Repetitive Loss Area # 3

Harlow/Parkview Creek
W. Archer & S. 38th W. Ave. Area

August 17, 2017

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Engineering Services

CITY OF Tulsa
A New Kind of Energy.

Planning and Coordination
ENGINEERING SERVICES DEPARTMENT

August 17, 2017

Dear Resident/Property Owner:

Once considered the most flood-prone city in America, Tulsa has worked hard to reduce or eliminate flooding of its homes and neighborhoods. The City joined the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP) in 1974 and through decades of effort is now recognized as a national leader in flood hazard mitigation. As a result, property owners in Tulsa receive as much as 40% discount on their flood insurance.

A key component of the NFIP has been its focus on Repetitive Loss Properties, which make up only 1 percent of insured properties, but account for over 30 percent of flood insurance claims payments. A Repetitive Loss Property is defined by FEMA as any property that has been paid two or more flood insurance claims of $1,000 or more in a 10-year time period.

The NFIP recently expanded its flood hazard mitigation program to include the identification of "Repetitive Loss Areas" (RLA)—those properties near an existing Repetitive Loss Property that may be subject to the same general flooding conditions. In most instances, 95% of the properties in an RLA will never have experienced flooding—especially if the cause of damage is shallow, overland flow due to local drainage conditions. Once the City has identified an RLA, we are required to contact the owners and residents of the area and work together to develop a plan to reduce or eliminate flooding in the neighborhood.

Your property has been identified as being in a Repetitive Loss Area. We want to re-emphasize that this does not mean your property has flooded or is even likely to flood—only that it is in the same area, and in a similar geographical situation, as an existing Repetitive Loss Property.

You can protect your property from flooding. We would like to invite you to participate in our flood prevention and mitigation efforts for your neighborhood. We need your input. What can we do, working together, to eliminate potential flood losses in your area? We look forward to hearing from you.

To learn more about your risk of flooding visit www.floodsmart.gov or contact the City of Tulsa Customer Care Center at (918) 596-7777.

Sincerely,
CITY OF TULSA, ENGINEERING SERVICES

Bill Robison

Bill Robison, P.E., CFM
Senior Special Projects Engineer
Stormwater Project Coordination

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Acknowledgements

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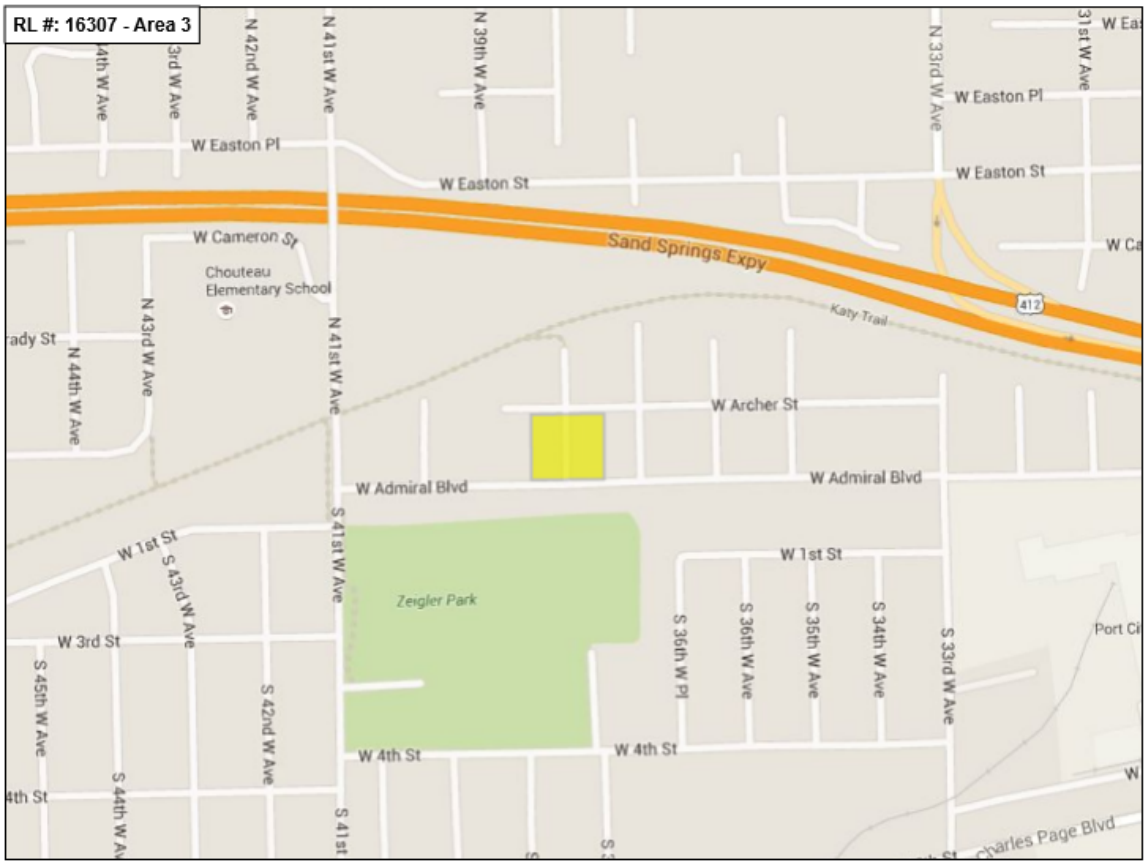
Repetitive Loss Area # 3

