

Comprehensive Flood Management Plan

City of Sacramento Department of Utilities



City of
SACRAMENTO
Department of Utilities

February 2016 (Updated May 2017)



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ACRONYMS AND ABBREVIATIONS

AAR	After-Action-Report
AB	Assembly Bill
ADA	American Disabilities Act
ALERT	Automated Local Evaluation in Real Time
ATC	Applied Technology Council
ARFCD	American River Flood Control District
BAM	Best Available Map
BCEGS	Building Code Effectiveness Grading Schedule
BFE	Base Flood Elevation
BMP	Best Management Practice
Cal OES	California Governor’s Office of Emergency Services
CDBG	Community Development Block Grant
CDD	Community Development Department
CDEC	California Data Exchange Center
CFM	Certified Floodplain Manager
CFMP	Comprehensive Flood Management Plan
CIP	Capital Improvement Projects
CIS	Community Information System
City	City of Sacramento
CP	Coverage Improvement Plan
CRS	Community Rating System
CSS	Combined Sewer System
CTP	Cooperating Technical Partner
CVFPP	Central Valley Flood Protection Plan
DFIRM	Digital Flood Insurance Rate Map
DI	Drain Inlets
DOC	Department Operations Center
DOU	Department of Utilities
DWR	California Department of Water Resources

EIR	Environmental impact report
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
FEMA	Federal Emergency Management Agency
FIA	Flood Insurance Coverage Assessment
FIRM	Flood Insurance Rate Map
GRR	General Reevaluation Report
HSEEP	Homeland Security Exercise and Evaluation Program
HMA	Hazard Mitigation Assistance
IA	Individual Assistance
ICC	Increased Cost of Compliance
ICS	Incident Command System
IP	Improvement Plan
JFP	Joint Federal Project
LHMP	Local Hazard Mitigation Plan
MA9	Maintenance Area 9
MEP	Maximum Extent Practicable
NDRF	National Disaster Recovery Framework
NFIP	National Flood Insurance Program
NIMS	National Incident Management System
NLIP	Natomas Levee Improvement Project
NOAA	National Oceanic and Atmospheric Agency
O&M	Operation and Maintenance
OES	Sacramento County's Office of Emergency Services
PCA	Project Cooperation Agreement
PIO	Public Information Officer
PPI	Program for Public Information
PRP	Preferred Risk Policy
QPF	Quantitative Precipitation Forecasts
RAC	Rate Advisory Commission
RLAA	Repetitive Loss Area Analysis
RD 1000	Reclamation District 1000
RFMP	Regional Flood Management Plan

RM	River Mile
Sac Bank	Sacramento River Bank Protection Program
SAFCA	Sacramento Area Flood Control Agency
SB	Senate Bill
SBA	Small Business Administration
SDE	Substantial Damage Estimator
SEMS	Standardized Emergency Management System
SFHA	Special Flood Hazard Area
SOP	Standard Operating Procedure
SPD	Sacramento Police Department
SQIP	Stormwater Quality Improvement Program
SUALRP	Sacramento Urban Area Levee Reconstruction Project
SRFCP	Sacramento River Flood Control Project
SRFCS	Sacramento River Flood Control System
SSSG	South Sacramento Streams Group
WMP	Watershed Management Plan
ULDC	Urban Levee Design Criteria
ULOP	Urban Level of Flood Protection
USACE	US Army Corps of Engineers

1 INTRODUCTION

1.1 Background

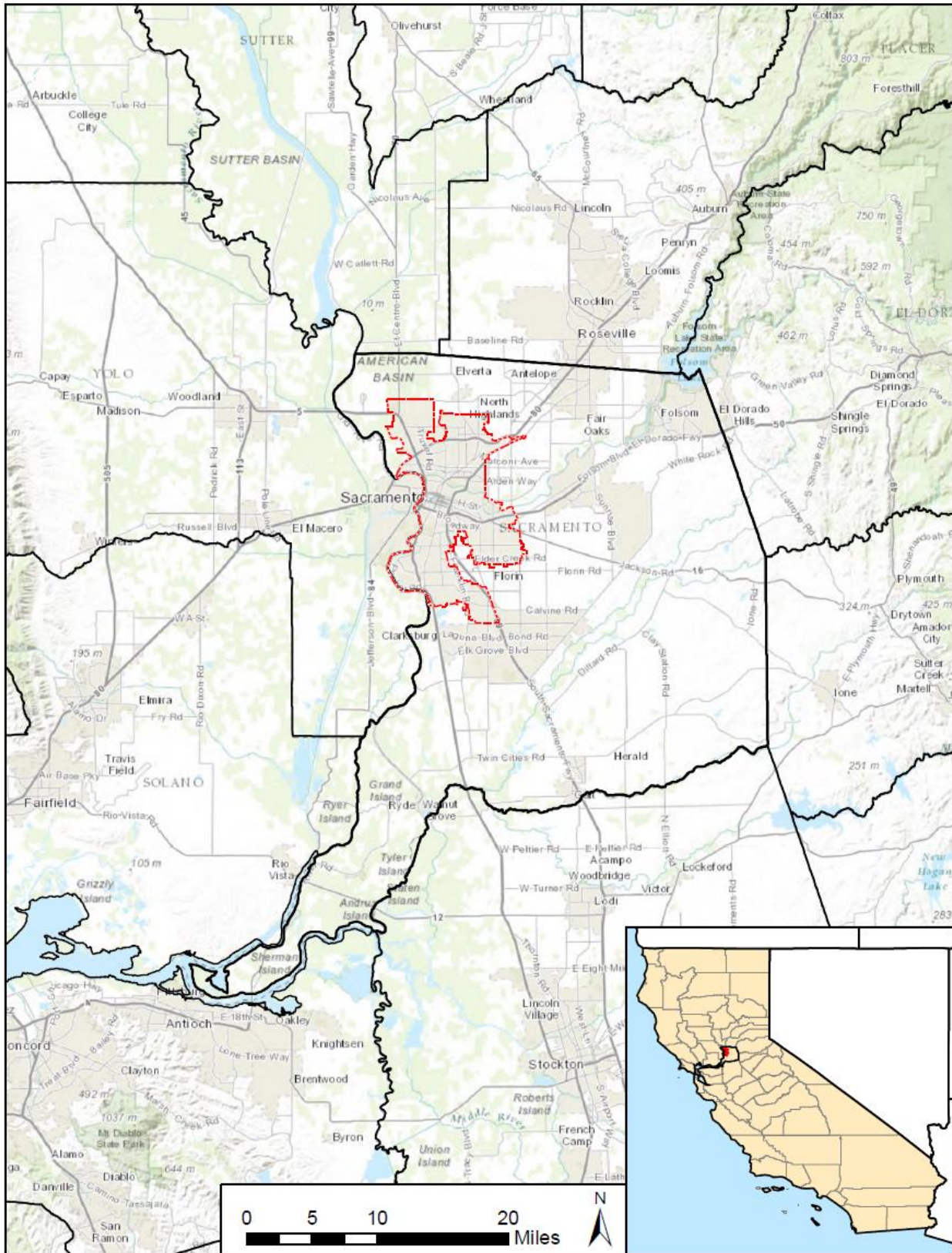
The City of Sacramento (City) is located in the heart of California's Central Valley at the confluence of the Sacramento and American rivers (see Figure 1.1). The Central Valley is a flat alluvial plain approximately 50 miles wide and 400 miles long in the central portion of California. The northern part is the Sacramento Valley drained by the Sacramento River, and the southern part is the San Joaquin Valley drained by the San Joaquin River. It is surrounded by the Sierra Nevada Mountains to the east, the Tehachapi Mountains to the south, Coastal Range to the west, and Cascade Range to the north. The topography of the area is relatively flat. There is a gradual slope rising from elevations as low as sea level in the southwestern portion of the Valley up to approximately 75 feet above sea level in the northeastern portion.

Sacramento is the cultural and economic center of its six-county metropolitan area (El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba counties) and the largest city in the Central Valley. The regional location of Sacramento is roughly halfway between San Francisco to the west and Lake Tahoe to the east. Sacramento covers a total area of approximately 99 square miles and is the seventh most populous city in California with a 2010 Census Bureau population of 466,488. Sacramento has a Mediterranean climate that is characterized by mild winters and dry, hot summers. Rain typically falls between November and March, with the rainy season tapering off almost completely by the end of April. Average daily high temperatures range from the 50s in December and January to the 90s in July (with many days of over 100° Fahrenheit).

The City, like other urban areas, faces risks to life and property from many natural and man-made hazards, including: fire, earthquake, terrorism, toxic spills, wind, drought, wildfire, and flood. Most notably, of all these risks, flooding poses the greatest threat to the residents of Sacramento.

Given the City's high flood risk and vulnerability, this Comprehensive Flood Management Plan (CFMP) is being developed and implemented by City government to guide the City's flood risk reduction and mitigation efforts. This CFMP, initiated by the City's Department of Utilities (DOU), will serve as the City's strategic plan to reduce flood risk over the next five years (2016-2021).

Figure 1.1. City of Sacramento Location



1.1.1 Relation to the City of Sacramento 2035 General Plan

It is anticipated that by the year 2035, Sacramento will have added 168,000 individuals; 86,000 jobs; and 68,000 residential units. The City has historically relied on Greenfield development to meet the housing, retail, and service needs generated by growth. The City's 2035 General Plan, adopted in March 2015, takes a different approach and focuses growth inward, encouraging infill development.

The 2035 General Plan also reflects the City's commitment to the protection of life and property from the risks of natural and man-made hazards. This commitment is based on the premise that a safe environment enhances residents' quality of life, contributes to a city's livability, and is important for attracting and retaining businesses needed to sustain a thriving economy. Flood management is primarily referenced in the Resource Constraints Element of the General Plan, which addresses interagency coordination, funding for 200-year flood protection, maintenance of facilities, levee setbacks, and new development.

Additional flood-related policies in the 2035 General Plan address response and disaster preparedness for potential emergencies in the Public Health and Safety Element and the Mobility Element. The Utilities Element calls for the implementation of master planning programs, including identifying facility and infrastructure needs for flood management.

The 2035 General Plan was updated in March 2015 to include policies and maps to address flood risks and higher standards for flood protection. Policies proposed include levee requirements, new development evaluations, and flood management planning efforts, all resulting in a minimum flood protection standard of a 200-year event.

1.2 Understanding Flood Risk

Flooding is the rising and overflowing of a body of water onto normally dry land. Floods are among the most costly natural disasters in terms of human hardship and economic loss nationwide. Floods can cause substantial damage to structures, landscapes, and utilities and create significant life safety issues.

The City of Sacramento is susceptible to various types of flood events: riverine, flash, and localized stormwater flooding; and levee and dam failure flooding. Regardless of the type of flood, the cause is most often the result of severe weather patterns and excessive rainfall, either in the flood area or upstream reach. Flooding is the most significant natural hazard that the City faces.

1.2.1 Flood Risk

As measured by the risk of flooding and the value of at-risk assets in the floodplain, the City currently has the greatest flood risk in the nation. The definition of flood risk can be stated as:

$$\text{Flood Risk} = \text{Probability of Flood} \times \text{Consequences}$$

Therefore, effective flood risk reduction works at reducing both the probability *and* the consequences of flood. Flood risk reduction can be accomplished through implementation of a range of structural (through levee improvements and maintenance, internal drainage improvement, etc.) and non-structural tools (e.g., land use planning, public outreach and preparedness activities, etc.).

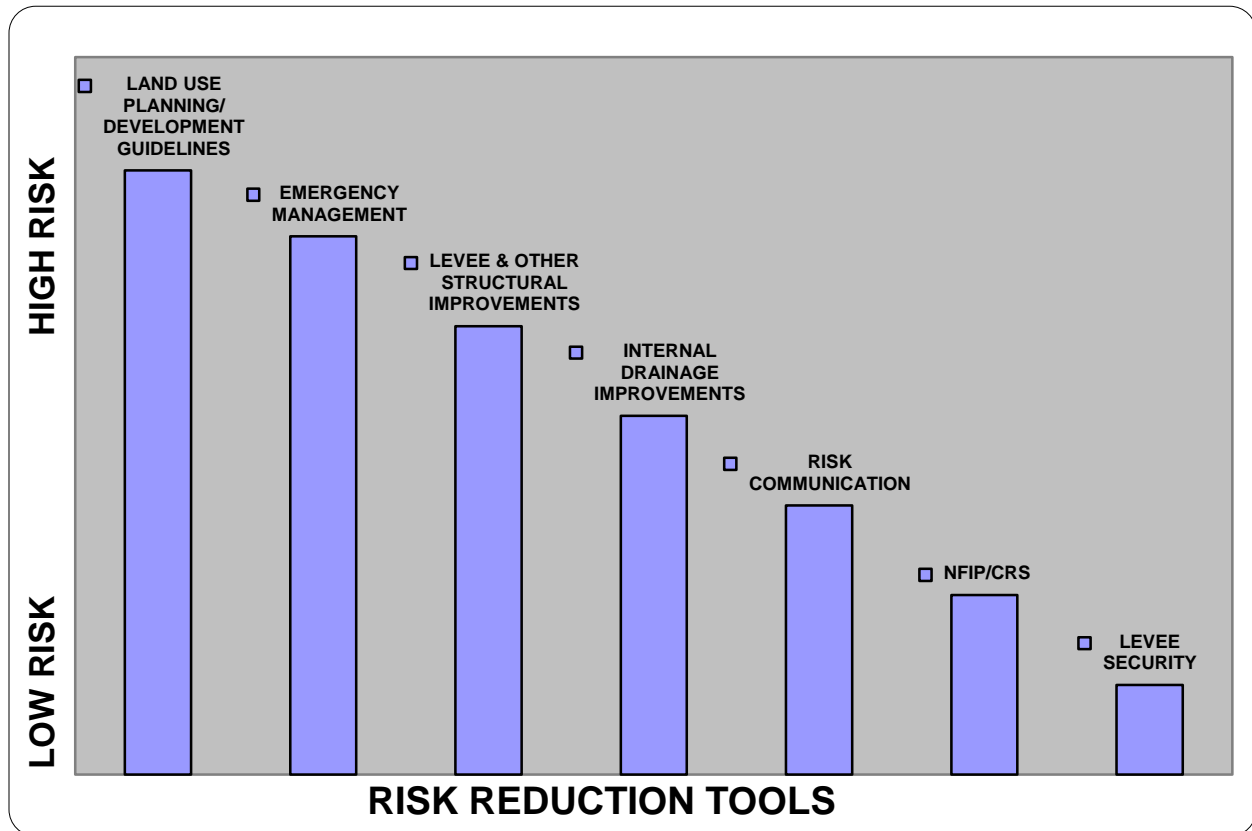
There is often a temptation to focus all risk reduction activities and resources on structural protection (e.g., levees, dams, flood gates, etc.) as over 1,100 miles of levees protect more than two-thirds of the City. However, since levees can be overtopped or fail due to a variety of circumstances, flood risk cannot be completely eliminated by structural flood control projects alone. While the City continues to partner with others such as the US Army Corps of Engineers (USACE) and the Sacramento Area Flood Control Agency (SAFCA) on levee improvements and other structural projects, further risk reduction within the City can be achieved through other, non-structural measures. Thus, flood risk reduction is best achieved by employing a suite of risk reduction tools, with each one adding to the overall reduction in flood risk.

1.2.2 The Seven Risk Reduction Tools

Figure 1.2 shows seven risk reduction tools utilized by the City to reduce flood risk:

- Land Use Planning and Development Guidelines
- Emergency Management
- Levee and Other Structural Improvements
- Internal Drainage Improvements
- Risk Communication (Program for Public Information)
- National Flood Insurance Program (NFIP)/Community Rating System (CRS)
- Levee Security

Figure 1.2. Flood Risk Reduction Tools



Source: DOU 2016

For each of the seven risk reduction tools, the City has identified a number of critical questions related to flood risk reduction:

1. Land Use Planning and Development Guidelines:

- Since flood risk reduction begins with planning, what kind of development will the City allow in areas protected by levees?
- How will the City plan this development?
- What kind of buffer will be required adjacent to levees?
- What special restrictions or requirements will the City place on development in areas protected by levees?
- What ordinances need to be drafted or modified?
- What does the City need to do to ensure that codes and ordinances are implemented and followed?

2. Emergency Management:

- How can the City assist its citizens in preparing for, responding to (including possible evacuations), and recovering from a serious flood event?
- What does the City need to do to be prepared to respond successfully and recover quickly from a serious flood event?
- How best can the City define and identify critical facilities and include them in the emergency strategy?

3. Levees and Other Structural Improvements:

- How will the City work with Sacramento Area Flood Control Agency (SAFCA) and other local, state and federal agencies to ensure that the flood control system protecting our citizens is properly operated and maintained?
- How will these agencies work together to make sure that improvements to the system are continually being made?

4. Internal Drainage Improvements:

- What will the City do over the next five years to reduce flood risk through effective operation and maintenance of the City's internal storm drain system?
- How will the City make improvements to the system?

5. Risk Communication (Program for Public Information):

- What does the City need to do to effectively communicate flood risk to the citizens so that they are motivated to take all necessary steps and use all available tools to reduce their flood risk?
- How can staff effectively communicate risk to the City Manager and City Council so that they will fully support the implementation of this CFMP?

6. National Flood Insurance Program (NFIP)/Community Rating System (CRS):

- What does the City need to do to maximize the flood risk reduction offered by these federal programs?
- How do we get more residents to take advantage low cost flood insurance?
- How can the City achieve the lowest level possible rating in the CRS program?

7. Levee Security:

- What steps is the City taking to protect urban and urbanizing area levee systems from acts of terrorism and other malicious or negligent acts?
- Who is responsible for managing security planning efforts and establishing a chain of command for emergency operations?

-
- What vulnerabilities are being addressed with network detection, deterrence, physical security, and intrusion interdiction during high threat periods?

1.3 CFMP Purpose and Overview

The City adopted its first CFMP in 1996, but this initial flood management plan was only partially implemented, and many of its components are outdated and in need of revision. By necessity, the focus of this plan is more educational than strategic. Future CFMPs will be more strategic in nature.

1.3.1 2016-2021 CFMP: Plan Purpose

This City of Sacramento CFMP establishes a strategic, comprehensive management approach to reducing flood risk through the implementation of seven risk reduction tools utilized by the City. It is the intent of this CFMP to communicate these tools to City staff, the community, and other key stakeholders to better facilitate an integrated, unified approach by the City to flood risk reduction.

This CFMP will guide the City's flood risk reduction and mitigation efforts from the current year (2016) through 2021. As a comprehensive management document, the plan includes a detailed description of each risk reduction tool and includes implementation strategies with goals, schedules, specified responsibilities, and accountability for City departments, and potential funding sources (where appropriate). While both City government officials and Sacramento residents must understand that flood risk cannot be totally eliminated, the CFMP will guide the City's ongoing efforts to reduce the overall flood risk to the community. The intent of this CFMP is not to quantify the flood risk reduction specific to each of the tools, but to demonstrate that by using all of the tools, flood risk can be reduced for the City.

