookhaven - 2

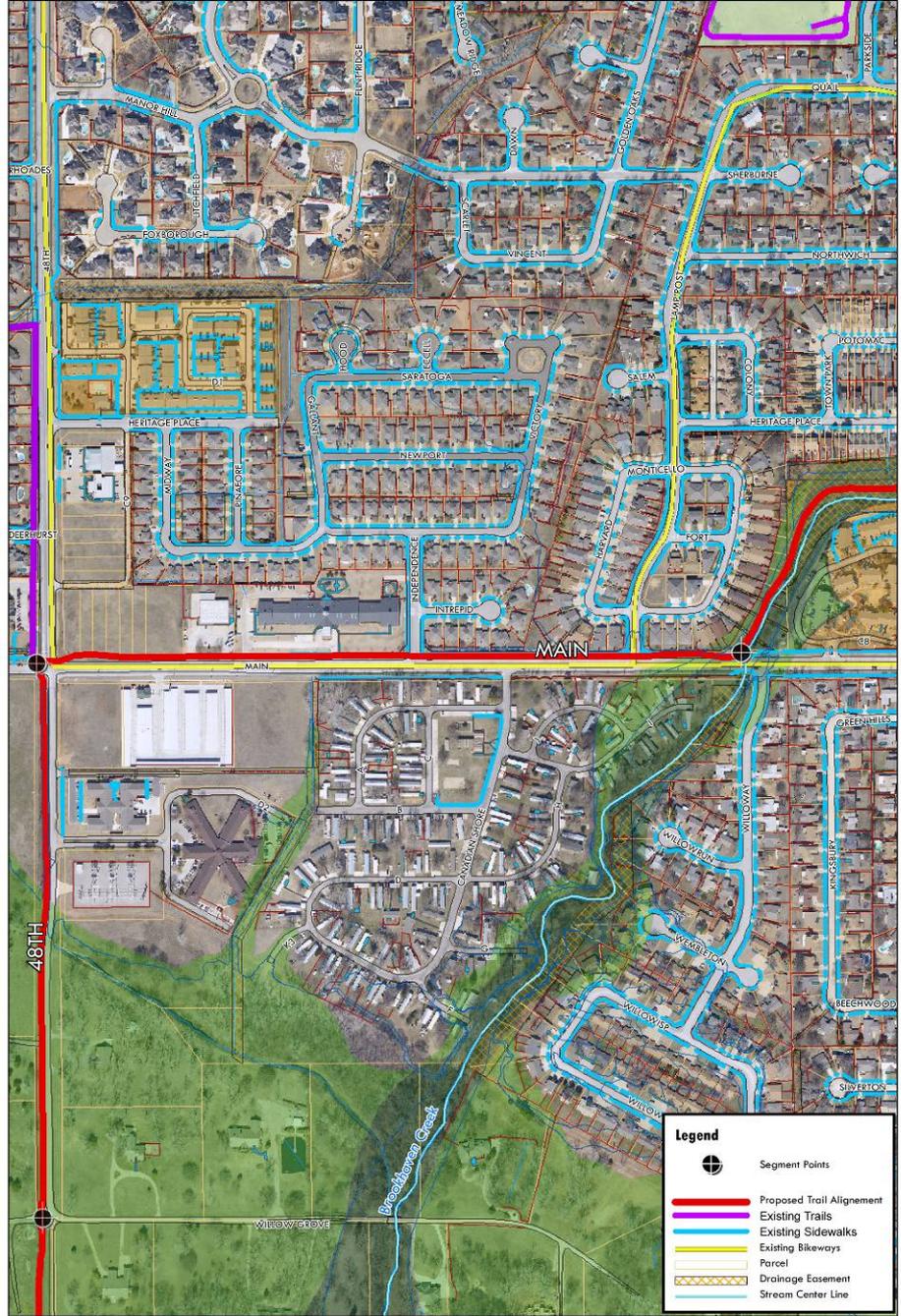




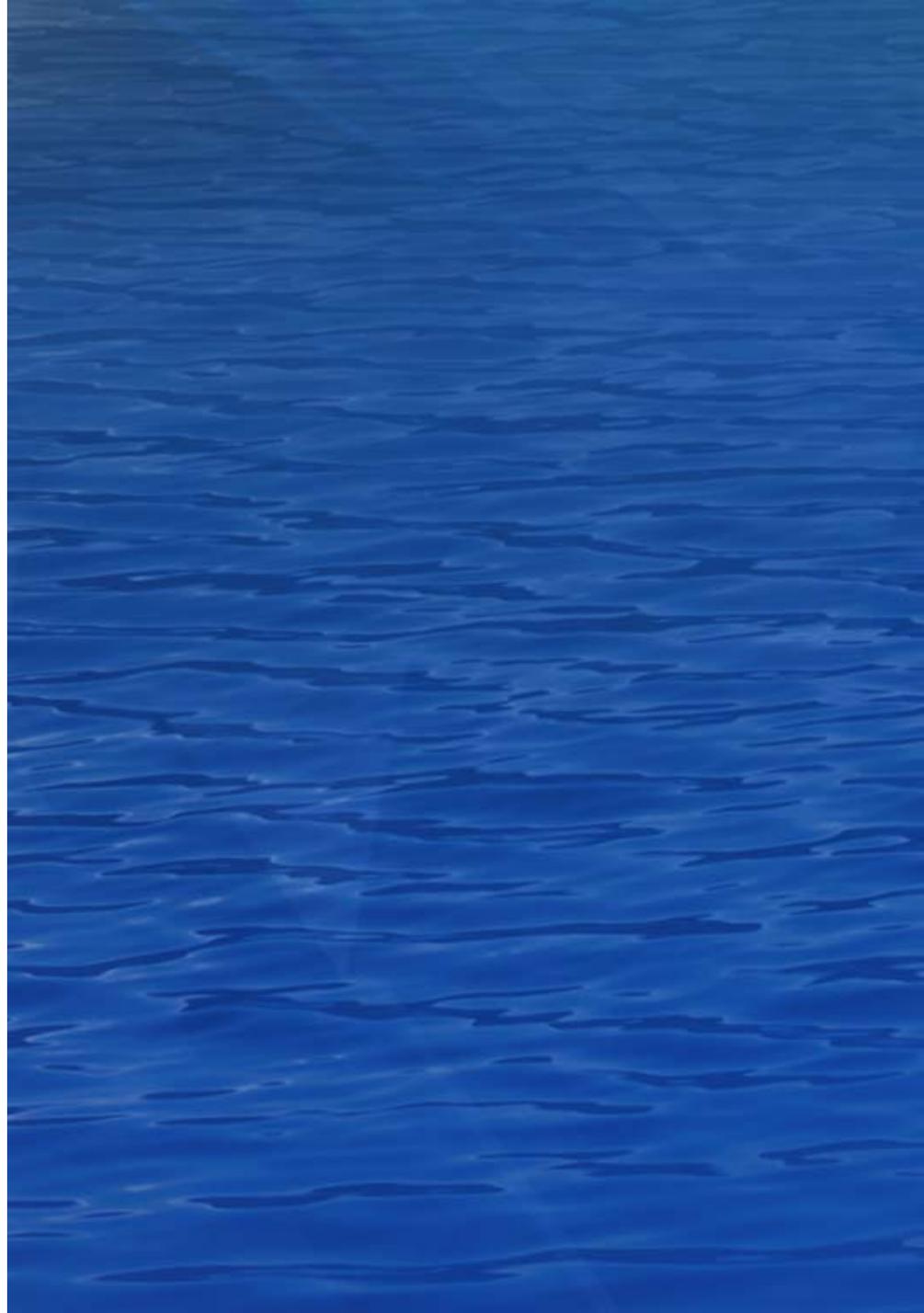
# Brookhaven - 3





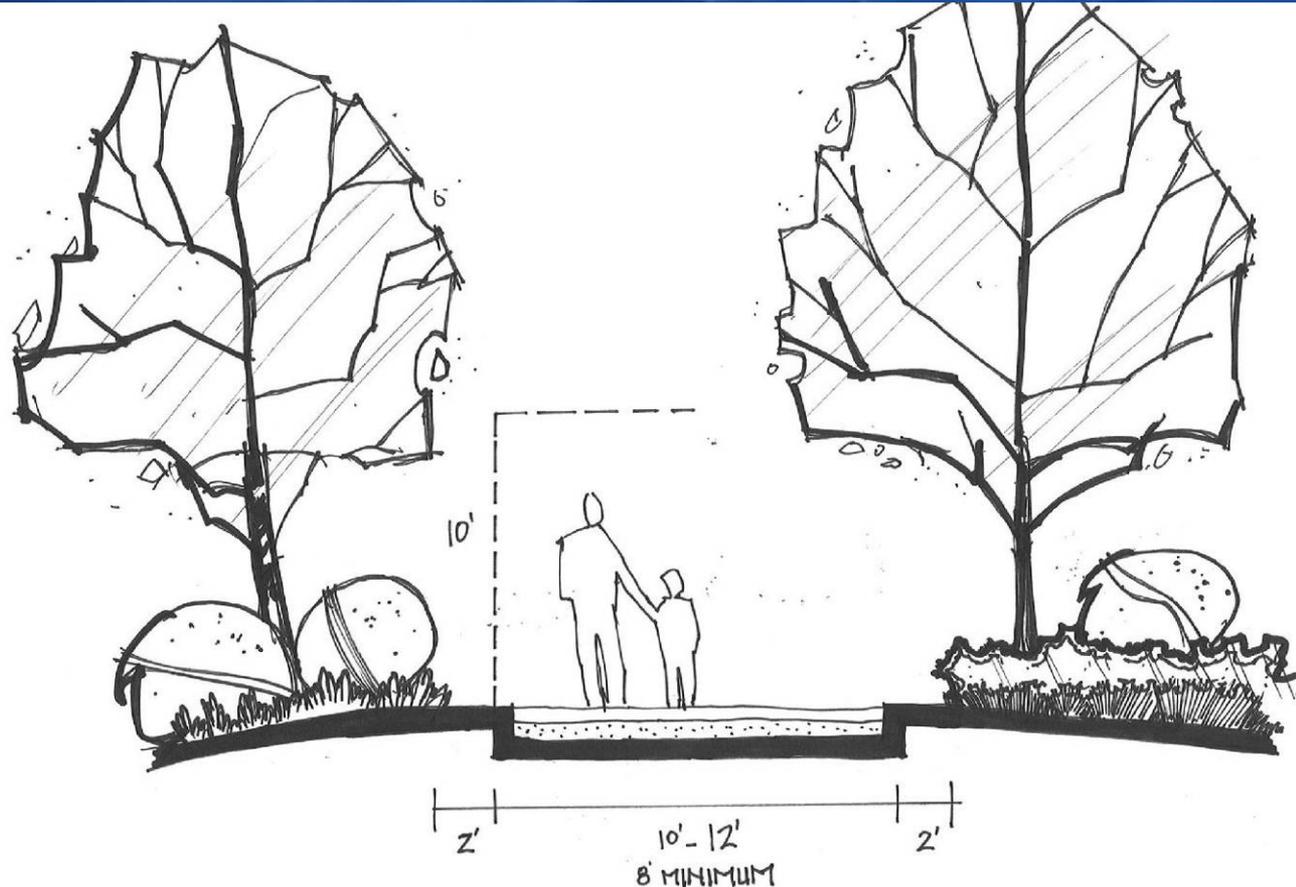


# Brookhaven - 5



# Trail Standards – Off Street Trail

- 8' minimum width, 10' width preferred
- 12' width for designated major "arterial" trails
- Concrete surface preferred
- 2' minimum shoulder on both sides
- 20' minimum clear height



