North Central Texas Council of Governments

# Transportation and Stormwater Infrastructure Study

County Government Workshop | July 31, 2025

Funded by the Texas General Land Office, Community Development Block Grant, Disaster Recovery Program.

Also Funded by the Texas Water Development Board and Texas Department of Transportation.

# Procedures for Hybrid Meeting

- Note that today's presentation is being recorded.
- Today's presentation and recording will be posted on the TSI website at www.nctcog.org/tsi.
- Please keep your microphone on mute when not speaking.
- Please use the "raise hand" feature to ask a question or provide a comment.
  - When called on, state your name and entity you are representing.
- If you would like us to send you a certificate for CFM continuing education credits, please let us know!
  - Online: Place your name and email in the chat
  - In person: Indicate your email address and need for a certificate on the sign-in sheet

Thank you for joining us!

integrating **Transportation & Stormwater Infrastructure**

# Agenda

1. Welcome and Introductions
2. Introduction to the TSI Study and Goals; Pre-Workshop Survey
3. Importance of County Watershed and Stormwater Management
4. Waterfront Property No One Wants: How Counties Can Reduce Flood Risk through Sustainable Growth
5. Transportation Resilience in the Face of Growth, Flooding, and Limited Funding
6. I HATE CHANGE
7. County Governments – Using Higher Stormwater and Floodplain Management Standards to Create More Resilient Infrastructure
8. Protecting Sponsors' Land Rights Regarding Floodwater Retarding Structures
9. Roundtable Discussion
10. Post-Workshop Survey

# Welcome and Introductions

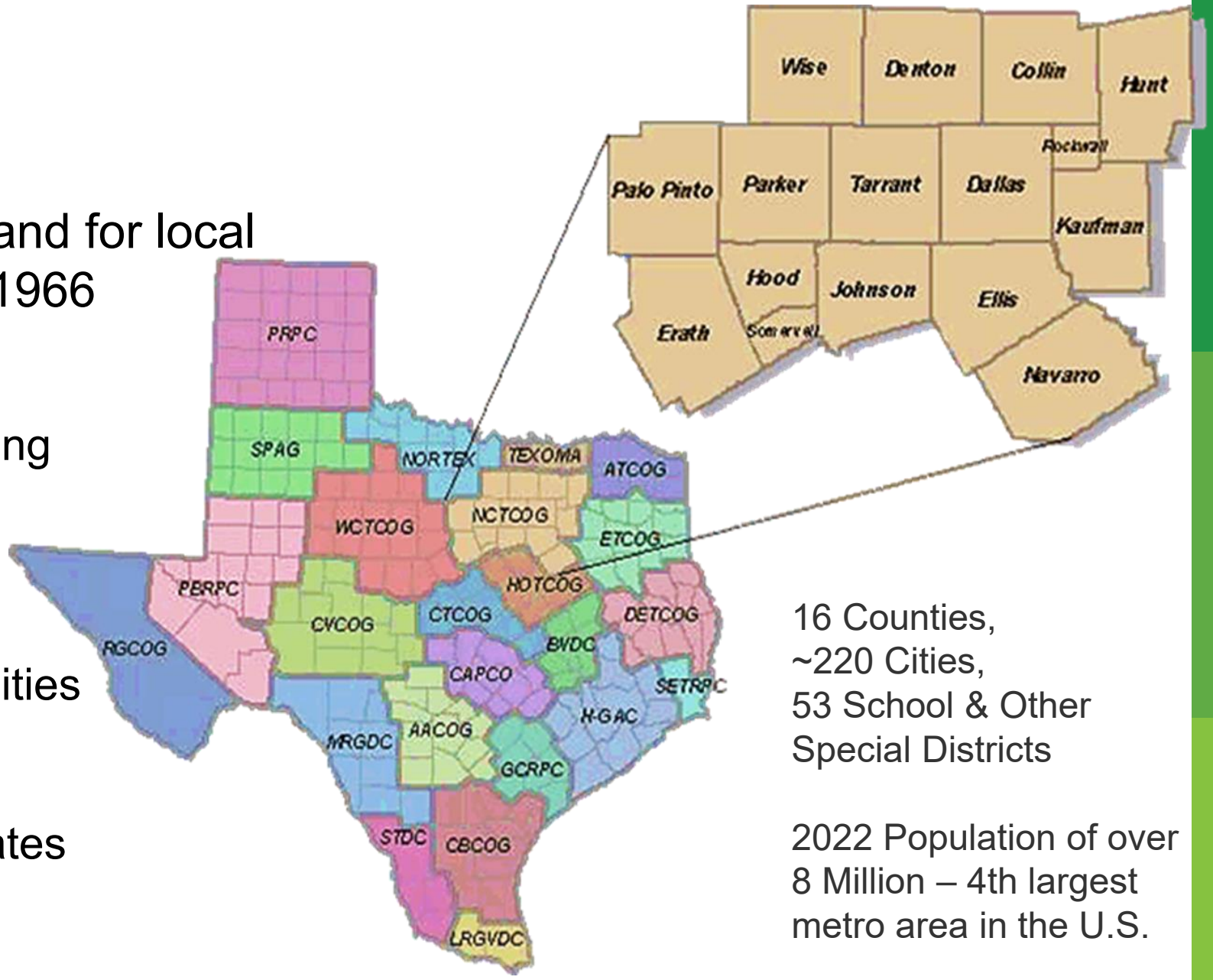
Susan Alvarez, PE, CFM

NCTCOG Environment & Development Department

# About NCTCOG

Voluntary association of, by, and for local governments, established in 1966

- Plans for common needs
- Serves as Metropolitan Planning Organization
- Strengthens individual and collective power
- Recognizes regional opportunities
- Resolves regional problems
- Makes joint decisions/cooperates for mutual benefit




16 Counties,
~220 Cities,
53 School & Other Special Districts

2022 Population of over 8 Million – 4th largest metro area in the U.S.

# Environment & Development Programs & Initiatives

Trinity River COMMON VISION Program

- Corridor Development Certification Process
- Flood Management Task Force
- Steering Committee

Government Officials Flood Information Efforts

- Participate in TWDB Region 3 Flood planning
- Regional Stormwater Coordinating Council
- Community Rating System Users Group
- Cooperating Technical Partners Program

Flood Reporting Tools

Stormshifting Project

Integrated Stormwater Management (“iSWM™”)

TxShare Flood Warning System Contracts

Integrated Transportation & Stormwater Infrastructure Study

# Trinity River COMMON VISION

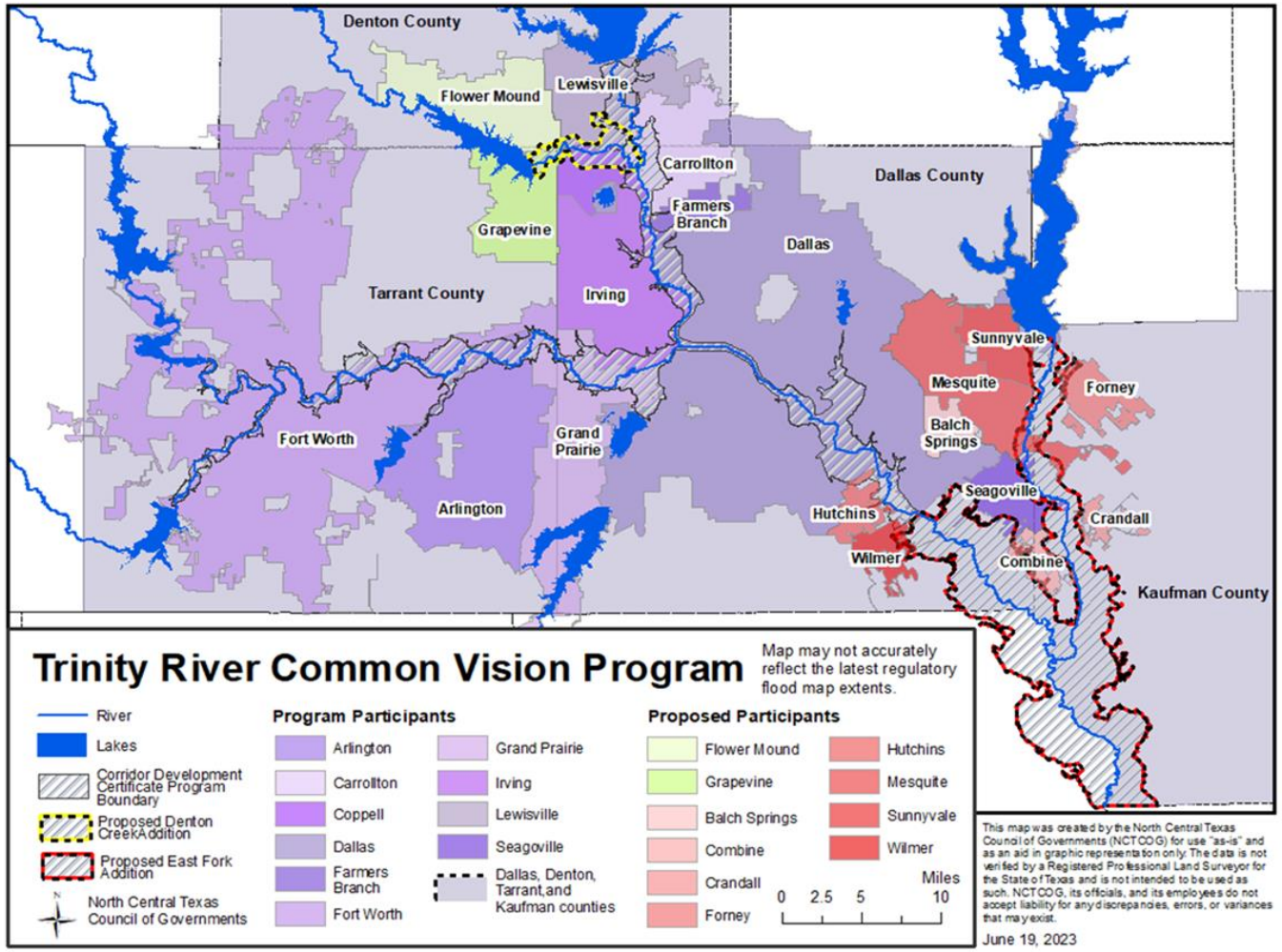
## Participating Members

### Ten Cities
Arlington
Carrollton
Coppell
Dallas
Farmers Branch
Fort Worth
Grand Prairie
Irving
Lewisville
Seagoville

### Four Counties
Dallas County
Denton County
Kaufman County
Tarrant County

### Programmatic Partners
U.S. Army Corps of Engineers
FEMA
TWDB

### Two Special Districts
Tarrant Regional Water District
Trinity River Authority

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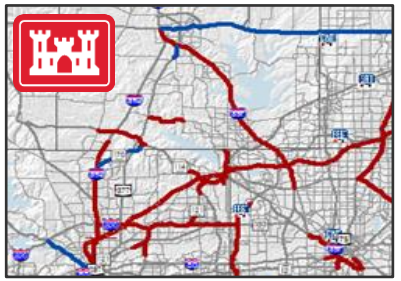
# Transportation: Complementary Programs & Initiatives

Asset Management

Blue-Green-Grey Infrastructure Program

Title VI Programs



USACE Section 214 Program – Water Resource Development Act

Planning & Environmental Linkages (PEL)

Sustainable Development Infrastructure

Land Use & Transportation Connections

Environmental Stewardship Program

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# Transportation: Linking Planning, Resilience, & Asset Management

- **USDOT FY 2022-26 Strategic Plan:** "DOT will increase its effectiveness in ensuring infrastructure is resilient enough to withstand extreme weather."
- **Federal Highway Administration (FHWA)** requires extreme weather durability / adaptation be considered in:
  - FHWA programs & policies *(Order 5520)*
  - Transportation system, project-level, & operations / maintenance planning *(23 CFR 450)*
  - Transportation Asset Management Plans *(23 CFR 515)*
  - Roads / bridges repeatedly damaged by emergency events *(23 CFR 667)*

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Texas Department of Transportation

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

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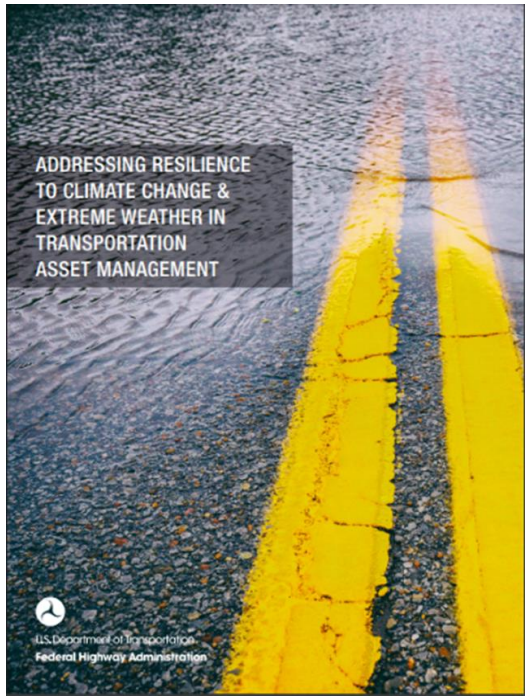
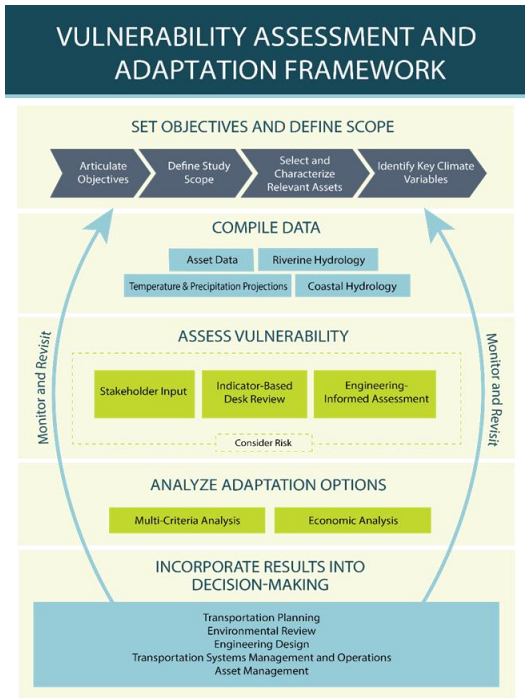
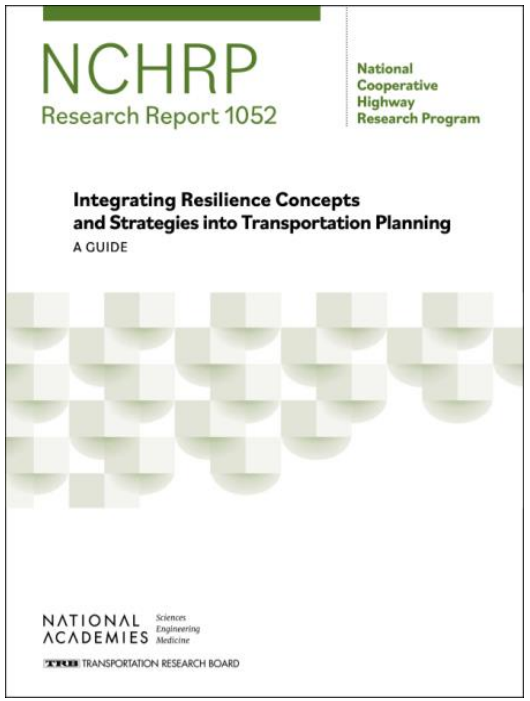



*Source: FHWA (2023)*




*Source: FHWA (2017)*




*Source: NCHRP (2023)*

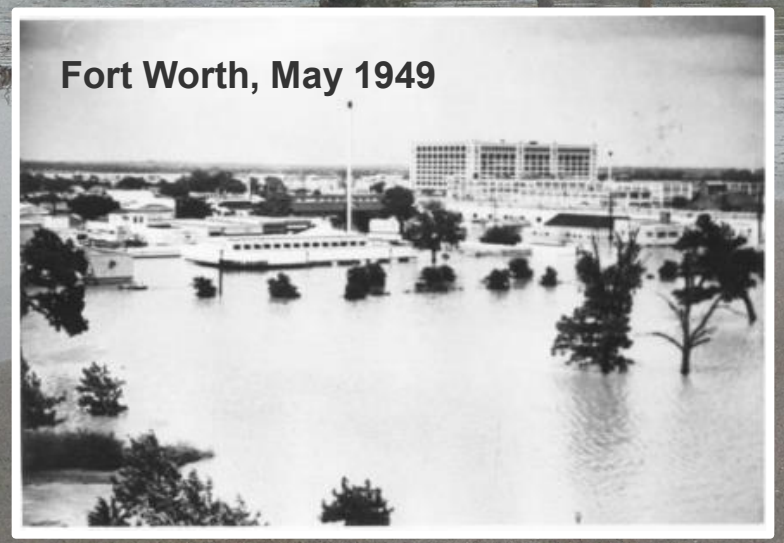
# Introduction to the TSI Study and Goals

# Pre-Workshop Survey

Kate Zielke, CFM

NCTCOG Environment & Development Department

# Historic flooding led to improvements in flood control infrastructure. But a need remains.

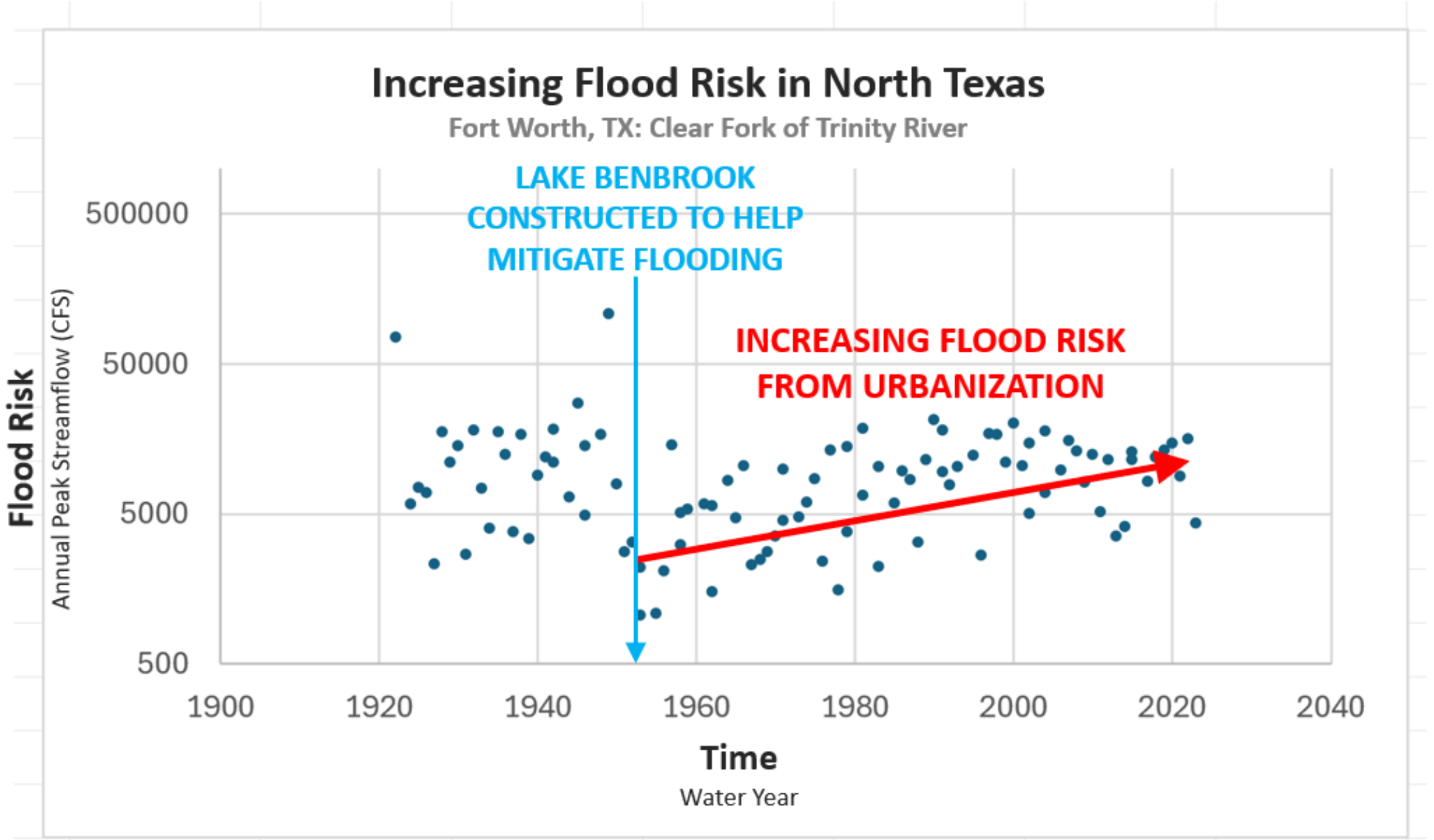


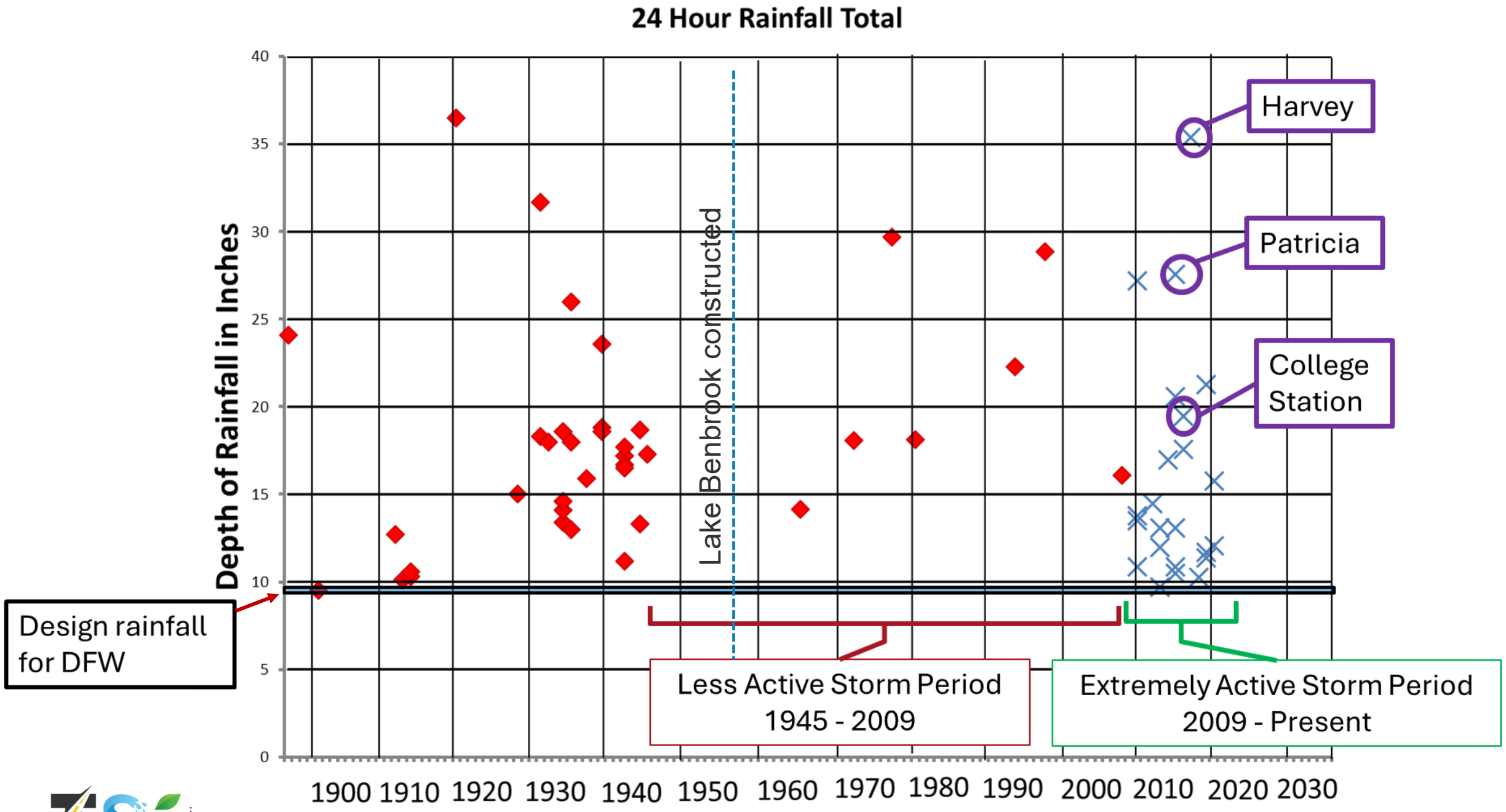

**Wise County, May 2015**
Courtesy Tarrant Regional Water District

**The integrated Transportation and Stormwater Infrastructure study proactively addresses the increased flood risk resulting from extraordinary population growth in the Upper Trinity River basin.**

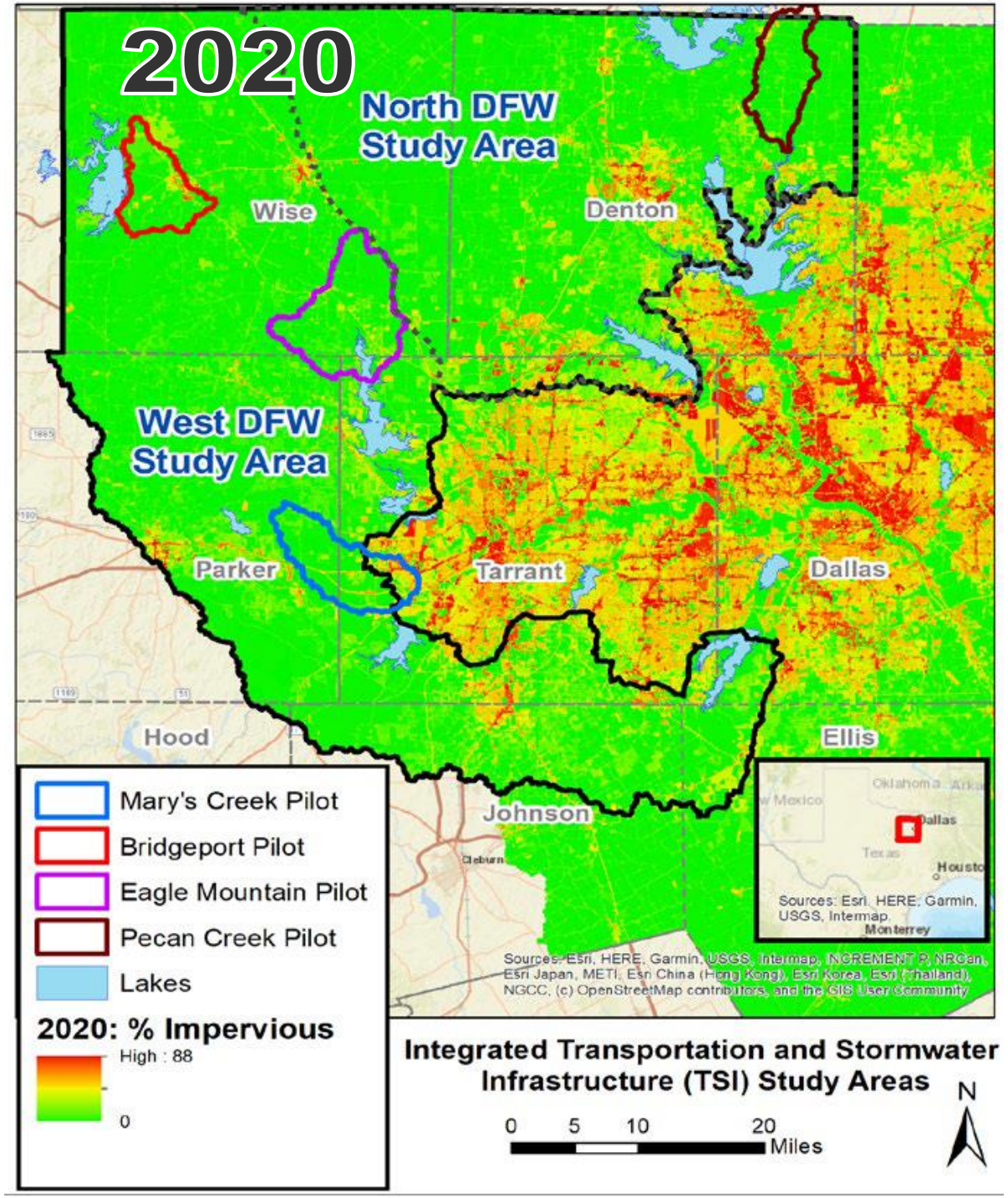
Adobe Stock

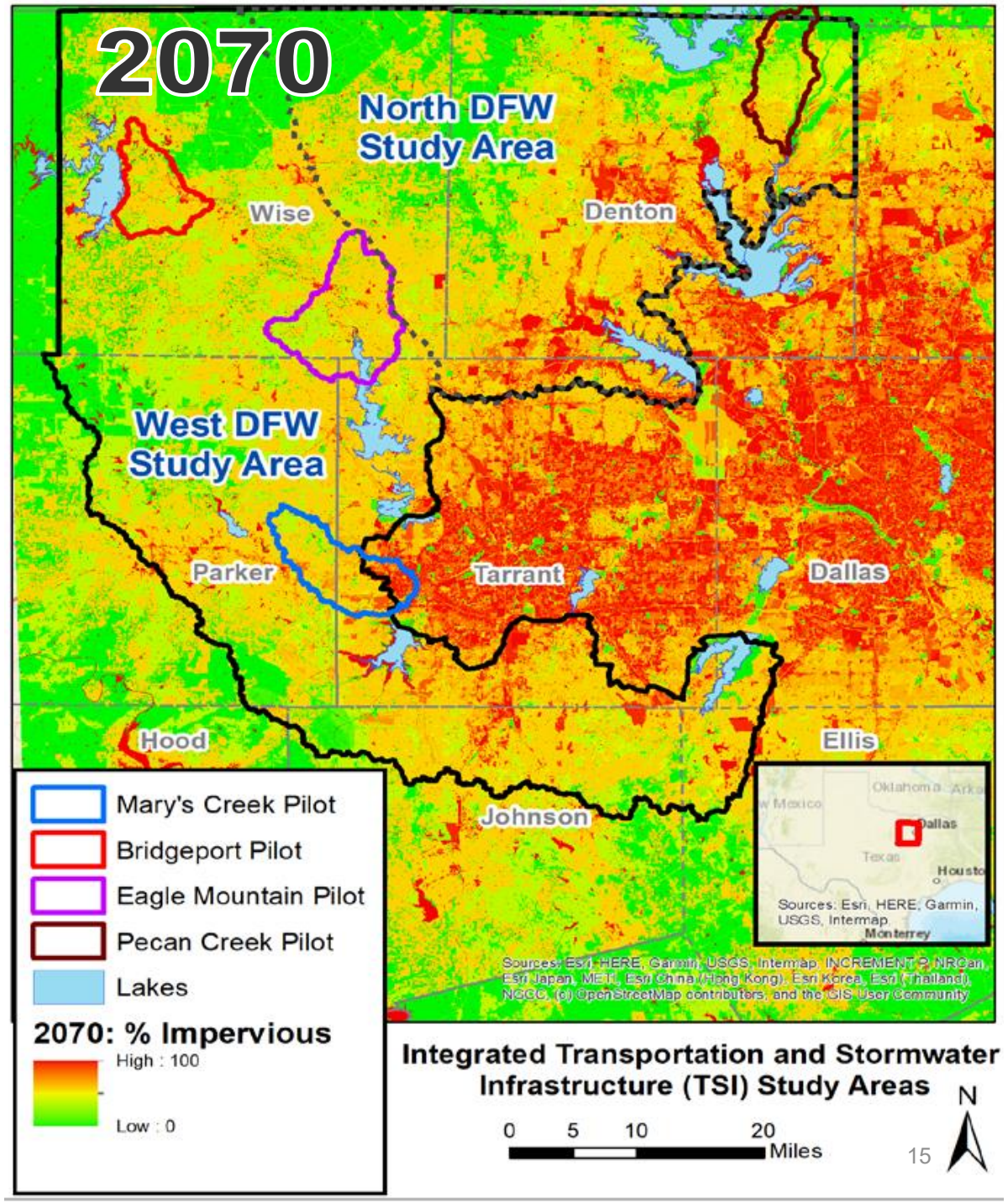
Courtesy City of Newark


Increasing Flood Risk in North Texas
Fort Worth, TX: Clear Fork of Trinity River
LAKE BENBROOK
CONSTRUCTED TO HELP
MITIGATE FLOODING
INCREASING FLOOD RISK
FROM URBANIZATION
Flood Risk
Annual Peak Streamflow (CFS)
500000
50000
5000
500
1900
1920
1940
1960
1980
2000
2020
2040
Time
Water Year




