

# APPENDIX D

## REPETITIVE LOSS AREA ANALYSIS

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# REPETITIVE LOSS AREA ANALYSIS

## Comprehensive Floodplain Management Plan

*Prepared for:*



*July 2023*

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## Repetitive Loss Analysis

On May 3, 2016, the City of Sacramento's Repetitive Loss Area Analysis (RLAA) was adopted by City Council as part of the City of Sacramento's Comprehensive Flood Management Plan (CFMP). Since its initial adoption, additional investigations have been performed in the City's repetitive loss areas. This report reflects all current and past findings.

The City of Sacramento is using the ISO repetitive loss list and AW-501s dated December 2021, and a follow-up list dated December 2022 as the basis for this RLAA. This is the last officially sanctioned Community Rating System (CRS) repetitive loss data set issued to the City. According to the list, the City of Sacramento has 59 repetitive loss properties; 23 are mitigated, 23 are unmitigated, and 13 are misidentified and are pending removal. See Attachment 1 for details of the Repetitive Loss List. Area analyses are not required to be completed for mitigated properties. Four properties have been added to the list since the 2016 analysis that are analyzed herein. These are Region 3-Area 12 and Region 6-Areas 19 and 20.

The City is seeking mitigated status approval for one property; this property is included in the area analyses provided in this RLAA.

## Repetitive Loss Area Analysis Process

The RLAA planning process incorporated requirements from Section 510 of the 2017 CRS Coordinator's Manual. The planning process also incorporated requirements from the following guidance documents:

- Federal Emergency Management Agency (FEMA) publication *Reducing Damage from Localized Flooding: A Guide for Communities*, Part III Chapter 7;
- CRS publication *Mapping Repetitive Loss Areas* dated August 15, 2008; and
- Center for Hazards Assessment Response and Technology, University of New Orleans draft publication *The Guidebook to Conducting Repetitive Loss Area Analyses*.

Most specifically, this RLAA included all five planning steps included in the 2017 CRS Coordinator's Manual:

- Step 1. Advise all properties in the repetitive loss areas that the analysis will be conducted and request their input on the hazard and recommendation actions.
- Step 2. Contact agencies or organizations that may have plans or studies that could affect the cause or impacts of the flooding. The agencies and organizations must be identified in the analysis report.
- Step 3. Visit each building and collect basic data.
- Step 4. Review alternative approaches and determine whether any property protection measures or drainage improvements are feasible.
- Step 5. Document the findings. A separate analysis report must be prepared for each area.

Beyond the five planning steps, additional credit criteria must be met:

- The community must have at least one repetitive loss area delineated in accordance with the criteria in Section 503.



- The repetitive loss area must be mapped as described in Section 503.a. A Category “C” community must prepare analyses for all of its repetitive loss areas if it wants to use the RLAA to meet its repetitive loss planning prerequisite.
- The RLAA report(s) must be submitted to the community’s governing body and made available to the media and the public. The complete RLAA report(s) must be adopted by the community’s governing body or by an office that has been delegated approval authority by the community’s governing body.
- The community must prepare an annual progress report for its area analysis.
- The community must update its RLAA in time for each CRS cycle verification visit.

The majority of the repetitive loss areas experience the same cause of flooding, that of local drainage problems; however, each region has unique characteristics that impact the property protection measures that are most effective in promoting flood protection. Therefore, data collected and analyzed in steps three, four, and five have been organized by region.

## **1. Step 1. Advise all Property Owners**

RLAA Step 1 (2017 CRS Coordinator’s Manual Section 512.b) requires notification that an analysis is being conducted to all properties in the repetitive loss areas, with a request for input on the hazard and recommended actions. The City of Sacramento sends an annual notice to all repetitive loss area properties with information on the potential flood hazard and recommended mitigation activities.

Before fieldwork began on the current RLAA, individual letters were mailed to property owners within all six repetitive loss areas (Figure 1). Letters were mailed to all properties within each area, including repetitive loss properties, and additional properties with similar flooding conditions but which have no known claims paid against the NFIP. In total, 438 notification letters were mailed to property owners. The letters were sent out on January 17, 2023. Copies of the addresses are maintained on file with the City of Sacramento, Department of Utilities. In accordance with the privacy act of 1974, the letters will not be shared with the general public.

For this process, the City also developed a questionnaire (Figure 2), which allowed homeowners to share important information about flooding in their neighborhoods. The questionnaire included an explanation of what a repetitive loss area was, and requested historical information on the properties’ flood history.

Prior to the field visit, a second targeted outreach letter and questionnaire were mailed in March 2023. This mailing included properties recently added to the City’s repetitive loss list. A copy of this targeted letter is included as Figure 3.

### **1.1. Mailed Questionnaire and Online Survey**

The questionnaire was included with each letter mailed to building owners, and was also available online, through an online link as well as a QR code. The questionnaire asks about the type of foundation and if the building has a basement, if the building has experienced any type of flooding, the cause of the flooding, flood protection measures and whether the owner has flood

insurance. A copy of the entire mailing, including the property notification letter, survey, and “Protect Your Home from Flooding” FEMA brochure, is included in Attachment 2.

Of the 438 mailed notification letters and questionnaires, the City of Sacramento received 14 responses. A compilation of the responses can be found in Attachment 4.


FIGURE 1. EXAMPLE RLAA PROPERTY NOTIFICATION LETTER (JANUARY MAILING)



FIGURE 2. QUESTIONNAIRE SENT WITH MAILING, AND AVAILABLE ONLINE


## WAS THERE FLOODING IN YOUR AREA? FLOOD PROTECTION QUESTIONNAIRE

Please help us by completing this survey by February 15th, 2023.  
Return this survey in the enclosed envelope - or complete our online survey at  
<https://www.surveymonkey.com/r/VMB6M9F> or scan on your phone by using this QR code:



Name: \_\_\_\_\_ Email: \_\_\_\_\_  
Address: \_\_\_\_\_

- How many years have you occupied the home/building at this address? \_\_\_\_\_
- Do you rent or own this home/building? ☐ Rent ☐ Own
- What type of foundation does the home/building have?  
☐ Slab ☐ Crawl Space ☐ Basement ☐ Other \_\_\_\_\_
- Has this home/building or property ever been flooded or has a water problem?  
☐ Yes ☐ No (if "no" please complete only 10-14)
- In what year(s) did it flood? \_\_\_\_\_
- What do you feel was the cause of the flooding? Check all that affect your home/building.  
☐ Storm drain backup ☐ Standing water next to house/building  
☐ Drainage from nearby property ☐ Saturated ground/leaks in basement walls  
☐ Overbank flooding from: \_\_\_\_\_ ☐ Other: \_\_\_\_\_
- How did the water enter your home/building?  
\_\_\_\_\_
- How deep did the water get?  
☐ Yard: \_\_\_\_\_ feet ☐ Crawl Space: \_\_\_\_\_ feet ☐ Garage: \_\_\_\_\_ feet  
☐ Over First Floor: \_\_\_\_\_ feet ☐ Basement: \_\_\_\_\_ feet  
☐ Water kept out of house by sandbagging, sewer valve, or other protective measures
- What was the longest timeframe that water stayed in the house/building?  
\_\_\_\_\_ hours or \_\_\_\_\_ days
- Have you installed any flood protection measures on the property?  
☐ Sump pump ☐ Waterproofed the outside walls ☐ Re-graded yard to reduce water  
☐ Moved things out of basement ☐ Backup power system/generator ☐ Sandbagged  
☐ Elevated utilities (water heater, etc.) ☐ Onsite Drainage ☐ Other \_\_\_\_\_
- Did any of the measures checked in item 10 work? If so, which ones? If not, do you know why they failed?  
\_\_\_\_\_

 SIGN UP FOR EMERGENCY ALERTS | [WWW.SACRAMENTO-ALERT.ORG](http://WWW.SACRAMENTO-ALERT.ORG)



12. Do you have flood insurance? ☐ Yes ☐ No

13. Interested in mitigating your flooding issues through floodproofing actions? ☐ Yes ☐ No

14. Include any additional information and comments you may have about flooding in your area:

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### Why You Received This Questionnaire

The City of Sacramento is conducting an analysis of specific areas in the City that have experienced repetitive flooding throughout the years. These areas are called **Repetitive Loss Areas**. You have received this survey because you are located in or near a Repetitive Loss Area.

Any information you can provide us will help the City determine the source of flooding in your neighborhood and what measures can be taken to prevent future flooding. There may be opportunities to receive grant funding to mitigate flooding issues. **If you are interested in information on grant programs and property protection, please check “yes” on question 13 of the survey.**

If you would like to receive an email notification when the Repetitive Loss Area Analysis is ready for review, please provide your email address on the returned survey.

### General Flood Preparedness

- We have enclosed a brochure on how to prepare and protect yourself, property, and family in the event of a flood. We also encourage residents to purchase flood insurance to protect their assets. Most homeowner's insurance policies do not cover loss from flooding.
- Sign up for emergency alerts at [www.sacramento-alert.org](http://www.sacramento-alert.org). Sacramento Alert is the new “reverse 911” system for the Sacramento region. In the event of an emergency, this system will be used to provide real-time information such as levee updates, evacuation routes, and other important information.
- For onsite visits, grant information, or general flood information, please contact the Flood Information hotline at (916) 808-5061 or [floodinfo@cityofsacramento.org](mailto:floodinfo@cityofsacramento.org). **In the case of active flooding, please contact 311.**

**Mail Survey:** Jamie McKinley, Department of Utilities, 1395 35<sup>th</sup> Avenue, Sacramento, California 95822

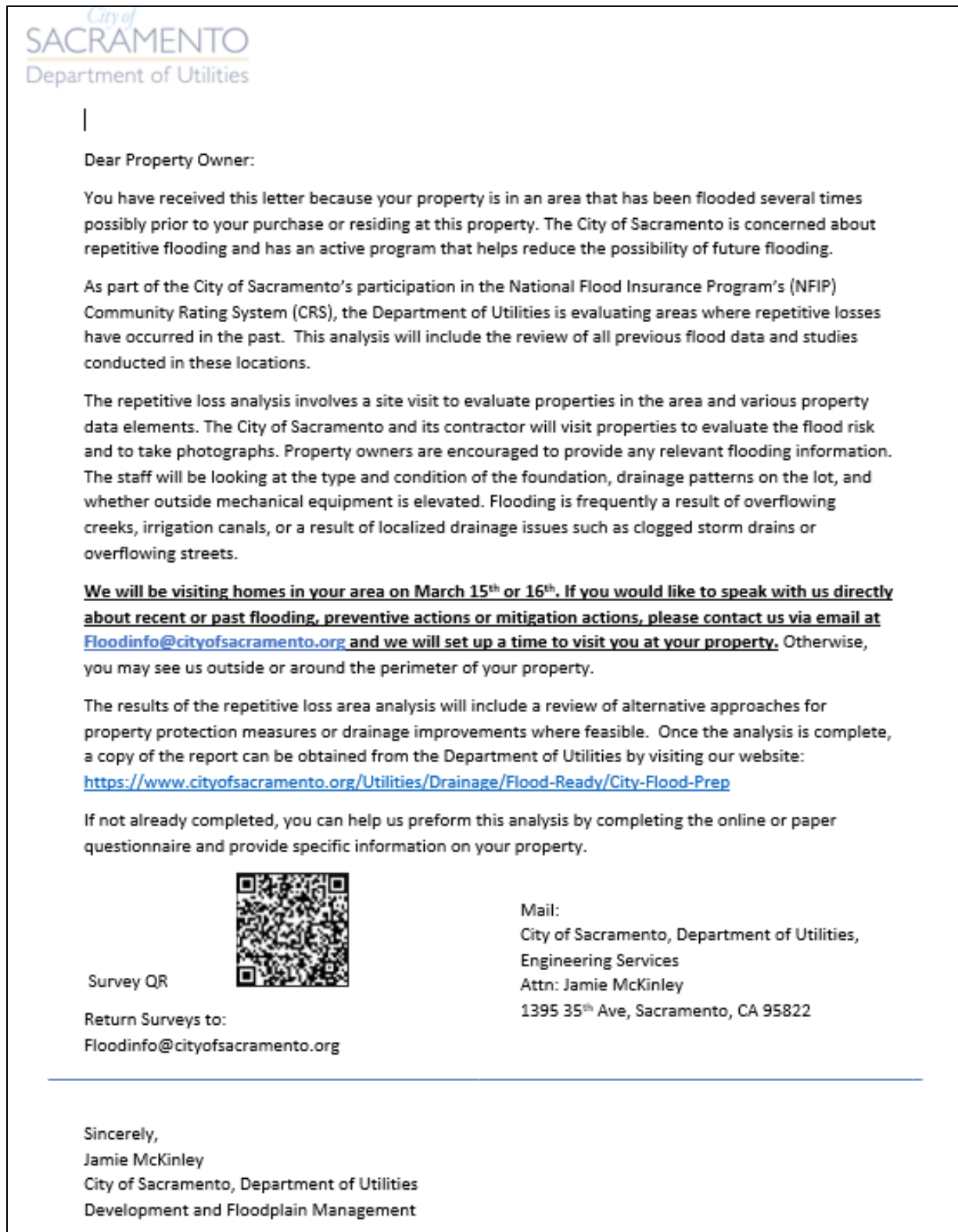
## Has your neighborhood experienced flooding?

**Please take a moment to fill out this survey or call us at 916-808-5061.**

**We may be able to help.**

City of  
**SACRAMENTO**  
Department of Utilities

FIGURE 3. TARGETED PROPERTY NOTIFICATION LETTER MAILED IN ADVANCE OF FIELD VISIT (MARCH MAILING)



## **2. Step 2. Contact Agencies and Organizations**

The City reached out to external agencies and internal departments to access plans and studies that could affect or help determine the causes or impacts of flooding within the repetitive loss area. The following reports could help determine future problems and potentially assist in mitigation measures for the property owners.

- City of Sacramento
  - Comprehensive Flood Management Plan
  - Sacramento Rescue and Flood Evacuation Maps: Levee & Folsom Dam Breach
  - Capital Improvement Plan and Utilities Drainage Master Plans
  - Urban Design Guidelines
  - Historical flood data
- County of Sacramento
  - Sacramento County Local Hazard Mitigation Plan
- California Department of Water Resources (DWR)
  - FloodSAFE
  - Levee Flood Protection Zone Map (LFPZ)
  - Best Available Maps
  - California Data Exchange Center (CDEC)
- Sacramento Area Flood Control Agency (SAFCA)
- US Army Corps of Engineers
  - Sacramento District Levee Systems Inspection Status
- FEMA
  - Repetitive Loss & Flood Insurance Claims Data
  - FEMA Flood Insurance Studies/Flood Insurance Rate Maps
  - NFIP Coordinators Manual
- National Oceanic and Atmospheric Administration California Nevada River Forecast Center
- GEI Consultants, Inc.
  - Technical Memorandum: Repetitive Flood Loss Investigation

### **2.1. Summary of Studies and Reports**

#### **City of Sacramento Comprehensive Flood Management Plan**

The purpose of this plan is to identify, assess, and mitigate flood hazards and flood risk in the City using nonstructural and structural measures. This plan analyzes improving floodplain management through land use planning and development, levee security, outreach, internal drainage, structural measures, and emergency management. The plan also develops strategies and action items on how the City will mitigate flood hazards and vulnerabilities.

#### **Sacramento Rescue and Evacuation Maps**

The maps show the results of hypothetical levee and dam failures at different locations within the City and County of Sacramento for the 100-year and 200-year flood events. The maps show evacuation routes and water depths over time.

### **City of Sacramento Proposed Capital Improvement Program, 2023-2028**

The 2023-2028 Capital Improvement Plan is a five-year plan for the funding and construction or repair of City buildings and facilities such as streets, roads, storm drains, traffic signals, parks, and community centers. The total planned Capital Improvement Plan budget for fiscal years 2023-2028 is \$465 million. The FY2023/24 budget for the City Utilities Program totals \$47.3 million for 37 projects or programs. The five-year plan totals \$235.7 million for 42 projects or programs. A total of \$9 million is designated for storm drainage projects.

### **Sacramento County Local Hazard Mitigation Plan**

The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards. The communities within Sacramento County developed this Local Hazard Mitigation Plan (LHMP) update to make its residents less vulnerable to future hazard events. This plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 so that Sacramento County would be eligible for FEMA's Pre-Disaster Mitigation and Hazard Mitigation Grant programs.

The communities followed a planning process prescribed by FEMA, which began with the formation of a hazard mitigation planning committee comprising key representatives and other regional stakeholders. The committee conducted a risk assessment that identified and profiled hazards that pose a risk within the County, assessed the County's vulnerability to these hazards, and examined the capabilities in place to mitigate them. The County is vulnerable to several hazards that are identified, profiled, and analyzed in this plan. Floods, levee failures, wildfires, and severe weather are among the hazards that can have a significant impact on the County.

The 2021 LHMP update serves to update the 2016 FEMA approved Sacramento County LHMP. Annex F details the hazard mitigation planning elements specific to the City of Sacramento. The Comprehensive Flood Management Plan and RLAA from 2016 are those most recently used for reference.

### **FloodSAFE, Levee Flood Protection Zone Map, and Best Available Maps**

The FloodSAFE program is a sustainable integrated flood management and emergency response system throughout California where steps are taken to manage flood risk. Multiple types of maps have been prepared as part of this program. LFPZ maps were prepared for the Lower Sacramento Valley Region as part of the FloodSAFE initiative. The LFPZ maps identify the areas that are protected by a project levee. The LFPZ maps are also used as part of the DWR's levee risk notification program. The DWR has the Best Available Maps to display the latest floodplains in a web viewer located at <http://gis.bam.water.ca.gov/bam>. With this viewer, the DWR has expanded the floodplains to cover all counties in the State and to include 500-year floodplains. The 100-, 200-, and 500-year floodplains can be selected for display using this viewer. The web viewer allows users to view a particular area, identify their potential flood hazards, and print a floodplain map.

### **Sacramento District Levee Systems Inspection Status**

The levee inspections show any unacceptable items within the levees that may have affected the repetitive loss area properties in the past and future projects. These unacceptable items include items



such as encroachments, slope stability issues, animal burrowing, and erosion. The State of California also provides levee inspection reports.

#### **California Data Exchange Center**

The CDEC installs, maintains, and operates an extensive hydrologic data collection network, including automatic precipitation and river stage sensors for the flood forecasting program through a centralized location online. The CDEC stores and processed real-time hydrologic information gathered by various cooperators throughout the State; it then disseminates this information to support forecasting and flood operations activities and to meet the data reporting needs of various cooperators, public and private agencies, the news media, and the public.

The CDEC includes the ALERT gauges maintained by the City and County of Sacramento. ALERT is an acronym which stands for Automated Local Evaluation in Real Time. The Sacramento City and County's ALERT system consists of two base stations and approximately 50 gauging stations.

#### **FEMA Flood Insurance Studies (FIS)**

FEMA's FIS for the City of Sacramento are dated August 16, 2012, and June 16, 2015. The FIS revises and updates information on the existence and severity of flood hazards within the City. The FIS also includes part of the revised digital Flood Insurance Rate Maps (FIRMs), which delineate updated Special Flood Hazard Areas and flood zones for the City.

In 2022, FIS Number 06067CV001E was developed that affected Sacramento County (CID 060262) and Citrus Heights (CID 060765). FEMA is revising the FIRMs and FIS for Arcade Creek in Sacramento County. The revision will enlarge the floodplain and increase the 100-year flood elevations by up to more than 2 feet. A number of properties in the County of Sacramento are being added to the floodplain for the first time and property owners may be required to obtain flood insurance by their mortgage companies. The 100-year flood elevations will also increase for properties already in the floodplain and these properties may see the cost of flood insurance increase. It is expected that the revised FIRM will become effective sometime in mid-2023.

#### **Repetitive Loss and Flood Insurance Claims Data**

The data received on the repetitive loss file such as the date(s), amount(s), and frequency of past flood insurance claims was used to analyze the cause of flooding. The Privacy Act of 1974 (5 U.S. Code 522a) restricts the release of flood insurance policy and claims data to the public. This information can only be released to state and local governments for the use in floodplain management related activities. Therefore, all claims data in this report are only discussed in general terms, but the data was used internally.