# **Watershed / Stream Assessment and Hydrologic & Hydraulic Analysis**

**Duke Altman, PE, CFM, BCEE  
PBS&J**





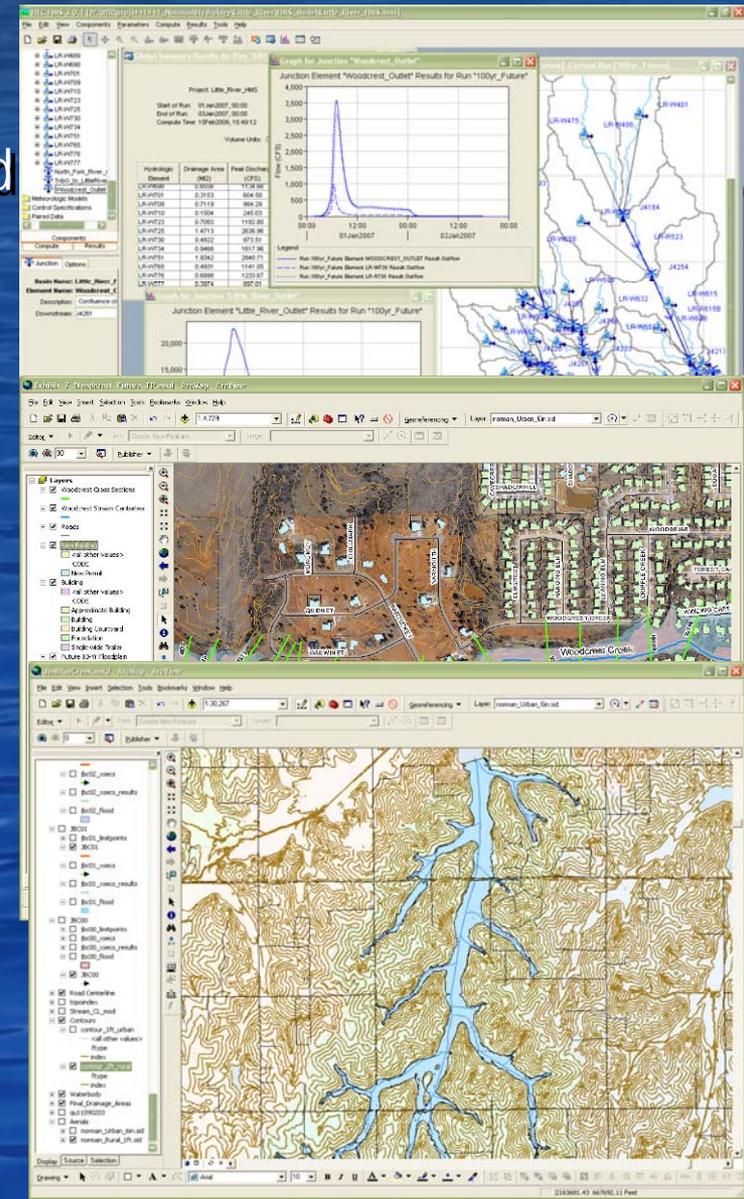
# Summary of Last Public Meeting

- **Hydrology & Hydraulic Analyses**

- » Level 1 & 2 streams – 47 miles of present and past **detailed H&H analyses**
- » USACE **HEC-RAS** and **HEC-HMS** software models
- » **Existing and future (Norman 2025) development conditions**

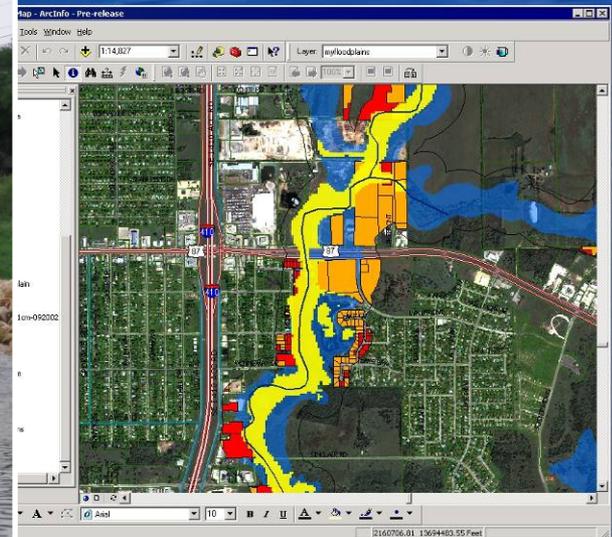
- **Stream Planning Corridor**

- » Level 3 & 4 streams - 277 miles of **Stream Planning Corridors**
- » Corridor defined by the **100-year future (Norman 2025) storm event** plus a buffer strip
- » Streams draining greater than **40 acres**

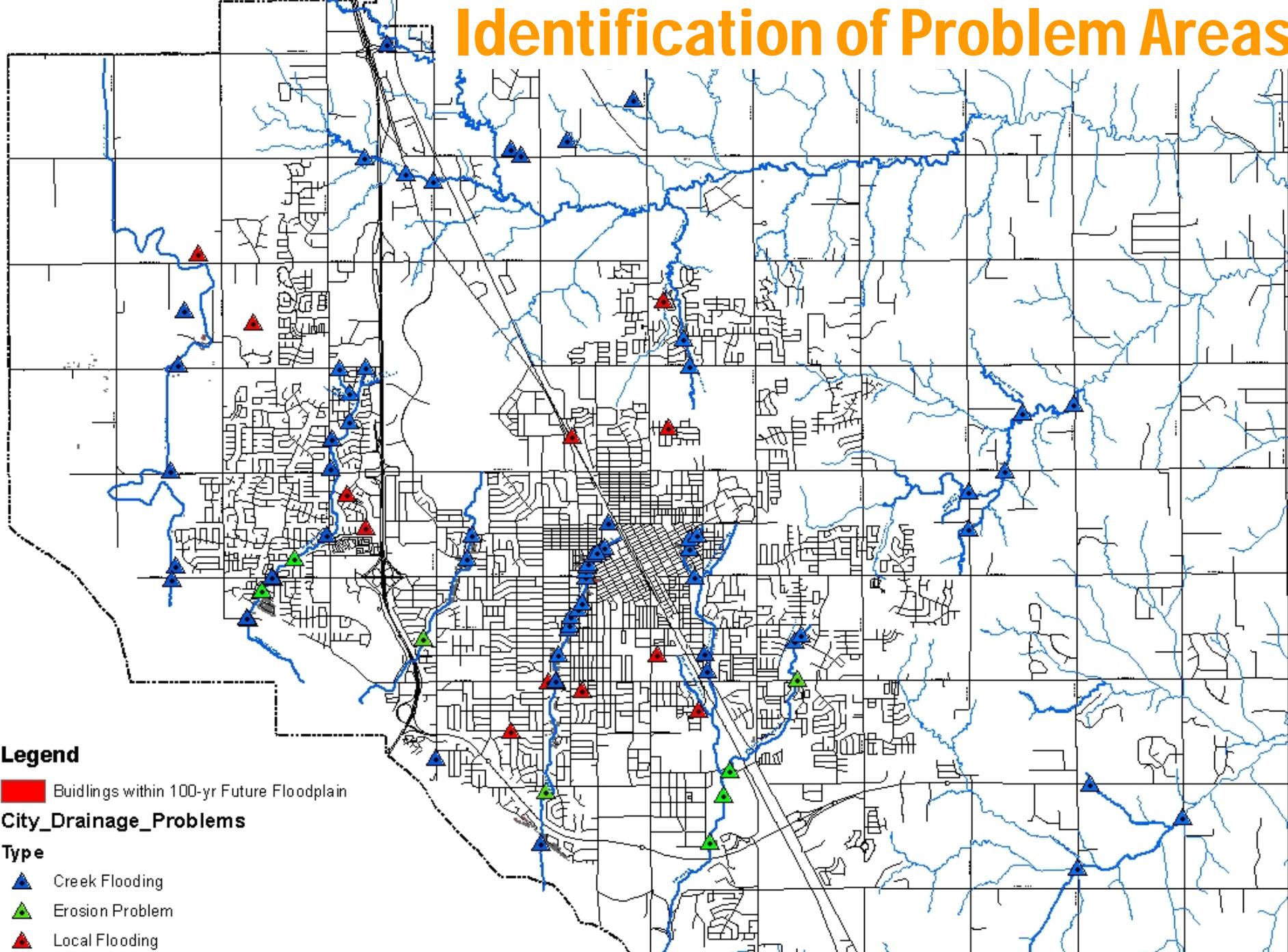


# Identify Watershed Problems and Opportunities

- Flooding
- Erosion / stream stability
- Water quality
- Water supply protection
- Recreation



