
City of Tulsa

Repetitive Loss Area Analysis

Upper Middle Mingo Creek Basins

August 18, 2026



Contents

Contents	2
Introduction	3
Background.....	3
Location and Drainage	5
Audubon Creek.....	7
RLA 21.....	8
Area Specific Flooding	8
Improvements	8
Claims Data	10
Research And Analysis.....	10
Bell Creek.....	13
RLA 31.....	14
Area Specific Flooding	14
Improvements	14
Claims Data	16
Research And Analysis.....	16
RLA 32	19
Area Specific Flooding	19
Improvements	19
Claims Data	21
Research And Analysis.....	21
Notifications.....	23
Mitigation Measures.....	24
Overview	24
Individual Mitigation Measures: What You Can Do.....	24
Repetitive Loss Area Mitigation Measures: What the City Can Do.....	27
Funding	27
Recommendations.....	28

Introduction

The National Flood Insurance Program (NFIP) is a federal program administered by the Federal Emergency Management Agency (FEMA) that provides flood insurance to property owners in participating communities. In exchange, communities agree to adopt and enforce floodplain management regulations designed to reduce future flood risk. These regulations establish minimum standards for development in flood-prone areas and are intended to minimize damage to structures and infrastructure over time. The City of Tulsa has adopted its floodplain management regulations in Title 11A of the City's Code of Ordinances.

To encourage communities to go beyond these minimum requirements, FEMA established the Community Rating System (CRS). The CRS is a voluntary program that provides flood insurance premium discounts to policyholders in communities that implement additional floodplain management, public outreach, and hazard mitigation activities.

Over time, the NFIP has continually faced the job of balancing flood claim payments with insurance premium affordability, particularly while some properties flood more frequently than others. A subset of properties that cause a disproportionate impact to this balance are repetitive loss properties. FEMA defines repetitive loss properties as any property that has been paid two or more flood insurance claims of \$1,000 or more in a 10-year period. These repetitive loss properties account for approximately 25 to 30 percent of the NFIP's total claim payments, or about \$200 million annually, while representing only 1 percent of NFIP-insured properties nationwide. To aid in managing this issue, one of the requirements of the CRS is that communities identify all repetitive loss properties in their jurisdiction and work with the owners in finding ways to reduce or eliminate future flood damage. This initiative has been very successful in reducing flood losses and claims.

Using NFIP repetitive loss data, communities must analyze and map the surrounding areas where similar flooding conditions may exist. These areas are referred to as Repetitive Loss Areas (RLAs). For each RLA, the community is required to follow a 5-step process: notify affected property owners, assess potential flood risks, and develop strategies to reduce or eliminate future flood damage. As a CRS Class 1 Community, the City of Tulsa is required to update these reports in time for its program verification cycle. The updates must review the flooding and building conditions and modify the repetitive loss areas and their analyses accordingly. This 2026 update to the repetitive loss area analysis is intended to fill this verification requirement.

Background

The City of Tulsa's flooding history dates back to before statehood and has grown with the City. In the post-World War II era, the City experienced rapid development and expansion into what has become the Mingo and Joe Creek watershed. Most of this development occurred in the low-lying floodplains of these creeks which resulted in increased flood risk.

Tulsa's rapid development during this time was not singular, many communities across the country were experiencing urbanization and increased flood loss. In response, the U.S.

Congress established the National Flood Insurance Program in 1968. The City of Tulsa joined the NFIP in 1974.

By the 1980s, Tulsa had been experiencing floods in rapid succession, with nine floods occurring over 15 years¹. Two specific storms contributed largely to the number of repetitive loss properties in the City of Tulsa: the June 1979 and May 1984 floods. As of this 2026 update, the 1984 flood is still maintained as the City's Flood of Record.

Many of the City's repetitive loss properties filed claims in 1979. Significant flooding that year occurred in the Little Joe Creek and Dirty Butter Creek watersheds². According to a June 1979 National Oceanic and Atmospheric Administration (NOAA) publication titled *Storm Data and Unusual Weather Phenomena*, four to six inches of rain fell over a two-hour period in South Tulsa accompanied by high winds³—causing damage to dozens of buildings. The impact of the storm was felt the most in the Joe Creek watershed with Little Joe Creek overtopping its banks.

Numerous repetitive loss properties in the City of Tulsa list the May 1984 storm as their most recent flood insurance claim. The creeks that were the most heavily impacted were Mingo Creek, Bigheart Creek, Harlow Creek, Flatrock Creek, Dirty Butter Creek, Coal Creek, Little Joe Creek, and Haikey Creek. A slow-moving storm caused approximately six to fifteen inches of rain to fall over an eight-hour period, occurring primarily overnight. The largest rainfall totals occurred in the Mingo Creek watershed⁴.

The 1984 storm was severe, causing 14 fatalities and injuries to hundreds of people. The impacts on infrastructure were significant, with more than 5,000 buildings affected and total losses estimated at approximately \$180 million⁵ (about \$575 million in 2026 dollars). Following the event, President Ronald Reagan issued a federal disaster declaration.

After the 1984 flood, the City created a Flood Hazard Mitigation Team to guide recovery and long-term mitigation efforts. The City has since worked to acquire flood-prone properties, implement major flood control projects, and develop basin-wide master drainage plans.

The City's ongoing investment in mitigating flood risk has resulted in a comprehensive floodplain management program. At the turn of the century, FEMA classified Tulsa as first in the nation for its floodplain management program, leading to the lowest flood insurance premiums for residents in the US. The City has continued to improve their program, joining the NFIP's Community Rating System (CRS) in 1991. As a result, Tulsa has been awarded Class I, which grants its residents a 45 percent discount on the cost of NFIP flood insurance for structures.

¹ <https://www.cityoftulsa.org/floodcontrol>

² United States Army Corps of Engineers, Southwestern Division, Tulsa District. *Tulsa Urban Study: Flooding Overview Report*. October 1982.

³ National Oceanic and Atmospheric Administration (NOAA), Environmental Data and Information Service, National Climatic Center. *Stormwater Data Volume 21, No.6*. Asheville, NC, June 1979.

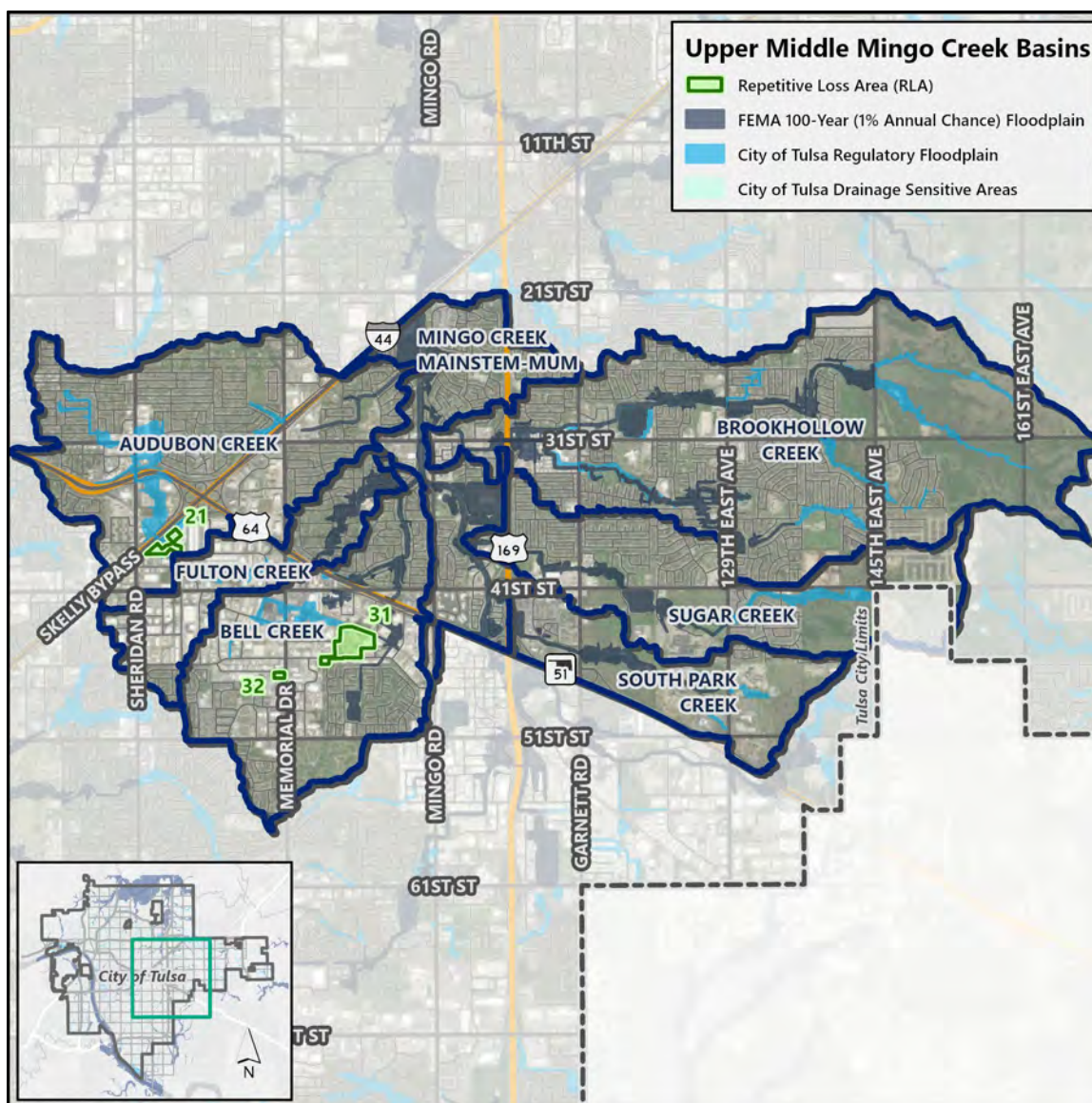
⁴ National Weather Service. *Tulsa Memorial Day Flood of May 26-27, 1984*.
https://www.weather.gov/tsa/1984may26_tulsamemorialdayflood