#### **California Nevada River Forecast Center**

The California Nevada River Forecast Center provides weather, water, and climate data. The City of Sacramento utilized this source to help in the analysis and explanation of claims that occurred during heavy precipitation events.

### **Technical Memorandum: Repetitive Flood Loss Investigation**

GEI Consultants and Michael Baker International provided assistance to the City of Sacramento, Department of Utilities in determining why seven repetitive loss areas flooded. Site visits, investigations and review of the local drainage system and the topographic/field survey contributed in determining the proposed mitigation efforts for each property. These analyses are included herein in Step 5. Analysis of Individual Repetitive Loss Areas.

### **Regional Reports**

Many methods were utilized to collect data for the RLAA. During field investigation work for the 2016 RLAA, while delivering flood protection questionnaires, staff conducted field surveys for all structures in the 18 repetitive loss areas. Elevation data was collected from the Sacramento County Assessor's Office, as well as through some on-site surveying. Staff reviewed all available Drainage Master Plans for the affected areas. These studies provided drainage capacity information and potential mitigation strategies. Flood management plans were analyzed to help determine the community's current mitigation activities and provided hazard information. Lastly, past insurance claim information was analyzed for each repetitive loss area to identify patterns in flooding issues.

The repetitive loss properties are vastly spread throughout the City of Sacramento. The majority of the structures flooded during the winter storms of 1995 and 1997 due to undersized drainage conveyance systems, power outages at the pump stations, and low-lying properties within their respective neighborhood. For reporting purposes, the 23 repetitive loss properties have been categorized into six regions which are then broken down into individually selected areas/neighborhoods where the properties are located. At no point is the repetitive loss property specifically identified in this report. All structures within a repetitive loss area are susceptible to the same flooding conditions; however, they may not have experienced flood losses.

Table 1 details the percentage of each repetitive loss area that falls within the 100-year, 500-year or Unshaded Zone-X flood zone, while Table 2 details the number of properties in each flood zone.

**TABLE 1. PERCENTAGE OF REPETITIVE LOSS PROPERTIES IN EACH FLOOD ZONE**

RL Area	Zone AE 100-yr	Zone X Unshaded	Zone X (Levee)	Zone A99	Shaded X
1	33%			67%	
2			100%		
3		17%	83%		
4			100%		
5			100%		
6	33%		33%		33%

**TABLE 2. NUMBER OF RL PROPERTIES BY FLOOD ZONE (TOTAL 23)**

RL Area	Zone AE 100-yr	Zone X Unshaded	Zone X (Levee)	Zone A99	Shaded X
1	1			2	
2			2		
3		1	5		
4			1		
5			8		
6	1		1		1

### **3. Step 3. Building Data Collection**

The on-site field survey for the current analysis was conducted March 16 and 17, 2023. In addition to building-specific data collection, multiple photographs were taken of each structure on the properties, to the extent the structures were visible from the street.<sup>1</sup> Photos were taken of current drainage features and mitigation and flood-proofing measures if evident from street or parking lot views. The following information was recorded for each property:

- Existing mitigation observed
- Type and condition of the structure and foundation
- Number of stories
- Height above street grade and height above site grade
- Presence and type of appurtenant structures
- Likely areas and severity of damage on property
- Presence of any HVAC units that would be vulnerable

Data was also gathered, when possible, through conversations with property owners/and or residents. These conversations provided detail on the extent of flooding, potential cause of flooding, and recollections from past flood events, which help to understand flooding issues for these areas. Data was also incorporated from off-site research, including a review of FEMA FIRMs and the location of the repetitive loss areas in relation to FEMA flood zones.

**TABLE 3. TYPE OF FLOODING AFFECTING RLAA PROPERTIES ADDED IN 2022**

<b>Region</b>	<b>Area</b>	<b>No. Properties</b>	<b>Type of Flooding</b>
3	12	1	Localized/Stormwater Flooding
6	19	2	Overbank Flooding
6	20	1	Localized/Stormwater Flooding

Many of the properties are located outside of a Special Flood Hazard Area. This is consistent with the majority of the City of Sacramento classified as an X Zone whether it is due to minimal flood hazard or reduced risk due to levees. Exceptions include Region 1 where the area is classified mostly as an A99 Zone, with only a small fraction listed as an AE Zone. The AE Zone is found on the Garden Highway, which runs along the Sacramento River where a small amount of development was built on the waterside of the levee. Another localized AE Zone is along Arcade Creek. Based on this information, traditional flood zones are not a contributing factor in determining repetitive loss areas within the City. It also reinforces the findings that many of the repetitive loss areas are affected by on-site grading and draining issues during heavy, long duration storms.

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<sup>1</sup> Some structures were not visible due to fences around the entire structure or trees.

## 4. Step 4. Review Alternative Approaches

Although this report presents separate analyses for each identified repetitive loss area in the City of Sacramento, the list of potential measures to address repetitive flooding problems is similar for each area. This chapter summarizes the alternatives that were identified for consideration. These alternatives can be implemented by the City, the homeowner, or other entities. The selection of suitable alternatives for each at-risk property in the repetitive loss areas is described in the chapters presenting individual RLAA's.

Many types of flood hazard mitigation exist, and there is no single mitigation measure that fits every case or even most cases. Successful mitigation often requires multiple strategies. The 2017 CRS Coordinator's Manual breaks the primary types of mitigation down as follows:

**Preventive** activities keep flood problems from getting worse. The use and development of flood-prone areas are limited through planning, land acquisition, or regulation. These activities are usually administered by building, zoning, planning, and/or code enforcement offices.

**Property protection** activities are usually undertaken by property owners on a building-by-building or parcel basis.

**Natural resource protection** activities preserve or restore natural areas or the natural functions of floodplain and watershed areas. These activities are implemented by a variety of agencies, primarily parks, recreation, or conservation agencies or organizations.

**Emergency services** are measures taken during an emergency to minimize its impact. These measures are usually the responsibility of city or county emergency management staff and the owners or operators of major or critical facilities.

**Structural projects** keep floodwaters away from an area with a levee, reservoir, or other flood control measure. They are usually designed by engineers and managed or maintained by public works staff.

**Public information and outreach** activities advise property owners, potential property owners, and visitors about hazards and ways to protect people and property from them, as well as the natural and beneficial functions of local floodplains. They are usually implemented by a public information office.

TABLE 4. STRUCTURAL AND NONSTRUCTURAL POTENTIAL MITIGATION MEASURES

Structural Alternatives	Nonstructural Alternatives
Dry flood-proofing. Commercial structures and even residential structures are eligible for dry flood-proofing; however, in many instances this requires human intervention to complete the measure and ensure success. For example, installing watertight shields over doors or windows requires timely action by the homeowner, especially in a heavy rainfall event.	Provide public education through posting information about local flood hazards on City websites, posting signs at various locations in neighborhoods or discussing flood protection measures at local neighborhood association meetings.
Wet flood-proofing. Wet flood-proofing a structure involves making the uninhabited portions of the structure resistant to flood damage and allowing water to enter during flooding. For example, in a basement or crawl space, mechanical equipment and ductwork would not be damaged.	Implement volume control and runoff reduction measures in the City's Stormwater Management Ordinance.

<b>Structural Alternatives</b>	<b>Nonstructural Alternatives</b>
For basements, especially with combined storm sewer and sewer systems, backflow preventer valves can prevent storm water and sewer from entering crawl spaces and basements.	Relocate internal supplies, products/goods above the flooding depth.
Acquire and/or relocate properties/target abandoned properties.	Promote the purchase of flood insurance.
Elevate structures and damage-prone components, such as the furnace or air conditioning unit, above the base flood elevation.	Continue to enforce the City's floodplain and zoning ordinances.
Construct engineered structural barriers, berms, and floodwalls (Note: Assuming lot has required space for a structural addition).	
Increase road elevations above the base flood elevation of the 100-year floodplain.	
Implement drainage improvements such as increasing capacity in the system (up-sizing pipes), providing additional inlets or larger inlets to receive more stormwater, or constructing detention basins where space allows.	
Promote stormwater system maintenance program to ensure inlets and channels are free of clogging debris.	

#### **4.1. Preventive**

The City of Sacramento regulates residential and commercial development through its building code, planning and zoning requirements, stormwater management regulations and floodplain management ordinances. The City of Sacramento has adopted building codes and procedures designed to protect lives and property in the event of a 100-year flood. Specific floodplain management regulations and building codes are enforced to regulate construction in at-risk areas throughout the city. Construction certificate and hold harmless agreement requirements for each flood zone are shown in Table 5.

TABLE 5. CITY OF SACRAMENTO CONSTRUCTION REQUIREMENTS FOR FLOOD ZONES

FLOOD ZONE REQUIREMENTS			
ZONE	DEFINITION	RESIDENTIAL CONSTRUCTION (Includes all single / multi. family dwelling units)	COMMERCIAL CONSTRUCTION (Excludes all residential dwelling units )
A	No base flood elevations determined (base flood elevation to be determined by Department of Utilities).	NEW CONSTRUCTION AND SUBSTANTIAL IMPROVEMENT:	NEW CONSTRUCTION AND SUBSTANTIAL IMPROVEMENT:
AE	Base flood elevations determined [Example ZONE AE (EL 33)].	<input type="checkbox"/> Elevate lowest floor, including basement, a minimum of one foot (1') above the base flood elevation or depth number. If no depth is specified for the zone AO, elevate two feet (2') above the highest adjacent grade.	<input type="checkbox"/> Elevate lowest floor, including basement or floodproof the building to a minimum of one foot (1') above the base flood elevation or depth number. If no depth is specified for the zone AO, elevate two feet (2') above the highest adjacent grade.
AH	Flood depths of 1 to 3 feet (Usually areas of ponding); base flood elevations determined [Example ZONE AH (EL 17)].	<input type="checkbox"/> Hold Harmless Agreement regarding Risk of Flooding <input type="checkbox"/> Elevation Certificate	<input type="checkbox"/> Hold Harmless Agreement regarding Risk of Flooding <input type="checkbox"/> Elevation Certificate
AO	Flood depths of 1 to 3 feet (Usually sheet flow on sloping terrain; average depths determined. For areas of alluvial fan flooding; velocities determined [Example ZONE AO (DEPTH 2)]).		<input type="checkbox"/> Floodproofing Certificate (when floodproofing provided)
Magpie Creek 100yr	See Magpie Creek Floodplain Map (Local Floodplain not FEMA)		
A99	To be protected from 100-year flood by Federal protection system under construction; no base flood elevations determined.	NEW CONSTRUCTION AND SUBSTANTIAL IMPROVEMENT: <input type="checkbox"/> Hold Harmless Agreement Regarding Risk of Flooding on Property	
AR	Area of special flood hazard which results from the decertification of a previously accredited flood protection system which is determined to be in the process of being restored to provide 100-year or greater level of flood protection [Examples ZONE AR, ZONE AR (EL 18), ZONE AR (DEPTH 2)].	NEW CONSTRUCTION: <input type="checkbox"/> Elevate lowest floor, including basement, to the lower of the following: a. Three feet(3') above the highest adjacent grade b. Base flood elevation or depth number <input type="checkbox"/> Hold Harmless Agreement regarding the Risk of Flooding <input type="checkbox"/> Elevation Certificate SUBSTANTIAL IMPROVEMENT: <input type="checkbox"/> Hold Harmless Agreement regarding the Risk of Flooding on Property	NEW CONSTRUCTION: <input type="checkbox"/> Elevate lowest floor, including basement, or floodproof the building to the lower of the following: a. Three feet(3') above the highest adjacent grade b. Base flood elevation or depth number <input type="checkbox"/> Hold Harmless Agreement regarding the Risk of Flooding <input type="checkbox"/> Elevation Certificate SUBSTANTIAL IMPROVEMENT: <input type="checkbox"/> Hold Harmless Agreement regarding the Risk of Flooding on Property
X (SHADED)	Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.	None	
X	Areas determined to be outside the 500-year floodplain.	None	

## 4.2. Property Protection

Property protection is essential to mitigating repetitive loss properties and reducing future flood losses. There are many ways to protect a property from flood damage. Property protection measures recognized in the 2017 CRS Coordinator's Manual include relocation, acquisition, building elevation, retrofitting, sewer backup protection, and insurance. Different measures are appropriate for different flood hazards, building types and building conditions. Table 6 lists typical property protection measures.

TABLE 6. TYPICAL PRIVATE PROPERTY PROTECTION MEASURES

Demolish the building or relocate it out of harm's way.
Elevate the building above the flood level.
Elevate damage-prone components, such as the furnace or air conditioning unit.
Dry flood-proof the building so water cannot get into it.
Wet flood-proof portions of the building so water won't cause damage.
Construct a berm or redirect drainage away from the building.
Maintain nearby streams, ditches, and storm drains so debris does not obstruct them.
Correct sewer backup problems.

Source: 2017 CRS Coordinators Manual.

These measures are generally performed by property owners or their agents. FEMA has published numerous manuals that help a property owner determine which property protection measures are appropriate for particular situations.

#### **4.2.1. Flood Insurance**

Insurance is included as a property protection activity although it does not mitigate or prevent damage caused by a flood. However, flood insurance does help the owner repair and rebuild their property after a flood, and it can enable the owner to afford incorporating other property protection measures in that process. Flood insurance provides funding to repair flood-damaged property without the need to draw down savings and/or take on debt. As long as a policy is in force, insurance offers the advantage of protecting the property without requiring human intervention for the measure to work.

TABLE 7. ADVANTAGES AND DISADVANTAGES OF FLOOD INSURANCE

Advantages	Disadvantages
Provides protection outside of what is covered by a homeowners' insurance policy	Cost may be prohibitive
Can help to fund other property protection measures after a flood through increased cost of compliance coverage	Policyholders may have trouble understanding policy and filing claims
Provides protection for both structure and contents	Does not prevent or mitigate damage
Can be purchased anywhere in a community, including outside of a flood zone	

#### **4.2.2. Dry Flood-Proofing**

Dry flood-proofing consists of completely sealing around the exterior of the building so that water cannot enter the building. Making the structure watertight involves sealing the walls with waterproof coatings, impermeable membranes, or a supplemental layer of masonry or concrete; installing watertight shields over windows and doors; and installing measures to prevent sewer backup. Due to the potential damage to a building as a result of hydrostatic pressure and/or hydrodynamic forces, dry flood-proofing is not a good option for areas where floodwater is deep or flows quickly. Dry flood-proofing can be a good option in areas that have minimal velocity and low depth.



TABLE 8. ADVANTAGES AND DISADVANTAGES OF DRY FLOOD-PROOFING

Advantages	Disadvantages
Often less costly than other retrofitting methods	Requires human intervention and adequate warning to install protective measures
Does not require additional land	Does not minimize the potential damage from high-velocity flood flow and wave action
May be funded by a FEMA mitigation grant program	May not be aesthetically pleasing

### 4.2.3. Wet Flood-Proofing

Wet flood-proofing consists of modifying uninhabited portions of a home (crawl space, garage, or unfinished basement) to allow floodwaters to enter or exit the structure without causing damage. Openings must be large enough for the water to flow through the structure such that the elevation of the water in the structure is equal to the elevation of the water outside of the structure in order to prevent damage to structural walls as a result of hydrostatic pressure.

TABLE 9. ADVANTAGES AND DISADVANTAGES OF WET FLOOD-PROOFING

Advantages	Disadvantages
Often less costly than other mitigation measures	Extensive cleanup may be necessary if the structure becomes wet inside and possibly contaminated by sewage, chemicals and other materials borne by floodwaters
Allows internal and external hydrostatic pressures to equalize, lessening the loads on walls and floors	Pumping floodwaters out of a basement too soon after a flood may lead to structural damage
	Does not minimize the potential damage from a high-velocity flood flow and wave action

### 4.2.4. Direct Drainage Away from the Building

Structures are sometimes built at the bottom of a hill or in a natural drainage way or storage area, such that water naturally flows toward them. Within zones AH, AO, and AR/AH, adequate drainage paths on slopes shall be required to guide floodwaters around and away from proposed structures. It may be necessary to regrade a yard if water flows toward the building; a new swale or wall can direct the flow to the street or a drainage way. Simple improvements can be made on a property to keep floodwaters away from a structure.

### 4.2.5. Drainage Maintenance

Internal drainage creates a considerable risk in the City for shallow flooding. Internal storm drainage creates flood issues for many buildings because of the flat nature of terrain and runoff which is pumped through levees to a creek or river. If drainage inlets are clogged or pump stations fail, there is a potential for damage to properties. Part of the problem can be attributed to a combined drainage and sanitary

sewer system. Over 7,500 acres of the City is subject to a combined system. City Code states that no person shall dump any materials in any water or waterway, or upon the levees or banks adjacent thereto. Residents are encouraged to report drainage discharges at 916-808-5454.

**TABLE 10. ADVANTAGES AND DISADVANTAGES OF DRAINAGE IMPROVEMENTS**

<b>Advantages</b>	<b>Disadvantages</b>
Could increase channel carrying capacity through overflow channels, channel straightening, crossing replacements, or runoff volume storage	May help one area but create new problems upstream or downstream
Minor projects may be fundable under FEMA mitigation grant programs	Channel straightening increases the capacity to accumulate and carry sediment
	May require property owner cooperation and right-of-way acquisition

#### **4.2.6. Sewer Improvements**

Heavy rains can saturate the soil and infiltrate the sanitary sewer system through leaky joints or cracks in the pipes. The inflow of stormwater floods the sanitary sewer system causing water to back up into the home through lower-level plumbing fixtures. This occurrence can be prevented by installing a sewer backflow preventer, which would allow the sanitary sewer water to flow freely from the home to the sewer, but restrict the reverse flow. Backflow preventers do require maintenance and can fail if debris in the sewer prevents the valve seating properly.

#### **4.2.7. Barriers**

Several types of temporary barriers are available to address typical flooding problems. They work to direct drainage away from structures with the same principles as permanent barriers such as floodwalls or levees, but can be removed, stored, and reused in subsequent flood events. Lower-cost solutions include sandbags, inflatable barriers, and barriers that self-activate with the pressure of the floodwaters. A flood protection barrier is usually an earthen levee/berm or a concrete retaining wall. While levees and retaining walls can be large, spanning miles along a river, they can also be constructed on a much smaller scale to protect a single home or group of homes.

TABLE 11. ADVANTAGES AND DISADVANTAGES OF BARRIERS

Advantages	Disadvantages
Relative cost of mitigation is less expensive than other alternatives	Property is still located within the floodplain and has potential to be damaged by flood if barrier fails or waters overtop it
No alterations to the actual structure or foundation are required	Solution is only practical for flooding depths less than 3 feet
Homeowners can typically construct their own barriers that will complement the style and functionality of their house and yard	Barriers cannot be used in areas with soils that have high infiltration rates

The cost of constructing a barrier will depend on the type of barrier and the size required to provide adequate protection. An earthen berm will generally be less expensive compared to an equivalent concrete barrier primarily due to the cost of the materials. Another consideration is space; an earthen barrier requires a lot of additional width per height of structure compared to a concrete barrier to ensure proper stability. Key items to consider for barriers:

- There needs to be adequate room on the lot.
- A pump is required to remove water that either falls or seeps onto the protected side of the barrier.
- Human intervention will be required to sandbag or otherwise close any openings in the barrier during the entire flood event.

### 4.3. Natural Resource Protection

Care should be taken to maintain the streams, wetlands and other natural resources within a floodplain or repetitive loss area. Removing debris from streams and channels prevents obstructions. Preserving and restoring natural areas provides flood protection and natural habit, and preserves water quality.

### 4.4. Emergency Services

Emergency management is a critical risk reduction tool in the arsenal of any municipality. The role of city government in a disaster is to take all possible actions in order to protect life and property. To accomplish this task, the City has an aggressive emergency management system in place that includes comprehensive hazards planning. Utilities staff, City of Sacramento Office of Emergency Management, and the Sacramento Fire and Police departments work closely together to actively engage in the four phases of emergency management: preparedness/planning, response, recovery, and mitigation (or risk reduction). These efforts are comprehensive in nature and cover an all-hazard approach, including emergencies involving flooding.