Harlow/Parkview Creek
W. Archer & S. 38th W. Ave. Area

Overview

Repetitive Loss Area #3 is comprised of eight single-family residential properties located in the Parkview Creek/Ditch drainage in northwest Tulsa, along N. 38th W. Ave. between W. Archer St. on the north and W. Admiral Blvd. on the south. As shown on the map below, the RLA is about 700 ft. south of I-412 and the old Missouri, Kansas and Texas railroad grade (now the Katy Trail), and 200 ft. north of the Parkview Ditch and Zeigler Park. The properties are within the historic Arkansas River floodplain, at an elevation of about 645 feet. Before the development of the railway and the Parkview Ditch channelization, Parkview Creek drained to the southeast through this neighborhood. With railroad construction and subsequent urbanization, the creek was routed several hundred feet farther west, to N. 41st W. Ave., then south through storm sewers to Zeigler Park, where it turned east to follow generally its original course for 1.7 miles to its junction with the Arkansas River. The creek in this reach is now concrete-lined trapezoidal



RLA #3 is located in the Harlow Creek/Parkview Ditch drainage in northwest Tulsa.

channel. The eight residences that comprise the RLA sit in an oblong pocket of low-lying ground—likely the swale from the original stream bed—that was flooded in 1979 and 1984. The cause of flooding was overland flow south from the high ground along the Katy Trail that collected in the shallow depression of the old creek bed. Only one property, the local Repetitive Loss Property—and the RLA's only slab-on-grade structure—suffered damage in both events. A storm sewer draining south to the Parkview Ditch was subsequently installed along the west side of N. 38th W. Ave. with inlets on Archer Ave. and Admiral Blvd. Surface runoff along N. 38th W. Ave. between Archer St. and Admiral Blvd. is carried in shallow bar ditches.

The general location of RLA #3 is shown on the map above and on the more detailed photo/topography map on page 6. The detailed map identifies properties, County Assessor parcels, floodplains, and the existing storm sewer system.

I. Background

During the post-World War building boom of the 1950s and 1960s, Tulsa expanded rapidly, not just east and south into the Mingo and Joe Creek basins, but also west along the north bank of the Arkansas River. The expansion west of Newblock Park was facilitated by the system of levees that were constructed on the Arkansas River between Sand Springs and Tulsa during World War II to protect refineries and other industries from floods like those of June 13, 1923 and May 20, 1943. It was believed at the time that the new levees would make the floodplains along Charles Page Blvd. safe for residential development. The majority of homes in RLA #3, for example, were built during the post-war boom between 1948 and 1968.

Flooding on the Arkansas River, however, has not been the area's only problem. There were streams flowing south out of the Gilcrease Hills into the Arkansas' floodplain that also overran their banks periodically, like Harlow, Big Heart (formerly Blackboy) and Parkview creeks. Over the years before the levees were put in, these creeks would cut different paths to the river, sometimes flowing west into the Big Heart and Harlow creek drainage and sometimes east into the Parkview basin. For example, at the time the "Hominy" topography map of the area was printed in 1915, Big Heart and Harlow creeks were draining east through RLA #3 and into the Parkview basin. Under certain conditions, the levees can actually make flooding on these creeks worse by trapping their outflows behind the dikes. With the creation of the levees, Big Heart and Harlow creeks were channeled west into the Arkansas River and Parkview Creek eastward along the ditch. Keeping these streams apart has been an important element of flood control in the Lower Basin.

Because of the area's climate, Tulsa's post-war suburban growth brought with it an increased risk of flooding. Indeed, by the mid-1970s floods were occurring almost yearly and flooding had become Tulsa's most destructive natural hazard. One researcher at the time declared the city "the most flood-prone community in the nation."