⁵ United States Army Corps of Engineers, Southwestern Division, Tulsa District. *Flood of May 27, 1984*. May 1985.

Location and Drainage

The Upper Middle Mingo Creek basin group is located in East Tulsa along Mingo Creek. Most of this area is covered with a mix of industrial, commercial, and residential land use. This basin group is covered by council districts 5, 6 and 7.

Figure 1: Upper Middle Mingo Creek



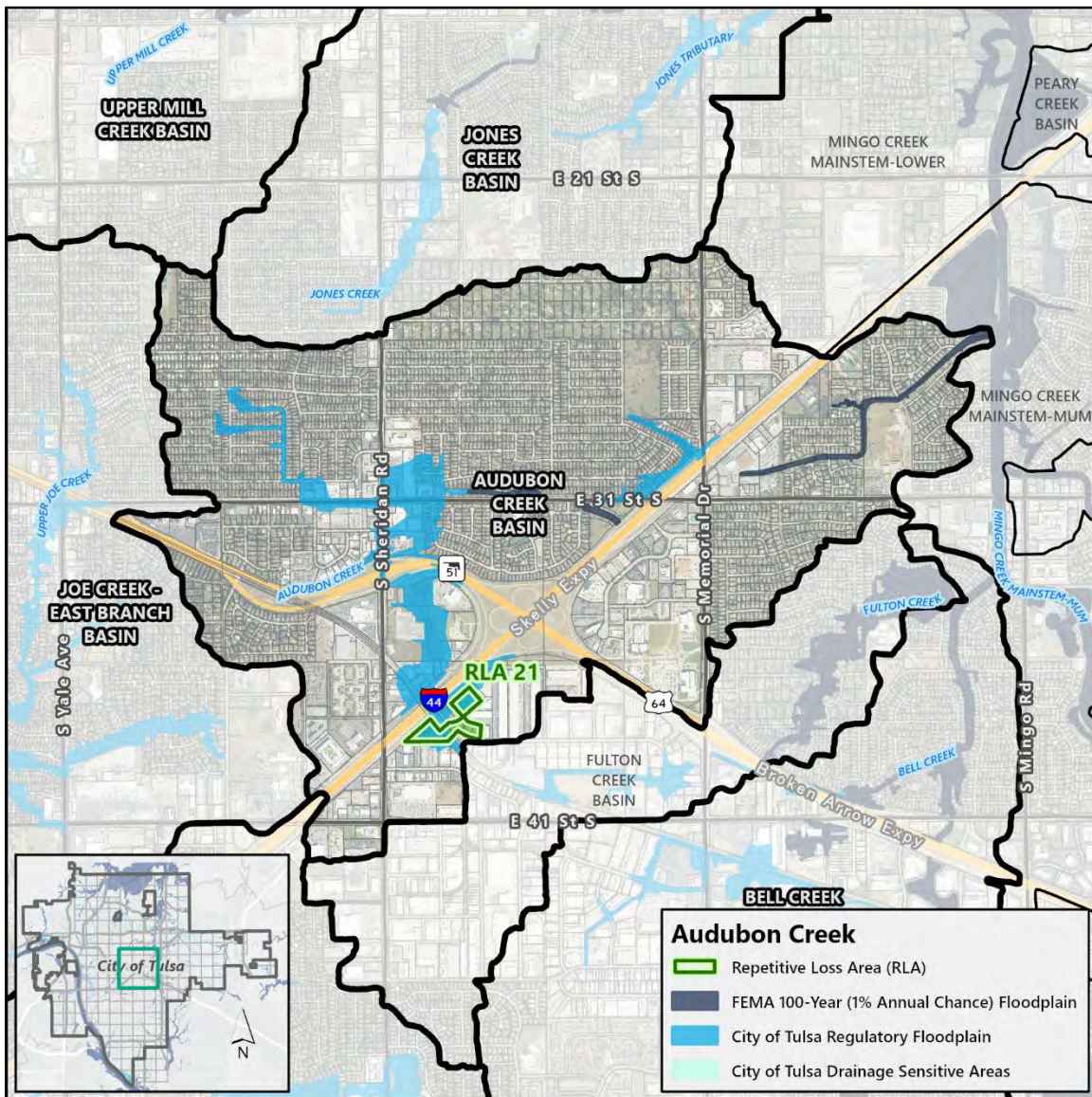
The Upper Middle Creek Basin Group contains seven subbasins: Mingo Creek MUM, Audubon Creek, Bell Creek, Brookhollow Creek, Fulton Creek, Sugar Creek, and Southpark Creek and has three active repetitive loss areas. The creeks within the Upper Middle Mingo Creek Basins' floodplains are located within Special Flood Hazard Area and the City regulatory floodplain. This area historically was subject to a mix of overbank flooding and overland flooding. Through continuous improvements along the Mingo Creek that include flood control projects

and acquisition of flooded properties, the City has made a tremendous effort to reduce flooding loss and improve public safety for its citizens. There are two basins containing four unmitigated repetitive loss properties. The unmitigated repetitive loss properties are spread over three areas.

Audubon Creek

Audubon Creek is located in East Tulsa. This creek is a tributary of Mingo Creek; it extends approximately 3 miles and has a contributing drainage area of 2.9 square miles. The watershed is a mix of residential, industrial and commercial land use. The creek generally flows east-northeast until its confluence with Mingo Creek near the intersection of S. 94th E. Ave. and E. 27th St. The lower reaches of Audubon Creek are designated as FEMA Zone AE with Floodway, while the City of Tulsa regulatory floodplain encompasses the main channel and several tributaries. The Audubon Creek basin contains one unmitigated RLA.

Figure 2: Audubon Creek Overview



RLA 21

Area Specific Flooding

Repetitive Loss Area 21, located in the Audubon Creek watershed, was established in 2017. This Repetitive Loss Area is comprised of five properties located near the intersection of E. 38th St. and S. 73rd E. Ave. The properties were developed between 1960 and 1984. The terrain on which the buildings are located is in the City of Tulsa regulatory floodplain for Audubon Creek, which touches three of the RLA's five structures. Although the RLA is toward the top of the subbasin, the area is mostly impervious outside of the channel due to industrial and commercial development allowing for increased runoff potential.

Drainage conditions in this RLA indicate that flooding is likely caused by overland flow and undersized culverts at the I-44 and railroad. Overland flow passes through the properties and is conveyed by inadequate ditches. This RLA is located where Audubon Creek's mainstem is formed from two primary branches. The eastern branch originates around E. 38th St. and Skelly Dr., this branch is primarily storm sewer until it daylights on the north side of I-44. The western branch originates at 41st St. and Sheridan and is primarily storm sewer until passing under the MKT/BNSF railroad and turning north under I-44. The two branches join north of I-44, forming the mainstem of Audubon Creek.