The City also works closely with the Sacramento County's Office of Emergency Services and the Sacramento Area Flood Control Agency during major flood events which impact both jurisdictions, demanding an integrated response prior to, during and following an emergency. This coordination provides consistent emergency management service to the Sacramento community.

#### **4.5. Structural Projects**

Structural projects keep floodwaters away from an area with a levee, reservoir, or other flood control measure. The majority of Sacramento is protected by dams and levees. While these dams and levees provide residents with excellent protection, they are still subject to failure and the City remains at risk of flooding.

The City of Sacramento is highly vulnerable to localized flooding. The City's local drainage system services approximately 100 square miles and is handled by a combination of gravity and lift stations for a total of approximately 140 storm drainage basins. Since the City is typically lower than the elevated rivers by as much as 5-25 feet, most of the local drainage must be pumped into the rivers. The City operates 105 sumps and pumps to keep the drainage pumped down. Detention basins have been planned and, in many areas, constructed to help mitigate flooding in the region.

Improving the stormwater drainage system and storage capacity throughout the City can eliminate some building damage and road closures in these areas. Similarly, improving drainage outfalls can reduce stormwater flooding from heavy rains. These structural methods require large capital expenditures and cooperation from private property owners. The City's websites, social media, email distribution lists, press releases and variable message boards can help get these messages out to business owners and residents.

#### **4.6. Public Information and Outreach**

Over the years, the City of Sacramento, through many departments and in coordination with various stakeholder groups and outside agencies, has prepared multiple independent outreach messages to educate the public on the hazards associated with flooding. Sacramento developed a Program for Public Information (PPI) in an ongoing effort to prepare, implement, and monitor a range of public information activities best suited for a community's flood problems. The objective of the PPI is to provide additional credit for information programs that are designed to meet local needs and that are monitored, evaluated, and revised to improve their effectiveness.

With advances in technology and a greater familiarity with web-based services, Sacramento has realized that mailing information directly to property owners may not be the most effective method. The PPI process now grants communities the ability to decide how to best deliver messages to various groups throughout the City.

Social and economic factors were considered by the PPI Committee in ensuring that the right messages, tools and resources were used to reach all target audiences. The PPI Committee identified six target audiences who need special messages on flood protection:

Target Audience #1: Businesses, Homeowners, and Renters (entire City)

Target Audience #2: School Children

Target Audience #3: Real Estate, Lending and Insurance Companies

Target Audience #4: Vulnerable Populations (Special Needs, Elderly, etc.)

Target Audience #5: Political Leaders

Target Audience #6: Language Barriers

In order to develop an effective local outreach program that raises public awareness about flood-related issues, the PPI identified the entire City of Sacramento as flood-prone, and for the entire City to be the target area for outreach within the community. The PPI Committee concluded that outreach projects should be directed to all properties (residential, commercial, and public). The entire City and all flood zones, including the X zone, are subject to flooding, and the PPI should strive to reach all residents and businesses within the City with a variety of messages for flood protection and flood safety.

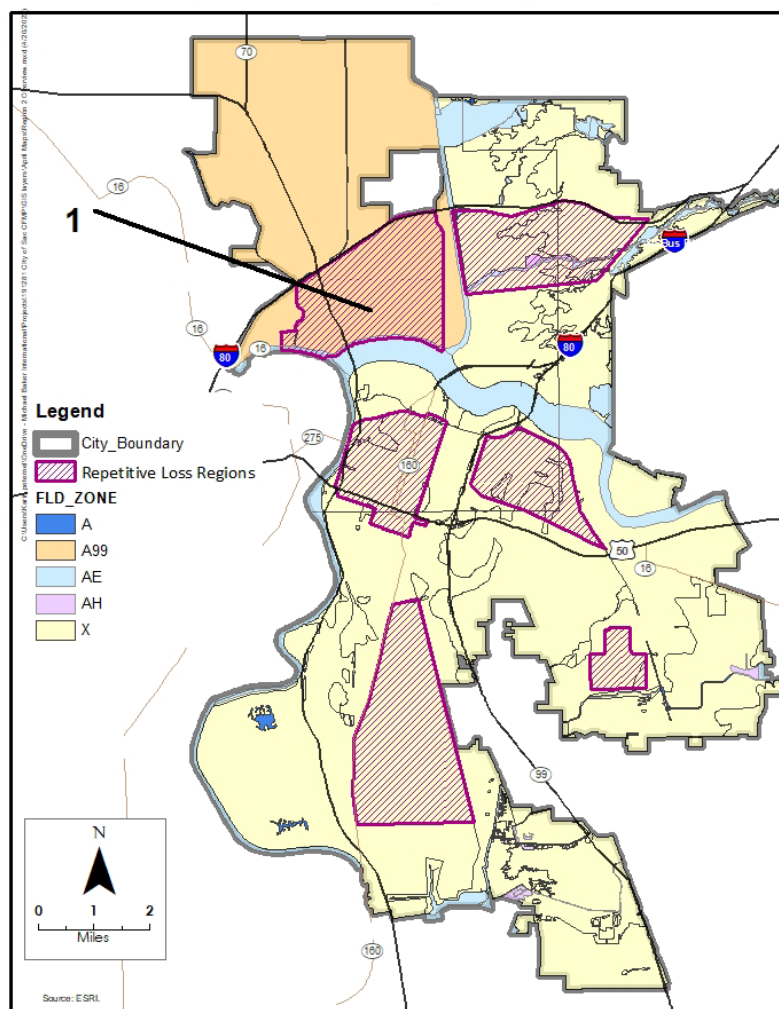
## 5. Step 5. Analysis of Individual Repetitive Loss Areas

This section includes a review of the repetitive loss properties, and alternative approaches to determine whether any property protection measures or drainage improvements are feasible. It is organized by Repetitive Loss Regions 1 through 6.

### 5.1. Region 1 – South Natomas

The greater Natomas Basin is 55,000 acres in size and extends into the northwest portion of Sacramento County running south. The Basin is north of downtown at the American River Parkway (3 miles from downtown). Within the City, the area of the Natomas Basin is approximately 12,500 acres and is surrounded by levees. Natomas is in a FEMA A99 zone, meaning that levee construction is more than 50 percent complete to reach 100-year flood protection among other requirements. In addition to riverine flooding and potential levee breach, the Natomas Basin has interior levees and canals, so it is also at risk to internal drainage issues. The Natomas area is divided into North Natomas and South Natomas. The focus of the RLAA is in South Natomas where three repetitive loss areas were analyzed.

**FIGURE 4. REPETITIVE LOSS AREA REGIONS MAP – REGION 1**



**RLAA Region 1 – Area 1**

**Location:** West of Northgate Blvd,  
Binghampton Dr and Larchwood Dr

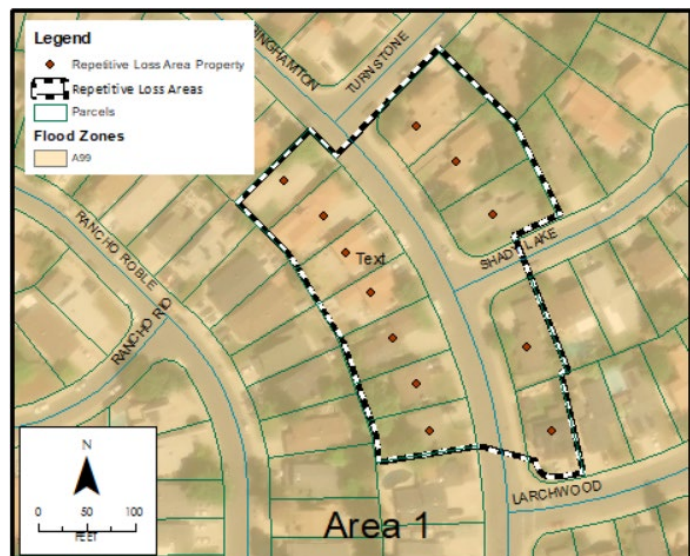
**Number of Properties in Defined Area:** 12

**Number of RL Properties in Area:** 1

**Flood Zone:** A99

**Dates of RL Flooding:** 1/10/1995, 1/24/2000

**Source of RL Flooding:** This area is in Drainage Basin 141, which is prone to street flooding due to increased development in the area. Also, some properties are more prone to structural damage due to the addition of fill to their property. The changes in grading causes water to pool and seep into a portion of the structure that is built below or at grade.



**Mitigation Recommendations:** For the area, flooding can be reduced by the addition of a detention basin, increase in pumping capacity, and pipe improvements. These projects are identified in the Drainage Master Plan for Basin 141. As new development is constructed, drainage improvements will be funded and built. For individual property protection, residents are encouraged to ensure proper grading on the property to allow runoff to reach street drains. Other options, including installation of a drain or diversion, elevating the portion of the structure that is built below or at grade, and sandbagging, can provide additional protection from localized flooding.

FIGURE 5. EXAMPLE OF DIFFERENT FRONT YARD GRADING FOUND WITHIN THE NEIGHBORHOOD





**RLAA Region 1 – Area 2**

**Location:** East of Truxel Road, Oak Nob Way, Woodside Glen Way and Stonecreek Dr

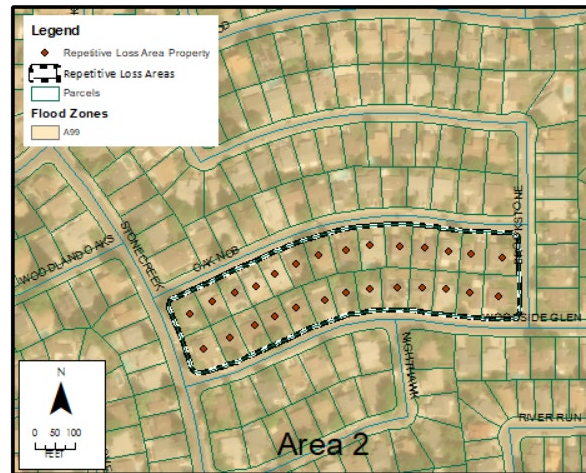
**Number of Properties in Defined Area:** 28

**Number of RL Properties in Area:** 1

**Flood Zone:** A99

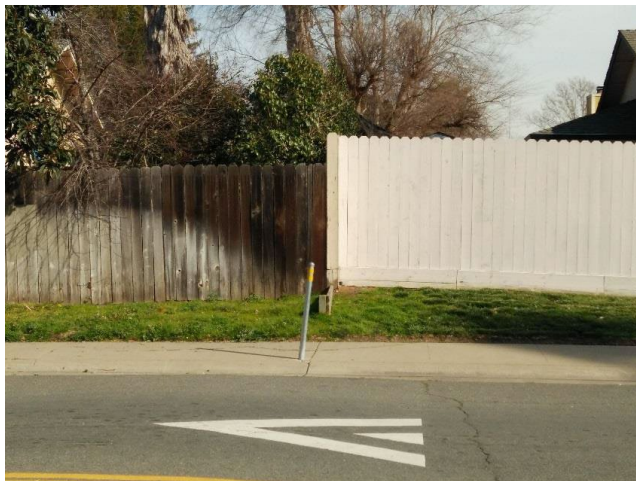
**Dates of RL Flooding:** 1/05/1997, 2/04/1998

**Source of RL Flooding:** Flooding occurred during heavy winter storms. The source of the flooding is runoff from adjacent properties graded to a higher elevation.



**Mitigation Recommendations:** On-site grading on property to redirect the flow of water, installation of drains to divert pooling water, construction of a floodwall, or sandbags.

**FIGURE 6. EXAMPLE OF THE CHANGE IN GROUND ELEVATION BETWEEN ADJACENT PROPERTIES**



**FIGURE 7. DIVERSION WAS CREATED TO DIRECT WATER AWAY FROM STRUCTURES**





**RLAA Region 1 – Area 3**

**Location:** Garden Highway, North of Sacramento River

**Number of Properties in Defined Area:** 3

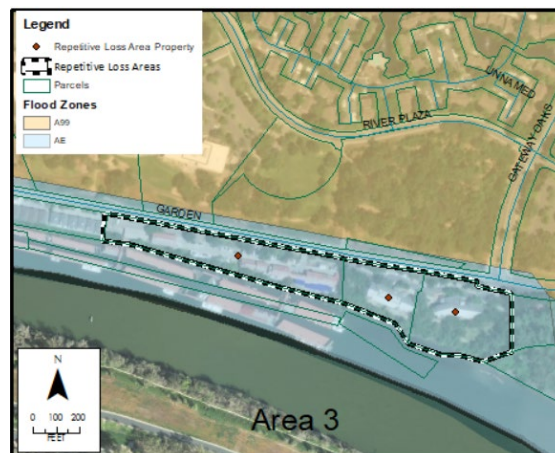
**Number of RL Properties in Area:** 1

**Flood Zone:** AE

**Dates of RL Flooding:** 1/09/1995, 1/01/1997

**Source of RL Flooding:** During winter storms, this strip of commercial development will experience a large amount of water draining down into the parking structures and overflow from the Sacramento River. Flooding has occurred when the pump system located in the parking structures fail.

**Mitigation Recommendations:** Improvement or replacement of sump system. Based on information provided by occupants of this area, improvements have been made to the pump systems and no additional failures have occurred. Also, the repetitive loss area is located adjacent to natural functions and open space areas. Care should be given to preserve the natural quality of its surrounding to promote natural flood control qualities found near the river.



**FIGURE 8. PARKING GARAGE LOCATED NEAR THE EDGE OF THE SACRAMENTO RIVER**



**FIGURE 9. ENTRANCE TO PARKING GARAGES BELOW MAIN STRUCTURES**



## Region 1 – Field Visits

Attachment C – Property Visit Documentation provides field visit information collected for all structures in Region 1’s repetitive loss areas. Questionnaires were left at each building and City staff talked with residents and tenants in the area after a large storm in January and February of 2017 to help further understand flooding patterns in the area.

## Region 1 – Mitigation and Action Items

Various mitigation activities were considered when analyzing Region 1’s hazard assessment. Table 12 lists all considered mitigation activities and identifies appropriate mitigation activities for each repetitive loss area.

**TABLE 12. REGION 1 REVIEW OF ALTERNATIVE APPROACHES**

Mitigation Activity	Region 1		
	Area 1	Area 2	Area 3
<b>Prevention</b>			
Continue Enforcement of Stormwater Regulations	X	X	X
Continue Drainage System Maintenance	X	X	X
Continue Enforcement of Floodplain Management Regulations			X
<b>Property Protection</b>			
Building Elevation	X		
Relocation			
Improvement or Installation of Private Sumps			X
Sewer Backup Protection			
Flood-proofing			
Flood Insurance	X	X	X
Grading	X	X	
Sandbags	X	X	
Elevate Utilities			
<b>Natural Resource Protection</b>			
Natural Area Preservation			X
Natural Area Restoration			
<b>Structural Projects</b>			
Floodwalls		X	
Diversions	X	X	
<b>Conveyance System Improvements (Structural)</b>			
Detention Basin	X		
Increased Pumping Capacity	X		
Pipe Improvements	X		
<b>Public Information</b>			
Outreach Projects	X	X	X

Mitigation Activity	Region 1		
	Area 1	Area 2	Area 3
Map Information	X	X	X
Technical Assistance	X	X	X
<b>Emergency Services</b>			
Hazard Threat Recognition	X	X	X
Hazard Warnings	X	X	X
Health and Safety Maintenance			X

Based on the complete analysis of this region, the following action items were identified. These action items were selected based on community feedback, funding, current City activities, and data reports.

**TABLE 13. REGION 1 ACTION ITEMS**

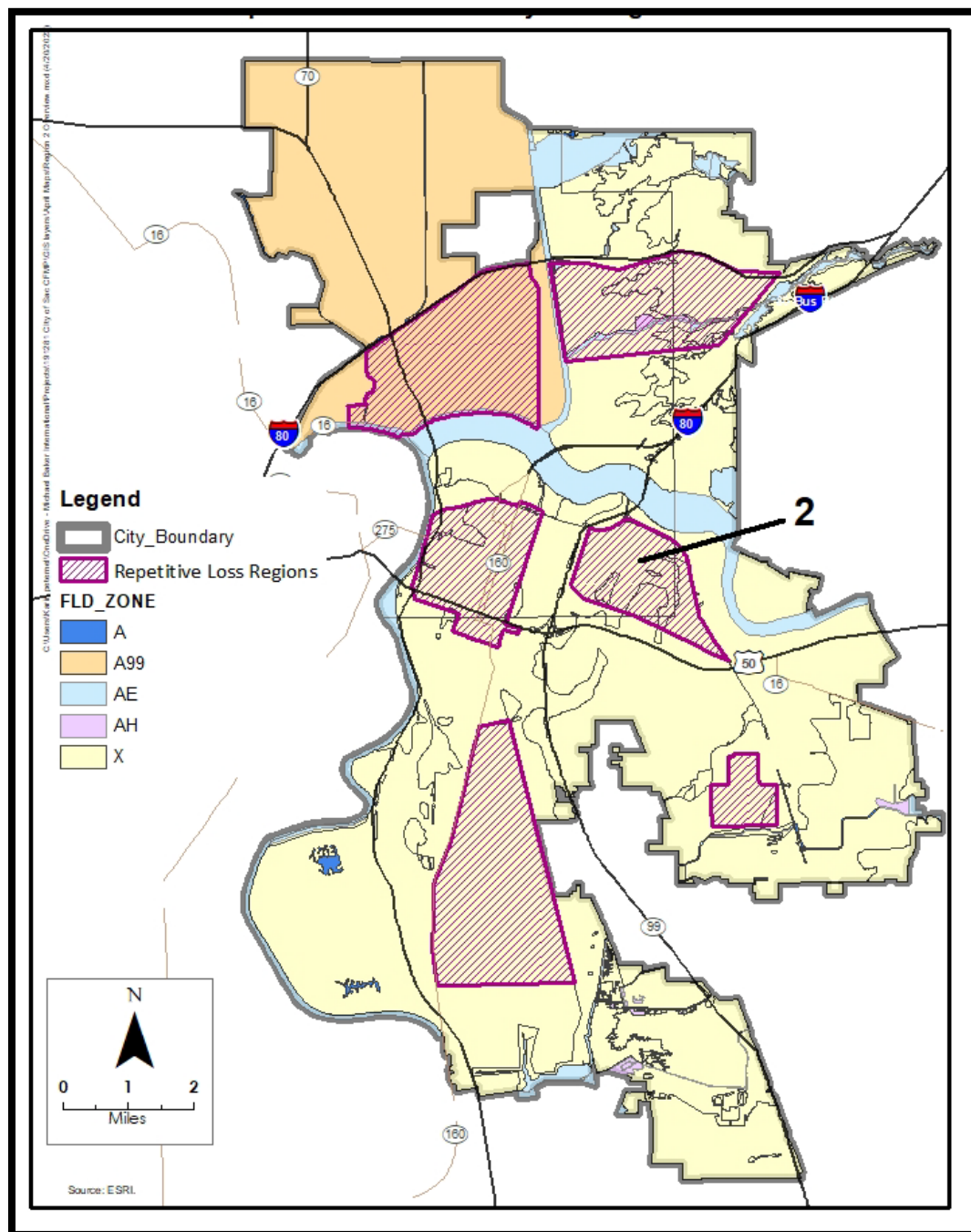
Action Item	Responsible Office	Schedule	Potential Funding
Elevate structures that are built at or below grade	Department of Utilities, Floodplain Management	Dependent on property owner interest and grant opportunities	Grants and private funding
Flood/map information hotline		Ongoing	Department funding
Technical assistance visits			
Enforcement of floodplain management regulations			
Promotion of flood insurance			
Inform residents of location of sandbag supplies in their area	Department of Utilities, Operations & Maintenance (supplies only); Property Owner	During flood event	Department funding (supplies only)
Improvement and maintenance of private sumps	Property Owner	Ongoing	Private funding
On-site grading to divert water to city conveyance system		Dependent on property owner interest	Private funding or grants
Diversions to direct stormwater to City conveyance system			
Hazard threat recognition system	Department of Utilities	Ongoing	Department funding
Develop sandbag locations closer to repetitive loss area		Ongoing	Department funding
Hazard warnings	Department of Utilities; Emergency Services; Public Information Office	During flood event	Department funding

<b>Action Item</b>	<b>Responsible Office</b>	<b>Schedule</b>	<b>Potential Funding</b>
Conveyance system improvements identified in Drainage Master Plan for Basin 141	Department of Utilities, Wastewater & Stormwater Engineering Program	Long-Term	Capital Improvement Program
Enforcement of stormwater regulations	Department of Utilities, Environmental & Regulatory Compliance	Ongoing	Department funding
Drainage system maintenance	Department of Utilities, Operations & Maintenance	Ongoing	Department funding

## 5.2. Region 2 – Downtown East

The three repetitive loss areas in Region 2 are located in the neighborhoods of River Park, McKinley Park, and Coloma Terrace. These are older areas of the City that are vulnerable to overbanking, erosion, and seepage from the American River levees nearby and have other risks such as interior drainage issues (i.e., undersized and aged pipes).