& Stormwater Infrastructure


2020
North DFW Study Area
West DFW Study Area
Wise
Denton
Parker
Tarrant
Dallas
Hood
Ellis
Johnson
Mary's Creek Pilot
Bridgeport Pilot
Eagle Mountain Pilot
Pecan Creek Pilot
Lakes
2020: % Impervious
High : 88
0
Integrated Transportation and Stormwater Infrastructure (TSI) Study Areas
0 5 10 20 Miles
N
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community


2070
North DFW Study Area
West DFW Study Area
Wise
Denton
Parker
Tarrant
Dallas
Hood
Ellis
Johnson
Mary's Creek Pilot
Bridgeport Pilot
Eagle Mountain Pilot
Pecan Creek Pilot
Lakes
2070: % Impervious
High : 100
Low : 0
Integrated Transportation and Stormwater Infrastructure (TSI) Study Areas
0 5 10 20 Miles
N
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

# TSI Overview and Study Goals

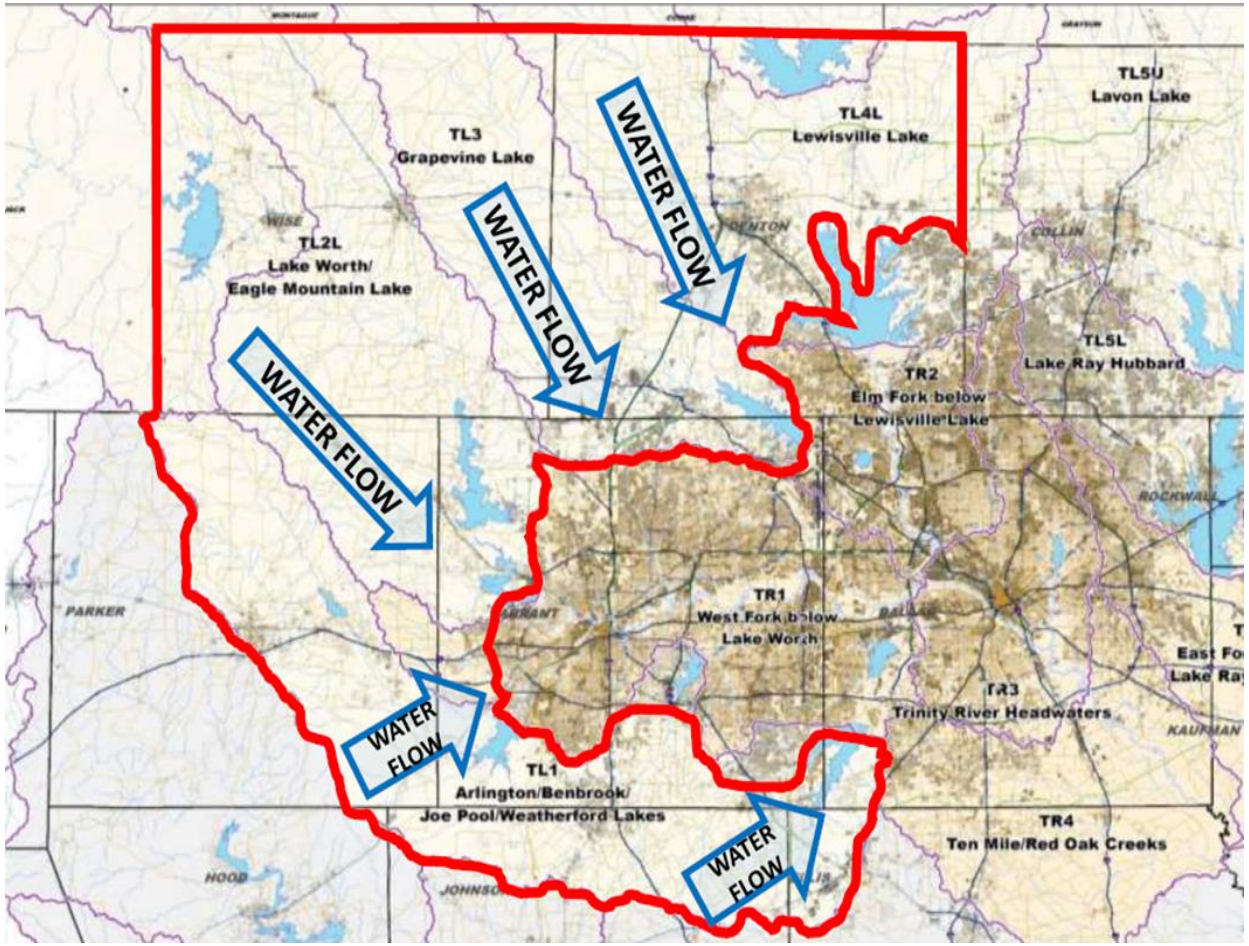
1. Demonstrate **proactive planning** that integrates transportation, stormwater, and environmental planning

2. **Reduce flooding within and downstream** from rapidly growing communities, including increasing the resiliency of infrastructure

3. Develop tools and resources, including policy recommendations, to **empower communities** to adopt higher floodplain management standards

4. **Implement local-scale innovation** in hydrologic and hydraulic modeling and emergency management modeling

5. Produce **planning-level design for transportation infrastructure and stormwater detention**

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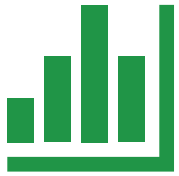
# TSI outputs will empower engineers, local governments, and developers to reduce the threat to people, property, and infrastructure.



Collect and Analyze Data

Assess Hydrology and Hydraulics Scenarios

Identify Transportation Infrastructure Impacts

Conduct Environmental Planning

Evaluate a Real-Time Flood Warning System

Support and Empower Communities

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# Estimated Study Timeline

**Through Winter 2025**
Continue training workshops and site visits to individual communities

**Winter 2025/2026**
Complete H&H modeling and identify transportation, environmental and other policy recommendations

**Spring 2026**
Conduct project update meeting to present findings and seek stakeholder feedback

**June 2026**
Conduct project update meeting to present final products incorporating stakeholder feedback

**July 2026**
Submit deliverables to funding agencies

# Project Partners

**West Study Area**

North Central Texas Council of Governments

US Army Corps of Engineers

University of Texas at Arlington

Texas A&M AgriLife Extension Service

Tarrant Regional Water District

Freese and Nichols, Inc.

Halff Associates, Inc.

**North Study Area**

North Central Texas Council of Governments

Upper Trinity Regional Water District

Halff Associates, Inc.

Highland Economics, LLC

University of Texas at Arlington

Texas A&M AgriLife Extension Service

**Funders**

Texas General Land Office

Texas Department of Transportation

Texas Water Development Board

Federal Emergency Management Agency

US Army Corps of Engineers

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# Pre-Workshop Survey

https://www.surveymonkey.com/r/2JLR3DB

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# Importance of County Watershed and Stormwater Management

Kate Zielke, CFM & Susan Alvarez, PE, CFM

NCTCOG Environment & Development Department

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# Recap of 2017 County Roundtable

- Hosted by NCTCOG on March 14, 2017, and July 12, 2017
  - Discussed counties' abilities to adopt more comprehensive floodplain management rules per Texas Senate Bill 936 (77R, 2001)
  - Developed a Menu of Regionally Recommended Standards in Watershed Management for New Development within County Regulated Areas

- NCTCOG's Executive Board approved a resolution on October 26, 2017, endorsing a recommendation for counties to adopt a resolution and implement these standards

# Menu of Standards

1. **Design** infrastructure **to fully developed conditions** with approved land-use maps if data is available
2. **Begin protection** at the most **upstream end** of the watershed above FEMA Limit of Detail Study
3. **Maintain unfilled valley storage areas**
4. Protect against and **reduce erosive velocities**
5. **Match pre-developed** site runoffs
6. **Verify/require** adequate downstream conveyance
7. **Require freeboard** from fully developed (if data is available) and changing watershed conditions
8. **Define written operation and maintenance** responsibilities
9. **Size conveyance** of street and storm systems adequately to safely convey traffic
10. **Create stream buffers** and preserve open space; limit clearing and grading
11. **Consider** regional (on or off stream) **detention** incentives
12. **Implement Conservation and/or Cluster Development incentives**
13. **Encourage** low impact development techniques, nature-based solutions and/or **green infrastructure**

# Standards Adoption

- Dallas County Court Order 2017-1375
- Other counties adopt a resolution and implement these standards?

**COURT ORDER**
**2017-1375**

Trinity River Common Vision Program
East Fork Trinity - CDC Permit and Higher Development Standards

On a motion made by Commissioner Mike Cantrell, District 2, and seconded by Commissioner Dr. Theresa M. Daniel, District 1, the following order was passed and adopted by the Commissioners Court of Dallas County, State of Texas:

BRIEFING DATE: 10/17/2017
FUNDING SOURCE: N/A

Be it resolved and ordered that the Dallas County Commissioners Court does hereby support the study of the East Fork of the Trinity River and the addition of the East Fork of the Trinity River into the Corridor Development Certificate program, and adopt the regionally recommended watershed management standards and incorporate these standards into future subdivision and floodplain management standards, regulations, and policies.

Done in open court October 17, 2017, by the following vote:

IN FAVOR: Honorable Clay Lewis Jenkins, County Judge
Commissioner Dr. Theresa M. Daniel, District 1
Commissioner Mike Cantrell, District 2
Commissioner John Wiley Price, District 3
Commissioner Dr. Elba Garcia, District 4
OPPOSED: None
ABSTAINED: None
ABSENT: None

Recommended by: Alberta Blair
Originating Department: Public Works

# MS4 Permit Compliance Support

- Permit compliance re: Minimum Control Measures (MCM) relative to Post-Construction Runoff Controls
- Meets Post-Construction Runoff Controls MCMs in both Phase 1 and Phase II MS4 Permits
- TSI deliverables include recommendations for related policies, ordinances, and implementation

Photo courtesy of TAMU AgriLife- Extension

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# Member Surveys on MCM Support by NCTCOG

- 2019 Stormwater Survey indicated:
  - MCM for Construction Site Stormwater Runoff was identified as the top concern followed closely by MCM for Post-Construction Stormwater Management.
  - Development of **regional recommendations for stormwater management** (e.g. model ordinances and contracts, guidance documents, templates, and checklists) was the most valued NCTCOG-provided resource (55.56% of responses) second only to **trainings on a variety of topics for various audiences** (66.67% of responses).
- The TSI study can help address both of these identified opportunities.

# Member Surveys on MCM Support by NCTCOG

- 2024 Survey of Phase II Public Education Needs showed:
  - Majority of respondents plan to specifically address **Developers or Construction Site Operators** to meet permit requirements related to public education and outreach.
  - The pollutants most respondents plan to address was tied between:
    - Sediment Runoff from Construction Activities,
    - Pet Waste,
    - Illegal Disposal of Household Hazardous Waste,
    - Litter, trash containment, balloon releases, and
    - Grass clippings and leaf litter.
- Anticipated outreach during the TSI study may also be used to address these concerns.

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# Synergies Between TSI and Stormwater Management Plans

- Model ordinances
  - Opportunity for Regional Stormwater Management Coordinating Council to influence language
- Public education and outreach materials
  - Could be compatible with permit requirements
- Integration of transportation and stormwater infrastructure
  - Potential for minimizing discharge of pollutants
- Developer outreach
  - Opportunity to promote BMPs and structural controls compatible with TSI
- Identified funding strategies
  - Implementing green stormwater infrastructure and nature-based solutions

Photo courtesy of City of Newark

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# Waterfront Property No One Wants:

## How Counties Can Reduce Flood Risk through Sustainable Growth

Stephanie Griffin, PE, CFM, F.ASCE

Halff

# Agenda

- Introduction
- Need for Infrastructure Regulation in Counties
- County's Legal Authority Over Infrastructure
- Recommendations for Future Actions

*(Photo courtesy of Halff)*

# Introduction

# Purpose

## Key takeaways:

Counties have legislative authority over infrastructure.

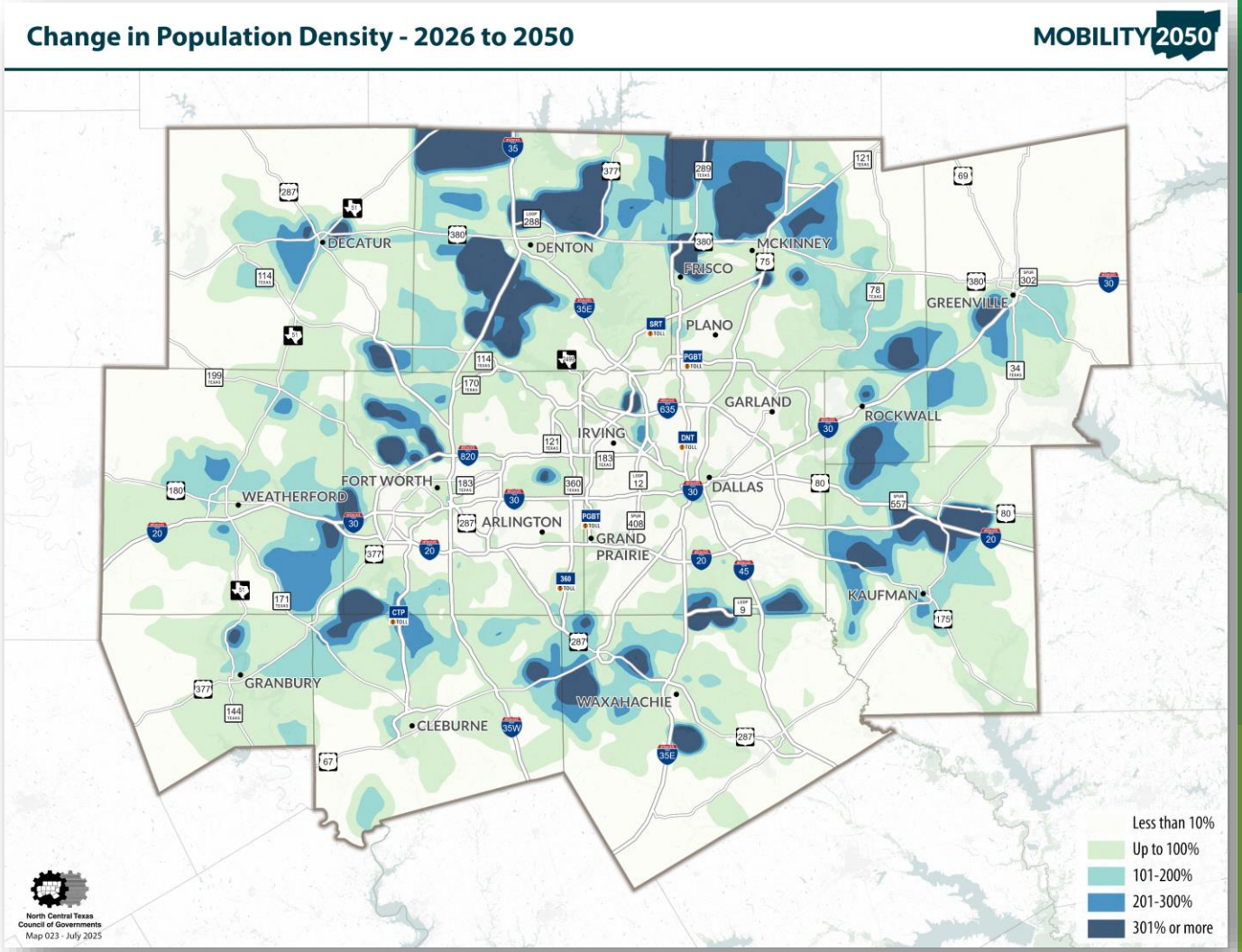
Counties can use those legislative authorities to take a proactive approach to flood risk.

# Need for Infrastructure Regulation in Counties

# Population Increases

Over the years, the population has changed dramatically for North Central Texas counties.

- In 2000, **~5.2M people**
- In 2010, **~6.4M people**
- In 2020, **~7.7M people**
- In 2026, NCTCOG projects a population of ***~8.6M people***
- In 2050, NCTCOG projects a population of ***~12.3M people***




*Projected "Change in Population Density – 2026 to 2050" figure from the 2025 NCTCOG Mobility 2050 Metropolitan Transportation Plan*

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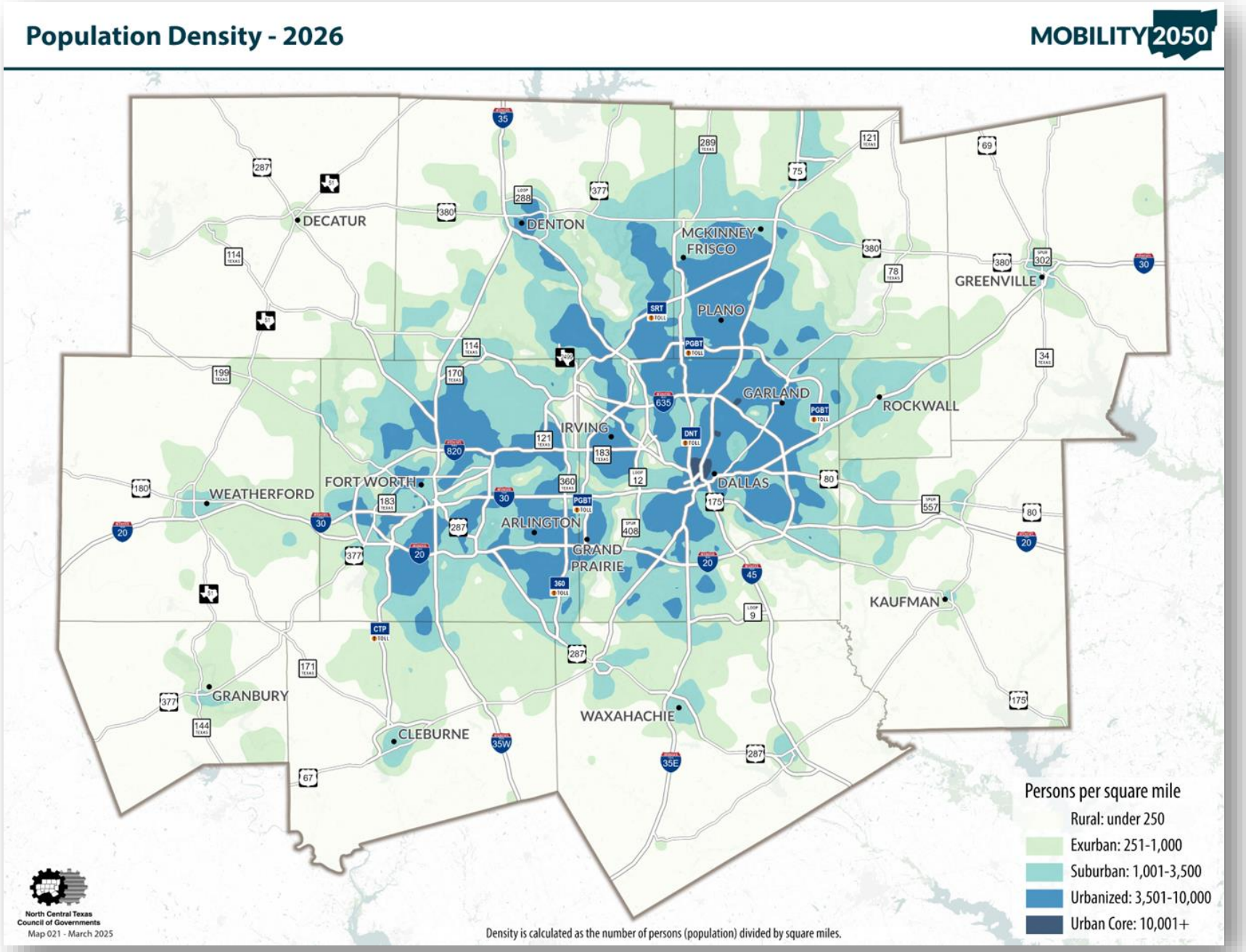


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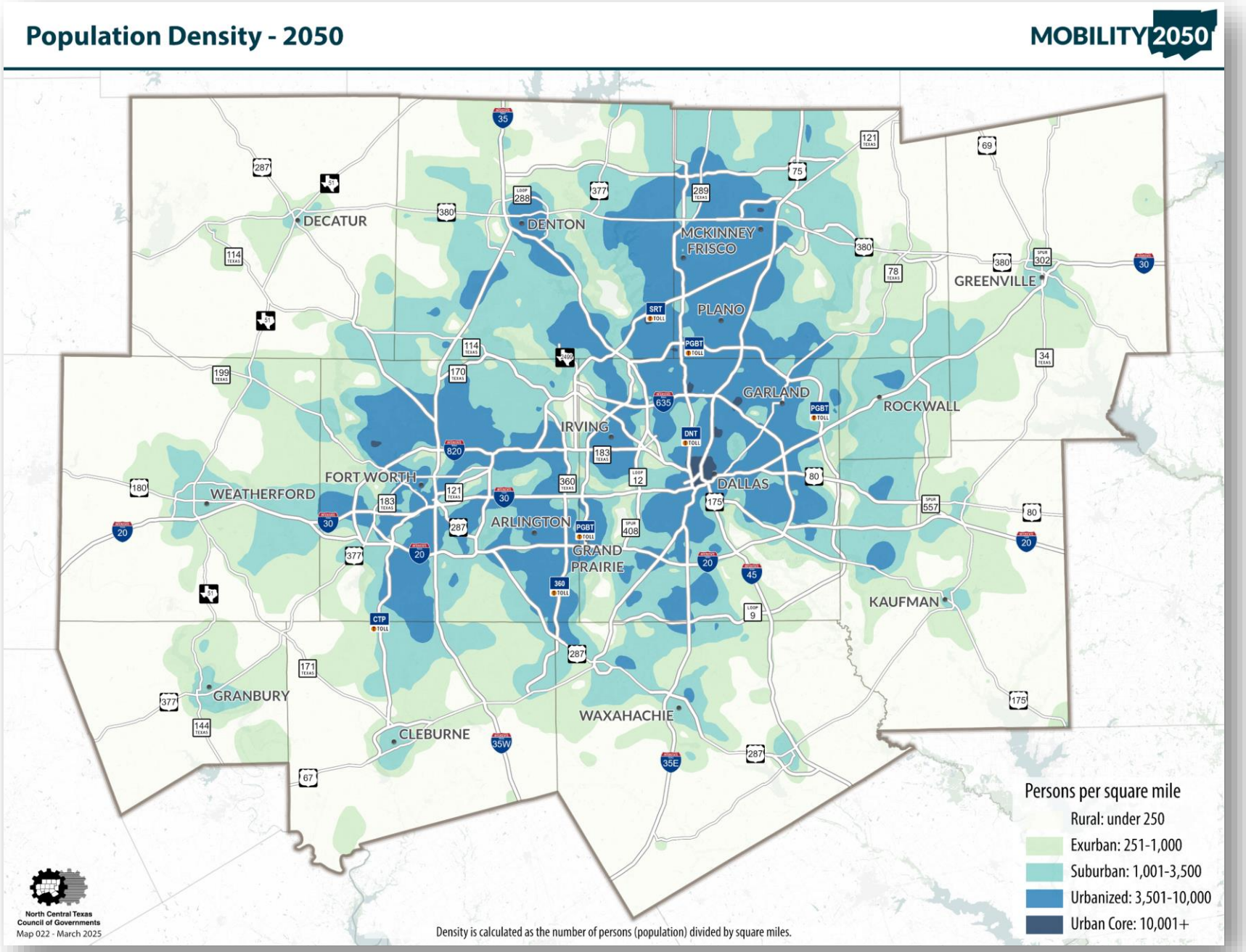
*Projected "Population Density - 2026" figure from the 2025 NCTCOG Mobility 2050 Metropolitan Transportation Plan*

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*Projected "Population Density - 2050" figure from the 2025 NCTCOG Mobility 2050 Metropolitan Transportation Plan*

# Flooding History

In May 2015, many counties in North Central Texas experienced flooding that resulted in damages to infrastructure and property.

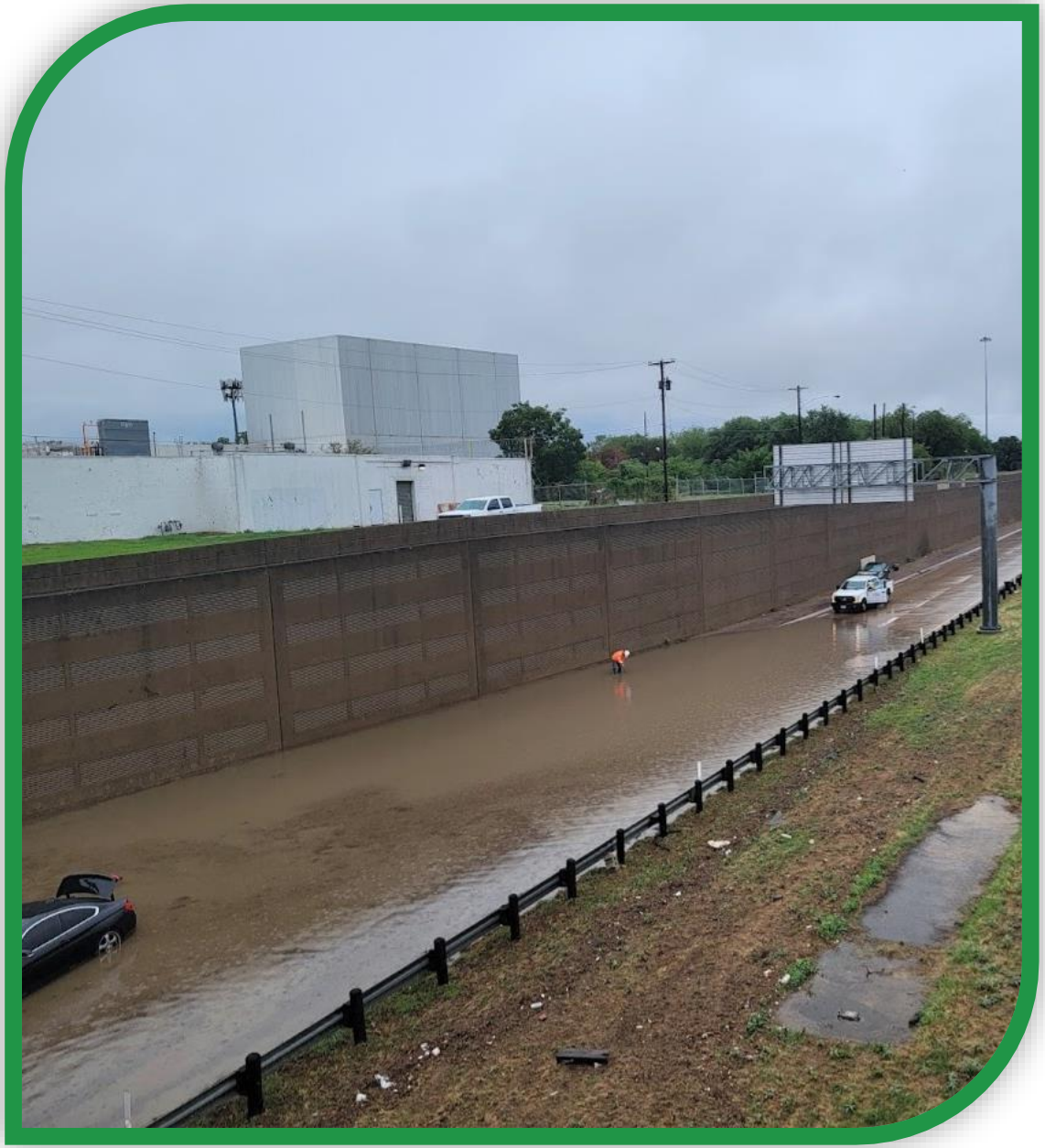
*FM 407 over Oliver Creek in Denton County from May 2015 flooding (Photo courtesy of Stephen Belknap)*

# Flooding History

In August 2022, North Central Texas received extreme amounts of rainfall upwards of about **10 inches**. Flash flooding led to numerous rescues.