1.3.2 2016-2021 CFMP: Plan Overview

This CFMP provides an overview of flood history in Sacramento and addresses how, using a number of flood risk reduction tools, the City proposes to: (1) reduce the frequency of damaging floods; (2) respond to future flood disasters through emergency management activities; and (3) minimize risk from flooding through adherence to land use planning and development guidelines, improvement of levees and other structures, and promotion of public education and awareness that among other things, encourages residents to purchase flood insurance.

Specifically, this plan document outlines how the City will utilize all seven risk reduction tools and associated implementation strategies, each of which are discussed in detail in subsequent chapters of the plan. This 2016-2021 CFMP is organized into eight chapters as described below:

Chapter 1: Introduction

Chapter 1 provides an introduction to this CFMP update which includes:

- Background
- Relation to the City's 2035 General Plan
- Understanding Flood Risk and Risk Reduction Tools
- CFMP Purpose and Overview
- Staff Roles and Responsibilities
- CFMP Update Process

Chapter 2: Historical Perspective

This Chapter provides a historical perspective of flooding in the City and surrounding area. A summary of past flood efforts is provided. Current conditions are also outlined.

Chapters 3-8: The Seven Risk Reduction Tools

Chapters 3 through 9 in the CFMP each discuss one of the seven risk-reduction tools and all include: 1) a brief Introduction and Background of the chapter's contents and the risk reduction tool being discussed; 2) the Current Implementation Status of the tool and how it is being used to reduce flood risk today; and 3) Implementation Strategies and Actions Items for 2016-2021 and beyond, which outline the action items identified for implementation to reduce flood risk in the City of Sacramento as part of this CFMP.

The implementation strategies and action items for each risk reduction tool also includes an implementation schedule. The implementation schedule is broken down by three implementation timeframes: short term (1-3 years), mid-term (3-5 years), and long term (greater than 5 years). The chapters detailing the seven risk reduction tools are:

- Chapter 3: Land Use Planning and Development Guidelines
- Chapter 4: Emergency Management
- Chapter 5: Levee and other Structural Improvements
- Chapter 6: Internal Drainage Improvements
- Chapter 7: Risk Communication/Program for Public Information (PPI)
- Chapter 8: NFIP/CRS
- Chapter 9: Levee Security

Appendix A: Summary Implementation Plan

A Summary Implementation Plan organized by risk reduction tool is included in Appendix A. This includes a summary table that details a list of implementation strategies, responsible parties, potential funding, and implementation schedule. Complete implementation action items for each risk reduction tool from each chapter are also included in this Appendix.

Appendix B: Risk Communication (PPI) Planning Process Documentation

Appendix B includes documentation supporting the planning process as part of the PPI. PPI meeting invitations, sign-in sheets, and agendas are included here.

Appendix C: Rescue and Evacuation Area Maps

Appendix C includes the detailed Rescue and Evacuation Maps that are used for development purposes and support Chapter 3 Land Use Planning and Development Chapter.

Appendix D: Repetitive Loss Area Analysis

The Repetitive Loss Area Analysis (RLAA) incorporates requirements for repetitive loss properties from Section 510 of the 2013 *CRS Coordinator's Manual*.

Appendix E: Procedures for Flood Response Projects

Appendix E includes flood response outreach projects that have been developed in advance to allow for quick implementation during and after a flood event.

City Staff Department Roles and Responsibilities

The 2016-2021 CFMP is a city-wide document that affects most City departments and many City staff. The departments responsible for its implementation include:

- DOU, Field Services Division
- DOU, Engineering Services, Floodplain Management
- DOU, Security and Emergency Preparedness
- City Office of Emergency Services
- Community Development Department (CDD), Long Range and Current Planning
- Police and Fire Departments

In order for this 2016-2021 CFMP to be implemented effectively, input and consensus will be needed from all responsible City departments. In addition, one City staff position will be identified as being ultimately responsible for overall plan implementation and reporting. The head of the Floodplain Management Section, housed in the DOU, will assume that position, and he or she will be responsible for holding all departments involved with the CFMP accountable for their multiple implementation tasks and timeframes.

1.3.3 CFMP Update Process

Once adopted, the City of Sacramento will be responsible for CFMP implementation and maintenance. The status of implementation actions identified in this CFMP will be updated on an annual basis as part of the Annual Progress Report prepared in accordance with the

implementation requirements of the Sacramento County Local Hazard Mitigation Plan (LHMP) Update, of which the City is a primary partner and participating jurisdiction and as also required by the NFIP's CRS program. The update schedule for this CFMP is aligned with future five-year updates of the LHMP. Thus, this CFMP will be formally reviewed and revised as a strategic plan every five years.

2 HISTORICAL PERSPECTIVE

2.1 Introduction and Background

Flooding and the threat of a flood emergency have historically been linked to the Sacramento area and the Central Valley. The City has always been susceptible to major flood events because of its location at the confluence of two great waterways: the Sacramento and American rivers. The City has been flooded periodically during major storms that traditionally occur in December, January, and February.

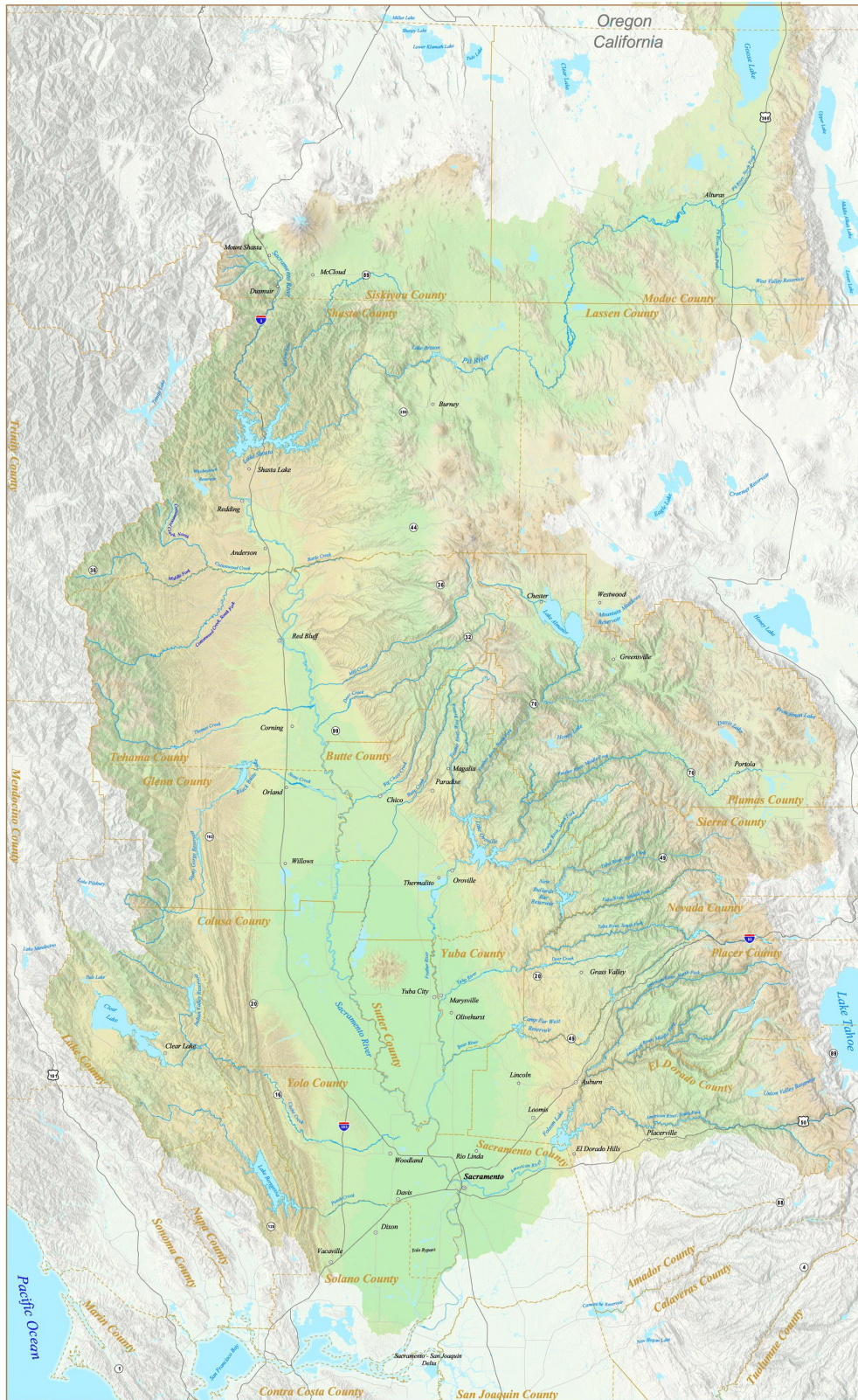
In the Sierra Nevada Mountains, small creeks and high streams are fed by underground springs, storm run-off, and melting snow. Descending from the upper watershed, these creeks and streams form large rivers such as the Sacramento, American, Feather, Yuba, San Joaquin, Mokelumne, and Cosumnes. These waterways are characterized by: (1) small river beds conveying normal flow from the mountains; and (2) wide overbank floodplains carrying flood flows caused by heavy mountain rainfall. The Sacramento River Watershed, which includes the American River, encompasses some 27,000 square miles and drains most of Northern California (see Figure 2.1).

In the City of Sacramento, much of the flood damage occurs in the floodplains of the Sacramento River and the American River. Six small tributaries of the Sacramento River pass through and provide drainage for the City of Sacramento. These tributaries are Dry Creek, Magpie Creek, and Arcade Creek in the northern portion of the City (north of the American River), and Morrison Creek, Elder Creek, Florin Creek, Unionhouse Creek, and Laguna Creek in the southern portion of the City (south of the American River). Additional natural drainages within the City include Chicken Ranch and Strong Ranch sloughs, and Rio Linda Creek. Man-made drainage canals that provide drainage for a large portion of the urbanized area that is not served by the City's combined sewer system or the storm drainage collection system include the Natomas East Main Drain Canal and the East, West, and Main Drainage canals. These waterways and drainages are discussed in greater detail in Chapter 5 and 6.

2.1.1 Growth, Development, and Flooding

By the 1840s, settlers slowly began to move westward across the Great Plains from crowded cities in the eastern United States. Many wagon trains of Americans looking for fresh land to farm and new homes in California came through John Sutter's Fort near Sacramento. However, the boom to growth and development in the Central Valley really began with the discovery of gold in 1849 at Sutter's Mill, just east of Sacramento in the Sierra foothills.

Figure 2.1. Sacramento River Watershed



Source: caringforourwatersheds.com, retrieved 11/14/2014

The gold mining era reached its peak several decades later, coming to a close in the late 1800s. By then, however, the dredge tailings – sands and gravels produced by hydraulic mining activity – had clogged many of the Valley’s waterways; damaged farms, fields and orchards; and exacerbated the area’s frequent flooding. In 1884, the farmers filed a lawsuit against the mine owners to make them stop dumping debris in rivers and streams. A new federal law known as the Sawyer Decision, considered by many the first environmental protection legislation, virtually outlawed destructive hydraulic mining.

At the same time, farmers who now relied on the fertile Valley soil to grow crops for themselves and for export worldwide recognized the need to devise ways of controlling the rivers from flooding their banks and destroying local houses and farms. In an independent fashion, area farmers built a piecemeal flood control system of levees, embankments, and channels to protect themselves from the frequent river inundations. However, this early patchwork of predominately levee improvements provided little protection for the larger flood events of the late 1800s.

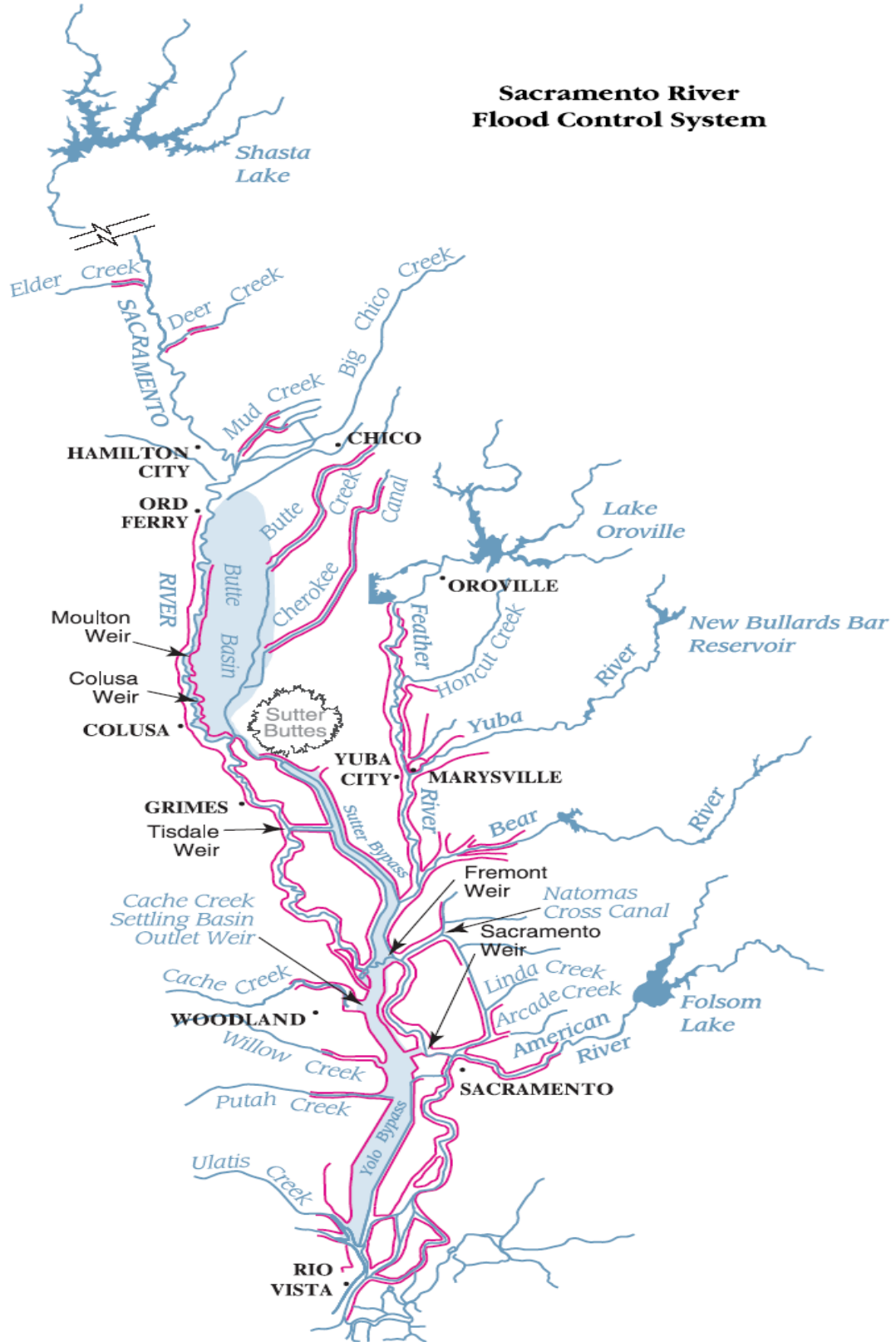
2.1.2 Official Flood Control Efforts

A coordinated effort to control flooding in the Valley did not come about until the State of California and the federal government became involved in the early 1900s. Joint efforts by the California Reclamation Board (now the California Central Valley Flood Protection Board) and the USACE culminated in 1917 with authorization from the U.S. Congress for the Sacramento River Flood Control Project (SRFCP). The original project envisioned systematic construction of levees along the river channels, paralleled by large, leveed overflow channels connected to the rivers through a series of weirs and by-pass channels. Together, the new system would safely convey flows in excess of river channel capacity to the Sacramento-San Joaquin River Delta.

The Central Valley Project, a later companion to the SRFCP, established a series of multipurpose dams and reservoirs in the Sierra foothills to augment the existing flood control system. Folsom Dam and Reservoir, a prominent feature of the project in the Sacramento area, regulates run-off for some 1,860 square miles of drainage area of the American River.

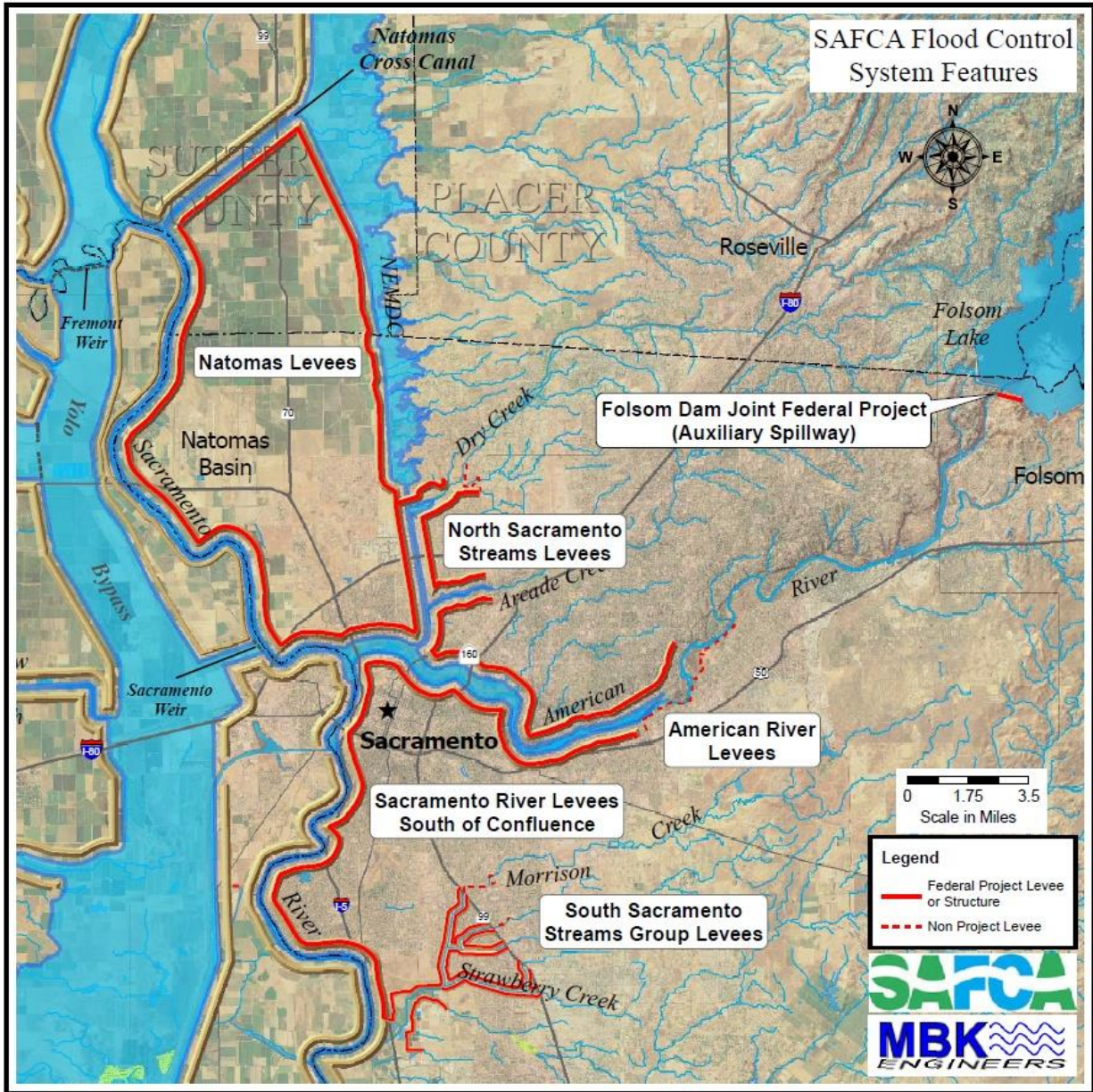
The original congressional approval for the project was followed by subsequent reauthorizations in 1928, 1937, 1941, 1944, and 1950, which increased the federal government’s involvement and expanded the Sacramento River Area Flood Control System, as it is now called. Today, the flood control system is essentially complete as originally planned. Figures 2.2 and 2.3 show the current flood control system from a regional and more local perspective. The responsibility for operating and maintaining the system locally is divided between the City of Sacramento, American River Flood Control District (ARFCD), Reclamation District 1000 (RD 1000), and Maintenance Area 9 (MA9).