FIGURE 10. REPETITIVE LOSS AREA REGIONS MAP – REGION 2





**RLAA Region 2 – Area 5**

**Location:** 45th St and C St, East of Elvas Avenue  
in Coloma Terrace Neighborhood

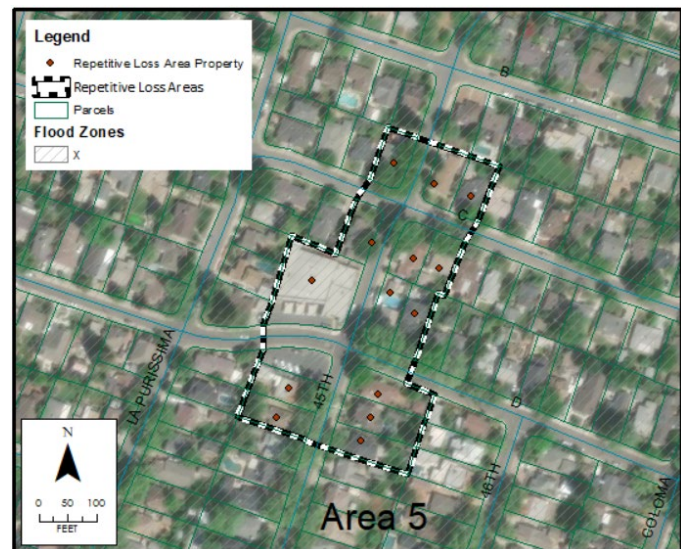
**Number of Properties in Defined Area:** 15

**Number of RL Properties in Area:** 1

**Flood Zone:** Shaded-X Zone

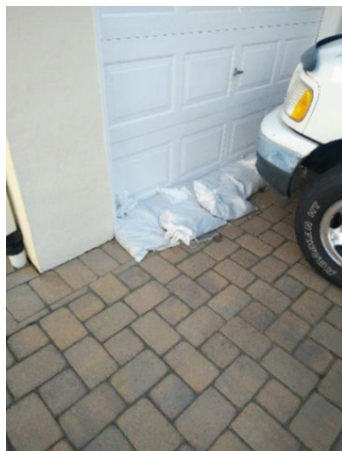
**Dates of RL Flooding:** 4/08/1995, 2/04/1998

**Source of RL Flooding:** Flooding occurs during heavy storms that overwhelmed the undersized drainage system in the area. The structures included in the repetitive loss are located in a low-lying area of the neighborhood, so they are more dramatically affected by street flooding.



**Mitigation Recommendations:** Based on the Basin 10 Drainage Master Plan, improvements have been identified. Recommends critical pipes in the system be enlarged and a detention basin be constructed to provide adequate flood protection for the basin. These improvements would mitigate the repetitive loss properties in Area 5. Individual property owners can mitigate flood losses by using sandbags, keeping street drains clear of debris, constructing floodwalls on their property, installing sump pumps, and elevating utilities.

**FIGURE 11. RESIDENTS USE SANDBAGS TO PROTECT GARAGES FROM STREET FLOODING DURING JANUARY 2017 STORMS**



**FIGURE 12. DEBRIS COLLECTING ON A STORM DRAIN AT THE CORNER OF 45TH AND C STREETS**



### RLAA Region 2 – Area 6

**Location:** McKinley Park, Park Way and Santa Ynez Way

**Number of Properties in Defined Area:** 12

**Number of RL Properties in Area:** 1

**Flood Zone:** Shaded-X Zone

**Dates of RL Flooding:** 1/29/1995, 1/25/1997

**Source of RL Flooding:** This area is located in a basin with an undersized drainage conveyance system. This area is also impacted by overflows from the Combined Sewer System. During large storms, water pools in the streets and yards of the surrounding properties. Most flood loss is due to water seeping into garages, basements and entryways located at grade level.

**Mitigation Recommendations:** The McKinley Water Vault project was completed in 2021. An AW-501, the NFIP Repetitive Loss Update Worksheet is in process to change the property status to “Mitigated” on the Repetitive Loss list.



FIGURE 13. STREET FLOODING FROM FEBRUARY 2017 STORM. OVERWHELMED CONVEYANCE SYSTEM



FIGURE 14. EXAMPLE OF THE CITY'S WARNING THAT THE AREA MAY CONTAIN SEWAGE





FIGURE 15. SOME HOMES IN THIS AREA HAVE BASEMENTS AND DOORWAYS LOCATED AT GRADE LEVEL



## Region 2 – Field Visits

Attachment C – Property Visit Documentation provides field visit information collected for all structures located in Region 2’s repetitive loss areas. Questionnaires were left at each building and City staff talked with residents and tenants in the area after a large storm in January and February of 2017 to help further understand flooding patterns in the area.

## Region 2 – Mitigation and Action Items

The following mitigation activities were considered to address the hazards found in Region 2. Table 14 lists all considered mitigation activities and identifies appropriate mitigation activities for each repetitive loss area.

TABLE 14. REGION 2 REVIEW OF ALTERNATIVE APPROACHES

Mitigation Activity	Region 2	
	Area 5	Area 6
<b>Prevention</b>		
Continue Enforcement of Stormwater Regulations	X	X
Continue Drainage System Maintenance	X	X
Continue Enforcement of Floodplain Management Regulations	X	X
<b>Property Protection</b>		
Building Elevation		X
Relocation		
Improvement or Installation of Private Sumps		X
Sewer Backup Protection		X



Mitigation Activity	Region 2	
Flood-proofing		
Flood Insurance	X	X
Grading		
Sandbags	X	X
Elevate Utilities	X	X
<b>Natural Resource Protection</b>		
Natural Area Preservation		
Natural Area Restoration		
<b>Structural Projects</b>		
Floodwalls	X	
Diversions		
<b>Conveyance System Improvements (Structural)</b>		
Detention Basin/Vault	X	X
Increased Pumping Capacity		X
Pipe Improvements	X	X
<b>Public Information</b>		
Outreach Projects	X	X
Map Information	X	X
Technical Assistance	X	X
<b>Emergency Services</b>		
Hazard Threat Recognition	X	X
Hazard Warnings	X	X
Health and Safety Maintenance		X

### Mitigation Activity

Based on the complete analysis of this region the following action items were identified. These action items were selected based on community feedback, funding, current City activities, and data reports.

TABLE 15. REGION 2 ACTION ITEMS

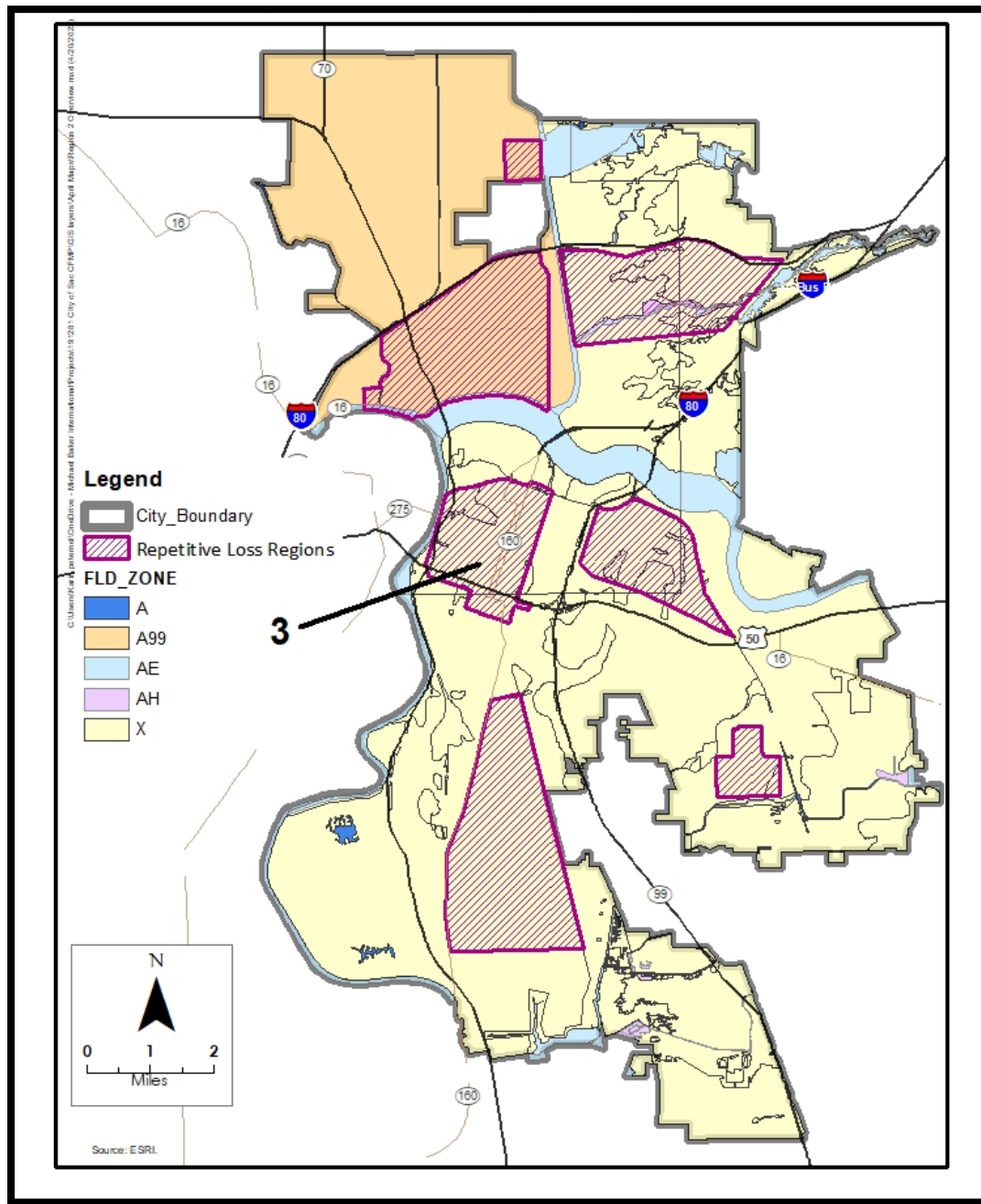
Action Item	Responsible Office	Schedule	Potential Funding
Elevate structures that are built at or below grade	Department of Utilities, Floodplain Management	Dependent of property owner interest and grant opportunities	Grants and private funding
Develop grant proposal for		Summer 2018	Department

Action Item	Responsible Office	Schedule	Potential Funding
installation of sumps to protect garages and basements			funding
Enforcement of floodplain management regulations		Ongoing	
Promotion of flood insurance			
Flood/map information hotline			
Technical assistance visits			
Provide neighborhood with storm/flood ready information - include emergency alert information		Annual	
Improvement and maintenance of private sumps	Property Owner	Ongoing	Private funding
Sewer backup protection system		Dependent on property owner interest	Private funding or grants
Construction of a floodwall			
Conveyance system improvements identified in Drainage Master Plan for Basin 31	Department of Utilities	Complete	Capital Improvement Program
McKinley Water Vault Protect		2021 Complete	
Enlarge critical pipes and construct detention basin in Drainage Basin 10		Dependent on funding	
Hazard threat recognition system		Ongoing	Department funding
Inform residents of location of sandbag supplies in their area	Department of Utilities, Operations & Maintenance (supply only); Property Owner	During flood event	Department funding (supply only)
Health and safety warnings and inspection of Combined Sewer System area	Department of Utilities, Operations & Maintenance	During/after flood event	Department funding
Drainage system maintenance		Ongoing	Department funding
Enforcement of stormwater regulations	Department of Utilities, Environmental & Regulatory Compliance	Ongoing	Department funding
Hazard warnings	Department of Utilities; Emergency Services; Public Information Office	During flood event	Department funding

### 5.3. Region 3 – Downtown West

Region 3 of the City of Sacramento’s RLAA is the western portion of Downtown Sacramento located just east of the Sacramento River. This area consists of several commercial buildings and high-rises as well as housing. The repetitive loss properties in this region are residential and the primary source of flooding in this area occurs due to an undersized Combined Sewer System that gets overwhelmed during large storms.

FIGURE 16. REPETITIVE LOSS AREA REGIONS MAP – REGION 3



**RLAA Region 3 – Area 7**

**Location:** 23rd St and X St

**Number of Properties in Defined Area:** 8

**Number of RL Properties in Area:** 1

**Flood Zone:** X-Zone

**Dates of RL Flooding:** 12/12/1995, 1/22/1997,  
9/19/2004

**Source of RL Flooding:** During moderately intense storms, flooding occurs in Area 7 due to the undersized conveyance system. Also, during times of high-level ground saturation ponding, uneven grading, and seepage cause additional flooding in resident's yards, garages, and basements.

**Mitigation Recommendations:** Improvement of Combined Sewer System, flood-proof basements, installation of sump pumps, sewer system backup protection, basement fill-in, property grading, on-site drainage to flow into main system, sandbags, utilities elevation, outreach on storm/flood preparedness, and flood insurance.

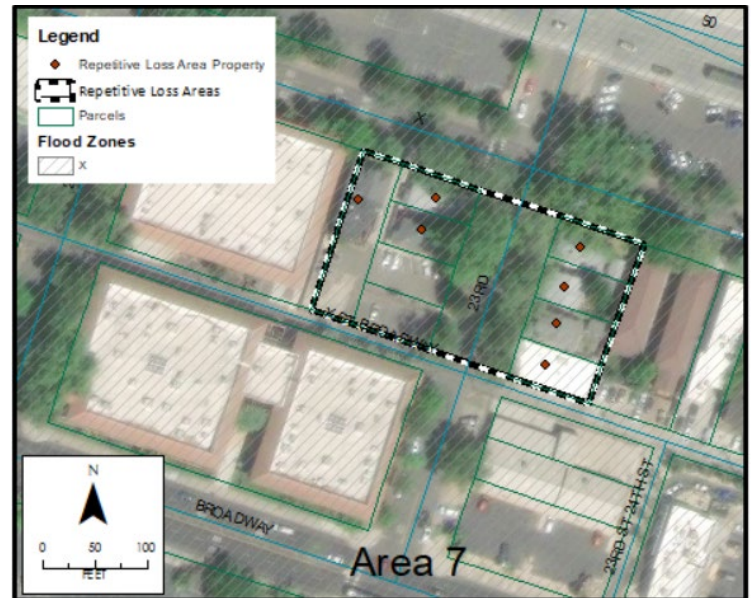


FIGURE 17. ON-SITE DRAINAGE ADDED TO AID  
IN STORMWATER DRAINAGE



FIGURE 18. A FRACTURED BASEMENT WALL CAUSED BY  
HYDROSTATIC PRESSURE; CRACKS HAVE LED TO WATER  
SEEPING INTO THE BASEMENT





**RLAA Region 3 – Area 8**

**Location:** 14th St. & Broadway

**Number of Properties in Defined Area:** 33

**Number of RL Properties in Area:** 1

**Flood Zone:** X-Zone

**Dates of RL Flooding:** 1/10/1995, 9/19/2004

**Source of RL Flooding:** During long duration storms, flooding occurs due to an undersized conveyance system. Many residents experience flooding in their yards, garages, and basements. Because of hills in the areas, there are garages located below grade that can be inundated by water during large storms.

**Mitigation Recommendations:** Improvement of Combined Sewer System, flood-proof basements, installation of sumps, sewer system backup protection, sandbags, elevate utilities, outreach on storm/flood preparedness, and flood insurance.



FIGURE 19. EXAMPLE OF DEBRIS IN THE STORM DRAIN. LEAF PILES ARE ALLOWED TO BE LEFT ON STREETS FOR CITY PICKUP AFTER CURBSIDE BINS ARE FULL; MANY TIMES, THESE LEAVES CAN CLOG THE STORM DRAIN



FIGURE 20. EXAMPLE OF A TYPICAL HOME IN THIS AREA THAT WOULDN'T FLOOD; ELEVATED ON A CRAWL SPACE AND THE GARAGE LOCATED IN THE BACK OF THE PROPERTY. SOME HOMES HAVE BASEMENTS



**RLAA Region 3 – Area 9**

**Location:** 28th St and N St

**Number of Properties in Defined Area:** 5

**Number of RL Properties in Area:** 1

**Flood Zone:** X - Zone

**Dates of RL Flooding:** 1/10/1995, 1/25/1997,  
9/19/2004

**Source of RL Flooding:** During long duration storms, flooding occurs due to an undersized conveyance system. This is a commercial area and many of the business entryways are not elevated. If street flooding overtops the curbs, water can flow into the structure causing structural damage.

**Mitigation Recommendations:** Improvement of Combined Sewer System, sewer system backup protection, sandbags, elevate utilities, elevate buildings, outreach on storm/flood preparedness, and flood insurance.

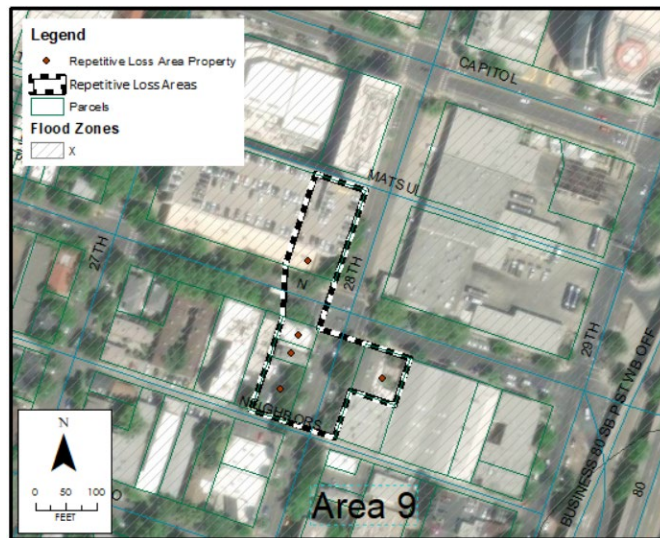


FIGURE 21. THE MAJORITY OF THE BUILDINGS IN AREA 9 DO NOT HAVE ELEVATED ENTRYWAYS





**RLAA Region 3 – Area 10**

**Location:** 6th St and Q St

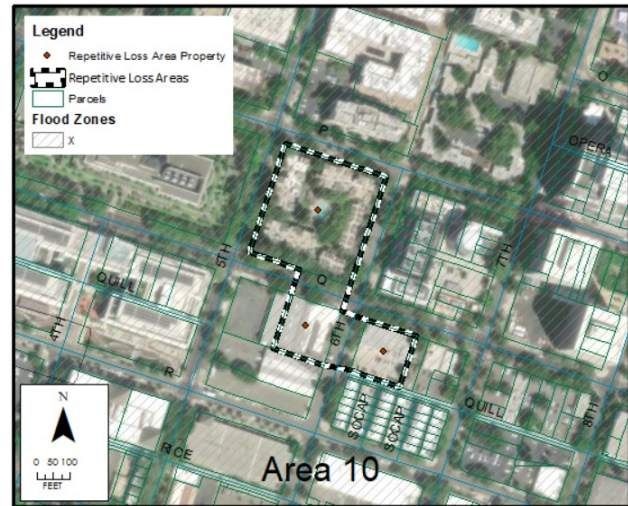
**Number of Properties in Defined Area:** 3

**Number of RL Properties in Area:** 1

**Flood Zone:** X-Zone

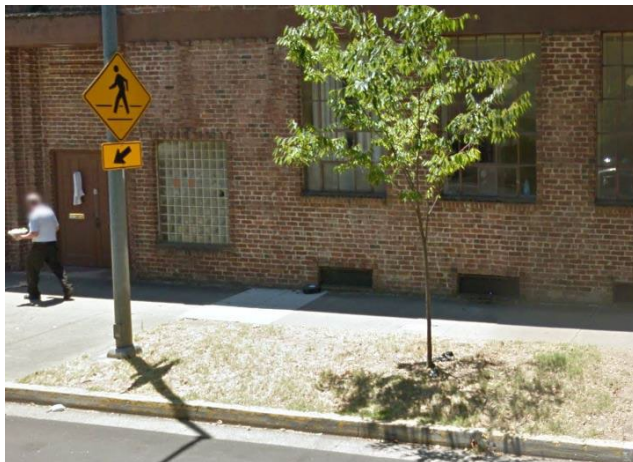
**Dates of RL Flooding:** 3/02/1995, 1/25/1997,  
9/19/2004

**Source of RL Flooding:** During long duration storms, flooding occurs due to an undersized conveyance system. This is an area that is commercial and residential. Only some of the structures are elevated. If street flooding overtops the curb, water can flow into the structure. There are also garages that are located below grade that can be inundated by water during large storms.



