Repetitive Loss Area # 24

Fred Creek

E. 72nd St. & S. Gary Ave. Area

August 17, 2017

Flanagan & Associates, LLC
Planning Consultants

SWIFT WATER RESOURCES ENGINEERING, LLC
9 East 4th Street • Suite 301 • Tulsa, OK 74103 918-582-1380 • swre@sbcglobal.net

Bill Robison, P.E., CFM
Engineering Services

CITY OF Tulsa
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ENGINEERING SERVICES

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 an 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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Brad Jackson, P.E., CFM	Lead Engineer, Stormwater Design
Laura Hendrix, CFM	Floodplain Administrator
Tim Lovell	Disaster Resilience Network
Angela King	Records Custodian

Consultants

Flanagan & Associates, LLC
Planning Consultants
3015 E. Skelly Drive, Suite 430
Tulsa, Oklahoma 74105
(918) 749-2696 www.rdflanagan.com

Ronald D. Flanagan, CFM, Principal
John D. Flanagan, Research, Writing
Tyler Brooks, GIS Specialist
Nancy K. Edwards, Administration

Swift Water Resources Engineering, LLC
Hydrologic Engineering Consultants
9 East 4th Street, Suite 301
Tulsa, Oklahoma 74103
(918) 582-1380 swre@sbcglobal.net

Mark Swift, P.E., CFM
Angela Swift, CPA, CEO

Repetitive Loss Area # 24

Fred Creek
E. 72nd St. & S. Gary Ave. Area

Overview

Repetitive Loss Area #24 is comprised of five residences and miscellaneous recreational facilities belonging to the Guier Woods Addition. The neighborhood is located along Fred Creek's Harvard Tributary, just north of its junction with the mainstem, generally in the 7200 block of S. Gary Ave. The RLA is about 1 mile above the Oral Roberts University campus and 2.5 miles above Fred Creek's confluence with the Arkansas River. Guier Woods is a private, gated community of upscale, single-family condominiums. The properties are one- and two-story, ranch-style, slab-on-grade structures built between 1973 and 1976, currently in Very Good condition. The 100-year flood elevation along the Harvard Tributary in this reach is between 680 and 692 feet, while the properties are situated at between the 690 and 694 feet. Four residences in the subdivision are within or touched by Tulsa's Regulatory Floodplain. The *Fred Creek Master Drainage Plan* determined that one structure in the community was below the 100-year flood level. Three properties in the neighborhood have made seven flood damage claims, four of which were paid—in 1979, 1980 and 1982—for a total of $10,995. The claims averaged about $2,750. The local Repetitive Loss Property made two claims, one in 1979 and the other in 1980, for a total of $9,663. Four claims were made by the Guier Woods community itself—two in 1979 and one in 1982—only one of which, in 1979, was approved by the NFIP. There have been no claims or reported flooding in this neighborhood since 1982. According to the *Fred Creek Master Drainage Plan Interim Report*, flooding has been due to overland flow from undersized storm sewers within the subdivision, flooding one residence, numerous backyards and tennis courts, and the community swimming pool.

Fred Creek's Harvard Tributary rises in the high ground around E. 67th and S. Evanston Pl. and flows in an open channel from north to south, passing through several amenity ponds and underground briefly in Guier Woods before joining the Fred Creek mainstem at about E. 74th and S. Gary Pl. The Fred Creek mainstem flows generally from east to west, beginning just west of the detention facility at E. 72nd St. and S. Urbana Ave., passing under Harvard Ave. at E. 73rd St., and continuing southwest across the ORU campus to the Arkansas River.

