

# AIM Norman - Stormwater

## February City Council Study Session

February 18, 2025







# AIM NORMAN

AREA & INFRASTRUCTURE MASTER PLAN

STORMWATER MASTER PLAN UPDATE

## STORMWATER SUB-COMMITTEE

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- Amanda Nairn - Chair
- Zack Roach
- Rachel Butler
- Shellie Chard
- Dr. Russell Dutnell
- Michael Ridgeway
- Dr. Nick Shepherd
- Heather Supinie
- Andy Sherrer

## STORMWATER STAFF

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- Scott Sturtz – Public Works Director
- Jason Murphy – Stormwater Program Manager
- Michele Loudenback – Division of Environmental Resilience and Sustainability (DoERS) Manager

# The goal of today's meeting is to provide an overview major findings from the Stormwater Master Plan Update.



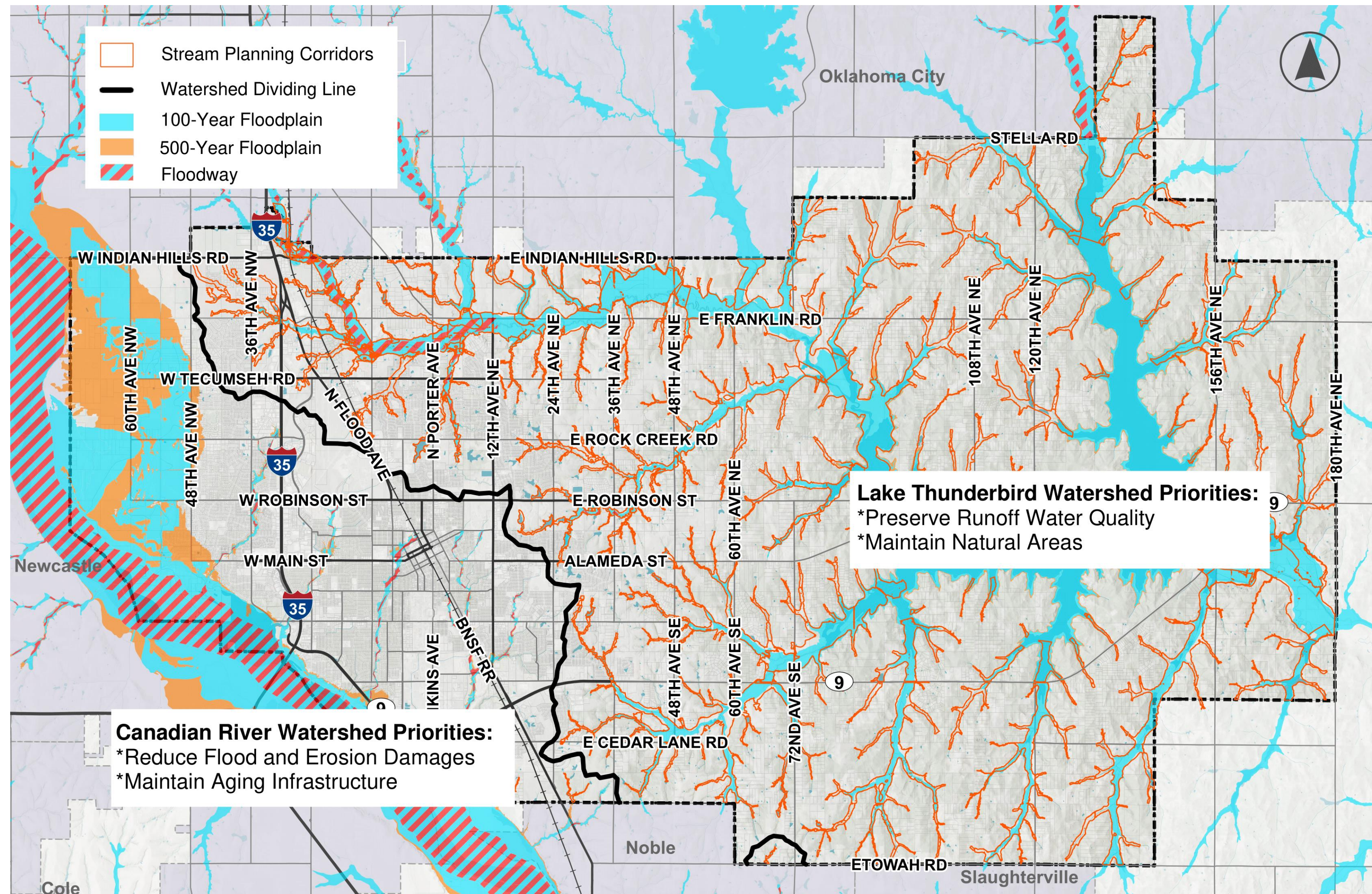
## AGENDA

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- Stormwater issues facing Norman
- What is the purpose of the SWMP Update?
- Items accomplished since 2009
- What is left to do?
- What is new for 2025?



# What is Stormwater?





# What is Stormwater?





# What is Stormwater?





# What is Stormwater?

Keeping Our  
Waters "P"  
Free



Photo From Lake Thunderbird Watershed Partnership



# PUBLIC INPUT (NEIGHBORHOOD WORKSHOPS)

Criteria	Average percent of attendees who gave this top importance	Average percent of attendees who gave this 2 <sup>nd</sup> importance
Ecological Improvement	58%	29%
Public Safety	29%	37.5%
Cost to Implement	8%	29%
Economic Development	4%	4%





# What is the purpose of the SWMP Update?



**Tuning the 2009 Piano**

**Understand public sentiment about stormwater priorities**

**Identify potential policy changes needed with proposed land use changes**

**Updated Goals**

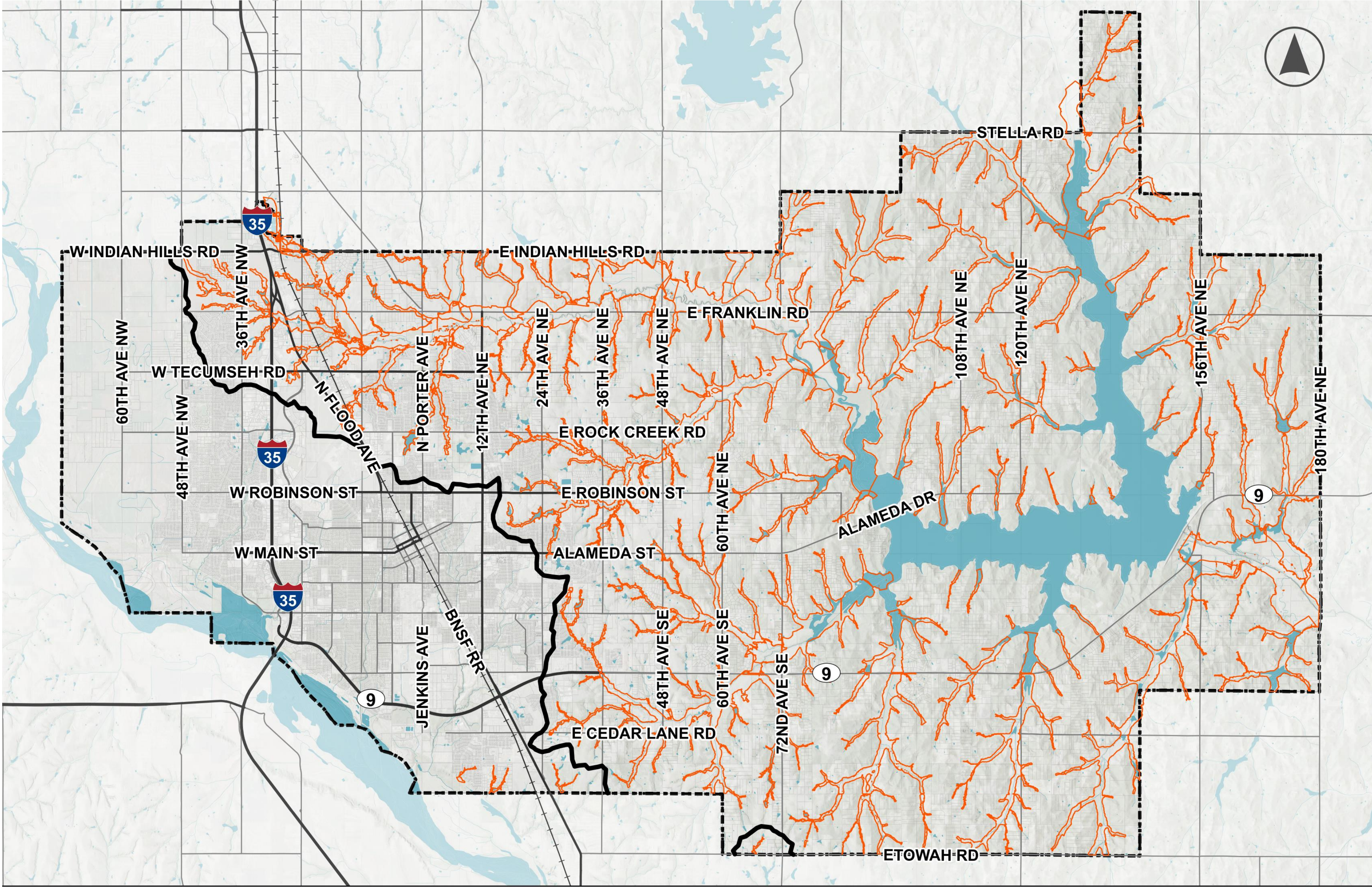


# STORMWATER UPDATES SINCE 2009

- Water Quality Projection Zone Ordinance (2011)
- Fertilizer Ordinance (2013)
- Completed Stormwater Projects since 2009
- Several Water Quality Studies



# WATER QUALITY PROTECTION ZONES (2011)





# FERTILIZER ORDINANCE (2013)

## Did you know?

Lake Thunderbird has been identified by the Oklahoma Department of Environmental Quality as having impaired water quality due to elevated levels of chlorophyll-a. The high level of chlorophyll -a is directly related to increased algae production caused by excess phosphorus in the lake.