# Identification of Problem Areas

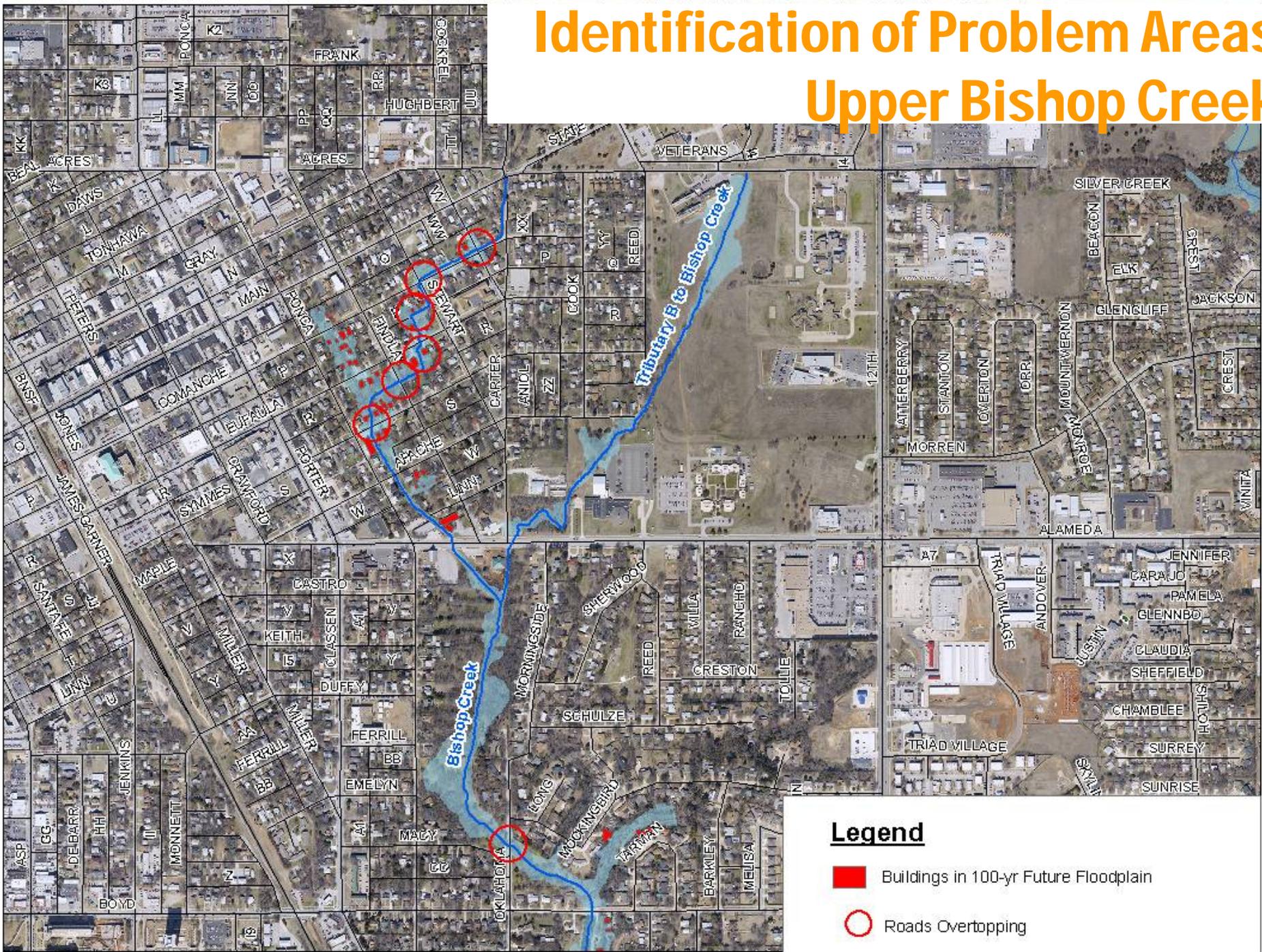


**Legend**  
Buildings within 100-yr Future Floodplain

### City\_Drainage\_Problems

- Type**
- Blue triangle: Creek Flooding
  - Green triangle: Erosion Problem
  - Red triangle: Local Flooding

# Identification of Problem Areas Upper Bishop Creek



# Identification of Problem Areas Lower Bishop Creek



## Legend

-  Buildings in 100-yr Future Floodplain
-  Identified Channel/Bank Erosion

# Solution Investigations/Recommendations

- Flood solutions being considered:
  - » Detention ponds
  - » Road crossing improvements
  - » Channel conveyance Improvements
  - » Flow diversion
  - » Buyout/Acquisition
  - » Flood proofing
- Erosion solutions being considered:
  - » Bio-engineered MSE walls/Soil lifts
  - » Grade controls (rock)
  - » Rock rip rap to protect channel toes and banks
  - » Streambank shaping

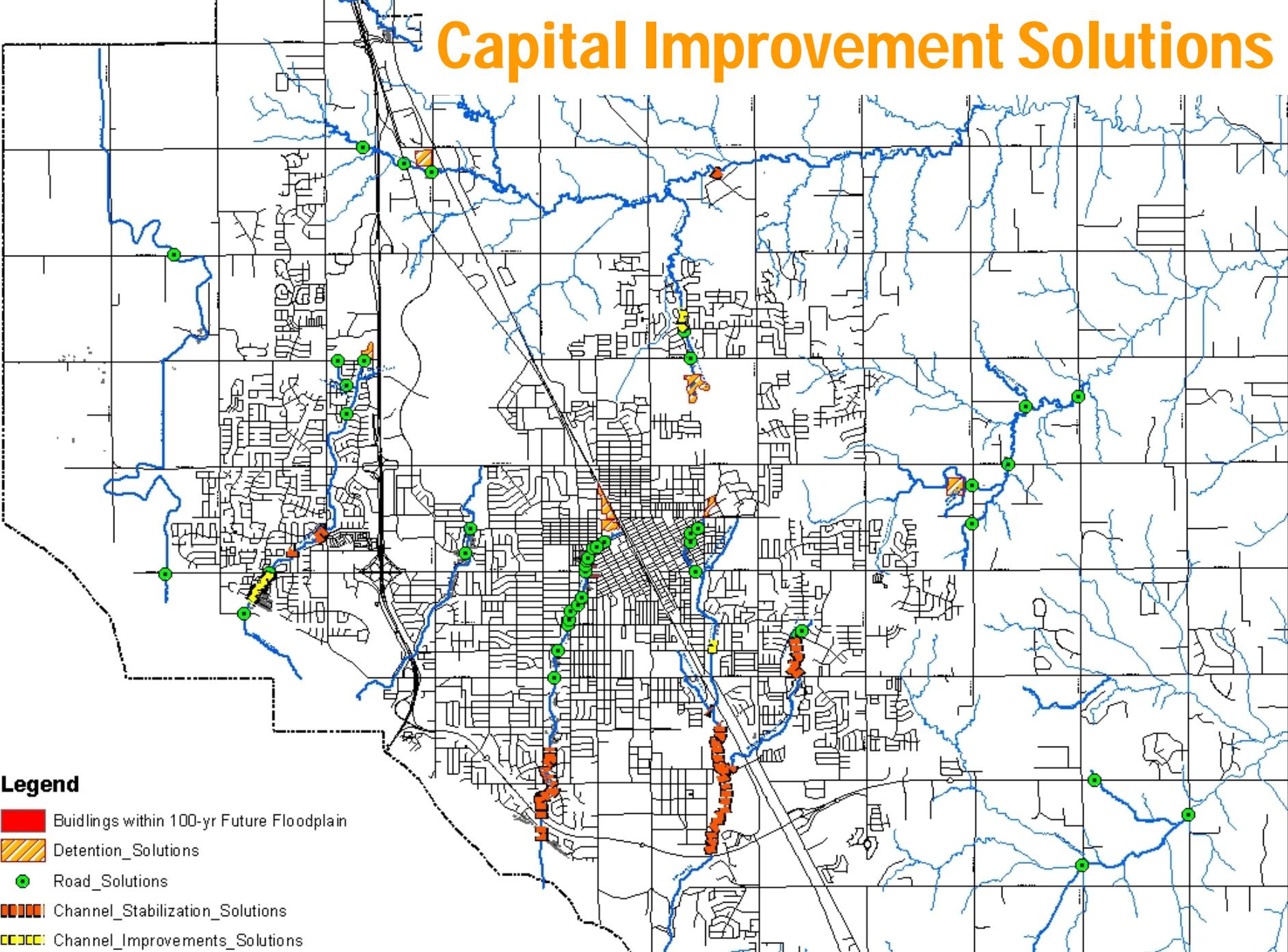


# Proposed Solutions Summary

- 45 Road Crossing Improvements
- 4,700 LF of Channel Conveyance Improvements
- 12,400 LF of Channel Stabilization
- 85 acres of Detention Ponds
- Selective Acquisitions



# Capital Improvement Solutions



- Legend**
- Buildings within 100-yr Future Floodplain
  - Detention Solutions
  - Road Solutions
  - Channel Stabilization Solutions
  - Channel Improvements Solutions