In Dallas, the fire department crews responded to **195 high-water incidents** and **39 water rescues**.

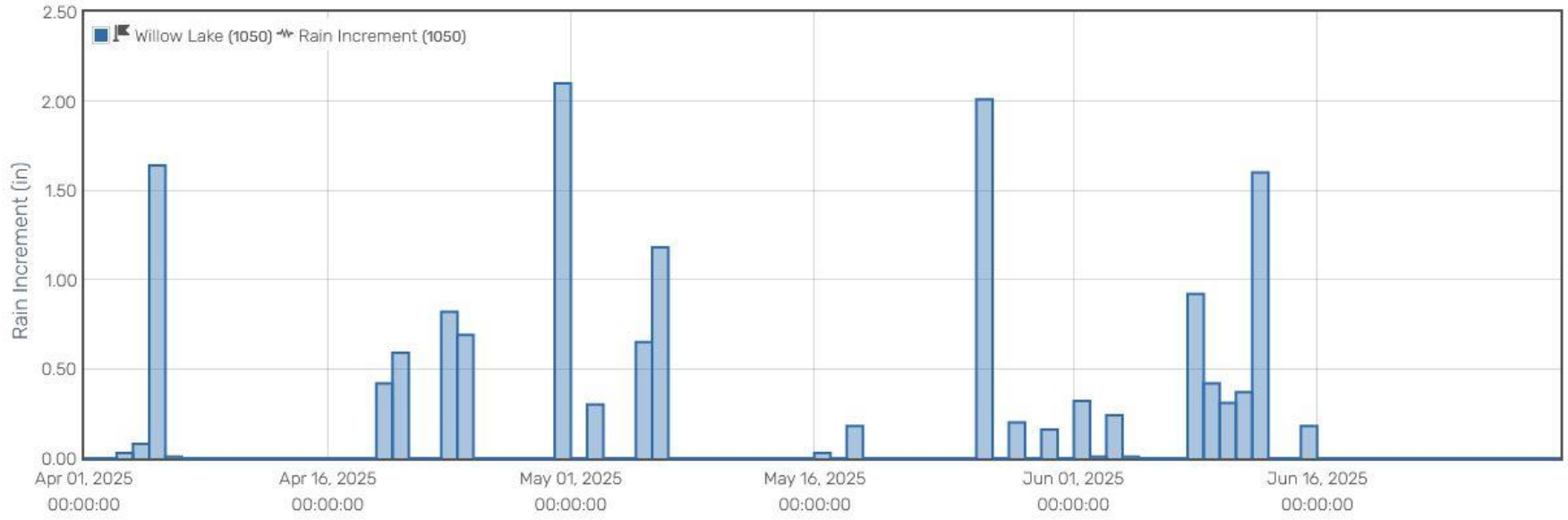
In Fort Worth, the fire department responded to **133 high water calls** in **24 hours**.



*Ramp near Plano Road from August 2022 flooding (Photo courtesy of Halff)*

# Flooding History

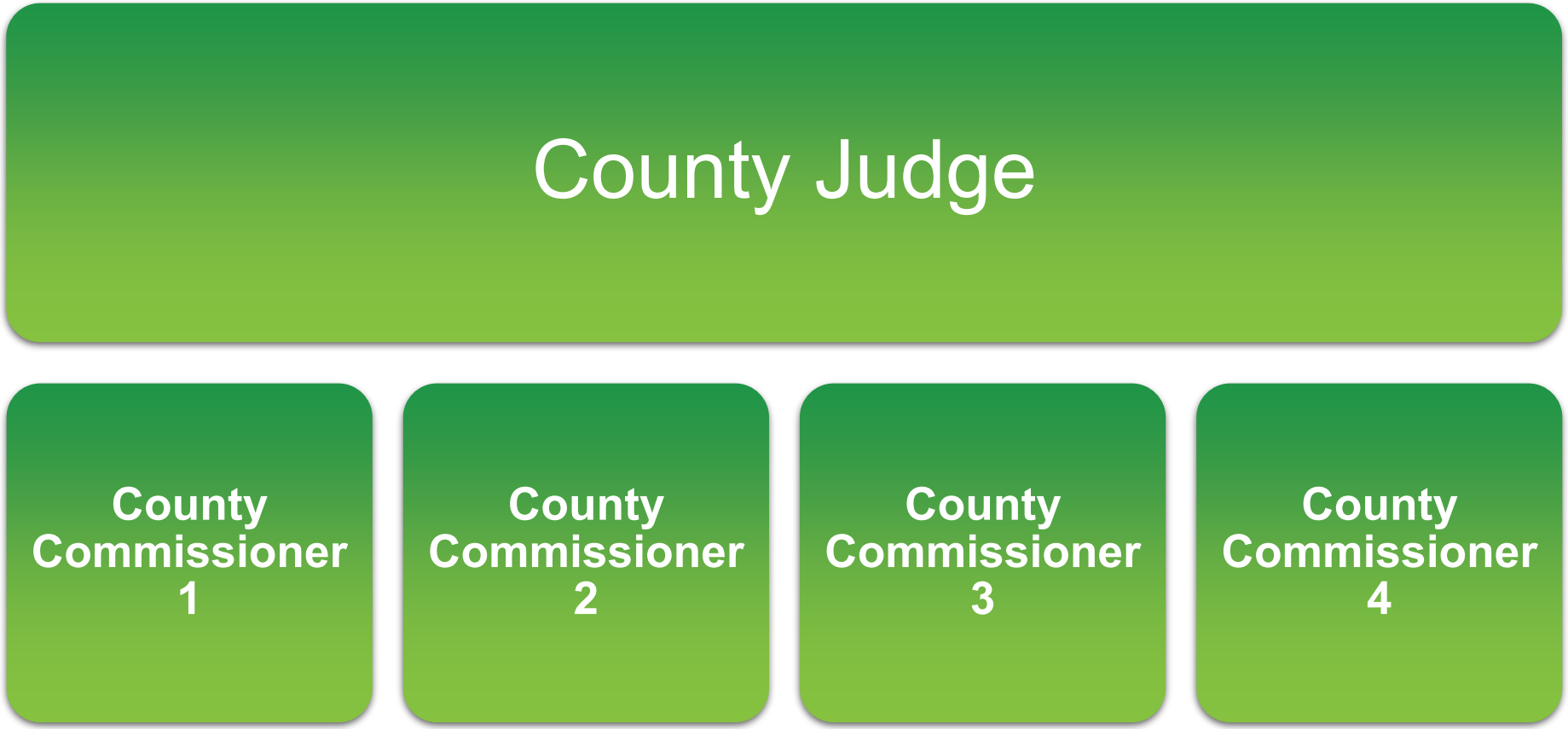
Heavy storms from this year in April, May, and June 2025 led to multiple road closures and flood damage in North Central Texas.




*Rain Increment Data from Willow Creek Lake in Fort Worth, TX*
*(Data retrieved from NCTCOG rain gauge map)*

# County's Legal Authority Over Infrastructure

# County Government Structure



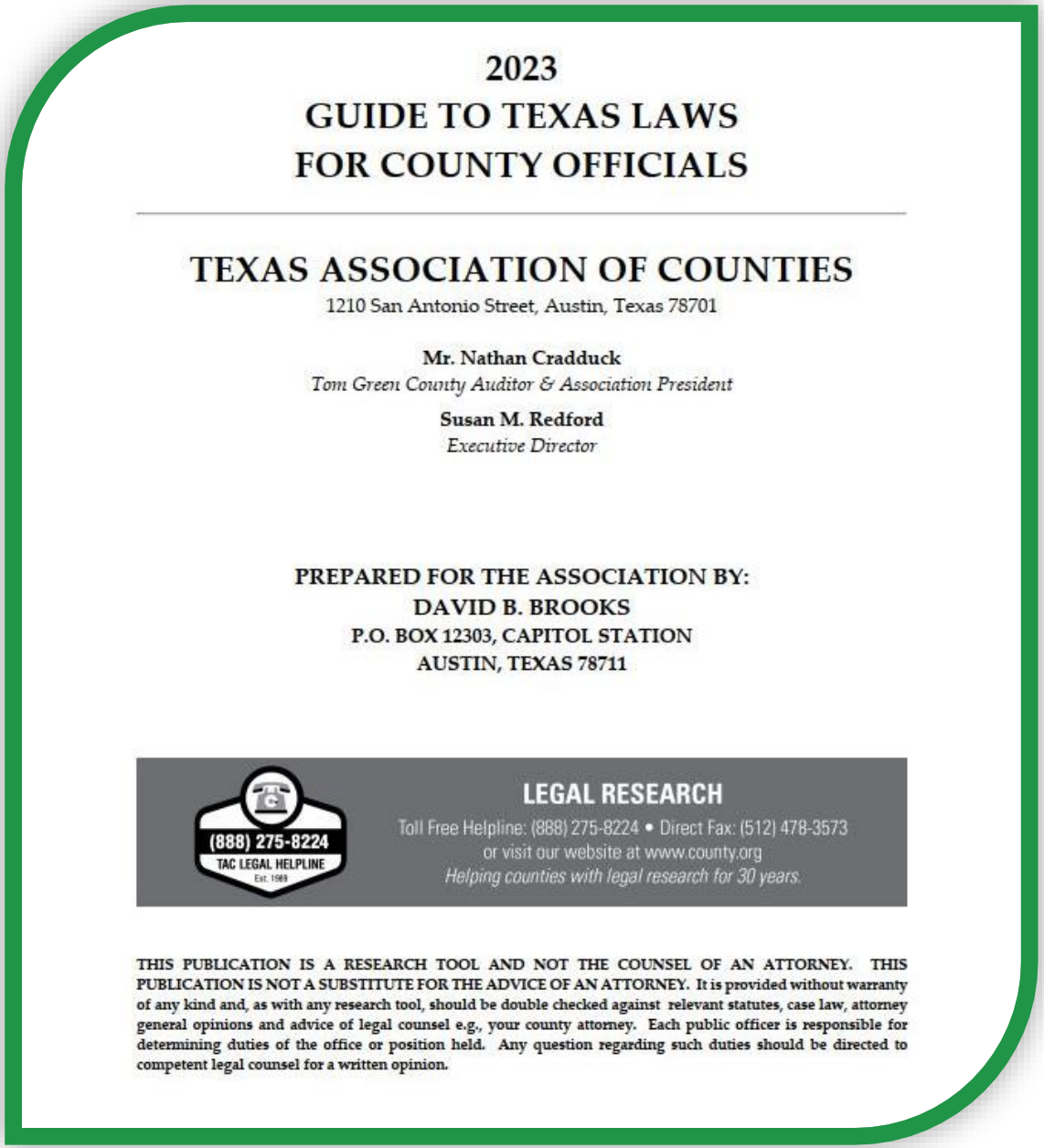
# Applicable Legal Documents

The following documents describe counties regulatory authority:

- Texas Constitution
- Texas Revised Civil Statutes Annotated, and the various codes:
  - Local Government Code
  - Agriculture Code
  - Election Code
  - Government Code
  - Natural Resources Code
  - Family Code
  - Tax Code
  - Parks and Wildlife Code
  - Water Code
  - Transportation Code
  - Business and Commerce Code

# Applicable Legal Documents

The **2023 Guide to Texas Laws for County Officials** prepared for Texas Association of Counties is a great summary of county legislative authority.



2023

GUIDE TO TEXAS LAWS
FOR COUNTY OFFICIALS

TEXAS ASSOCIATION OF COUNTIES
1210 San Antonio Street, Austin, Texas 78701

**Mr. Nathan Cradduck**
*Tom Green County Auditor & Association President*

**Susan M. Redford**
*Executive Director*

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**DAVID B. BROOKS**
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**AUSTIN, TEXAS 78711**

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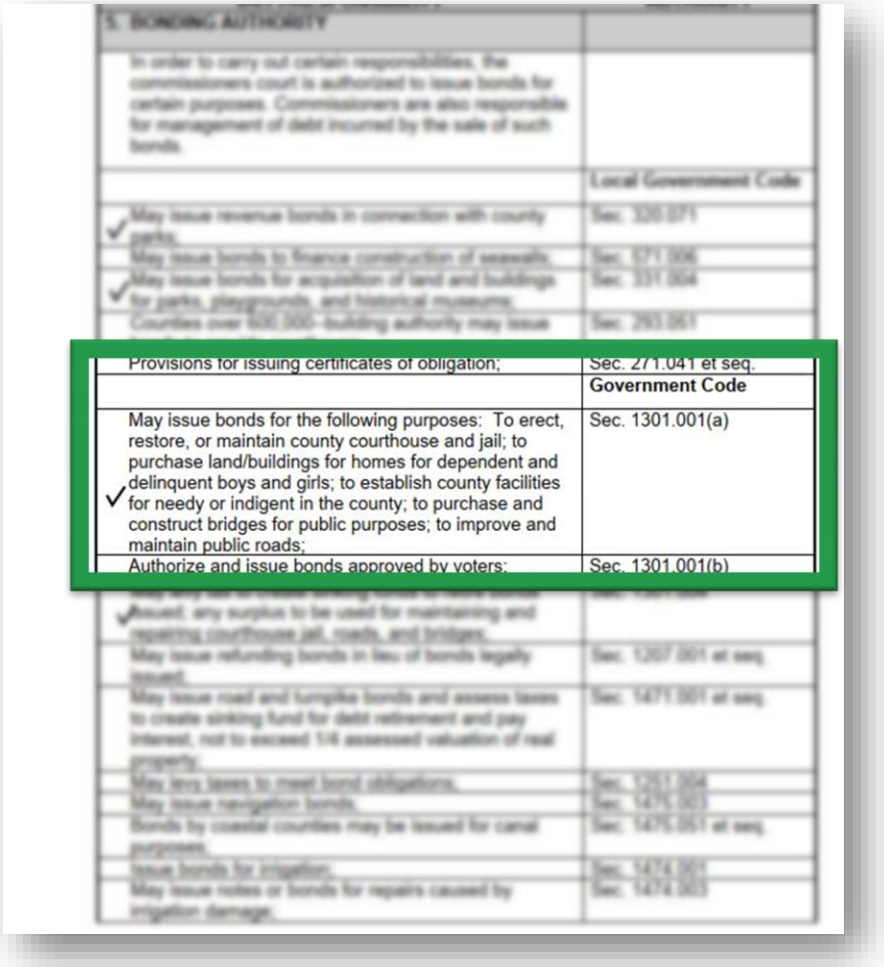
# Transportation Infrastructure

- Counties can:
  - Appoint a county road engineer
  - Regulate subdivision
  - Regulate road & bridge construction and maintenance
  - Regulate drainage construction and maintenance
  - Acquire equipment and resources
  - Form intergovernmental agreements
  - Enter partnership with TxDOT


*Ripy Road bridge in Denton County (Photo courtesy of Halff)*

# Funding Transportation Plans

- Counties can:
  - Form road districts
  - Issue and authorize bonds for transportation projects
  - Levy taxes to repay bonds
  - Impose ad valorem taxes
  - Obtain grants



| | |
|---|---|
| Provisions for issuing certificates of obligation; | Sec. 271.041 et seq. |
| | **Government Code** |
| ✓ May issue bonds for the following purposes: To erect, restore, or maintain county courthouse and jail; to purchase land/buildings for homes for dependent and delinquent boys and girls; to establish county facilities for needy or indigent in the county; to purchase and construct bridges for public purposes; to improve and maintain public roads; | Sec. 1301.001(a) |
| Authorize and issue bonds approved by voters; | Sec. 1301.001(b) |

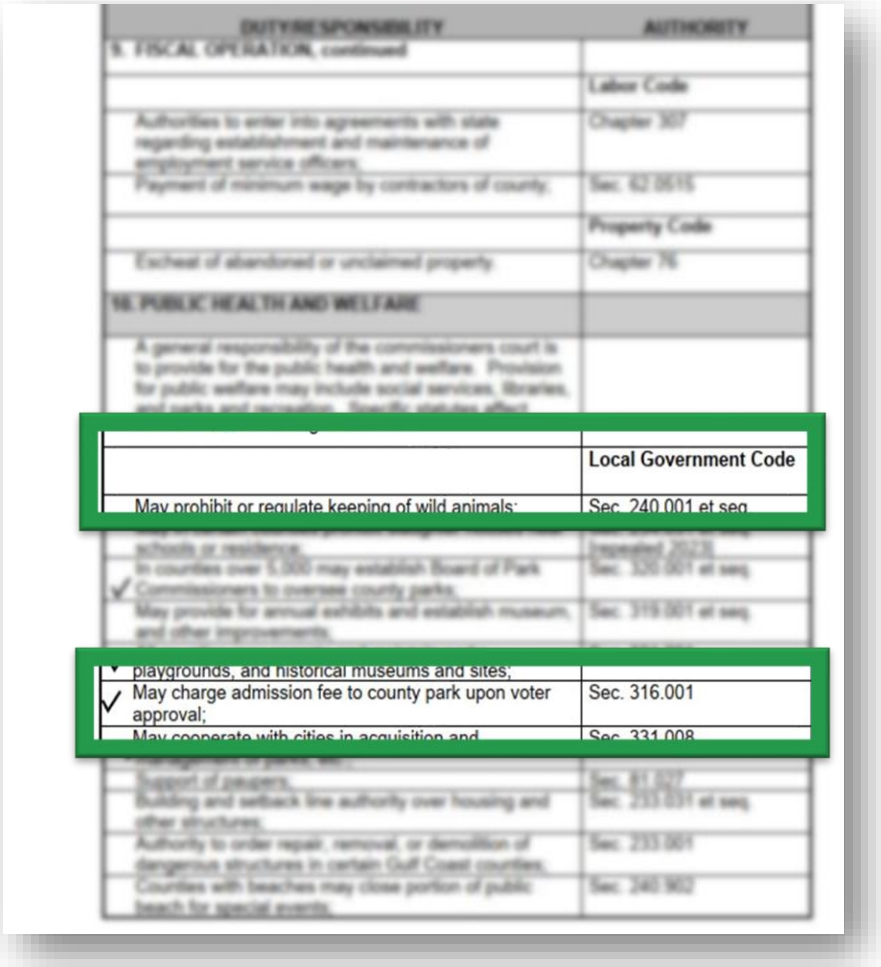
# Environmental Protection

- Counties can:
  - Change zoning around certain lakes
  - Operate and maintain parks
  - Acquire parks
  - Form intergovernmental agreements
  - Regulate junk and refuse
  - Protect water quality

*Lake Lakewood Park in Leander, TX (Photo courtesy of Halff)*

# Funding Environmental Plans

- Counties may:
  - Charge admission to parks and museums with voter approval
  - Issue revenue bonds for parks



| DUTY/RESPONSIBILITY | AUTHORITY |
|---|---|
| 9. FISCAL OPERATION, continued | |
| | Labor Code |
| Authorities to enter into agreements with state regarding establishment and maintenance of employment service officers | Chapter 307 |
| Payment of minimum wage by contractors of county | Sec. 62.0515 |
| | Property Code |
| Escheat of abandoned or unclaimed property | Chapter 76 |
| 10. PUBLIC HEALTH AND WELFARE | |
| A general responsibility of the commissioners court is to provide for the public health and welfare. Provision for public welfare may include social services, libraries, and parks and recreation. Specific statutes affect | |
| | Local Government Code |
| May prohibit or regulate keeping of wild animals; | Sec. 240.001 et seq. |
| ✓ In counties over 1,000 may establish Board of Park Commissioners to oversee county parks; | Sec. 320.001 et seq. |
| May provide for annual exhibits and establish museum, and other improvements; | Sec. 319.001 et seq. |
| playgrounds, and historical museums and sites; | |
| ✓ May charge admission fee to county park upon voter approval; | Sec. 316.001 |
| May cooperate with cities in acquisition and | Sec. 331.008 |
| Support of paupers | Sec. 81.027 |
| Building and setback line authority over housing and other structures | Sec. 233.031 et seq. |
| Authority to order repair, removal, or demolition of dangerous structures in certain Gulf Coast counties | Sec. 233.061 |
| Counties with beaches may close portion of public beach for special events | Sec. 240.902 |

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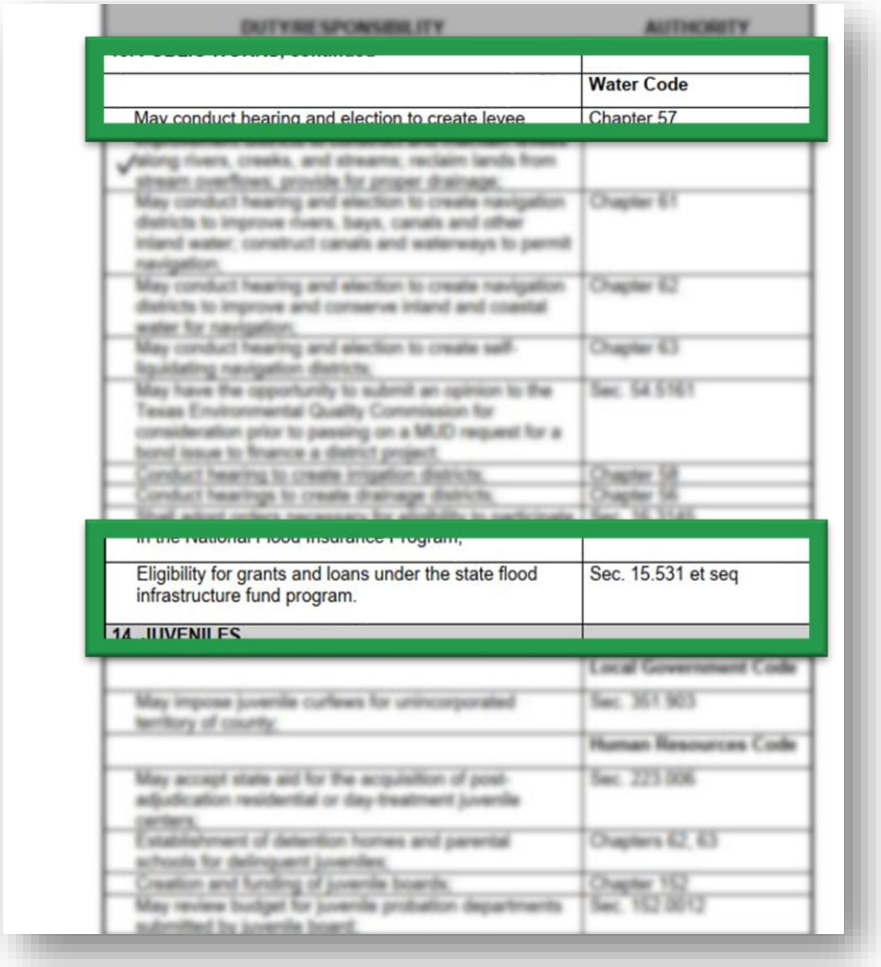
# Water Resources

- Counties can:
  - Contract for flood control projects
  - Acquire property for flood control
  - Construct reservoirs, dams, etc.
  - Create drainage districts
  - Maintain emergency programs
  - Guide future development
  - Develop water plans
  - Protect water quality

*Winding Hollow Dam in Plano, TX (Photo courtesy of Halff)*

# Funding Water Resources Plans

- Counties may:
  - Issue bonds
  - Levy taxes to construct lakes, reservoirs, etc.
  - Obtain grants



| DUTY/RESPONSIBILITY | AUTHORITY |
|---|---|
| | **Water Code** |
| May conduct hearing and election to create levee | Chapter 57 |
| along rivers, creeks, and streams; reclaim lands from stream overflows; provide for proper drainage. | |
| May conduct hearing and election to create navigation districts to improve rivers, bays, canals and other inland water; construct canals and waterways to permit navigation. | Chapter 61 |
| May conduct hearing and election to create navigation districts to improve and conserve inland and coastal water for navigation. | Chapter 62 |
| May conduct hearing and election to create self-liquidating navigation districts. | Chapter 63 |
| May have the opportunity to submit an opinion to the Texas Environmental Quality Commission for consideration prior to passing on a MUD request for a bond issue to finance a district project. | Sec. 54.5161 |
| Conduct hearing to create irrigation districts. | Chapter 58 |
| Conduct hearings to create drainage districts. | Chapter 56 |
| in the National Flood Insurance Program; | |
| Eligibility for grants and loans under the state flood infrastructure fund program. | Sec. 15.531 et seq |
| 14. JUVENILES | |
| | Local Government Code |
| May impose juvenile curfews for unincorporated territory of county. | Sec. 351.903 |
| | Human Resources Code |
| May accept state aid for the acquisition of post-adjudication residential or day-treatment juvenile centers. | Sec. 223.006 |
| Establishment of detention homes and parental schools for delinquent juveniles. | Chapters 62, 63 |
| Creation and funding of juvenile boards. | Chapter 152 |
| May review budget for juvenile probation departments submitted by juvenile board. | Sec. 152.0012 |

# County Legal Authority | Other Infrastructure Powers

- Counties can:
  - Leverage public and/or private partnerships
  - Collaborate with other governments
  - Utilize eminent domain


*Denton County Commissioners Court*
*(Photo courtesy of Denton County website)*

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# Recommendations for Future Actions

# Recommendations for Future Actions

1. Participate in the TSI project.
2. Establish regulations that account for rapid growth.
3. Develop a regional flood plan (if one is needed).
4. Develop Drainage Master Plans w/ Environmental Considerations.
5. Participate in the Regional and State Flood Plans.
6. Implement actions from flood plans.
7. Confirm that Hazard Mitigation Plan aligns with other studies and recommendations.