## Understanding the Numbers on Your Fertilizer

All fertilizer labels have three numbers displayed. These numbers represent the nutrients nitrogen, phosphorus, and potassium.

### Nitrogen (N)

Encourages above ground growth, foliage, and lush leaves.

### Phosphorus (P)

Encourages fruit/flower production and improves root health. Most soils in Norman already have sufficient P levels for a healthy lawn.



Potassium (K)  
Improves overall plant health.

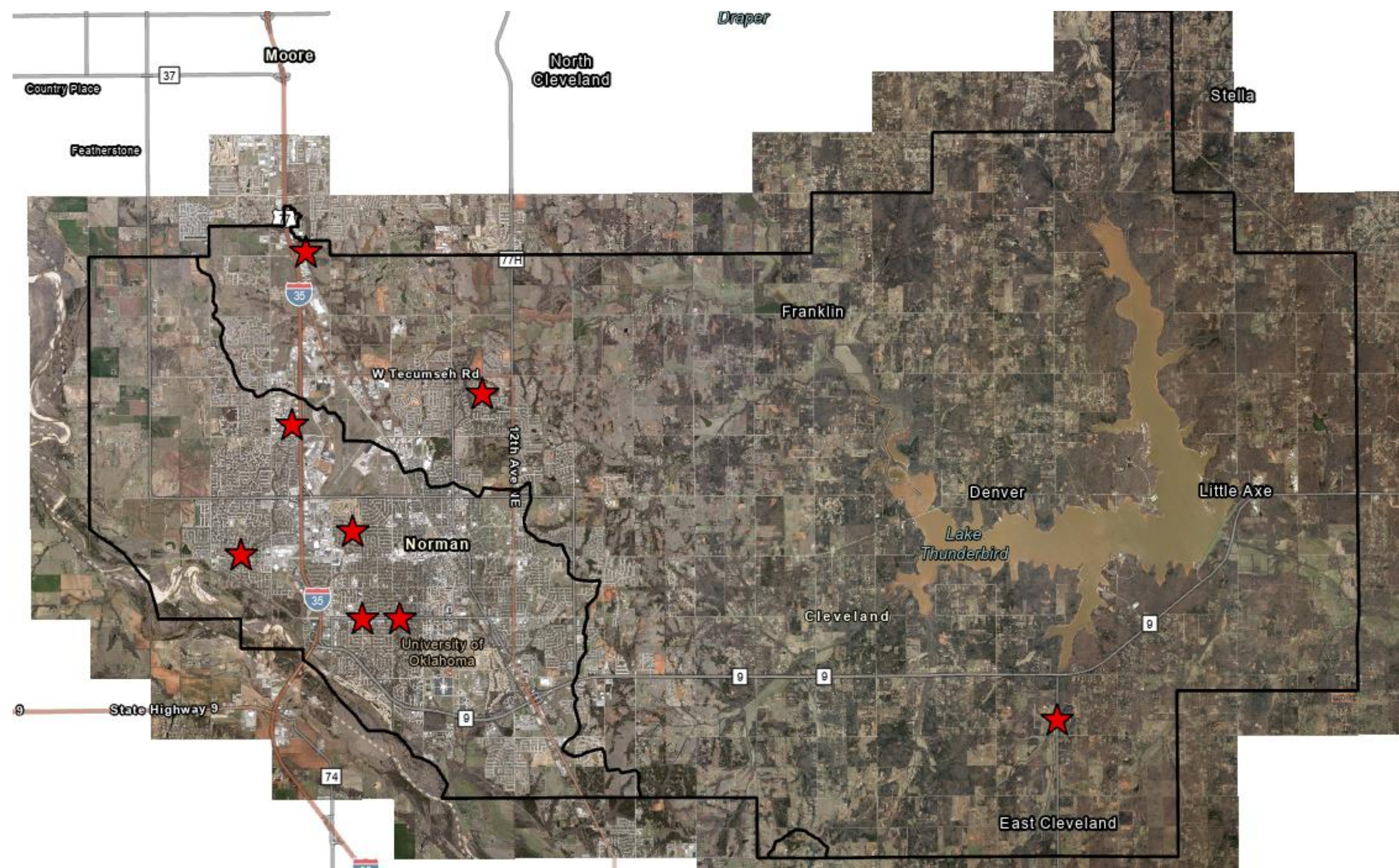
## Dos & Don'ts at Home

- ✓ Obtain a soil test from a certified lab to check existing soil nutrient levels. If your soil has phosphorus levels greater than ten (10) parts per million (ppm) then no additional fertilizer is needed.
- ✓ Sweep or blow fertilizer that is on streets, driveways, and sidewalks back onto your yard or dispose of it properly.
- ✓ Use natural or organic fertilizer or other forms of naturally occurring phosphorus.
- ✓ Fertilize within the first six (6) months of turf establishment from seed or sod.
- ✓ Water within fourteen (14) hours of applying fertilizer.
- ✗ Don't apply fertilizer when it's raining, rain is in the forecast, or when soils are saturated or frozen.
- ✗ Don't apply fertilizer within twenty-five (25) feet of creeks, streams, and ponds.
- ✗ Don't blow or dump grass clippings, leaves, or any yard waste into streets, storm drains or waterways.
- ✗ Don't store open containers of fertilizer on impervious surfaces like streets, driveways, and sidewalks.





# STORMWATER CIP PROJECTS SINCE 2009





# Completed Projects Lake McGee (IC-5)





# Completed Projects – Brookhaven Creek (BHC-1)





# Completed Projects – Imhoff Creek at Lindsey Street (IC-3A)





# STORMWATER UPDATES SINCE 2009

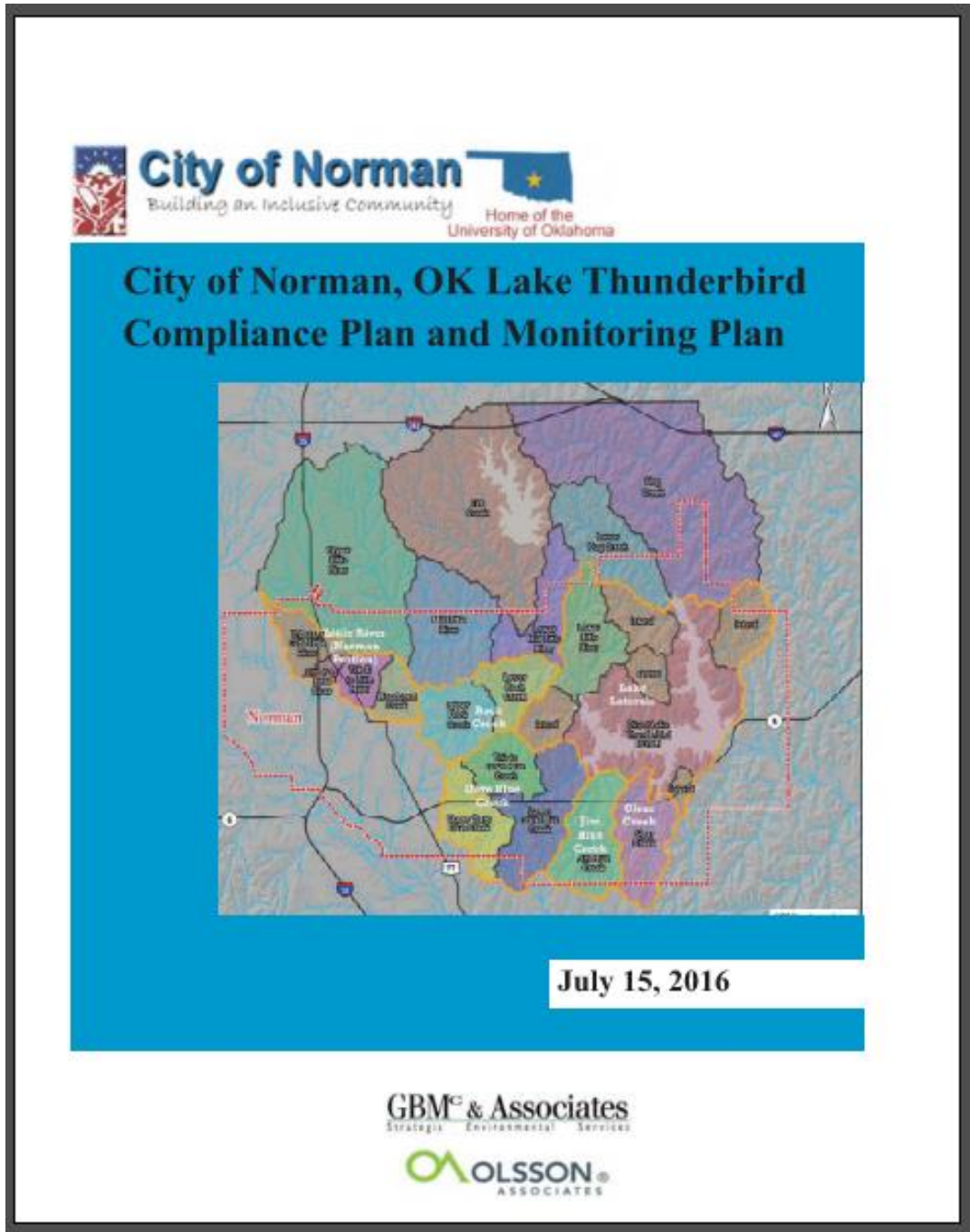
The 2023 Engineering Design Criteria Update provided edits and additions regarding Drainage Design Criteria, Stormwater Quality Design Criteria, and Sustainable Stormwater Design (Section 7000)