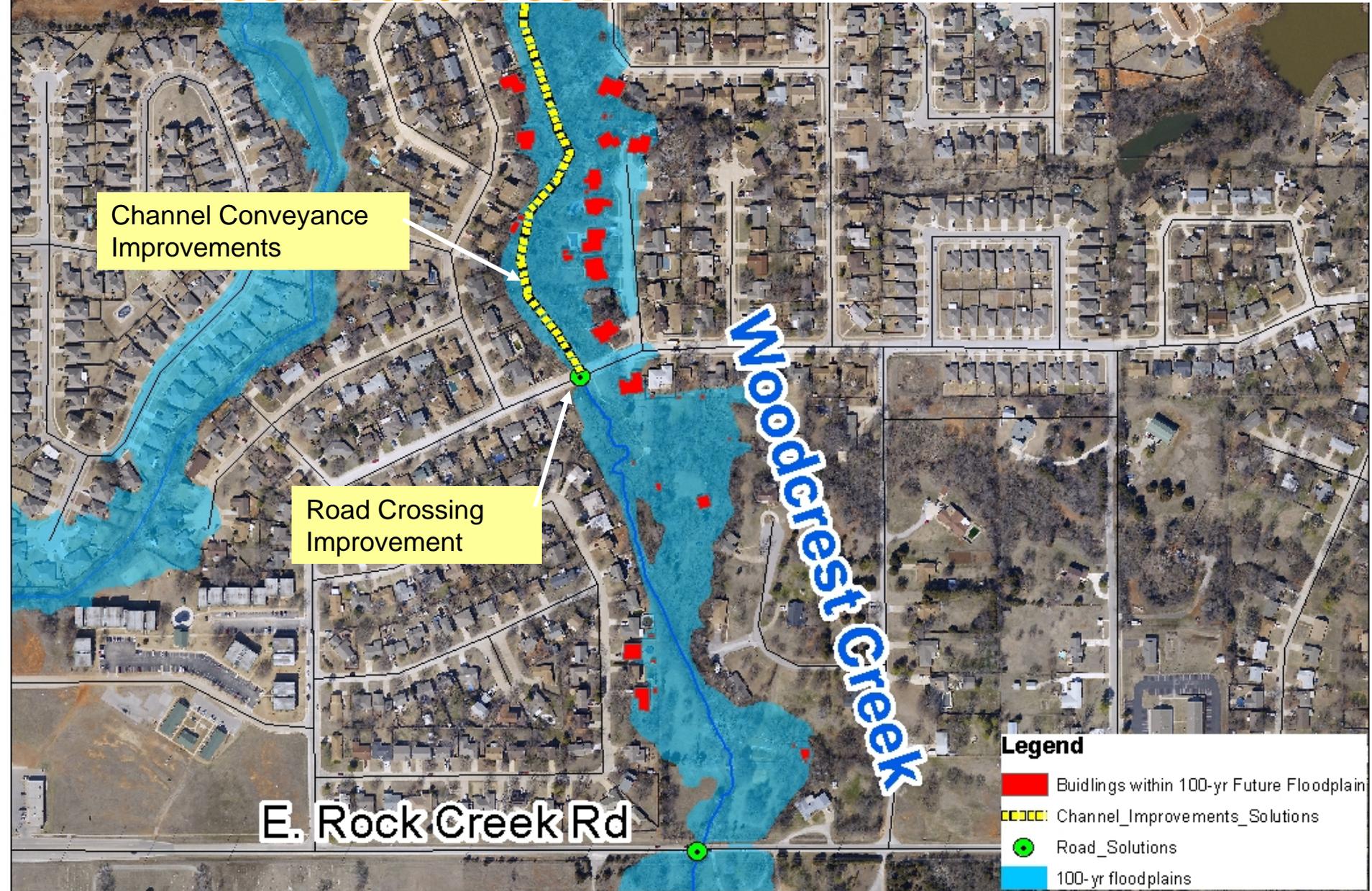
# Road Crossing Improvements



# Channel Conveyance/Bypass



# Road and Conveyance Improvement Options on Woodcrest Creek



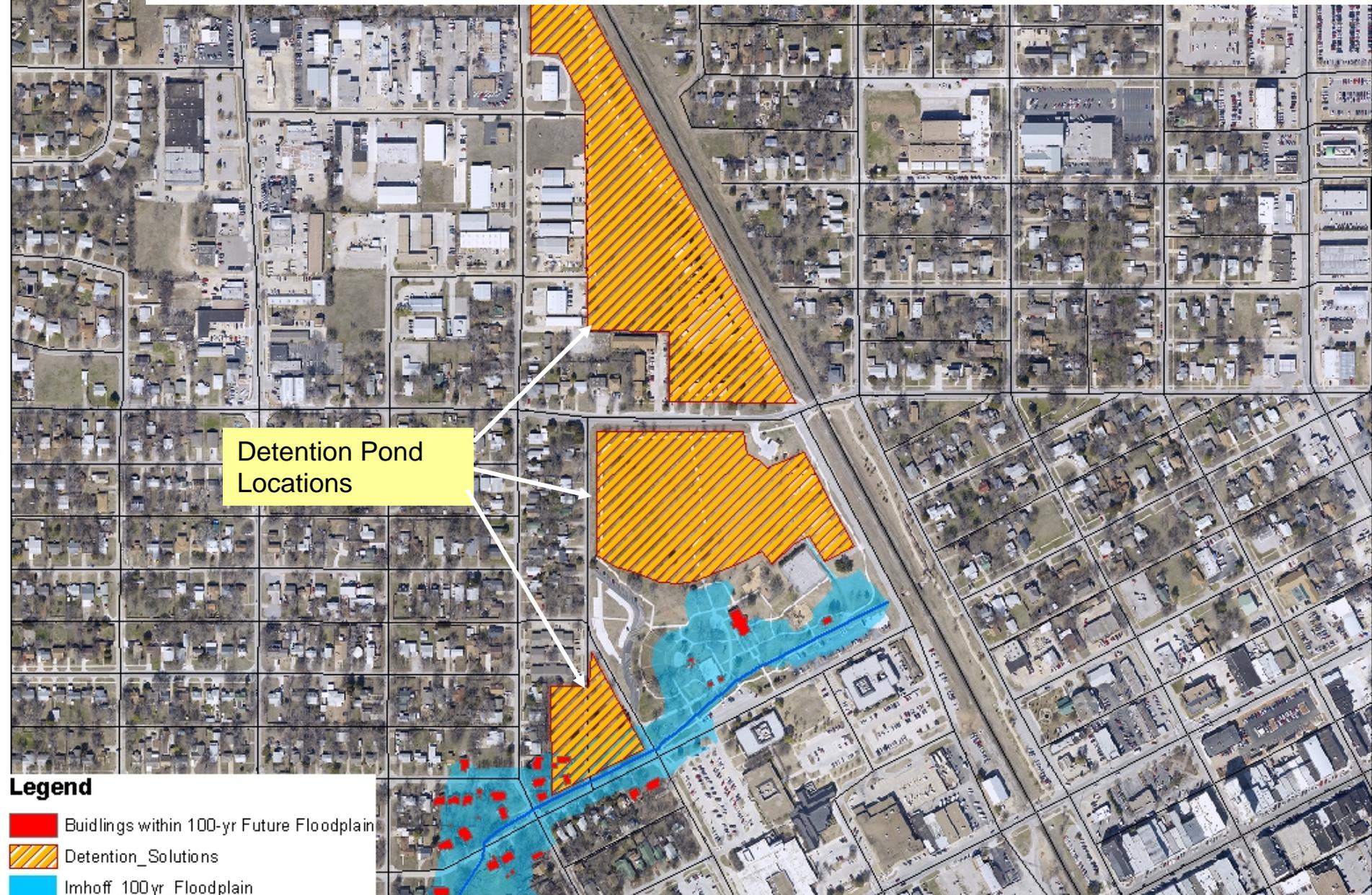
# Detention Ponds



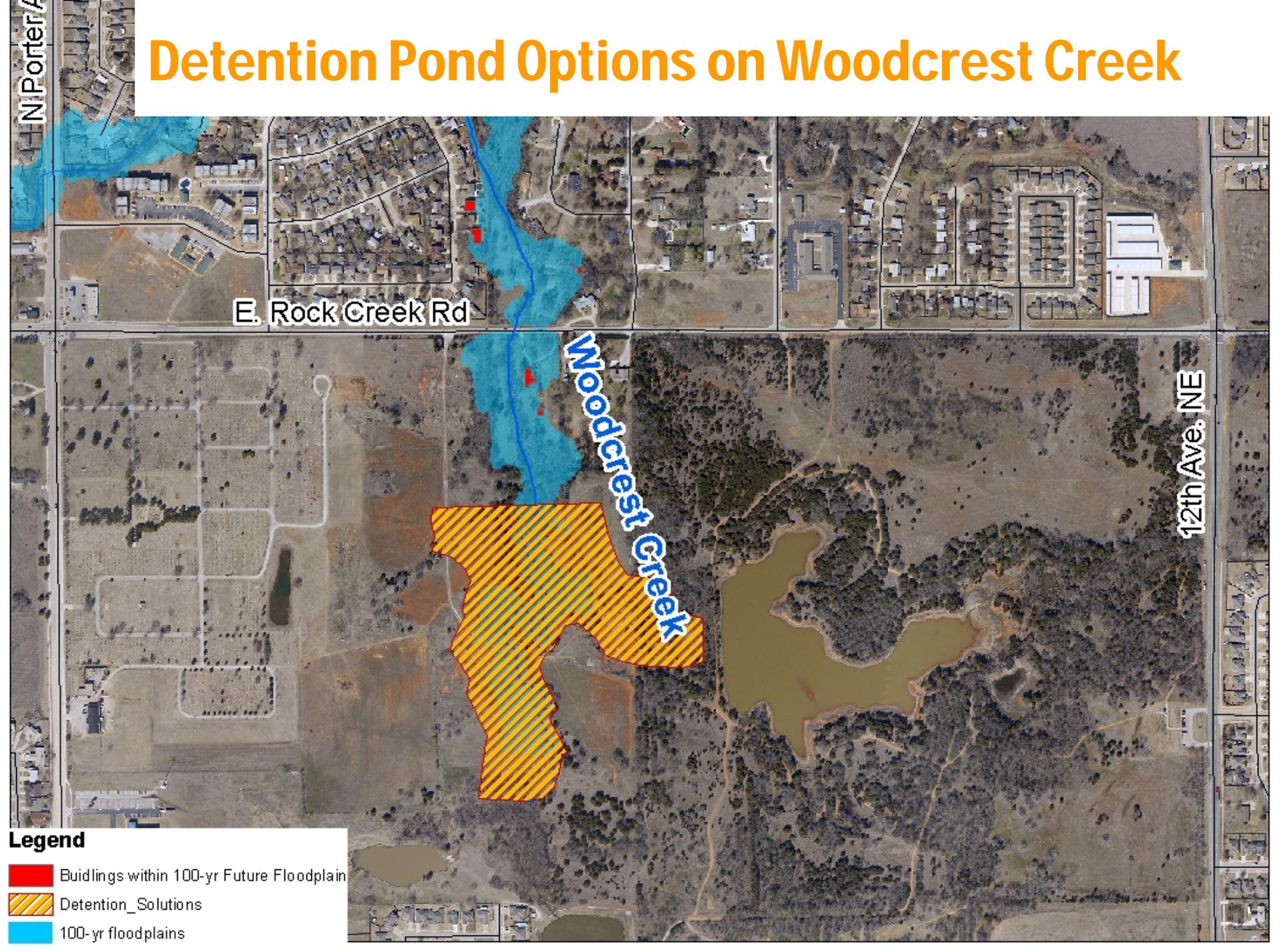
# Detention Pond at School with Trail Integration