# Thank You!

halff

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*Water Resources Director at Halff*

817.813.5704

Sam Sarkar, PE
*Project Advisor at Halff*

214.346.6368

# References


- https://countyorgprodblob2023.blob.core.usgovcloudapi.net/cms/tac/media/default/member-services/legal/legal-publications/guide-to-laws-for-county-officials.pdf
- https://www.nctcog.org/getmedia/7c1802ca-464e-4d3f-95ab-cdf25e9d1be7/3-0-Social-Considerations.pdf
- https://www.wfaa.com/article/news/local/eagle-mountain-lake-ups-discharge-to-quell-flooding/287-148863384
- https://www.wfaa.com/article/weather/dallas-fort-worth-flood-map-weather-rainfall-totals-august-22-2022/287-bbe096d5-de12-4ef9-a106-cce11fb0f763Flood and Coastal Storm Risk Management
- https://www.usace.army.mil/Missions/Civil-Works/Flood-and-Coastal-Storm-Risk-Management/

# References


- https://www.floods.org/about/
- https://www.tfma.org/page/about-tfma
- https://www.wfaa.com/article/weather/north-texas-storm-flooding-where-to-avoid-dallas-fort-worth/287-6470b4e5-15f4-41ea-92cc-b78c51ec6768#:~:text=In%20Rowlett%2C%20several%20roads%20were%20closed%20due,Broadmoor%20Lane%20and%20Springfield%20Park%2C%20officials%20said.
- https://www.roadsbridges.com/bridge-construction/news/55038232/texas-flooding-leads-to-damaged-roads
- https://nctcog.onerain.com/map/?view=b87bc1c0-81a3-4bf1-a0dc-a8b0dacf34f1

# Break

# Transportation Resilience in the Face of Growth, Flooding, & Limited Funding

Brendon Wheeler, PE, CFM

NCTCOG Transportation Department

# Metropolitan Planning Area

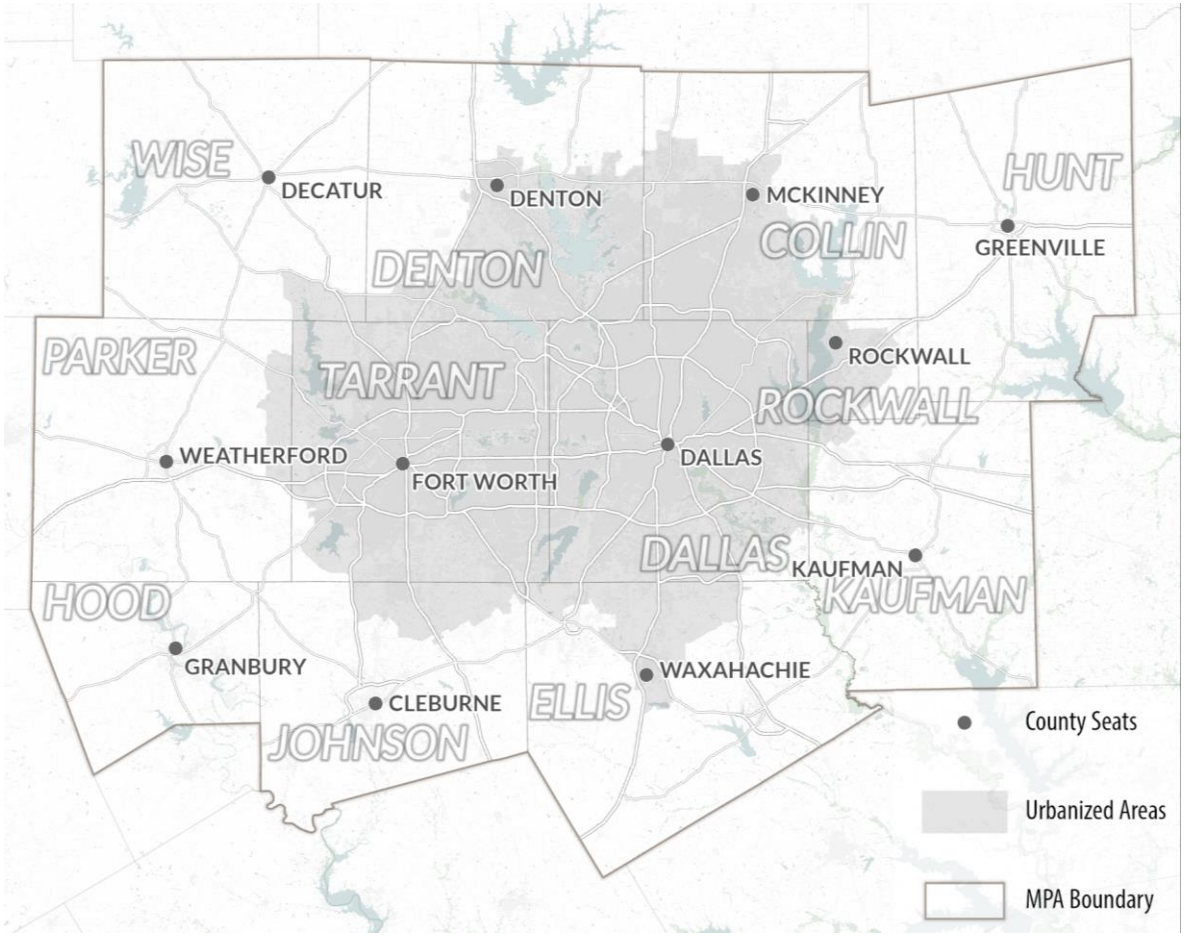
**Over 9,000** square miles

**12** counties

**Over 200** cities, towns and communities

**4th** largest metro area in the US

By 2050, expected to pass Chicago as **3rd** largest metro area in the US

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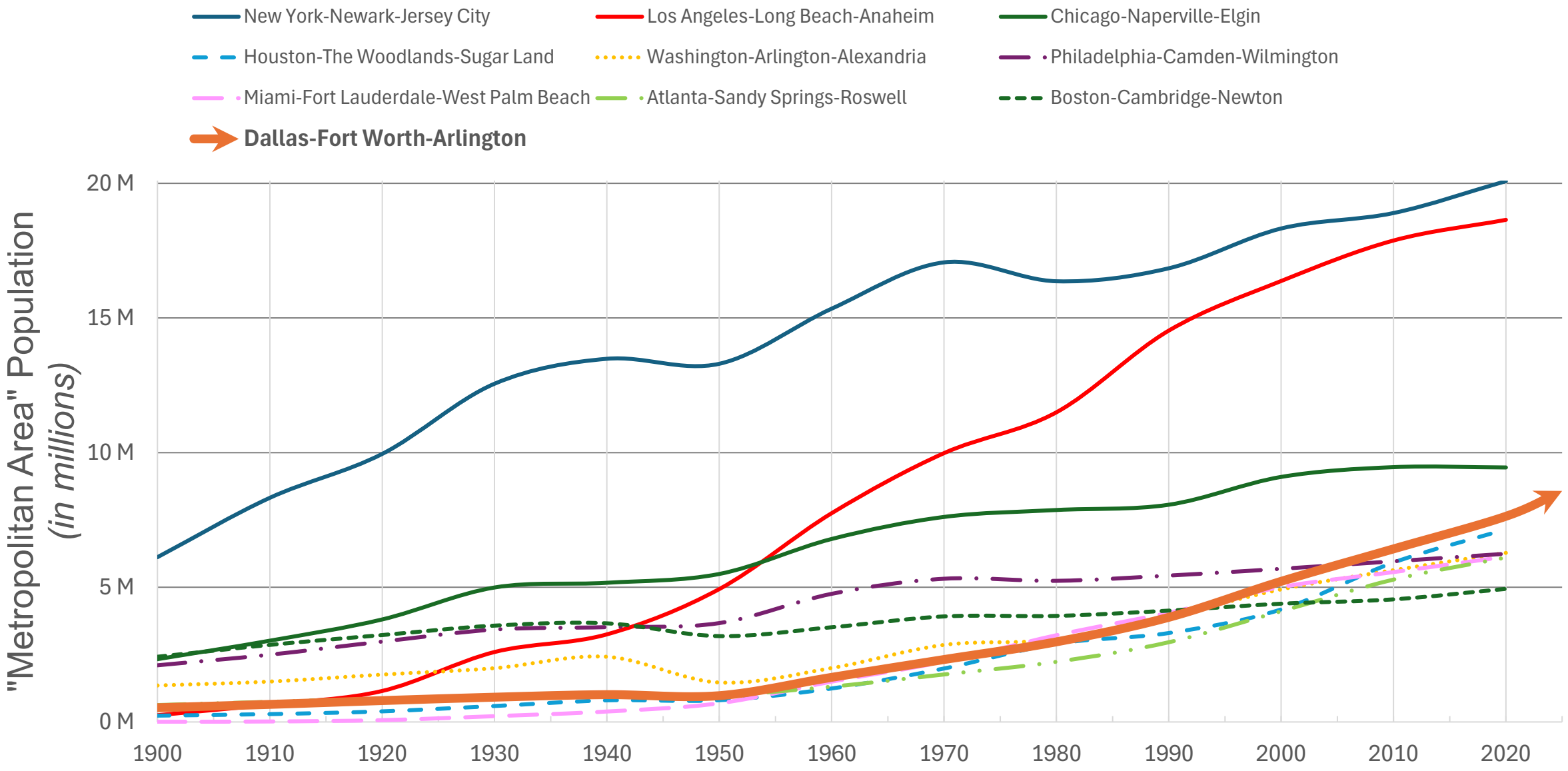


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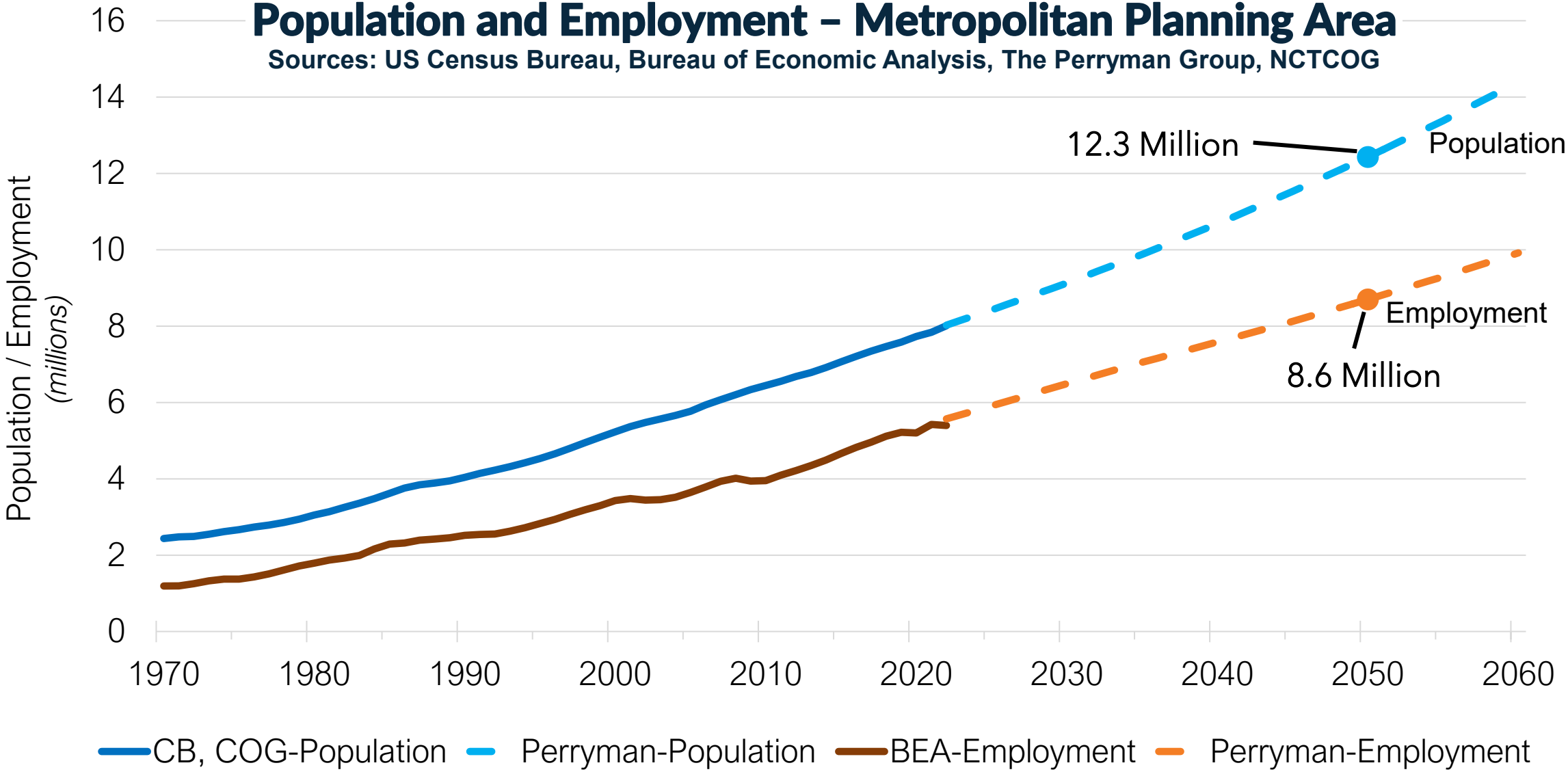
Source: US Census Bureau; County-based data between 1950 and 2020. Pre-1950, datum shifts, though still using US Census data. Presented to represent growth trends, specifically between 1910 to 1940 and 1950 to 2020.

# Dallas-Fort Worth: Historical and Projected Total Population and Employment – Metropolitan Planning Area

**Sources: US Census Bureau, Bureau of Economic Analysis, The Perryman Group, NCTCOG**

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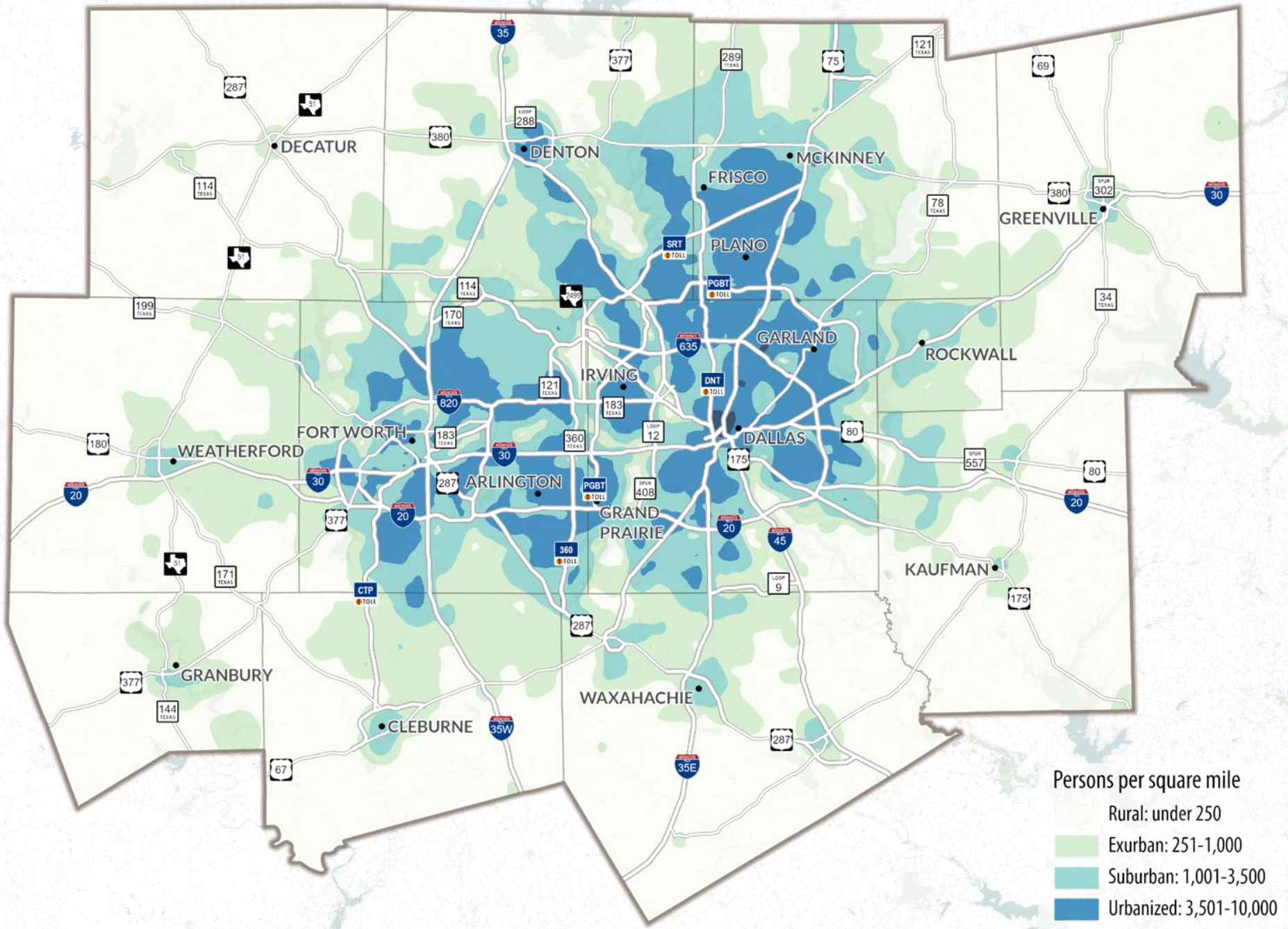
# Population Density 2026

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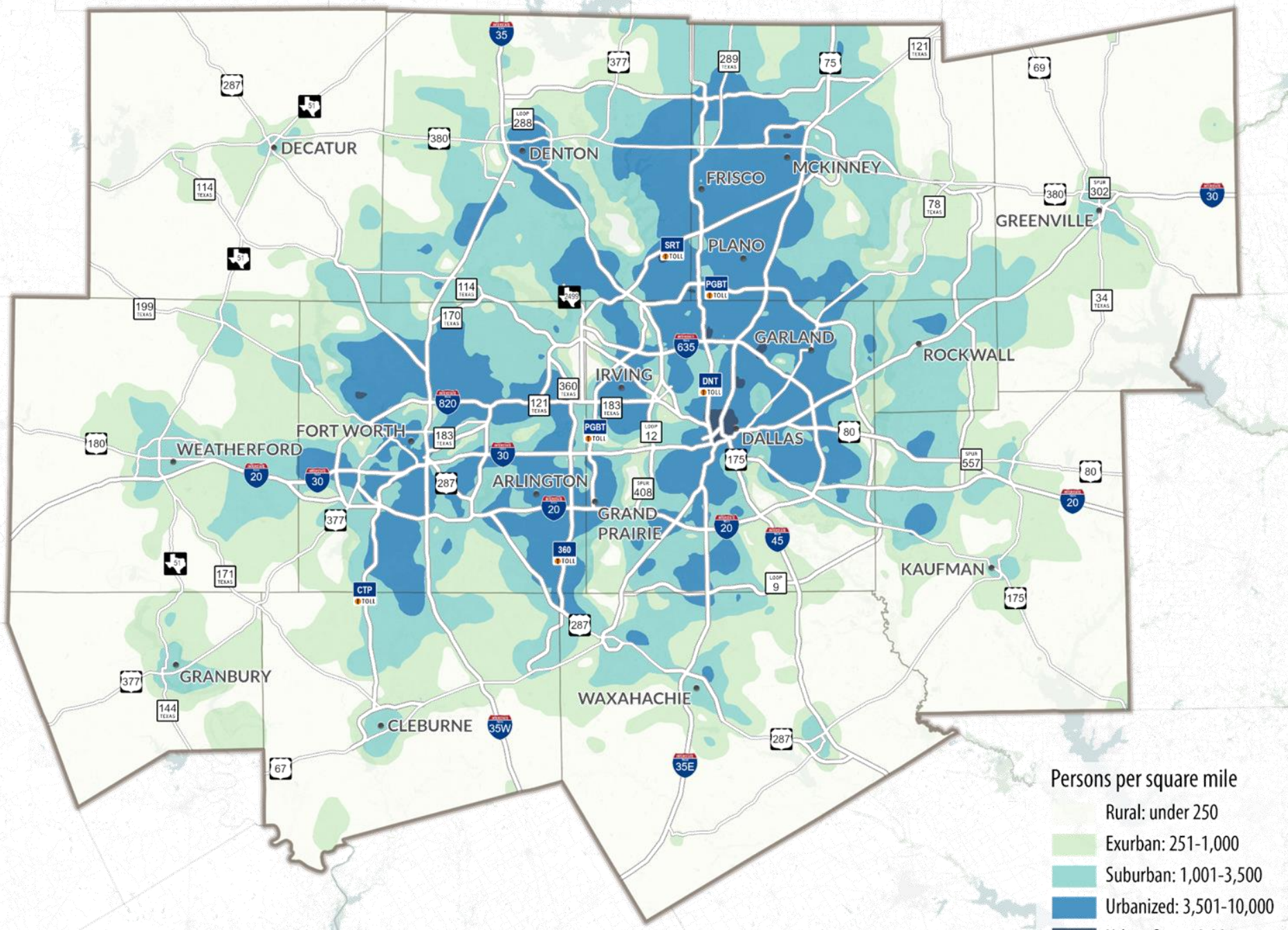
# Population Density 2050

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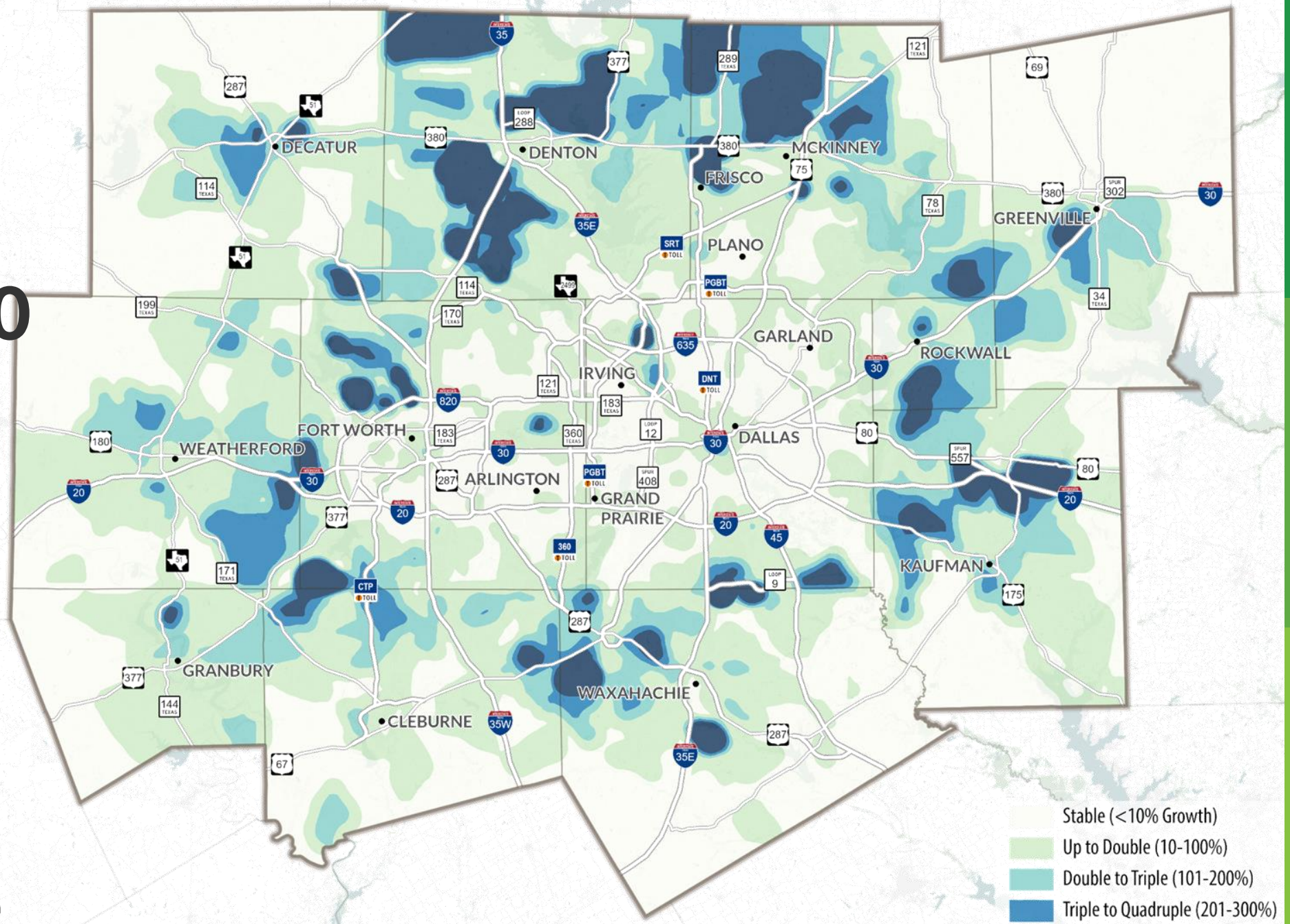
# Change in Population Density: 2026 - 2050

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# 2050 Population Forecast by County


| County | 2026 | 2050 | 2026-2050 Change | 2026-2050 Percent Change |
|---|---|---|---|---|
| Collin | 1,271,000 | 2,155,000 | 884,000 | 70% |
| Dallas | 2,728,000 | 3,071,000 | 343,000 | 13% |
| Denton | 1,104,000 | 1,878,000 | 774,000 | 70% |
| Ellis | 241,000 | 442,000 | 201,000 | 83% |
| Hood | 72,000 | 114,000 | 42,000 | 60% |
| Hunt | 119,000 | 206,000 | 87,000 | 74% |
| Johnson | 215,000 | 370,000 | 155,000 | 72% |
| Kaufman | 177,000 | 403,000 | 226,000 | 127% |
| Parker | 190,000 | 375,000 | 185,000 | 97% |
| Rockwall | 133,000 | 246,000 | 113,000 | 84% |
| Tarrant | 2,258,000 | 2,867,000 | 609,000 | 27% |
| Wise | 88,000 | 172,000 | 84,000 | 95% |
| **Total MPA** | **8,595,000** | **12,297,000** | **3,702,000** | **43%** |

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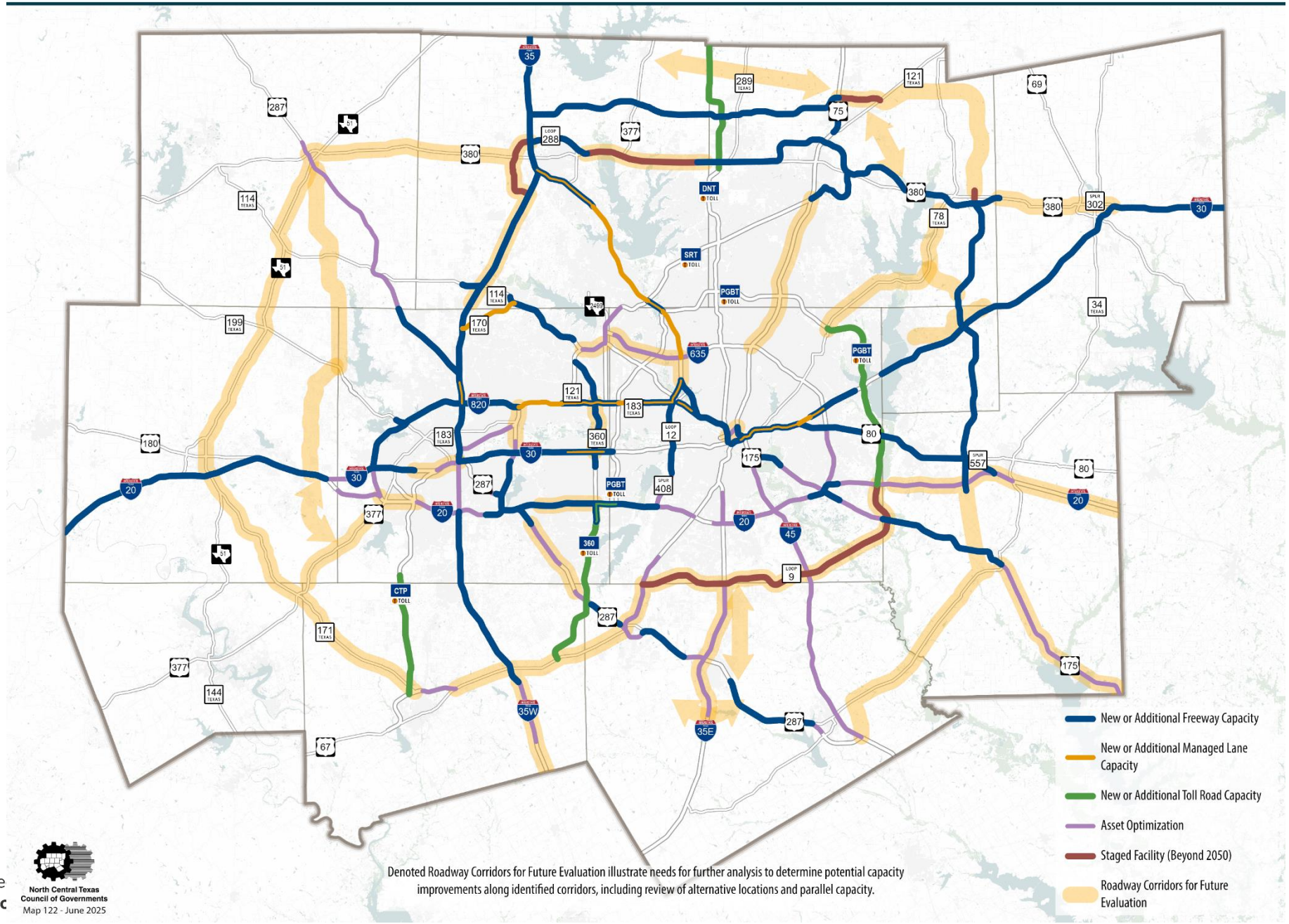
# Major Roadway Recommendations and Roadway Corridors for Future Evaluation

MOBILITY 2050




Denoted Roadway Corridors for Future Evaluation illustrate needs for further analysis to determine potential capacity improvements along identified corridors, including review of alternative locations and parallel capacity.