**February 28, 2023**



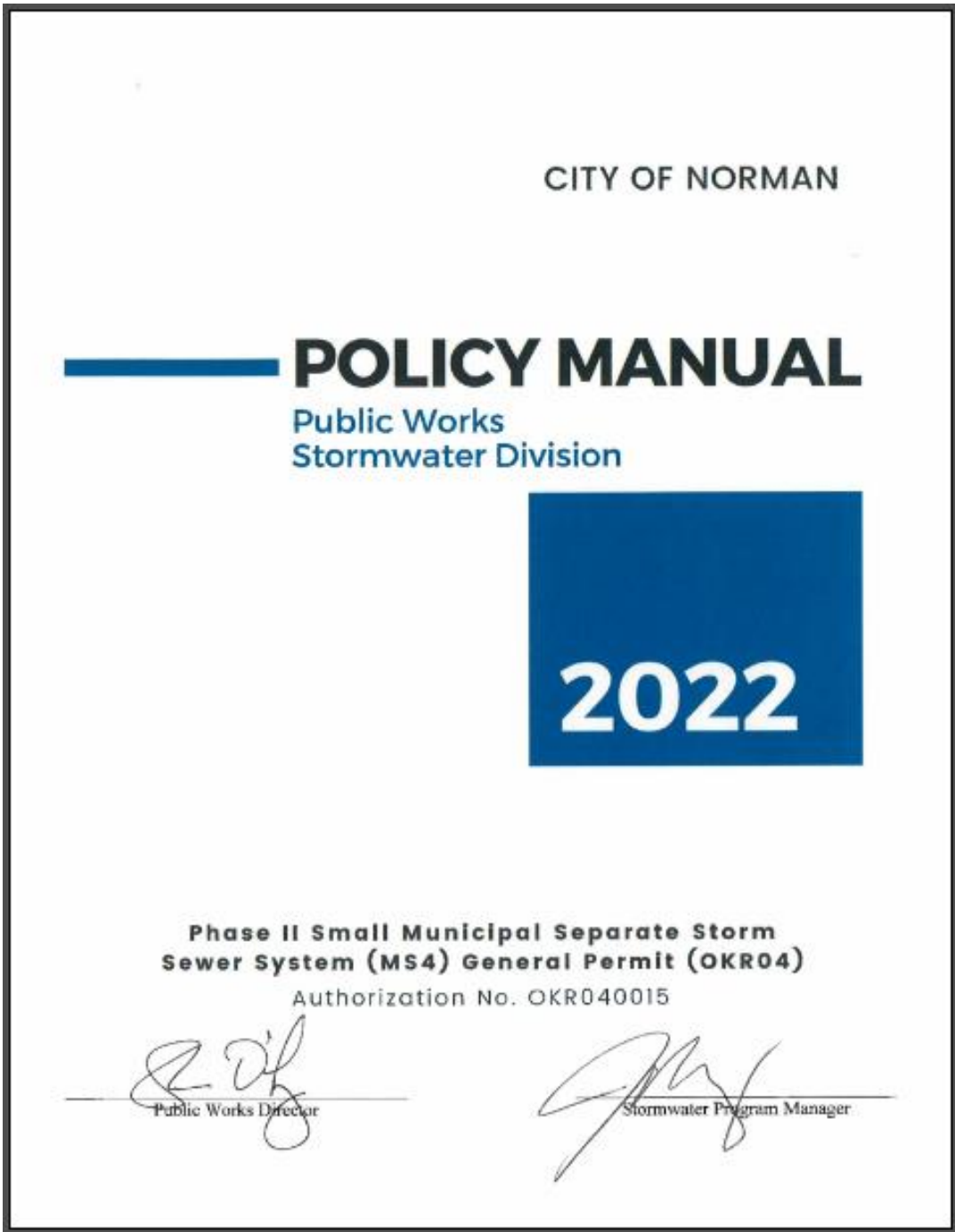
# STORMWATER STUDIES SINCE 2009



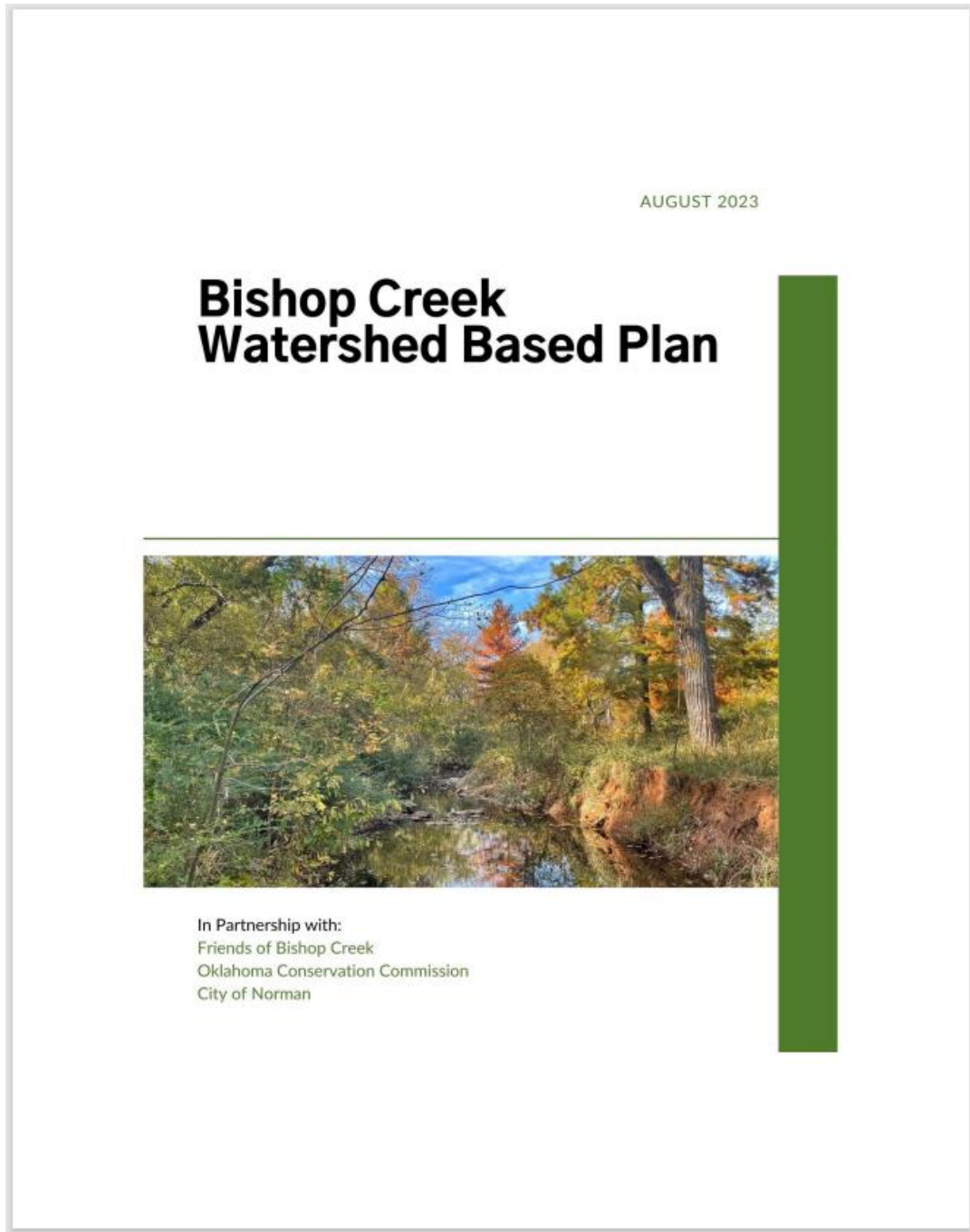
Lake Thunderbird TMDL Compliance and Monitoring Plan