Tulsa was not unique in its rapid post-war development and attendant risks. Cities across America were experiencing similar problems as they spread out into prosperous subdivisions. In response, the U.S. Congress created the National Flood Insurance Program (NFIP) in 1968 to help property owners protect themselves from flood losses. The NFIP offered flood insurance to homeowners, renters, and business owners if their

community participated in the NFIP and agreed to adopt and enforce ordinances that met or exceeded FEMA requirements to reduce the risk of flooding.

Tulsa joined the NFIP in 1974, and through great effort and considerable expense has significantly reduced its exposure to flooding. As a result, Tulsa has been awarded a Class II rating in the NFIP's Community Rating System (CRS), which grants its residents a 40 percent discount on the cost of flood insurance for structures in the Special Flood Hazard Area (SFHA), also known as the 1% or 100-year floodplain. Since the Biggert-Waters Flood Insurance Reform Act of 2012, many properties have seen a substantial increase in their premiums, making this discount even more important.

For its part, the NFIP is continually faced with the job of paying claims while trying to keep the price of flood insurance at an affordable level. Properties that flood repeatedly—known as "Repetitive Loss Properties," have been a particular problem for the program: Although they make up only 1 percent of insured properties, they account for one-third of all claims payments (about $200 million a year, or $4.5 billion to date). A Repetitive Loss Property is defined by FEMA as any property that has been paid two or more flood insurance claims of $1,000 or more in a 10-year time period.

Consequently, one of the requirements of the CRS is that communities identify all Repetitive Loss Properties in their jurisdiction and work with the owners to find ways to reduce or eliminate future flood damage. This initiative has been very successful in reducing flood losses and claims.

FEMA has recently extended its repetitive loss program to include "Repetitive Loss Areas" (RLA). To maintain a Class II rating in the CRS, Tulsa is now required to analyze the area surrounding each of its Repetitive Loss Properties and identify any neighboring properties (including uninsured ones) that may be subject to the same general flooding conditions. This group of nearby properties is then designated as an RLA. The City is required to contact the owners of the properties in all its RLAs, inform them that they are located in an area subject to flooding, and develop a plan for mitigating or eliminating flooding in the area, much as is being done for the individual Repetitive Loss Properties.

The May 27, 1984 "Memorial Day" flood, looking east from about S. 45th W. Ave. The Parkview Ditch and flooded Zeigler Park are in the upper left of the picture and the Arkansas River in the upper right.

It is important to note that most of the homes in a Repetitive Loss Area—perhaps as many as 90%—may not have experienced flooding of any kind. What they

have in common is being subject to the same general geographical and flood conditions as the nearby repetitive loss property. It should also be stressed that the flooding events in question may have had little or nothing to do with overflow from a creek, but perhaps may have been the result of storm sewer backup or overland flow from a neighbor's property into a low-lying, slab-on-grade home or garage.

II. Location

RLA #3 is located at an elevation of about 645 ft., on level ground, in the former floodplain of both the Arkansas River and Parkview Creek. The RLA is about 200 ft. north of the Parkview Ditch, 700 ft. south of I-214, and 1000 ft. east of N. 41st W. Ave. The RLA is situated in a shallow, oblong depression between W. Archer St. and W. Admiral Blvd. that was likely the stream bed of the original Parkview Creek. The 100-year floodplain in this reach of the Parkview Ditch is at about 640 ft.

The Parkview Creek/Ditch mainstem is about 4 miles in length. It rises in the Gilcrease Hills in Osage County at about the 800 ft. contour near W. 26th N. Ave. and W. Latimer St. and empties into the Arkansas River just west of the 11th St./I-244 bridge. The stream flows initially to the southeast beneath Gilcrease Museum Rd. then turns south through an open, grass-lined channel to a storm sewer northeast of N. 24th W. Ave and W. Haskell St. The creek bends west and emerges on the west side of Gilcrease Museum Rd. and flows through a concrete-lined channel to 27th W. Ave. and W. Edison St., where it is storm-sewered to its junction with right-bank tributary 4 (RB.4) near the Central High School campus, at about Edison St. and N. 27th W. Ave. From this point the creek flows generally west through an open channel to N. 38th W. Ave. and W. Easton St. where it passes under I-412/OK 64 and then west on the north side of the Katy Trail to N. 41st W. Ave. where it turns south through a storm sewer to Zeigler Park. Near S. 41st W. Ave. and Admiral Blvd. the creek flows east in the Parkview Ditch to join the Arkansas River at about S. 7th St. and S. Quanah Ave.

Parkview Creek at N. 41st W. Ave. and the Katy Trail, looking east.