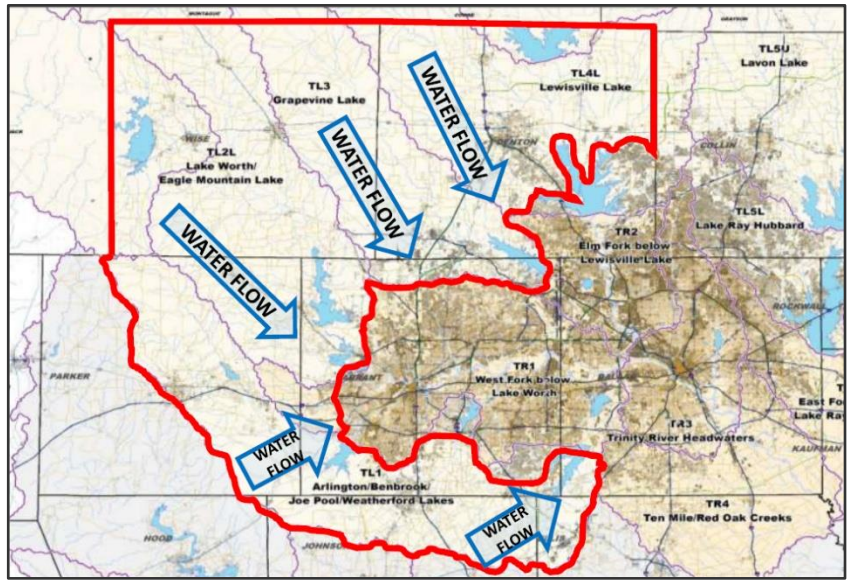
North Central Texas Council of Governments

Map 122 - June 2025

# Transportation Planning in TSI

***Goals***

- Minimize overall life-cycle costs
- Identify and address vulnerable assets
- Decrease flood risk
- Provide environmental and social benefits

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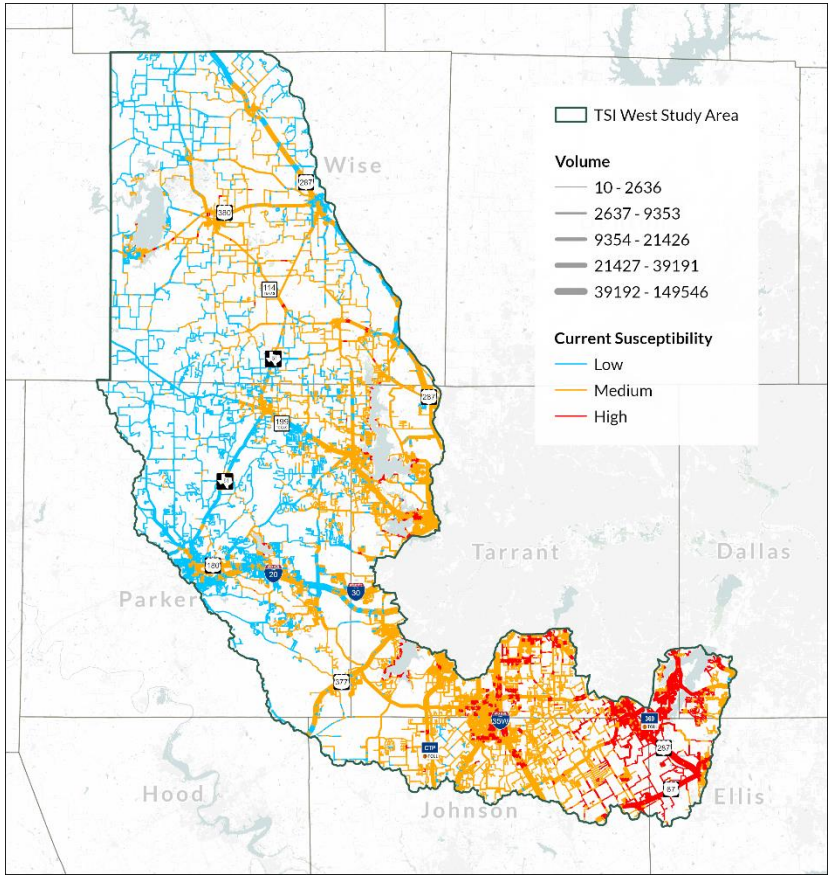
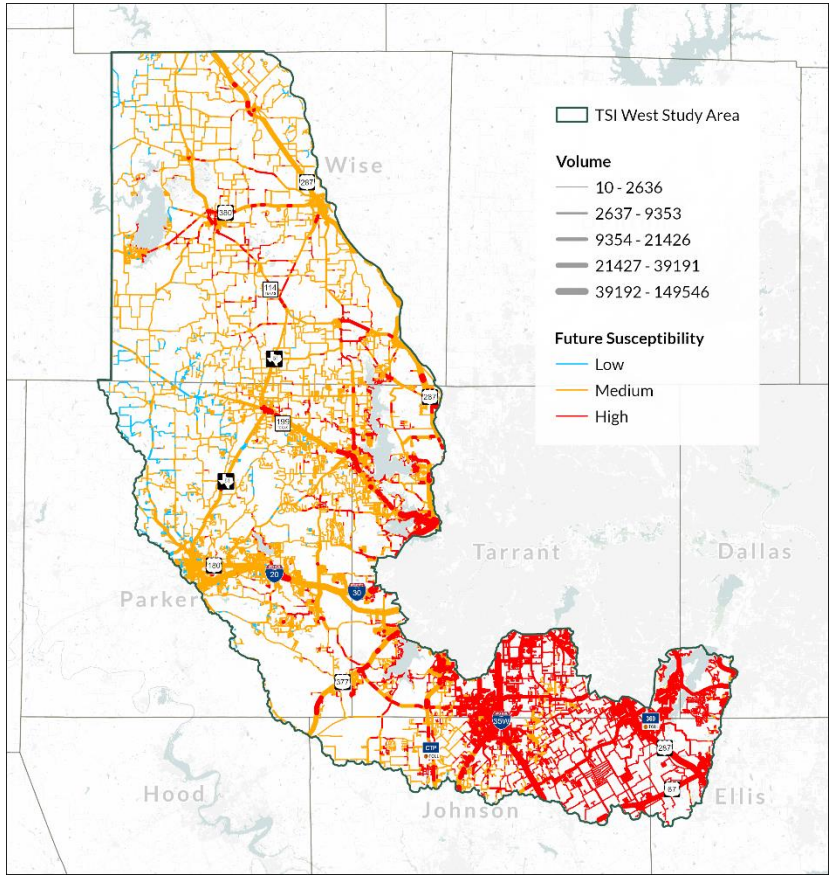
# PRELIMINARY DATA – Transportation Facilities Susceptible to Flooding

## Current Susceptibility




## Future Susceptibility

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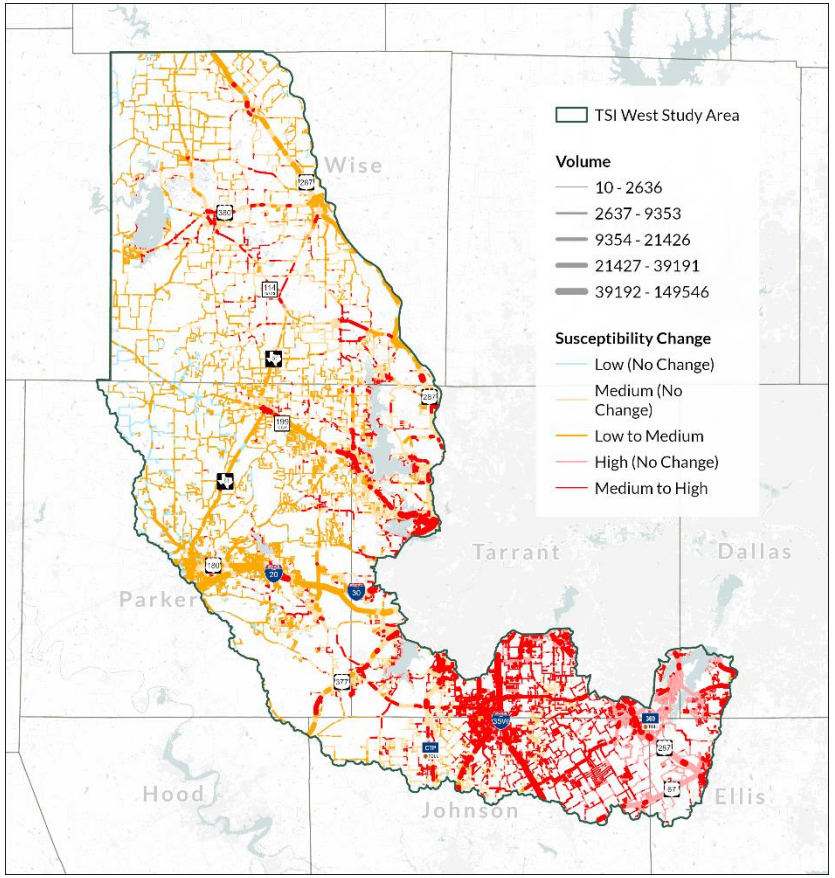
# PRELIMINARY DATA – Transportation Facilities Susceptible to Flooding

## Changes in Susceptibility




**Identify the WHERE, giving context to the WHAT in terms of mitigation strategies of most use in areas of most need…**

**Susceptibility**

**Vulnerability**

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# Questions for Broader Consideration

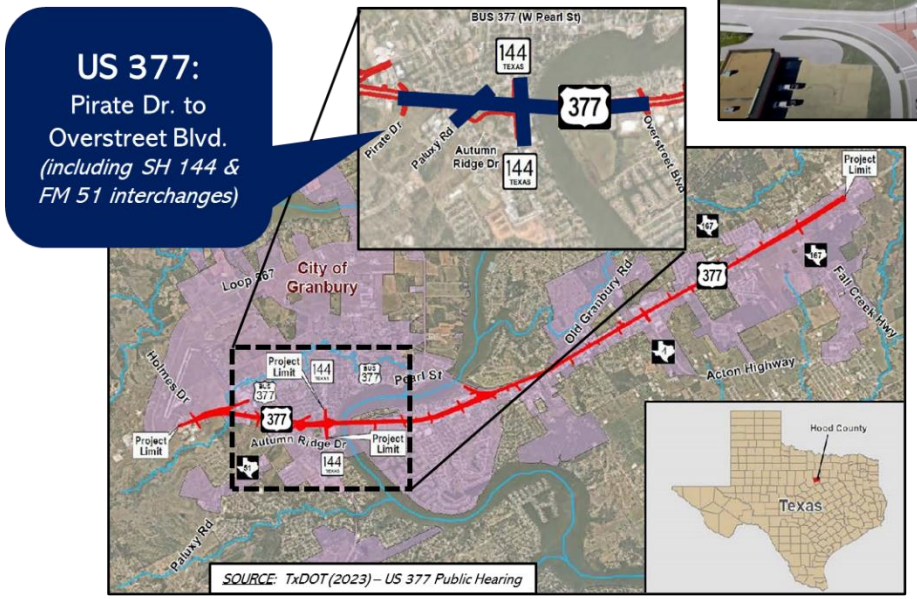
- List of roadways most vulnerable to storms?
- Which pinch points play a more significant role dictating hydraulic function of watershed?
- As areas urbanize, how can we minimize impervious surfaces that exacerbate runoff?
- County role in reviewing downstream effects of future developments?
- What do counties need to be more proactive in this space?

Silo-busting

- Discipline
- Jurisdiction
- Strategies (traditional vs. innovative)

# RESULT: More Transportation/Water Infrastructure
## Silo-Busting *(US 377 – Granbury, TX)*

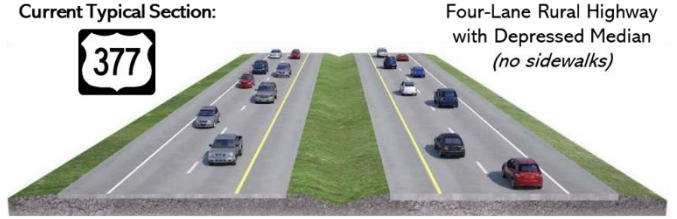
**US 377:**
Pirate Dr. to Overstreet Blvd.
*(including SH 144 & FM 51 interchanges)*





**Diverging Diamond Interchange *(DDI)***

**Current Typical Section:**




Four-Lane Rural Highway with Depressed Median *(no sidewalks)*

**Proposed Typical Section:**


Six-Lane Urban Highway with Raised Median *(buffer-separated 10' side paths)*



### Stormwater Diversion System – Heather Drive Neighborhood

- Alleviates flood risks for up to 74 properties below 100-year floodplain
- Diversion located within US 377 right-of-way (ROW) for direct path into Lake Granbury

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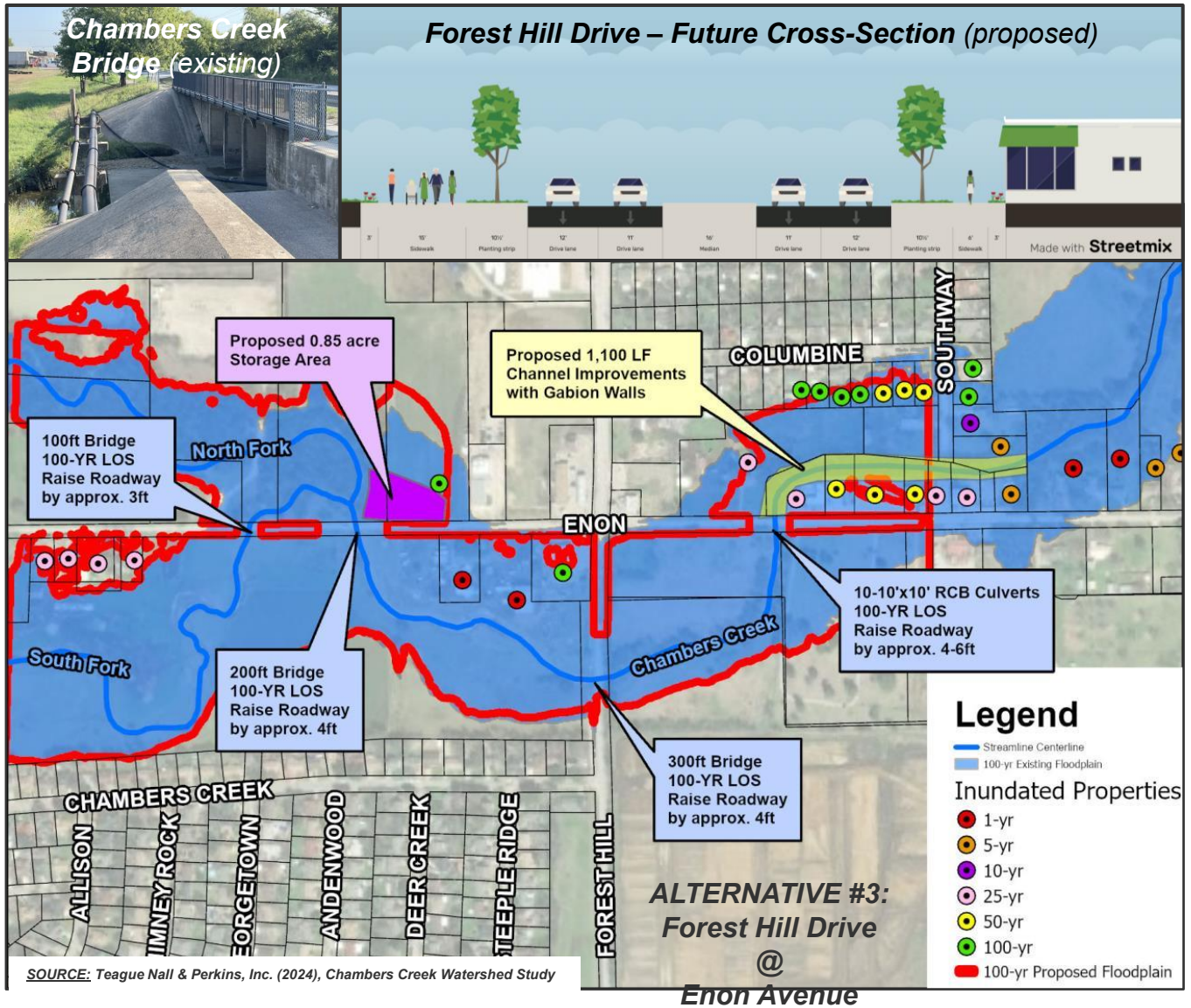
# RESULT: More Transportation/Water Infrastructure Silo-Busting (*Forest Hill Drive – Everman, TX*)

**Forest Hill Drive Study *(2023-24)* identified alignment, configuration, & capacity recommendations in Everman, Forest Hill, & Fort Worth**

- Located within larger **TSI Study** area
- Major flood events in 2015, 2018, & 2022
- Expecting substantial cost share related to integrating thoroughfare/stormwater needs
- Proximity of Chambers Creek crossings may require Enon Avenue reconstruction/raising as part of Forest Hill Drive widening
- *"Land banking"* options already considered in initial stakeholder discussions
- **TSI Study** feedback vital to identify/optimize *"land banking"* uses, locations, & policies
- Existing precedents for NCTCOG *"land banking"* in other transportation projects *(e.g., Arlington, Irving, White Settlement)*




SOURCE: Teague Nall & Perkins, Inc. (2024), Chambers Creek Watershed Study

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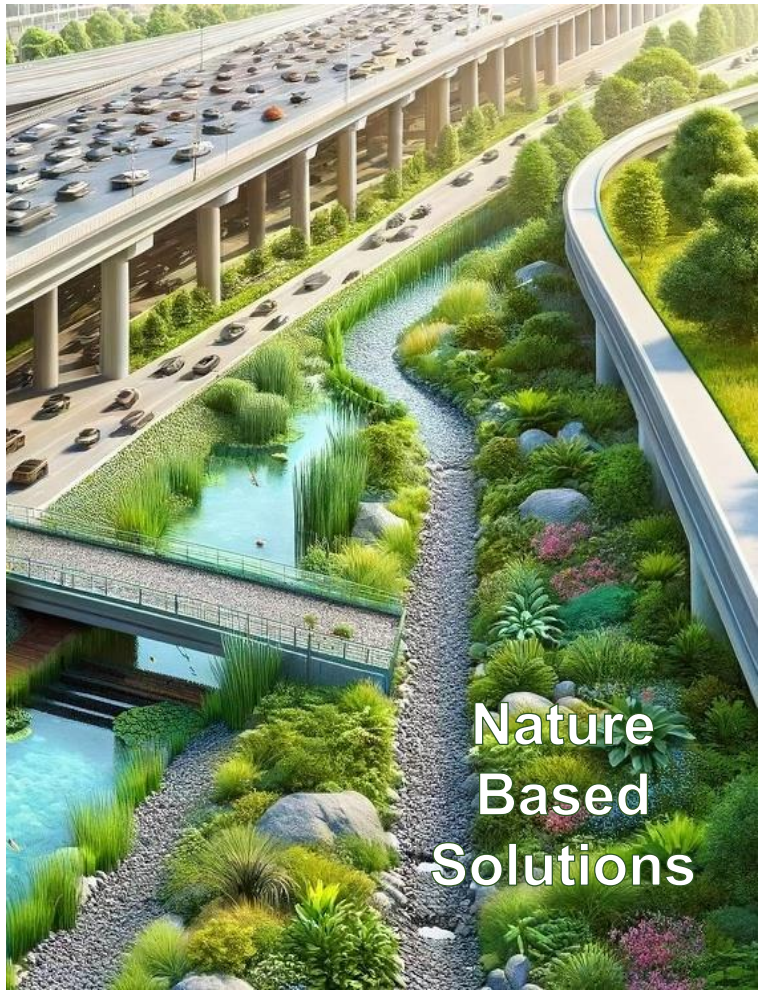
# RESULT: *Integration Options Where it Makes Sense*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# How Now Shall We Grow?


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# Contact Information


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**jneal@nctcog.org**

# I HATE CHANGE

Chad Davis, PE, CFM

Wise County

# “I have a Drainage Problem”

- *“No You Don’t…You’re Experiencing Gravity”*
  - *“IQ and Elevation tend to be proportional”*

# Encourage Low Impact Development techniques and/or green infrastructure Design Considerations

Rainfall Intensities 6 in/hr -7 in/hr vs. 9.15-9.20 in/hr

6 in/hr to 9.20 in.hr = 53% increase

Charts vs. Calculations

“Go Green vs Go Native”

# Valley storage and Mining in Wise County

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# Protecting Against Erosive Velocities

- Wise County Development Rules and Regulations;
- Max 6 ft/s AND No more than 5% increase in velocity
- Rock Filter Dams are NOT necessary in most cases, and are a maintenance problem.

Detention may be required.

Wise County Development Rules require detention for :

2-yr, 25-yr, and 100-yr flood events

# Match Pre-development site runoffs

- I HATE CHANGE
- "The Almighty had a good plan…try to stick with it'
- 0.0 change at the boundary of the development


Use simple Engineering techniques to control velocity

Slope vs Distance

- **Impacts to county infrastructure**
- **Flood Control Dams Work**

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# Impacts to the public/private property

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# Impacts to the public/private property

# Size Conveyance of street and storm systems adequately to safely convey traffic

Platted Subdivision

Not in the Zone A floodplain

At least 2 points of access for developments with 25 or more lots


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# Breach Inundation Zones

Flood Control Dam Encroachments

Easements

Renew/Refresh your easements

**Wise County Development Rules and Regulations**

**Breach Inundation studies are Required**

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# Breach Inundation

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## Floodplain

Preserve existing conditions (at the boundary of the development)

***Wise County Flood Damage Prevention Ord.***

**SECTION D. METHODS OF REDUCING FLOOD LOSSES**

In order to accomplish its purposes, this ordinance uses the following methods:

**(6) In order to preserve the existing hydraulic conditions and Base Flood Elevation, any work to be performed in the Special Flood Hazard Areas ZONE A OR ZONE AE will be required to perform a Hydrologic and Hydraulic study to determine the existing Base Flood Elevation as well as a Hydrologic and Hydraulic study for the proposed conditions. The Base Flood Elevation shall not have a difference between the existing and proposed conditions of more than 0.00 feet.**

**Zero Change…NOT Zero Rise**
**Recharge Zone for Trinity Aquifer**
**Reduces Adverse Impacts to neighbors**

## Breach Inundation

***Wise County Development Rules and Regulations***

**Section 3.07 Drainage**

H. Drainage Studies

6. **Building shall not be permitted within the breach inundation limits of a flood control structure, as determined by a breach analysis performed to evaluate a Natural Resources Conservation Service (NRCS) regulated flood control structure or a dam as defined by Texas Commission on Environmental Quality (TCEQ). If a breach analysis has not previously been performed, the Developer is responsible for providing a breach analysis as defined by TCEQ and in accordance with Wise Soil and Water Conservation District No. 548 requirements. Documentation of approval by Wise Soil and Water Conservation District No. 548 must be provided, prior to submittal to the County. A breach analysis must be signed and sealed by a Licensed Engineer in the State of Texas.**

I. **Building shall not be permitted within the breach inundation limits of a flood control structure, as determined by a breach analysis performed to evaluate a Natural Resources Conservation Service (NRCS) regulated flood control structure or a dam as defined by Texas Commission on Environmental Quality (TCEQ). If a breach analysis has not previously been performed, the Developer is responsible for providing a breach analysis as defined by TCEQ and in accordance with Wise Soil and Water Conservation District No. 548 requirements. Documentation of approval by Wise Soil and Water Conservation District No. 548 must be provided, prior to submittal to the County. A breach analysis must be signed and sealed by a Licensed Engineer in the State of Texas.**

# Consider regional (on or off stream) detention incentives

I. Detention Rates
Should the result of a downstream assessment and/or reasonable Standard of Care determine that on-site detention will be required, specific detention criteria will be determined on a case-by-case basis by the County Engineer. Detention criteria will be dependent upon the significance of downstream impacts. Runoff rates for all land uses shall be limited to the rates that would be produced from pre-developed conditions single family residential areas.

Amended February 10, 2025
Detention/retention facilities shall be designed for the 2-year, 25-year and 100-year design
flood storm events and may be subject to the following criteria:

# HEAVY RAIN WASHES OUT DAM AT EAST TEXAS LAKE

Wise County Development Rules and Regulations
https://www.co.wise.tx.us/DocumentCenter/View/409/Development-Rules-and-Regulations-PDF

Wise County Flood Damage Prevention Ordinance
https://www.co.wise.tx.us/DocumentCenter/View/414/Flood-Damage-Prevention-Ordinance-PDF

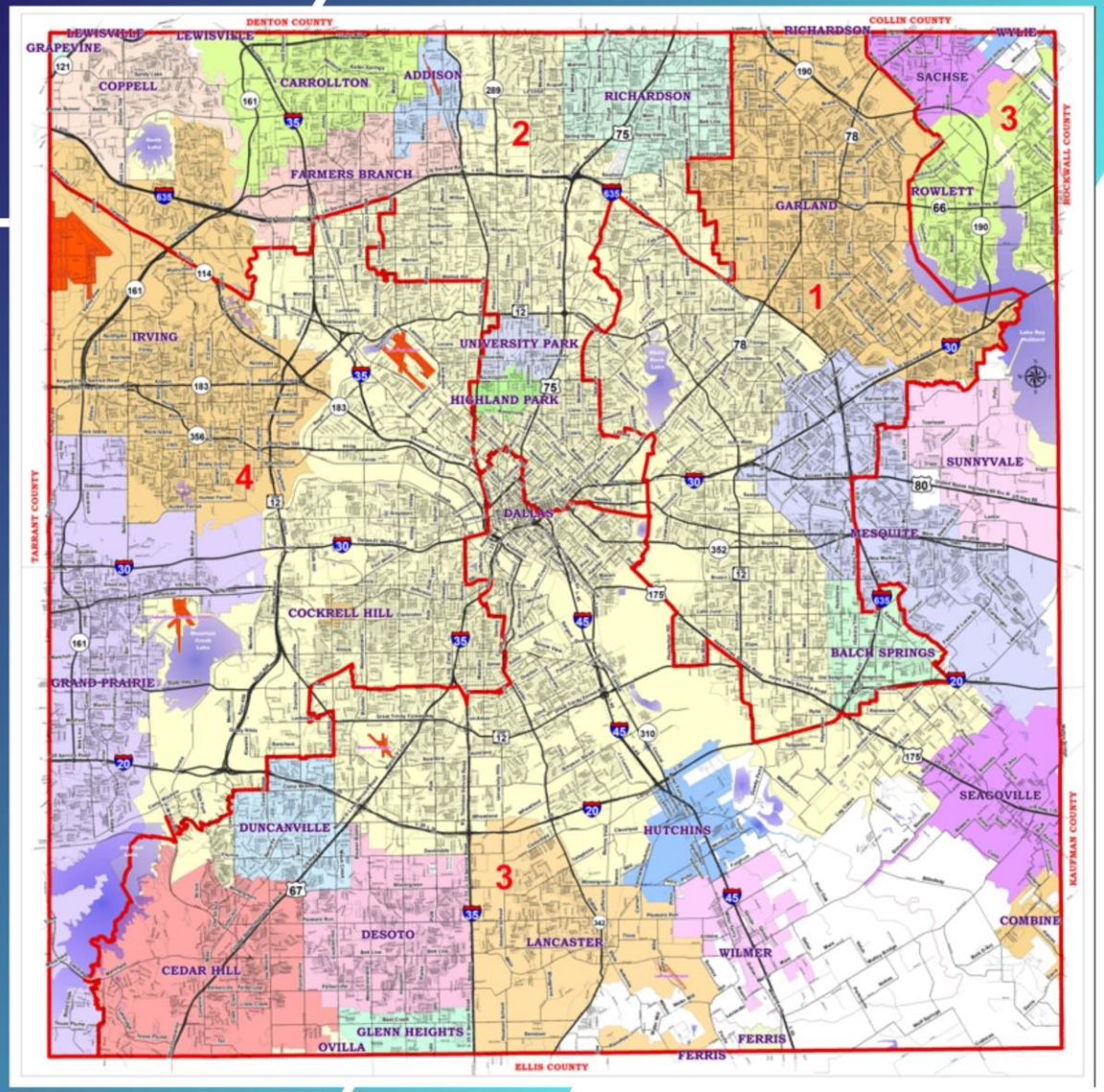
# How Dallas County uses Higher Stormwater and Floodplain Management Standards

Lissa Shepard, PE, CFM

Dallas County

Thursday July 31, 2025

# How Dallas County uses Higher Stormwater & Floodplain Management Standards




# DALLAS COUNTY
## COMMISSIONER COURT

**County Judge**
Judge Clay Jenkins

**Commissioner District 1**
Dr. Theresa Daniel

**Commissioner District 2**
Andy Sommerman

**Commissioner District 3**
John Wiley Price

**Commissioner District 4**
Dr. Elba Garcia

MISSION • VISION • VALUES

# DALLAS COUNTY

## Mission

Deliver exceptional services that promote a thriving community

## Vision

Improving people's lives

## Values

- Professionalism
- Customer Focus
- Diversity & Inclusion

# DALLAS COUNTY PUBLIC WORKS

## MISSION • VISION • VALUES

To improve the quality of life of our customers-- the citizens, taxpayers, transportation users, communities, and internal County partners -- by effectively planning, developing, implementing and administering approved regional transportation projects, supporting maintenance of countywide roads and bridges, and providing real property management services.

To be a recognized leader in regional transportation planning and coordination, an effective agent and valued partner for our cities, and a vital part of Dallas County government.

To be Respected, Responsive & Reliable in all our relationships.