Stormwater Management Plan



City of Norman Stormwater Policy Manual



Bishop Creek Watershed Based Plan



# EDUCATION AND COOPERATION OF STORMWATER MANAGEMENT

	Clean-ups	Workshops/ Festivals	Schools	Total
FY21	12	5	1	18
FY22	20	3	3	26
FY23	14	6	3	23
FY24	29	5	2	36
FY25	9	3	1	12
			Total	116

Number of Public Events/Public Education for the MS4 Program

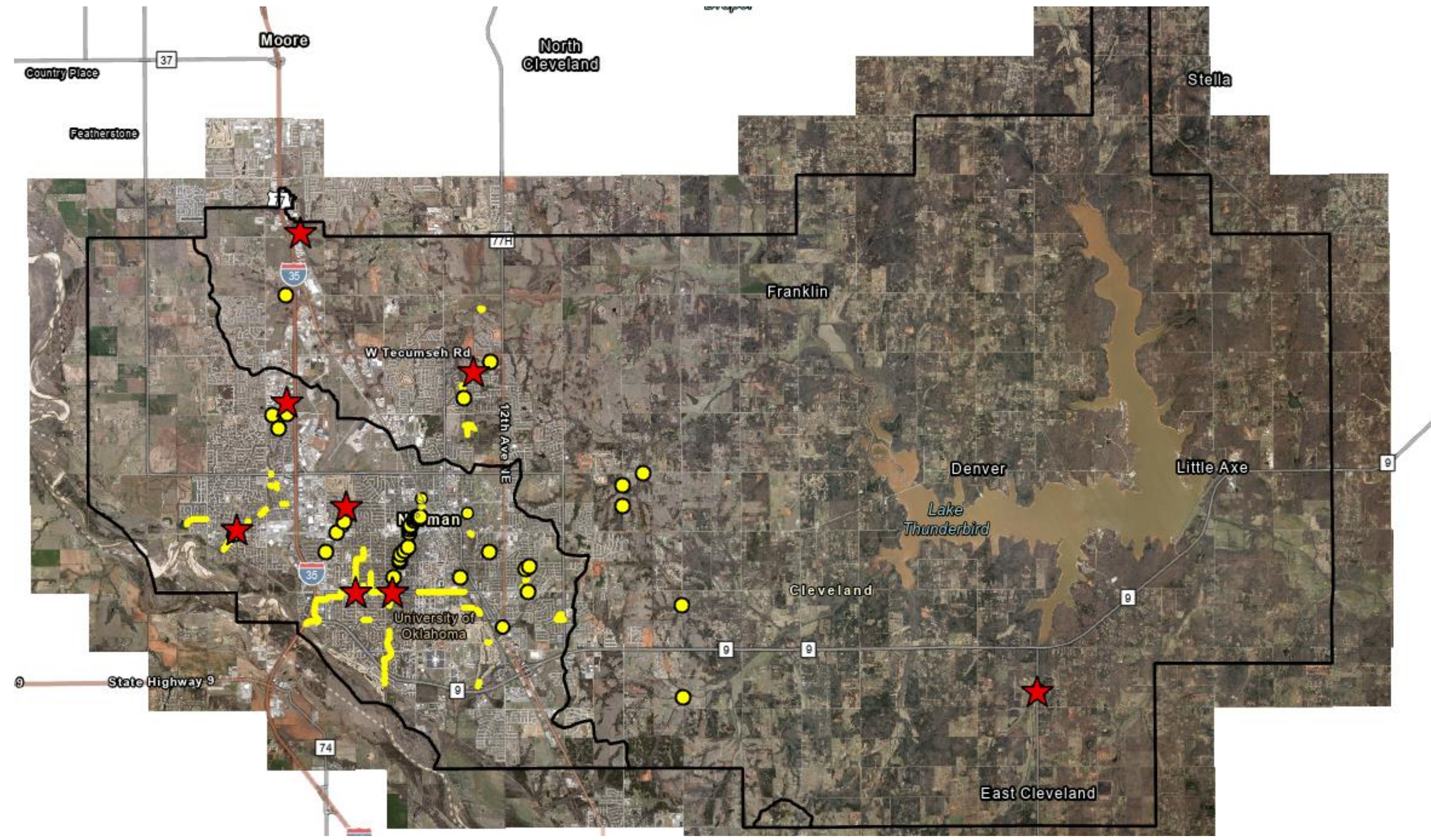




# What is left to do?

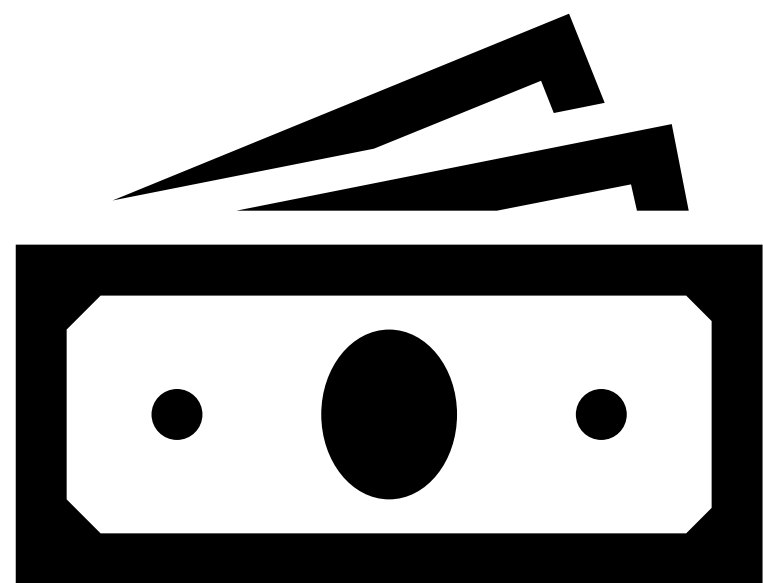


# CAPITAL PROJECTS LIST

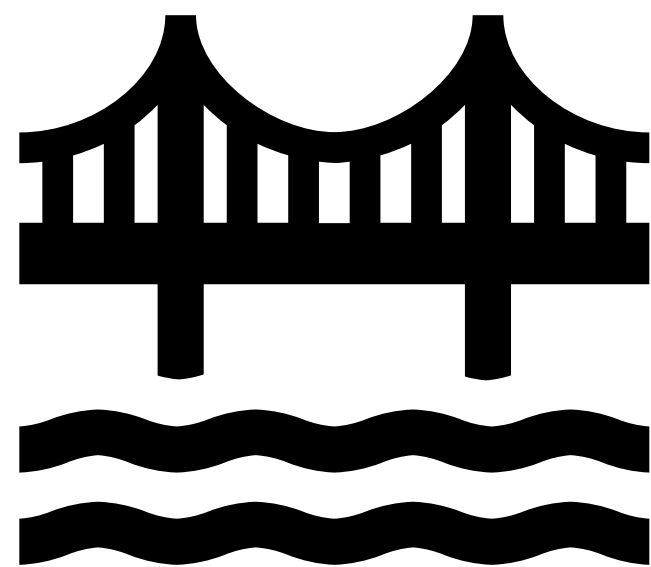




# ALTERNATIVE FUNDING SOURCES



**Stormwater  
Utility Fee  
(SWU)**



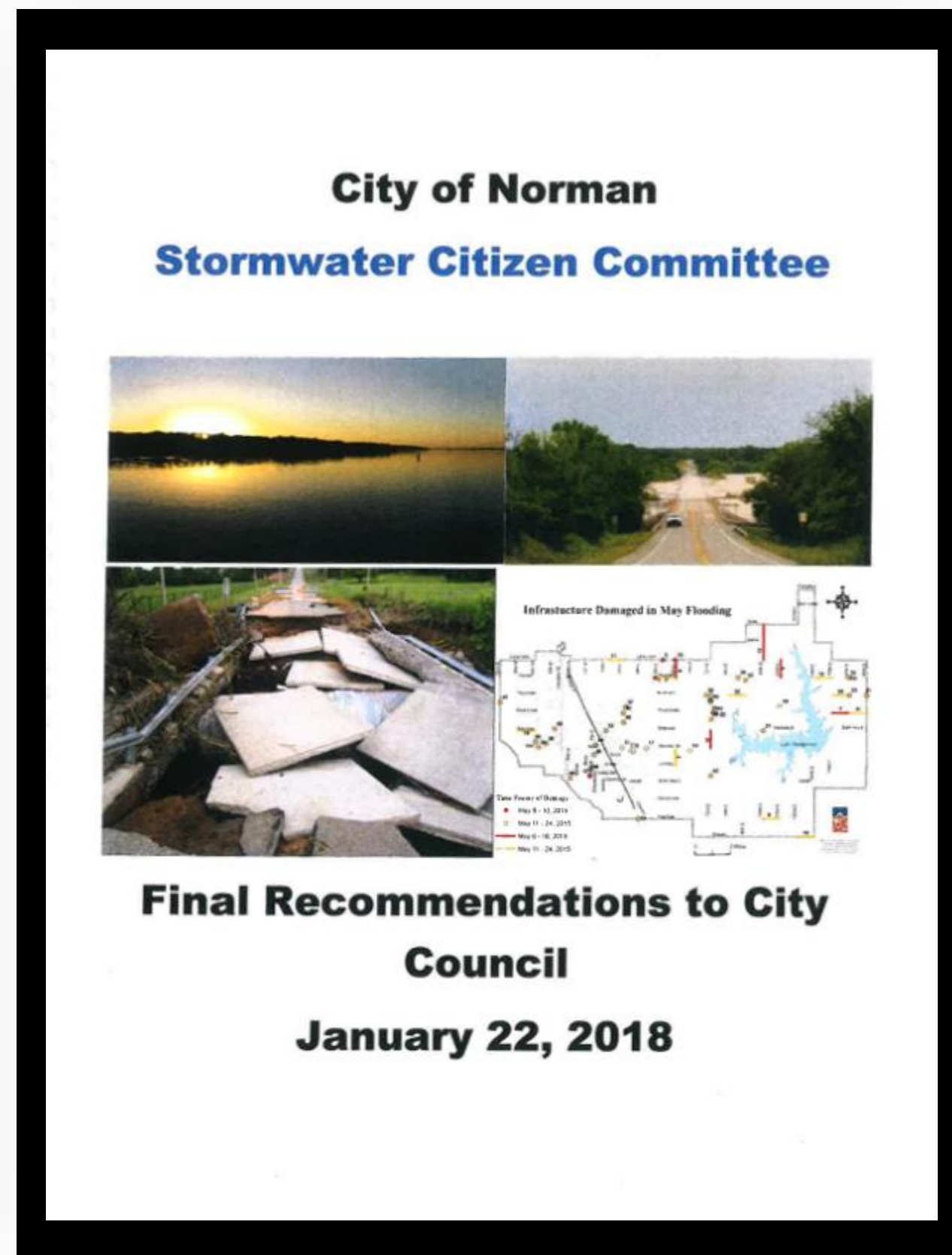
**General  
Obligation  
Bond for  
CIP Projects**



**Stormwater projects  
added to other City  
infrastructure projects  
(e.g. Transportation or  
Parks)**



# INCREASE STORMWATER FUNDING



## 2018 Stormwater Citizen Committee Proposed Funding

Program Elements	2018 Annual Funding	2018 Annual Funding Needed
Stormwater Quality	\$1,194,832	\$2,403,423
Infrastructure Maintenance & Operations	\$1,994,516	\$5,033,942
Grand Total:	\$3,189,348	\$7,437,366
General Fund Contribution		\$3,189,348
<b>Deficit</b>		<b>\$4,248,018</b>





# What is new for 2025?



# UPDATED SWMP GOALS:

**Protect the runoff water quality contributing to Lake Thunderbird and the Canadian River to preserve the natural and beneficial uses of these waterbodies.**

**Provide an understanding of the flood risk to citizens in our community and continue to implement and enhance the capital improvement program to help reduce flooding risks.**

**Enhance and preserve the ecological character of the unurbanized areas of Norman.