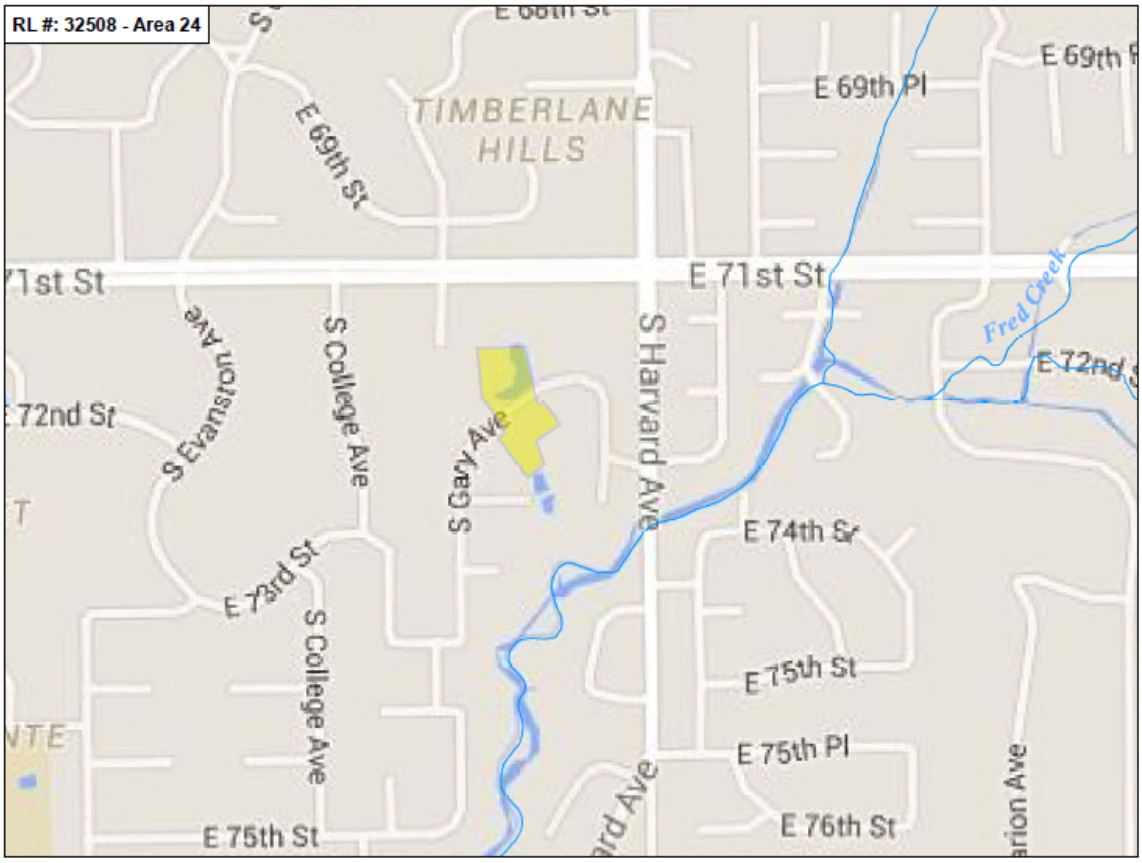
The general location of RLA #24 is shown on the map on Page 2 and on the more detailed photo/topography map on Page 6. The detailed map identifies residential properties, County Assessor parcels, floodplains and the existing storm sewer system.

I. Background

During the post-World War building boom of the 1950s and 1960s, Tulsa expanded rapidly east and south into the basins of Mingo, Joe and Fred creeks. Because of the

city's climate and the broad floodplains along these creeks, this growth brought with it an increased risk of flooding. And indeed, by the mid-1980s floods were occurring almost yearly and flooding had become Tulsa's most destructive natural hazard. One researcher at the time declared Tulsa "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 for reducing the risk of flooding.



RLA #24 is located just north of the junction of the Harvard Tributary with Fred Creek mainstem at about E. 72nd St. and S. Gary Ave.

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 per 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 an "RLA." The City is required to contact the owners of the properties in the RLA, 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 has been done for the individual repetitive loss properties.

Fred Creek mainstem, looking downstream (west) from the Harvard Ave. bridge. Guier Woods is on the right, behind the privacy wall.

It is important to note that most of the homes in a Repetitive Loss Area—perhaps as many as 80% or 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. The location of RLA #24 is shown on the aerial photo/topography map on page 4, below. The map identifies residential properties, County Assessor parcels, floodplains and the existing storm drainage systems.

II. Location

The Fred Creek is a 4.5-mile-long, left-bank tributary to the Arkansas River that drains 3.76-square-miles of southeast Tulsa. The creek rises in five principal branches at about the 750-ft. contour in the south Tulsa hills, near E. 69th St. and S. Columbia Ave., E. 67th

and S. Florence Ave., E. 66th and S. Marion Ave., E. 68th and S. Yale Ave., and E. 73rd and S. Yale Ave. The stream flows generally to the south and west through fully developed neighborhoods and across the campus of Oral Roberts University, to join the Arkansas River at about E. 83rd and Riverside Dr. The creek has been channelized through much of its lower reaches. Four former tributaries of Joe Creek have been rerouted to join Fred Creek near E. 78th and S. Lewis Ave., and Fred Creek's mainstem itself has been re-channeled to meet the Arkansas River at E. 83rd St., rather than following its original course to join the river near E. 91st St. and Riverside Dr.