Figure 2.2. Sacramento River Flood Control System Regional Perspective



Source: DWR, November 2003

Figure 2.3. Sacramento Flood Control System Local Perspective



Source: SAFCA, MBK Engineers

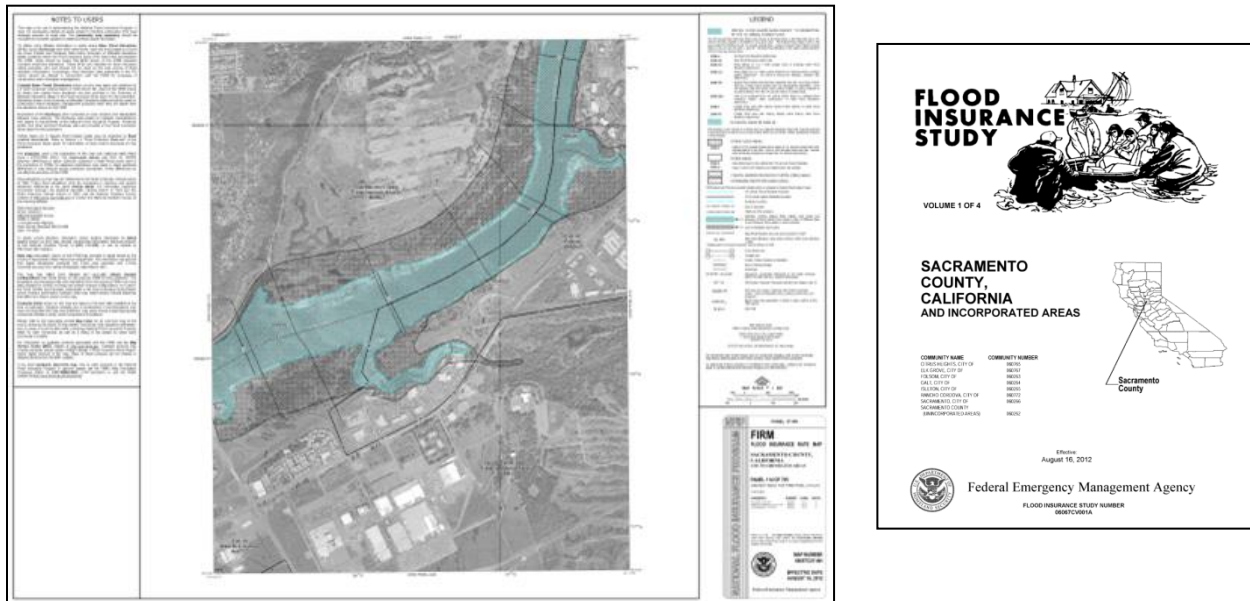
While this comprehensive flood control system of dams, levees, overflow weirs and flood bypasses plays a critical role in protecting the City from serious flood damage, it does not eliminate the flood risk entirely. Figure 7.3 in Chapter 7 illustrates potential flood depths within the City assuming no levees.

2.1.3 City of Sacramento Floodplains and Floodplain Mapping

In support of the NFIP, FEMA identifies flood hazard areas throughout the United States and its territories. Most areas of flood hazard are commonly identified on Digital Flood Insurance Rate Maps (DFIRMs).

- DFIRMs identify risk in a community. It is the official map of a community on which FEMA has delineated the SFHAs, BFEs, and the risk premium zones applicable to the community. The current DFIRMs for the City of Sacramento became effective on August 16, 2012 and June 16, 2015. Effective May 12, 2014, a large portion of property within the South Sacramento Streams Group was remapped by FEMA through a Letter of Map Revision, which is not included on the current “official” DFIRMs.
- Flood Insurance Studies (FISs) are a compilation and presentation of flood risk data for specific watercourses, lakes, and coastal flood hazard areas within a community. When a flood study is completed for the NFIP, the information and maps are assembled into an FIS. The FIS report contains detailed flood elevation data in flood profiles and data tables. The current FIS for the City of Sacramento also became effective on August 16, 2012 and June 16, 2015.

Figure 2.4. FEMA Regulatory Products



Source: FEMA

FEMA Non-Regulatory Products

FEMA began a new initiative in 2010, the Risk Mapping, Assessment, and Planning (Risk MAP) program. The program takes a watershed-based approach to flood studies, which creates a more accurate, holistic picture of the flood risk. The Risk MAP program provides communities with additional non-regulatory products (flood information and tools) to enhance their mitigation

plans and take action to better protect their citizens. The non-regulatory products include the following:

- Flood Risk Database
 - Changes Since Last FIRM (CSLF)
 - Flood Depth and Analysis Grids
 - Flood Risk Assessment
 - Areas of Mitigation Interest
- Flood Risk Report
- Flood Risk Map

Non-regulatory products have not been prepared for the City of Sacramento at this time. Flood hazard mapping information for the City of Sacramento, as defined below, is available on the City's website:

- <http://portal.cityofsacramento.org/Utilities/Education/Flood-Ready/Maps>

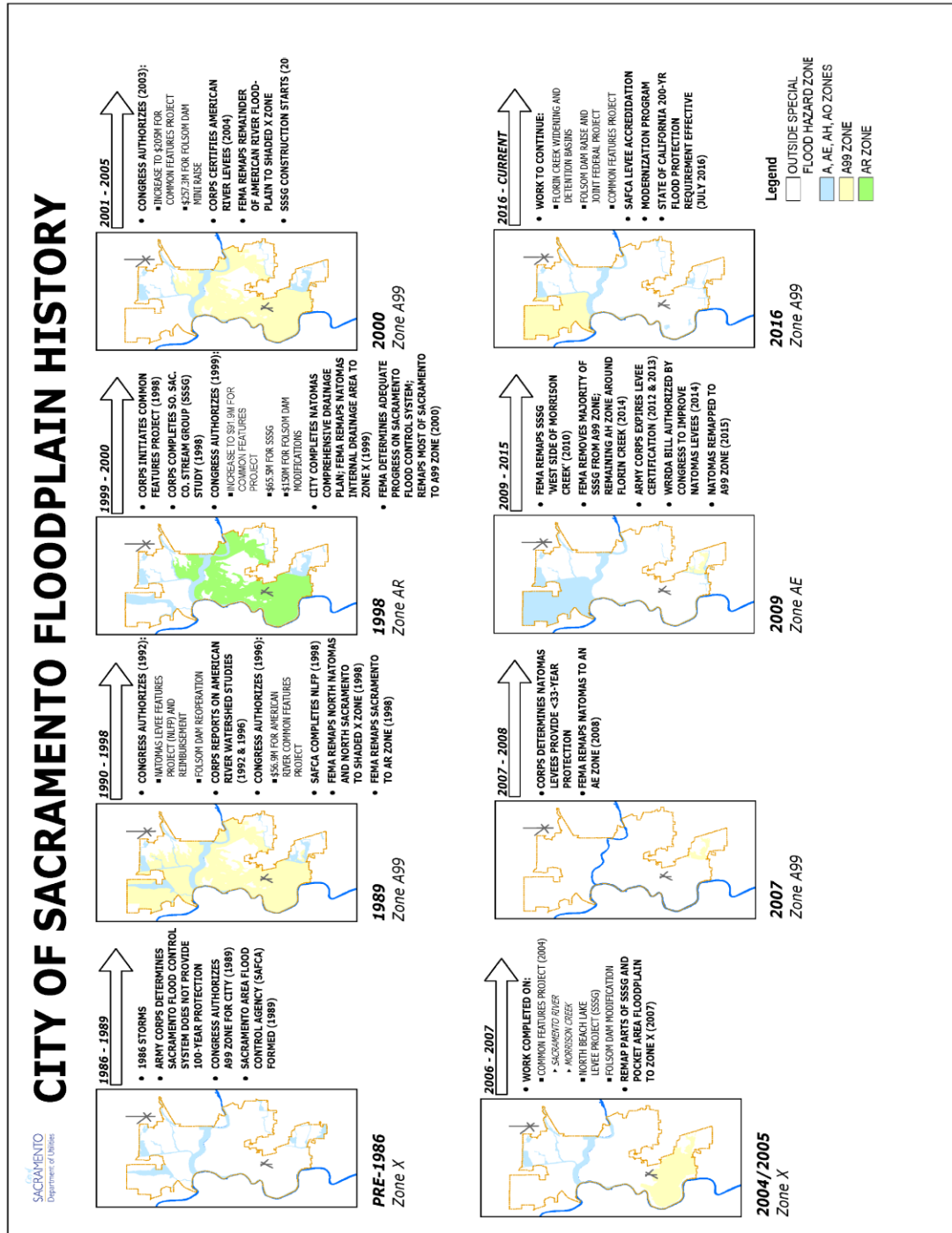
The City has had many changes to its designated floodplain since joining the NFIP, administered by Federal Emergency Management Agency (FEMA), on September 15, 1978. Figure 2.5 provides an historical perspective of the City's floodplains and Flood Insurance Rate Maps (FIRM) and Figure 2.6 provides the current Digital Flood Insurance Rate Map (DFIRM) for the City.

Based on the current FIRM for the City and analysis conducted for the Sacramento County Local Hazard Mitigation Plan Update (2011), over 32,000 parcels totaling in excess of \$10B are located in the Special Flood Hazard Area (SFHA). The SFHA, also known as the 100-year floodplain, is the area expected to be inundated from a flood that has a 1% chance of being equaled or exceeded in any given year. There are over 8,000 parcels valued at over \$868 million located in the 0.2% annual chance, or 500-year, floodplain and over 8,000 parcels valued in excess of \$14 billion that are located in an area protected by a levee from the 1% annual chance flood. There are over 118,000, 35,000, and 229,000 people that reside respectively in the 1%, 0.2% and areas protected by a levee within the City of Sacramento. A comprehensive analysis of the risk and vulnerability of the City to various flood events is included in the Sacramento County Local Hazard Mitigation Plan Update (2011).

In addition to those 1% and 0.2% annual chance floodplains regulated under the NFIP, recent California legislation resulting from Senate Bill 5 (SB 5, 2007), later amended to SB 1278, requires cities and counties within the Sacramento-San Joaquin Valley to address new flood protection standards of the 200-year (0.5% chance of being equaled or exceeded in any given year) flood when considering development. This recent legislation (SB 5 and Assembly Bill AB 162) is intended to improve local land use decisions by strengthening the link between land use and flood management. These standards, discussed in more detail in Chapter 3, will become

effective in July 2016. Figure 2.6 and 2.7 presents the 100-year and 200-year floodplains for the City of Sacramento.

Figure 2.5. City of Sacramento Floodplain History



Source: 2016 City of Sacramento

Figure 2.6. City of Sacramento Current Effective DFIRM

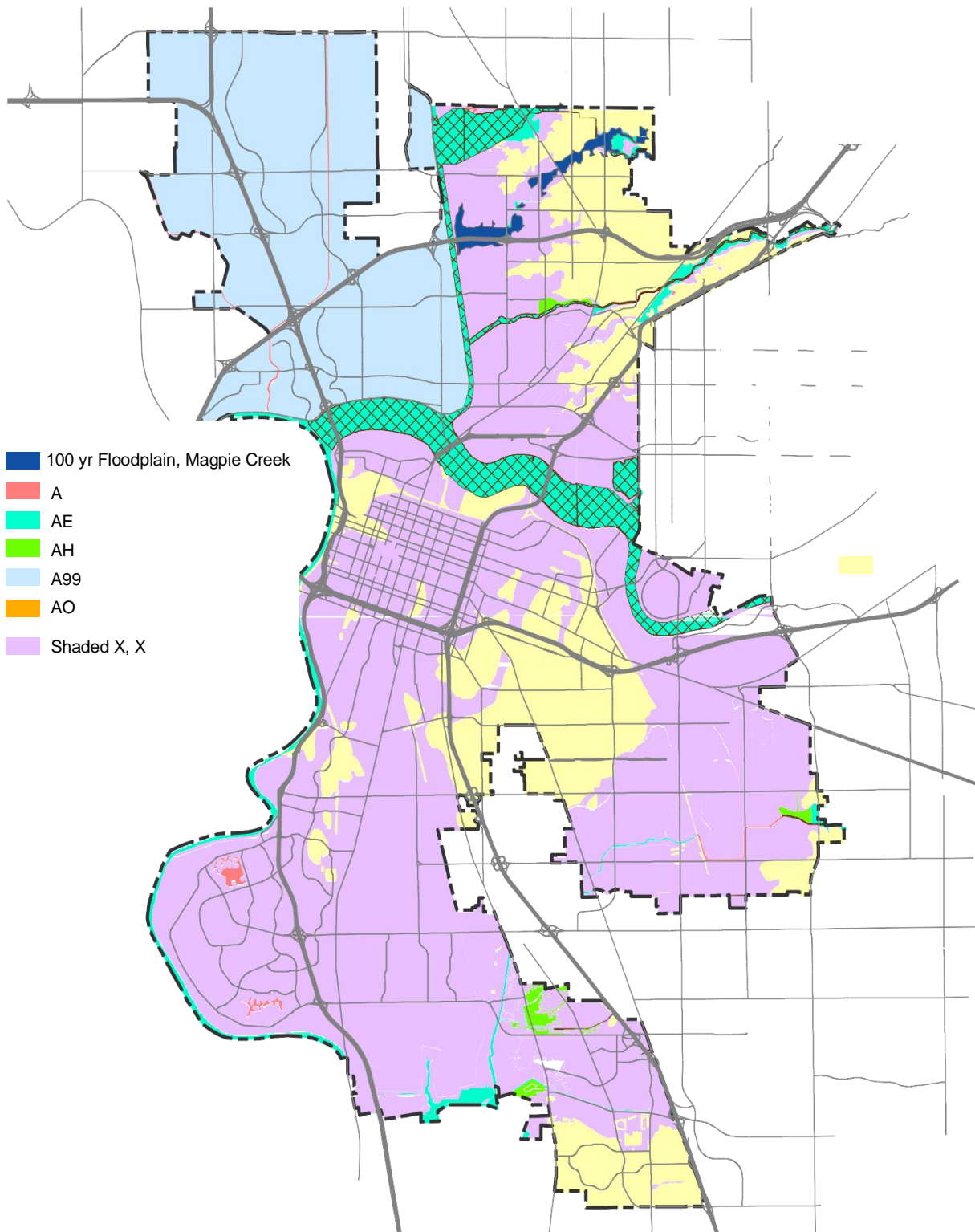
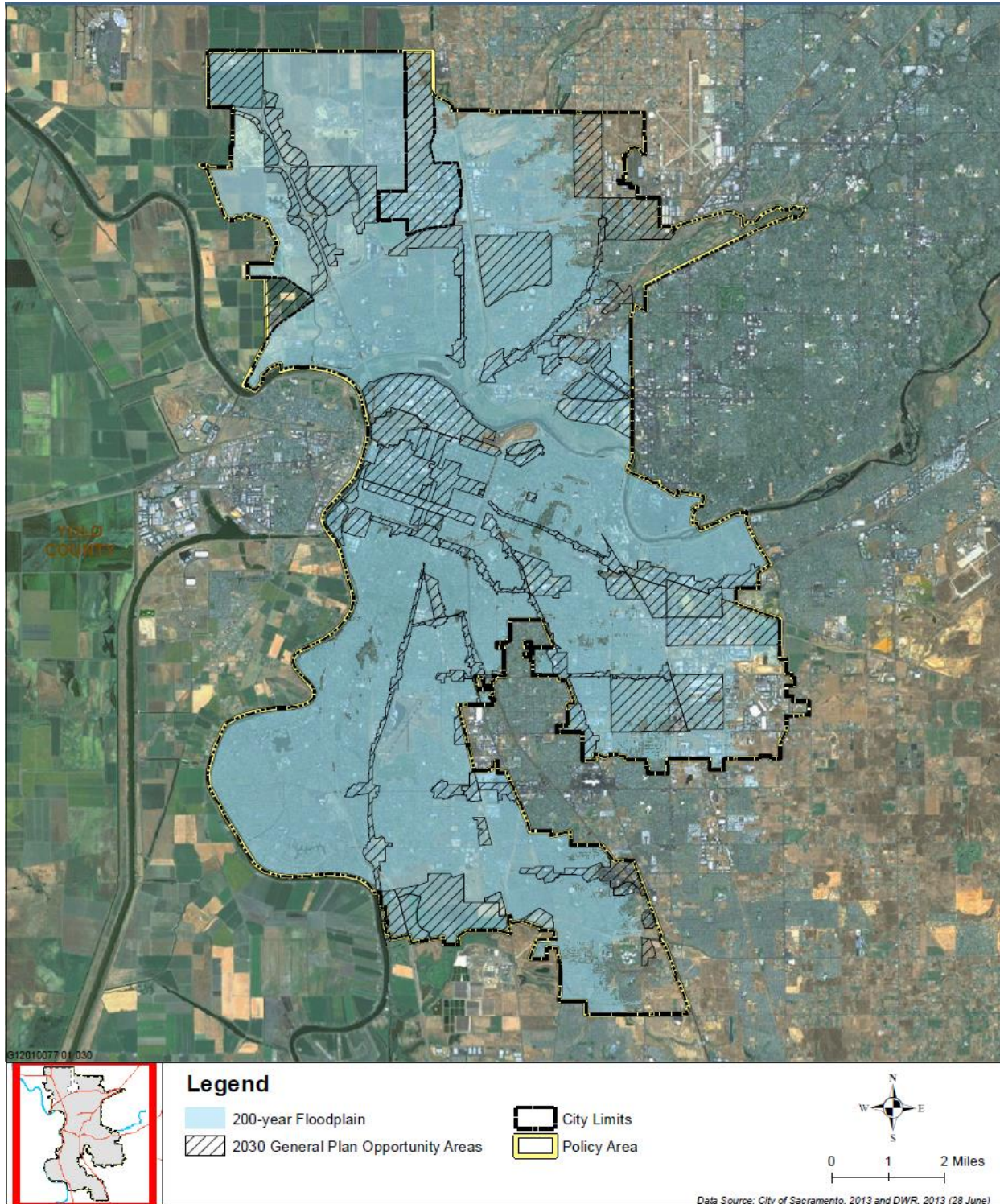