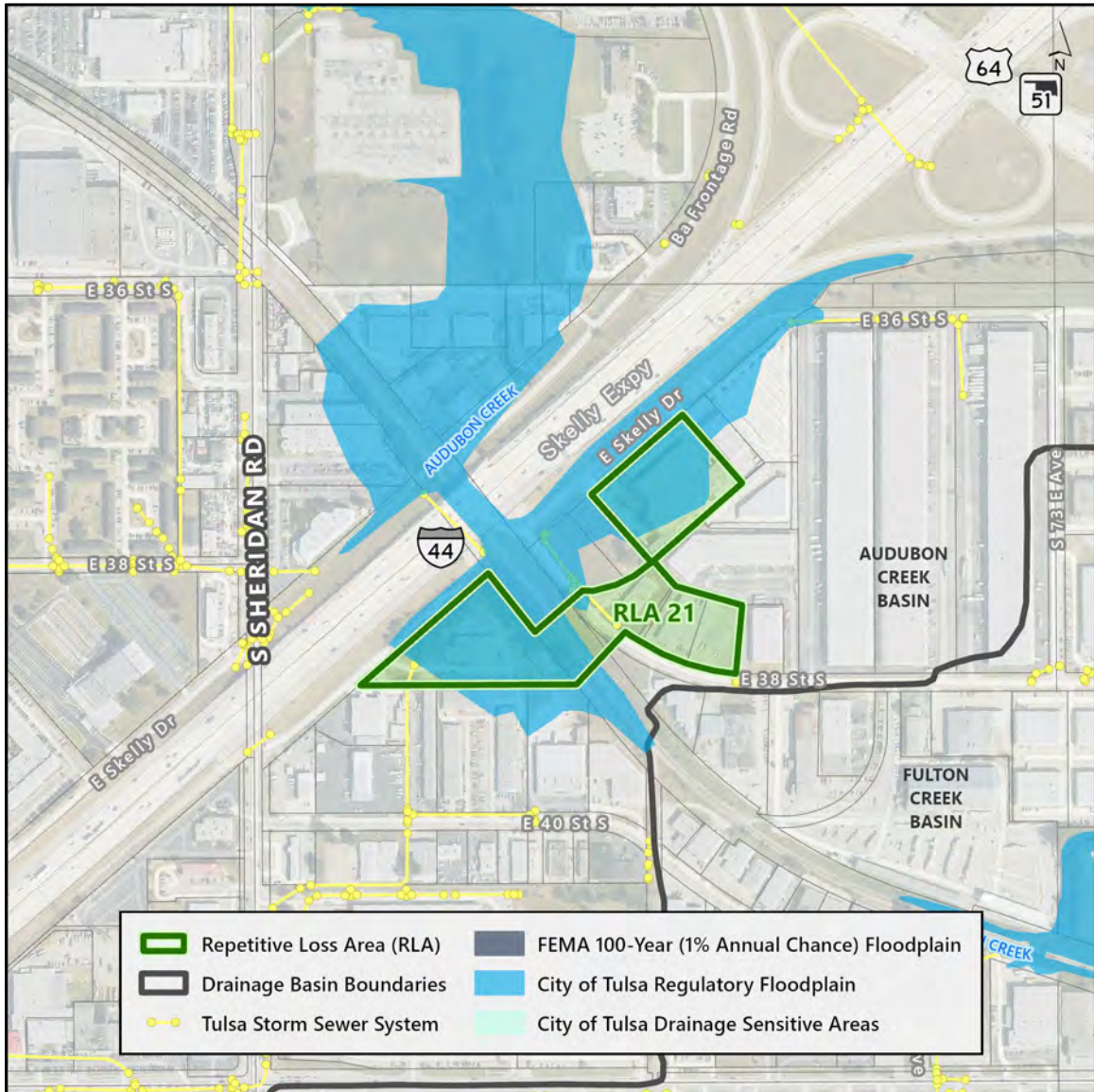
The Upper Mill, Audubon and Jones Creeks Basin Drainage Study, written in 1993, suggests improved channels along I-44, enlarged structures at the railroad and I-44, and increase ditch capacity along Skelly Dr.

The general location of this RLA is shown on the map below. The detailed map identifies residential properties, County Assessor parcels, floodplains and the existing storm sewers and inlets system.

Improvements

Several improvements recommended by the Upper Mill, Audubon and Jones Creeks Basin Drainage Study have been implemented, including improved drainage channels along I-44 west and east of E. 38th St., enlarged conduits beneath the railroad, Skelly Dr., I-44 and E. 38th St., and increased bar ditch capacity along the north and south sides of I-44 and Skelly Dr. As of this 2026 update, there have been open channel improvements made along the north side of this RLA, between its bounds and Skelly Dr. The improved capacity of this channel could help mitigate flooding in this RLA.

Figure 3: RLA 21



Claims Data

FLOOD INSURANCE DATA One property in this RLA has carried flood insurance and made three damage claims to the NFIP. Two of the claims were paid, totaling \$20,500. The last claim for this RLA was filed in 1981. Because the Privacy Act of 1974 (5 USC 522a) restricts the release of flood insurance policy and claims data to the public, neither the repetitive loss property nor specific claim data are detailed in this plan.

Research And Analysis

The original analysis of this RLA was conducted in 2017 by the Project Team through interviews with City officials, research into Stormwater Design files, including the Upper Mill, Audubon, and Jone Creek Master Drainage Plan, review of the City's extensive flood history documentation, assessment of insurance claims, visits to the RLA, interviews with homeowners and questionnaires mailed to the property owners and occupants soliciting information about prior and existing flooding issues, if any. For this 2026 review, additional claims data, updated topography, 311 citizen call logs, and a review of the City's CIP prioritization were used to update this analysis.

AGENCIES AND ORGANIZATIONS During the course of the 2017 RLA analysis and plan development, the Project Team solicited input from the City of Tulsa Stormwater Design, the Communications Department, and the Working in Neighborhoods Department (WIN), Indian Nations Council of Governments (INCOG), US Army Corps of Engineers (USACE), City of Tulsa Emergency Management, and Tulsa County Emergency Management. Research and analysis were done in accordance with guidelines from the Federal Emergency Management Agency (FEMA), the National Flood Insurance Program (NFIP) and the NFIP's Community Rating System (CRS). In this 2026 update, the Project Team worked with City agencies to verify the status of the repetitive loss properties.

PLANS, STUDIES AND DOCUMENTS The following City of Tulsa and FEMA documents were used in the analysis:

- FEMA Flood Map Panel: 40143C0357L, October 16, 2012
- Regulatory Floodplain Map Atlas, Tulsa Engineering Services, September 2024
- City of Tulsa Stormwater Management Plan
- Stormwater Management Criteria Manual, June 2019
- Stormwater Capital Improvements List, City of Tulsa, Water and Sewer
- 2024 City of Tulsa Hazard Mitigation Plan Update, Freese & Nichols, 2024
- Guidebook to Conducting Repetitive Loss Area Analyses, UNO and FEMA
- Upper Mill, Audubon and Jones Creeks Basin Drainage Study, Tulsa, OK, FHC Inc., May 28, 1993
- Mill, Jones and Audubon Creeks Basin Drainage Study, Tulsa, OK, FHC Inc., October 29, 1992
- "The Effects of Urbanization on the Mingo Creek Watershed," Tim Mars, 1984
- Repetitive Loss Area #21, Flanagan & Associates, Swift Water Resources, 2017

CAPITAL IMPROVEMENTS PLANS The City of Tulsa has planned a Capital Improvement Project that would benefit this RLA by implementing the pond capacity and storm sewer improvements recommended in the 1993 Master Drainage Plan.

FIELD SURVEYS AND SITE VISITS In 2017, site visits were conducted during the study, primarily to confirm foundation type and view local on-site overland flow drainage patterns. During this 5-year update, these areas were reviewed using GIS data and aerial imagery along with site visits.

REVIEW DRAINAGE PATTERNS The Project Team examined aerial topography maps, master drainage plans, storm sewer plans, City Customer Care Center complaints and comments, and conducted field checks to determine area drainage patterns and identify flooding problem areas. The results of the research and analysis are described in the following paragraphs and summarized in the table below.