Repetitive Loss Area #24 is located in the Guier Woods Addition, generally in the 7200 block of S. Gary Ave. The RLA is just north of the confluence of Fred Creek's Harvard tributary with the mainstem, about 1 mile above the Oral Roberts University campus and 2.5 miles from the creek's junction with the Arkansas River. Fred Creek flows at an elevation of about 675 feet at Harvard Ave., and between 675 to 670 feet as it passes along Guier Wood's southern boundary. The 100-year flood elevations in this reach of Fred Creek range from 670 ft. at the confluence with the Harvard Tributary to 675 ft. at Harvard Ave. bridge. The Harvard Tributary passes through Guier Woods at between 670 to 692 ft., with the 100-year flood level ranging from 680 to 692 feet in elevation. One residence within the subdivision has its first finished floor elevation at 690 ft., about 1 foot below the level of the 100-year flood at that location.

III. History

Development

The properties in RLA #24 were developed between 1973 and 1976 as parts of the Guier Woods subdivision. The structures are five upscale single-family residences built on slab foundations and miscellaneous recreational facilities belonging to the community. The residences are currently in Very Good condition. The Harvard Tributary of Fred Creek emerges from beneath E. 71st St. and flows south through a combination of open, grass-lined channel and underground pipes and amenity ponds to join Fred Creek about 400 ft. downstream from the Harvard Ave. bridge. Fred Creek, itself, has been attractively channelized through the Guier Woods neighborhood with concrete walls and riprap banks and drop structures.

Flooding

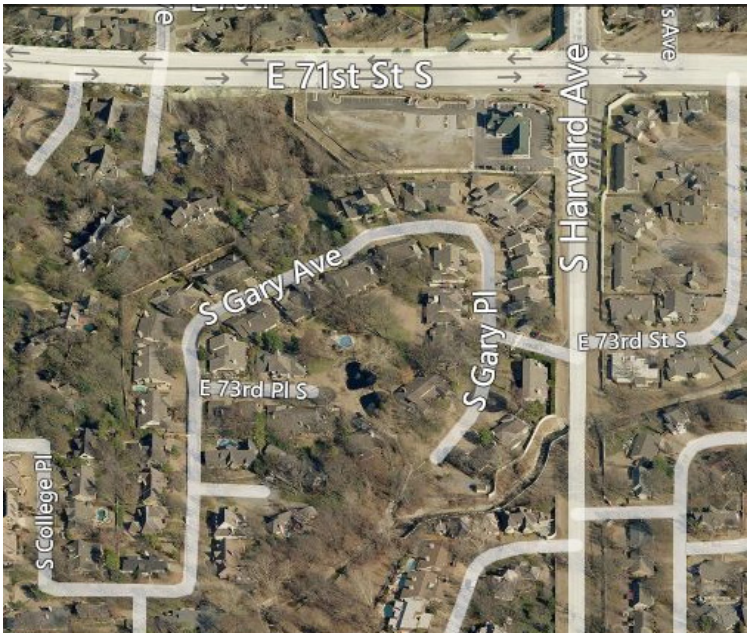
Flood damage in RLA #24 has primarily been the result of undersized storm sewers within the Guier Woods subdivision and consequent overland flow during peak rainfall events. The Harvard Tributary's floodplain in the subdivision is about 150 ft. wide and includes one structure, which sits on fill above the original channel. Numerous backyards, tennis courts, and the community swimming pool are also affected by the 100-year event and after flooding require extensive cleanup. The flood events for which paid claims were made occurred on June 20, 1979, when between 4 and 6 inches of rain fell in less than two hours in south Tulsa, and on June 16-17, 1980, when 6 to 10 inches of rain fell in the Tulsa area.

Improvements

As mentioned above, flooding within Guier Woods has been due to undersized storm sewers within the development, and to one residence having its first floor elevation approximately one foot below the level of the 100-year flood. The residents have constructed a channel next to this property to convey surface water around it and prevent runoff from flooding the first floor.

The solution recommended by the *Fred Creek Master Drainage Plan* was the construction of a storm drainage pipeline to carry excess runoff around the Guier Woods development. As proposed, the relief line would run east along the south side of 71st St. to Harvard Ave., and then south along Harvard Ave. to join Fred Creek's mainstem at the 73rd St. bridge.