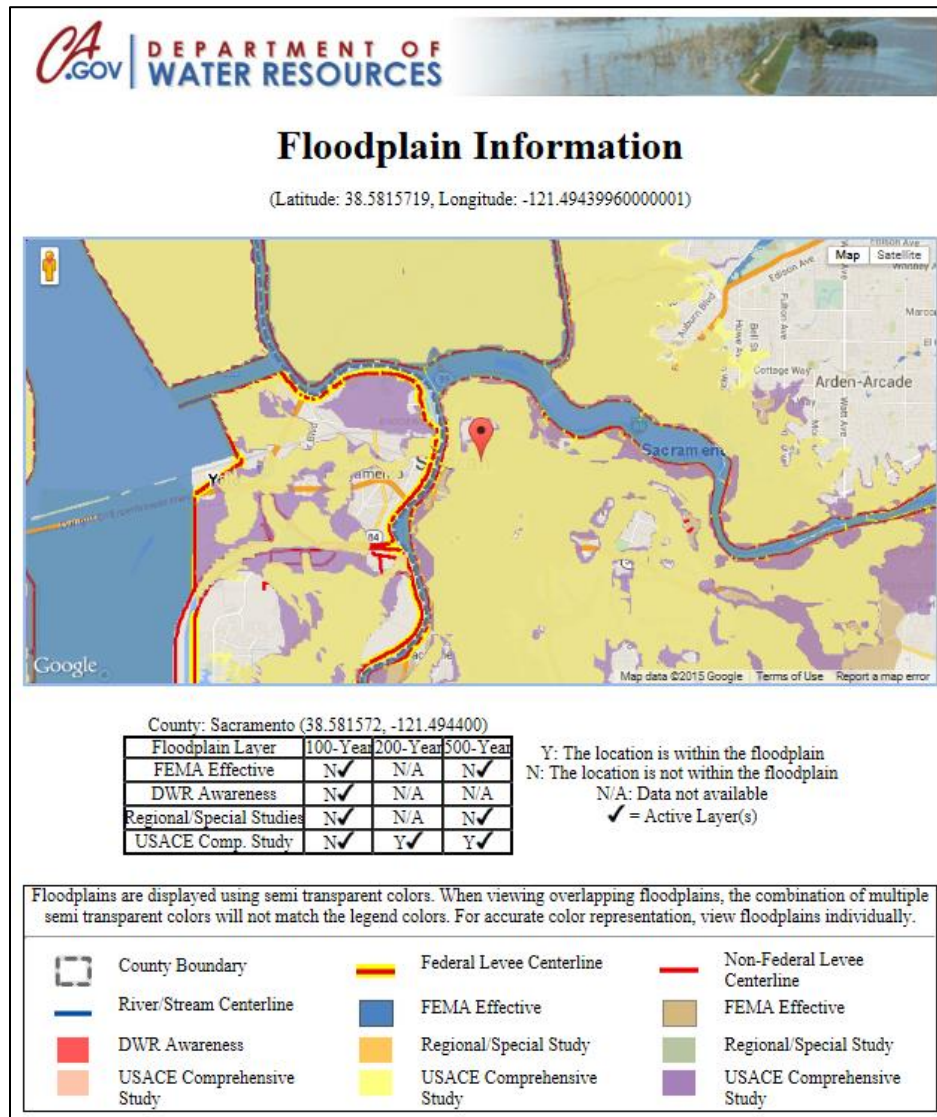
Figure 2.7. City of Sacramento 200-Year Floodplain



Source: City of Sacramento 2035 General Plan

As part of the SB 1278 initiative, the DWR developed preliminary 200-year flood maps for floodplains located within the Sacramento-San Joaquin Valley watershed. These maps were developed to better reflect the most accurate information about the flooding potential in a community and were designed to provide a better understanding of the true risk of flooding to public safety and property. These DWR Best Available Maps (BAM), have no regulatory status for floodplain development and do not replace the existing FEMA regulatory floodplain maps (i.e., FIRMs and DFIRMs) and therefore do not make any changes in federal flood insurance requirements for homes and businesses. These maps were used by the City to identify areas that warranted further 200-year studies and to help make informed floodplain management and land use decisions. These studies are discussed in more detail in Chapter 5. A sample BAM from the DWR website for the City is presented in Figure 2.8.

Figure 2.8. Sample of BAM Data for the City of Sacramento

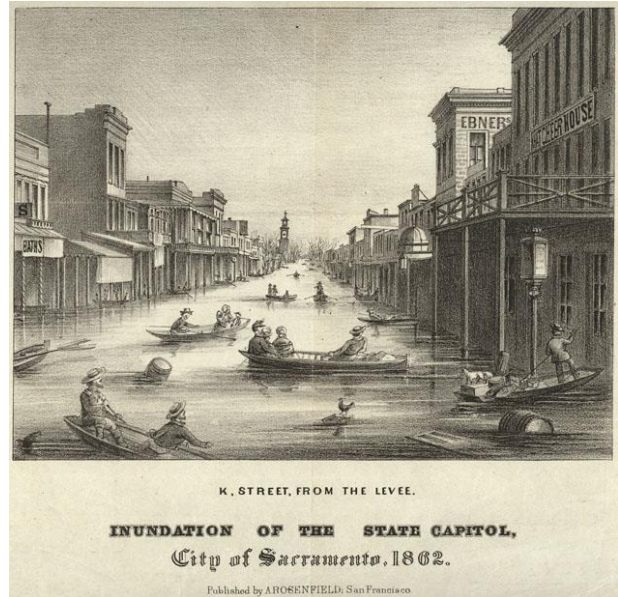


Source: <http://gis.bam.water.ca.gov/bam/>

2.2 History of Major Flooding

Historically, the City of Sacramento has always been vulnerable to flooding because of its relatively flat terrain and number of watercourses that traverse the City and surrounding County area. Flooding frequently occurred before a flood control system existed. Early residents of downtown Sacramento were forced to build on top of the original town level to avoid floods.

Flooding can occur in the City of Sacramento anytime from October through April. Flooding generally results from prolonged heavy rainfall and is characterized by high peak flows of moderate duration and by a large volume of runoff. Flooding can be more severe when antecedent rainfall has resulted in saturated ground conditions. Several areas of the City are subject to flooding by the overtopping of rivers and creeks, levee and dam failures, and the failure of urban drainage systems that cannot accommodate large volumes of water during severe rainstorms.



SAFCA has concluded that Sacramento faces an unacceptably high risk of flooding for two primary reasons:

1. The cores of today's levees are often the levees built by farmers and settlers as much as 150 years ago. Early levees were not constructed to current engineering standards, and little care was given to the suitability of foundation soils. These remnants of the past make today's levees unreliable. It was believed prior to 1986 that the levees containing the Sacramento River and the American River were of sufficient height and stability to protect the county from 100-year or greater storms. The storms that occurred in February 1986 demonstrated that those levees are not always sufficient.

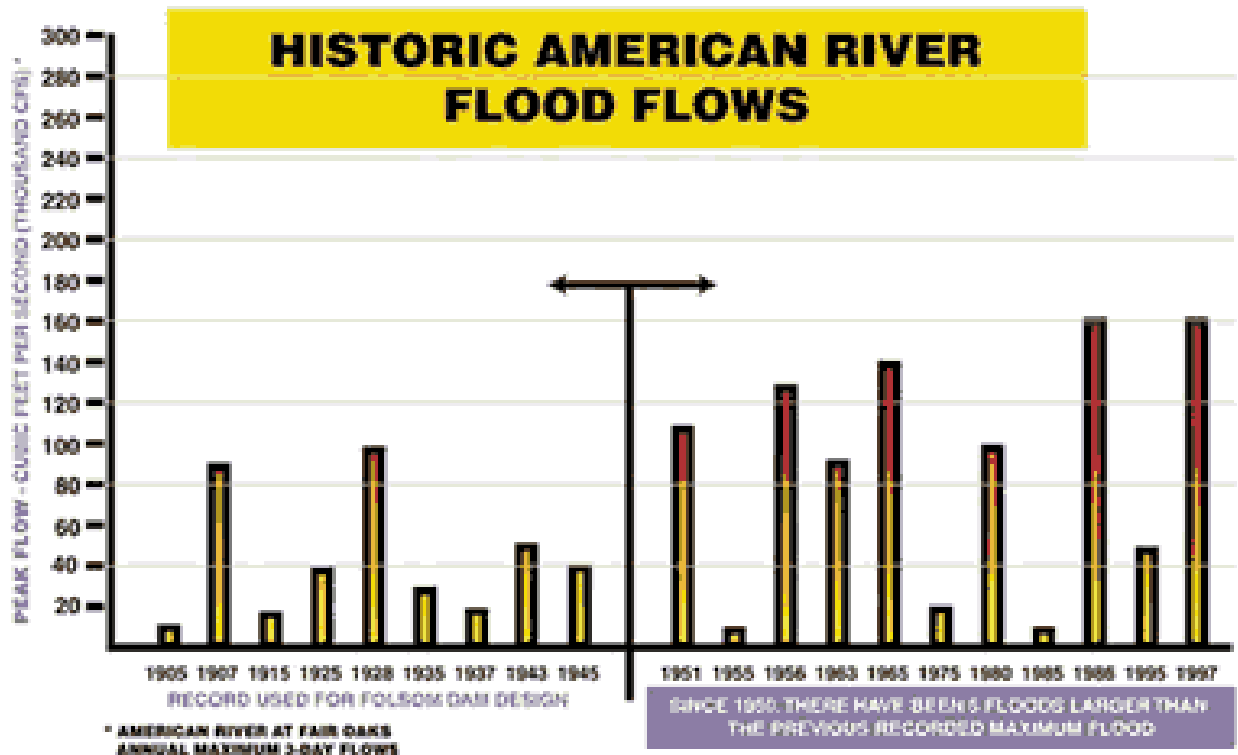
To address this issue, levee improvements to strengthen levees and to make them less susceptible to seepage-induced failures are a major portion of SAFCA's efforts to reduce the risk of flooding in Sacramento. An overview of these ongoing levee improvements is included in Chapter 5 of this CFMP.

2. The quantity of water flowing out of the Sierra Nevada Mountains during large floods appears to be increasing. Folsom Dam was designed to reduce flood flows in the American River to a flow rate that could be safely carried by downstream levees. Construction on Folsom Dam began in 1950. The first storm that occurred after

beginning the construction of Folsom Dam was larger than any occurring in the prior 45 years. Since that 1951 storm, Sacramento has experienced four more “record floods” each somewhat larger than the previous. A comparative analysis run on the two periods (1905 to 1950 and 1950 to 2000) shows that a storm with one chance in 500 of occurring in any year based on the earlier period is approximately the same size as a storm with one chance in 50 of occurring using the entire 95-year period.

The graphic below shows the relative size of large floods over the past 100 years.

Figure 2.9. Historic American River Flood Flows



Source: SAFCA

Sacramento experienced great floods in 1850, 1852, 1862, 1911, 1913, 1951, 1956, 1963, 1964, 1986, 1995, 1997, and 2005. Record breaking flood events are detailed further below:

1850 Flood - During the night of January 7, 1850, a great storm swept in from the west. Almost overnight the water posed a grave threat to life and property. Within two days of the storms beginnings, downpours that reached an inch an hour, had transformed the rivers into raging torrents. There was no levee protecting the new city which started right at the river banks. Within hours, the entire community, for a mile back from the river, was deep under rushing waters. Houses were toppled; businessmen watched as thousands of dollars in inventory was washed out their doors; and a small steamboat navigated the town's streets to deliver goods. Very few homes escaped having water on the first floors. Many were swept from their underpinnings.

Figure 2.10. Sketch of the City of Sacramento during the Flood of 1850



Source: California State Library

1852-53 Flood – In December of 1852, the Sacramento Valley was again inundated, even more deeply than they had in the high water of 1850. On March 29, 1853, the Sacramento River rose twelve feet within twenty-four hours. When the water finally broke through the levees, it was at a point south of the city, toward Sutterville. The out rush of waters on the flatlands were sweeping and violent. By April 2, 1853, the water had backed up into the city. Again the City was under water. Sacramento was a city submerged. The City was a lake, boats were in the streets and the water didn't drain away for two months. The City had levees along both the Sacramento and American Rivers. Although levees served to prevent the rivers from invading the growing city, they also served to trap storm and refuse water that would otherwise drain directly into those rivers.

1861-1862 Flood – Sacramento had enjoyed eight winters of the rivers staying in-bank. The City had prospered and became the State capital. On December 9, 1861, at 8:00 A.M., the American River suddenly went over the levee at Smith's Gardens, about 31st & B Streets, in the northeastern part of the City. The water took its old channel, rushed through the slough west of the Fort and over its banks in less than 30 minutes, the low lots between O & R Streets were overflowed two to three feet deep. The R Street levee stopped its flow, causing it to back up into the City. By 9 A.M., the entire City, south of J Street, was inundated. By 11:30 A.M., only J, K and the levee streets (I, R, and Front) were above water. Within an hour and a half, J and K Streets were under water.

1951 Record Flood – Just after ground is broken on Folsom Dam, the American River watershed experiences the first of five record storms.

Figure 2.11. January 1862 K Street Flooding



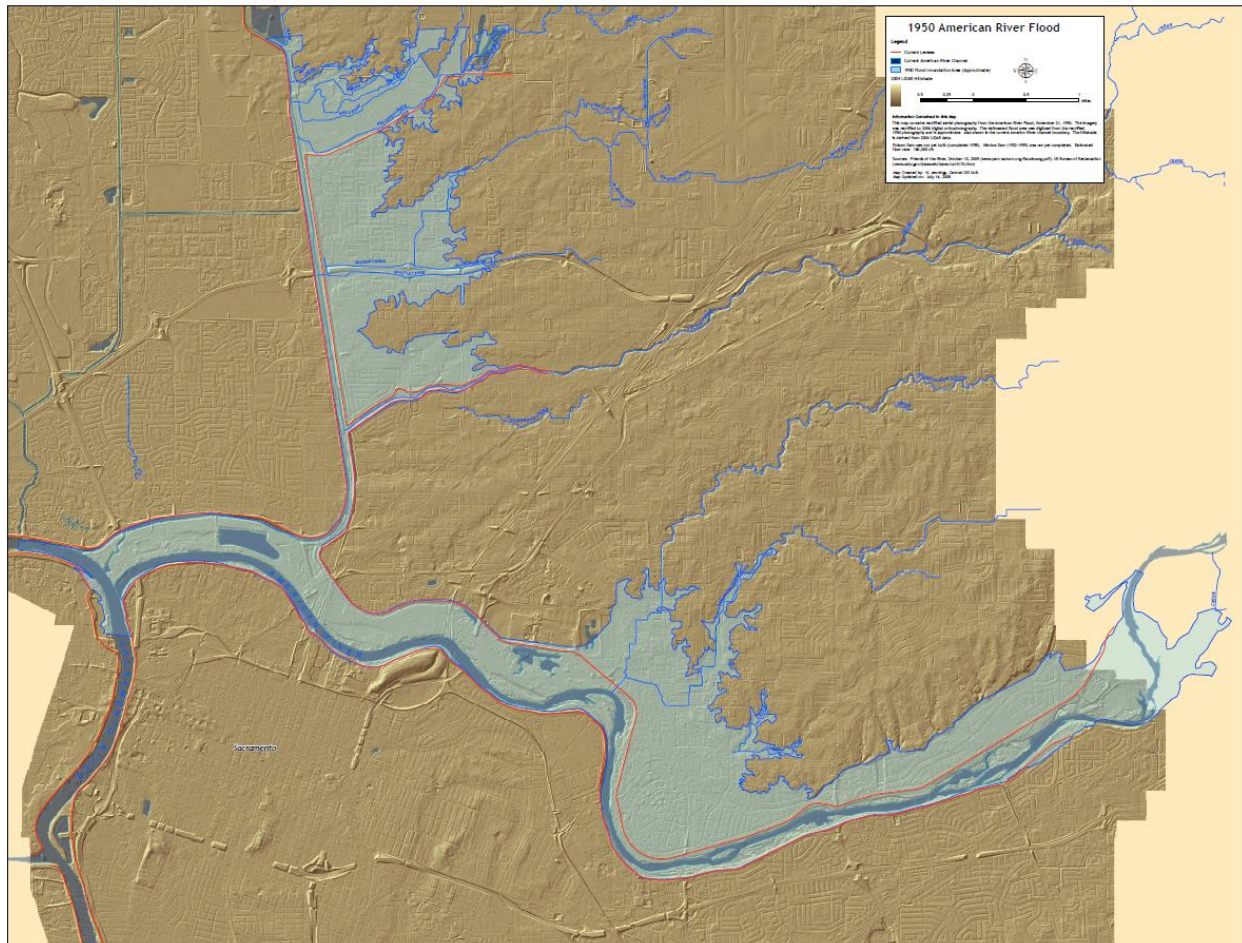
Source: Drainage and Flood Control, 152 Years.

Figure 2.12. 1950 Flood – H Street Bridge



Source: SAFCA

Figure 2.13. 1950 Flood Coverage



Source; Friends of the River, October 10, 2005 (www.parc-auburn.org/floodmang.pdf); US Bureau of Reclamation (www.usbr.gov/dataweb/dams/ca10174.htm)

1956 Record Flood – Though engineers had been predicting it would take a year to fill the nearly completed upstream Folsom Dam, the second record storm filled the dam in a week and Sacramento is saved from flooding.

1964 Record Flood – the 3rd record flood in less than 15 years. Engineers concluded that Folsom Dam was only designed to handle a 120-year storm, not a 500-year storm.

Figure 2.14. Flooding on Franklin Boulevard in 1964



Source: Drainage and Flood Control, 152 Years.

1986 Record Flood: In February 1986, major storms in northern California caused record flood flows in the American River basin. Overflows from Folsom Reservoir, together with high flows in the Sacramento River, caused water levels to rise above the safety margin on levees protecting the Sacramento area. A series of tropical storms roared through the State that month. Ten inches of rain fell in 11 days. The levee overtopped in a low spot of Strawberry Manor, flooding approximately 500 homes. Outflows from Folsom Reservoir, together with high flows in the Sacramento River, caused water levels to rise above the safety margin on levees protecting the Sacramento area. The storm brought large flood flows into Folsom Reservoir with a maximum six-day record inflow of 1.14 million acre-feet, exceeding the six-day design inflow of 987,000 acre-feet. To relieve the pressure on the dam, 115,000 cubic feet per second (cfs), the design capacity of the levees downstream, was released from the reservoir for two days. As the rain continued, officials boosted those releases to 130,000 cfs for 24 hours. Officials considered increasing releases to 150,000 cfs, but the rain let up, and disaster was averted. At that point, it was estimated by flood officials that three more hours of rainfall would have overwhelmed the system, flooding thousands of homes. Runoff in the American River quickly filled the temporary diversion dam built at the Auburn Dam site, approximately ten years earlier, causing it to burst, and sending 100,000 acre feet of water rushing into Folsom Reservoir. Folsom Dam was downgraded to about a 60-year storm. The USACE determined that a majority of the City did not have 100-year level of flood protection.