**Mitigation Recommendations:** The Drainage Master Plan for Basin 52 recommends an alternative analysis be done. A 2D model is recommended to determine problem areas. For individual property mitigation, using sandbags, installation of a temporary floodwall, elevate buildings are recommended. Outreach on storm/flood preparedness, and flood insurance should continue.

**FIGURE 22. BASEMENT WINDOWS AND ENTRY DOOR ARE NOT ELEVATED.**



**FIGURE 23. GARAGES ARE LOCATED BELOW GRADE.**



**RLAA Region 3 – Area 11**

**Location:** 12th St and L St

**Number of Properties in Defined Area:** 3

**Number of RL Properties in Area:** 1

**Flood Zone:** X-Zone

**Dates of RL Flooding:** 1/09/1995, 1/01/1997

**Source of RL Flooding:** During moderately intense storms, flooding occurs when stormwater flows into the underground parking structures. Some of structures are now equipped with temporary floodwalls and sumps.

**Mitigation Recommendations:** Installation of temporary floodwalls, sumps, and sandbags.

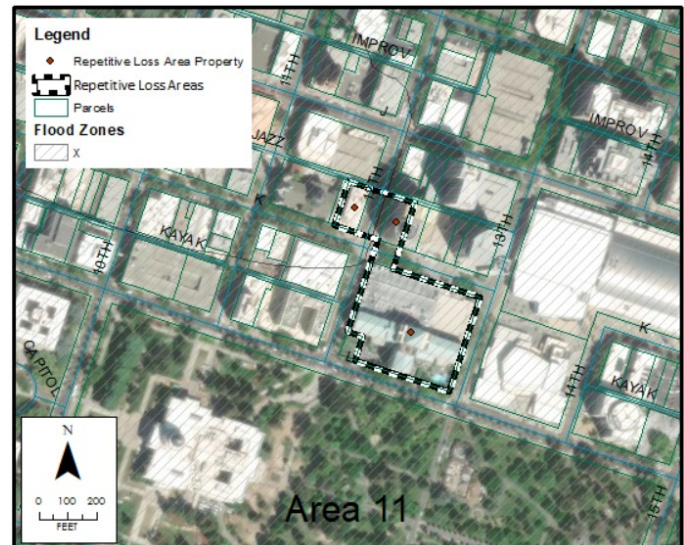
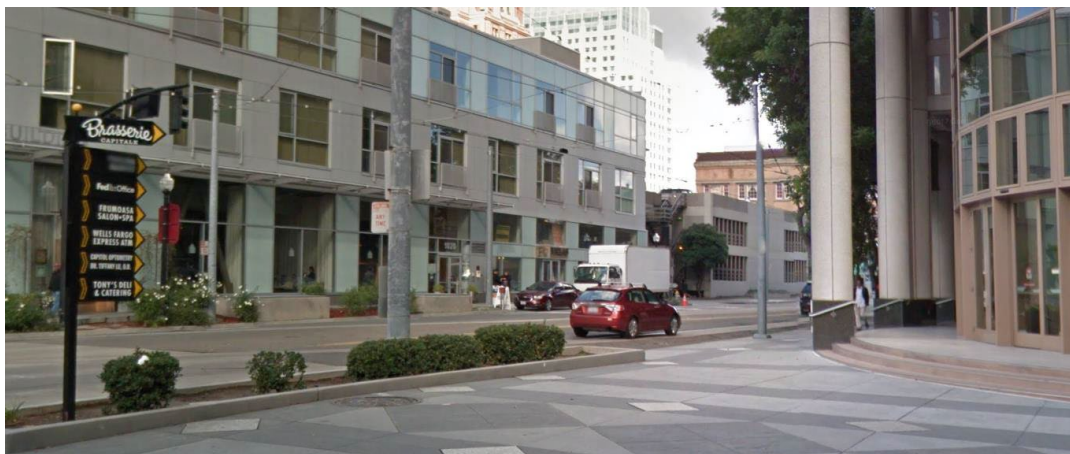


FIGURE 24 . AREA 11 IS LOCATED IN THE MIDDLE OF DOWNTOWN SACRAMENTO.  
MANY OF THE ENTRYWAYS ARE ELEVATED, BUT THE PARKING STRUCTURES ARE BELOW GROUND

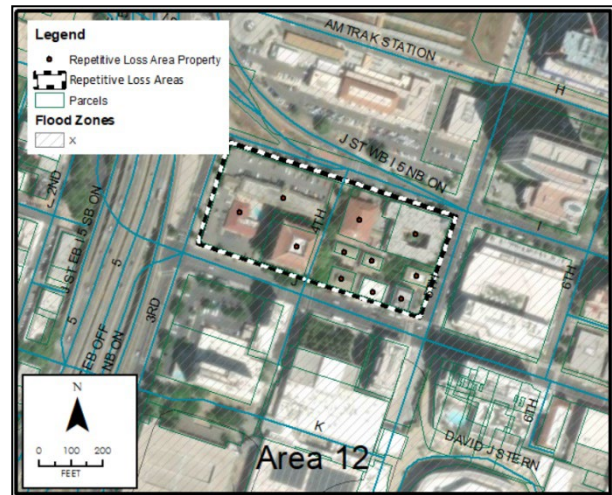




**Location:** J St and 3<sup>rd</sup> St

**Number of RL Properties in Area: 1**

**Dates of RL Flooding: 1/26/1997, 9/19/2004**



**Source of RL Flooding:** During storm events, the street will continue draining runoff to the gutter until the capacity of the gutter is exceeded, and as a result water could potentially flow from the street downhill to the property. However, rainfall directly on the entire block (5 acres) can accumulate at the lowest point of the block, near the bottom floor of this building. Little availability for infiltration of rainfall. Directly beneath the RL property there are banks of large (6-foot dia) culverts that may be a component of a large-scale, regional sump or drainage system but that information is currently unknown. The building's mechanical equipment is elevated about 18 inches above the bottom floor (ground) level.

**Mitigation Recommendations:** 2D model analysis to determine if future development at the nearby Railyards could help this area. Other recommendations include improvement of Combined Sewer System, sewer system backup protection, sandbags, elevate utilities, elevate buildings, outreach on storm/flood preparedness, and flood insurance.

FIGURE 25. CURB AND GUTTER AT BASE OF RAMP  
TO STREET ABOVE



FIGURE 26. BANKS OF 6-FOOT DIA CULVERTS  
UNDER BUILDING

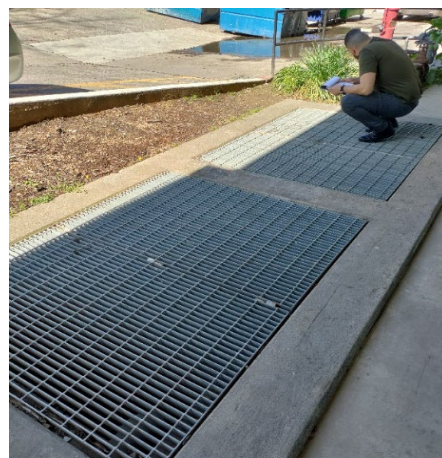


FIGURE 27. TRENCH DRAINS ALONG SOUTH SIDE  
OF LOWEST FLOOR



FIGURE 28. UTILITIES ELEVATED



### Region 3 – Field Visits

Attachment C – Property Visit Documentation provides field visit information collected for all structures located in Region 3’s repetitive loss areas. Questionnaires were left at each building and City staff talked with residents and tenants in the area after a large storm in January and February of 2017 to help further understand flooding patterns in the area. Staff visited Area 12 in March 2023 to understand flooding patterns in this area.

### Region 3 – Mitigation and Action Items

The following mitigation activities were considered to address the hazards found in Region 3. Table 16 lists the considered mitigation activities and identifies appropriate mitigation activities for each repetitive loss area.

TABLE 16. REGION 3 RECOMMENDED MITIGATION ACTIONS

Mitigation Activity	Region 3					
	Area 7	Area 8	Area 9	Area 10	Area 11	Area 12
<b>Prevention</b>						
Continue Enforcement of Stormwater Regulations	X	X	X	X	X	X
Continue Drainage System Maintenance	X	X	X	X	X	X
Continue Enforcement of Floodplain Management Regulations	X	X	X	X	X	X
<b>Property Protection</b>						
Building Elevation			X	X		
Relocation						
Improvement or Installation of Private Sumps	X	X				X
Sewer Backup Protection	X	X	X			X
Flood-proofing	X	X				X
Flood Insurance	X	X	X	X	X	X
Grading						
Sandbags	X	X	X	X	X	X
Elevate Utilities	X	X	X	X		X
<b>Natural Resource Protection</b>						
Natural Area Preservation						
Natural Area Restoration						
<b>Emergency Services</b>						
Hazard Threat Recognition	X	X	X	X	X	X
Hazard Warnings	X	X	X	X	X	X
Health and Safety Maintenance	X					
<b>Structural Projects</b>						
Floodwalls				X	X	X
Diversions						

Mitigation Activity	Region 3					
	Area 7	Area 8	Area 9	Area 10	Area 11	Area 12
Conveyance System Improvements (Structural)						
Detention Basin/Vault				X		
Increased Pumping Capacity	X	X	X	X		X
Pipe Improvements	X	X	X	X		
Public Information						
Outreach Projects	X	X		X		X
Map Information	X	X	X	X	X	
Technical Assistance	X	X	X	X	X	

Based on the complete analysis of this region the following action items were identified. These action items were selected based on community feedback, funding, current City activities, and data reports.

**TABLE 17. REGION 3 ACTION ITEMS**

Action Item	Responsible Office	Schedule	Potential Funding
Elevate structures and utilities that are built at or below grade	Department of Utilities, Floodplain Management	Dependent on property owner interest and grant opportunities	Grants and private funding
Floodproofing			
Provide neighborhoods with storm/flood ready information - include emergency alert information		Annual	
Enforcement of floodplain management regulations		Ongoing	
Promotion of flood insurance			
Flood/map information hotline			
Technical assistance visits			
Improvement and maintenance of private sumps	Property Owner	Ongoing	Private funding
Prohibit occupancy of lowest level		Short-term; Dependent on property owner interest	Private
Sewer backup protection system		Dependent on property owner interest	Private funding or grants
Hazard threat recognition system	Department of Utilities	Ongoing	Department funding

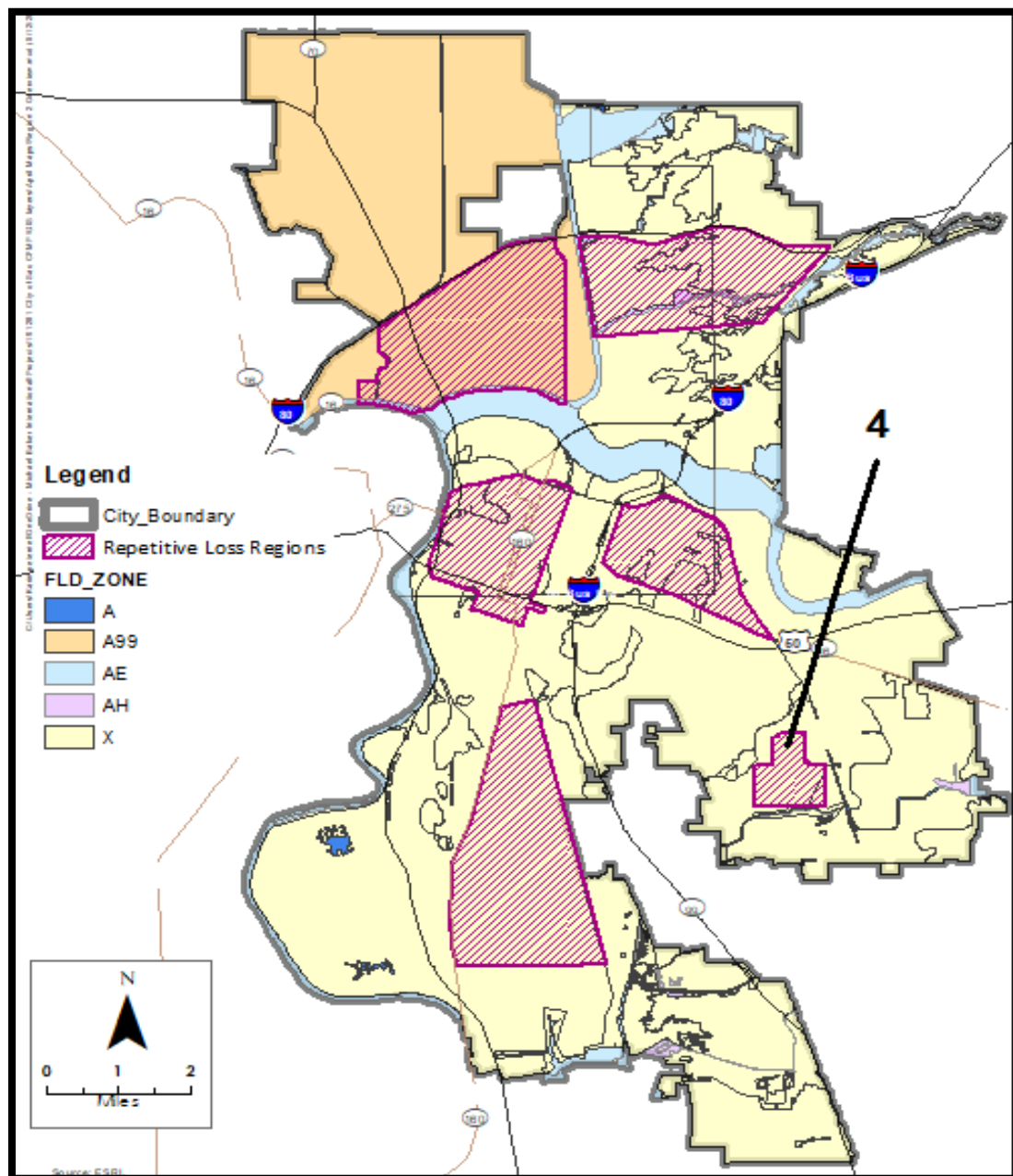


Action Item	Responsible Office	Schedule	Potential Funding
Acquisition by City		Long-term	Grant/department funding
Inform residents of location of sandbag supplies in their area	Department of Utilities, Operations & Maintenance (supply only); Property Owner	During flood event	Department funding (supply only)
Health and safety warnings and inspection of combined sewer system area	Department of Utilities, Operations & Maintenance	During flood event	Department funding
Drainage system maintenance		Ongoing	
Improvements identified in the Combined Sewer System Improvement Plan Update	Department of Utilities, Wastewater & Stormwater Engineering Program	Long-Term	Capital Improvement Program
Conveyance system improvements identified in Drainage Master Plan for Basin			
Enforcement of stormwater regulations	Department of Utilities, Environmental & Regulatory Compliance	Ongoing	Department funding
Hazard warnings	Department of Utilities; Emergency Services; Public Information Office	During flood event	Department funding

#### 5.4. Region 4 – Southeast Sacramento

Region 4 of the RLAA is located in the southeast portion of Sacramento's city limits. This entire region is composed of residential properties located between 65th Avenue and Power Inn Road. There are two repetitive loss properties located in this region that have flooded mainly due to poor grading. Water from higher adjacent properties flows into low-lying areas causing some homes to flood. A drainage study of Basin 96 concluded that limitations were discovered during observed flooding such as overland flow from one property to another and constraints such as fences and landscape features.

FIGURE 29. REPETITIVE LOSS AREA REGIONS MAP – REGION 4



**RLAA Region 4 –Area 13**

**Location:** 37th Ave and 66<sup>th</sup> St

**Number of Properties in Defined Area:** 12

**Number of RL Properties in area:** 1

**Flood Zone:** X-Zone

**Dates of RL Flooding:**

1/10/1995, 1/22/1997, 12/31/2005

**Source of RL Flooding:** Flooding occurs during heavy, long duration storms. The source of the flooding is from open land adjacent to the properties.

**Mitigation Recommendations:** Grading on the property to redirect the flow of water, installation of drains to divert water, construct floodwall, sandbags, flood insurance, and outreach on storm/flood preparedness.



FIGURE 30. STRUCTURE BUILT ON A CRAWL SPACE AND HVAC UNIT IS ELEVATED AS A FLOOD-PROOFING MEASURE



FIGURE 31. PONDING CAUSED BY LANDSCAPING OBSTRUCTIONS



#### Region 4 – Field Visits

Attachment C – Property Visit Documentation provides field visit information collected for all structures located in Region 4’s repetitive loss areas. Questionnaires were left at each building and City staff talked with residents and tenants in the area after a large storm in January and February of 2017 to help further understand flooding patterns in the area.

#### Region 4 – Mitigation and Action Items

The following mitigation activities were considered to address the hazards found in Region 4. Table 18 lists the considered mitigation activities and identifies appropriate mitigation activities for each repetitive loss area.

TABLE 18. REGION 4 REVIEW OF ALTERNATIVE APPROACHES

Mitigation Activity	Region 4
	Area 13
<b>Prevention</b>	
Continued Enforcement of Stormwater Regulations	X
Continue Drainage System Maintenance	X
Continued Enforcement of Floodplain Management Regulations	X
<b>Property Protection</b>	
Building Elevation	X
Relocation	
Improvement or Installation of Private Sumps	
Sewer Backup Protection	
Flood-proofing	
Flood Insurance	X
Grading	
Sandbags	X
Elevate Utilities	X
<b>Natural Resource Protection</b>	
Natural Area Preservation	
Natural Area Restoration	
<b>Emergency Services</b>	
Hazard Threat Recognition	X
Hazard Warnings	X
Health and Safety Maintenance	
<b>Structural Projects</b>	

Mitigation Activity	Region 4
	Area 13
Floodwalls	
Diversions	
<b>Conveyance System Improvements (Structural)</b>	
Detention Basin/Vault	X
Increased Pumping Capacity	
<u>Pipe Improvements</u>	
<b>Public Information</b>	
Outreach Projects	X
Map Information	X
Technical Assistance	X

Based on the complete analysis of this region the following action items were identified. These action items were selected based on community feedback, funding, current City activities, and data reports.