IV. Research and Analysis

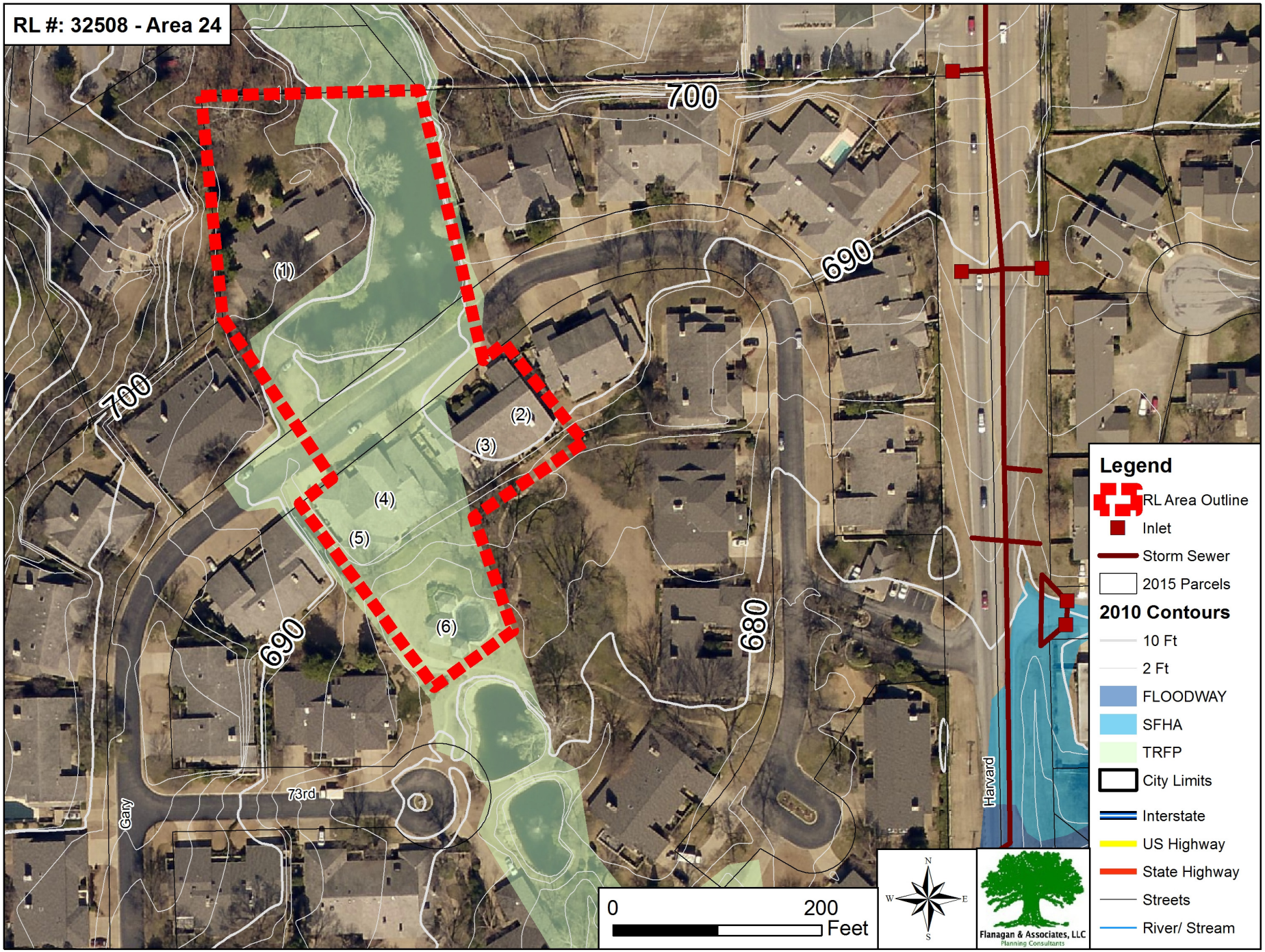


The Harvard Branch of Fred Creek enters the Guier Woods Addition on the south side of E. 71st St., passes under S. Gary Ave. to join Fred Creek mainstem at the bottom center of the above map.

The analysis of Repetitive Loss Area #24 was conducted by the Project Team through interviews with City officials, research into Engineering Services and Stormwater Drainage files, including the *Fred Creek Master Drainage Plan*, 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 the residences soliciting information about prior and existing flooding issues, if any. The Repetitive Loss Property in RLA #24 is an upscale slab-on-grade residence that was damaged on two occasions because of inadequate storm sewers and consequent overland flow within the Harvard Tributary's 100-year floodplain.