Figure 2.15. 1986 Flood – H Street Bridge



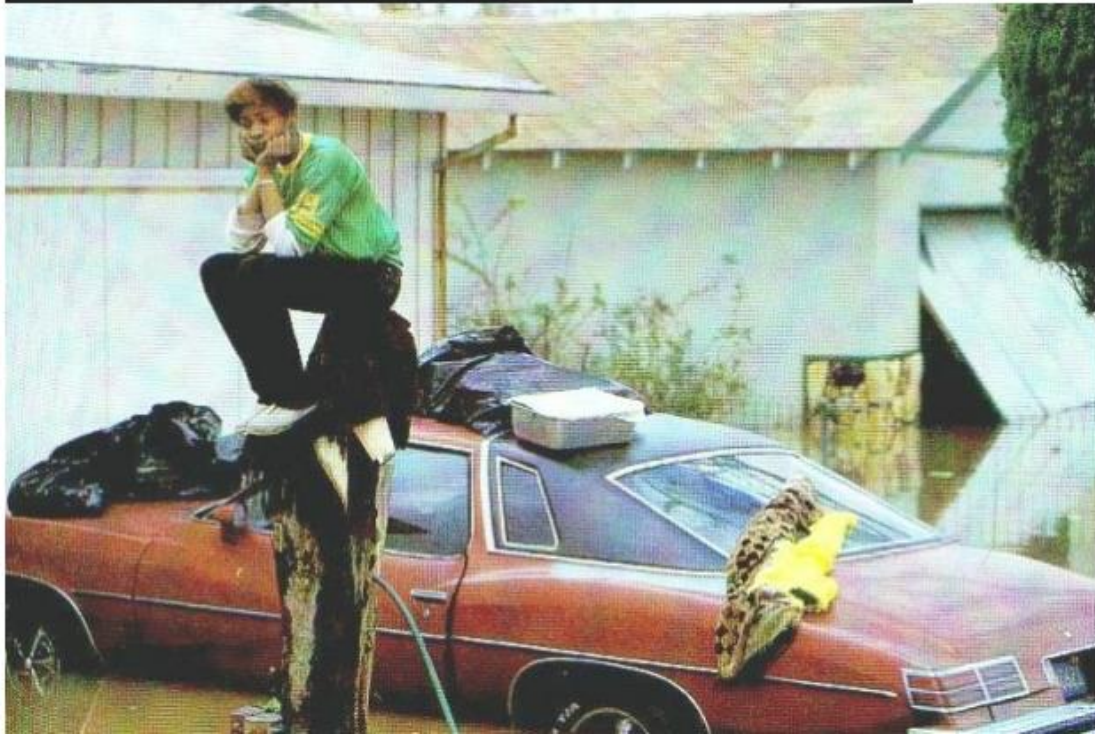
Source: SAFCA

Figure 2.16. Aerial View of 1986 Flood



Source: SAFCA

Figure 2.17. 1986 Flood



Source: SAFCA

1997 Record Flood: The fifth record flood in 46 years occurs over the New Year’s holiday. Unprecedented flows from rain and melted snow surge into the Feather and the San Joaquin. Sacramento is spared when the fury of the storm hits 40 miles north in the Feather River. Levee failures flood Olivehurst, Adboga, Wilton, Manteca, and Modesto. By the end of January 1997, 48 counties were declared disaster areas and 290 square miles of property, valued at about \$2 billion, including homes, farmlands, bridges, roads and flood management infrastructures were damaged. Nine people were killed and 120,000 people were evacuated from their homes.

Other large flood events will certainly occur in the future, leaving the City vulnerable to additional, potentially catastrophic flooding. Further localized flooding problems both in and outside of the natural floodplains are likely to continue as drainage channels are altered and confined with new development.

Figure 2.18. Tower Bridge – Jan 2003



Source: SAFCA

Figure 2.19. December 30, 2005 Pomegranate Ave along Florin Creek in south Sacramento



Source: SAFCA

3 LAND USE PLANNING AND DEVELOPMENT GUIDELINES

3.1 Introduction and Background

Land use planning is a tool used to guide the future use, or reuse, of land within a jurisdiction. Such planning helps determine where people, jobs, and structures will be located and where different types of uses will occur. Public safety and flood risk are also taken into consideration in land use planning. The City of Sacramento General Plan identifies land use in Sacramento through a range of designations that determine a site's density, floor-area ratio, and general characteristics of desired development.

Development guidelines are used to ensure that structures built within the floodplain are located and constructed so that potential flood impacts are minimized. Development guidelines apply to residential structures (i.e., single family and multifamily development) as well as non-residential structures (i.e., commercial, industrial, and office buildings; permanent material storage; and tanks). Some development guidelines can be applied to both new and existing development.

This chapter discusses the importance and relevance of land use planning and development guidelines to flood control in the Sacramento area.

3.1.1 Land Use Planning

Under the 2035 General Plan, **infill development** (i.e., that which occurs on *previously developed land*) is encouraged over **greenfield development** (i.e., that which occurs on *previously undeveloped land*), requiring the City to: (1) build more compactly; (2) redevelop underutilized property; (3) develop more intensely near transit; and (4) locate jobs closer to housing. One of infill development's key benefits is the reduced need for future development in undeveloped floodplain areas.

In addition to policies governing *which* land is developed, the 2035 General Plan also includes policies that influence *how* land is developed. For example, levee integrity is enhanced by requiring development to meet state and federal setback requirements. Other land use planning policies support the requirement that development adjacent to levees must dedicate land for the levee footprint to the City, thus preserving rivers and creeks for floodplain storage. In addition, the 2035 General Plan calls for adequate stormwater internal drainage through master planning for facilities needed to prevent 10-year-event street flooding and 100-year-event structure flooding.

3.1.2 Development Guidelines

The focus of development guidelines is twofold. Some measures are directed at protecting public safety, while others are designed to safeguard property. Development guidelines address building design, building location, and land use; they change as greater levels of flood protection are achieved. The four levels of flood protection applied to both federal and local guidelines are:

- Less than 100-year level of flood protection.
- 100-year level of flood protection.
- 200-year level of flood protection.
- Greater than 200-year level of flood protection.

Local guidelines require additional development guidelines for Evacuation and Rescue Areas.

3.2 Current Implementation Status

Both land use planning and development guidelines are implemented using the City's zoning, building, and subdivision codes. The City is currently implementing various federal, state, and local mandates for land use planning and development.

(Note: For a summary comparison of these three different levels of government requirements, see Section 3.2.4.)

3.2.1 Federal Flood Protection Measures

FEMA coordinates federal response actions for a variety of natural disasters, including floods, fires, earthquakes, or other emergency situations in the United States for which a Presidential Disaster Declaration is made. More than 50 percent of these declarations are due to flooding.

Flood protection measures relating to development guidelines focus on either saving lives or protecting property. While the supporting protective measures described below may result in higher construction costs, they are necessary to reduce potential flood damages to levels acceptable by FEMA.

- Where property is concerned, “floodproofing” is the term applied to a broad category of measures, including “any combination of structural or non-structural changes or adjustments incorporated in design, construction or alteration of individual buildings or properties that will reduce flood damages.”¹
- Floodproofing measures such as relocating or raising existing buildings are applicable to buildings already in the floodplain and often concentrate on individual structures.

¹ U.S. Army Corps of Engineers, *Flood-proofing Techniques, Program and References*, National Flood-proofing Committee, February 1993, p.3.

-
- The cost of floodproofing existing structures can be expensive if a large number of structures are involved or the structures are located in a deep floodplain. In these situations, other methods such as raising the ground level by fill or building levees often prove more cost effective.

In a typical 100-year flood zone, FEMA requires protective development guidelines be in place prior to the issuance of building permits. Information regarding these measures is provided to developers before construction begins. The primary focus of these measures is to raise the lowest floor of a dwelling above the base flood elevation (BFE) or to floodproof the structure (non-residential structures only).

In considering flood protection measures, elevating and dry floodproofing of structures and establishment of refuge areas are viable alternatives for new development. In existing development, elevating and dry floodproofing structures are neither practical nor financially feasible without grant funds. Therefore, refuge areas are the most feasible flood protection measure for existing development.

Structure Elevation

Elevating an existing structure so that damageable (non-flood resistant) portions are above expected flood waters provides one floodproofing technique. Methods of raising a structure include construction on piles or columns with no lower area enclosures except access, garage, and storage. (This is the only recommended method in areas where flooding is accompanied by currents or waves.)

- An advantage of this method over others (e.g., relocation, which is discussed below) is that no land costs are involved, and neighborhoods are left intact.
- Typically, structures are raised by jacking them up onto a new foundation or by cribbing, a method that works better on lighter wood frame buildings than on stucco or masonry, which can crack.
- Utilities and electrical systems should be located above the BFE or be floodproofed.
- If raised high enough, the structure's new lower portions may be used for storage of easily moved items. However, the structure's lower portion cannot be used for habitation or occupied during high water.

Elevated structures may be most effective in areas of the City with flood depths up to five feet. The design, however, may not be consistent with existing development, especially for infill areas. Structure elevation may also preclude disabled access per the American Disabilities Act (ADA) and California Title 24 requirements. Where elevated structures and raised foundations are neither practical nor feasible, building pads should be elevated so that the lowest floor elevation of a structure sits above the BFE.

As with most floodproofing measures, the substantial increase in construction costs presents a major drawback to elevating existing structures. FEMA provided examples of typical elevation project costs in its 1986 Design Manual for Retrofitting Flood-prone Residential Structures. The manual serves as an excellent technical reference for most floodproofing techniques and includes design details and technical notes as well as cost information.² FEMA has also developed a similar manual for non-residential structures.³ These costs would need to be significantly increased today in Sacramento, not only for present dollar values, but to reflect the higher cost of construction and permits in this region as compared with other areas of the country.

Structure Relocation

This measure involves physically relocating a structure out of the flood hazard area, either to higher ground on the same property or onto another lot. Relocation is particularly appropriate for high hazard areas and structures that would be unsafe if continually occupied. Relocation can have the added benefits of creating more open space in the floodplain for other appropriate activities and increasing the conveyance capacity of a floodway (i.e., the path of water flow).

As with structure elevation, the cost of structure relocation presents the major drawback to this measure, since the purchase of a new lot is often required. In an area such as Sacramento, this alternative is often not feasible. However, relocation may be viable in creek areas subject to localized flooding due to the limited number of structures in these locations.

Construction of Barriers/Wet and Dry Floodproofing

Barriers include traditional structures such as levees and floodwalls. These types of barriers can be built for individual structures in addition to being used on a region-wide basis, although in most instances this is impractical. Other barriers include the concept of wet and dry floodproofing of non-residential structures.

Wet and dry floodproofing methods use waterproof methods to seal portions of structures below the BFE, thereby preventing damage to the structure. Buildings are designed, along with attendant utility and sanitary facilities, so that the area of the structure below the BFE is waterproof. Building walls should be substantially impermeable to the passage of water; structural components should have the capability of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy.

- The dry floodproofing method seals a building with waterproof methods and materials up to the flood level, thereby preventing damage by not allowing water to enter the structure. Dry floodproofing generally involves placing sealant along the lower portion of the structure;

² Federal Emergency Management Agency (FEMA), *Manual for Retrofitting Flood-prone Residential Structures*, September 1986, pp. 55-60.

³ FEMA, *Flood Proofing Non-residential Structures*, May 1986

raising window openings; providing closures for doors and other openings; and raising and/or floodproofing utilities and electrical service. Costs for this measure vary widely depending on the features needed.

- The wet floodproofing method minimizes damage to a structure and its contents from water that is allowed into a building. Flood water flows through the building, which is protected from flood damage by using flood-resistant materials below the flood level and elevating items above the BFE that are subject to flood damage. For flood depth of more than three feet, this method must be coupled with design improvements to enable the structure to withstand the hydrostatic pressure.

3.2.2 State Flood Protection Measures

Senate Bills (SB) 5 and 17 and Assembly Bills (AB) 5, 70, 156, and 162 (Legislation) were signed into law in 2007 to address flood problems, direct use of bond funds, and support local land-use planning. As part of this Legislation, DWR was required to develop a Central Valley Flood Protection Plan (CVFPP). The CVFPP was adopted in 2012 and will be updated every 5 years. In 2012, SB1278 and AB1965 were enacted, revising provisions related to planning and zoning for flood protection.

The City amended the General Plan to include the data and analysis contained in the 2012 CVFPP. The zoning code must then be modified within 12 months of the General Plan to include those amendments. Although all of these amendments are not required until July 2016, the City's General Plan was amended in February 2015 and the zoning ordinance was amended in March 2016. The City will be required to make findings related to an urban level of flood protection as stipulated in California Government Code Sections 65865.5, 65962, and 66474.5, using criteria consistent with, or developed by DWR after July 2016. DWR has developed draft criteria, *Urban Level of Flood Protection* (ULOP) (November 2013).

The ULOP requires a minimum urban level of 200-year flood protection before a community can issue a building permit or approve a parcel map. This requirement affects areas in the Sacramento-San Joaquin Valley where flood depths are anticipated to exceed three feet and are in a watershed greater than 10 square miles for the 200-year flood event. If a ULOP plan is in place to reach 200-year flood protection and adequate progress is shown annually, then these requirements can be delayed until 2025. The City will be presenting this ULOP plan being currently developed by SAFCA to City Council in June 2016.

Many areas of the City that are in watersheds greater than 10 square miles and exceed three feet in depth will not be covered by a ULOP plan. The 200-year floodplain in these areas were mapped and will be utilized for development purposes.

The Legislation also requires DWR to propose updated requirements to the California Building Standards Code for adoption and approval by the California Building Standards Commission.

These requirements apply to construction in the Sacramento and San Joaquin valleys, where flood levels are anticipated to exceed three feet for a 200-year flood event.

Appendices G and K of the California Building Standards Codes were added in January 2010 by DWR with an optional adoption by local communities. Appendix G requires the minimum requirements of the NFIP, which includes anchoring structures (including fuel tanks) and gas shut-off valves. The City is in the process of adding portions of Appendix K to its floodplain ordinance. Appendix K requires accessibility to:

- Refuge and staging locations with exits (e.g., second-floor areas with windows or balconies).
- Exit locations when the way out is in an extraordinary location for persons with disabilities (e.g., a roof hatch).
- Evacuation points/routes for transport to safety.

Appendix K, in its entirety, will not be adopted by the City, but a modified version is in the process of being adopted in the City's floodplain ordinance.

3.2.3 Local Flood Protection Measures

The City has adopted the following local measures to guide development in the floodplain. These measures will be applied in compliance with, or in addition to, FEMA and state requirements. Each of the measures described in the development guidelines should comply with FEMA regulations, the City Building Code, and the California Building Standards Code.

Elevating and Floodproofing Structures

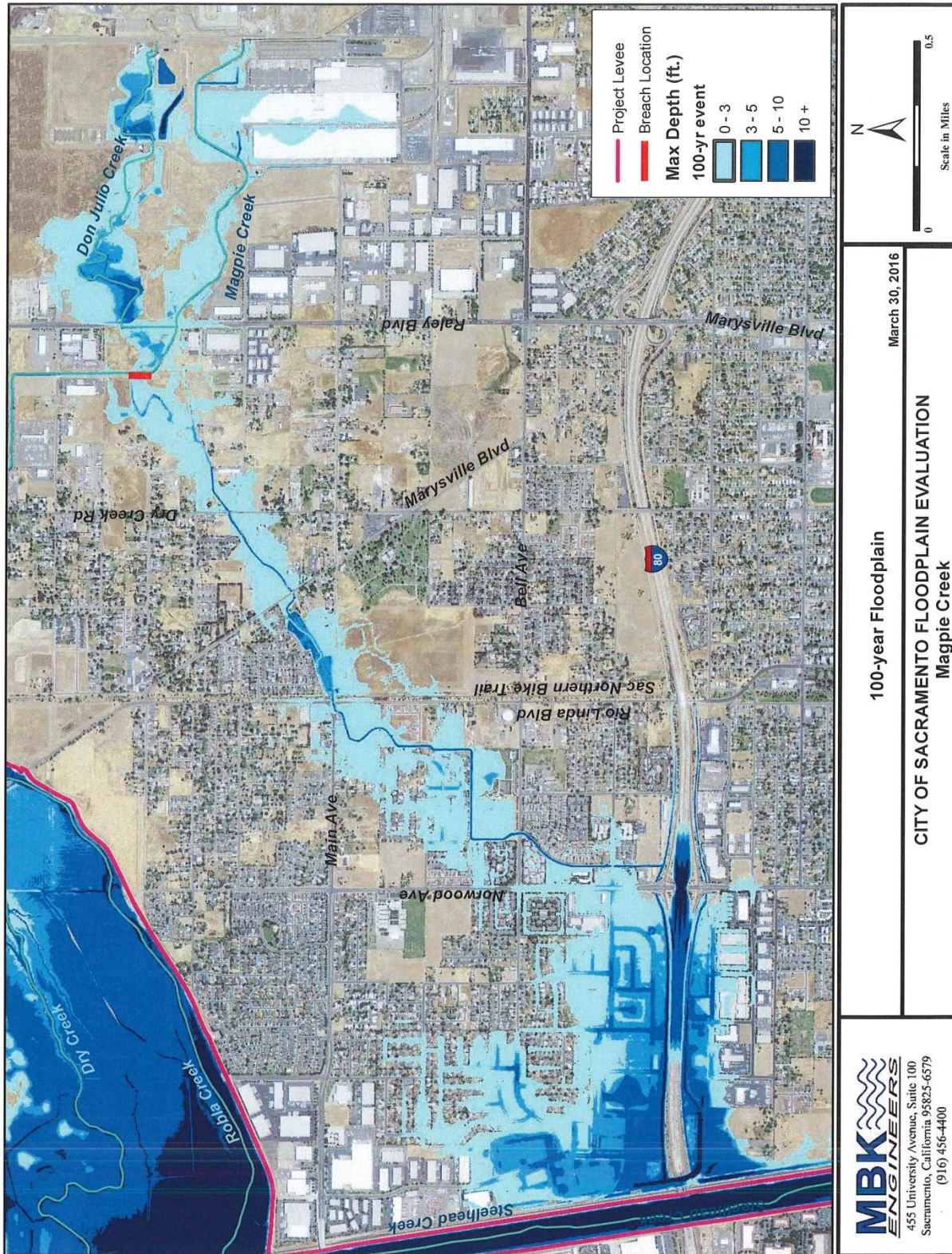
Structural and non-structural building components at or below one foot above the BFE should be flood-resistant; residential structures should be elevated one foot above the BFE. All mechanical equipment (e.g., hot water heaters, furnaces, air-conditioners, and water softeners), utilities, and drains should also be above the BFE or floodproofed. New structures should be designed and adequately anchored to prevent flotation, collapse, or lateral movement resulting from hydrodynamic and hydrostatic loads. The City's floodplain management regulations require:

- Non-conversion agreements for any proposed enclosed areas below the BFE.
- Hold Harmless Agreements for new development or substantial improvements in floodplains.
- No increase in flood levels from development.

Magpie Creek Floodplain

The City uses a local floodplain along historical Magpie Creek for new development purposes. This is the best available information for this area. Eventually this area will be mapped on the City's DFIRMs. Figure 3.1 shows the Magpie Creek floodplain.