**TABLE 19. REGION 4 ACTION ITEMS**

Action Item	Responsible Office	Schedule	Potential Funding
Elevate structures that are built at or below grade	Department of Utilities, Floodplain Management	Dependent on property owner interest and grant opportunities	Grants and private funding
Flood/map information hotline		Ongoing	Department funding
Technical assistance visits			
Enforcement of floodplain management regulations			
Promotion of flood insurance			
Elevate utilities that are at or below grade	Property Owner	Dependent on property owner interest	Private funding
Grading or diversion to redirect the flow of stormwater to drainage system			
Inform residents of location of sandbag supplies in their area	Department of Utilities, Operations & Maintenance; Property Owner	During flood event	Department funding
Hazard threat recognition system	Department of Utilities	Ongoing	Department funding
Drainage system maintenance	Department of Utilities, Operations & Maintenance	Ongoing	Department funding
Enforcement of stormwater	Department of Utilities,	Ongoing	Department

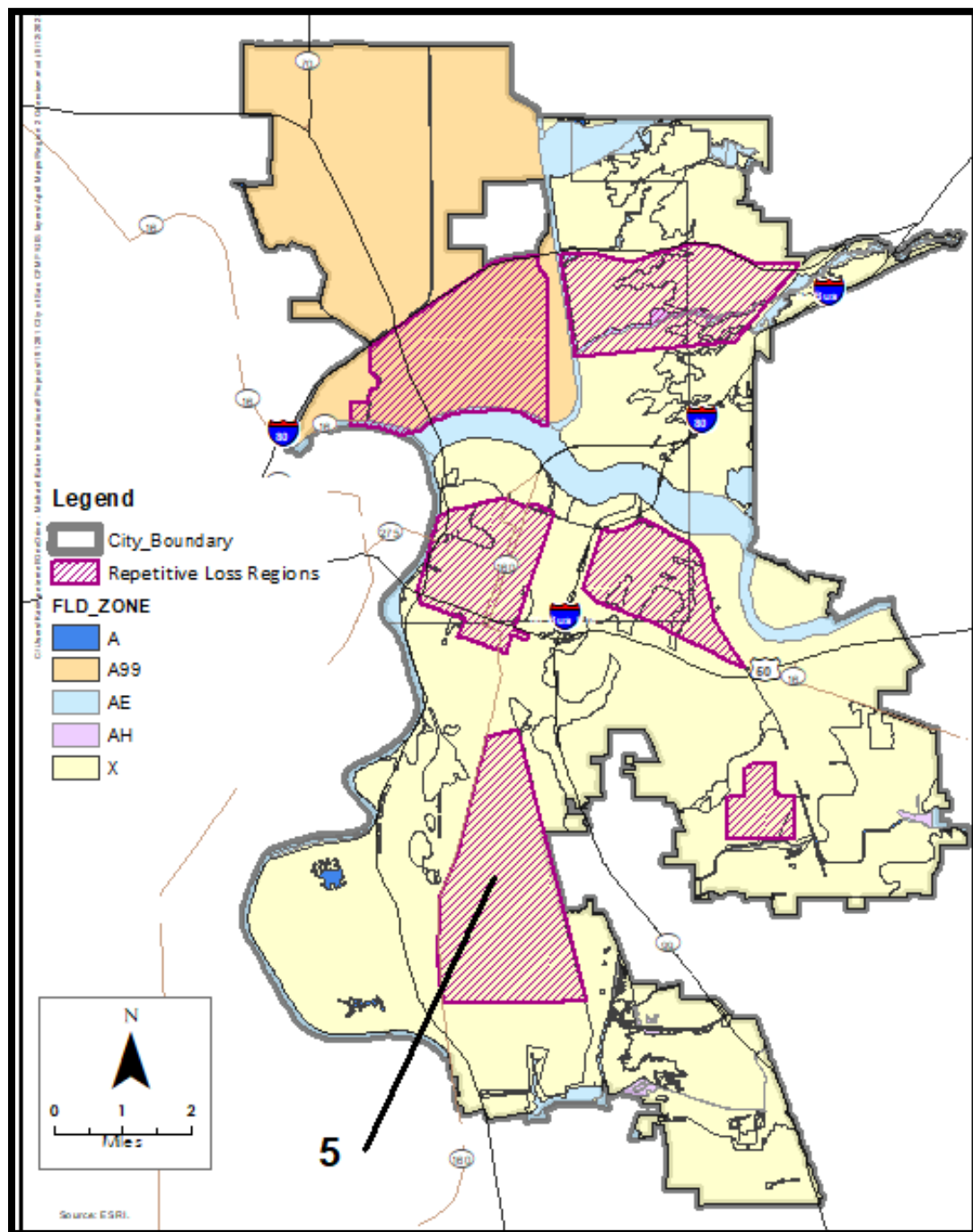
<b>Action Item</b>	<b>Responsible Office</b>	<b>Schedule</b>	<b>Potential Funding</b>
regulations	Environmental & Regulatory Compliance		funding
Conveyance system improvements identified in Drainage Master Plan for Basin 96	Department of Utilities, Wastewater & Stormwater Engineering Program	Long-Term	Capital Improvement Program
Hazard warnings	Department of Utilities; Emergency Services; Public Information Office	During flood event	Department funding



## 5.5. Region 5 – Sutterville/Meadowview

Region 5 of the RLAA stretches from Sutterville Road down south to Meadowview Road. The majority of this area is residential; however, it does consist of a few shopping/corporate centers, Bing Maloney Gold Course, and the Sacramento Executive Airport. This entire region is classified by FEMA as Zone X with a low risk of flooding due to surrounding levees.

FIGURE 32. REPETITIVE LOSS AREA REGIONS MAP – REGION 5



**RLAA Region 5 – Area 14**

**Location:** 24th St and 69<sup>th</sup> Ave

**Number of Properties in Defined Area:** 10

**Number of RL Properties in Area:** 1

**Flood Zone:** X-Zone

**Dates of RL Flooding:** 2/23/20002, 12/31/2005

**Source of RL Flooding:**

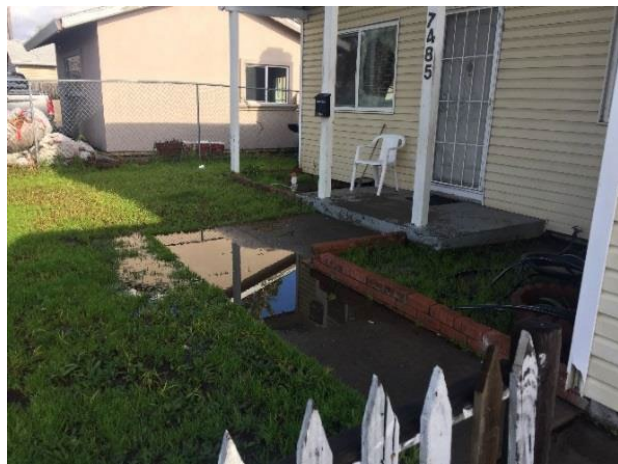
Based on the investigation performed by GEI Consultants, it was discovered that flooding likely occurred due to undersized drainage system during long duration storm events. Discussions with the property owners confirmed this conclusion.

**Mitigation Recommendations:** Based on Drainage

Master Plan of Basin 33 and the technical analysis performed by GEI, on-site private property protection should be implemented. This area is a localized low spot. Private property actions including drainage and grading of the property, sandbags, or elevation of the finished floor would be effective mitigation actions.



**FIGURE 33. DRAINS INSTALLED AFTER FLOODING TO DIVERT WATER BACK TO THE MAIN DRAINAGE SYSTEM**



**FIGURE 34. FRONT YARDS INUNDATED BY STREET FLOODING; PICTURES TAKEN TWO DAYS AFTER A LARGE STORM**



**RLAA Region 5 – Area 15**

**Location:** 20th Ave and Freeport Blvd

**Number of Properties in Defined Area:** 13

**Number of RL Properties in Area:** 4

**Flood Zone:** X-Zone

**Dates of RL Flooding:**

**Property 1:** 1/10/1995, 2/07/1996  
1/22/1997

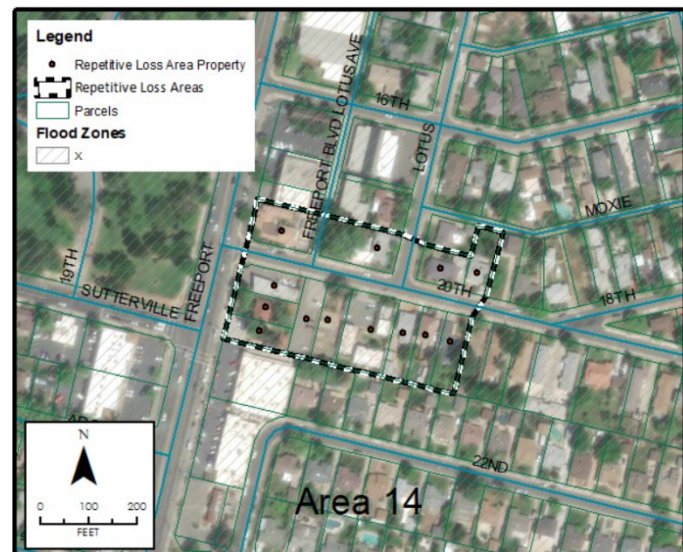
**Property 2:** 1/10/1995, 1/22/1997

**Property 3:** 1/10/1995 1/22/1997

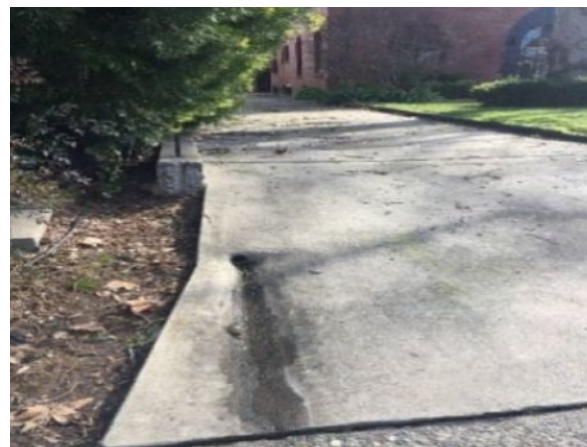
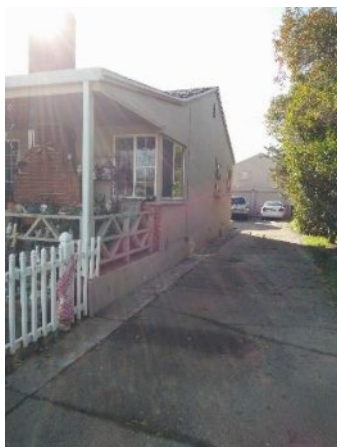
**Property 4:** 3/25/1989 1/12/1990 1/13/1993  
1/09/1995 1/20/1996 1/22/1997

**Source of RL Flooding:** This area is located in a low-lying area with an undersized drainage conveyance system. Flooding occurs during moderate and long duration storms.

**Mitigation Recommendations:** A master plan will need to be prepared for this area to look for alternatives to mitigate this area. Pipeline replacement and upsizing should be performed at the end of the pipe's useful life. For individual property protection, flood insurance, sandbags, diversions, and elevation of utilities will provide additional flood protection.



**FIGURE 35. EXAMPLES OF FLOODPROOFING MEASURE SUCH AS A CRAWL SPACE (LEFT)  
AND ADDITIONAL ON-SITE DRAINAGE PIPE (RIGHT)**





**RLAA Region 5 – Area 16**

**Location:** Alcedo Dr and Winnett Way,  
West of Franklin Blvd

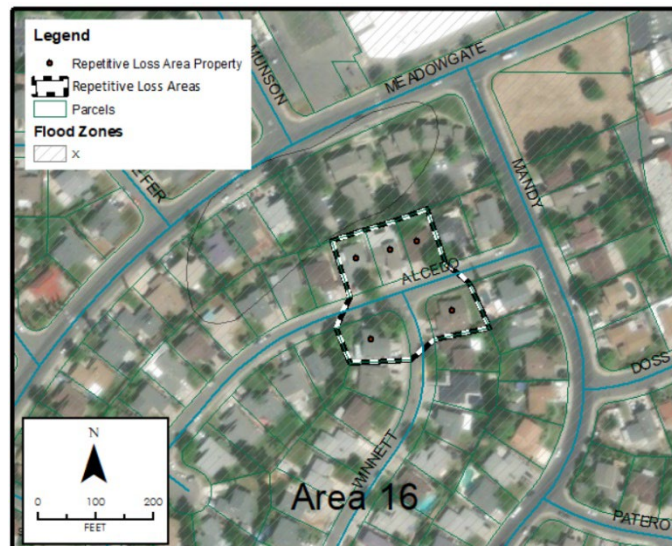
**Number of Properties in Defined Area:** 5

**Number of RL Properties in Area:** 1

**Flood Zone:** X-Zone

**Dates of RL Flooding:** 1/10/1995,  
1/27/1997

**Source of RL Flooding:** This area is in a low-lying area with an undersized drainage conveyance system. Flooding occurs during moderately intense and long duration storms.



**Mitigation Recommendations:** Elevate garages, ensure proper on-site drainage to allow water to flow to storm drains, elevate utilities, sandbags, storm readiness outreach, and flood insurance.

**FIGURE 36. CRAWL SPACE UTILIZED AS A FLOODPROOFING MEASURE TO PREVENT FLOODING IN THE STRUCTURE**



**FIGURE 37. STANDING WATER AFTER A LARGE JANUARY STORM UNABLE TO CONVEY FLOWS**



**RLAA Region 5 – Area 17**

**Location:** 68th Ave and 21<sup>st</sup> St

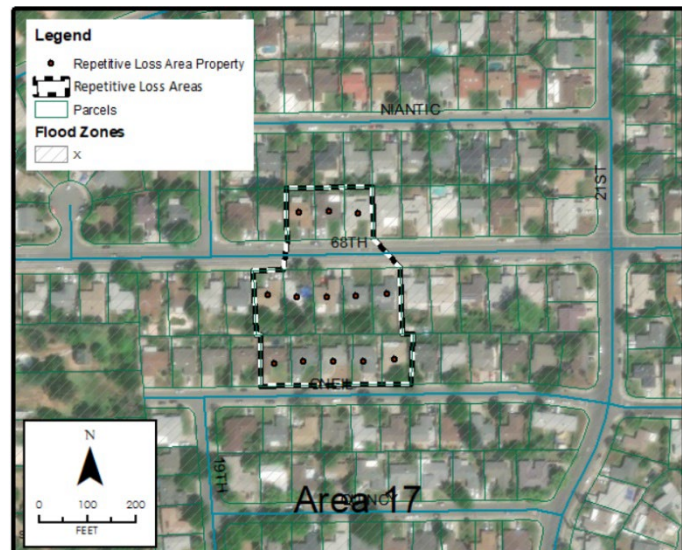
**Number of Properties in Defined Area:** 13

**Number of RL Properties in Area:** 1

**Flood Zone:** X-Zone

**Dates of RL Flooding:** 1/10/1995, 2/26/2000

**Source of RL Flooding:** Based on GEI Consultants' investigation, the most logical reason for flooding is unique to specific property drainage within the area. It is believed that an addition of a patio structure in the back of the property reduced the ability of the property to drain properly.



**Mitigation Recommendations:** For area flood protection, Drainage Master Plan for Basin 108 does not show property damage in this area. Some pipe upsizing recommendations to mitigate street flooding. Also suggest updating the model for alternative recommendations. Residents can add diversion(s) to promote the flow of water to the main drainage system, purchase flood insurance, and use sandbags to mitigate flooding.

FIGURE 38. ELEVATED HOME WITH LANDSCAPING  
ASSISTING IN ON-SITE DRAINAGE

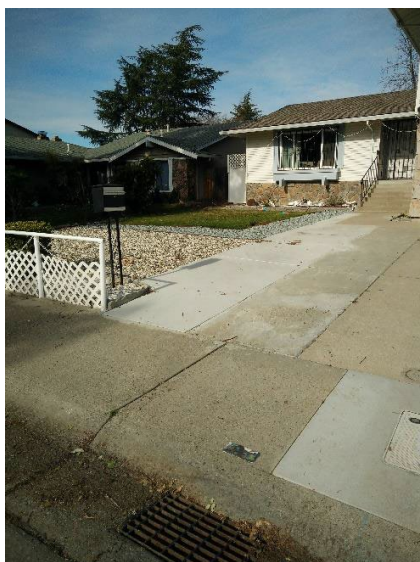


FIGURE 39. ELEVATED STRUCTURE WITH A CRAWL SPACE  
BELOW AS A FLOOD PROTECTION METHOD





**RLAA Region 5 – Area 18**

**Location:** Golf View Dr and 48<sup>th</sup> Ave

**Number of Properties in Defined Area:** 14

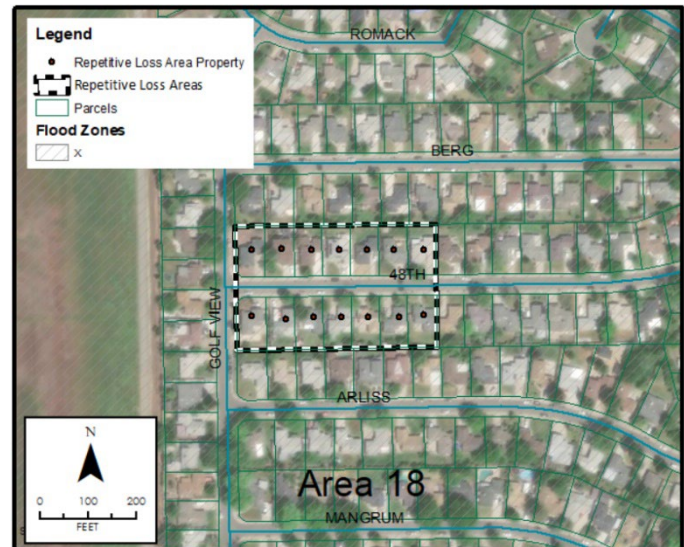
**Number of RL Properties in Area:** 1

**Flood Zone:** X-Zone

**Dates of RL Flooding:** 1/25/1997, 12/23/2004

**Source of RL Flooding:**

Based on GEI Consultants' investigation, the flooding in this area is caused by undersized drain pipes that are overwhelmed during long duration storms. Street flooding can overtop the curbs and begin to flood yards and garages.



**Mitigation Recommendations:** The Drainage Master Plan for Basin 22 to be completed. Old master plan did not show property damage in this area. Some pipe upsizing improvements to mitigate street flooding. Also suggest updating the model. Other mitigation options are flood preparedness education, elevate utilities, flood insurance, and sandbags.

**FIGURE 40. EXAMPLE OF FLOODED YARD FROM JANUARY 2017 STORMS**



**FIGURE 41. EXAMPLE OF UTILITIES LOCATED ON THE ROOF; MANY OF THE HOMES IN THIS AREA HAVE HVAC UNIT LOCATED ON THE ROOF**





**Region 5 – Field Visit**

Attachment C – Property Visit Documentation provides field visit information collected for all structures in Region 5’s repetitive loss areas. Questionnaires were left at each building and City staff talked with residents and tenants in the area after a large storm in January and February of 2017 to help further understand flooding patterns in the area.

**Region 5 – Mitigation and Action Items**

The following mitigation activities were considered to address the hazards found in Region 5. Table 21 lists the considered mitigation activities and identifies appropriate mitigation activities for each repetitive loss area.

**TABLE 20. REGION 5 MITIGATION ALTERNATIVE APPROACHES**

Mitigation Activity	Region 5				
	Area 14	Area 15	Area 16	Area 17	Area 18
<b>Prevention</b>					
Continue Enforcement of Stormwater Regulations	X	X	X	X	X
Continue Drainage System Maintenance	X	X	X	X	X
Continue Enforcement of Floodplain Management Regulations	X	X	X	X	X
<b>Property Protection</b>					
Building Elevation	X		X		
Relocation					
Improvement or Installation of Private Sumps					
Sewer Backup Protection					
Flood-proofing					
Flood Insurance	X	X	X	X	X
Grading	X			X	X
Sandbags	X	X	X	X	X
Elevate Utilities		X	X	X	X
<b>Natural Resource Protection</b>					
Natural Area Preservation					
Natural Area Restoration					
<b>Emergency Services</b>					
Hazard Threat Recognition	X	X	X	X	X
Hazard Warnings	X	X	X	X	X
Health and Safety Maintenance					
<b>Structural Projects</b>					
Floodwalls	X				
Diversions	X	X		X	X
<b>Conveyance System Improvements (Structural)</b>					
Detention Basin/Vault				X	X

Mitigation Activity	Region 5				
	Area 14	Area 15	Area 16	Area 17	Area 18
Increased Pumping Capacity					
Pipe Improvements	X	X		X	X
<b>Public Information</b>					
Outreach Projects	X	X	X	X	X
Map Information	X	X	X	X	X
Technical Assistance	X	X	X	X	X

Based on the complete analysis of this region the following action items were identified. These action items were selected based on community feedback, funding, current City activities, and data reports.