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).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TRFP
City Limits
Interstate
US Highway
State Highway
Streets
River/ Stream

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
- *Fred Creek Master Drainage Plan, Interim Report*, September 1987
- *Fred Creek Master Drainage Study, Final Report*, August 1988
- *Guidebook to Conducting Repetitive Loss Area Analyses*, UNO and FEMA

Capital Improvements Plans

No City of Tulsa Capital Improvements are currently planned that could have a positive impact on the flooding problems in Repetitive Loss Area # 24. There are storm sewer improvement and regional detention facilities on the existing CIPs for Little Joe Creek along with Master Drainage Plan recommendations that are not yet on the CIPs. None are presently funded.

Flood Insurance Data

One property in the RLA currently carries flood insurance. Because the Privacy Act of 1974 (5 USC 522a) restricts the release of flood insurance policy and claims information to the public, neither the Repetitive Loss property nor address-specific claims data are detailed in this Plan.

Claims Data.

Three properties in the RLA have made seven flood damage claims—in 1979, 1980 and 1982, four of which were paid for a total of $10,995. Three claims for flood damage in

1979 and 1982 were not approved. There have been no claims or reported flooding in this neighborhood since 1982.

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 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 RLA #24 to determine the situation and condition of the structures. Visual analysis was verified by queries of Tulsa County Assessor data.

Structure Type.

The structures in RLA #24 are all upscale single-family residences and community facilities.

Foundation Type.

The type of foundation was determined by field investigation and query of Tulsa County Assessor records. All structures in RLA #24 are built on slab-on-grade foundations.

Condition of Structures.

The condition of the residences in the RLA was determined by field investigation and a search of the County Assessor's records. The structures were all considered to be in Very Good condition. These findings are summarized in the following table.

Properties in the RLA

Address	Structure Type	Foundation Type	Year Built	Condition
Property 1	Single Family Res.	Slab	1976	Very Good
Property 2	Single Family Res.	Slab	1975	Very Good
Property 3	Single Family Res.	Slab	1974	Very Good
Property 4	Single Family Res.	Slab	1974	Very Good
Property 5	Single Family Res.	Slab	1973	Very Good
Property 6	Guier Woods Facilities	Slab	1973	Very Good

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 and families, including the purchase of flood insurance.

Annual Repetitive Loss Area Notification. Residents in Repetitive Loss Area #24 are notified annually that their homes are located in a Repetitive Loss Area, and are potentially subject to flood damage from storm sewer back-up and 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. City Staff/Consultants interviewed homeowners to brief them on the Repetitive Loss Area Analysis Study/Plan, receive their input, and discuss possible mitigation measures. There have been no comments concerning flooding from property owners in response to notification.

Conclusions

Repetitive Loss Area #24 is located in Guier Woods subdivision, a gated community of upscale single-family residences located along Fred Creek's Harvard Tributary, just north of its confluence with the mainstem. The six properties that comprise the RLA are five single-family residences and miscellaneous recreational facilities belonging to the Guier Woods community—such as tennis courts and swimming pool. The properties are one- and two-story, ranch-style, slab-on-grade structures built between 1973 and 1976, currently in Very Good condition. Only one property in the RLA was determined to have a first-finished-floor elevation below the level of the 100-year flood. One residence in the RLA (the Repetitive Loss structure) has made two paid flood damage claims—in 1979 and1980, and two others have made single claims in the same years that were approved. All flood damage has been due to overland flow as a result of undersized storm sewers in the development. The residents have constructed channels to convey surface water and prevent runoff from flooding the properties. The *Fred Creek Master Drainage Plan* recommended the construction of a storm drainage pipeline to carry peak flow runoff from upstream of 71st St. around Guier Woods—running east along the south side of 71st St., then south on Harvard Ave. to empty into Fred Creek at the 73rd St. bridge. Although this relief line has not been constructed, other measures undertaken by the community appear to have significantly limited, if not eliminated, flooding in the RLA. There have been no claims or reported flooding in the neighborhood since 1982.