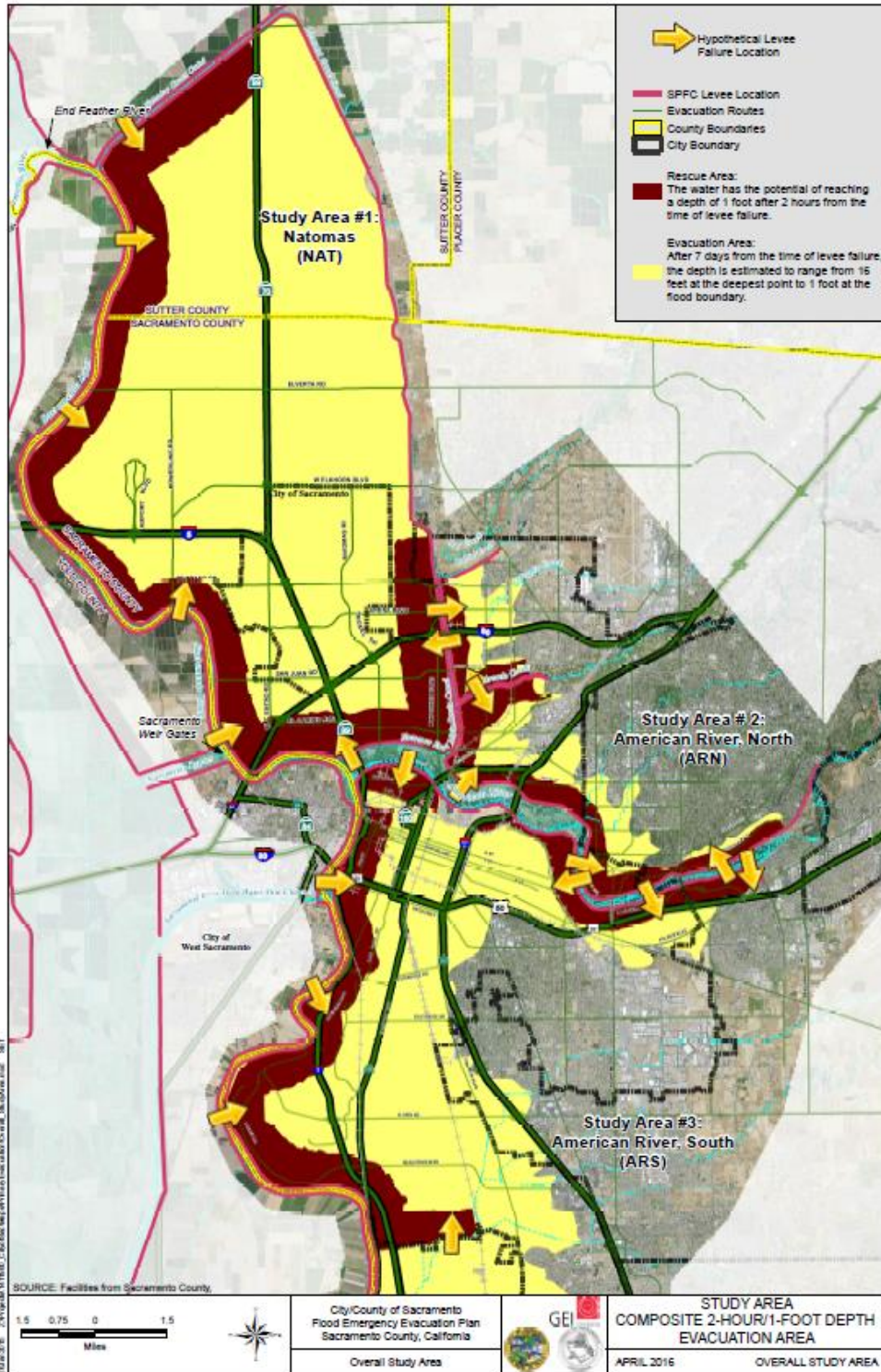
Figure 3.1. 100-year Magpie Creek Floodplain



Local Public Safety Measures

Complementing those measures that protect property, the second component of land use planning and development guidelines focuses on public safety for proposed structures in rescue and evacuation areas based on the City's Rescue and Evacuation Areas Map (Figure 3.2) The rescue areas are areas that water has the potential of reaching a depth of at least 1 foot after 2 hours from the time of levee failure, depending on the location of the failure. Evacuation areas are areas that water travels to when the City has a levee break based on modeling. See Appendix C for detailed maps of these areas.

Figure 3.2 City of Sacramento Rescue and Evacuation Areas



Source: Department of Utilities

Rescue Areas

Within the rescue areas, local public safety measures address refuge areas for the following:

- Public facilities and commercial buildings (excluding industrial occupancies) with an enclosed building area greater than 40,000 square feet;
- Residential subdivisions occupying an area greater than two acres; and
- Special Needs Facilities.

Refuge Areas

The concept of refuge areas is based on providing a temporary safe haven for residents in the event of a catastrophic flood emergency until they can be rescued. Refuge areas are not intended to provide food, clothing, or shelter against the elements. Their sole purpose is to prevent drowning and loss of life.

- Refuge areas include locations within immediate walking distance of residents or workers that are above the highest expected flood depths.
- Building roofs, accessible attics, upper story floors, high ground, and levees are all potential refuge areas.

To be effective as a refuge area, a structure must include a way to access its roof top or attic. Both external and internal ladders and stairways that have exit doors or hatches can provide such access. Building roofs or attics must also be designed or retrofitted to carry the load of many people closely packed together. If private buildings are to be used as refuge sites, legal agreements would most likely have to be executed.

In developed portions of the City, potential refuge areas need to be identified and access provided if none already exists. In areas of new development, refuge areas can be incorporated into community plans and phased in as needed. Maps that clearly show refuge areas and access points should be prepared and distributed to neighborhoods as part of the community education effort discussed in Chapter 7, Risk Communication (Public Education and Awareness).

Public Facilities and Commercial Buildings Refuge Areas

In order to allow more time for evacuation and emergency services in the event of a flood event, major public facilities and commercial building projects greater than 40,000 square feet (excluding industrial) must have roof access and a top plate at least one foot above the BFE or contain second-story construction. Refuge at private structures will be required to accommodate employees only. Additional public access will require agreements with developers. Additional engineering will be necessary to accommodate increases in loads.

New Residential Development Refuge Areas

New residential subdivisions greater than two acres must provide or identify refuge locations. Refuge locations may include commercial and office buildings (these require agreements with developers), levees, schools, or other public facilities with roof access. The refuge locations must be located within walking distance of a project site.

Special Needs Facilities

In areas of deep flooding, evacuation and rescue efforts during a flood event may prove more difficult and time-consuming than in areas of shallower flooding. Residents with mobility problems may be most impacted. Therefore, planning for special needs facilities such as hospitals, schools, and elder care facilities located in rescue zones must anticipate a potentially extended rescue or evacuation time. In fact, the location of some special needs facilities may be inappropriate in rescue zones where flood depths exceed three feet.

Rescue and Evacuation Areas

Within rescue and evacuation areas, local public safety measures address the following additional requirements:

- Title 15 requirements;
- Special Need Facilities; and
- Emergency Vehicle Access.

Title 15

- Approved lever handle gas valves shall be used for all residential and nonresidential gas appliances as required under Title 15.
- Above ground fuel tanks shall be securely anchored to a foundation to prevent movement or flotation during a flood as required under Title 15.

Special Needs Facilities

The City's floodplain management regulations require:

- Special needs facilities have a flood warning and response plan approved by the local administrator prior to occupancy of the structure.

Emergency Vehicle Access

To facilitate rescue and evacuation services prior to and during a flood event, new subdivisions located in both rescue and evacuation zones must have two or more entrance and exit points. Knox boxes shall be provided in gated communities to facilitate emergency vehicle access.

3.2.4 Floodplain Land Use Planning & Development Standards Summary

Federal (FEMA) Mandates

- Require standard FEMA measures (e.g., elevation, flood proofing, etc.) for less than 100-year protection.
- Require flood insurance for less than 100-year protection.

State (DWR) Mandates

- Require minimum urban level of 200-year flood protection for issuing development permits. (The plan for 200-year flood protection must be in place by July 2016 with the 200-year flood protection provided by 2025.)

Local (City) Mandates

- Elevate or floodproof structures one foot above the BFE.
- Anchor structures.
- Elevate or floodproof utilities.
- Require non-conversion agreements for enclosed areas below the BFE.
- No increase in flood levels from development.
- Hold Harmless agreements for new development or substantial improvements in Special Flood Hazard Areas.
- Public refuge areas and evacuation locations for certain new development, as described below.

Public Refuge Areas and Evacuation Locations for Rescue Areas

- The following categories of new development must provide refuge and a means for evacuation:
 - Special needs facilities (e.g., hospitals, senior centers, etc.).
 - Non-residential development greater than 40,000 square feet.
 - Residential subdivisions greater than two acres.
- New construction must have a public refuge that is:
 - Not less than one foot above the rescue flood elevation and within one mile of the location where occupants are expected to congregate pending evacuation; or
 - A building space not less than one foot above the rescue flood elevation from which occupants may be evacuated during conditions of flooding, such as a space within the building that has an exit door or operable window; a deck, balcony, porch, rooftop platform, or rooftop area; or combinations thereof.
- New construction must provide evacuation locations such that:

- An evacuation route is provided through any number of intervening rooms or spaces without the use of a key, combination, tool, or special knowledge or effort.
- Evacuation locations provide at least seven square feet per occupant.
- Evacuation locations that are spaces within buildings provide the occupants a means to be evacuated out of the building, and at least one window or door meets the egress requirements of the California Residential Building Code.
- Evacuation spaces that are balconies must have finished floors not less than one foot above the rescue elevation; and must be designed for the live load required for building occupancy.
- Evacuation spaces that are rooftop platforms and areas must not be less than one foot above the rescue flood elevation; must support the live load required for occupancy; and must provide access by way of stairway, ramp, ladder, or other means.
- Evacuation spaces that are located in building attics must not be less than one foot above the rescue flood elevation; must provide adequate headroom (as defined by the city’s floodplain management ordinance); must be solidly sheathed; must support the live load required for occupancy; and must provide access by way of stairway, ramp, ladder, or other means.

Rescue and Evacuation Areas Additional Requirements

- New subdivisions shall have two or more vehicular ingress and egress points.
- Approved lever handle gas valves shall be used for all residential and nonresidential gas appliances.
- Above ground fuel tanks shall be securely anchored to a foundation.
- Special needs facilities must have a flood warning and response plan approved by the local administrator prior to occupancy of the structure.

3.3 Implementation Strategies and Action Items

The following implementation strategies are for land use planning and locally mandated development guidelines that are intended to protect both public safety and property, in addition to those measures required by minimum FEMA development standards.

Table 3.1. Land Use Planning and Development Action Items Summary

Action	Responsible Office	Schedule
1. Update the Floodplain Management Ordinance for development within a 200-year floodplain.	DOU, Community Development	Short Term
2. Update City Code for New Development Adjacent to Levees.	DOU, Community Development	Short Term

Action	Responsible Office	Schedule
3. Improve Methods for Providing Development Guideline Information to the Public and Developers.	DOU, Community Development	Short Term
4. Update the Floodplain Management Ordinance for Development in Rescue and Evacuation Areas.	DOU, Community Development	Short Term
5. Enforce Existing Development Guidelines.	DOU, Community Development	Short Term and Ongoing
6. Adopt a Plan for 200-year Flood Protection by July 2016.	DOU, Community Development	Short Term
7. Improve the Building Permit Process with Respect to Floodplain Management.	DOU, Community Development	Short Term and Ongoing
8. Continue Implementation of Phased Development for A99 Natomas Floodplain.	Community Development	Short Term

1. *Update the Floodplain Management Ordinance (Chapter 15) for Development within a 200-year Floodplain.*

Issue/Background Statement:

Many areas of the City that are in watersheds greater than 10 square miles and exceed three feet in depth will not be covered by the ULOP 200-year plan being developed by SAFCA. The 200-year floodplains in these areas were mapped and will be utilized for development purposes after July 2, 2016. These areas need standards for structures similar to the NFIP standards for a 100-year floodplain.

Implementation Strategy: Staff will develop additional amendments to the Floodplain Management Ordinance for development within a 200-year floodplain, when required.

Responsible Office: DOU, Community Development

Potential Funding: Staff time

Schedule: Short Term

2. *Update City Code for New Development Adjacent to Levees.*

Issue/Background Statement: The proposed 2035 General Plan requires adequate setbacks from flood control levees consistent with local, regional, state, and federal design and management standards. The zoning code was amended in 2013 to require a minimum 20-foot setback for infill and 50-foot setback for development greater than 5 acres from the landside toe of any flood control levee for all new residential and non-residential structures.

Implementation Strategy: Staff will continue to update zoning codes to be consistent with existing regulatory requirements for development adjacent to flood control structures. In addition, City staff will determine the best mechanisms for dissemination of this information.

Responsible Office: DOU, Community Development

Potential Funding: Staff time

Schedule: Short Term

3. Improve Methods for Providing Development Guideline Information to the Public and Developers.

Issue/Background Statement: Implementing development standards for new construction and substantial improvements is very important in order to remain in the National Flood Insurance Program. City departments will continue to improve the procedures/methods for implementing development standards required by federal, state, and local codes.

Implementation Strategy: As city codes and ordinances are updated, staff will develop materials summarizing the guidelines for the general public and developers.

Responsible Office: DOU, Community Development

Potential Funding: Staff time

Schedule: Short Term

4. Update the Floodplain Management Ordinance for Development in Rescue and Evacuation Areas.

Issue/Background Statement: The California Building Standards Code requires evacuation locations in new buildings located in areas protected by facilities of the State Plan of Flood Control where flood levels are anticipated to exceed 3' in a 200-year flood event. The new code provisions are in Appendix K of the California Building Standards Code.

Implementation Strategy: A draft City ordinance to require refuge areas, exits, and evacuation routes in rescue areas is scheduled to be adopted in June 2016. The draft City Ordinance will be a modification of Appendix K.

Responsible Office: DOU, Community Development

Potential Funding: Staff time

Schedule: Short Term

5. Enforce Existing Development Guidelines.

Issue/Background Statement: In areas defined as rescue/evacuation zones of flooding, the following development guidelines must be enforced as follows:

- Major projects (40,000 square feet and larger) shall provide refuge areas and means for evacuation.
- New residential subdivisions greater than two acres shall provide or identify refuge locations and means for evacuation.
- Special facilities such as hospitals and elder care facilities will be required to have refuge areas and have flood emergency response plans in place prior to occupancy.
- New subdivisions shall have multiple entrance and exit points where feasible to facilitate evacuation and other emergency services.

Implementation Strategy: City staff will continue to enforce the development guidelines above, and merge the requirements for refuge areas, exits, and evacuation routes following adoption of the revised floodplain management ordinance.

Responsible Office: DOU, Community Development

Potential Funding: Staff time

Schedule: Short Term and ongoing

6. Adopt a Plan for ULOP Protection by July 2016.

Issue/Background Statement: After July 2016, permits cannot be issued for development in areas protected by facilities of the State Plan of Flood Control (SPFC) where flood depths are anticipated to exceed 3' and in a watershed greater than 10 square miles for the 200-year flood event unless a plan is in place to reach 200-year flood protection for areas protected by SPFC facilities. SAFCA is working on this ULOP plan.

Implementation Strategy: Actions to achieve 200-year flood protection are part of the 2035 General Plan. . City Staff will take this plan to City Council in June 2016.

Responsible Office: DOU, Community Development

Potential Funding: Staff time

Schedule: Short Term

7. Improve the Building Permit Process with Respect to Floodplain Management.

Issue/Background Statement: In 2010, the City submitted a corrective action plan to FEMA and implemented building permit process improvements. Since then, the City has successfully incorporated floodplain development requirements into the building permit process.

Implementation Strategy: The City will continue on an ongoing basis to train staff and improve building permitting, plan check, and inspection.

Responsible Office: DOU, Community Development

Potential Funding: Staff time

Schedule: Short Term and ongoing

8. Continue Implementation of Phased Development Guidelines for the A99 Natomas Floodplain.

Issue/Background Statement: The Natomas Basin was remapped from an AE to A99 flood zone in June 2015. Since the levees are only 50% complete in the Natomas Basin and levee construction has not started in the City of Sacramento, the City implements a conservative approach on development in Natomas.

Implementation Strategy: The City will continue on an ongoing basis to continue implementation of the phase development guidelines.

Responsible Office: Community Development

Potential Funding: Staff time

Schedule: Short Term

4 EMERGENCY MANAGEMENT

4.1 Introduction and Background

Emergency management is a critical risk reduction tool in the arsenal of any municipality. The effects of a natural disaster can either be mitigated or worsened depending on the government's response. The role of city government in a disaster is to take all possible actions in order to provide protection of life and property. To accomplish this task, the City has an aggressive emergency management system in place that includes comprehensive hazards planning. City staff 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.



Multiple departments and agencies have direct roles and responsibilities in each of the phases of emergency management. These departments are typically focused on operational/function specific roles and responsibilities. It is necessary that these discipline-specific efforts are well-coordinated and integrated into the larger system. This is the foundation of the Standardized Emergency Management System (SEMS), a system for management of multiagency and multijurisdictional emergencies in California. SEMS is integrated with the National Incident Management System (NIMS) to meet all federal requirements and timeframes. SEMS/NIMS is a comprehensive system that improves local response operations through the use of the Incident Command System (ICS) and the application of standardized procedures and preparedness measures. City staff are regularly trained on SEMS/NIMS and the ICS.

The City also works closely with the Sacramento County's Office of Emergency Services (OES) and SAFCA 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 delivery to the Sacramento community.

4.2 Current Implementation Status

Emergency management activities within the City, as related to flood events, were reviewed and evaluated for each of the four phases of emergency management: preparedness, response, recovery, and mitigation. A summary of activities for each phase is provided in the following sections of this chapter. Recommended implementation strategies and actions were also identified to assist the City in enhancing the level of flood protection and are provided in Section 4.3.

4.2.1 Technical Responsibilities

A. PREPAREDNESS

Flood Hazard Information

Knowing and understanding the flood risks for the community is paramount to being prepared for proper response to an event. The risk of flooding is the potential for damage, loss, or other impacts that are caused by the interaction of the flood hazard with community assets. Understanding the flood hazard for the community is achieved through research and review of existing flood hazard studies, flood hazard mapping, historical documentation of previous flood events, and field visits. Flood hazard mapping information for the City of Sacramento is presented in Chapter 2 *Historical Perspective*, Subsection 2.1.3 and in Chapter 8 *National Flood Insurance Program/Community Rating System*, Subsection 8.2.1.