# Counties in Texas

- Duties of County Governments include
  - Managing courts and jails
  - Operating sheriff's offices
  - Administering elections
  - Public records
  - Maintaining county roads and bridges
- Governed By Commissioners Court
  - County judge elected at large
  - Four commissioners elected from individual precincts or districts

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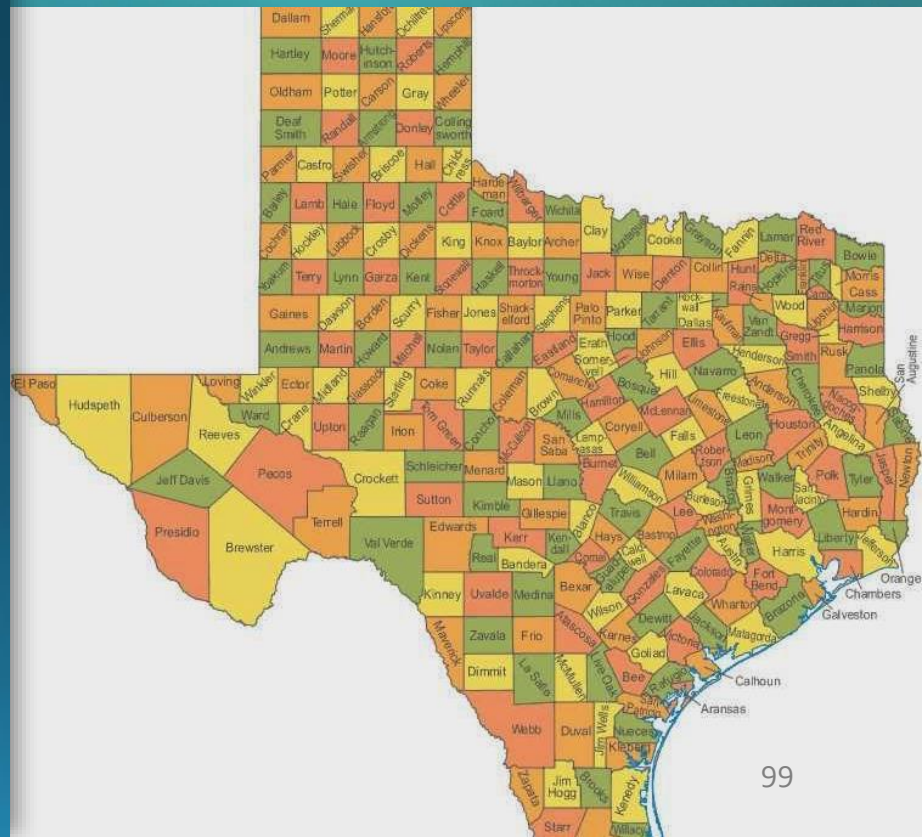

# Counties in Texas

- Additional officials such as sheriffs, clerks, tax assessor-collectors, and attorneys are also elected by county voters.
- To fund operations, counties rely primarily on property taxes, supplemented by fees, fines, and grants from state and federal sources.
- **Despite their local focus, counties have no inherent sovereignty—they are legal extensions of the state and may exercise only those powers specifically granted by law. (That's why legislative sessions are so important to County Governments)**

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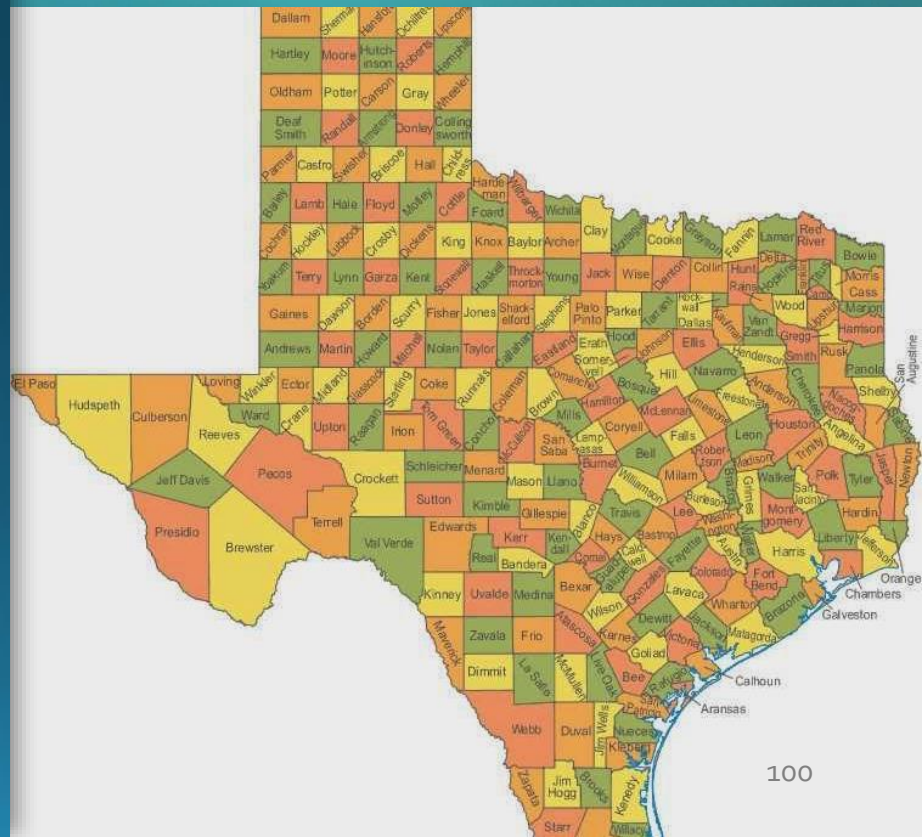


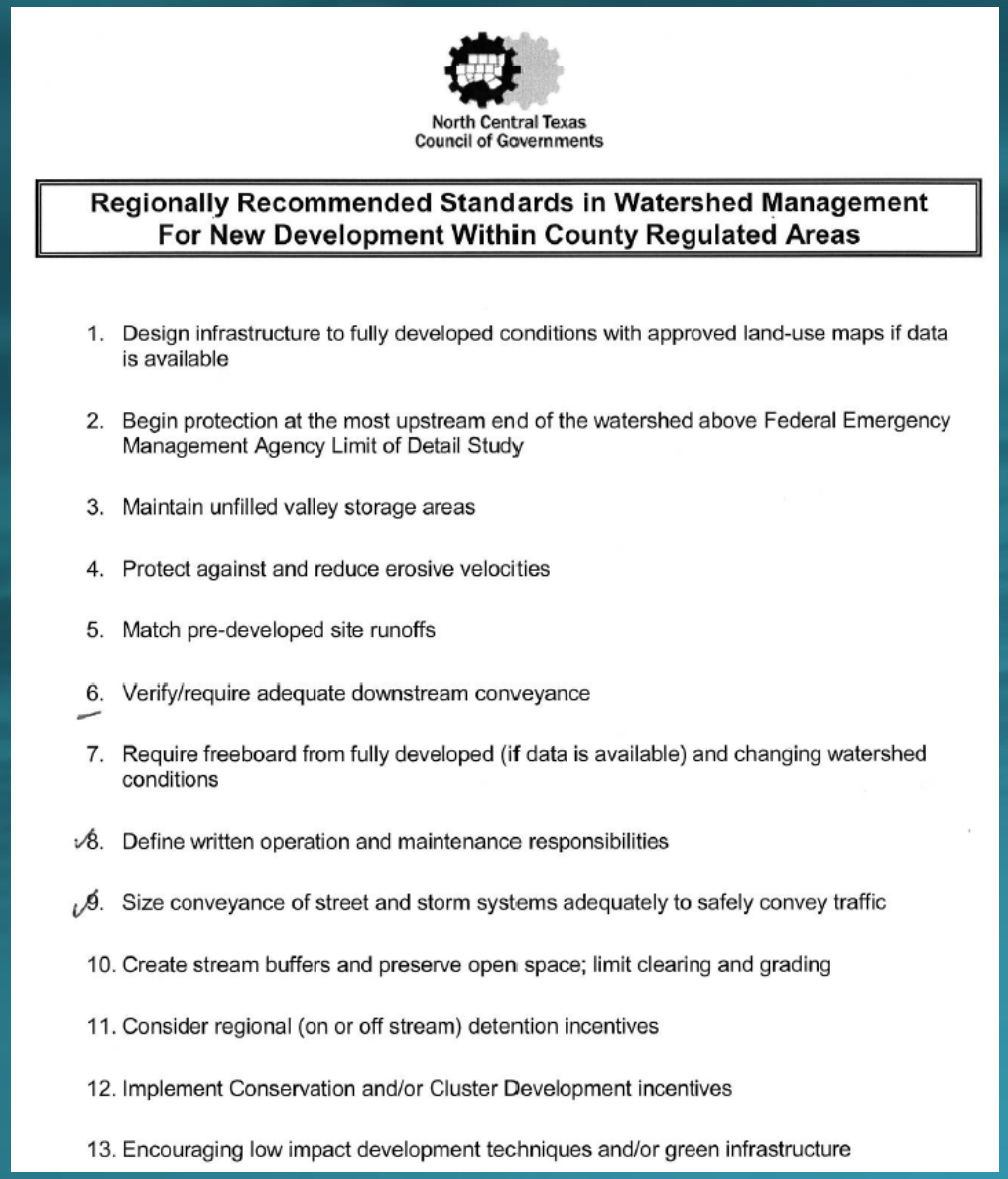
# County Governments

- Limited Authority
- Controlled by the Texas Legislature
- Have Regulations (vs. Ordinances)
- In Texas, County governments have authority over development in unincorporated areas

# Legislative Authority

- Texas Water Code
- Local Government Code
- Texas Transportation Code
- Texas Administrative Code

# NCTCOG Regionally Recommended Standards



North Central Texas
Council of Governments

**Regionally Recommended Standards in Watershed Management For New Development Within County Regulated Areas**

1. Design infrastructure to fully developed conditions with approved land-use maps if data is available
2. Begin protection at the most upstream end of the watershed above Federal Emergency Management Agency Limit of Detail Study
3. Maintain unfilled valley storage areas
4. Protect against and reduce erosive velocities
5. Match pre-developed site runoffs
6. Verify/require adequate downstream conveyance
7. Require freeboard from fully developed (if data is available) and changing watershed conditions
8. Define written operation and maintenance responsibilities
9. Size conveyance of street and storm systems adequately to safely convey traffic
10. Create stream buffers and preserve open space; limit clearing and grading
11. Consider regional (on or off stream) detention incentives
12. Implement Conservation and/or Cluster Development incentives
13. Encouraging low impact development techniques and/or green infrastructure

- Developed at a County Regional Watershed Roundtable meeting March 2017
- Dallas County adopted these Regional Standards through Court Order
- Dallas County incorporated these changes to the Floodplain Regulations later in 2019

# NCTCOG Regionally Recommended Standards

Added #4 – Protect against & Reduce Erosive Velocities
Added #5 – Match Pre-developed site run-offs
Added #7 – Freeboard of 2' & For Fully Developed Flows
Added #8 – Define Written Operation and Maintenance Responsibilities
Added #9 – Size Conveyance of street and storm systems adequately to safely convey traffic.
Already Doing #10 - Create Stream Buffers and Preserve Open Space

# Subdivision Regulations

**SECTION J. DRAINAGE STANDARDS**

1. The integrated Storm water Management (iSWM) program developed by the North Central Texas Council of Governments (NCTCOG) shall be used to develop properties within the unincorporated limits of Dallas County, Texas. However, the incentives, or credits referenced in the manual do not apply.

2. Drainage is to be designed by a Texas Professional Engineer. Drainage calculations shall be based on 100 year design for all roadways and bridges (bridges shall have 2' of freeboard) and the assumption that all property in the watershed is fully developed.

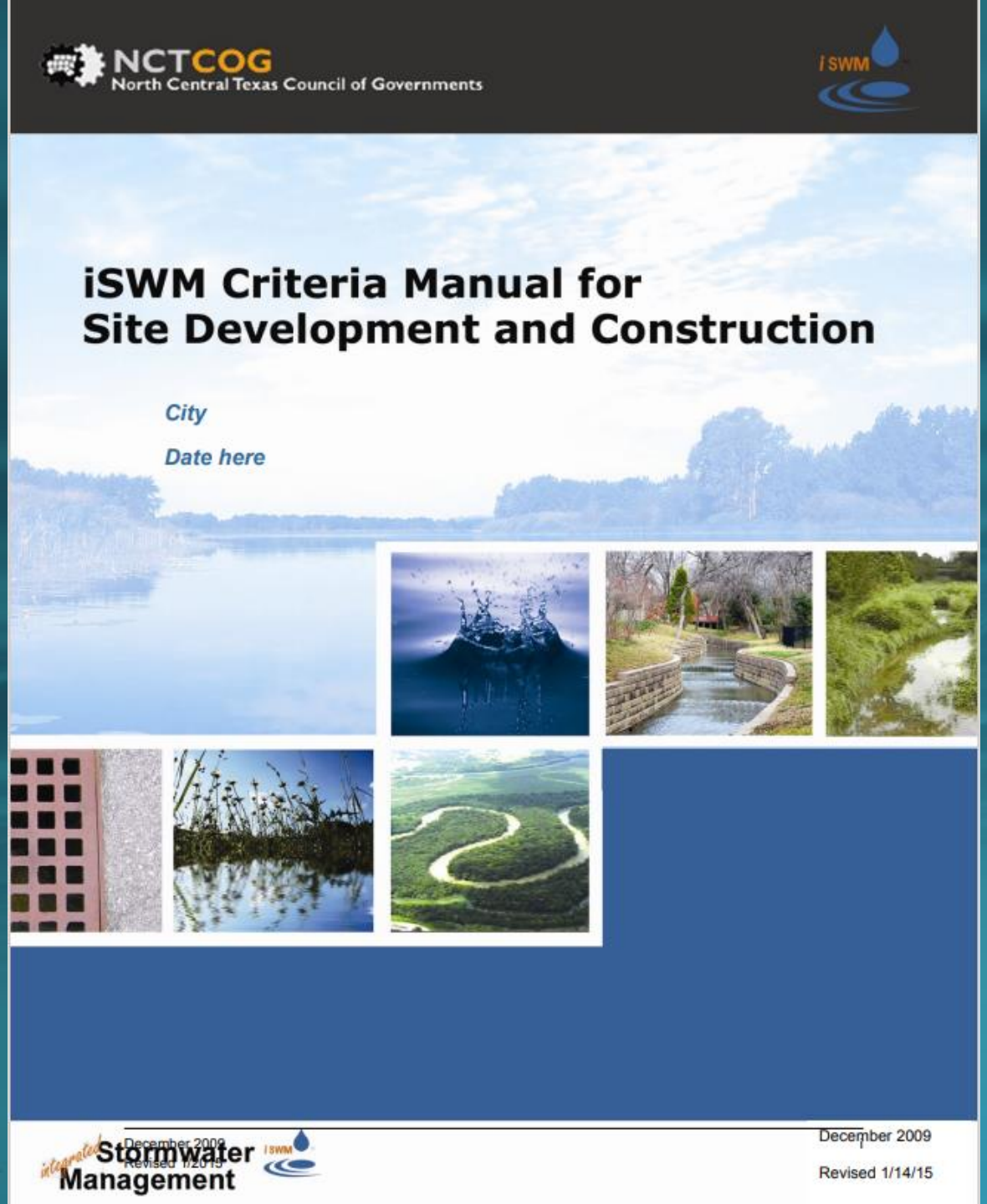
3. Chapters 1 through 5 of the iSWM Criteria Manual for Site Development and Construction should be used for the planning and design of storm water management facilities for residential subdivisions and internal residential streets within Dallas County. This manual can be found on the NCTCOG website.

4. Any reduction in floodplain storage or conveyance capacity must be offset with a hydraulically equivalent (one to one) volume of mitigation sufficient to offset the reduction. The reduction may result from development or the placement of fill within the floodplain.

5. Any placement of fill within FEMA-designated floodplain areas shall meet Dallas County Flood Regulations and state and federal regulations. The owner or developer of tract of land located in these areas shall supply sufficient hydrological/hydraulic data suitable to determine flood plain and flood way limits and to determine base flood elevations. Improvements that extend into the floodway must be adequately sized to insure that no encroachments will occur in the floodway.

6. The Developer shall provide copies of all permits required by TxDOT, TCEQ, EPA, USACE or any other governmental entity with jurisdiction of the real property or adjacent roads, streets or highways. Surface drainage from private property shall be taken to roads, streets, or drainage courses as directly as possible. Drainage water from roads and streets shall be taken to defined drainage courses as directly as possible. Roads and streets shall not be used as major drainage courses. All road and street drainage structures shall be complete within twenty-four months from the date of Plat approval, unless an extension of time is granted by the Director.

- Section I – Stormwater Pollution Prevention Plan
- Section J – Drainage Standards




# Drainage Standards (within Subdivision Regulations)

- Use iSWM Criteria Manual
- Added Fully Developed Flows & Freeboard
- Added Valley Storage Offset

# Dallas County Floodplain Regulations

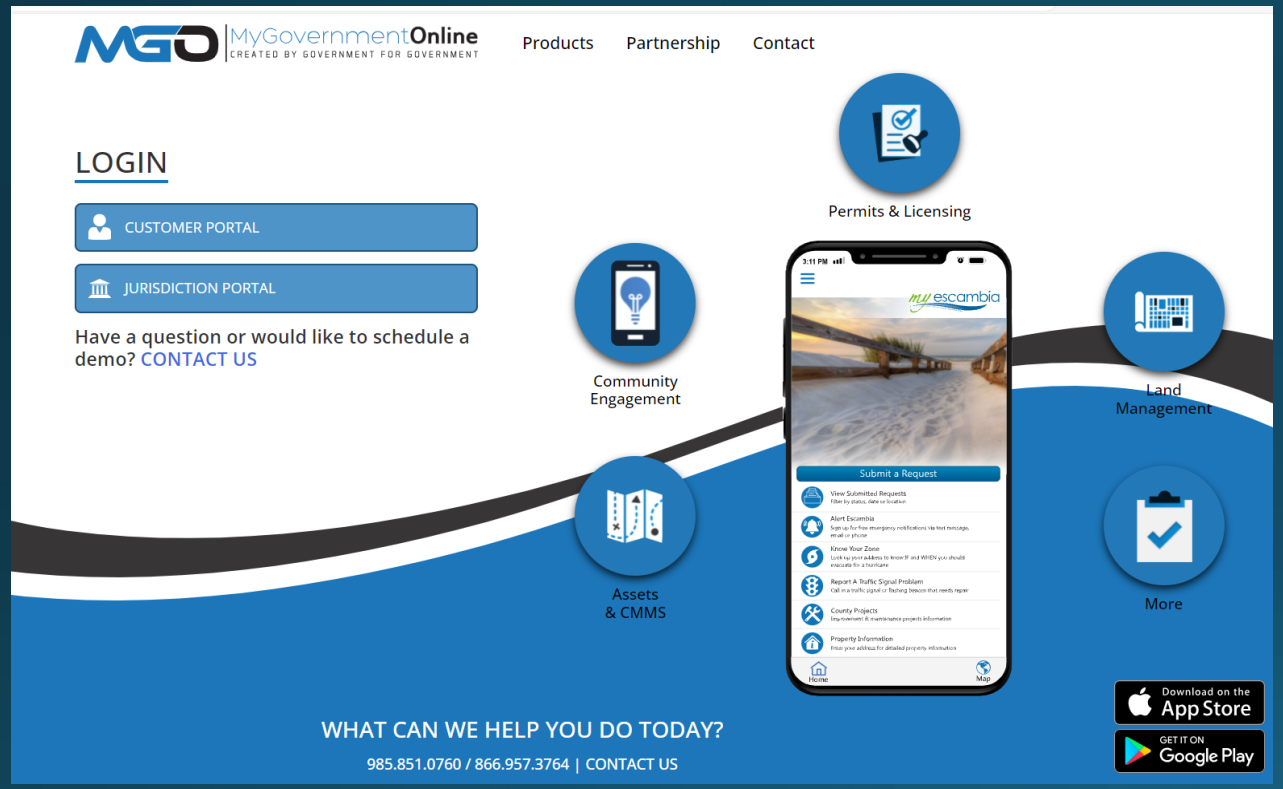
- Addition of Trinity Common Vision Program (CDC) to Dallas County Floodplain Regulations

*Dallas County is a regional partner in the CDC. This has been verified by past Court Orders (89-283, 94-176, 2004-1698, 2013-0506). However, it is not specifically included in the Floodplain Management Regulations. The CDC employs higher floodplain management standards with regard to erosion, valley storage, and fully-developed future flows within the Trinity River Floodplain and the East Fork of the Trinity River Floodplain.*

- *Defined Stop Work Orders & Enforcement for Floodplain Violations*

# DCPW Permit Review Process Team

## My Government Online Portal – permit software platform:

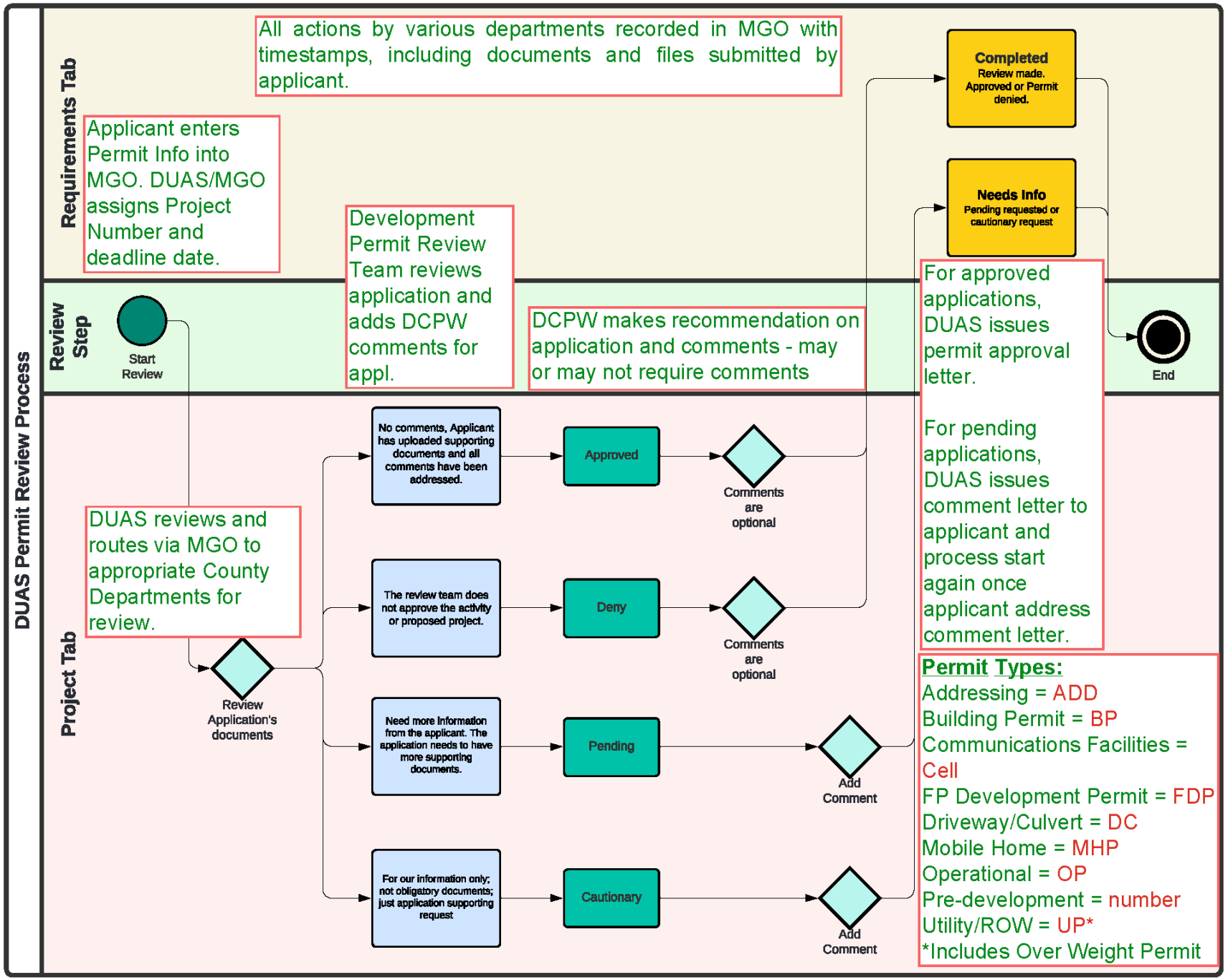



## Development Permit Review Team :

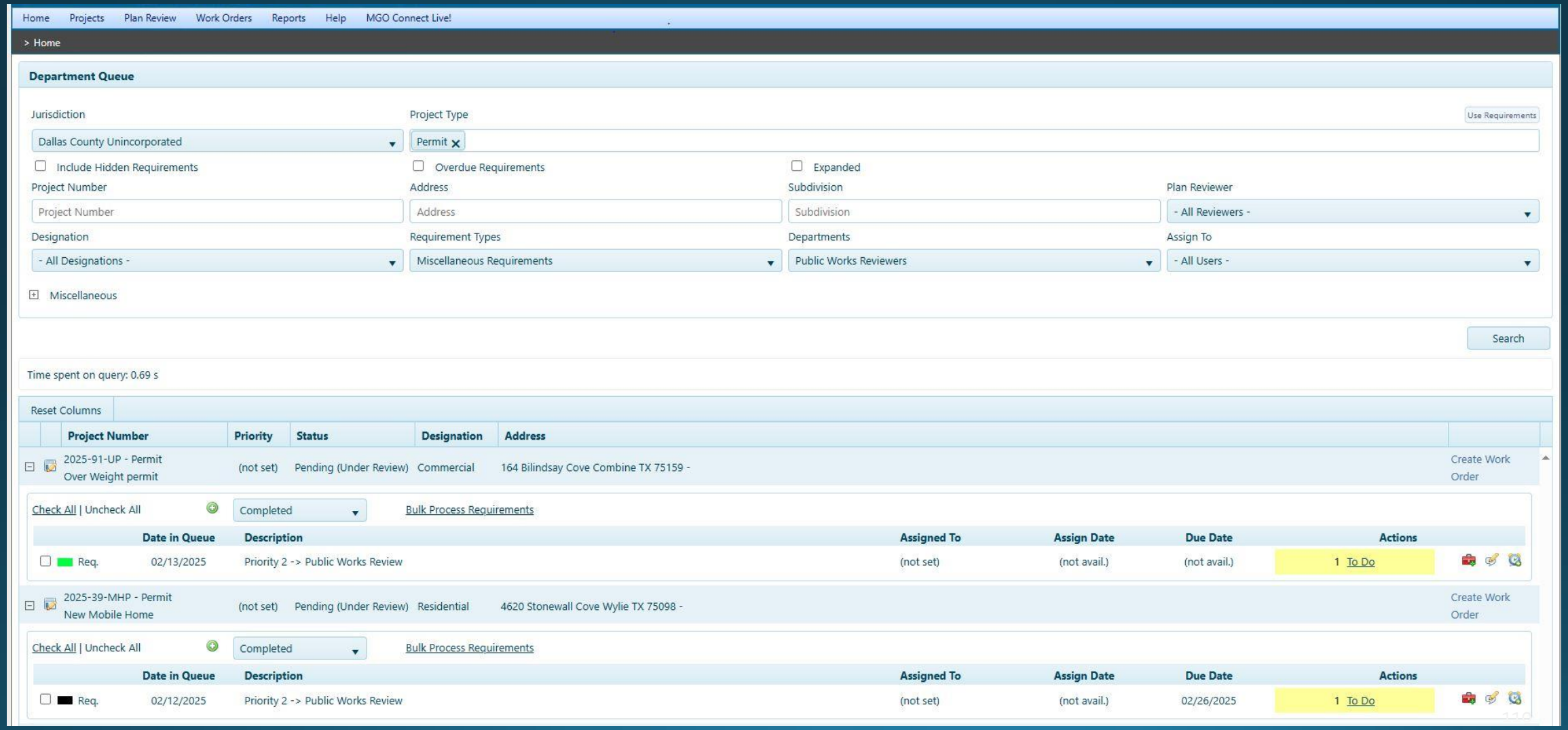
At Dallas County, permitting is channeled through the Department of Unincorporated Area Services (DUAS)
Permits are received through MGO and are sent to all county departments for review:

- Fire Marshal
- Road & Bridge
- Health & Human Services
- Public Works

# DUAS Permit Review Process Flow Chart



# DCPW Review Portal in MGO



# Permitting

- Checklist

**Development Permit**

Templates

Items needed for Permit Application Review by Public Works Dept.

Plan Sheets needed

- ☐ Cover Sheet
- ☐ Site Plan
- ☐ Erosion Control Plan
- ☐ Grading Plan
- ☐ Existing Drainage Area Map
- ☐ Proposed Drainage Area Plans and Map
- ☐ Water & Sewer Plan
- ☐ Paving Plan
- ☐ Traffic Control Plan
- ☐ Standard Construction Details

Site Plan (sealed by a PE licensed in Texas)

- ☐ Show Ingress/Egress
- ☐ Show adjacent Roadways
- ☐ Show lot dimensions
- ☐ Show existing drainage structures/facilities
- ☐ Show existing utilities
- ☐ Show proposed utilities
- ☐ Show ROW widths
- ☐ Drainage Flow Arrows on adjacent roadways
- ☐ Show dimensions of the driveway
- ☐ Drainage Amount of Stormwater coming from site
- ☐ Drainage – Amount of Stormwater prior to development
- ☐ Existing & Proposed Drainage Area Maps
- ☐ Excess stormwater generated by development shall be detained
- ☐ Detention Pond needs to be in an easement.
- ☐ Drainage Easements need to be identified on a plat or by separate instrument.
- ☐ Detention Pond needs to have a maintenance plan and agreement is filed at Dallas County and is maintained on the site and that describes the following:
  a. Identifies Responsible Parties
  b. Identifies required maintenance activities
  c. Identifies the frequency of inspections
- ☐ Calculate capacity of adjacent roadway drainage structures (ditches) & other drainage structures
- ☐ Provide calculations for the detention ponds
- ☐ North Arrow
- ☐ Scale labeled
- ☐ Provide Legend
- ☐ Provide Building Setback Lines

# Detention Pond Maintenance Plan

## Detention Pond Inspection & Maintenance Plan

**SITE LOCATION:**

_____

_____

**DETENTION POND INFORMATION**

Detention ponds are designed to settle out sediment and associated pollutants to improve water quality. Detention ponds also provide rate and flood control before discharging into a receiving waterway's storm drain system.