STRUCTURES The Project Team made a number of visits to this RLA to determine the situation and condition of the structures. Visual analysis was verified by queries of Tulsa County Assessor data.

STRUCTURE TYPE The structures are all commercial buildings.

FOUNDATION TYPE The type of foundation was determined by field investigation and query of Tulsa County Assessor records.

CONDITION OF STRUCTURES The condition of the residences in the RLA was determined by field investigation and the County Assessor's records. These findings are summarized in the following table.

Alias	Structure Type	Foundation Type	Year Built	Condition
Property 1	Commercial	Slab	1975	Avg
Property 2	Commercial	Slab	1975	Avg
Property 3	Commercial	Slab	1970	Avg +
Property 4	Commercial	Slab	1984	Avg
Property 5	Commercial	Slab	1960	Avg

CONCLUSIONS Based on flood data, the Upper Mill, Audubon and Jones Creeks Basin Drainage Study, site surveys and discussions with City officials, the causes of damage have been overland flooding, overbank flooding from undersized culverts along the creek, and undersized ditches along Skelly Dr. Improvements done in the 1990s to drainage ditches along I-44 and the conduits beneath the railroad improved flooding conditions. Four buildings remain touched by the City of Tulsa's regulatory floodplain. Since these improvements the only recorded complaints of flooding have been due to street inundation at S. 79th E. Ave. and E. 38th St. In 2025, a ditch improvement was made along the south side of Skelly Dr. that corresponded with roadway improvements. The City of Tulsa has planned a Capital

Improvement Project that would benefit this RLA by implementing the pond capacity and storm sewer improvements recommended in the 1993 Master Drainage Plan.

RLA 21



Google Earth

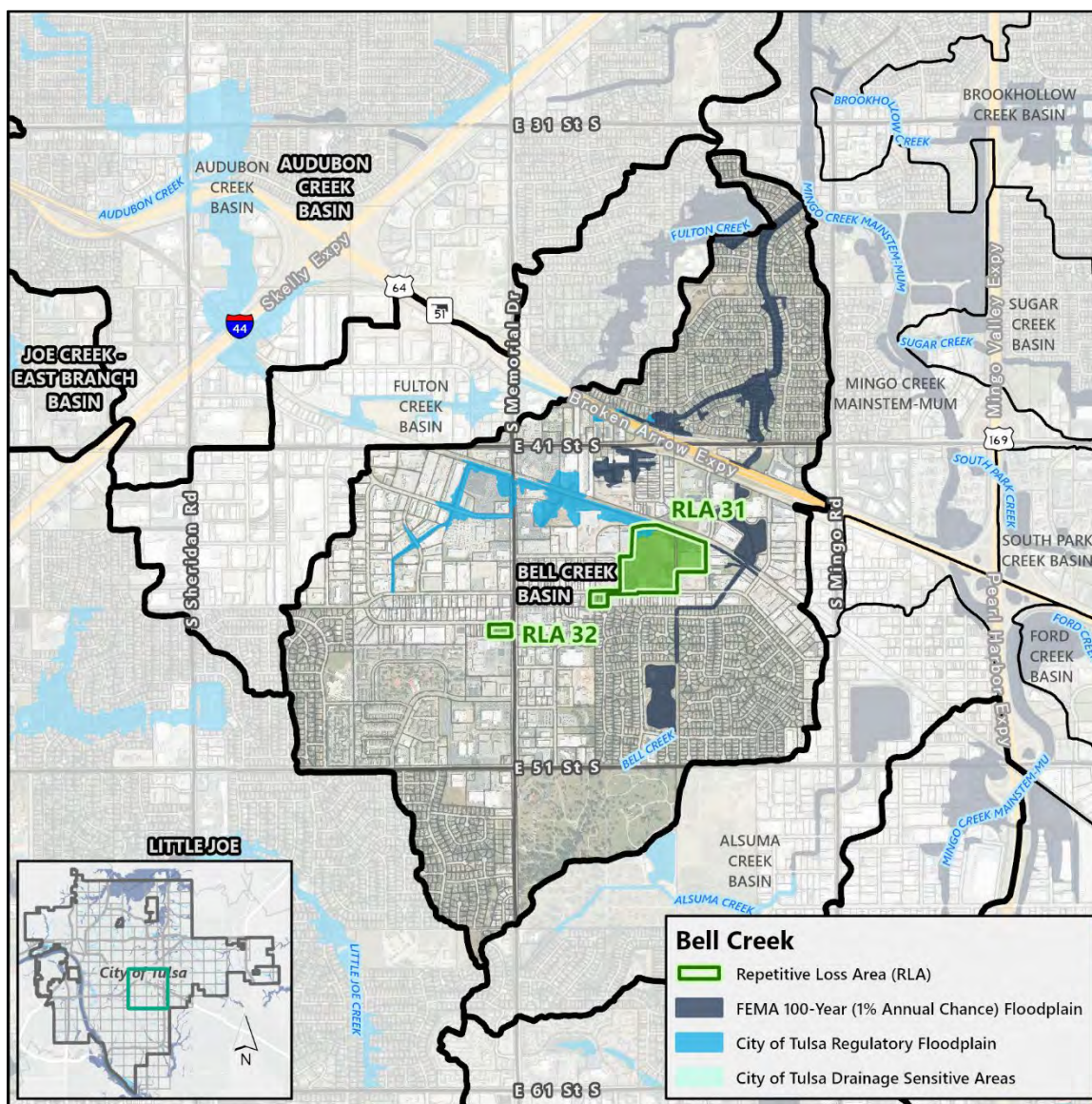
© 2026 Google

5.45 ft

Bell Creek

Bell Creek is located in East Tulsa. This creek is a tributary of Mingo Creek; it extends approximately 2.5 miles and has a contributing drainage area of 2.5 square miles. The watershed is a mix of residential, industrial and commercial land use. The creek generally flows north-northeast until its confluence with Mingo Creek near the intersection of E. 32nd Pl. and S. 93rd E. Ave. Most of the reaches of Bell Creek are designated as FEMA Zone AE with Floodway and are also mapped in the City of Tulsa regulatory floodplain. The Bell Creek basin contains two unmitigated RLAs.

Figure 4: Bell Creek Overview



RLA 31

Area Specific Flooding

Repetitive Loss Area 31, located in the Bell Creek watershed, was established in 2017. This Repetitive Loss Area is comprised of seven properties located at the intersection of E. 48th St. S. and S. 86th E. Ave. The properties were developed between 1965 and 1985. The terrain on the north and northeastern side of this RLA is located in the City of Tulsa regulatory floodplain for Bell Creek. The floodplain touches one of the RLA's seven structures. In this 2026 analysis, two historic RLAs (31 and 61) have been combined to form RLA 31.

Drainage conditions in this RLA indicate that flooding is likely caused by overland flow and storm sewer backup. The land on which the buildings are constructed is generally flat. This area is mostly impervious due to industrial and commercial development, allowing for increased runoff potential.

This area is located in Problem Area 15 of the Bell Fulton MDP Updates. According to the plan, the storm sewer along 44th St. only conveys the 1-year storm and the system along 46th St. can convey the 2-year storm, causing overland flooding to be an issue during smaller rain events. The recommended plan for this problem area in the Bell Fulton MDP is a storm sewer system improvements and channel improvements downstream.