Above RLA #3, Parkview Creek has three right-bank tributaries. Right Bank Tributary 4 (RB.4) mentioned above, rises at the 700-ft. contour near N. 29th W. Ave. and W. Independence St. and flows south as a grass-lined channel through the Central High School campus to join the mainstem at about N. 31st W. Ave. and W. Edison St. RB.2 and RB.3 both rise at about the 680-ft. contour, in the open land immediately west of the Central High School campus, and flow south through open channels to join the mainstem on the south side of W. Edison St.

III. History

Development

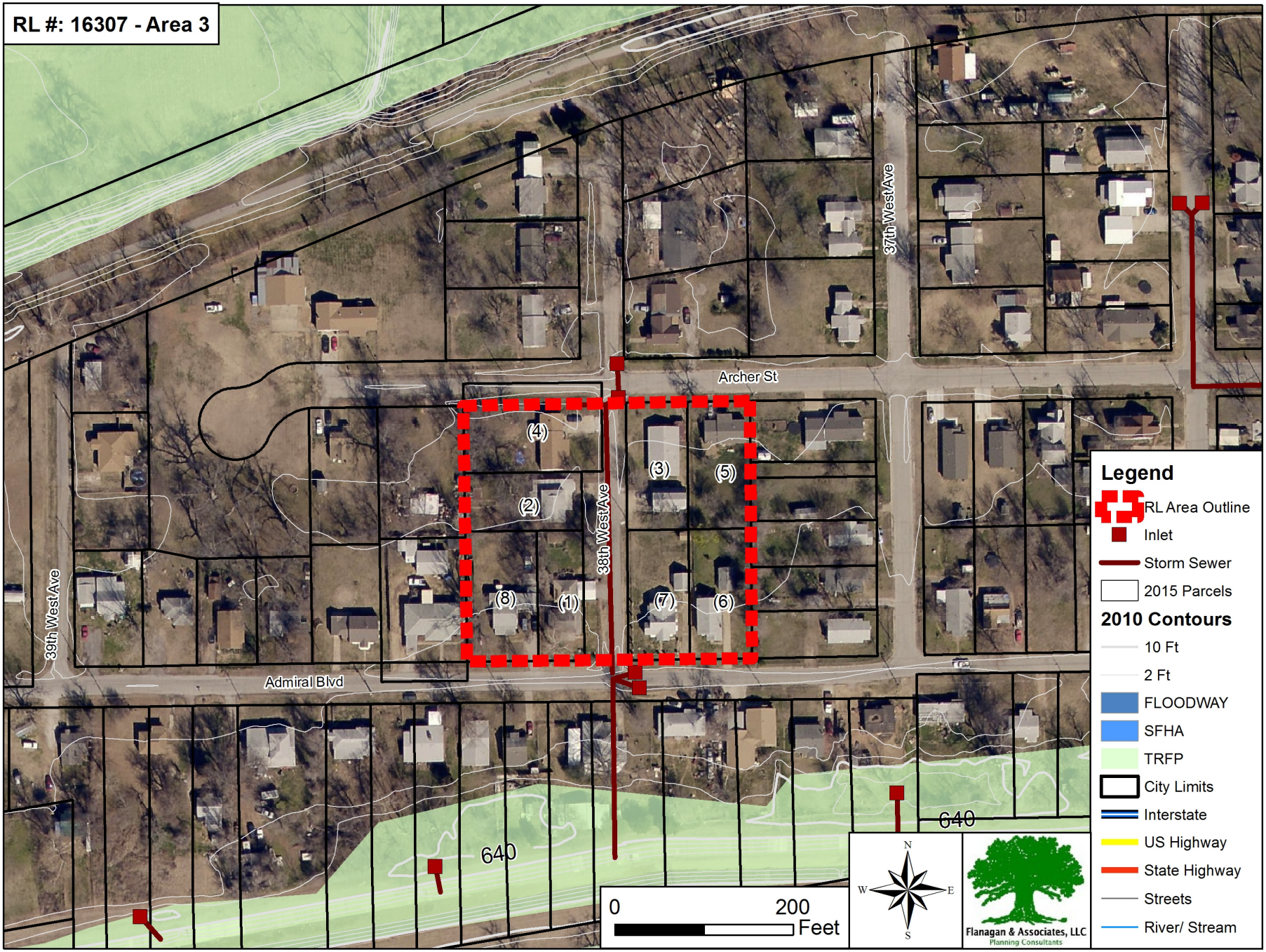
As mentioned above, before the development of the MKT railroad, Parkview Creek used to bend sharply to the south and east at about N. 39th W. Ave. and W. Cameron St. and pass through the area that now includes RLA #3, following a course that was more or less between Archer St. and W. Admiral Blvd. With development, Parkview Creek was re-directed along the north side of the railroad grade to N. 41st W. Ave., then south through storm sewers to Zeigler Park, where it turned east to its junction with the Arkansas River through a concrete-lined channel, the "Parkview Ditch." Although redirecting the creek removed RLA #3 from the flood hazard zone, a trace of the old stream bed remained as a long, bowl-like depression about 1,000 feet in length and 200 feet wide, generally between Archer and Admiral Blvd., and from about N. 39th W. Ave. to N. 37th W. Ave. As a result, during very heavy rains, overland flow tends to drain south from the high ground along the Katy Trail and collect in the swale that was once Parkview Creek.