**DETENTION POND INSPECTION/MAINTENANCE**

*The [CURRENT OWNER] or their designee is responsible for completing inspections and conducting maintenance. Such as:*

1. **Vegetation:** The pond areas have a ground cover of grass, which if properly maintained will prevent erosion of the embankment and provide an easy surface for inspection.
2. **Re-Seeding:** Periodic re-seeding may be required to establish grass on areas where seed did not take or have been destroyed. Before seeding, fertilizer (12-12-12) should be applied at a minimum rate of 12 to 15 pounds per 1,000 SF. The seed should be evenly sown at a rate of three pounds per 1,000 SF. The seed should be covered with soil to a depth of approximately ¼". Immediately following the planting, the area should be mulched with straw.
3. **Trees and Shrubs:** Trees and shrubs are not permitted to be established in the detention pond or drainage channels leading to and from the pond. Grass shall be maintained and kept healthy and vibrant. This is for vegetation planted to buffer the dry pond.
4. **Mowing:** Grass mowing, brush cutting and removal of weed vegetation will be necessary to properly maintain the areas. All area slopes and vegetation should be mowed when the grass exceeds 8" in height. Acceptable methods include the use of weed whips or power brush cutters and mowers.
5. **Erosion:** Erosion occurs when the water concentrates causing failure of the vegetation or when vegetation dies and sets up the environment for rill erosion and eventually gullies from the stormwater runoff. The areas should be inspected. Proper care of vegetative areas that develop erosion is required to prevent more serious damage to the site. Rills and gullies should be filled with suitable soil compacted and then seeded. Methods described earlier on vegetation should be used to properly establish the grass surface. Where eroded areas are detected, the cause of the

# APWA Accreditation

American Public Works Association Accredits agencies who follow recommended practices for Public Works

Benefits of APWA Accreditation

- Established agency-wide culture of continuous improvement
- Improved operational performance
- Team building and staff development
- Succession planning/institutional knowledge retention
- Central location for documentation and SOPs
- Increased efficiencies/reduced duplication and wasted resources
- Improved communication
- Justification for budget requests
- Lowering of insurance premiums
- Reduced liability

# APWA Accreditation

American Public Works Association Accredits agencies who follow recommended practices for Public Works

- Document Practices in 40 Key Areas
- Everything from Program Management to Beach Management
- Since we are a County government, many items did not apply (about 15 areas)

# APWA Accreditation

- ✓ Public Works was officially accredited in October 2022. Culminating a multi-year process and extensive review by public works officials from throughout the state and Country.
- ✓ Dallas County is the first out of all Texas Counties to receive this prestigious designation.
- ✓ Commissioner Court presented the award on December 20, 2022.
- ✓ The APWA program will serve as an organizational and orientation tool for the department into the future.
- ✓ The APWA review team scored Dallas County Public Works "Fully Compliant" on all our submitted practices (25 out of 40) and designated three practices as "Model Practices" for consideration by all APWA members.
- ✓ It is an ongoing effort; recertification will be coming up in December 2026

## MODEL PRACTICES

★★★★★ ***Finance/Establishing Selection Criteria***

*This program is very clear, and the selection criteria are outlined and understandable to partner agencies.*

★★★★★ ***Utility Coordination/Long-Range Utility Planning***

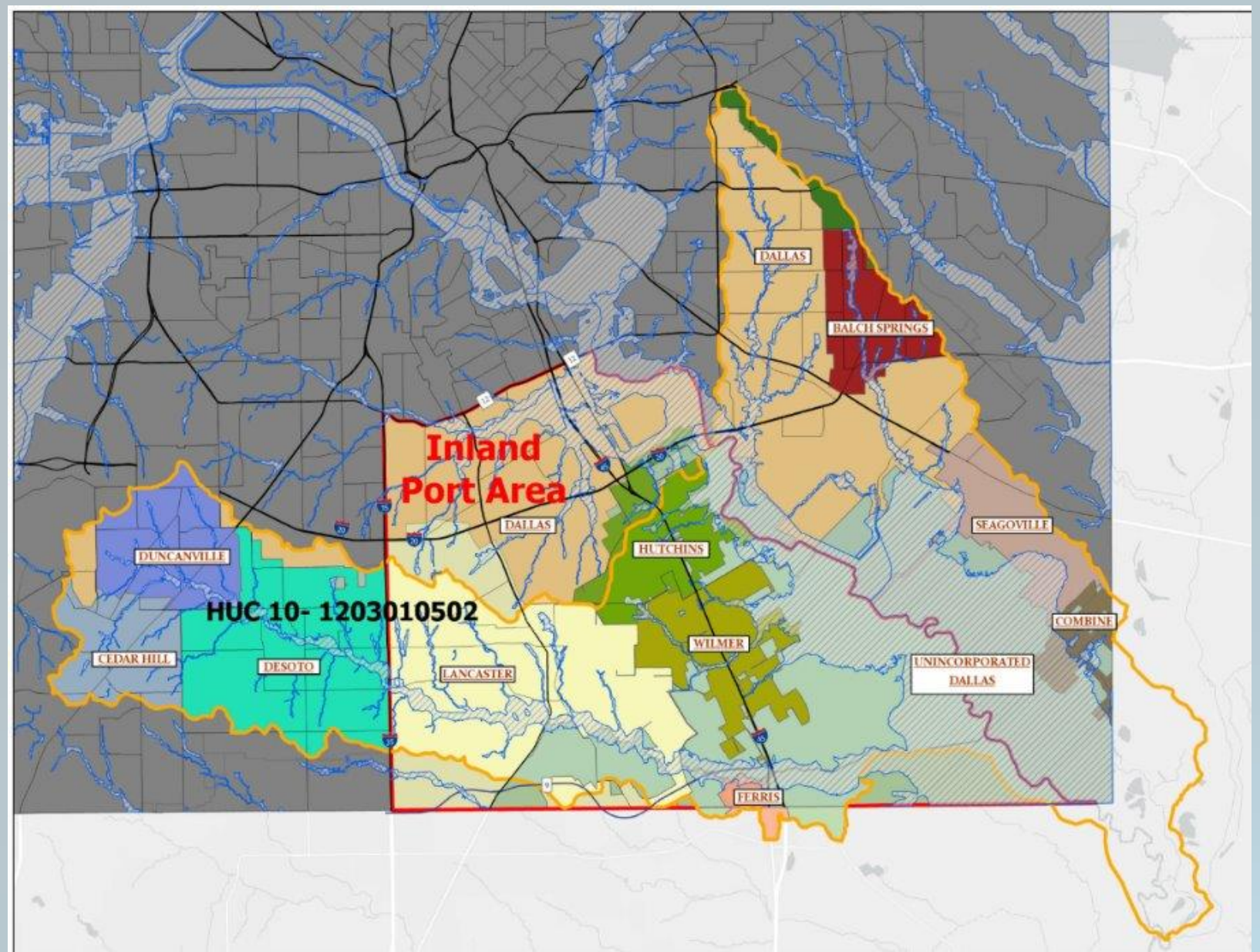
*The Project Management Practices Manual: 5 Phase Project Delivery System is a great example illustrating all the various phases of construction management all in one document.*

★★★★★ ***Bridges/Inspection Frequency***

*The documentation on this one is great.*


Accredited Public Works Agency

# DALLAS COUNTY INLAND PORT FLOOD PLANNING STUDY




## PROJECT SCOPE

- **H&H study of the overall HUC-10 area including:**
- Ten Mile Creek,
- Cottonwood Creek,
- Rawlins Creek
- **Hydraulic (stormwater) study of the Inland Port area –Trunk Lines**
  - Tasks:
  - Floodrisk Mapping
  - Review of design criteria
- Identify Potential projects

Funding:

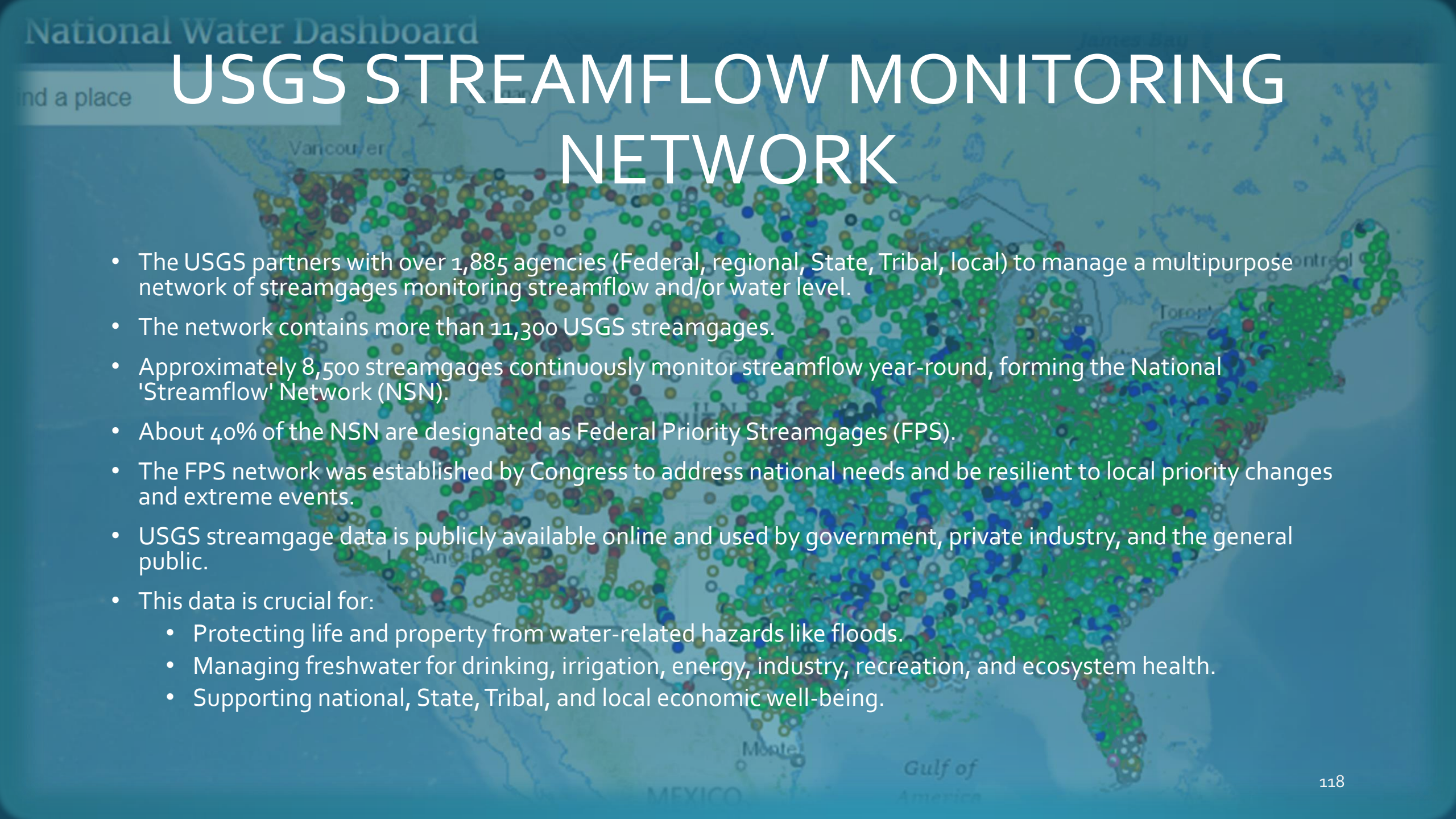
$1.81 Million – Dallas County

$5.34 Million - TWDB

# WHAT'S NEXT

- Final Study in review by TWDB
- Provide final study to all the cities for their use for new infrastructure & proposed developments
- Nine Projects will be added to the 2028 Texas State Flood Plan and will be eligible for future grant funding.

# USGS STREAMFLOW MONITORING NETWORK




- The USGS partners with over 1,885 agencies (Federal, regional, State, Tribal, local) to manage a multipurpose network of streamgages monitoring streamflow and/or water level.
- The network contains more than 11,300 USGS streamgages.
- Approximately 8,500 streamgages continuously monitor streamflow year-round, forming the National 'Streamflow' Network (NSN).
- About 40% of the NSN are designated as Federal Priority Streamgages (FPS).
- The FPS network was established by Congress to address national needs and be resilient to local priority changes and extreme events.
- USGS streamgage data is publicly available online and used by government, private industry, and the general public.
- This data is crucial for:
  - Protecting life and property from water-related hazards like floods.
  - Managing freshwater for drinking, irrigation, energy, industry, recreation, and ecosystem health.
  - Supporting national, State, Tribal, and local economic well-being.

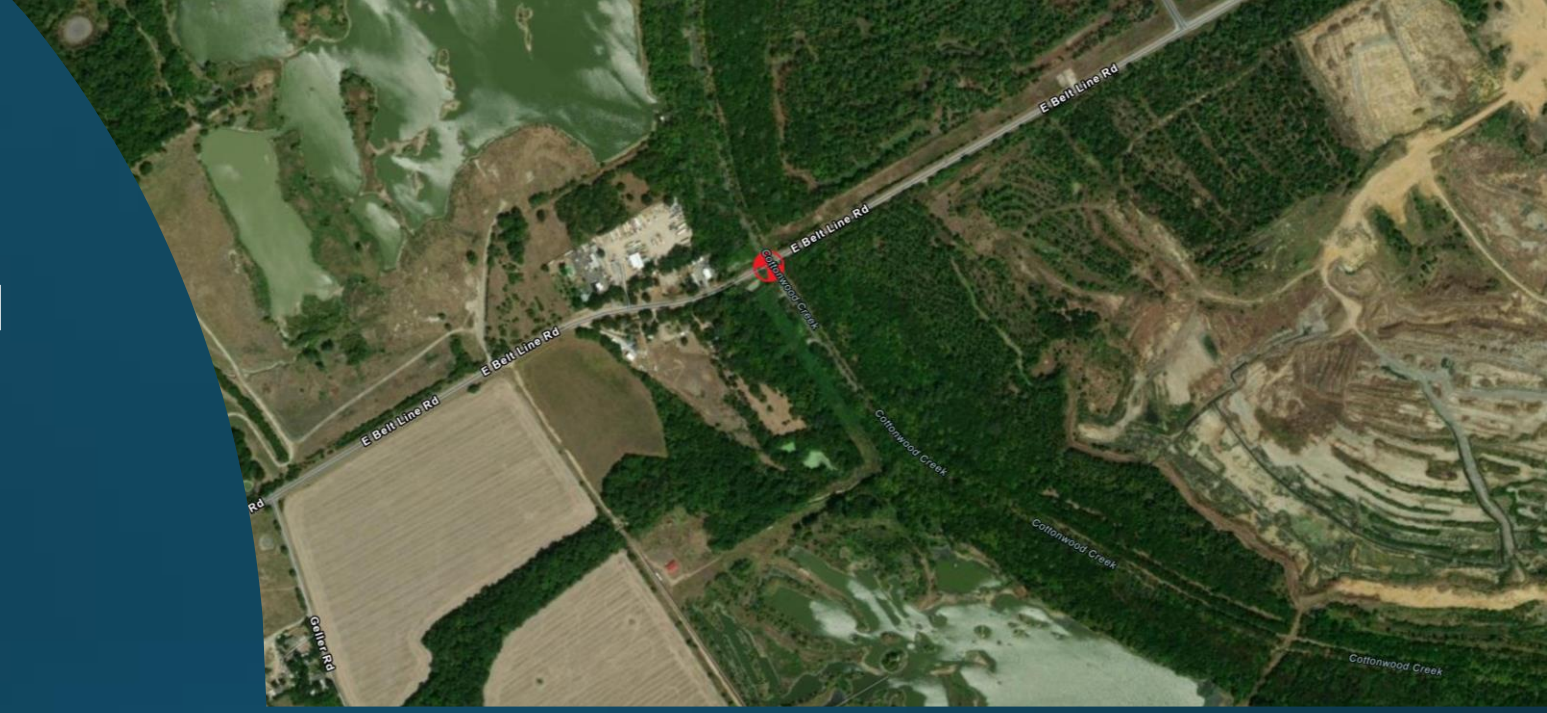
# LOCATIONS & FEATURES OF PROPOSED STREAMGAGES IN DALLAS COUNTY

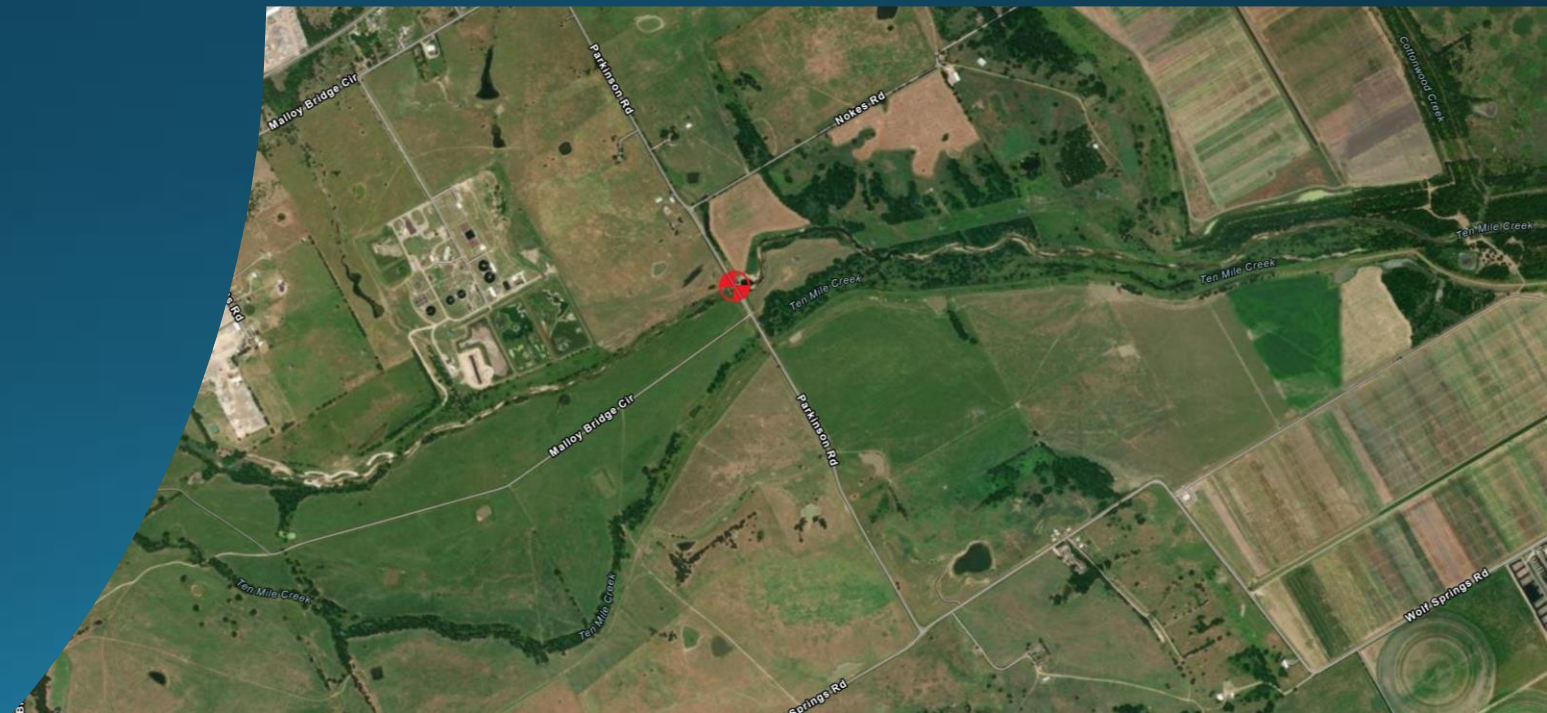
**Beltline Road at Cottonwood Creek 0002W**

- Full Range Streamflow
- Flood hardened
- Precipitation
- Camera

**Parkinson Road at Ten Mile Creek 0002T**

- Stage Only
- Flood hardened
- Precipitation
- Camera

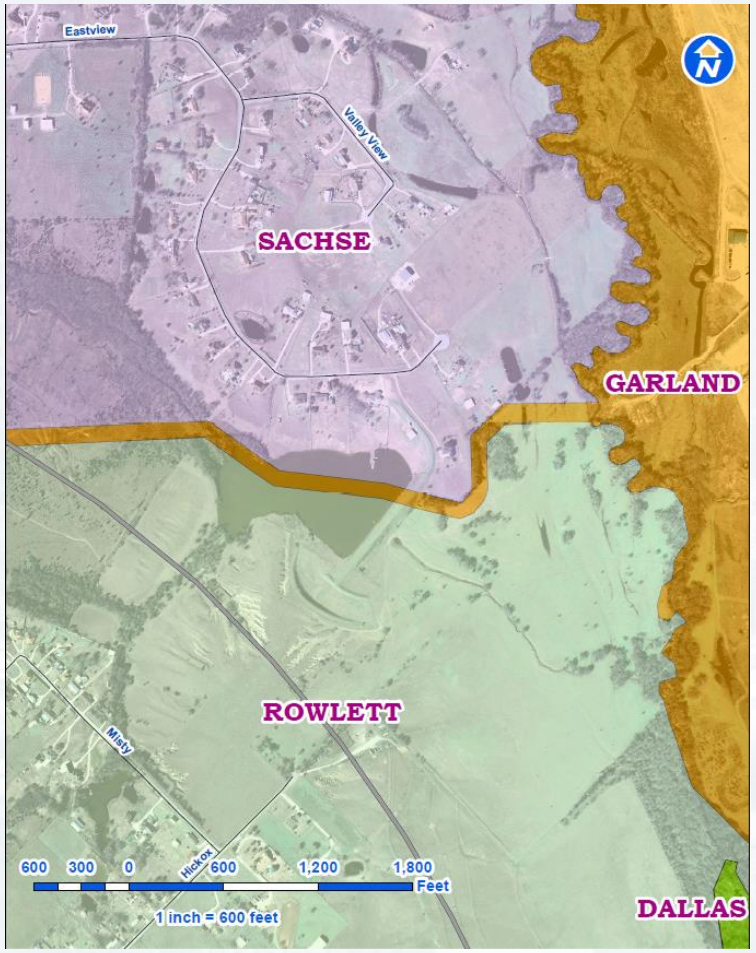


# Site 10
# Rowlett Creek WS


Located in Sachse, TX off of Pleasant Valley Road north of George Bush Turnpike

# Site 11
# Rowlett Creek WS




Located in Sachse, Garland, and Rowlett

# Site 12
# Rowlett Creek WS


Located in Rowlett off of Merritt Road

# Overview

- Four Watershed Dams that Dallas County contracts with Dalworth Soil and Water Conservation Service to maintain
- 3 of the 4 are located in the Rowlett Creek or Muddy Creek Watershed – District 3 and are in the Cities of Rowlett, Sachse, and Garland
- Included in updated MCIP Master agreement & Road & Bridge Master Agreement that individual cities take over the maintenance of the dams. (3 dams in the Rowlett Creek or Muddy Creek Watershed.)
- An inspection was performed by the NRCS (Natural Resources Conservation Service) in March of 2024 that identified items that need to be addressed on the three dams.
- A cost estimate has been developed based on the items identified at the inspection and included in the MOA between Dallas County and Dalworth.
- The MOA between Dalworth and Dallas County for FY 2025 & 2026 to maintain the dams is being evaluated by the Dalworth board at their March 19, 2025 board meeting.

# THANKS FOR YOUR TIME!

Lissa Shepard, PE, CFM
Sr. Bridge Engineer & Floodplain Manager
Dallas County, Texas
Lissa.shepard@dallascounty.org

# Protecting Sponsors' Land Rights Regarding Floodwater Retarding Structures

Jilane L. Carper

Collin County Soil & Water Conservation District #535

# PROTECTING SPONSORS' LAND RIGHTS

## REGARDING

## FLOODWATER RETARDING STRUCTURES

Collin County SWCD #535

Jilane Carper – District Manager

# Floodwater Retarding Structures (FWRS or FP Sites)

- US Congress passed the Flood Control Act of 1936
- In 1944 Congress passed Public Law 76-534
- USDA-NRCS {formerly Soil Conservation Service (SCS)} designed & constructed small, earthen watershed dams
- In 1954 Congress passed Public Law 83-566
- Over 2,000 structures in Texas
- All are listed in the National Inventory of Dams
- Regulated by Texas Commission on Environmental Quality (TCEQ)

# Watershed Project Easement Basics

When local watershed project sponsors construct a flood control dam or related structure with assistance from the Natural Resources Conservation Service (NRCS) Watershed Program, they must own the land or have a legal right to use the land (easements).

Watershed project sponsors must be a unit of local government such as a conservation district, water improvement district, county, city, town or tribal government.

When a District has an easement, it is accepting the responsibility to protect and care for it for a very long time – perpetuity.

# District easements in general:

- Allow for the construction of a dam, for permanent storage of water in the sediment basin,
- For floodwater to be temporarily stored after heavy rains in designated flood pool areas, and
- For District representatives to have access to the dam for operation, maintenance, inspections and repairs
- General right of access
- Blanket or elevation easements

# Common Misconceptions:

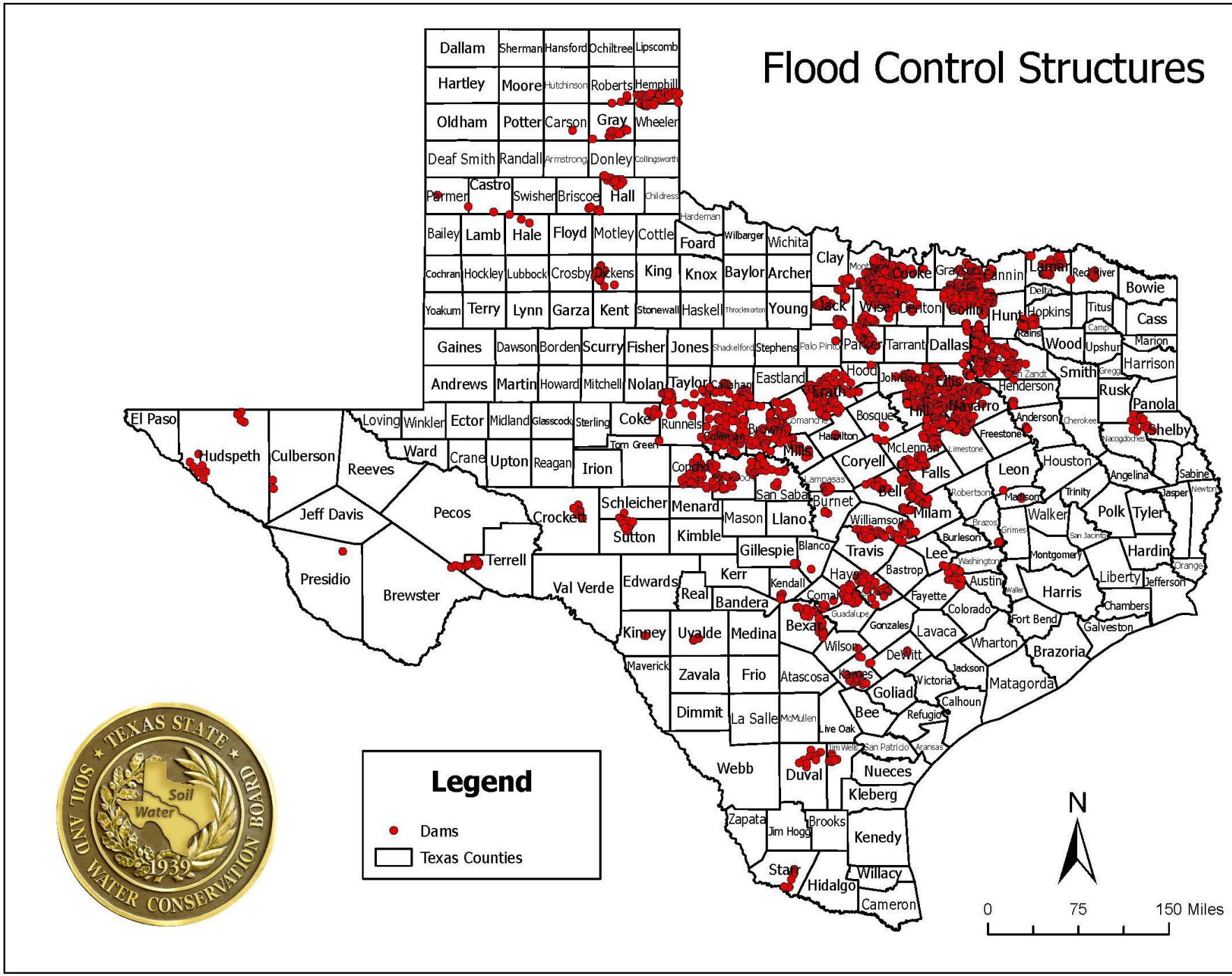
- SCS ponds or lakes
- Built by the Corps of Engineers
- 100-year Flood Plain
- Water will never get that high
- They are old and no longer provide flood protection
- Publicly accessible recreation land

# Texas:

2,038 dams

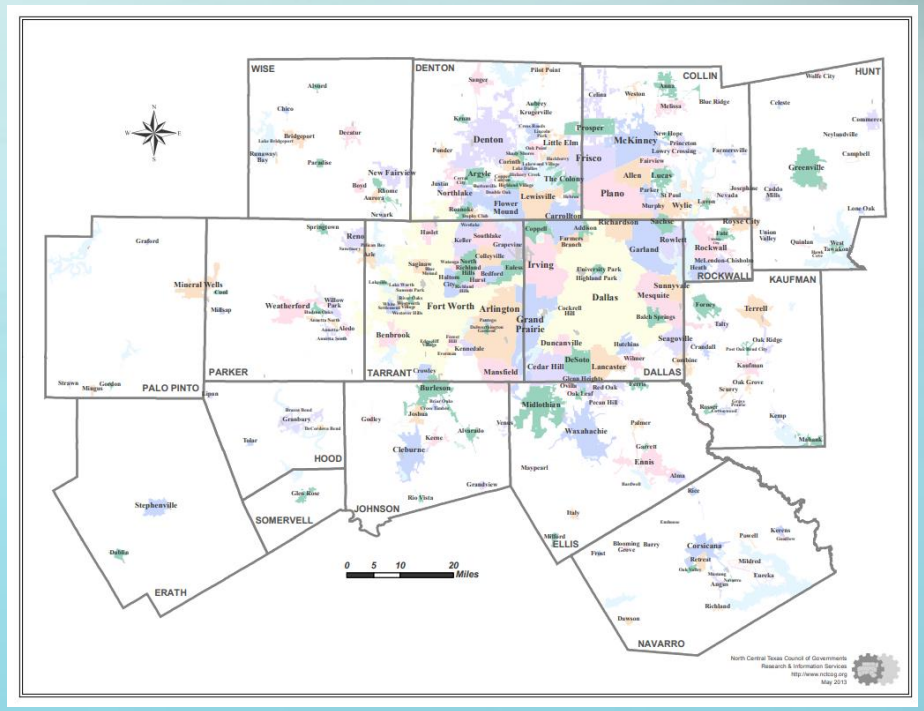
753 high hazard

608 of the high hazard do not meet safety criteria and need upgrade



| COUNTY | NUMBER OF DAMS | NUMBER OF HIGH HAZARD |
|---|---|---|
| Collin | 99 | 60 |
| Wise | 83 | 25 |
| Denton | 22 | 9 |
| Hunt | 19 | 7 |
| Palo Pinto | 4 | 2 |
| Parker | 34 | 8 |
| Tarrant | 0 | 0 |
| Dallas | 8 | 5 |
| Rockwall | 27 | 24 |
| Kaufman | 74 | 31 |
| Erath | 76 | 14 |
| Hood | 2 | 2 |
| Somervell | 2 | 2 |
| Johnson | 26 | 18 |
| Ellis | 83 | 35 |
| Navarro | 99 | 11 |
| TOTALS | 658 | 253 |