**

**Restore and rehabilitate riparian areas in the urbanized areas of Norman while expanding recreational access and opportunities that support ecological health of these areas.**

**Continue to prioritize community awareness and education regarding flood risk, stormwater quality, City infrastructure, and individual responsibilities to preserve and maintain both natural and manmade stormwater resources.**

**Prioritize stormwater projects using a transparent process that includes collaboration with all stakeholders.**



# KEY RECOMMENDATIONS

Require runoff quality treatment in new developments

Prevent reduction of WQPZ widths in the 2045 Reserve

Install additional water quality monitoring stations

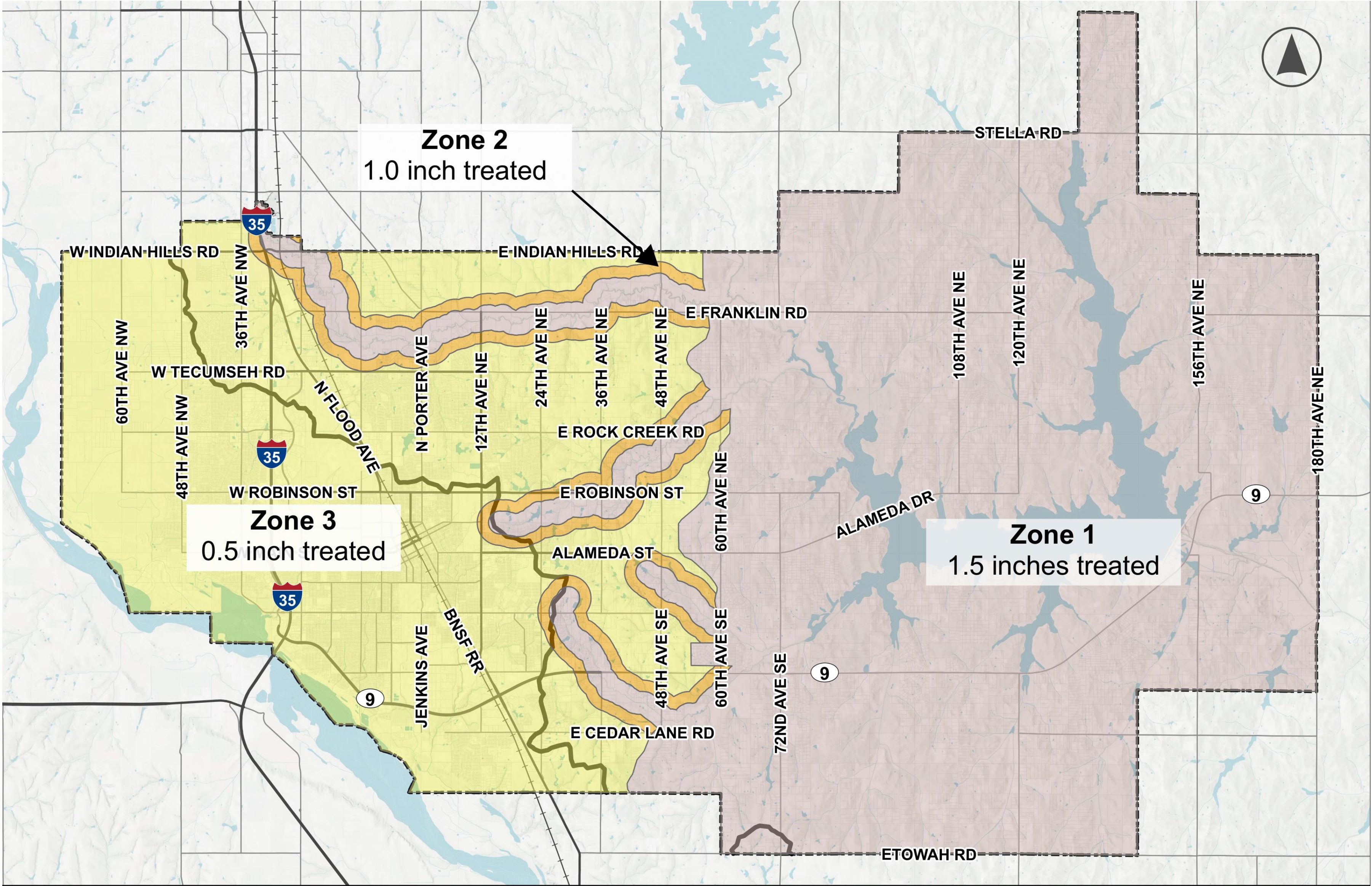
Create an incentive program for projects exceeding stormwater management requirements

Regularly update Engineering Design Criteria

Encourage LID when accessory structures are permitted



# STORMWATER QUALITY TREATMENT REQUIREMENTS





# RECOMMENDED STUDIES (FUNDING NEEDED)

Flood Warning System (in progress)

Stormwater Infrastructure Inventory (in progress)

Low Impact Development (LID) Optimization Study

Geomorphology and Sediment Transfer Study within Lake Thunderbird Watershed

Rain-On-Mesh Hydrologic and Hydraulic Modeling where appropriate

Updated regulatory floodplain mapping for the City



# Open Discussion







# STORMWATER





# STORMWATER & LAND USE

Stormwater, or runoff generated by rain events, influences Norman's environment and infrastructure by contributing to flooding, erosion, and surface water quality concerns. The AIM Norman Land Use Plan considers how land uses changes will influence stormwater management.