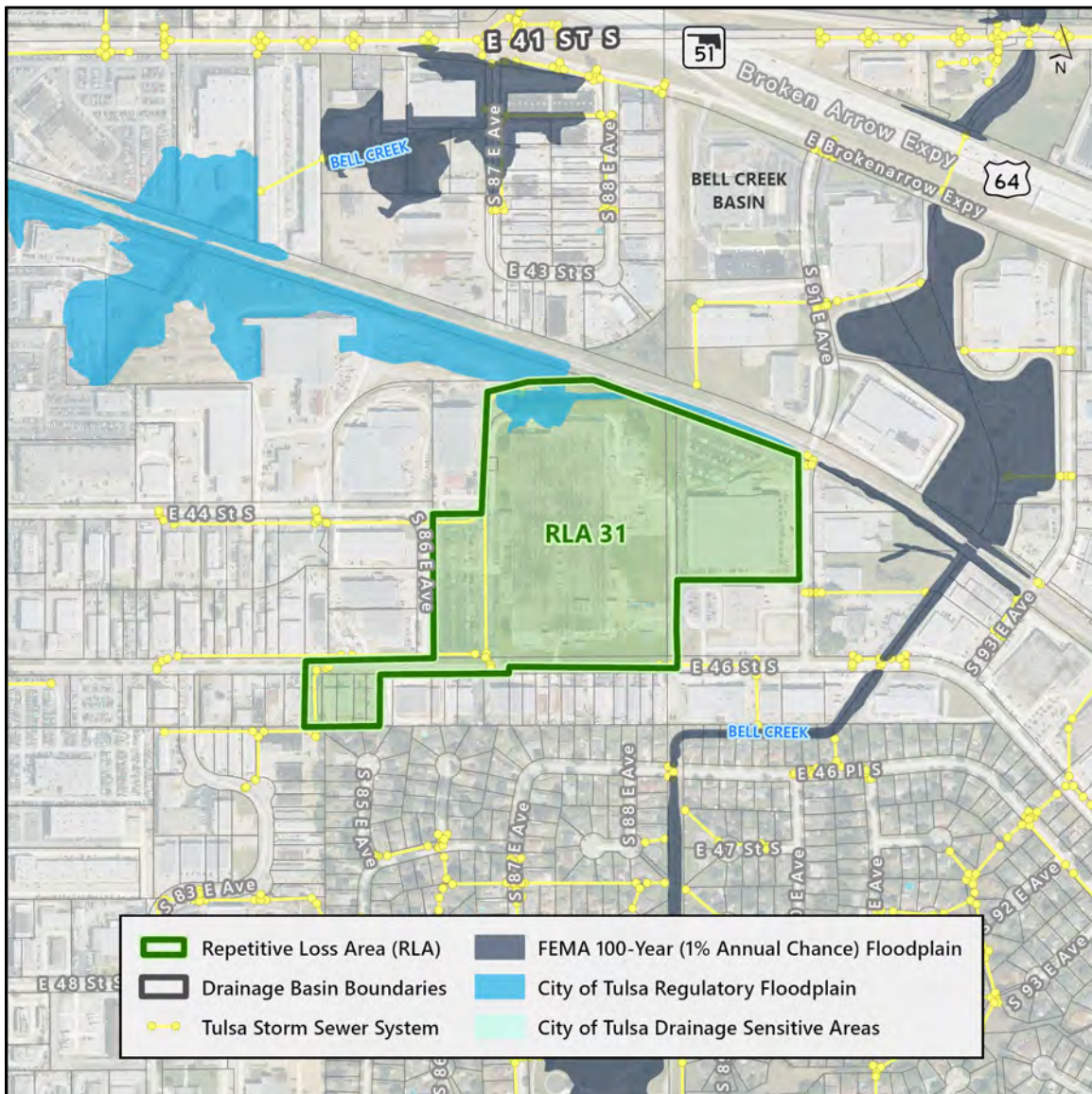
A property owner reported that flooding occurs about every other year. In 2011, the water came through the front door and interfered with business operations, damaging both structure and contents. In 2012, as much as 8 to 10 inches of water entered the building causing structural damage.

The general location of this RLA is shown on the map below. The detailed map identifies residential properties, County Assessor parcels, floodplains and the existing storm sewers and inlets system.

Improvements

The culverts beneath 41st St. and the Broken Arrow Expressway downstream of this RLA were enlarged, improving conveyance. The owners of the industrial building reported previously that they have made necessary improvements on their property to prevent flood damage, but that the City's drainage system is undersized. Sometime after 1984, the City of Tulsa installed additional storm sewer inlets on S. 83rd E. Ave. and in front of the properties on E. 46th St., but flooding has continued in this area.

Figure 5: RLA 31



Claims Data

FLOOD INSURANCE DATA There are two repetitive loss properties in this RLA. Two properties in the RLA have carried flood insurance and both properties have made two damage claims to the NFIP, totaling \$70,272. The last claim for this RLA was filed in 2012. Because the Privacy Act of 1974 (5 USC 522a) restricts the release of flood insurance policy and claims data to the public, neither the Repetitive Loss property nor specific claim data are detailed in this Plan.

Research And Analysis

The original analysis of this RLA was conducted in 2017 by the Project Team through interviews with City officials, research into Stormwater Design files, including the Bell Fulton Creeks Master Drainage Plan, review of the City's extensive flood history documentation, assessment of insurance claims, visits to the RLA, interviews with homeowners and questionnaires mailed to the property owners and occupants soliciting information about prior and existing flooding issues, if any. For this 2026 review, additional claims data, updated topography, 311 citizen call logs, and a review of the City's CIP prioritization were used to update this analysis.

AGENCIES AND ORGANIZATIONS During the course of the 2017 RLA analysis and plan development, the Project Team solicited input from the City of Tulsa Stormwater Design, the Communications Department, and the Working in Neighborhoods Department (WIN), Indian Nations Council of Governments (INCOG), US Army Corps of Engineers (USACE), City of Tulsa Emergency Management, and Tulsa County Emergency Management. Research and analysis were done in accordance with guidelines from the Federal Emergency Management Agency (FEMA), the National Flood Insurance Program (NFIP) and the NFIP's Community Rating System (CRS). In this 2026 update, the Project Team worked with City agencies to verify the status of the repetitive loss properties.

PLANS, STUDIES AND DOCUMENTS The following City of Tulsa and FEMA documents were used in the analysis:

- FEMA Flood Map Panel: 40143C0357L, October 16, 2012
- Regulatory Floodplain Map Atlas, Tulsa Engineering Services, September 2024
- City of Tulsa Stormwater Management Plan
- Stormwater Management Criteria Manual, June 2019
- Stormwater Capital Improvements List, City of Tulsa, Engineering Services
- 2024 City of Tulsa Hazard Mitigation Plan Update, Freese & Nichols, 2024
- Guidebook to Conducting Repetitive Loss Area Analyses, UNO and FEMA
- Mingo Creek Master Drainage Plan for Tributaries between I-44 and the Broken Arrow Expressway, June 1981
- Bell Fulton Creeks Master Drainage Plan, Meshek & Associates, 2017
- "The Effects of Urbanization on the Mingo Creek Watershed," Tim Mars, 1984
- Repetitive Loss Area #31, Flanagan & Associates, Swift Water Resources, 2017
- Repetitive Loss Area #61, Flanagan & Associates, Swift Water Resources, 2017

CAPITAL IMPROVEMENTS PLANS The City of Tulsa has planned a Capital Improvement Project that would benefit this RLA by implementing the storm sewer and channel improvements recommended in the 2017 Master Drainage Plan.

FIELD SURVEYS AND SITE VISITS In 2017, site visits were conducted during the study, primarily to confirm foundation type and view local on-site overland flow drainage patterns. During this 5-year update, these areas were reviewed using GIS data and aerial imagery along with site visits.

REVIEW DRAINAGE PATTERNS The Project Team examined aerial topography maps, master drainage plans, storm sewer plans, City Customer Care Center complaints and comments, and conducted field checks to determine area drainage patterns and identify flooding problem areas. The results of the research and analysis are described in the following paragraphs and summarized in the table below.

STRUCTURES The Project Team made a number of visits to this RLA to determine the situation and condition of the structures. Visual analysis was verified by queries of Tulsa County Assessor data.

STRUCTURE TYPE The structures are all commercial buildings.

FOUNDATION TYPE The type of foundation was determined by field investigation and query of Tulsa County Assessor records.

CONDITION OF STRUCTURES The condition of the residences in the RLA was determined by field investigation and the County Assessor's records. These findings are summarized in the following table.

Alias	Structure Type	Foundation Type	Year Built	Condition
Property 1	Commercial	Slab	1985	Avg
Property 2	Commercial	Parking Lot		
Property 3	Commercial	Slab	1967	Avg
Property 4	Commercial	Slab	1967	Avg +
Property 5	Commercial	Slab	1968	Good
Property 6	Commercial	Slab	1971	Avg
Property 7	Commercial	Slab	1965	Avg

CONCLUSIONS Based on flood data, the Mingo Creek Master Drainage Plan, site surveys and discussions with City officials, the causes of damage have been overland flooding and overbank flooding from undersized culverts along the creek, and undersized ditches along Skelly Dr. Storm sewer improvements along 44th and 46th St. were implemented and appear to have solved some of the flooding issues in the RLA. However, greater than 100-year rainfall events, like the storm of 1984, will likely continue to pose a flooding threat to the structures. The recommended plan for this problem area in the Bell Fulton MDP is a storm sewer system that

conveys a 5-year storm event which includes concrete lined channels, culvert replacement, and a new system of inlets and closed storm sewer.