# 16 Counties of NCTCOG



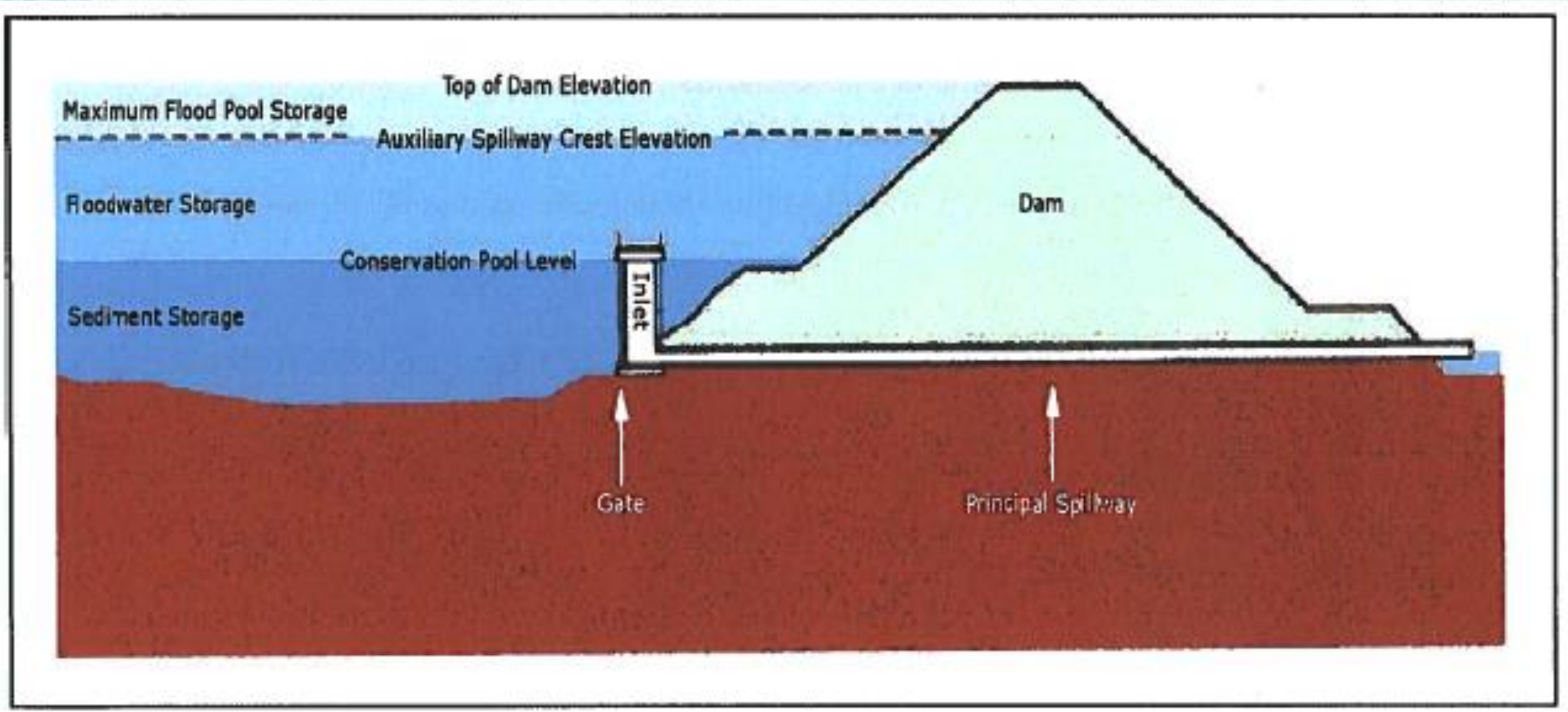



Fig. 1 – Vertical Zones of Dam Structure

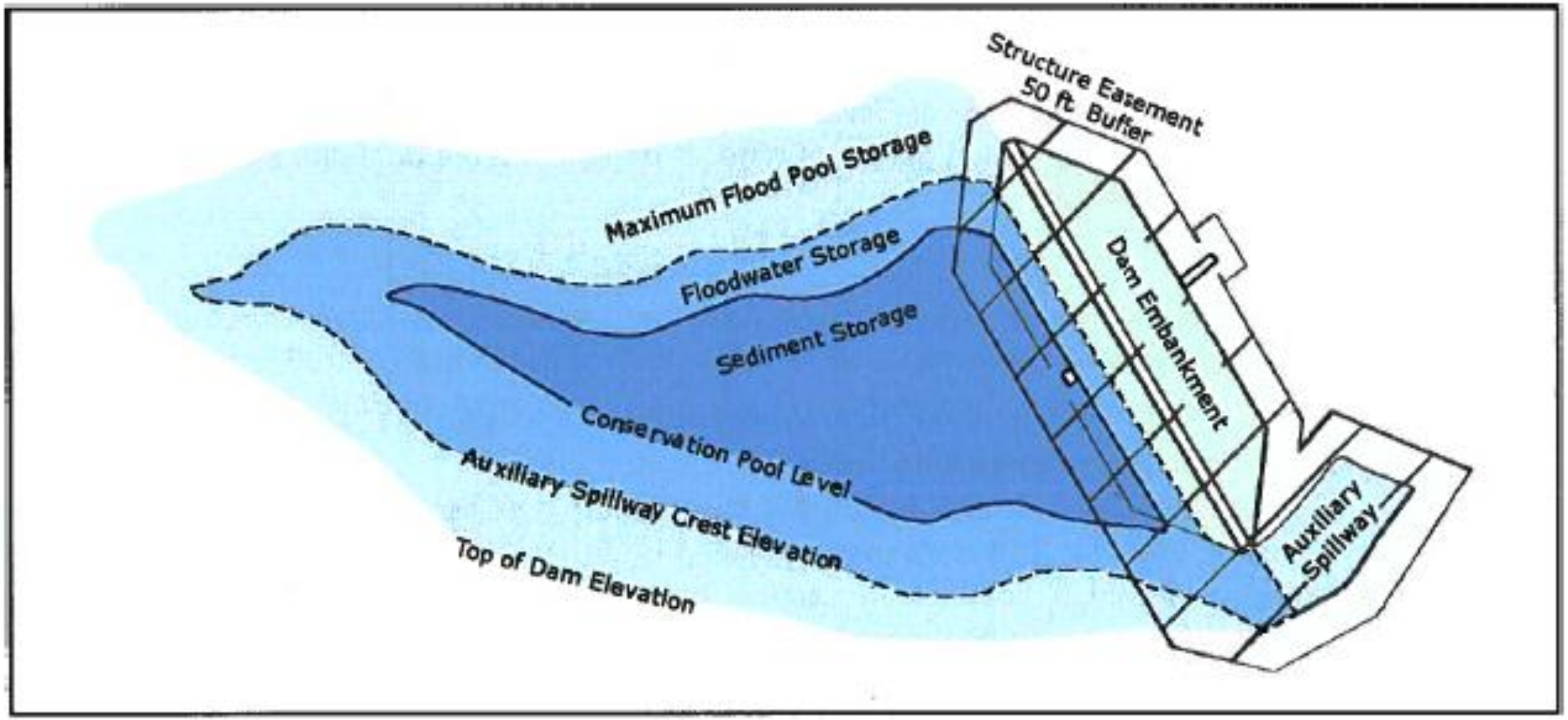



Fig. 2 – Horizontal Zones of Dam Structure

# Flood Control Dam – Normal Pool Level

Low Hazard Dam

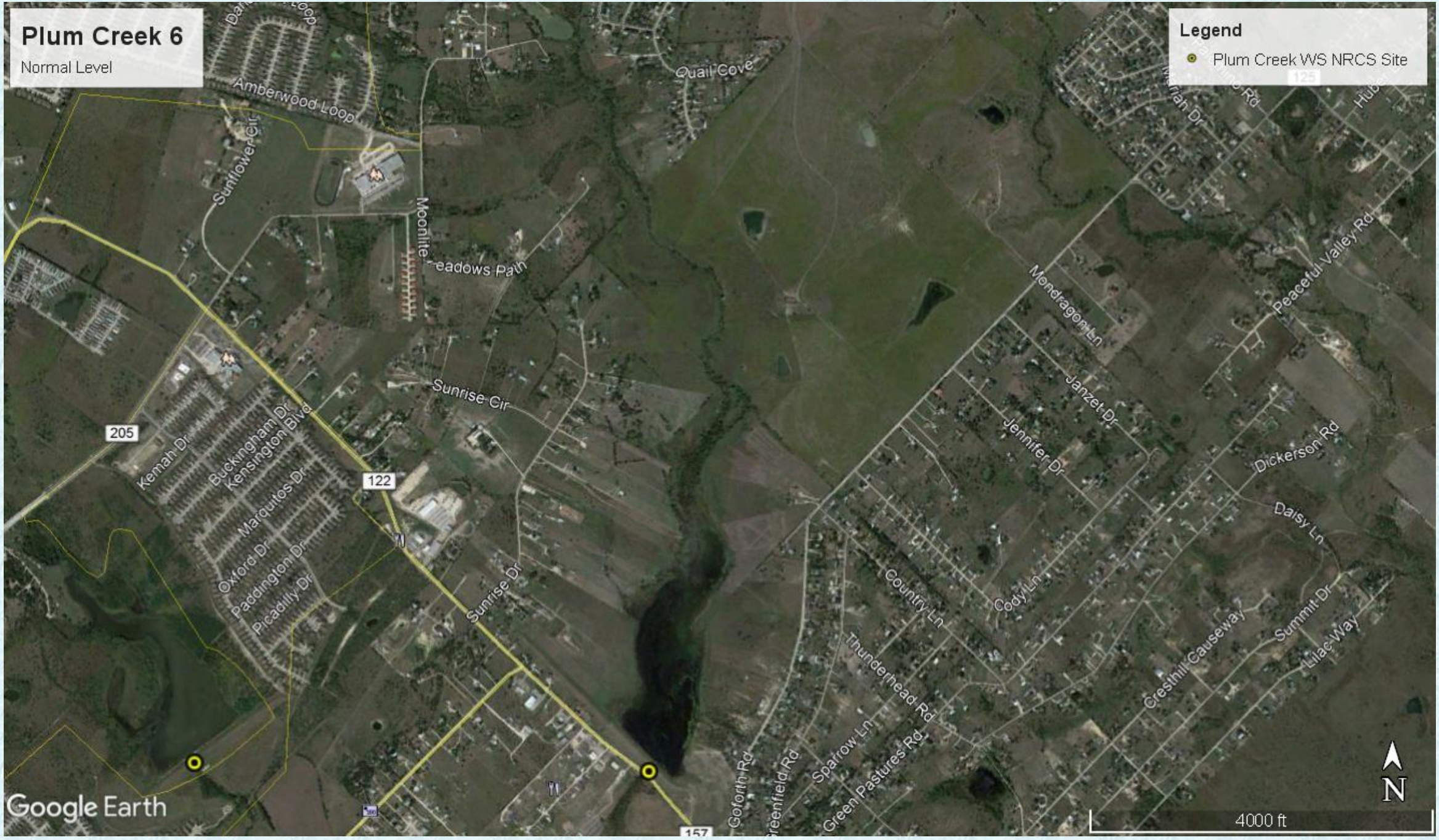
# Flood Control Dam – Flood Pool (June 2007)


Low Hazard Dam

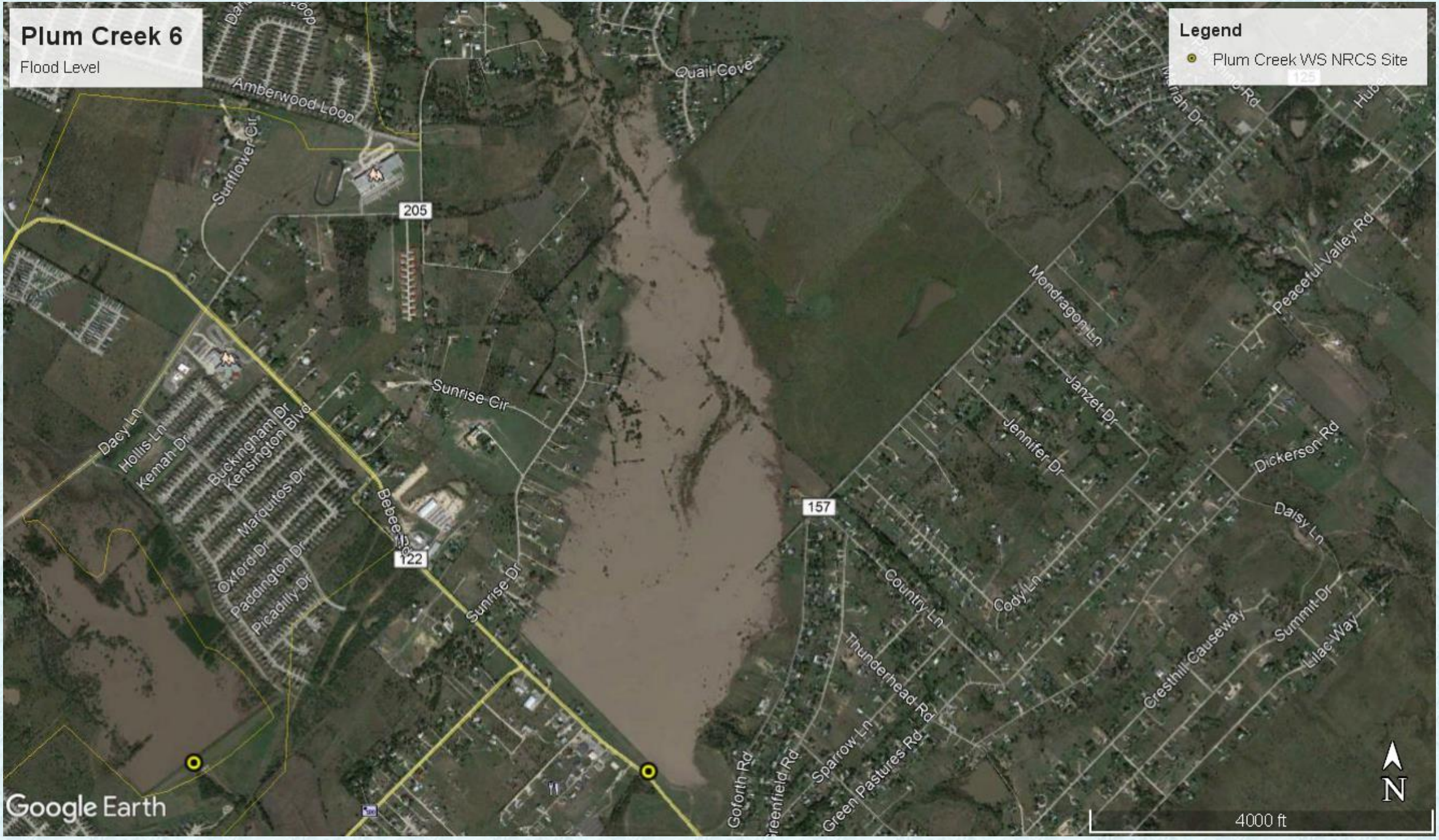
# Concerning Issues Impacting Floodwater Retarding Structures

- Urban creep and development of rural areas in which a floodwater retarding structure is located is creating more problems
- Development downstream (behind the dam) causing re-classification of hazard class
- Access issues, either limited access or outright denial
- Lack of appropriate funding for operation & maintenance and funds to rehabilitate dams
- Use issues including objections to maintenance or rehabilitation and wanting easements limited

# Urban Encroachment on the Flood Pool



# Urban Encroachment on the Flood Pool



# Hazard Classification

**High Hazard**

- Loss of human life expected
  - 3 or more habitable structures in the breach inundation area

- Excessive economic loss
  - Extensive damage to public facilities, agricultural/industrial/commercial facilities, public utilities, main highways, major railroads

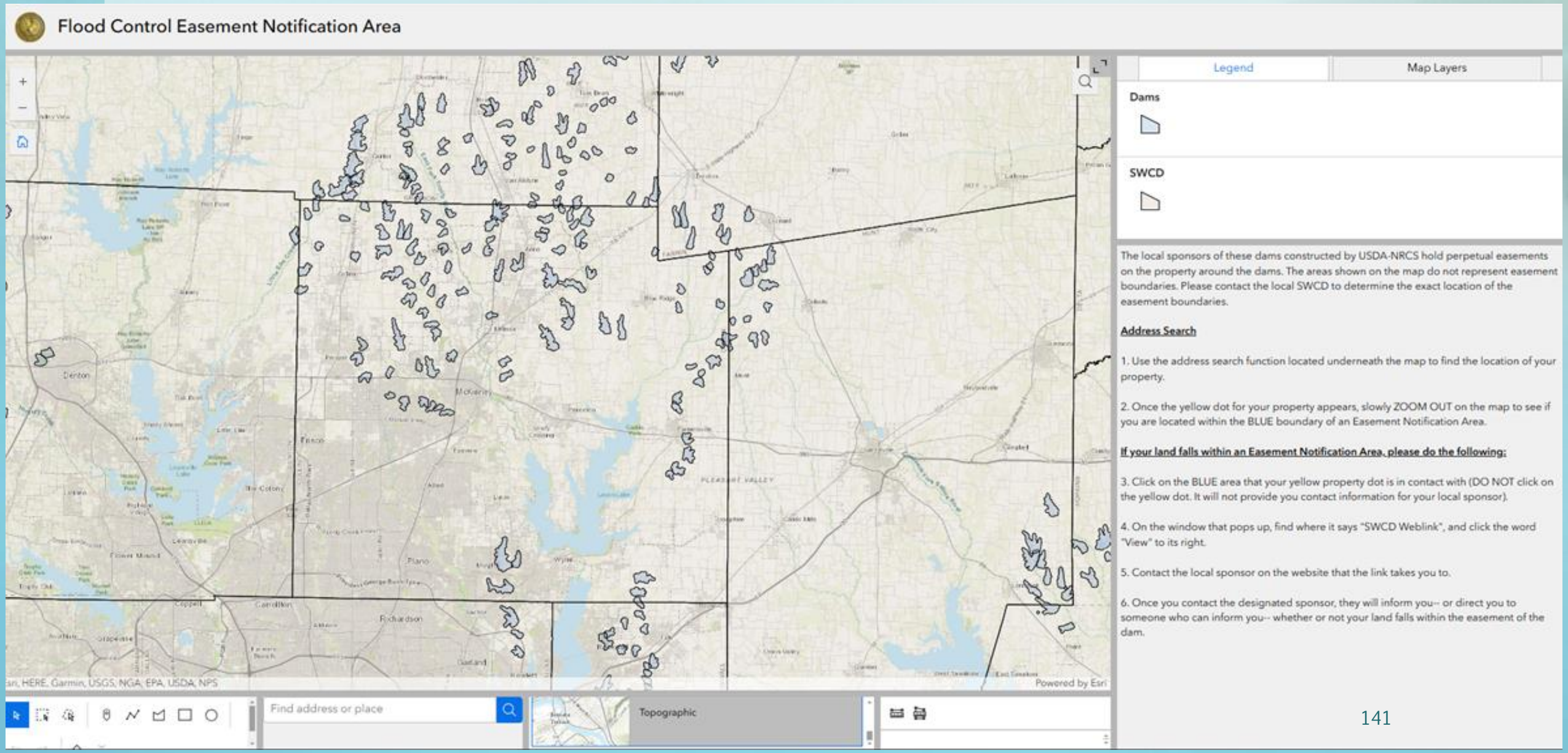
# Urban Encroachment on the Flood Pool

# Under an easement granted to the SWCD, the Landowner Cannot:

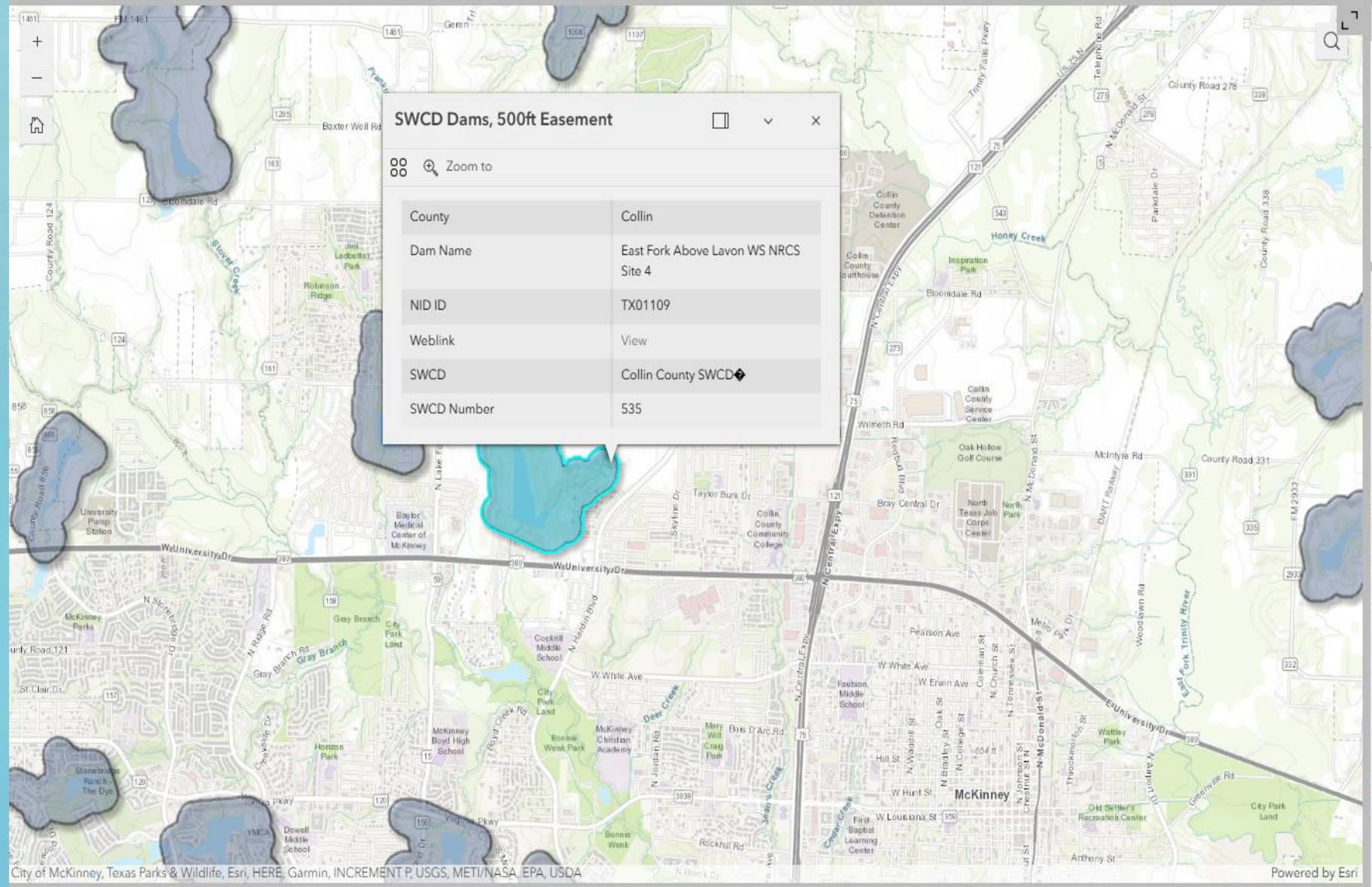
| | |
|---|---|
| Deny | Deny the district access to operate, maintain and inspect a structure, |
| Undertake | Undertake activities that would impair the purpose of the district's structures, |
| Undertake | Undertake activities that damage the structure including it appurtenances (example: the principal spillway or emergency spillways), or |
| Allow or convey | Allow or convey to others the ability to do any of the above. |

# *New – EASEMENT NOTIFICATION AREA

https://www.tsswcb.texas.gov/programs/flood-control-program



# Flood Control Easement Notification Area




Legend | Map Layers

**Dams**

**World Topo Map**

Citations

The local sponsors of these dams constructed by USDA-NRCS hold perpetual easements on the property around the dams. The areas shown on the map do not represent easement boundaries. Please contact the local SWCD to determine the exact location of the easement boundaries.

**Address Search**

1. Use the address search function located underneath the map to find the location of your property.

2. Once the yellow dot for your property appears, slowly ZOOM OUT on the map to see if you are located within the BLUE boundary of an Easement Notification Area.

**If your land falls within an Easement Notification Area, please do the following:**

3. Click on the BLUE area that your yellow property dot is in contact with (DO NOT click on the yellow dot. It will not provide you contact information for your local sponsor).

4. On the window that pops up, find where it says "SWCD Weblink", and click the word "View" to its right.

5. Contact the local sponsor on the website that the link takes you to.

6. Once you contact the designated sponsor, they will inform you-- or direct you to someone who can inform you-- whether or not your land falls within the easement of the dam.


# Encroachment Manual

Adopted March 1, 2022

# Table of Contents

# TAC

## Title 30

## Part 1

## Chapter 299

## Dams & Reservoirs

### View TAC

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| TITLE 30 | ENVIRONMENTAL QUALITY |
| PART 1 | TEXAS COMMISSION ON ENVIRONMENTAL QUALITY |
| CHAPTER 299 | DAMS AND RESERVOIRS |

### Subchapters

| | |
|---|---|
| SUBCHAPTER A | GENERAL PROVISIONS |
| SUBCHAPTER B | DESIGN AND EVALUATION OF DAMS |
| SUBCHAPTER C | CONSTRUCTION REQUIREMENTS |
| SUBCHAPTER D | OPERATION AND MAINTENANCE OF DAMS |
| SUBCHAPTER E | REMOVAL OR BREACH OF DAMS |
| SUBCHAPTER F | EMERGENCY MANAGEMENT |
| SUBCHAPTER G | ENFORCEMENT |

## Section 4 Construction Activity Near Dams

Texas Administrative Code (TAC) 299.16(d), as amended, identifies activities near dams that may warrant evaluation by a professional engineer, registered in the State of Texas, at the request of the dam owner or the executive director of the Texas Commission on Environmental Quality (TCEQ). The District reserves the right to request such an evaluation for all work that falls within the criteria listed below.

***TAC 299.16(d):***

*When a person proposes one of the following activities near the owner's dam, the owner or the executive director may request that the person have a professional engineer perform an evaluation to determine if the integrity of the dam would be compromised. If the person has a report prepared by a professional engineer, the person shall submit the evaluation report to the executive director and the owner for review and approval before any work is performed for a proposal to:*

*(1) dredge the reservoir within 200 feet of the dam;*

*(2) install a utility line or pipeline in the dam or in the spillways that requires significant excavation in the dam or spillways;*

*(3) construct a road across the dam or spillways or within 200 feet of the dam;*

*(4) drill oil or gas wells, perform horizontal drilling or fracturing, or perform oil or gas exploration within 500 feet of the dam and spillways; or*

*(5) blast within 1/2 mile of the dam.*

# Collin County Regulations for FWRS

**“For Platting:**

Our Subdivision Regulations require Drainage and Floodplain information for final platting (this sets the initial review of surrounding floodplains and SCS lakes). Information we request includes Dam Breach Inundation Zones; we do not allow structures in these zones .

**For Construction Plan Review:**

A Drainage Plan/construction documents are required and must comply with our Floodplain Regulations. This again causes us to review surrounding floodplains and SCS lakes.

**For all permitting (residential or commercial)**:

All applications are checked for floodplains and SCS lakes.”

“Do unto those downstream as you would have those upstream do unto you.”

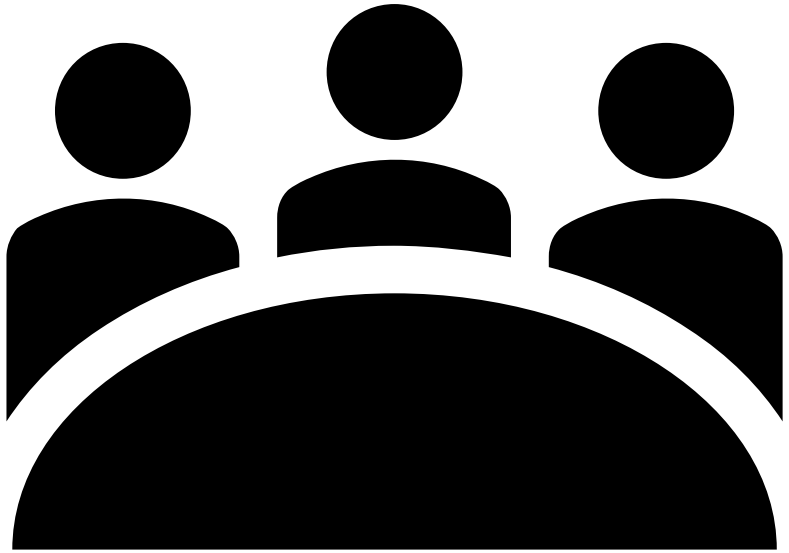
-Wendell Berry

535 SWCD Soil & Water Conservation District


# Jilane Carper
District Manager
972-542-0081 ext. 3
Jilane.Carper@tx.nacdnet.net


collincountyswcd.org


CollinCountySWCD535



# Roundtable Discussion

# Post-Workshop Survey

https://www.surveymonkey.com/r/J3M5J9K

integrating Transportation & Stormwater Infrastructure

# Continuing Education Credits

- If you would like us to send you a certificate for CFM continuing education credits, please let us know!
  - Online: Place your name and email in the chat
  - In person: Indicate your email address and need for a certificate on the sign-in sheet

# Contacts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