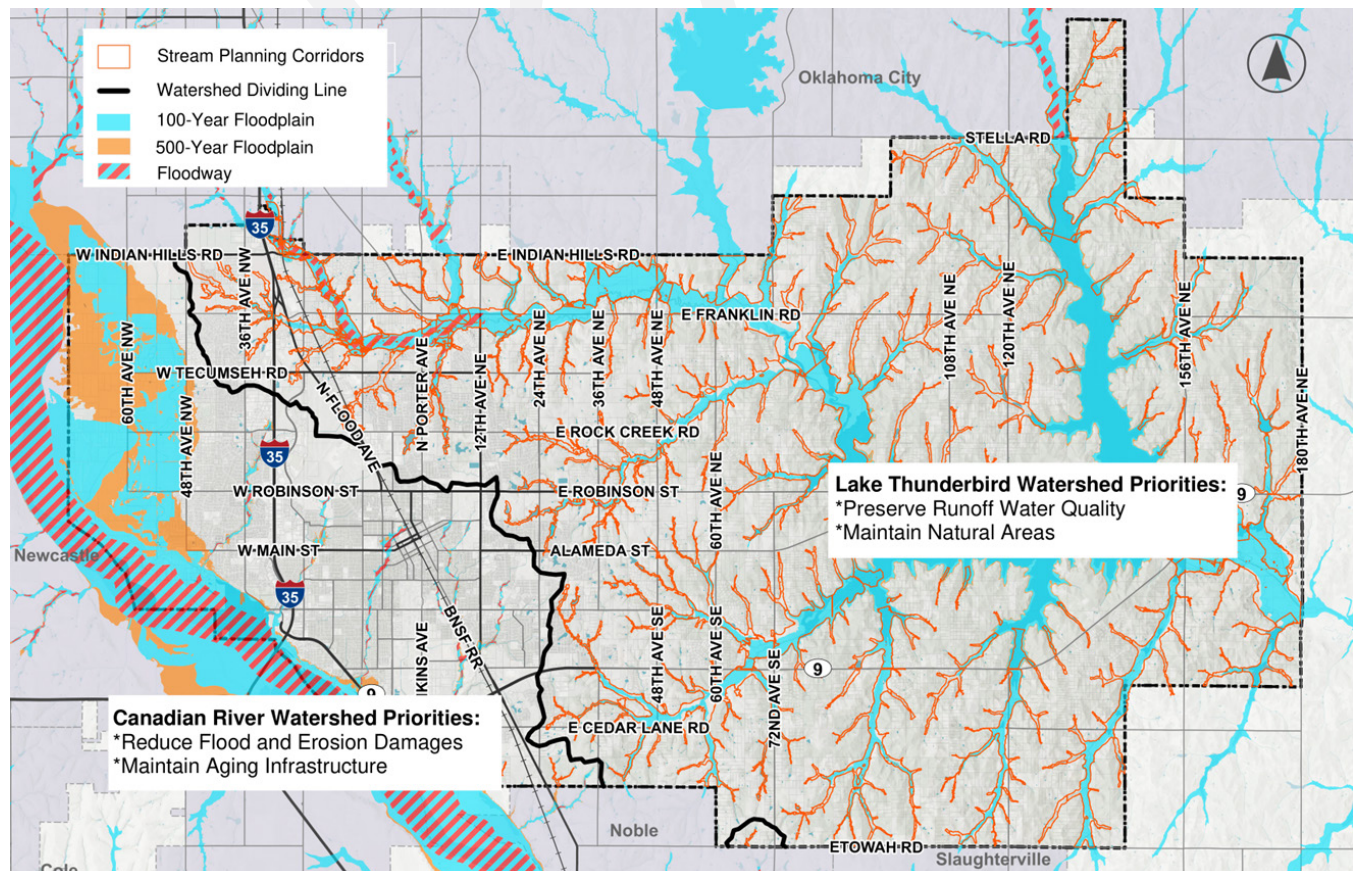
The AIM Norman Stormwater Master Plan update aligns the 2009 SWMP with 2025 stormwater management standards while integrating strategies into the AIM Norman Land Use Plan to anticipate challenges and protect Norman's future.

The map below highlights Norman's main stormwater features. The ridgeline dividing the Lake Thunderbird Watershed and the Canadian River Watershed delineates different stormwater challenges and priorities for each area. The priorities for the watersheds are important to strive for and not mutually exclusive. The Canadian River Watershed priorities include costly upgrades to outdated, undersized infrastructure and reducing flood and erosion damages. The Lake Thunderbird Watershed priorities include preserving water quality, maintaining natural areas, and sustainable development practices to protect the Lake - which is Norman's primary drinking water source.

## NORMAN STORMWATER QUICK FACTS

- There are two primary watersheds in Norman: Lake Thunderbird and Canadian River.
- Norman has over 100 miles of storm sewers.
- Norman has 16 FEMA mapped streams.
- Over 15,000 acres of stream planning corridors exist in Norman.
- There are approximately 53 stream miles of ODEQ-listed impaired waterbodies.

Given the diverse elements of stormwater management, Norman must balance community and environmental needs as it implements land use changes.





# PROMOTION OF THE DEVELOPMENT PRINCIPLES

## AIM NORMAN DEVELOPMENT PRINCIPLES

- 1** Manage urban services efficiently.
- 2** Promote diverse housing options.
- 3** Promote infill development and neighborhood reinvestment.
- 4** Protect the environment in all decision-making.
- 5** Enhance distinctive neighborhoods, business districts, and natural areas with a strong sense of place.
- 6** Provide a multi-modal and connected transportation network.
- 7** Enhance public safety and minimize hazards.
- 8** Encourage balanced and connected neighborhoods.
- 9** Make development decisions predictable, fair, and cost effective.
- 10** Make decisions in a transparent and collaborative manner.

Identified below are the six stormwater goals for Norman. While these goals are specific to stormwater, they further promote the Development Principles of AIM Norman and will help the City realize the vision of the plan.

APPLICABLE DEVELOPMENT PRINCIPLES

### GOAL 1

**Protect the water quality runoff into Lake Thunderbird and the Canadian River to preserve the natural and beneficial uses of these water bodies**

2 4 7

### GOAL 2

**Educated on the flood risk to residents and continue to implement and enhance the Capital Improvement Program to reduce flooding risks.**

1 4 7 10

### GOAL 3

**Enhance and preserve the ecological character of Norman's unurbanized areas.**

2 4 7



#### GOAL 4

Restore and rehabilitate riparian areas in Norman's urbanized areas while expanding recreational access and opportunities that support their ecological health.

1 2 3 4 5 7 8

#### GOAL 5

Continue to educate and raise awareness to the community about flood risk, stormwater quality, City infrastructure, and individual responsibilities to preserve and maintain both natural and manmade stormwater resources.

1 4 7 10

#### GOAL 6

Prioritize stormwater projects using a transparent process that includes collaboration with all stakeholders.

4 7 9 10



# RECENT STORMWATER INITIATIVES

Since adopting the 2009 Stormwater Master Plan (SWMP), Norman has implemented updates and studies to address immediate and long-term stormwater needs. These initiatives reflect proactive responses to changing environmental, regulatory, and community needs. This section highlights key studies and updates since the 2009 SWMP, illustrating the collective progress toward a resilient stormwater management system that continues to evolve with the community.

- **2011:** Adoption of the Water Quality Protection Zone (WQPZ) Ordinance. This is the only ordinance of this kind in the state of Oklahoma.
- **2013:** Manufactured Fertilizer Ordinance. This encourages reduction of Nitrogen and Phosphorous in residential and commercial fertilizer applications.
- **2013:** Lake Thunderbird Watershed was issued a Total Maximum Daily Load (TMDL).
- **2016:** City of Norman TMDL Compliance and Monitoring Plan created for Lake Thunderbird. The lake is included on the state's list of impaired waterbodies and must meet specific water quality standards.
- **2016:** First Stormwater Utility Fee (SWU) Campaign.
- **2018:** Stormwater Citizen's Committee Reports. Summary of discussions and findings from the educational push leading to the second vote on a City-wide SUF. The vote for the SUF failed, but the reports generated from this effort contain valuable information regarding citizen's understanding of the stormwater challenges in Norman.
- **2023:** Engineer Design Criteria Update. Significant updates were made to the drainage design criteria, including updated precipitation estimate requirements, detention requirements, and design storm criteria for roadway cross structures. A section detailing the benefits of Stormwater Best Management Practices (BMPs) was added. These BMPs are intended to provide a guide for minimizing pollutants in stormwater and how to implement them during design and construction of a new development.
- **2023:** Mayor's Climate Protection Agreement Recommendations Update.
- **2023:** Bishop Creek Watershed Based Plan completed.
- **2024:** Stormwater Management Plan Update. This document includes 5-year stormwater quality implementation, maintenance, and documentation plan.