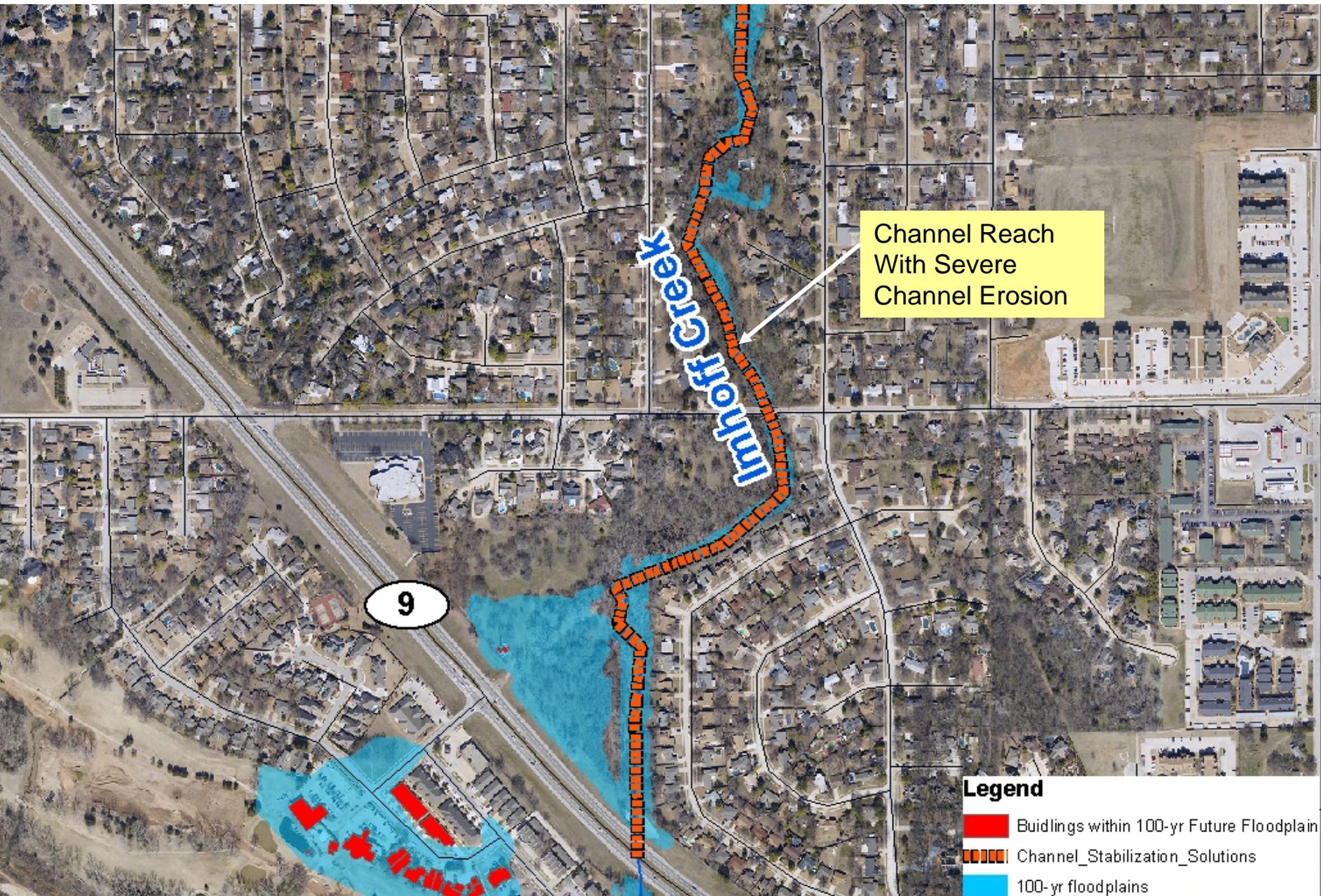
# Detention Pond Options on Imhoff Creek



# Detention Pond Options on Woodcrest Creek



# Channel Stabilization Option on Imhoff Creek



# Imhoff Creek Bed and Bank Erosion



# Embankment Stabilization/Enhancement



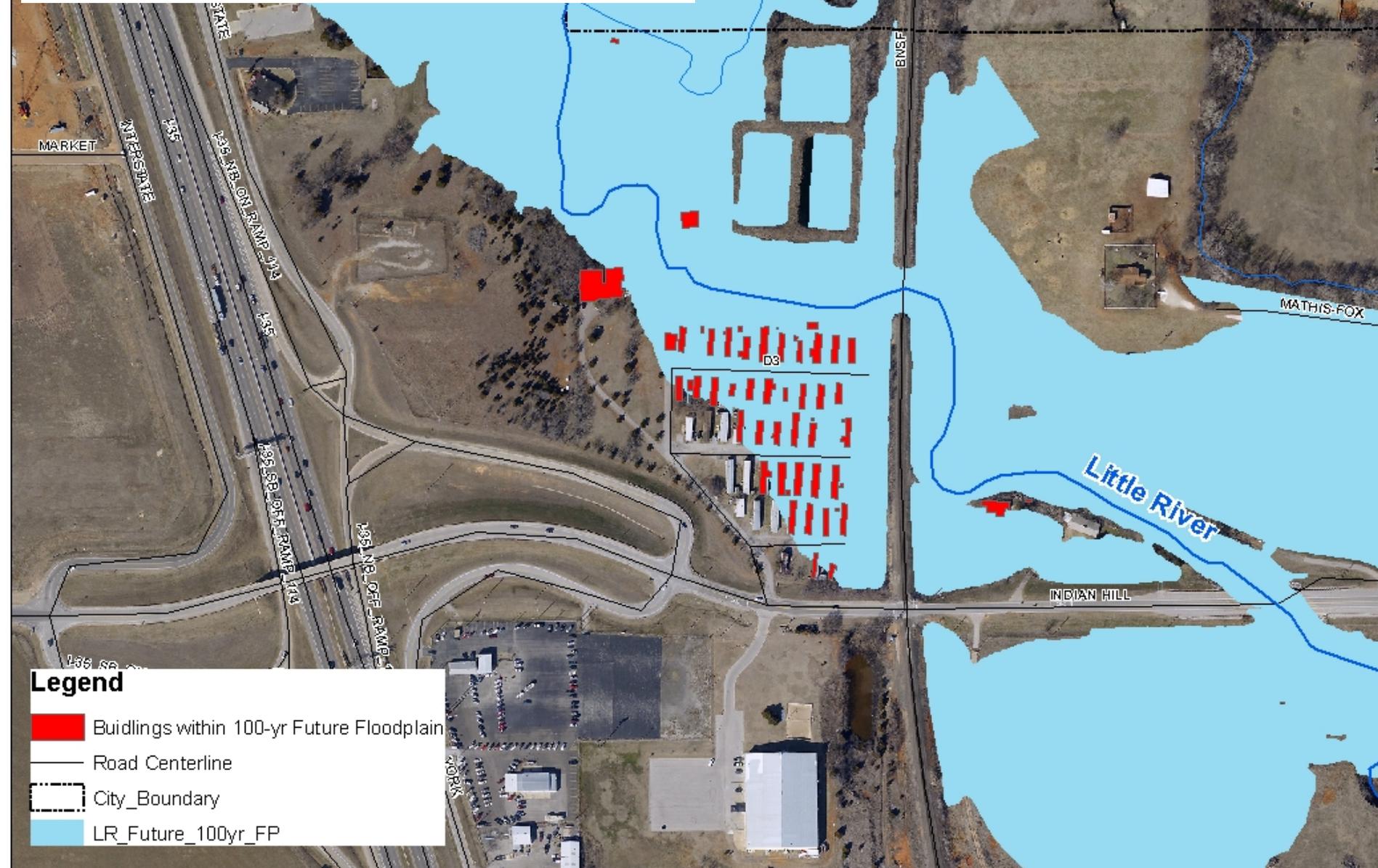
# Streambank Toe Protection



# Streambank Shaping & Rock Rip Rap Protection



# Mobile Home Structures Buyouts/Acquisition

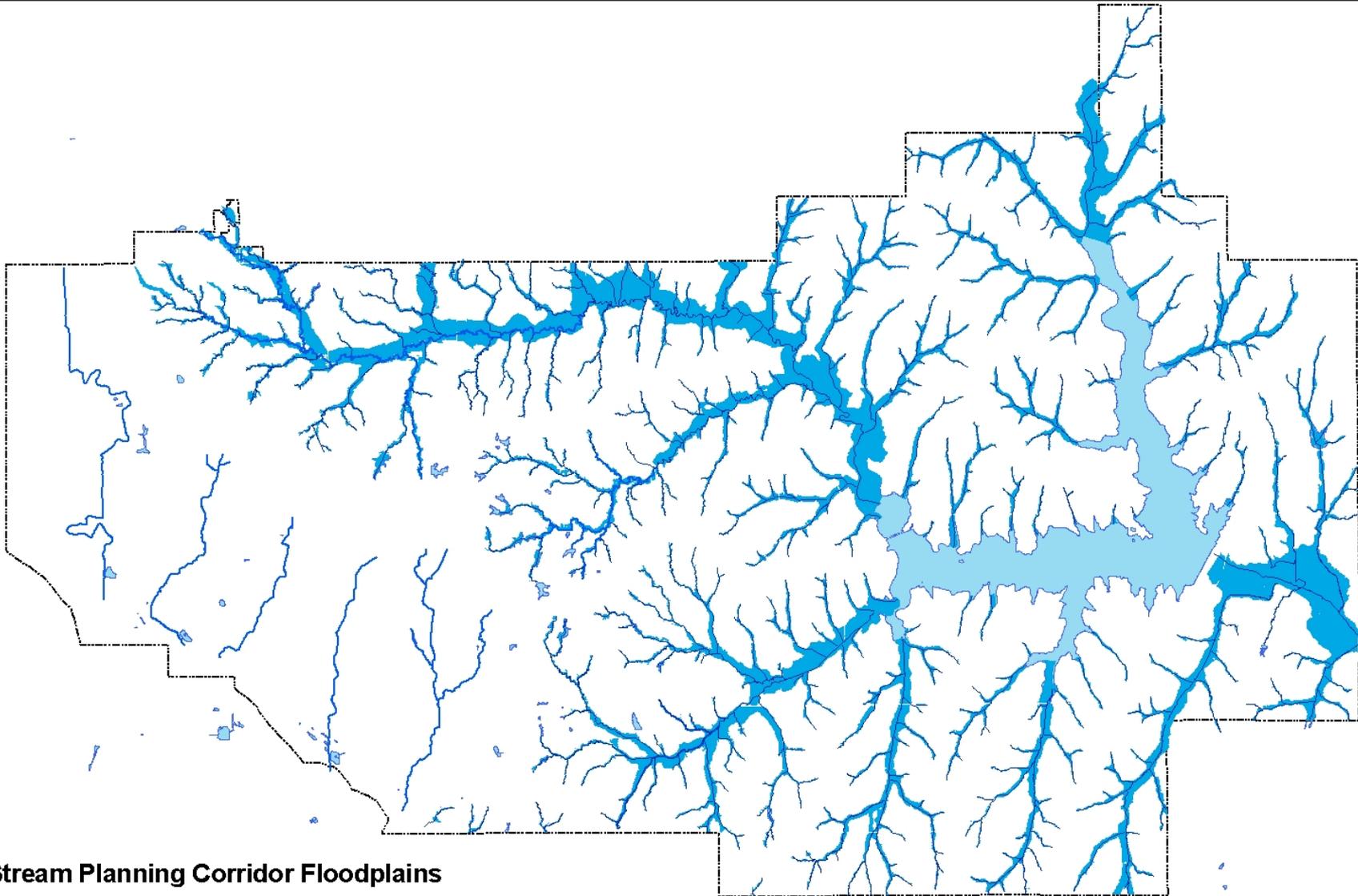


# Key Issues Being Studied with Task Force

- » Stream Planning Corridors and Buffers
- » Purchased or Donated Drainage Easement / Rights of Way
- » Maintenance of Creeks & Detention Ponds
- » CIP Project Prioritization
- » Dam Safety
- » Water Quality