RLA 31



Google Earth

© 2026 Google

6.89 ft

RLA 32

Area Specific Flooding

Repetitive Loss Area 32, located in the Bell Creek watershed, was established in 2017. This Repetitive Loss Area is comprised of four commercial buildings on three property lots located on the south side of E. 46th Pl. and the west side of Memorial Dr. The properties are situated in a former drainage channel of Bell Creek's Mingo Tributary 11A. Most of the properties were developed between 1970 and 1975 along the south side of E. 46th Pl, with one constructed in 2023. The land on which the buildings were constructed is generally flat, but does slope toward E. 46th Pl. This area is mostly impervious due to industrial and commercial development allowing for increased runoff potential. These properties are not located in the floodplain.

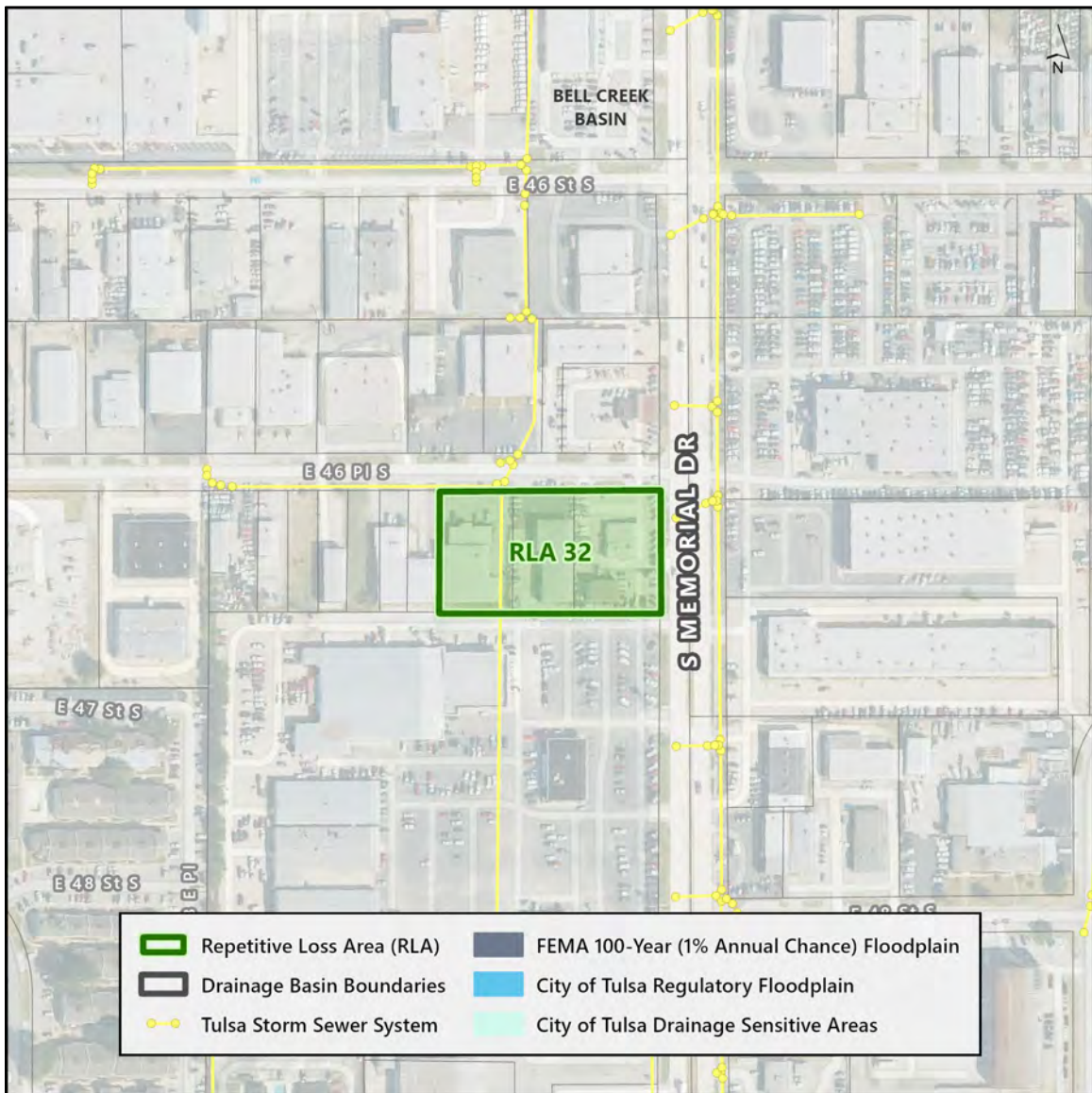
Drainage conditions in this RLA indicate that flooding is likely caused by overland flow and storm sewer backup. The properties in this RLA have made two claims, the last was made following the 1984 storm. These flood events were likely the result of rainfall flowing off of the rising ground to the south and south southwest. The runoff likely overwhelmed the storm sewer system, and the resulting overland flow followed the course of the former stream bed, which passes directly through this RLA. This RLA was not addressed in the Bell Fulton MDP Updates.

The general location of this RLA is shown on the map below. The detailed map identifies residential properties, County Assessor parcels, floodplains and the existing storm sewers and inlets system.

Improvements

After the flood events of 1982 and 1984, the City of Tulsa installed additional storm sewer inlets on E. 46th Pl. and along S. Memorial Ave. These measures appear to have solved the overland flow flooding for this RLA for 100-year and more frequent rainfall events.

Figure 6: RLA 32



Claims Data

FLOOD INSURANCE DATA There is one repetitive loss property in this RLA. One property in the RLA has carried flood insurance and made two damage claims to the NFIP totaling \$13,271. The last claim for this RLA was filed in 1984. Because the Privacy Act of 1974 (5 USC 522a) restricts the release of flood insurance policy and claims data to the public, neither the repetitive loss property nor specific claim data are detailed in this Plan.

Research And Analysis

The original analysis of this RLA was conducted in 2017 by the Project Team through interviews with City officials, research into Stormwater Design files, including the Bell Fulton Creeks Master Drainage Plan, review of the City's extensive flood history documentation, assessment of insurance claims, visits to the RLA, interviews with homeowners and questionnaires mailed to the property owners and occupants soliciting information about prior and existing flooding issues, if any. For this 2026 review, additional claims data, updated topography, 311 citizen call logs, and a review of the City's CIP prioritization were used to update this analysis.

AGENCIES AND ORGANIZATIONS During the course of the 2017 RLA analysis and plan development, the Project Team solicited input from the City of Tulsa Stormwater Design, the Communications Department, and the Working in Neighborhoods Department (WIN), Indian Nations Council of Governments (INCOG), US Army Corps of Engineers (USACE), City of Tulsa Emergency Management, and Tulsa County Emergency Management. Research and analysis were done in accordance with guidelines from the Federal Emergency Management Agency (FEMA), the National Flood Insurance Program (NFIP) and the NFIP's Community Rating System (CRS). In this 2026 update, the Project Team worked with City agencies to verify the status of the repetitive loss properties.

PLANS, STUDIES AND DOCUMENTS The following City of Tulsa and FEMA documents were used in the analysis:

- FEMA Flood Map Panel: 40143C0357L, October 16, 2012
- Regulatory Floodplain Map Atlas, Tulsa Engineering Services, September 2024
- City of Tulsa Stormwater Management Plan
- Stormwater Management Criteria Manual, June 2019
- Stormwater Capital Improvements List, City of Tulsa, Engineering Services
- 2024 City of Tulsa Hazard Mitigation Plan Update, Freese & Nichols, 2024
- Guidebook to Conducting Repetitive Loss Area Analyses, UNO and FEMA
- Mingo Creek Master Drainage Plan for Tributaries between I-44 and the Broken Arrow Expressway, June 1981
- Bell Fulton Creeks Master Drainage Plan, Meshek & Associates, 2017
- "The Effects of Urbanization on the Mingo Creek Watershed," Tim Mars, 1984
- Repetitive Loss Area #32, Flanagan & Associates, Swift Water Resources, 2017

CAPITAL IMPROVEMENTS PLANS No City of Tulsa Capital Improvements are currently planned that could have a positive impact on the flooding problems in this Repetitive Loss Area.