## 2024 STORMWATER MANAGEMENT PLAN UPDATE MISSION STATEMENT & GOALS:

### MISSION

The City of Norman's Stormwater Program is dedicated to maintaining stormwater infrastructure, enhancing runoff water quality, and investing in strategic capital improvements to protect our community and natural resources.

### GOALS

1. Protect the runoff water quality contributing to Lake Thunderbird and the Canadian River to preserve the natural and beneficial uses of these waterbodies.
2. Provide an understanding of the flood risk to citizens in our community and continue to implement and enhance the capital improvement program to help reduce flooding risks.
3. Enhance and preserve the ecological character of the unurbanized areas of Norman through stormwater management efforts.
4. Restore and rehabilitate riparian areas in the urbanized areas of Norman while expanding recreational access and opportunities that support ecological health of these areas.
5. Continue to prioritize community awareness and education regarding stormwater quality, City infrastructure, flood risk, and individual responsibilities to preserve and maintain both natural and manmade stormwater resources.
6. Prioritize stormwater projects using a transparent process that includes collaboration with all stakeholders.



# 2024 STORMWATER MASTER PLAN RECOMMENDATIONS

Many recommendations from the 2009 Stormwater Master Plan (SWMP) remain relevant and are reaffirmed in the 2024 update. The new recommendations support Norman's growth while protecting water resources. Below is a brief overview of each stormwater recommendation.

## CONTINUING RECOMMENDATIONS

The following recommendations highlight items from the 2009 SWMP that are most relevant to the Land Use Plan. These include updates and progress made since 2009, and policy strategies that remain valid. Additional detail may be found in section 9 of the SWMP.

### STORMWATER FUNDING

- Explore long-term funding options such as a stormwater utility fee or bonds. Continue strategic outreach and planning to help residents understand the need for funding.

### FUTURE MEETINGS AND COORDINATION

- Continue public outreach, adapt stormwater goals to changing needs, and maintain public engagement to ensure sustainable stormwater management.

### STREAM PLANNING CORRIDORS

- Continue to dedicate Stream Planning Corridors (SPCs) and 100-year full-buildout floodplains through easement or title for streams in the Lake Thunderbird Watershed with drainage areas over 40 acres.
- Continue to restrict development and major land disturbances within these SPCs and floodplains, allowing only the exemptions permitted today.

### STORMWATER QUALITY CONTROL

- Require large developments (over 1 acre) to capture and treat a minimum of 0.5 inches of runoff through the use of low impact development (LID).
- Encourage LID on smaller development and infill development with an option to contribute to a regional water quality program.
- Include nonstructural measures like public education on fertilizer use, septic maintenance, and density limits to protect Lake Thunderbird.

### STREAM BANK DISTURBANCE

- Require U.S. Army Corps of Engineers (USACE) and ODEQ permits for any stream bank work.
- Mandate mitigation measures like flowline stabilization, replacing vegetation and erosion control in accordance with language in USACE Nationwide Permits.

### CITY-WIDE MAINTENANCE

- Acquire easements for streams and detention areas in new developments.
- Establish a maintenance program for stormwater infrastructure protecting critical facilities.
- Create an operations and maintenance guide for local associations (e.g. HOAs) managing private stormwater management systems.

### DAM SAFETY ISSUES

- Partner with state agencies to assess dam risks and ensure safety measures are installed and maintained.
- Conduct an assessment of dam safety (for all existing and proposed dams) based on projected development identified in the Land Use Plan.

### POLICY, ORDINANCES, AND CRITERIA

- Regularly update development guidelines for rainfall, runoff, water quality, and erosion control as industry standards and best management practices change into the future.
- Develop standard city-wide "pre-development" runoff parameters to provide developers and City staff a documented baseline condition for detention analysis.

### STORMWATER QUANTITY AND QUALITY MANAGEMENT

- Continue funding and developing the Stormwater Program with dedicated staff to support implementation of the SWMP recommended policies, Total Maximum Daily Load (TMDL) compliance and construction of projects included in the Capital Improvement Program.
- Regularly monitor problem areas, prioritize greenway opportunities in conjunction with other AIM Norman plans, and engage regional partners to protect Lake Thunderbird.



## **HYDROLOGIC AND HYDRAULIC (H&H) MODELING**

- Schedule updates to regulatory H&H models city wide as precipitation estimates and hydraulic modeling techniques change.
- Create a centralized H&H model management system so that accepted models can be referenced by City staff, developers' engineers, and CIP project consultants.

## **NEW RECOMMENDATIONS**

Built upon the 2009 SWMP, many of these recommendations were a particular focus for the 2024 AIM Norman Stormwater Sub-Committee. Additional detail on these recommendations can be found in the SWMP.

### **CONDUCT ADDITIONAL STUDIES**

- Flood Warning System (in progress, 2024).
- Stormwater Infrastructure Inventory (in progress, 2024).
- Low Impact Development (LID) Optimization Study. This should include the 2009 Oklahoma Water Resources Board (OWRB) Garber-Wellington Aquifer Recharge Study.
- Stormwater BPM-focused Geomorphology and Sediment Transfer Study within Lake Thunderbird Watershed.
- Two-dimensional (2D) hydrologic and hydraulic (H&H) modeling where appropriate to identify flooding issues in the urbanized areas outside of the mapped floodplain.
- Update regulatory floodplain mapping for the city, specifically Markle Creek subbasin to include effects of airport detention.

### **STORMWATER MANAGEMENT PLAN**

- Continue implementing the six Minimum Control Measures (MCMs) outlined in the 2024 Stormwater Management Plan.

### **ENGINEERING DESIGN CRITERIA**

- Review and update the Engineering Design Criteria (EDC) every two years.
- Require runoff treatment as described in the EDC section 7000 ("Water Quality Volume") in new developments, with stricter standards near Lake Thunderbird and other impaired water bodies.

## **NORMAN'S COMMUNITY RATING SYSTEM**

- Improve flood preparedness with real-time warning systems for rain, stream, and detention levels.
- Inventory stormwater infrastructure to improve maintenance, reduce repair costs, and increase flood insurance discounts for residents.

## **NORMAN'S WATER QUALITY PROTECTION ZONE ORDINANCE**

- Update the Water Quality Protection Zone (WQPZ) Ordinance based on lessons learned since adoption in 2011. Updates should focus on protecting natural riparian areas during construction.
- Prevent "alternative width" reduction of WQPZ widths in the 2045 Reserve of the Land Use Plan Character Area Map.

## **INCENTIVIZE LOW IMPACT DEVELOPMENT**

- Establish overlay districts with stricter runoff treatment standards for areas that could directly impact sensitive and impaired water bodies.
- Create incentives for projects exceeding stormwater management standards, including expense credits, annual best practice awards, and expedited permits.
- Establish a local cost-share or grant program for retrofitting urban stormwater infrastructure and providing technical support to neighbors seeking to maintain their stormwater.

## **CONSTRUCTION SITE INSPECTIONS**

- Strengthen oversight of construction site BMP compliance by hiring additional inspectors and dedicated compliance officers.
- Ensure support of stormwater management enforcement across all stakeholders including City staff, officials, and residents to enforce stormwater regulations and protect Norman's waterbodies.





## **TOTAL MAXIMUM DAILY LOAD (TMDL) MONITORING STATUS**

- Install additional water quality monitoring stations for streams that may be affected by additional development allowed by the Land Use Plan or upcoming major transportation projects.

## **TREE COVER PROTECTION**

- Set a goal to preserve at least 60% of beneficial tree coverage post-construction within WQPZ riparian areas and offer incentive credits for meeting this target.