Parkview Ditch, looking east from S. 41st W. Ave. at Zeigler Park, just south of Admiral Blvd.

Arkansas River Levees

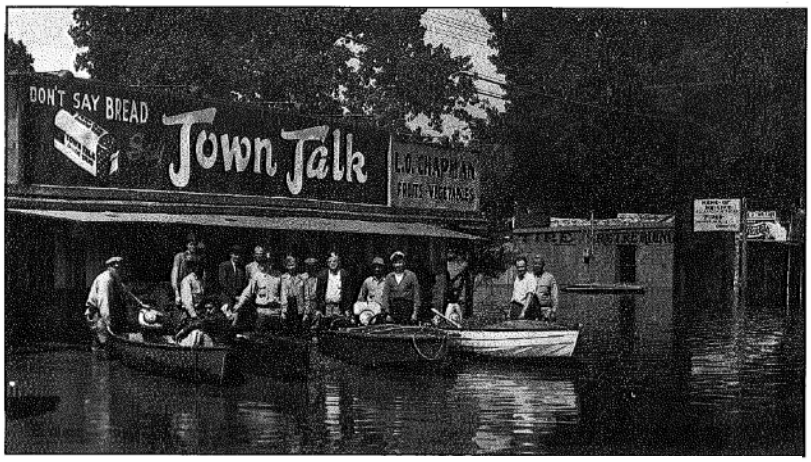
The Arkansas River levees were authorized by the Flood Control Act of 1941 and consist of three earthen levees, two on the left bank (Levee A and B) and one on the right bank (Levee C). RLA #3 is protected from flooding by Levee B, which reaches east from 65th W. Ave. to the 11th St. bridge, and south from US Hwy 412/64 (Keystone Expressway) to the river. The levees were constructed in phases by the US Army Corps of Engineers between 1935 and 1945 and are designed to protect against the standard project flood, or flows of 350,000 cfs. The levees protect $2 billion in infrastructure, 20,000 citizens, two major refineries, a steel mill and chemical production and distribution facilities, as well as established residential areas largely inhabited by low income and elderly populations who are especially vulnerable to flooding.

The levee failed in places during the flood of 1986 due to damaged pipes which ran through the levees. The levee failures did not impact Levee B or RLA #3.


RL #: 16307 - Area 3
Archer St
37th West Ave
38th West Ave
39th West Ave
Admiral Blvd
(1)
(2)
(3)
(4)
(5)
(6)
(7)
(8)
640
640
0
200
Feet
N
W
E
S
Flanagan & Associates, LLC
Planning Consultants
Legend
RL Area Outline
Inlet
Storm Sewer
2015 Parcels
2010 Contours
10 Ft
2 Ft
FLOODWAY
SFHA
TRFP
City Limits
Interstate
US Highway
State Highway
Streets
River/ Stream

Flooding

The flood stage on the Arkansas River at the 11th St. bridge is 18 feet, with a moderate flood occurring at 20 feet and a major flood at 22 feet. The top ten historical flows on the river at Tulsa were on October 5, 1986 (25.21 ft.), June 13, 1923 (22.8 ft.), October 5, 1959 (22.0 ft.), May 28, 1908 (21.8 ft.), May 21, 1957 (21.53 ft.), May 19, 1957 (20.35 ft.), June 12, 1923 (19.8 ft.), October 1, 1945 (19.7 ft.), April 26, 1944 (19.5 ft.), May 20, 1943 (19.5 ft.). Particularly severe were the floods of 1908, 1923 and 1943, as these occurred before the construction of the Arkansas River levees. Assuming the base flow of the Arkansas River at 41st W. Ave. to be 630 ft., a 22-ft. flood, as occurred in 1923 would have caused flooding up to the 652-ft. elevation contour, inundating the area around RLA #3 with about 7 feet of water. Were it not for Levee B, the 1986 flood could have flooded RLA #3 with almost 10 feet of water.