City of Sacramento, Department of Utilities

- Ultimate Flood Depths map – This map displays what the levels of flooding in the City of Sacramento would be if there were no levee protection. This map shows the ultimate depth of water for areas within City limits if there were nothing to protect the area or if nothing was done to stop flooding. The map is available here:
 - http://portal.cityofsacramento.org/~media/Corporate/Files/DOU/Flood-Ready/Maps/Ultimate_Flood_Depths.pdf
- Areas Dependent on Levees map– This map displays areas in Sacramento dependent on levees. This map does not show depth of the flooding, but does show areas vulnerable to flooding because they rely on levees to protect them. The map is available here:
 - http://portal.cityofsacramento.org/~media/Corporate/Files/DOU/Flood-Ready/Maps/Areas_Dependent_Levees.pdf
- Rescue and Evacuation maps - These maps show the depth of flooding with a 300 to 800-foot levee break, 200-year storm, and running 7 days straight without mitigation. These maps are available on the City website. A separate set of maps show the rescue and evacuation areas for development purposes (Appendix C). The rescue areas show which areas would have 2' of water within an hour.
 - <https://www.cityofsacramento.org/Utilities/Drainage/Flood-Ready/Flood-Depth-and-Evacuation-Maps>

California Department of Water Resources (DWR)

- Best Available Maps (BAM) –The BAM have been compiled by the DWR and are provided for informational purposes only, and are intended to reflect current 100-, 200-, and 500-year event risks using the best available data. The maps are available here:
 - <http://gis.bam.water.ca.gov/bam/>

-
- Levee Flood Protection Zone (LFPZ) Maps – The 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 maps are available as part of the BAM website.

Community Assets

With an understanding of the location, extent, and probability of flood events, familiarity with the community assets exposed to the flood hazard is also important. This includes people, property, infrastructure, and other critical facilities.

- People – The following vulnerable and special needs facilities are identified within the community. These facilities serve members of the community who may have additional needs before, during, and after a flood event. This facility information is updated on a regular basis by the DOU and is presented on the Rescue and Evacuation maps noted above.
 - Daycare and schools (K-12)
 - Disabled and elderly care facilities
 - Adult education centers
 - Community and health centers
 - Major hospitals
 - Animal Shelters
- Existing Structures – All structures are exposed to risk, but certain buildings or concentrations of buildings may be more vulnerable because of their location, age, construction type, condition, or use. Information on land use, zoning, parcel boundaries and ownership, and types and numbers of structures is available from the Sacramento County Assessor’s Office (<http://www.assessor.saccounty.net>) and the City of Sacramento’s Community Development Department (<http://portal.cityofsacramento.org/Community-Development>). Ideally, a photo of each structure should also be taken to accompany structure data. This helps identify the structure and document the condition of the structure prior to a flood event.
- Repetitive Loss Structures – Repetitive loss structures are costly and pose a high-risk threat to residents who may be threatened by continual flooding. The NFIP defines a repetitive loss property as “any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling 10-year period, since 1978. At least two of the claims must be more than 10 days apart.” There are currently 21 repetitive loss properties within the City of Sacramento.
- Infrastructure – Infrastructure systems, critical for life safety and economic viability, include the following: transportation, power, communication, water, and wastewater systems. The DOU has an Asset Management Group who tracks all utility infrastructure which includes water, sewer, drainage, wastewater treatment, water treatment plants, pump stations, etc.

-
- Critical Facilities – Critical facilities are structures and institutions necessary for a community’s response to and recovery from emergencies. Critical facilities must continue to operate during and following a disaster to reduce the severity of impacts and accelerate recovery. Critical facilities are identified in the Local Hazard Mitigation Plan and displayed on the Rescue and Evacuation maps noted above.

Flood Warning System

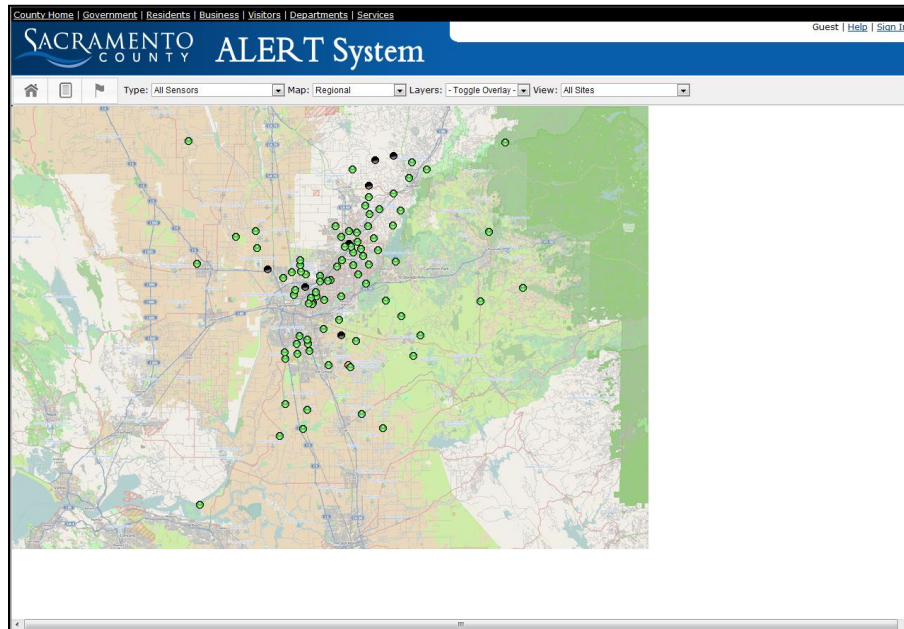
The City uses the California Data Exchange Center (CDEC, <http://cdec.water.ca.gov/>) for flood forecasting information. The CDEC installs, maintains, and operates an extensive hydrologic data collection network including automatic snow reporting gages for the Cooperative Snow Surveys Program and precipitation and river stage sensors for flood forecasting.

The City also uses the Automated Local Evaluation in Real Time (ALERT) system for local creeks. ALERT was created by the National Weather Service to signal us about possible flooding. ALERT provides us with continuous and automatic reports from river levels and rainfall gauges to help us detect impending high water levels. The ALERT system website is maintained by the County and is located here: <http://www.sacflood.org/>. ALERT information includes the following:

- Rainfall Summary
- Stage Summary
- Storm Ready
- Sandbag Information
- Detailed Forecast
- Quantitative Precipitation Forecasts (QPF) are maps depicting the amount of liquid precipitation expected to fall in a defined period of time.
- NWS River Forecasts

Figure 4.1 shows the location of available ALERT sensors.

Figure 4.1. Sacramento County ALERT System Sensor Locations



Emergency Planning

While a number of planning efforts have been developed or recently updated, emergency planning is never complete. Planning activities must be continuous to reflect ongoing changes in the community – demographic, geographical, political, legal, economic, sociological, and cultural changes – that have profound impacts on plan effectiveness. An emergency plan must be able to adapt to these changes, or else the plan’s effectiveness may be compromised.

City departments with field response roles need to have developed Standard Operational Procedures (SOPs) to be implemented during emergency situations. During an emergency, departments may need to activate their own department operations centers (DOC) and manage their field resources from those facilities. DOU is one such department which activates a DOC. The DOC, in turn, coordinates with the City’s Emergency Operation Center (EOC). While staff in some departments truly understand and are ready to implement these concepts, others have further to go to be prepared.

The primary plan that guides the City during any major emergency, including a flood, is the Emergency Operations Plan (EOP). State law requires that the City maintain an EOP to direct the organizational response during emergency situations. Response issues and responsibilities contained in the EOP include:

- Emergency public information and warning
- Situation survey and analysis
- Allocation and mobilization of response resources

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- Implementation of health and safety measures
 - Enforcement of police powers
 - Access control and movement
 - Evacuation and rescue
 - Care and treatment of casualties
 - Control and allocation of vital resources and supplies
 - Protection and restoration of facilities and systems
 - Mass care for displaced individuals and families
 - Collection, identification and disposal of the deceased

The City has recently developed or updated many of the key emergency plans that would be employed during flooding or other major emergencies:

- Emergency Operations Plan (EOP), 2005
- Evacuation Plan for Floods and Other Emergencies, 2008
- Continuity of Operations/Continuity of Government, 2009
- Field Services – Drainage Collection, Standard Operating Procedures (SOPs) for Emergency Response, 2007
- Utilities Operation Center Plan, 2007
- Resources & References – Drainage Collection, 2007
- Local Hazard Mitigation Plan, Update 2011

Current and upcoming emergency planning efforts, as presented in Section 4.3, will address sheltering and evacuation initiatives and include the functions of mass care, temporary housing, and human services. These emergency support functions are further defined as follows:

- Mass Care – this includes planning for mass sheltering, feeding, distribution of emergency supplies, and reunification of children with their parent(s)/legal guardians and adults with their families;
- Temporary Housing – options including rental, repair and loan assistance; replacement; factory-built housing; semi-permanent construction; referrals; identification and provision of safe, secure, functional and physically accessible housing; and access to other sources of temporary housing assistance; and
- Human Services – disaster assistance programs that help survivors address unmet disaster-caused needs and/or non-housing losses through loans and grants; also includes supplemental nutrition assistance, crisis counseling, disaster case management, disaster unemployment, disaster legal services, and other state and federal human services programs and benefits to survivors.

Exercises and Training

The DOU's emergency exercise and training programs have grown recently to focus on enhanced organizational understanding of existing planning expectations, roles and

responsibilities during major emergencies and to improve organizational capability and capacity. Providing training to City staff and opportunities for them to exercise their functional responsibilities is essential to ensuring that the City can address the enormous demands presented by an emergency. Additionally, simulating an emergency provides the optimal forum for testing emergency planning efforts by gauging plan assumptions, capacities and effectiveness. A workforce responsible for community welfare that does not adequately train and practice will likely fail in its mission.

In line with industry best practices, DOU’s exercise program complies with FEMA’s Homeland Security Exercise and Evaluation Program (HSEEP). The exercise program consists of a variety of exercise types including tabletop exercises, operational drills, functional exercises, and full-scale exercises. An After-Action-Report (AAR) and Improvement Plan (IP) are prepared following execution of each exercise and are used to improve DOU’s operating procedures and emergency response. 0 provides a summary of the exercise schedule for the DOU.

Table 4.1. Exercise Schedule for Department of Utilities

Exercise Type	Recommended Frequency for DOU	Number for Immediate Implementation (0-6 Months)	Number for Near-Term Implementation (6-18 Months)	Number for Long-Term Implementation (18-36 Months)
Tabletop Exercises	Annually		1	2
Other Discussion-Based Exercises per HSEEP (Seminars, Workshops, Games)		As Needed		
Drills	Twice Annually		2	3
Functional Exercises	Every 2 Years			1

The City is mandated by the federal government to ensure that staff members who would participate in responding to a major emergency are adequately trained. This requirement essentially affects the vast majority of City workers, and each employee’s level of responsibility determines the NIMS and ICS training that he or she must complete. DOU’s training program consists of two main elements:

- NIMS and ICS training classes, delivered to staff members according to their respective roles in DOU’s ICS organization, namely, Command Staff, General Staff, and/or other supporting roles. These courses are delivered in a classroom setting or can be taken online through the FEMA Independent Study Program when appropriate.
- Staff classroom training specific to DOU’s implementation of its DOPs and the City of Sacramento EOP. The training will complement the common ICS and related material presented in the standard courses indicated, and be consistent with any other applicable local existing related plans.

DOU’s training plan and participation is incorporated into a centralized training tracking system to facilitate program management and compliance. 0 summarizes DOU’s current training plan. All staff has been directed to obtain the identified training appropriate for their level in the ICS organization.

Table 4.2. Training Plan for Department of Utilities

Course	DOU Employee Categories			
	Awareness Level	Responder Level	Supervisor Level	Command/EOC Level
	All employees	Entry-level responders	Field command staff, section chiefs, , unit leaders, division/group supervisors, and branch directors	Command and general staff, emergency managers, EOC managers, and DOC or EOC staff
IS-906	✓	✓	✓	✓
IS-907	✓	✓	✓	✓
IS-106.12	✓	✓	✓	✓
IS-100.PWb	✓	✓	✓	✓
IS-200.b	✓	✓	✓	✓
IS-700.a	✓	✓	✓	✓
IS-800.B	✓	✓	✓	✓
ICS-300			✓	✓
ICS 400			✓	✓
G191			✓	✓
IS-860.A			✓	✓
IS-775/G775				✓
G611				✓
G626				✓

The funding mechanism to provide this current effort has been primarily based on grant funding from the Department of Homeland Security and the DWR. As with all grant funding opportunities, funds are not guaranteed for multiple years, and there is currently no other identified funding mechanism to ensure a continued citywide exercise and training program. In addition to response training, the training topics below are recommended for staff. Additional course detail is provided in Section 4.3 Implementation Strategies and Action Items.

- Certified Floodplain Manager Program
- Managing Floodplain Development through the National Flood Insurance Program
- Introduction to Incident Command System
- National Incident Management System (NIMS): An Introduction
- National Response Framework, an Introduction
- National Disaster Recovery Framework (NDRF) Overview

-
- Local Damage Assessment
 - Introduction to Individual Assistance (IA)
 - Introduction to FEMA’s Public Assistance Program
 - Substantial Damage Estimator (SDE) Tool, 2.0
 - Introduction to Hazard Mitigation
 - Mitigation eGrant System for the Subgrant Applicant
 - Benefit-Cost Analysis Fundamentals
 - Engineering Principles and Practices for Retrofitting Flood-Prone Residential Structures

Training for City staff, not only Department of Utilities, is conducted by the City’s Office of Emergency Services.

B. RESPONSE

The EOC functions as the coordination center during emergencies, including flood events. Representatives from multiple City operating departments, along with allied partners, are stationed at the EOC, working within an organizational framework outlined in SEMS/NIMS and ICS to ensure close interaction and rapid emergency response. Other critical functions provided at the EOC include coordination of resources and public information releases.

The Utilities Department will activate the Utilities Department Operations Center (UOC) at 5730 24th Street, Building 22, in coordination with the EOC. The UOC will provide administration and coordination for all Utilities Department emergency response and recovery personnel. Coordination with the EOC will streamline response efforts and avoid any potential duplication or redundancy. For flood events, the Utilities Department monitors and assesses all weather-related data and provides technical assistance for interpreting weather-related data and its impacts in the City. Initial response follows the receipt of a flood advisory or special weather statement.

Department contacts present at the UOC include the following:

- Department Director
 - Alternate - Field Service Manager
 - Alternate - Engineering Division Manager
- Public Information Officer
- Operations Section
- Planning Section
- Logistics Section
- Finance Section

The UOC will open for the following flood and severe weather event criteria:

- Flood Events

-
- Significant street flooding
 - Sacramento and American River at warning stage
 - Creeks, channels, and canals at warning stage
 - Levee failure
 - Dam failure
 - Severe Weather
 - Intensity and duration of storm – Forecasted ½ inch of rain or more in 1-hour period, or National Oceanic and Atmospheric Agency (NOAA) quantitative precipitation forecast of 1.4" in 6 hours, or 1.9" in 12 hours equating to 1 in 5 year or greater storm event
 - Sustained winds over 35 mph with rainfall
 - Forecasted sustained freezing temperatures

Activation of the UOC outside of the above criteria, may be necessary, should the flood or severe weather event present an unexpected situation requiring increased departmental coordination, data collection, and resource management.

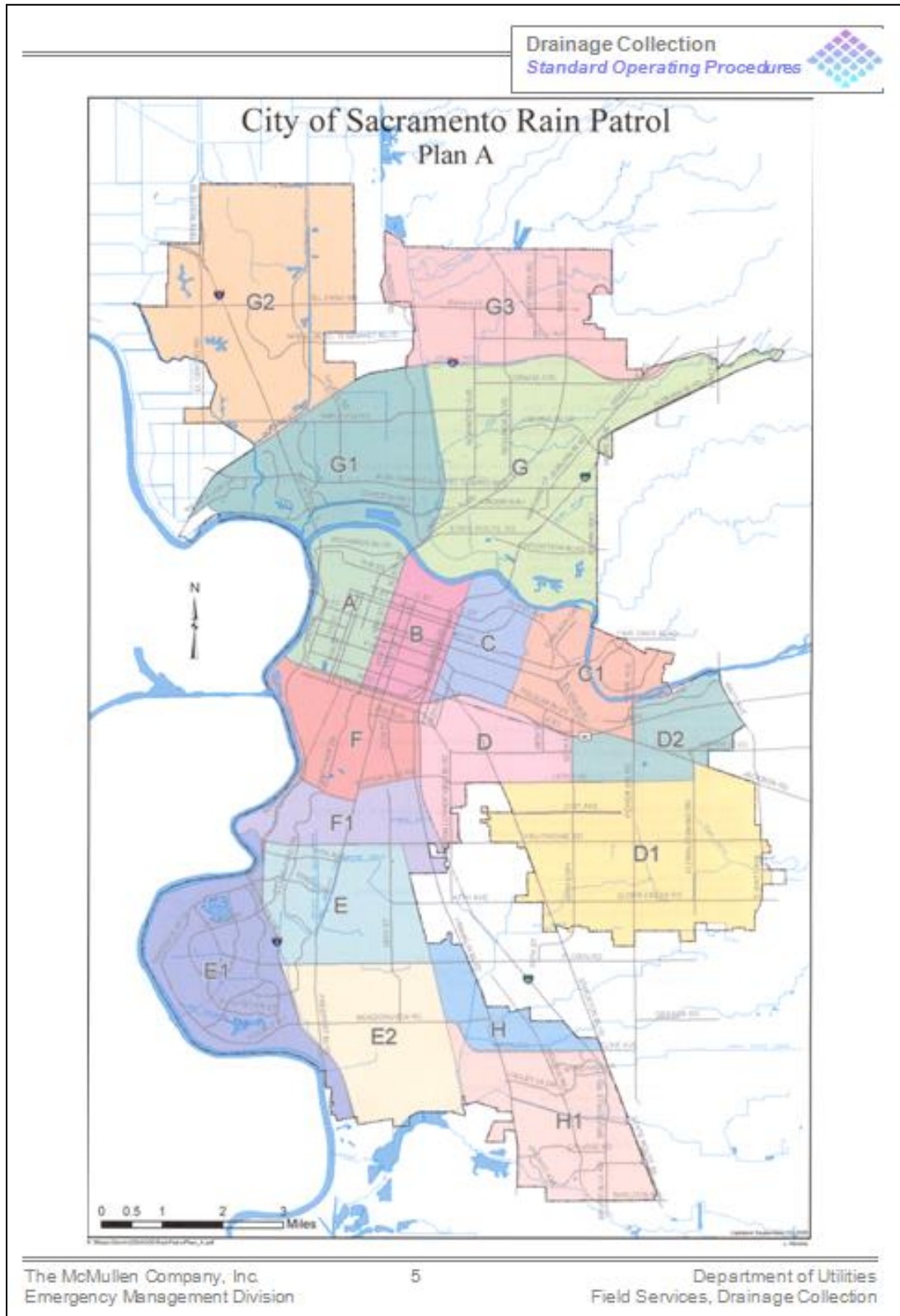
Emergency Response SOP

For flood events, the SOP for Emergency Response for the Drainage Collection Section outlines response activities as follows:

- Rain patrol
- Storm event situation report
- Levee patrol
- Controls of boils
- Major floodgate closures on primary levees
- Winter preparations

During a storm event, the Utilities Field Services Division patrol the stormwater drainage collection system, pumping plants and the combined sewer system service area, and report on major street flooding that close streets. Figure 4.2 presents the Rain Patrol Plan. Information collected during the patrols is reported back to the UOC and onto the EOC and is utilized to control access to flood impacted areas through notification to the Fire and Police departments, as well as, incorporated into a broad-scope impact assessment of the flood event. A broad-scope impact assessment (windshield survey) is conducted to verify the extent and impact of damage immediately following or during a disaster to expedite the start of the recovery process.