## **ACCESSORY STRUCTURES**

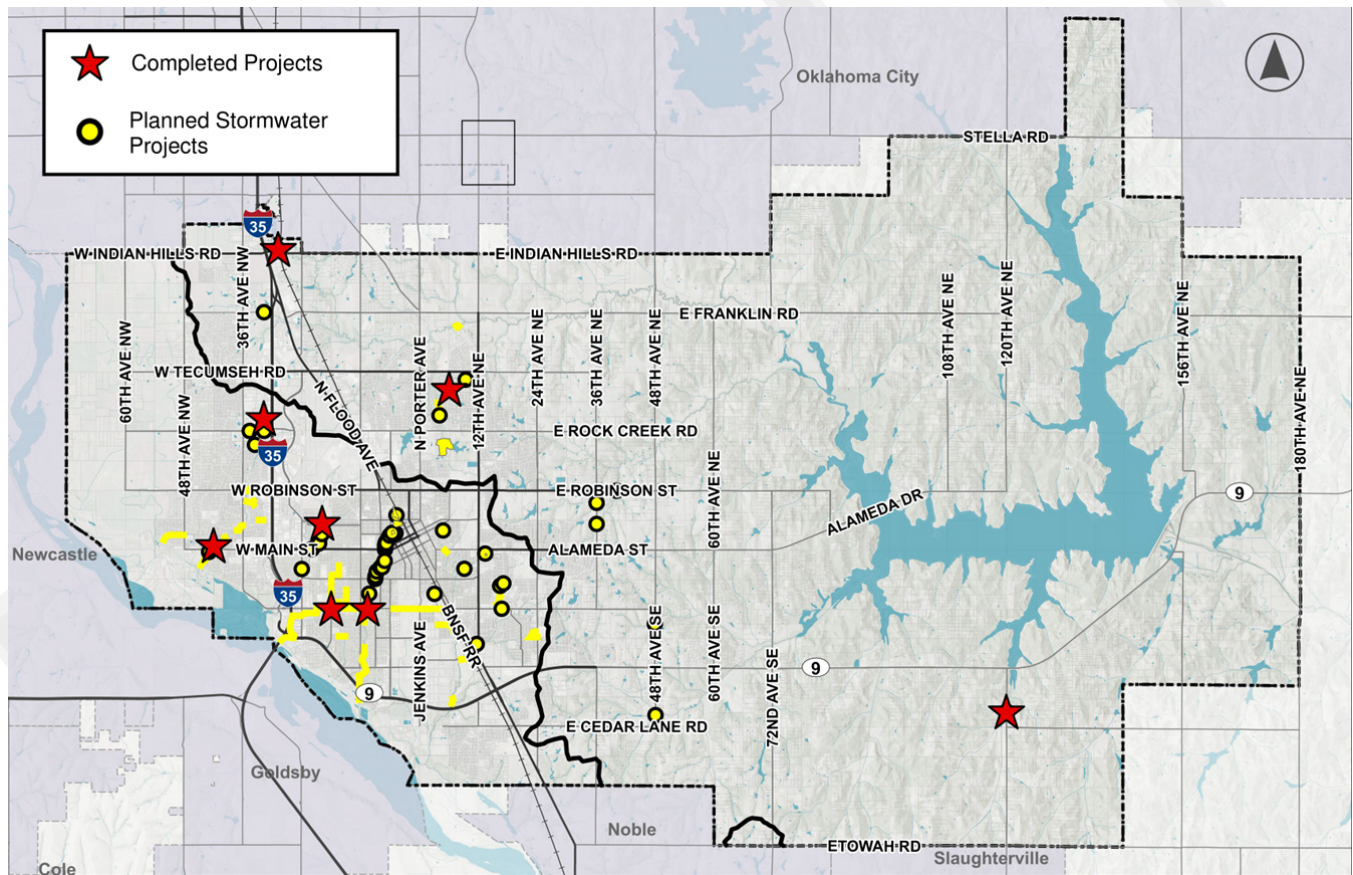
- Require stormwater BMPs when accessory structures are permitted to reduce the impact of increased impervious coverage in areas where stormwater management is an existing issue.
- Develop a plan to improve stormwater infrastructure as Core Norman incrementally redevelops.



# STORMWATER CAPITAL PROJECTS PLAN

The 2009 Stormwater Master Plan (SWMP) proposed solutions and cost estimates for 59 flood-related stream and erosion issues. Since 2009, many of the proposed solutions have been constructed, but a majority have not due to lack of funding. The map below highlights the locations of planned and completed projects.

Projects from the 2009 SWMP were grouped by issues like funding, erosion, water quality, and local drainage. The updated plan verifies and includes unfinished projects that still meet current needs.





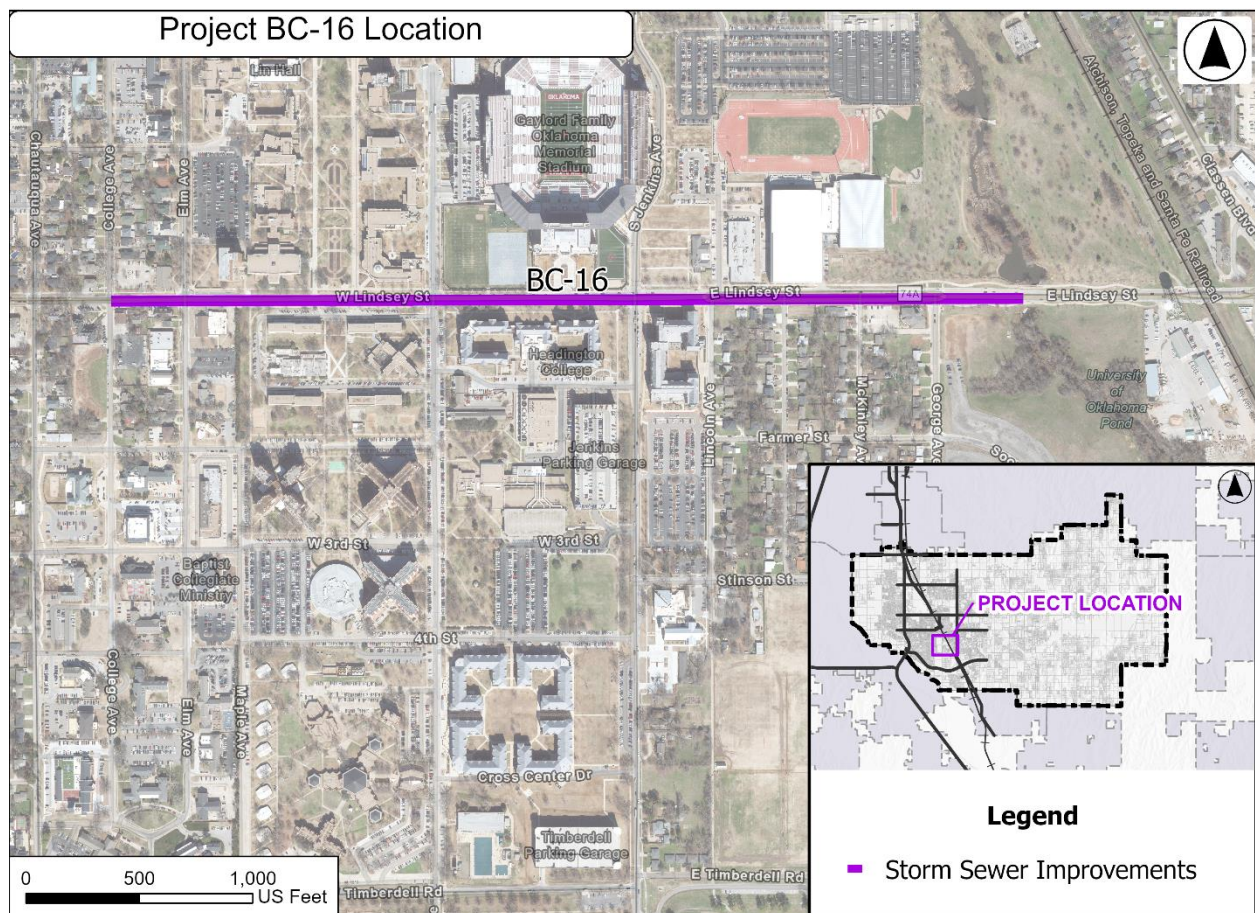
# Project BC-16 – Business Case Evaluation

## Project Description

The existing storm sewer system between College Street and Tributary C to Bishop Creek along Lindsey Street is not adequate to handle the 10-year storm event.

## Proposed Solution

The proposed project requires the installation of a parallel storm sewer system. The project can be implemented in a way that integrates the greenbelt trails plans for Norman.







### Special Considerations

- Standard operation and maintenance cost should be considered.

### Potential Project Phasing

Phase 1: Storm sewer system installation

Phase 2: Greenbelt trails implementation

### Additional Professional Services

Other possible services include surveying, geotechnical study, right of way acquisition, and utility relocation.

Project Identification	
Project Area	BC-16
Location:	Lindsey St
Community Ward:	7
2025 Schematic Cost	
\$10,981,327	
CIP Scoring	
Economic:	19
Social:	17
Ecological:	9
<b>Total:</b>	<b>45</b>
Improvement Parameters	
Structures Removed from 100yr Floodplain	---
Flood Prone Structures Removed	---
Stream Length Stabilized	---
CIP Rank	
Watershed Rank	3
City Rank	8
Ward Rank	1