**TABLE 21. REGION 5 MITIGATION ALTERNATIVES**

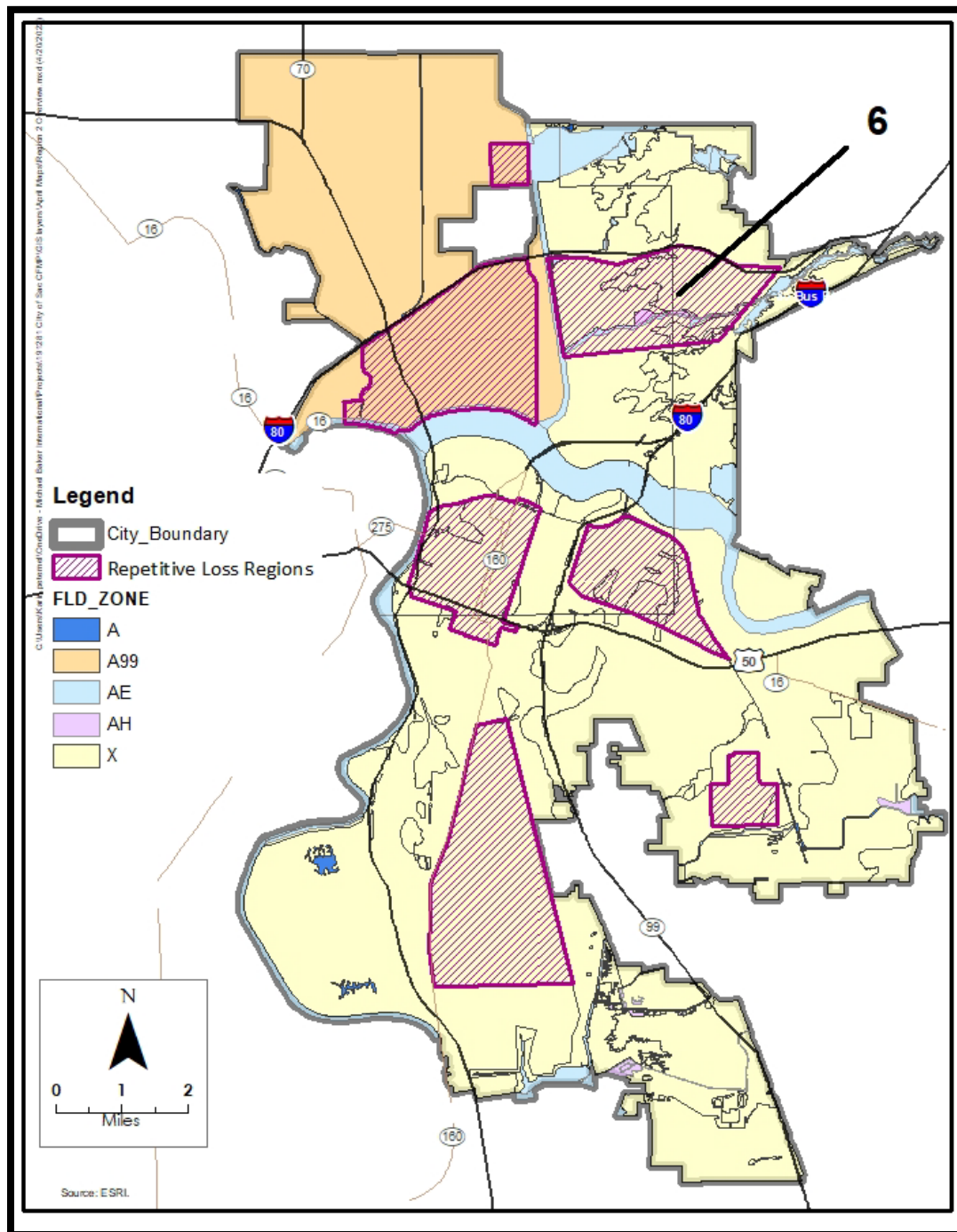
Action Item	Responsible Office	Schedule	Potential Funding
Provide neighborhoods with storm/flood ready information - include emergency alert information	Department of Utilities, Floodplain Management	Annual	Department funding
Elevate structures that are built at or below grade		Dependent on property owner interest and grant opportunities	Grants and private funding
Drainage system maintenance		Ongoing	Department funding
Enforcement of floodplain management regulations			
Promotion of flood insurance			
Flood/map information hotline			
Technical assistance visits			
Grading or diversion to redirect the flow of stormwater to drainage system	Property Owner	Dependent on property owner interest	Private funding
Elevate utilities that are at or below grade			
Construction of a floodwall		Dependent on property owner interest	Private funding or grants
Hazard threat recognition system	Department of Utilities	Ongoing	Department funding
Conveyance system improvements identified in Drainage Master Plan for Basin 33	Department of Utilities, Wastewater & Stormwater Engineering Program	Long-Term	Capital Improvement Program
Diversion identified in Drainage Master Plan for Basin 108			

Action Item	Responsible Office	Schedule	Potential Funding
Conveyance system improvements identified in Drainage Master Plan for Basin 22			
Conveyance system improvements identified in- Drainage Master Plan for Basin 108			
Inform residents of location of sandbag supplies in their area	Department of Utilities, Operations & Maintenance; Property Owner	During flood event	Department funding
Enforcement of stormwater regulations	Department of Utilities, Environmental & Regulatory Compliance	Ongoing	Department funding
Hazard warnings	Department of Utilities; Emergency Services; Public Information Office	During flood event	Department funding

## 5.6. Region 6 – Arcade Creek

Region 6 of the RLAA stretches from Watt Avenue, through Haggin Oaks Golf Course, and west to Steelhead Creek. The majority of this area is residential. The flooding in this region is due to overbank flooding due to severe storm events. The region includes Zone AE.

FIGURE 42. REPETITIVE LOSS AREA REGIONS MAP – REGION 6



**RLAA Region 6 – Area 19**

**Location:** Arcade Creek Blvd and Marysville Blvd to Verano St

**Number of Properties in Defined Area:** 71

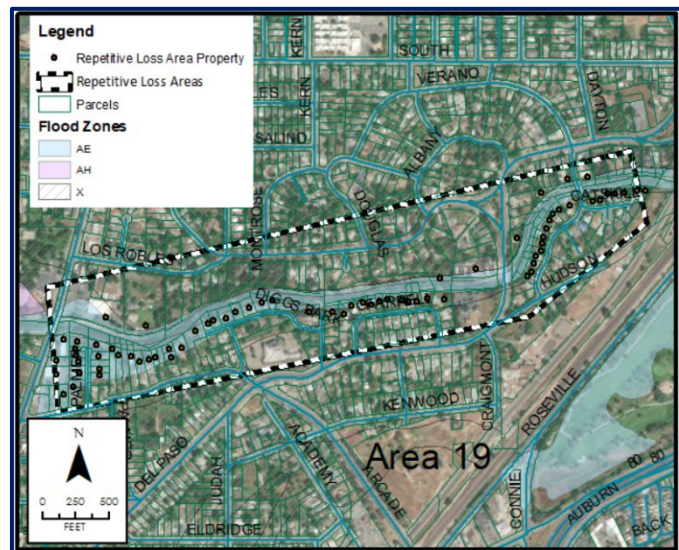
**Number of RL Properties in Area:** 2

**Flood Zone:** AE

**Dates of RL Flooding 1:** 1/4/1982, 1/10/1995

**Dates of RL Flooding 2:** 2/17/1986, 1/10/1995

**Source of RL Flooding:** This area is located along Arcade Creek, directly west of the publicly owned Haggin Oaks Golf Course. A record high stage reading of 80.9 feet was recorded at Arcade Creek on January 10, 1995. This suggests that the overtopping of the creek was probably the cause of the damage at the properties along Arcade Creek on that date. Properties along Palmer Street are additionally at a lower grade than Palmer itself; therefore at this location there is the potential for runoff from Arcade Blvd. as well as adjacent streets. Many properties have out-buildings at the back of the property that are even more directly adjacent to Arcade Creek that may have received the damage.



**East side:** A visit was made to the area during regional flooding on January 5, 2023. Properties that flooded are directly adjacent to the large, partially concrete-lined channel that is the bed of Arcade Creek through this area. These homes sit at a lower finished floor elevation than the adjacent road. Water also pools on Verano Bridge and along the streets during high storm events and due to poor drainage in the area.

**West side:** During the January site visit, water had accumulated at the intersection of Palmer St and Arcade Blvd to a depth of about 8 inches. Farther down the street on Palmer, accumulation of tree leaves, debris, and branches had clogged up the only two drainage inlets on the north and the south ends of the street. Properties on the north end of Palmer are at the lowest point of the street, which leads runoff to travel down north alongside the two gutter pans to the undersized drainage inlet at the end of the street. Without proper maintenance or drainage inlet upsizing, water will keep accumulating in this location and could cause flooding to the adjacent properties.

**Mitigation Recommendations:** Properties' finished floor elevations are low. Regional improvements could include detention storage in the golf course to provide adequate flood protection to the area, regional stormwater improvements to street drainage, and maintenance of the partially concrete-lined channel that is Arcade Creek. Ensure all upstream stormwater collection and conveyance infrastructure is cleaned and maintained before and during large events. On-property mitigation efforts should include raising mechanical equipment, raising of the structures themselves, relocating the structures, and sandbags or a floodwall to divert or direct water away from the structures.



FIGURE 43. VIEW NORTH ON PALMER TOWARD END OF THE STREET AND RL PROPERTY



FIGURE 44. CLOGGED DRAINAGE INLET ON PALMER ST AND ARCADE BLVD



FIGURE 45. ARCADE CREEK LOOKING WEST FROM VERANO BRIDGE (CULVERT OUTLET AT RED ARROW) (STAGE 35 FT AT MARYSVILLE BLVD (CITY) (47403); MARCH 16



FIGURE 46. ARCADE CREEK LOOKING WEST FROM VERANO BRIDGE (STAGE 40-42 FT AT MARYSVILLE BLVD (CITY) (47403); JANUARY 5



FIGURE 47. ARCADE CREEK LOOKING WEST FROM VERANO BRIDGE



FIGURE 48. VERANO BRIDGE WATER PONDING





**RLAA Region 6 – Area 20**

**Location:** Gillespie St and Fairbanks Ave

**Number of Properties in Defined Area:** 12

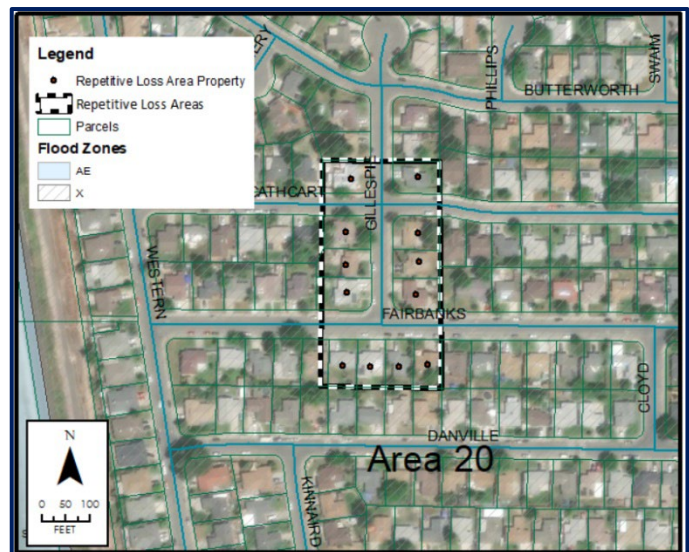
**Number of RL Properties in Area:** 1

**Flood Zone:** X

**Dates of RL Flooding:** 12/23/2012, 1/7/2017,  
3/1/2018

**Source of RL Flooding:** Previous communications with homeowner indicated that the foundation is weak from the 1986 flood, resulting in water entering the home through the foundation. The main area of flooding was in a lower level room and patio. Resident uses sandbags and boards to keep water out; however, the cracks in the foundation continue to let it seep through the floor.

**Mitigation Recommendations:** Structural improvements to house/foundation, use sandbags to prevent damage to the house, grading on the property to redirect the flow of water, installation of drains to divert water, construct floodwall, sandbags, flood insurance, and outreach on storm/flood preparedness.



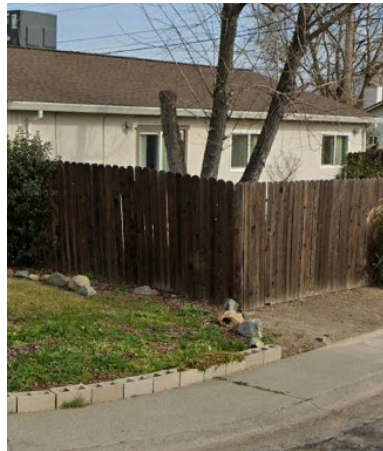
**FIGURE 49. SUMP 158 NEAR GILLESPIE STREET**



**FIGURE 50. SUMP 158 POND**



FIGURE 51. TYPICAL NEIGHBORHOOD HOME BUILT UP FROM STREET



### Region 6 – Field Visits

Attachment C – Property Visit Documentation provides field visit information collected for all structures located in Region 6’s repetitive loss areas. Targeted outreach letters and questionnaires were mailed to residents prior to the visit. Local residents responded to the outreach and provided anecdotal information on the local flooding.

### Region 6 – Mitigation and Action Items

The following mitigation activities were considered to address the hazards found in Region 6. Table 22 lists all considered mitigation activities and identifies appropriate mitigation activities for each repetitive loss area.

TABLE 22. REGION 6 REVIEW OF ALTERNATIVE APPROACHES

Mitigation Activity	Area 19	Area 20
<b>Prevention</b>		
Continue Enforcement of Stormwater Regulations	X	X
Continue Drainage System Maintenance	X	X
Continue Enforcement of Floodplain Management Regulations	X	X
<b>Property Protection</b>		
Building elevation	X	X
Relocation	X	
Improvement or Installation of Private Sump		
Sewer Backup Protection		
Flood-proofing	X	
Flood insurance	X	
Grading		
Sandbags	X	X

Mitigation Activity	Area 19	Area 20
Elevate Utilities	X	X
Structural Improvements		X
<b>Natural Resource Protection</b>		
Natural Area Preservation		
Natural Area Restoration	X	
<b>Emergency Services</b>		
Hazard Threat Recognition		
Hazard Warnings		
Health and Safety Maintenance		
<b>Structural Projects</b>		
Floodwalls	X	
Diversions		
<b>Conveyance System Improvements (Structural)</b>		
Detention Basin	X	
Increased Pumping Capacity		
Pipe Improvements		
<b>Public Information</b>		
Outreach Projects	X	x
Map Information		
Technical Assistance		

TABLE 23. REGION 6 ACTION ITEMS

Action Item	Responsible Office	Schedule	Potential Funding
Promote flood insurance	Department of Utilities, Floodplain Management	Ongoing	Department funding
Brochures, specific outreach			
Continue to enforce local floodplain development ordinance		Prior to flood event	Department funding, HMGP funding
Inform residents of location of sandbag supplies in their area		Long-term	
Investigate grant funding			
Elevate the structure	Property owner	Depends on interest of owner	
Rebuild foundation/structural improvements		Long-term	
Investigate Capital Improvement Plan for regional stormwater infrastructure	Department of Utilities	Long-term	Department funding, HMGP funding
Acquisition by City			Grant/department funding



## **6. Repetitive Loss Area Analysis Summary**

The City of Sacramento is highly vulnerable to localized flooding. The City's local drainage system services approximately 100 square miles and is handled by a combination of gravity and lift stations for a total of approximately 140 storm drainage basins. Since the City is typically lower than the elevated rivers by as much as 5-25 feet, the majority of the local drainage must be pumped into the rivers. The City operates 105 sumps and pumps to keep the drainage pumped down.

It is conceivable that extremely heavy local rainstorms can result in badly flooded streets and flooding of homes in some areas. It is estimated that such situations would be brought about by a slow-moving high-intensity rainstorm over several hours reaching a peak intensity of one-half inch per hour later in the storm event. Any higher intensity storm event will cause localized flooding problems. The majority of the structures in the City's repetitive loss areas are impacted by local drainage flooding. The identified structural projects related to drainage improvements will result in long-term flood protection for affected areas. However, most of these projects must wait for funding to proceed.

It is recommended that property owners prepare themselves at the beginning of each rainy season, typically October. The City suggests having sandbag materials on hand, clear debris of storm drains on a regular basis, and have backup generators for sumps. The City's mitigation activities recommended in this report include increased outreach on hazard awareness and warning, with additional efforts in repetitive loss area to ensure flood preparedness. Finally, the development of an ongoing program to match residents who would like to move forward with a structural or property protection mitigation activities with possible grant funding.

Through the collaborative efforts of the City and residents, the repetitive loss areas within Sacramento can become better prepared, more protected, and resilient to localized flooding.

### **6.1. Current Mitigation Projects**

#### **6.1.1. Capital Improvements Plan Drainage Improvements**

The FY2023/24 budget for the City Utilities Program totals \$47.3 million. At the current time, drainage improvements identified by the Utilities Department for implementation are under review and will be prioritized upon funding approval.

#### **6.1.2. Acquisition and Demolition**

The City of Sacramento has not identified any properties on its repetitive loss list that would be candidates for acquisition or demolition of the structures.

#### **6.1.3. Advantages and Disadvantages of Mitigation Measures**

Seven primary mitigation measures are discussed here: acquisition, relocation, barriers, floodproofing, drainage, elevation, and insurance. In general, the cost of acquisition and relocation will be higher than other mitigation measures but can completely mitigate the risk of any future flood damage. Building small barriers to protect single structures is a lower cost solution, but it may not be able to offer complete protection from large flood events and may impact flood risk on other properties. Where

drainage issues are the source of repetitive flooding, drainage improvements can provide flood mitigation benefits to multiple properties. Each of these solutions is discussed in greater detail below.

Insurance differs from other property protection activities in that it does not mitigate or prevent damage caused by a flood. However, flood insurance does help the owner repair and rebuild their property after a flood, and it can enable the owner to afford incorporating other property protection measures in that process. Insurance offers the advantage of protecting the property, as long as the policy is in force, without requiring human intervention for the measure to work.

## **7. Conclusion and Recommendations**

### **Conclusion and Recommendations**

Based on the field survey and collection of data, the analysis of existing studies and reports, and the evaluation of various structural and nonstructural mitigation measures, the City of Sacramento has identified various mitigation measures that can be implemented by homeowners or identified for possible regional stormwater or drainage improvements that will be evaluated by City staff.

The City will encourage property owners to use flood-proofing measures to help protect lower levels of their property. Outreach and education will continue to be a priority, not only citywide but to individually affected residents, in order to minimize future flood risk through increased public education efforts to increase awareness of flood preparedness and flood protection measures such as moving valuable items to above the flood elevation and permanently elevating vulnerable HVAC units. At the same time, the City will work with property owners, citizens, the State and other regional and federal agencies to implement capital improvement projects, which will help to eliminate flooding in the repetitive loss areas.