High water near 33rd W. Ave. and Charles Page Blvd. in the 1923 flood.

According to people who lived along the Sand Springs Line in the years before the levees were built, flooding on the Arkansas River was a normal occurrence and happened every few years. But the big floods were much less frequent—about every 20 years—as in 1908, 1923, 1943, 1957, and 1986. With the building of the levees, flooding behind the dikes became an additional concern. Arguably the worst flood in the area was the Memorial Day flood of May 27, 1984, when the Arkansas River did not flood, but very heavy rains—as much as 10 inches in four hours—in northwest Tulsa caused massive flooding along Big Heart, Harlow and Parkview creeks. Floodwaters filled Zeigler Park and much of land south of Parkview Ditch.

The greatest contributions to flooding in RLA #3 are the generally level terrain, undersized storm sewers and overland flow. During exceptionally heavy downpours, such as the 300-year rainfall event in May 1984, bar ditches and storm sewers become overwhelmed and shallow overland flow inundates any low-lying properties. Especially at risk are structures built on slab-on-grade foundations.

Improvements

As stated above, the major improvements that have reduced, if not eliminated, flooding in RLA #3 are the Arkansas River Levee B, the rerouting of Parkview Creek, the construction of Parkview Ditch, and the installation of a storm sewer along the west side of N. 38th W. Ave. from W. Archer St. south to the Parkview Ditch. The storm sewer,

installed in the early 1990s, has likely been a major factor in reducing flooding in RLA #3.

IV. Research and Analysis

The analysis of Repetitive Loss Area #3 was conducted by the Project Team through interviews with City officials, research into Engineering Services and Stormwater Drainage files, including the *Blackboy Creek, Harlow Creek Parkview and Oak Creek Master Drainage Plan, Final Report* (McLaughlin Water Engineers, 1989), *Charles Page Boulevard Area Neighborhood Revitalization Plan* (Tulsa Metropolitan Area Planning Commission, 1996), review of the City's extensive flood history documentation, assessment of insurance claims, field trips to the RLA, interviews with home owners, and questionnaires mailed to owners and residents soliciting information about prior and existing flooding issues, if any.

Agencies and Organizations

The City of Tulsa's Storm Drainage & Hazard Mitigation Advisory Board (SDHMAB), which also serves as the City's Hazard Mitigation and CRS Committee, and the CRS Public Participation Involvement & Information Committee (PPI) met monthly during the two-year Repetitive Loss Area Planning process. Each committee was updated on the status of the planning process, discussed issues, and provided guidance. Research and analysis were done in accordance with guidelines from the Federal Emergency Management Agency (FEMA), the National Flood Insurance Program (NFIP) and the Community Rating System (CRS).

Local, State & Federal Agencies and non-profit organizations are represented on the PPI Committee. The RLA plans were discussed at the PPI Committee meetings, and other agencies such as TAEMA were contacted by phone or email. The RLA plans were presented to City Council for adoption; the agenda was made public and furnished to the media. The council meeting is a public meeting and the local media was present at the meeting. In addition the council meetings are aired on our local government network TV channel TGOV.

Participating agencies and organizations involved were: City of Tulsa (CoT) Storm Drainage & Hazard Mitigation Advisory Board, CRS PPI Committee, CoT Communications Department, CoT Development Services, Working in Neighborhoods, CoT Engineering Services, CoT Finance Department, CoT Legal Department, CoT Streets & Stormwater, CoT Water & Sewer Department, Child Care Resource Center, Indian Nations Council of Governments, Tulsa Area Emergency Management Agency (TAEMA), Disaster Resilience Network, Metropolitan Environmental Trust, Oklahoma Insurance Department, Tulsa Association of Realtors, U.S. Army Corps of Engineers.

Plans, Studies and Documents

The following City of Tulsa and FEMA documents were used in the analysis:

- *Flood Insurance Rate Map*, City of Tulsa, October 16, 2012
- *Regulatory Floodplain Map Atlas*, Tulsa Engineering Services, October, 2016
- *2014 City of Tulsa Hazard Mitigation Plan Update*, Flanagan & Assoc., 2014

- City of Tulsa *Stormwater Management Plan*
- Stormwater Design Criteria Manual: Critical Neighborhood Flood Control Projects
- Stormwater Capital Improvements List, City of Tulsa, Engineering Services
- *Blackboy Creek, Harlow Creek Parkview and Oak Creek Master Drainage Plan, Final Report,* McLaughlin Water Engineers, 1989
- *Charles Page Boulevard Area Neighborhood Revitalization Plan,* Tulsa Metropolitan Area Planning Commission, 1996
- *Guidebook to Conducting Repetitive Loss Area Analyses*, UNO and FEMA

No City of Tulsa Capital Improvements are currently planned that could have a positive impact on the flooding problems in Repetitive Loss Area # 3. The Master Drainage Plan for the area is in the process of being updated by the Corps of Engineers and the City of Tulsa.