# Stream Planning Corridor Floodplains



Stream Planning Corridor Floodplains

# Stream Planning Floodplain Near Existing Development



# Creek/Detention Pond Maintenance

- Safety/responsibility/liability
- Ownership/Access
  - » Homeowners/POAs
  - » Purchase vs donations vs status quo
  - » Easements
  - » Rights of Way
  - » Rights of Entry (typically one-time action)



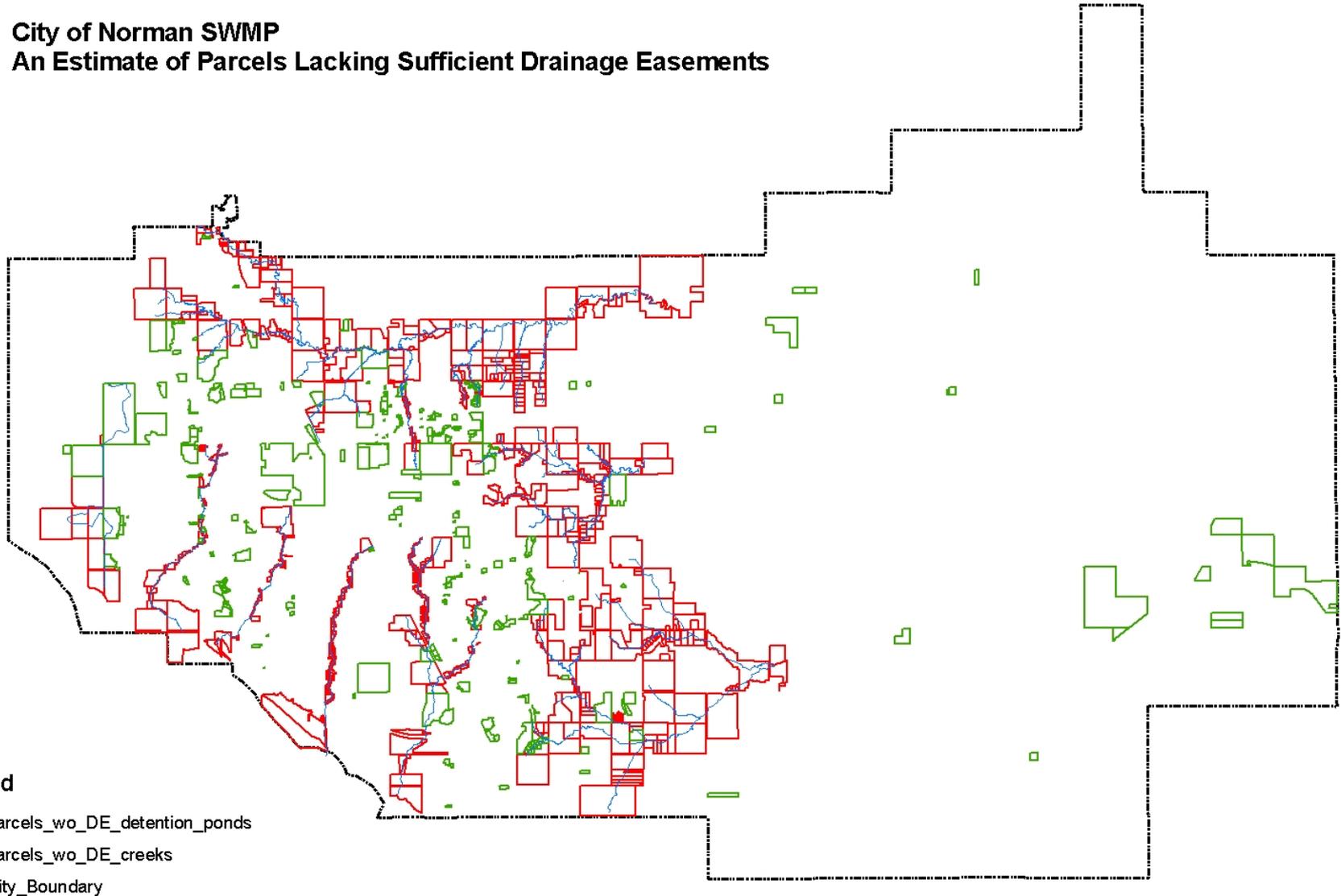
# Creek/Detention Pond Maintenance

- Initial debris cleanup costs
- 755 parcels along creeks without available drainage easements
- 285 parcels with detention facilities without drainage easements
- Trail considerations