V. Mitigation Measures

Overview

The Master Drainage Plan for this reach of the West Tributary identifies the most cost-effective structural solutions, while the Non-Structural Plan identifies buildings where structural measures are not cost-effective, and acquisition is the recommended solution. As noted above, all flooding events have been the result of overland flow to the west from the Pebble Creek Addition following the 72nd St. cul de sac into a gentle swale of

what was apparently a former drainage way. Only one property in the RLA is below the level of the 100-year flood. The addition of a storm sewer inlet at the base of E. 72nd St. has significantly reduced, if not eliminated, flooding of the Repetitive Loss Property. No additional changes were recommended for this reach in the *Fred Creek Master Drainage Plan*, as a number of improvements had already been put in place during the construction of the Pebble Creek Addition in the late 1990s.

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 (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.

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

Make a Disaster Preparedness Plan. It is always a good idea for people living in flood hazard zones to have 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 residences 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. This may be the most feasible solution for areas with flooding due to overland flow, as in RLA #24.

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 have 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. If you would like more information about this program contact the Customer Care Center at (918) 596-2100.

Acquisition is usually not feasible or cost effective for areas of shallow flooding, as in RLA #24. 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 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 homes in RLA #24 is a candidate for elevation.

Dry Floodproof Your Structure. This can include actions that seal a structure and prevent floodwaters 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.

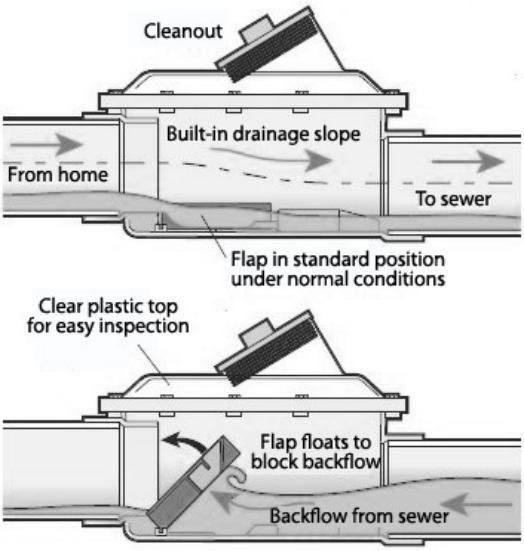
Wet Floodproof Your Garage. The garage, with its slab-on-grade construction, is one of the most vulnerable areas of your home to overland flow flooding. Remove, relocate, elevate, or otherwise protect items that can be damaged from flooding.

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. Channel blocking by limbs, grass cuttings and other debris in the largely natural course of the West Tributary through RLA #24 could contribute to future flooding. The channel must be regularly inspected and kept free of blockage. . 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 problem in low-lying, flood-prone areas like RLA #24. The installation of backflow prevention valves in 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, 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.



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

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 #24.

- Extend and/or improve the storm sewer system to better collect storm water runoff.
- Create overland flow path to allow better drainage of ponded water to the Creek.
- Acquire flood prone properties on a voluntary basis.

VI. Funding

Due to the nature of the flooding problems and the localized, minor damages involved in RLA #24, the funding of needed improvements will have to be borne by the individual homeowner.

VII. Conclusions and Recommendations

Repetitive Loss Area #24 is located in Guier Woods subdivision, a gated community of upscale single-family residences located along Fred Creek's Harvard Tributary, just north of its confluence with the mainstem. The properties are one- and two-story, ranch-style, slab-on-grade structures built between 1973 and 1976, currently in Very Good condition. The100-year floodplain in this reach of the tributary is about 150 feet wide and rises to between 680 and 692 feet in elevation. Four properties in the subdivision are within or touched by Tulsa's Regulatory Floodplain, and one residence has its first-finished-floor elevation below the level of the 100-year flood. All flood damage has been due to undersized storm sewers and consequent overland flow. There is one Repetitive Loss Property within the RLA, which made successful flood damage claims in 1979 and 1980. One other residence was damaged by flooding in 1979, as were tennis and swimming facilities of the Guier Woods Homeowners' Association.

According to the Fred Creek Master Drainage Plan, residents have constructed channels to convey surface water around the repetitive loss property and community facilities. These measures appear to have significantly limited, if not eliminated, flooding in the RLA. There have been no claims or reported flooding in the neighborhood since 1982.

The *Fred Creek Master Drainage Plan* cautions that some street and yard flooding could continue to occur in the basin during storms of a 100-year magnitude or greater. Consequently, slab-on-grade structures and community facilities will likely remain at some risk of flooding. Homeowners are encouraged to keep the Harvard Tributary and local drainage ways free of debris and maintain flood insurance on both their facilities, homes and contents. 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.