Flood Insurance Data

One property in the RLA currently carries flood insurance.

Claims Data.

Between 1979 and 1984 overland flow generated two damage claims from one property, for a total of $19,950, both of which were paid. The causes of both flood events was intense rainfall: 4 to 6 inches in four hours in June 1979 and 13 inches of rain in six hours in 1984. Both events caused widespread creek and street flooding throughout the city. Because the Privacy Act of 1974 (5 USC 522a) restricts the release of flood insurance policy and claims data to the public, no specific claim data are detailed in this Plan.

Field Surveys and Site Visits

Site visits were conducted during the study, primarily to confirm foundation type and view local on-site overland flow drainage patterns.

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 flood 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 has made numerous visits to the RLA to determine the situation and condition of the structures. On-site, visual analysis was verified by queries of Tulsa County Assessor data.

Structure Type.

The structures in RLA #3 are all one-story, single-family residences.

Foundation Type.

The types of foundations were determined by field investigation and query of Tulsa County Assessor records. All the residences but one in RLA #3 are built on foundations with crawl spaces. The single exception is the RLA's Repetitive Loss Property, which is slab-on-grade.

Condition of Structures.

The condition of the structures in the RLA was determined by field investigation and a search of the County Assessor's records: all properties are in Good to Good+ condition. These findings are summarized in the following table.

Properties in the RLA

Address	Year Built	Structure Type	Foundation Type	Condition
Property 1	1961	Residential Ranch 1 Story	Crawl Space	Average
Property 2	1955	Residential Ranch 1 Story	Crawl Space	Good
Property 3	1955	Residential Ranch 1 Story	Slab on Grade	Poor
Property 4	1968	Residential Ranch 1 Story	Crawl Space	Average
Property 5	1926	Residential Ranch 1 Story	Crawl Space	Good
Property 6	1948	Residential Ranch 1 Story	Crawl Space	Average
Property 7	1968	Residential Ranch 1 Story	Crawl Space	Fair
Property 8	1939	Residential Ranch 1 Story	Crawl Space	Fair

Notification

Annual Floodplain Notification. Each year, in March, 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, businesses and families, including the purchase of flood insurance.

Annual Repetitive Loss Area Notification. Residents and property owners in Repetitive Loss Area #3 are notified annually that their properties are located in a Repetitive Loss Area, and are potentially subject to flood damage from overland flow.

Property Owners/Residents Notification. 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. There have been no contacts from property owners in RLA #3 to the City in recent years concerning flooding: As of August 11, 2016, there have been no responses from property owners or residents of RLA #3 to notifications about the Repetitive Loss Area designation.

Conclusions

RLA #3 is located behind Levee B in the former floodplains of the Arkansas River and Parkview Creek. The land is generally level, with an oblong trough of low ground between Archer and Admiral Blvd., and from N. 39th W. Ave. to 37th, that was once the course of Parkview Creek prior to the construction of the Missouri Kansas Texas Railroad, the rerouting of the creek, and the construction of the Parkview Ditch. Until the 1990s, runoff in the neighborhood was carried through shallow bar ditches south to the Parkview Ditch. Flooding in 1979 and 1984 was the result of overland flow from intense rainfall which tended to flow south from the Keystone Expressway and the Katy Trail and collect in the swale of the former stream bed. Only one property in the RLA has filed damage claims: a slab-on-grade residence slightly below street level, and protected only by shallow bar ditches along W. Archer St. and N. 38th W. Ave. All of the other properties in the RLA are built on crawl spaces—and this one- or two-foot elevation difference has apparently been the primary reason the other residences have not experienced damage. It is possible that the installation of the storm sewer along N. 38th W. Ave., with inlets at Archer and Admiral, has eliminated flooding to the Repetitive Loss Property and in the immediate neighborhood.

V. Mitigation Measures

Overview

Given the location and situation of RLA #3, along with its flooding history, individual property protection actions are the most appropriate measures for reducing or eliminating flood damage. Such actions are normally 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, sewer backup protection, and flood insurance. Dry floodproofing is sometimes recommended for commercial structures.

Individual Flood Protection 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 (918) 596-7777, or go online to www.cityoftulsa.org/connect/contact-the-city.

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 is 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.

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 structures using such things as 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 (918) 596-2100. Berms or redirected drainage may be the most feasible solution for areas with flooding due to overland flow, such as RLA #3.