FIELD SURVEYS AND SITE VISITS In 2017, site visits were conducted during the study, primarily to confirm foundation type and view local on-site overland flow drainage patterns. During this 5-year update, these areas were reviewed using GIS data and aerial imagery along with site visits.

REVIEW DRAINAGE PATTERNS The Project Team examined aerial topography maps, master drainage plans, storm sewer plans, City Customer Care Center complaints and comments, and conducted field checks to determine area drainage patterns and identify flooding problem areas. The results of the research and analysis are described in the following paragraphs and summarized in the table below.

STRUCTURES The Project Team made a number of visits to this RLA to determine the situation and condition of the structures. Visual analysis was verified by queries of Tulsa County Assessor data.

STRUCTURE TYPE The structures are all commercial buildings.

FOUNDATION TYPE The type of foundation was determined by field investigation and query of Tulsa County Assessor records.

CONDITION OF STRUCTURES The condition of the residences in the RLA was determined by field investigation and the County Assessor's records. These findings are summarized in the following table.

Alias	Structure Type	Foundation Type	Year Built	Condition
Property 1	Commercial	Slab	2022	Avg +
Property 2	Commercial	Slab	1975	Avg
Property 3	Commercial	Slab	1973	Avg

CONCLUSIONS Based on flood data, the Mingo Creek Master Drainage Plan, site surveys and discussions with City officials, the causes of damage have been overland flow passing across various properties in this RLA on the way to a point of collection. Generally, the runoff from E. 51st St. flows toward the former stream bed inundating the surrounding properties. Storm sewer improvements in the immediate area were completed by the City of Tulsa in the 1990s, though an upstream neighbor has since complained of nuisance flooding during heavy rain events.

RLA 32



Google Earth

© 2026 Google

6.59 ft

Notifications

ANNUAL FLOODPLAIN NOTIFICATION Each year the City notifies all homeowners and residents living in a 100-year floodplain that their properties are subject to flooding and informs them of what steps they can take to protect their residences and families, including the purchase of flood insurance.

ANNUAL REPETITIVE LOSS AREA NOTIFICATION Residents in Repetitive Loss Areas are notified annually that their homes are located in a Repetitive Loss Area and are potentially subject to flood damage from overland flow and storm sewer back-up.

PROPERTY OWNERS/RESIDENTS NOTIFICATION In 2017, property owners and residents/occupants were advised of the Repetitive Loss Area study and analysis by letter, were sent a questionnaire soliciting information and input, and asked to contact the City for more information or a copy of the completed RLA Plan.

PUBLIC PARTICIPATION AND INVOLVEMENT City Staff/Consultants interviewed homeowners to brief them on the Repetitive Loss Area Analysis Study/Plan, receive their input, and discuss possible mitigation measures.

PROPERTY OWNER RESPONSE TO NOTIFICATIONS

- Audubon Creek: There have been two comments concerning flooding from property owners in response to notification sent in 2017. One property owner stated that the property has not flooded since purchased in 2012, and another said their property had never flooded. In 2010 there was a complaint about street flooding near this RLA. There have been no further complaints recorded as of this 2026 update.
- Bell Creek: There have been two comments concerning flooding from property owners in response to notification sent in 2017. During the 2013 MDP updates, a property owner had complained about ongoing flooding problems in RLA 31

Mitigation Measures

Overview

Along Audubon Creek, several improvements have been made including the detention facility between the Broken Arrow Expressway and I-44, the enlargement of conduits under E. 38th St., Skelly Dr., I-44 and the railroad, along with the improved channels on the north and south sides of. and I-44. While these improvements have increased conveyance and reduced flooding, RLA 21 is still within the City regulatory floodplain. The City of Tulsa has planned a Capital Improvement Project that would benefit this RLA by implementing the pond capacity and storm sewer improvements recommended in the 1993 Master Drainage Plan.

While storm sewer improvements have taken place over the years in both Bell Creek RLAs, flooding from overland flow and storm sewer backup still poses a risk. The 2017 Bell Fulton Master Drainage Plan identifies the most cost-effective structural solutions (channel improvements, enlarged inlets and storm sewers, stormwater detention ponds) for the area. The City of Tulsa has planned a Capital Improvement Project that would benefit RLA 31 by implementing the storm sewer and channel improvements recommended in the 2017 Master Drainage Plan. There are presently no funded Capital Improvement Projects for future flood control projects in RLA 32.

Individual Mitigation Measures: What You Can Do

Individual property protection actions are usually undertaken by property owners on a lot-by-lot, building-by-building basis, and include private floodproofing, moving mechanical equipment above flood levels, installing French drains and minor site grading to move local drainage to the street, sanitary sewer backup protection, and flood insurance.

The City of Tulsa is willing to have a stormwater engineer do a site visit to assist you in analyzing your specific drainage problems and discuss potential solutions. Contact the Customer Care Center at 311 or (918) 596-7777.

KNOW AND UNDERSTAND YOUR FLOOD RISK As stated above, being located in a Repetitive Loss Area does *not* mean a property will flood. Nevertheless, it is important that residents and property owners in flood hazard areas know and understand their flood risk and take what steps they can to protect their homes, families and possessions. City staff are available to explain the local flood risk, interpret floodplain maps, and determine if an area or property has drainage problems or a history of prior flooding. Staff can also discuss the ways a specific property can be protected from flooding. An Elevation Certificate can help define a property's flood risk under various rainfall scenarios (e.g., in a 10-year, 50-year, 100-year, or 300-year storm). You can receive a free flood zone determination by contacting the City with the correct legal description and street address, or the Tax Assessor/Parcel Number of the property.

The City maintains their Regulatory Floodplain map atlas on their website:

<https://cityoftulsa.org/government/departments/water-and-sewer/flood-control>

MAKE A DISASTER PREPAREDNESS PLAN It is always a good idea for residents and property owners in flood hazard zones to prepare a disaster preparedness and response plan that addresses all the steps and details that will demand attention once a flood watch or warning is issued. A Building Permit is required to install a safe room in a flood-prone area.

CREATE BERMS, SWALES OR REDIRECTED DRAINAGE Flood waters can be diverted away from properties using berms, brick planter boxes and swales, but these may not be done in ways that cause damage to other properties. Owners and residents can request a meeting with a City Engineer to discuss the best ways to solve existing drainage problems, and whether a Building Permit will be required. Contact the Customer Care Center at 311 or (918) 596-7777.

INSTALL LOCAL, PROPERTY-SPECIFIC PAVING, PLANTINGS AND CATCHMENT BASINS City Engineering staff can explain the natural functions of floodplains and how they act to slow and purify urban runoff and reduce flooding. Staff can also suggest low-impact development projects which imitate natural floodplain functions by slowing runoff and filtering out impurities. These include such things as rain gardens, catchment basins and pervious paving materials.