# Parcel Identification Lacking Drainage Easements

**City of Norman SWMP**  
**An Estimate of Parcels Lacking Sufficient Drainage Easements**

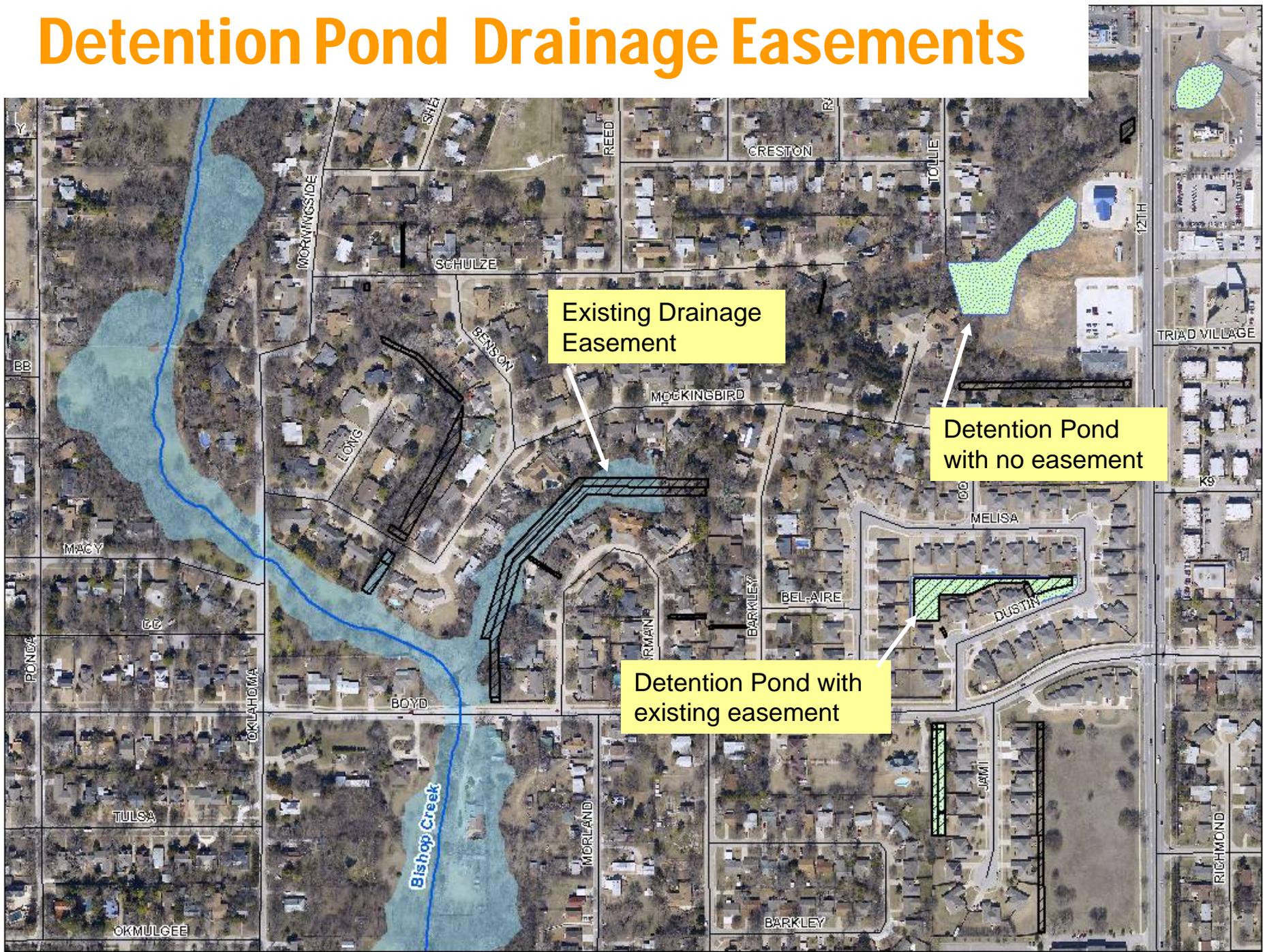


## Legend

- parcels\_wo\_DE\_detention\_ponds
- parcels\_wo\_DE\_creeks
- City\_Boundary



# Detention Pond Drainage Easements

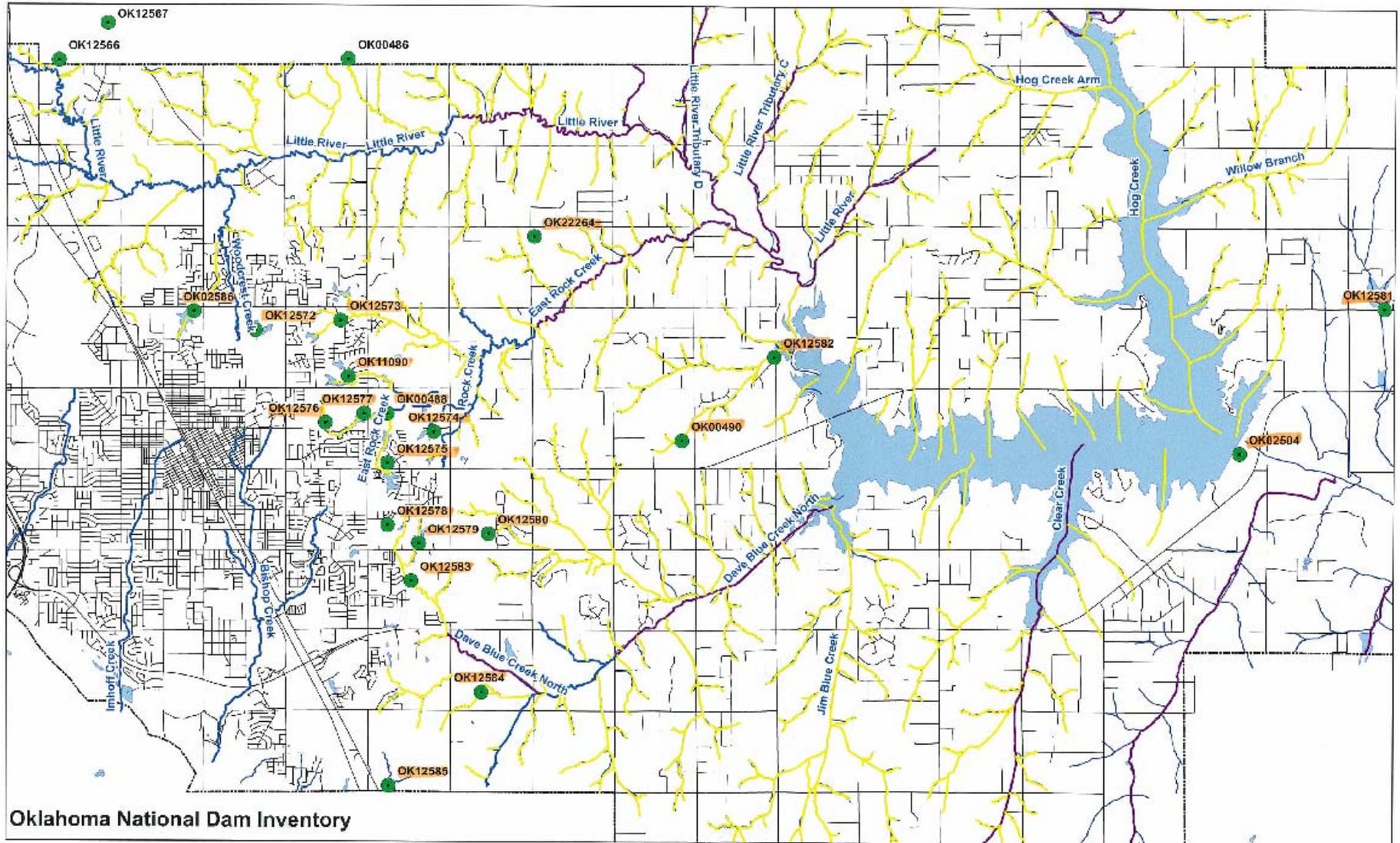


# Dam Safety / Liability / Inspection / Maintenance

- Approximately 20 dams identified by the OK National Dam Inventory
- Most all dams in inventory were constructed in the 1960s
- Additional Detention Pond Dams
- Who is responsible for the inspection of dams, dam safety, and the safety of downstream citizens?
- Does the City want to take over ownership, liability, and maintenance from POAs?



# Oklahoma National Dam Inventory



Oklahoma National Dam Inventory

# CIP Project Implementation & Prioritization

- » Purchased or Donated Drainage Easement / Rights of Way
- » Prioritization Spreadsheet
  - Technical justifications
  - Citywide balancing



# Water Quality

- MS4 program
  - » Covers existing areas and new development
  - » BMPs
- Possible regulatory changes for future development
  - » Stream Planning Corridors & Buffers
  - » Low Impact Development
  - » Structural Controls

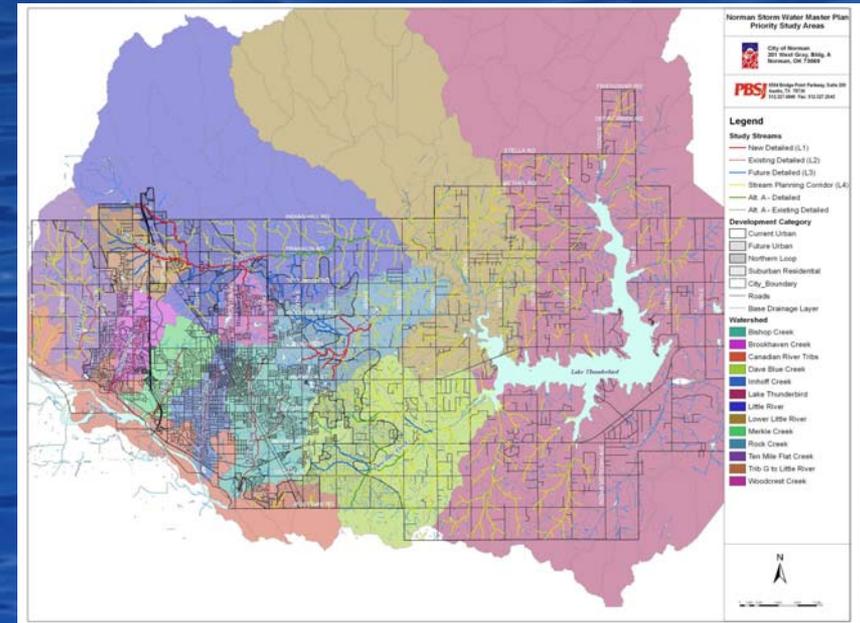


Low Impact Development



# Water Quality

- Possible Variations in Application
  - » Lake Thunderbird vs Canadian River Watersheds
  - » 2025 Land Use Areas
    - Country Residential
    - Suburban Residential
    - Future Urban Service Area
    - Current Urban Service Area



# Greenbelt / Trail Integration

- Combine with CIP projects where possible
- Possible maintenance overlap with storm water system



# Storm Water Financing

Karyn Keese  
PBS&J



# Preliminary Base Storm Water Utility Fee



# Rate Calculation

Storm Water Rate = Cash Needs ÷ Impervious Surface

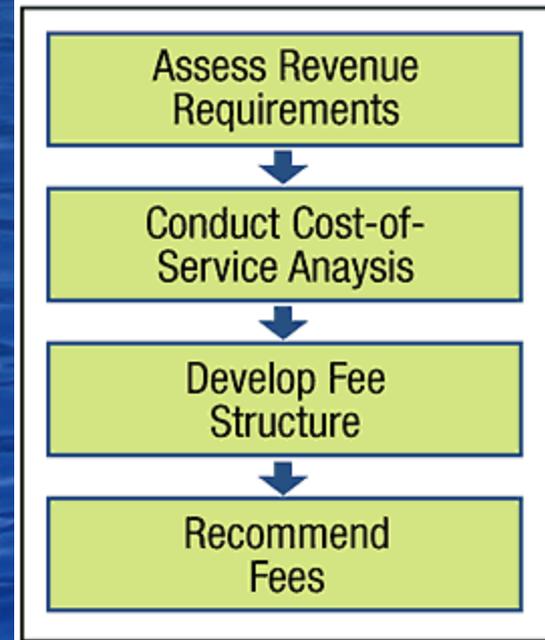
- Operational Cash Needs
  - » Includes utility operations and maintenance budget
  - » Includes an “allowance” for trail, detention pond, and Creek Maintenance
  - » DOES NOT INCLUDE MASTER PLAN CAPITAL PROJECTS OR EASEMENT/ROW/PROPERTY ACQUISITION
- Impervious Surface in Square Feet
  - » ALL impervious surface identified from City's GIS



# Rate Setting Process

- **Assess revenue requirements**
  - » Quantifies the annual need for fee-based funding
- **Cost of service**
  - » Basis for the rate-calculation process
- **Develop fee structure**
  - » Approx. 50% nationwide based on impervious surface
  - » Non-impervious cover methods
- **Recommended user fees**
  - » Based on equity and acceptability
  - » Based on individual impervious surface
  - » Approved in concept by Advisory Committee