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 is a voluntary program which offers property 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 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. Property owners who would like more information about this program are encouraged to contact the City's Customer Care Center at (918) 596-7777.

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

Acquisition is usually not feasible or cost effective for areas of shallow flooding, as in RLA #3. If a property is located in an existing FEMA Floodway or Special Flood Hazard Area, demolition, acquisition and relocation may be feasible and cost-effective.

Elevate Your Structure. Elevating the structure is usually not feasible or cost-effective for areas of shallow flooding, particularly for masonry structures built on concrete slabs. It can sometimes be cost-effective for wood frame buildings on crawlspaces. The Repetitive Loss Property in RLA #3 is not a candidate for elevation.

Dry Floodproof Your Building. includes actions that seal a structure and prevent floodwaters from entering. This method is best applied 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.

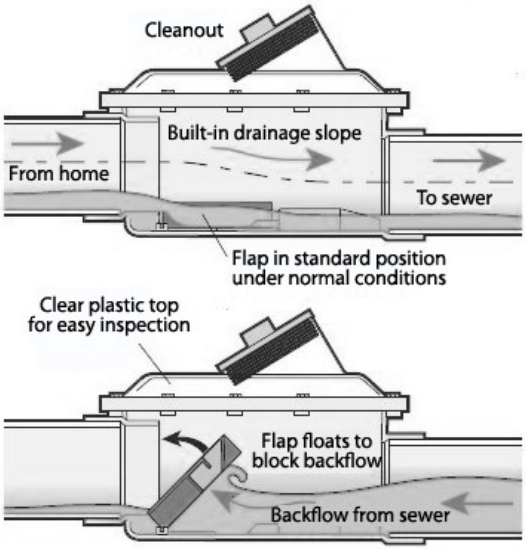
Wet Floodproof Your Building. Wet floodproofing allows water to enter a structure, while removing, protecting or elevating items that can be damaged, such as air conditioning equipment. This is often used on structures with crawl spaces and shallow flood depths. The City does not allow basements in flood-prone 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, elevate, or otherwise protect items that can be damaged from flooding.

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.

Maintain Nearby Streams, Ditches, and Storm Drains: Local flooding can often be caused by brush and other debris blocking drainage ways and culverts. Although this is not at present a major problem for the East Branch of Joe Creek in this reach, debris can block storm sewer inlets in RLA #3 and increase flood damage from overland flow. 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.

Correct Sanitary Sewer Backup Problems. Sanitary sewer backup can be a cause of home damage in low-lying, flood-



Sewer backflow prevention valves are essential components for homes in low-lying, flood-prone areas.

prone areas like RLA #3. 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 insurance claims are for properties that are outside the FEMA floodplain. Because of the City of Tulsa's sustained efforts to reduce flooding, property owners are entitled to a discount on your flood insurance. A property does not have to be in a floodplain to qualify for flood insurance.

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 flood 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 are appropriate for RLA #3.

- Extend and/or improve the storm sewer system to better collect storm water runoff.
- Acquire flood prone properties on a voluntary basis.
- Improve roadside ditches and drainage structures to improve drainage.

VI. Funding

Due to the nature of the flooding problems and the localized, minor damages involved in RLA #3, the funding of needed site improvements will have to be borne by the individual property owner. The City of Tulsa would bear the cost for the construction of any additional storm drainage.

VII. Conclusions and Recommendations

RLA #3 is comprised of eight single-family homes located in the historic floodplains of the Arkansas River and Parkview Creek. The floodplains have been modified by the construction of the Missouri Kansas and Texas railroad and the Arkansas River levees. The majority of homes in RLA #3 were built after the levees were put in and during the post-war boom between 1948 and 1968. Railroad and home construction covered over the original stream channel, which run through RLA #3, and routed the creek west to N.

41st W. Ave. and then east through the Parkview Ditch to the Arkansas River. Local runoff was carried through shallow bar ditches which proved to be incapable of handling massive rain storms like that of June 1979 and May 1984. In these events, bar ditch overflow and overland flow down the swale of the original drainage inundated some yards, garages and homes to depths of about one foot. Subsequent improvements to the sewer system in the area have largely solved the historic flooding problems in the neighborhood. At present, only one property in the RLA has a slab-on-grade foundation and is thus highly vulnerable to flooding from shallow overland flows. Nevertheless, rainfall events similar to the 300-year storm of 1984 will likely continue to cause flooding in the RLA.

Property owners and residents are encouraged to maintain flood insurance. The City of Tulsa is a Community Rating System (CRS) Class II Community, and all homeowners qualify for up to a 40% 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 advice.