ACQUISITION The City of Tulsa has a repetitive loss acquisition program to purchase repeatedly flooded properties. This voluntary program offers owners who are in this situation a way out. The City applies to FEMA for funds using the Hazard Mitigation Grant Program. Once the grant is awarded, the property is appraised as if it were not a flooded



This platform and wall protect the home and air conditioning equipment from shallow flooding.

property and the offer for the property is based on this appraisal. In addition to getting the best possible price, the owner receives moving expenses, a \$1,000 stipend for purchasing a home outside the floodplain, and a 30-day rent free period after closing in which to move. All closing costs and other fees are paid by the City. Once the owner has moved out, the home is demolished and restored as open space to protect the natural and beneficial function of the floodplain. If you would like more information about this program, contact the Customer Care Center at 311 or (918) 596-7777. Acquisition is

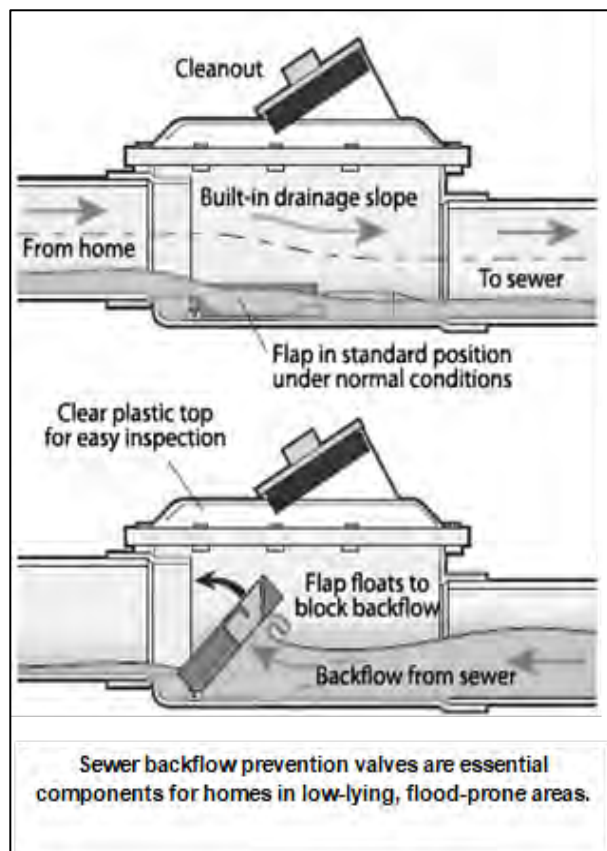
usually not feasible or cost effective for areas of shallow flooding. If a property is located in a FEMA Floodway or Special Flood Hazard Area, demolition, acquisition and relocation may be feasible and cost-effective.

ELEVATE DAMAGE-PRONE COMPONENTS Critical items such as furnace or air conditioning units should be elevated to avoid flood damage. This should be done for components that are in the wet floodproofed area of the building as well as for units that are outside of the structure but subject to shallow flooding.

ELEVATE YOUR STRUCTURE Elevating the structure is only suitable for areas of shallow flooding and is usually not feasible or cost-effective for masonry homes built on concrete slabs. It can sometimes be cost-effective for wood frame buildings on crawlspaces. None of the buildings in these RLAs are a candidate for elevation.

DRY FLOODPROOF YOUR STRUCTURE This can include actions that seal a structure and prevent floodwater from entering. This method is best in areas where flood depths are no more than two or three feet. Buildings can be made watertight by sealing the walls with waterproof coatings, impermeable membranes, or additional layers of masonry or concrete. Doors, windows, and other openings below the base flood elevation must also be equipped with permanent or removable shields, and backflow valves must be installed in sewer lines and drains. Dry floodproofing needs to be designed by an engineer to ensure the structure can resist the force of the water.

WET FLOODPROOF YOUR BUILDING Wet floodproofing allows water to enter a structure, while removing, protecting or elevating items that can be damaged, such as air conditioning equipment. This is often used on structures with crawl spaces and shallow flood depths. The City does not allow basements in flood-prone areas, or the wet floodproofing of basements.



WET FLOODPROOF YOUR GARAGE The garage, with its slab-on-grade construction, is one of the most vulnerable areas of your home to overland flow flooding. Remove, relocate, protect or elevate items that can be damaged from flooding.

CORRECT SANITARY SEWER BACKUP PROBLEMS. Sanitary Sewer backup can be a problem in low-lying, flood-prone areas. The installation of backflow prevention valves on your sanitary sewer lines is highly recommended.

PURCHASE AND MAINTAIN FLOOD INSURANCE Flood Insurance is available and recommended for the structure and contents for all properties in Tulsa. A large percentage of all flood claims are for properties that are outside the FEMA floodplain. Because of the City of Tulsa's sustained efforts to reduce

flooding, you are entitled to a discount on your flood insurance. A property does not have to be in a floodplain to qualify for flood insurance.

MAINTAIN NEARBY STREAMS, DITCHES, AND STORM DRAINS Local flooding can often be caused by brush and other debris blocking drainage ways and culverts. Residents and property owners should do their part in keeping inlets and drainage ways clear of brush and debris. Do not attempt to clear debris during a flood event.

Repetitive Loss Area Mitigation Measures: What the City Can Do

The City of Tulsa is actively committed to the following floodplain management activities:

- Preventative activities to keep flood problems from getting worse.
- Natural resource protection activities to preserve or restore natural areas or the natural functions of floodplain and watershed areas.
- Emergency services measures taken during an emergency to minimize its impact.
- Structural projects to keep flood waters away from properties.
- Public information activities to advise property owners, potential property owners, and visitors about the hazards, ways to protect people and property from the hazards, and the natural and beneficial functions of local floodplains.

As funding becomes available for this Repetitive Loss Area, the City will undertake a more detailed mini-master drainage plan to identify alternative solutions to the flooding problems and recommend a public works project. The actual construction of any public works project may require the acquisition of properties and/or drainage easements. The City will continue to fulfill its maintenance responsibility for channels, drainageways, and storm sewer inlets and pipes. At this time, the City has identified the following actions which may be appropriate for these RLAs.

- Extend and/or improve the storm sewer system to better collect storm water runoff.
- Create overland flow paths to allow better drainage of ponded water to the Creek. This solution is recommended in areas where ponded water could be relieved with a swale or channel.
- Create berms or swales to direct runoff away from residential properties. This solution is used to divert flowing waters away from structures and can only be used within the City's property or right of way.
- Construct upstream detention.
- Acquire flood-prone properties on a voluntary basis. This solution is only recommended for residential properties.

Funding

The City will investigate the availability of funding for the public works actions listed above. Funding for ongoing City maintenance responsibilities is provided by the Stormwater Utility Fee. Funding for a public works project is dependent on several factors, including the prioritized ranking of the project with other Capital Improvement projects, inclusion in future street maintenance projects, being part of a project in a Bond Issue, etc. In the case that the nature of the flooding problems is localized, and minor damage is involved, the funding for

needed improvements will have to be borne by the individual homeowner. Another potential funding source is FEMA's Hazard Mitigation Grant Program (HMGP), which can be implemented after a Presidential Major Disaster Declaration in the State.

Recommendations

AUDUBON CREEK

Overbank and overland flooding have historically threatened the properties in RLA 21. This RLA is located in a heavily commercial and industrial part of Tulsa. Three structures are within or touched by the City of Tulsa's regulatory floodplain. Since the improvements of the downstream crossings, the overbank flooding risk has been significantly reduced and most of the properties in the area have been removed from the City regulatory floodplain. Though flood risk still exists as some structures remain in the floodplain and the area is subject to continued flooding from overland flow and undersized ditches. The MDP recommendations have been largely enacted. The City of Tulsa has planned a Capital Improvement Project that would benefit this RLA by implementing the pond capacity and storm sewer improvements recommended in the 1993 Master Drainage Plan. Individual mitigation actions can be taken to reduce overland flooding risk. Local solutions would include elevating utilities, creating overland flow paths to better allow drainage of ponding water, and floodproofing as appropriate.

BELL CREEK

Overbank and overland flooding have historically threatened the properties in RLA 31. Improvements along Bell Creek to improve the downstream culvert capacity have largely reduced overbank flooding risk in this RLA, though the risk of overland flow flooding these structures still exists. RLA 31 was included in the 2017 Master Drainage Plan with recommendations for increased storm sewer capacity for protection against the 5-year event. The City of Tulsa has planned a Capital Improvement Project that would benefit RLA 31 by implementing the storm sewer and channel improvements recommended in the 2017 Master Drainage Plan.

Overbank and overland flooding have historically threatened the properties in RLA 32. Improvements along Bell Creek to improve the downstream culvert capacity have largely reduced overbank flooding risk in this RLA. Additionally, the City expanded the storm sewer system in this area in the 1990s. Overland flow paths and flooding complaints indicate that the risk of overland flow flooding these structures still exists. Individual mitigation actions can be taken to reduce overland flooding risk. Local solutions would include elevating utilities, creating overland flow paths to better allow drainage of ponding water, and floodproofing as appropriate.

Property owners are encouraged to maintain flood insurance. The City of Tulsa is a Community Rating System (CRS) Class I Community, and all homeowners qualify for up to a 45% discount on their flood insurance premiums. Homeowners are also encouraged to undertake individual mitigation measures to reduce their risk of overland flooding. The City of Tulsa is ready to assist in this effort with professional advice.