**Figure 1.**  
Rate-Setting Process

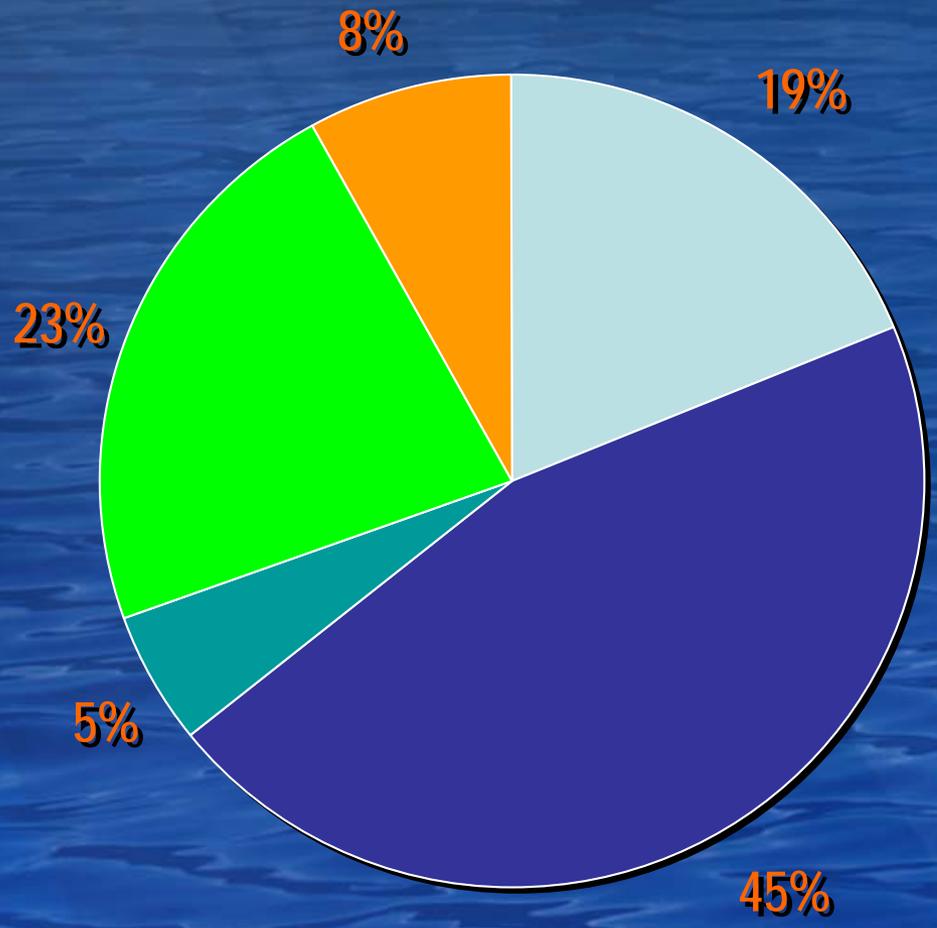


# Operations Budget

<b>Stormwater Budget</b>	<b>FY 08-09</b>	<b>FY 09-10</b>	<b>FY 10-11</b>	<b>FY 11-12</b>	<b>FY 12-13</b>
Total O&M	\$ 418,758	\$ 432,008	\$ 445,684	\$ 459,799	\$ 474,367
Shared City Services	\$ 115,094	\$ 119,698	\$ 124,486	\$ 129,465	\$ 134,644
Minimum Control Measures	\$ 501,105	\$ 651,353	\$ 737,745	\$ 748,616	\$ 1,334,552
Reserve Funding	\$ 175,000	\$ 175,000	\$ 175,000	\$ 175,000	\$ 175,000
<b>Subtotal Budget</b>	<b>\$ 1,209,957</b>	<b>\$ 1,378,059</b>	<b>\$ 1,482,915</b>	<b>\$ 1,512,880</b>	<b>\$ 2,118,563</b>
Enhanced Maintenance (Trails, Detention Ponds, Creek)	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000
<b>Total Cash Needs for Stormwater</b>	<b>\$ 2,209,957</b>	<b>\$ 2,378,059</b>	<b>\$ 2,482,915</b>	<b>\$ 2,512,880</b>	<b>\$ 3,118,563</b>



# Operations Budget



■ O&M ■ En. Main. ■ Shared Cost ■ MCM ■ Reserves



# Drainage Basins

Drainage Basin*	Parcel Count	Total Square Feet	Imp. Area (ft <sup>2</sup> )	% of Total Impervious Area	Watershed Impervious Area
Bishop Creek	7,936	230,589,142	64,657,416	22%	28%
Brookhaven Creek	4,624	98,010,628	26,629,604	9%	27%
Clear Creek	376	197,001,388	4,030,748	1%	2%
Dave Blue Creek	2,252	540,496,747	18,021,075	6%	3%
Downstream of Lk Thunderbird	2,678	676,191,048	19,894,102	7%	3%
Hog Creek	267	149,704,678	2,323,487	1%	2%
Hog Creek Arm	323	114,115,494	2,506,863	1%	2%
Hog Creek Tributary D	133	91,813,338	1,266,211	0%	1%
Imhoff Creek	5,543	76,757,298	25,479,752	9%	33%
Jim Blue Creek	301	213,448,532	3,295,600	1%	2%
Lake Thunderbird	813	718,101,075	12,205,044	4%	2%
Little River	2,085	756,567,145	24,673,025	8%	3%
Merkle Creek	3,244	106,096,286	34,324,538	12%	32%
Rock Creek	2,910	316,422,198	14,351,647	5%	5%
Ten Mile Flat Creek	1,903	255,059,959	12,611,081	4%	5%
Trib 1 to Lk Thunderbird	218	94,293,700	2,385,787	1%	3%
Trib 2 to Lk Thunderbird	205	62,781,314	1,945,272	1%	3%
Trib G to Little River	1,062	117,308,901	8,457,530	3%	7%
Willow Branch	123	112,285,473	1,233,259	0%	1%
Woodcrest Creek	2,855	73,804,602	11,523,780	4%	16%
<b>Total</b>	<b>39,851</b>	<b>5,000,848,945</b>	<b>291,815,821</b>	<b>100%</b>	

\* Data in this table includes OU parcels



# Watershed Summary

Endpoint*	Parcel Count	Total Square Feet	Imp. Area (ft <sup>2</sup> )	% of Total Impervious Area	Watershed Impervious Area
Downstream of Lk Thunderbird	2,678	676,191,048	19,894,102	7%	3%
Lake Thunderbird	13,923	3,558,144,584	108,219,326	37%	3%
Canadian River	23,250	766,513,313	163,702,392	56%	21%
<b>Total</b>	<b>39,851</b>	<b>5,000,848,945</b>	<b>291,815,821</b>	<b>100%</b>	

\* Data in this table includes OU parcels



# By User Class

User Class	Parcel Count	Total Square Feet	Imp. Area (ft <sup>2</sup> )	% of Impervious Area	Avg Impervious Area (ft <sup>2</sup> )	Impervious Area as a % of Total Area
Single Family	26,290	680,672,265	102,686,134	35%	3,906	15%
Multi-family	6,702	196,540,590	43,410,062	15%	6,477	22%
Comm/Indust/Agri/Office	6,766	4,079,424,477	132,823,210	46%	19,631	3%
Oklahoma University	83	43,931,224	12,768,234	4%	153,834	29%
Miscellaneous	10	280,388	128,180	0%	12,818	46%
Total with Oklahoma U.	39,851	5,000,848,945	291,815,821	100%		
Total w/o Oklahoma U.	39,768	4,956,917,720	279,047,587			



# Draft Base Rate

<b>Stormwater Rate -- \$ / Imp. Sq. Ft.</b>	<b>FY 08-09</b>	<b>FY 09-10</b>	<b>FY 10-11</b>	<b>FY 11-12</b>	<b>FY 12-13</b>
O&M Rate	\$ 0.0014	\$ 0.0015	\$ 0.0015	\$ 0.0016	\$ 0.0016
Shared City Services Rate	\$ 0.0004	\$ 0.0004	\$ 0.0004	\$ 0.0004	\$ 0.0005
Min. Control Measures (Phase II) Rate	\$ 0.0017	\$ 0.0022	\$ 0.0025	\$ 0.0026	\$ 0.0046
Reserve Funding Rate	\$ 0.0006	\$ 0.0006	\$ 0.0006	\$ 0.0006	\$ 0.0006
<b>Base Rate</b>	<b>\$ 0.0041</b>	<b>\$ 0.0047</b>	<b>\$ 0.0051</b>	<b>\$ 0.0052</b>	<b>\$ 0.0073</b>
Enhanced Maintenance (Trails, Detention Ponds, Creek)	\$ 0.0034	\$ 0.0034	\$ 0.0034	\$ 0.0034	\$ 0.0034
<b>Rate Including Enhanced Maintenance</b>	<b>\$ 0.0076</b>	<b>\$ 0.0082</b>	<b>\$ 0.0085</b>	<b>\$ 0.0086</b>	<b>\$ 0.0107</b>
<hr/>					
Average Single Family Imp. Sq. Ft.	3,906				
<b>Yearly Rate</b>					
O&M Rate	\$ 5.61	\$ 5.78	\$ 5.97	\$ 6.16	\$ 6.35
Shared City Services Rate	\$ 1.54	\$ 1.60	\$ 1.67	\$ 1.73	\$ 1.80
Min. Control Measures (Phase II) Rate	\$ 6.71	\$ 8.72	\$ 9.88	\$ 10.02	\$ 17.87
Reserve Funding Rate	\$ 2.34	\$ 2.34	\$ 2.34	\$ 2.34	\$ 2.34
<b>Base Rate</b>	<b>\$ 16.20</b>	<b>\$ 18.45</b>	<b>\$ 19.86</b>	<b>\$ 20.26</b>	<b>\$ 28.37</b>
Enhanced Maintenance (Trails, Detention Ponds, Creek)	\$ 13.39	\$ 13.39	\$ 13.39	\$ 13.39	\$ 13.39
<b>Rate Including Enhanced Maintenance</b>	<b>\$ 29.59</b>	<b>\$ 31.84</b>	<b>\$ 33.25</b>	<b>\$ 33.65</b>	<b>\$ 41.76</b>
<hr/>					
<b>Monthly Rates</b>					
O&M Rate	\$ 0.47	\$ 0.48	\$ 0.50	\$ 0.51	\$ 0.53
Shared City Services Rate	\$ 0.13	\$ 0.13	\$ 0.14	\$ 0.14	\$ 0.15
Min. Control Measures (Phase II) Rate	\$ 0.56	\$ 0.73	\$ 0.82	\$ 0.84	\$ 1.49
Reserve Funding Rate	\$ 0.20	\$ 0.20	\$ 0.20	\$ 0.20	\$ 0.20
<b>Base Rate</b>	<b>\$ 1.35</b>	<b>\$ 1.54</b>	<b>\$ 1.65</b>	<b>\$ 1.69</b>	<b>\$ 2.36</b>
Enhanced Maintenance (Trails, Detention Ponds, Creek)	\$ 1.12	\$ 1.12	\$ 1.12	\$ 1.12	\$ 1.12
<b>Rate Including Enhanced Maintenance</b>	<b>\$ 2.47</b>	<b>\$ 2.65</b>	<b>\$ 2.77</b>	<b>\$ 2.80</b>	<b>\$ 3.48</b>



**Note: These rates are very preliminary and are for discussion purposes only**

# Average Single Family Rate Scenarios (With and Without Exempt Parcels)

	Cost of Service (Total Stormwater Budget) FY 08-09	Total Impervious Square Feet	Monthly Rate per Impervious Sq. Ft.	Single Family Avg Imp. Sq. Ft.	FY 08-09 Average Monthly Bill
<b>All Parcels</b>	\$ 2,209,957	291,815,821	\$ 0.00063	3,878	\$ 2.45
<b>With Exempt Parcels but without OU Participation</b>	\$ 2,209,957	281,308,945	\$ 0.00065	3,878	\$ 2.54
<b>Without Exempt Parcels but with OU Participation</b>	\$ 2,209,957	246,287,738	\$ 0.00075	3,878	\$ 2.90
<b>Without Exempt Parcels and without OU Participation</b>	\$ 2,209,957	235,780,862	\$ 0.00078	3,878	\$ 3.03



# Task Force Guidance

- » Rate Structure
  - Per square foot of impervious surface
- » Operations Budget
  - Reserve policy
  - MS4 program
  - City costs
- » Include all parcels
  - OU
  - Institutional and government



# Open Discussion Issues

- Budget for enhanced maintenance costs
- How do we want to fund master plan capital costs?
  - » Include debt service for revenue bonds in user fees?
  - » Include debt service for general obligation bonds on property tax bill?
  - » Pay-as-you-go?
  - » Development impact fees for expansion projects?
  - » Grants, loans, others?
  - » Some combination of above funding sources?
- Capital projects by drainage basin or uniform?



# Storm Water Master Plan

## QUESTIONS AND COMMENTS



*Lake Thunderbird Sunset*