## **Attachment 1 - Repetitive Loss List**

**CITY OF SACRAMENTO – Comprehensive Floodplain Management Plan**  
**Repetitive Loss Area Analysis**

July 2023

Status	Total Count	Item Count	RL#	Mitigated?	Flood Zone	NFIP Insured
Approved AW-501	1	1	302953	NO	A99	NO
	2	2	83750	NO	A07	NO
	3	3	76416	NO	A99	YES
	4	4	14959	NO	X	NO
	5	5	304401	NO	X	NO
	6	6	80810	NO	X	NO
Pending AW-501	7	7	74636	YES	A99	NO
	8	8	49291	YES	AE	YES
	9	9	28436	NO	AE	NO
	10	10	54735	NO	AE	NO
	11	11	162939	NO	AE	NO
	12	12	81320	NO	A99	YES
Unmitigated	13	13	48021	NO	A	NO
	14	1	158498	NO	X	YES
	15	2	89651	NO	AE	YES
	16	3	91177	NO	A99	YES
	17	4	108339	NO	X	NO
	18	5	138956	NO	X	NO
	19	6	83634	NO	X	NO
	20	7	83635	NO	X	NO
	21	8	83636	NO	X	NO
	22	9	69776	NO	X	NO
	23	10	78107	NO	X	NO
	24	11	84233	NO	X	NO
	25	12	136519	NO	X	YES
	26	13	134126	NO	X	NO
	27	14	302890	NO	AE	NO
	28	15	257133	NO	X	NO
	29	16	90285	NO	X	NO
	30	17	300958	NO	X	NO
	31	18	107964	NO	A99	YES
	32	19	91108	NO	X	NO
	33	20	84247	NO	X	NO
Mitigated	34	21	80791	NO	X	NO
	35	22	90378	NO	X	NO
	36	23	158876	NO	X	NO
	37	1	89648	YES	A99	NO
	38	2	49650	YES	A	NO
	39	3	86119	YES	A99	NO
	40	4	76417	YES	A99	NO
	41	5	72548	YES	A99	NO
	42	6	86111	YES	A99	NO
	43	7	82068	YES	X	NO
	44	8	89658	YES	C	NO
	45	9	57940	YES	A99	NO
	46	10	80886	YES	A99	YES
	47	11	88303	YES	A99	YES
	48	12	85945	YES	A99	NO
	49	13	70855	YES	A99	NO
	50	14	94362	YES	A99	NO
	51	15	86120	YES	A99	NO
	52	16	1144	YES	X	NO

Status	Total Count	Item Count	RL#	Mitigated?	Flood Zone	NFIP Insured
	53	17	57936	YES	X	NO
	54	18	82390	YES	A99	NO
	55	19	81318	YES	A99	NO
	56	20	71120	YES	A99	NO
	57	21	84257	YES	C	NO
	58	22	88789	YES	A99	NO
	59	23	88811	YES		NO



## **Attachment 2 – Outreach Mailing Materials**



Flood Insurance – Are You Covered?

For many of us, our home and its contents are our greatest investment, so it is important to realize that standard homeowners and renters insurance policies do not cover losses due to flooding. You are encouraged to buy flood insurance – whether or not your home is located within the Special Flood Hazard Area (SFHA). Effective October 1, 2021, FEMA's National Flood Insurance Program (NFIP) has implemented Risk Rating 2.0 policy rating methodology. Premiums are determined based on an individual property's flood risk. Individuals will pay based on multiple factors including flood risk variables, rebuilding costs and valuation of homes.

Also, Communities will continue to earn National Flood Insurance Program rate discounts of 5% - 45% based on the Community Rating System classification. The discount will be uniformly applied to all policies throughout the participating community, regardless of whether the structure is in the Special Flood Hazard Area (SFHA).

Remember, you don't need to live in the SFHA to be affected by flooding. In fact, 30% of all claims occur outside the SFHA. Recent levee improvements have reduced but not eliminated the flood risk to our community. Be sure to insure your property and its contents. There is a 30-day waiting period for most flood insurance policies to take effect. If you are buying a home and need flood insurance, purchase the insurance before the close of escrow, so the policy will go into effect at the close of escrow.

Whether it is required or not, property owners in flood-prone areas should always consider flood insurance as their first and last line of defense in protecting their family and property. Call your insurance agent or the National Flood Insurance Program at (800) 427-4661 to get your policy before the winter rains! Residents can also contact the City's Floodplain Information Line, (916) 808-5061, for general flood insurance information.

How Does the City Know a Flood is Coming?

The California Data Exchange Center (CDEC) provides a centralized location to store and process real-time water level information gathered by various cooperators throughout the State including the City's Automated Local Evaluation in Real Time (ALERT) gauges located on City creeks. The CDEC can be used to signal us about possible flooding. CDEC provides continuous reports from river, creek, and rainfall gauges online at [www.cdec.water.ca.gov](http://www.cdec.water.ca.gov). With it, we can receive advanced warning of impending high water levels.

What You Need To Know

Because of levee and dam improvements, most of the City is outside the Special Flood Hazard Area (SFHA). While these dams and levees provide us excellent protection, they are still subject to failure and any property in the City remains at risk of flooding.

Sacramento's vast floodplain and flood risk are due to our proximity to the Sacramento and American Rivers, as well as our local creeks and streams, and drainage systems which rely on pumps to drain properly. In the past 36 years, areas of the City have been subject to significant flooding — most notably in 1986, 1987 and 1997. This risk of flooding means that it is important that you and your family protect yourself and your property against flooding.

The SFHA, as designated by the Federal Emergency Management Agency, represents the 100-year regulatory floodplain. This means that in any given year, your property has greater than a 1-in-100 chance of flooding. But all homes, in and out of the SFHA, are subject to floods.

Know the Warnings

- In case of a flooding emergency, the City may use different means to alert you to the situation and possible evacuation routes.
- **EMERGENCY ALERTS**  
Sacramento Emergency Communications Personnel will use the Everbridge system to alert residents via phone or email if there is a need to evacuate. Listen carefully to the information and instructions provided to get help if you need assistance evacuating. To sign up for Everbridge alerts, please visit: [www.Sacramento-Alert.org](http://www.Sacramento-Alert.org).
  - Listen for Sirens. In the case of an emergency, police and first officials will use their sirens and loudspeakers to alert you to necessary information about the emergency.
  - Turn On TV or Radio. During large storm events, turn on a television set or radio and tune to a local station to find out information about emergency and evacuation routes. The emergency broadcast station for Sacramento is KFBK Radio 1530-AM.

Planning Ahead

- Follow these tips to help your family be prepared in case of flooding.
1. Buy flood insurance. Know your insurance policies – what is covered and what isn't.
  2. Create a family emergency plan. Check out [www.ready.gov/plan](http://www.ready.gov/plan) for tips on what to plan for and a plan template.
  3. Be familiar with the routes in and out of your neighborhood in case you need to evacuate. Remember to check TV or radio to find the preferred route out of your area before you leave your home.
  4. Keep all of your important paperwork, including insurance policies and birth certificates in a safe place such as a deposit box, or get "tech ready" by having documents saved to a password-protected flash drive or cloud storage. If you keep them at home, be sure to take them with you when you leave your house.
  5. Find the high points in and around your home. If you are caught in a flood, stay out of the water if at all possible. Do not drive through flooded streets. Even shallow water can have a deadly current and may be contaminated. When moving to upper floors, roof or higher ground, be sure to take your emergency supplies with you.
  6. Teach children to dial 9-1-1 in case of emergency.
  7. If you live in an area that is frequently flooded, keep sandbags, plywood, plastic sheeting and lumber on hand. DO NOT stack sandbags against your building's foundation.

Contact Numbers

Floodplain Information Line (916) 808-5061 or [floodinfo@cityofsacramento.org](mailto:floodinfo@cityofsacramento.org)

To obtain general floodplain information, flood insurance information, structural retrofit and permit information, or if you need a site visit to discuss solutions to flooding and/or drainage problems, please email or call the Floodplain Information Line. Please be prepared to leave your name, telephone number, property address, tax assessor's parcel number and the type of information you need. A representative will return your call within two business days.

National Flood Insurance Program Referral Center (888) 379-9531 or [www.floodsmart.gov](http://www.floodsmart.gov).

To report issues with your local levee, storm drain backups or illegal dumping in ditches, gutters, streams or rivers, call 311 within City limits or (916) 264-5011 from outside the City.

Floodplain Protection

While flooding is a natural hazard in the Sacramento area, it is important to protect our waterways and the environment. Floodplains can provide valuable wildlife habitat and are a natural part of Sacramento. Understanding and protecting the natural functions of floodplains helps reduce flooding damage and protect our environment. The City of Sacramento is part of the Sacramento Stormwater Quality Partnership. The Partnership educates the public about illegal dumping into our waterways and stormwater pollution prevention. For more information, please call (916) 808-4H2O (808-4426) or visit [www.beriverfriendly.net](http://www.beriverfriendly.net).

In addition to the American and Sacramento Rivers, several waterways traverse the City. These include Steelhead Creek (Natomas East Main Drainage Canal), Arcade Creek, Magpie Creek, Robla Creek, Morrison Creek, Florin Creek, Elder Creek, Strawberry Creek, Unionhouse Creek, Laguna Creek, Sacramento Canals, Pocket Area Canals, and Hagginwood Creek.

8. Consider improvements to your property, such as grading or correcting drainage problems that will help keep water away from your ~~Streets~~ areas open between homes, property lines, and levees.
10. For individuals with disabilities or medical conditions, review FEMA's additional preparedness steps at <https://www.ready.gov/individuals-access-functional-needs>.

Help Us Help You


There are several things that you can do to help the City. Make sure to properly dispose of yard waste in containers provided by the City. Remember illegal dumping is against the law. Keep drain inlets, drainage ditches and canals clear of junk and debris, and report any illegally dumped materials to the City by calling 311 or (916) 264-5011. Also, during a storm event, if you see a storm drain backing up, please call 311.

To find out if your home is located within the SFHA, floodway, in or around historic flooding, or additional hazards, please contact the City's Floodplain Information line at [floodinfo@cityofsacramento.org](mailto:floodinfo@cityofsacramento.org) or (916) 808-5061. A City representative will respond to your request within two business days. Floodplain maps and filed list of elevation certificates can be found at our City DOU website and can be requested through our information line or email: [floodinfo@cityofsacramento.org](mailto:floodinfo@cityofsacramento.org).

Get a permit before you start construction. Remember, all floodplain development and redevelopment, including grading, building and retrofitting, requires a permit. If you know of a non-permitted development project, please contact the City at (916) 264-5011 or 311.

Note: In SFHA zones A, AE, AH, and AO, if the cost of reconstruction, rehabilitation, addition or other improvements to a structure is more than 50% of the building's market value, then the structure must meet the same structural requirements as a new structure. This standard also applies to our local Magpie Creek floodplain. Technical assistance for retrofitting homes and additional information can be obtained from the Floodplain Information Line at [floodinfo@cityofsacramento.org](mailto:floodinfo@cityofsacramento.org) or (916) 808-5061.

BE FLOOD  
READY  
protect yourself  
today and tomorrow  
A GUIDE FOR SACRAMENTO RESIDENTS



Printed on recycled paper

This brochure is provided as a public service to keep you informed and ready in the event of flooding.

**CALL (916) 264-5011**

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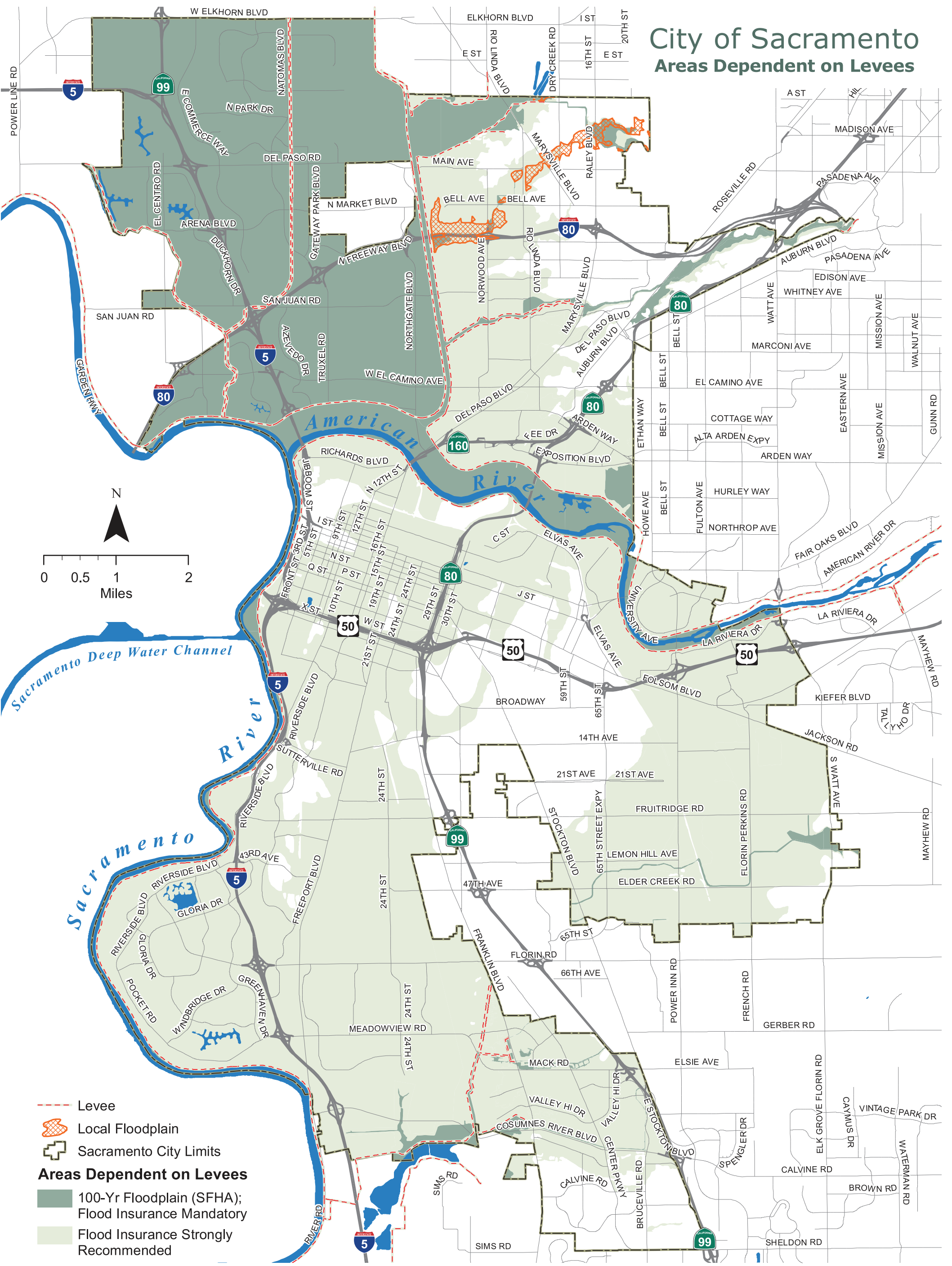
Мы говорим по-русски • ພວກເຮົາເວົ້າພາສາລາວ

Pe̍h hâis Ius Hmoob • Chúng tôi nói tiếng Việt



# City of Sacramento

## Areas Dependent on Levees



**Be prepared.  
Be flood ready.  
Buy flood insurance.**

[WWW.CITYOFSACRAMENTO.ORG/FLOODREADY](http://WWW.CITYOFSACRAMENTO.ORG/FLOODREADY)

City of  
**SACRAMENTO**  
Department of Utilities

## **Attachment 3 – Property Visit Documentation**

## **Attachment 4 – Summary of Questionnaire Responses**



<b>Q2: How many years have you occupied the home/building at this address?</b>		
<b>Answer Choices</b>	<b>Percentage</b>	<b>Number Responding</b>
less than 1 year	7	1
1 to 5 years	21	3
5 to 10 years	7	1
10 to 15 years	7	1
15 to 20 years	7	1
more than 20 years	50	7

<b>Q3: Do you rent or own this home/building?</b>		
<b>Answer Choices</b>	<b>Percentage</b>	<b>Number Responding</b>
Rent	7	1
Own	93	13

<b>Q4: What type of foundation does the home/building have?</b>		
<b>Answer Choices</b>	<b>Percentage</b>	<b>Number Responding</b>
Slab	42	5
Crawl Space	33	4
Basement	17	2
I'm not sure	0	0
Other (please specify)	8	1

<b>Q5: Has your home/building experienced flooding?</b>		
<b>Answer Choices</b>	<b>Percentage</b>	<b>Number Responding</b>
Yes	63	12
No	37	7

<b>Q6: How concerned are you that your home/building will experience a flood event or an additional flood event?</b>		
<b>Answer Choices</b>	<b>Percentage</b>	<b>Number Responding</b>
Very concerned	67	2
Somewhat concerned	33	1
A little concerned	0	0
Not at all concerned	0	0

<b>Q7: How prepared are you if your home/building experiences a major flood? Visit the Department of Utilities webpage for ideas on how you can prepare for a flood emergency before it happens: <a href="#">How you can prepare for flooding - City of Sacramento</a></b>		
<b>Answer Choices</b>	<b>Percentage</b>	<b>Number Responding</b>
Very prepared	0	0
Somewhat prepared	33	1
A little prepared	33	1
Not at all prepared	33	1

**Q8: If you do have flood insurance, was it required for you to obtain this insurance? For example, flood insurance is required for a federally-backed mortgage if you are in a flood zone.**

Answer Choices	Percentage	Number Responding
Yes	67	2
No	33	1
I don't have flood insurance	0	0
I don't know	0	0

**Q9: Has your household taken any precautions to prepare for a future flood? Please select all that apply.(If you would like more information on any of these measures or additional ideas, please see the links on the final page of this survey)**

Answer Choices	Percentage	Number Responding
Purchased flood insurance	21	4
Created evacuation plan	5	1
Cleared gutters	11	2
Elevated/raised the building	0	0
Re-graded yard to reduce runoff to the building	16	3
Installed flood vents	11	2
Installed sump pump	16	3
Moved utilities off ground level (e.g. electrical panels, propane tanks, A/C units, water heaters)	0	0
Purchased a backup power system or generator	5	1
Have access to sandbags	5	1
Waterproofed the outside walls	0	0
Moved things out of basement	0	0
We have not taken any precautions	0	0
Other (please specify)	11	2

**Q10: Did any of these precautions work?**

Answer Choices	Percentage	Number Responding
Yes	33	2
No	17	1
Please explain what worked or didn't work.		3

**Q11: In what year(s) did it flood?**

Answers	
2023	2
2017 (sump pump broke)	1
1993 and 1996 (street and basement only; before the French drain was installed in 2000)	1

**Q12: What do you feel was the cause of the flooding? Check all that affect your home/building.**

Answer Choices	Percentage	Number Responding
Storm drain backup	46	6
Standing water next to house/building	15	2
Saturated ground/leaks in basement walls	8	1
Overbank flooding	0	0
Heavy rain event	15	2
Other (please specify) (Q13) (Arcade Creek)	15	2

<b>Q14: How did the water enter your home/building? For example, through the garage, basement, or first floor of the home.</b>	
Answers	
It did not	1
From the street	1
Basement	4
Through the garage doors	

<b>Q15: How deep did the water get:</b>							
	< 6"	6" to 12"	1' to 2'	2' to 3'	3' to 5'	5' or more	Did not flood
Yard	1		2	1		1	1
Crawl space	1						1
Garage	2						2
Over first floor							2
Basement	1	1					1

<b>Q16: What was the length of time the water stayed in your house/building (how many hours or days)?</b>	
5-6 hours	3
We drained it ourselves with a hose and buckets	2
2 days	1
2 weeks water inside the garage	1

<b>Q17: If your home/building was damaged, did you continue to stay or go elsewhere?</b>		
Answer Choices	Percentage	Number Responding
Stayed in home	50	1
Left permanently	0	0
Left temporarily (specify how long you had to stay away)	50	1

<b>Q18: If you left temporarily please choose your lodging accommodation.</b>		
Answer Choices	Percentage	Number Responding
Stayed with friends or family	0	0
Shelter	0	0
Hotel/motel/Air BNB	0	0
Rented a place	0	0
Other (please specify)	100	1

<b>Q19: Prior to the flood(s), how vulnerable did you think your residence was to flooding?</b>		
Answer Choices	Percentage	Number Responding
Very vulnerable	25	1
Somewhat vulnerable	50	2
Not vulnerable	25	1
I did not know there was a risk of flood on this property	0	0
Please provide any comments on the flood risk for your property		1