Figure 4.2. Rain Patrol SOP



Source: City of Sacramento

Evacuations

The EOP Plan identifies the Law Enforcement Branch has the responsibility to coordinate evacuation and manage the Evacuation Movement Unit. This responsibility also includes the drafting and issuing of all evacuation orders. Evacuation routes are established for 20 areas within the City.

Safety for Field Staff

People participating in flood response activities should take precautions when working in floodwater. Floodwaters may contain raw sewage or other hazardous substances that can cause infections such as E. coli, Hepatitis A, or Tetanus.

First responders should take the following precautions during flood response activities:

- Hand Washing – To avoid exposure to waterborne illness, wash your hands with soap and clean, running water or use alcohol-based hand gels before work and meal breaks, at the end of work shifts, and after handling contaminated clothing or equipment.
- Protective Clothing – If you will be working in or near a flooded area, wear chemical-resistant outer clothing, boots, protective eye goggles, and plastic or rubber gloves. Protective clothing is especially necessary when working in flooded areas with known chemical storage or chemical release hazards.
- If possible, layer latex disposable gloves over cut-resistant gloves. Avoid touching your face with contaminated gloves and properly discard or disinfect gloves after use.
- Do not place equipment or clothing that has come into contact with contaminated floodwater in personal vehicles.
- If possible, shower and launder contaminated clothing before returning home.
- Other Hazards-If working in or around flooded homes or buildings, minimize exposure to mildew and mold by wearing N-95 masks. Wear gloves and eye protection as well.
- Discard mold-damaged materials in plastic bags and clean wet items and surfaces with detergent and water.
- Be aware of exposure to potential chemical or electrical hazards when participating in flood response activities. If working with portable generators, keep them dry and follow instructions for proper handling and safety. Never use a generator indoors or in poorly ventilated areas, due to the risk of carbon monoxide poisoning. Place portable generators outdoors and away from doors, windows, and vents.
- If working near roads or highways, remain aware of work zones and traffic control plans and the locations of signs, cones, barrels, and barriers.
- Ground may become saturated with water during heavy flooding, causing sinkholes and unstable terrain. Be aware of these hazards when working in water trenching operations or flooded areas.

When to seek medical care:

- Seek first aid or medical treatment if you experience nausea, vomiting, diarrhea, headache, muscle aches, fever, abdominal cramps, skin rashes, dizziness, or fatigue after working in a contaminated area.
- If skin is broken and has come into contact with contaminated material and it has been five years since your last Tetanus shot, you should talk to your healthcare provider about receiving another Tetanus vaccination. The Occupational Safety and Health Administration (OSHA) recommends a 5-year vaccination interval for first responders.

For more information, visit the Center for Disease Control at <http://www.cdc.gov/niosh/topics/emres/responders.html> and OSHA at <https://www.osha.gov/SLTC/emergencypreparedness/index.html>.

C. RECOVERY

The EOP identifies overall tasks for short-term and long-term recovery. Short-term recovery operations begin during the response phase and include rapid debris removal and cleanup and restoration of essential services (electricity, water, and sanitary systems). Long-term recovery operations work to restore the community to pre-disaster conditions and include hazard mitigation activities, restoration or reconstruction of public facilities, and disaster response cost recovery. The focus of this section of the CFMP is to outline those recovery tasks specific to floodplain management.

Documentation of Flood Impact Areas

Documentation of flood impacts includes (a) assessing the damage of impacted structures; (b) posting building safety information; and (c) collecting high water marks. Photographs and/or video can also assist in documenting the extent of damage to the community.

Damage Assessments

In a post-disaster environment, one of the most important recovery needs is the assessment of damaged structures prior to issuing a permit for reconstruction in order to remain in compliance with the NFIP and the community's flood damage prevention ordinance (SCC 115.104 Floodplain Management Regulations).

The process for performing damage assessments includes the following steps:

Step 1. Obtain and/or prepare mapping which combines the SFHA with community street/address or tax maps. Only structures found within the mapped SFHA will need 'substantial damage' estimations.

Step 2. Next, incorporate your broad-scope impact assessment from the Response Phase (derived from patrols by the Drainage Collection Section) into this mapping to identify general locations within the SFHA that are most likely to have damaged structures.

Step 3. Based upon your identified locations and the potential number of damaged structures, begin to outline a plan and logistics for conducting the damage assessments. This includes:

- Identifying staff and/or contract inspectors to form inspection teams; and
- Prioritizing areas to conduct assessments.

Step 4. Prior to beginning assessments, data preparations will need to include:

- Field maps for inspection teams with addresses and/or individual lot locations;
- Worksheets for data collection and/or digital forms/tablets;
- Data population into FEMA's SDE Tool, including:
 - Owner and location information
 - Structure information
 - Unit costs for determining reasonable structure value, and
 - Square footage (if possible).
- Identification of any inspection areas that may require permission or special access; and
- Procedures for performing damage assessments on locked or occupied structures.

Additional field equipment needs include:

- Digital data collection tools, i.e. laptop, tablets;
- Tape measure;
- Camera;
- White board and marker, or other method for identifying street address; and
- Appropriate field attire.

Step 5. Assessments for those damaged structures located within the SFHA, should be conducted using:

- FEMA's SDE Tool and Worksheets; and/or
- Rapid Depth Damage Field Estimate.

While documenting the damage, it is advised to leave a door tag notice to inform the owner that an initial damage assessment has been done and that they are to contact the local floodplain administrator and/or building official before proceeding with repair/ reconstruction, and provide contact information for the Utilities Department and Community Development/Codes.

It is important to be consistent in the method(s) of assessment used. Consistency will leave little room for argument about equality or appeals. All damage assessment documentation should be

maintained in the individual permit file. This will become especially important when the community is reviewed by the State NFIP Coordinator or by FEMA for NFIP compliance. Damage assessment methods include the following:

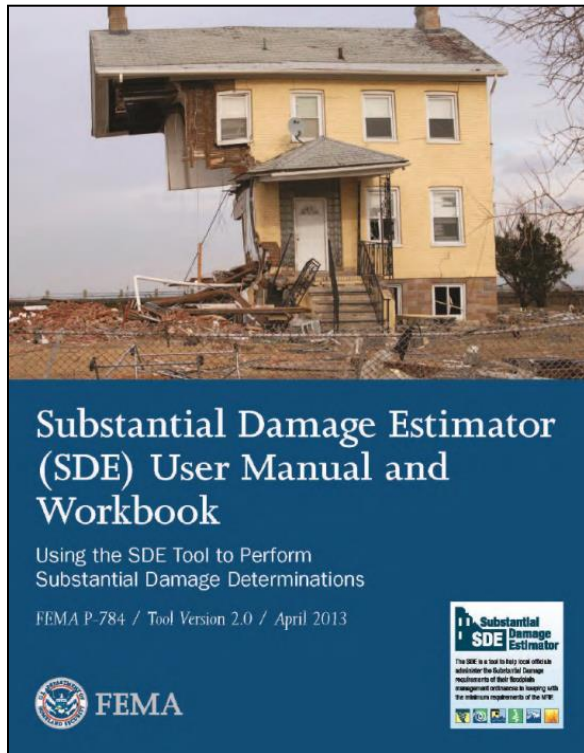
FEMA Substantial Damage Estimator (SDE)

FEMA has developed the Substantial Damage Estimator (SDE) Tool version 2.0, to assist state and community officials in estimating substantial damage to residential and non-residential structures.

The SDE tool is based on the concept of using damage estimates for individual structure elements to determine whether the structure as a whole is substantially damaged. Users are able to estimate damage percentages for each described building element. Using these percentages, SDE produces an aggregate “percent damage” for the structure as a whole.

The SDE tool includes assessment options for both residential structures (single-family homes, town or row houses, and manufactured homes) and common non-residential structures (e.g., office buildings, strip malls, restaurants).

Figure 4.3. FEMA Substantial Damage Estimator (SDE) User Manual and Workbook



Source: FEMA

SDE is customizable, allowing users to develop estimated repair costs and market values, or to input professional estimates or valuations. The SDE tool is intended to be used in conjunction with an industry-accepted construction cost-estimating guide.

Building-specific attributes that affect the estimates that the software produces are input by the user. The required attributes include the quality of construction, foundation type, number of stories, square footage, superstructure type, exterior finish, roof covering, and presence of HVAC systems. Additional inputs are requested for non-residential buildings, including building use, presence of elevators, escalators, and fire suppression systems.

Field Inspectors should be familiar with the SDE data requirements, how to use the SDE tool or the SDE Damage Inspection Worksheets to record the data, and safety precautions for working in and around damaged structures.

Rapid Depth Damage Field Estimate

Another method for determination of substantial damage is to utilize the Rapid Depth Damage Field Estimate. Using the Depth Damage Field Estimate allows a community to quickly separate flood-damaged structures into three groups:

- 1) Clearly non-substantial damage (less than 40%);
- 2) Clearly substantial damage (greater than 50%); and
- 3) Uncertain whether substantial damage (40-50%).

For structures which are clearly NOT substantially damaged, permits can be issued to repair at the existing elevation; provided no additional improvements or additions will be made and it does not conflict with any other regulations.

The Depth Damage Field Estimate captures essential information to make substantial damage determinations for flood-related damages. The damage estimations are based upon the USACE published Generic Depth-Damage Relationships. A Depth Damage Field Estimate worksheet is completed for each structure, indicating the depth (in feet) of floodwaters. This is done by actual measurement based on visual watermarks and/or observed flood damage to the structure. Ideally a photo of each structure should also be taken to accompany the worksheet. This helps identify the structure and document the condition of the structure.

There may be occasion when obvious structural damage has occurred, possibly from fire, floating debris, or contaminated water, or the condition of the existing home may be so poor such that even lesser depths of flood waters have caused significant damage. This should be noted on the Depth Damage Field Estimate worksheet. If it is uncertain whether substantial damage has occurred, additional improvements and/or additions are proposed, or there is a dispute regarding a damage assessment, more information will be required in order to accurately determine whether they or not they are substantially damaged.

Post-Flood Building Entry

Structures which have been inundated by the flood event (both inside and outside of the SFHA) may not be safe to enter. Information should be posted advising property owners a safety inspection is required before re-occupancy is authorized and entry to any flood-damaged building requires approval by local officials. This effort may occur simultaneously with the broad-scope impact assessment during the response phase and/or damage assessments.

The ATC-45 *Field Manual: Safety Evaluation of Buildings after Windstorms and Floods* provides guidelines and procedures to determine whether damaged or potentially damaged buildings are safe for use after wind storms or floods, or if entry should be restricted or prohibited. This publication of the Applied Technology Council (ATC) is not a manual for making substantial damage determinations. It provides guidelines and procedures for conducting both rapid evaluations and more detailed evaluations to determine the safety of damaged structures.

Green, yellow, and red placards are used to designate what types of restrictions are imposed on the building. The following are brief descriptions of the intent of the placards:

- Green—the building has been inspected and no restrictions on use or occupancy have been found.
- Yellow—the building has been inspected and found to be damaged as described on the placard. This placard can be used as a catchall to cover a wide range of hazards that may limit use of the building or portions of the building but not make it completely unsafe. Examples of such hazards include water saturated ceiling drywall, collapsed chimney on a portion of the roof or creating a falling hazard on an adjacent structure, electrical power lines that had been inundated during flooding, or a portion of the building has collapsed but other portions do not appear to have been damaged. A yellow card may allow for limited use of the building for removal of property, but restrict continuous habitation or sleeping in the building.
- Red—the building has been inspected and is damaged and unsafe. No entry is allowed, except as specifically authorized in writing by the jurisdiction. A red placard does NOT imply that the structure is condemned and must be demolished. It may be possible that repairs can be made to mitigate the hazard.

Figure 4.4. ATC-45 Placards



Source: ATC

Events after the inspection, such as severe weather, could require additional inspections and a change of the placard. It should be emphasized that the placement and removal of placards needs to be performed under the authority of the City of Sacramento.

The ATC-45 Field Manual describes the differences between rapid and detailed building evaluations. The rapid evaluation procedure is primarily an assessment of the exterior of the structure and identifies if the building is apparently safe, unsafe or should have restricted use. Often after a disaster it is important to allow people to return to as many of the affected buildings as possible because of a shortage of shelter and housing or to collect personal belongings. The ATC inspection protocols can be used to quickly determine if a building is habitable. If it is not apparent what the condition of the building is, then a detailed evaluation may be required. This should especially be done for any of the red placard buildings that have not been condemned.

A detailed evaluation includes visual observations of the external walls, cladding, parapets, and foundations; observation of geotechnical conditions; inspection of the internal structural framing, including vertical and lateral load carrying components; inspection for non-structural hazards such as falling ceiling tiles, or hazardous material spills; and any other potential hazards like debris blocking the exits. ATC-45 recommends that all essential facilities such as hospitals or fire stations receive a detailed inspection if any damage is suspected.

High Water Marks

Capturing and documenting the maximum flood elevations observed at different locations within the impacted area is beneficial to your community for several reasons. High water marks may be used to:

- Estimate the flood frequency;
- Assess the accuracy of the FIRM or DFIRM;
- Calibrate the hydraulic models;
- Conduct Losses Avoidance Studies;
- Prioritize mitigation projects;
- Assist in the preparation of benefit-cost analyses;

- Provide input for building performance assessments; and
- Determine the depth of flooding for structures.

In addition, posting permanent markers in these locations can:

- Raise awareness of flood risk in your community (see Figure 4.5);
- Drive action to reduce risk in your community; and
- Earn CRS points to reduce the cost of flood insurance across the community.

Figure 4.5. High Water Mark Sign at Garcia Bend Park



Source: City of Sacramento DOU

High water marks should be collected for riverine flooding events, in accordance with DWR's High Water Event Data Collection Manual, and include the following:

- Annual coordination with DWR to determine data collection efforts for the upcoming flood season, which may include DOU participation;
- Reconnaissance of areas adjacent to significant flood sources to identify mudlines or waterlines of trees or structures;
- Maps showing the extent of high water staking, frequency of staking, and information on the format of expected high water staking data;
- Appropriate markers placed on selected items; and
- Survey conducted to record elevations of high water marks.

Code/Ordinance Enforcement

Once location of the structure relative to the SFHA has been determined and damage assessments completed, the Code Compliance Division may proceed to the next step in the permit process. The Code Compliance Division is responsible for seeing that all the applicable requirements of the floodplain regulations are met.

Triage Process

Implementing a “triage” process will help the Code Compliance Division staff keep the permit process on a timely and efficient schedule, helping to aid in the recovery process for your community. Permit requests can be triaged as follows:

- For damaged structures located outside of the SFHA, permits can be issued and the homeowner can begin to repair.
- For structures which are clearly NOT substantially damaged (<40%), permits can be issued to repair at the existing elevation; provided no additional improvements or additions will be made and it does not conflict with any other regulations. This includes structures constructed both post-FIRM and pre-FIRM.
- Pre-FIRM structures that possibly have received substantial damage (40% to 60%) should undergo a detailed assessment (SDE). To more accurately determine the extent of damage, the permit official needs to have two pieces of information: the structure’s pre-damaged fair market value and the cost to restore the structure back to its pre-damaged condition. If additional improvements or additions are planned, the cost of the additional improvements or additions must also be considered. Post-FIRM regulatory standards apply to all substantially damaged structures. Provide information to property owners of the applicable flood safety standards, reconstruction, and permit requirements. Pre-FIRM standards apply to the structures that are determined not substantially damaged. Floodplain development permits are required.
- All pre-FIRM structures that have obviously received substantial damage (60% or more) can forego a more detailed assessment. Post-FIRM regulatory standards apply. Notify property owners of the applicable flood safety standards and maintain enough documentation of the damage to avoid misunderstandings. Floodplain development permits are required.

Permitting Process

Following the “triage” process, the Code Compliance Division may begin to issue permits for reconstruction. The following strategies can assist by simplifying the permit process.

General Communication

- Develop a quick and practical reference guide for the applicant that easily describes and guides them through the permitting process, including flow charts and checklists.
- Consider locations for the provision of a “one-stop shop” for permit applicants. The “one-stop shop” may also include:
 - Process for concurrent application submittal, if development projects require multiple permits; and
 - Technical review teams with representatives from boards and commissions involved in land use permitting for permit application review.
- Standardized forms and procedures

-
- Maximize available local websites by providing access to documents and required forms from several departments or agencies, agendas, announcements, and guidance on the permitting process.
 - Consider the use of electronic permit tracking systems that may help decrease administrative costs and provide more transparency, speed, and accuracy to the permitting process.

Fair Market Value

The structure's pre-damaged value is the fair market value of the structure only, excluding the land. The City determines the value by a professional appraisal or tax assessment records. It is important to be consistent in the method(s) of determining value. Consistency will leave little room for argument about equity or appeals.

The County tax assessment record is used as a pre-screening tool. If the structure value is greater than the County tax assessment, then an appraisal must be done. The property owner may provide an appraisal of the property (at their own expense) that represents the fair market value of the structure. Only accept appraisals performed by trained, qualified, state-licensed real estate appraisers.

Cost to Restore Structure to Pre-Damaged Condition

The two main items on a cost of repairs list should include the materials used and the cost of labor. When calculating the cost of materials and labor, the fair market value must be used – even if the materials and/or labor are donated. Some exclusions from in the cost of repair include debris removal, clean-up, building plans, and permit fees.

Building Protection Requirements

Buildings located in a SFHA that are determined to be substantially damaged/improved, must be brought into compliance with the minimum requirements of the community's ordinance. This includes: elevating the structure to one-foot above the BFE; using flood resistant materials to/below the BFE; adequate/compliant flood vents for enclosures below the BFE; protecting utilities; using flood damage resistant materials below the BFE; elevating utilities and mechanical/electrical equipment; and ensuring that all other local floodplain regulations are met. An "as-built" elevation certificate is needed to verify compliance.

The regulations may require a residential building to be elevated, resulting in additional costs for the homeowner. Such costs may be covered under the NFIP's Increased Cost of Compliance (ICC) coverage. Information on the ICC can be found in the September 2003 FEMA Publication No. 301, NFIP's Increased Cost of Compliance Coverage, Guidance for State and Local Officials.

Documentation of Permitting

Copies of all flood-related documents should be kept in the community's permit files. Examples of the items that should be kept are:

- Elevation certificates or “as-built” certifications
- Floodproofing certificates
- Correspondence with structure owners
- Photographs of structures
- Damage assessments;
- Appraisals
- Inventory of flood-damaged structures
- Copies of FIRMs or FIRMettes
- Any other supporting documentation.

Temporary Housing

Damage assessments also reveal the magnitude of the flood impact across the community and can assist in determining the feasibility of citizens returning to affected residential areas. This may help determine the placement of families into disaster housing based on the projected time to return to their homes after infrastructure and residential repairs have been completed.

Planning for the transition for displaced families from evacuation and sheltering to secure housing alternatives is vital. However, the City currently does not have a disaster housing plan. A disaster housing plan will outline the transition from temporary shelters to short-term/interim housing to permanent housing for displaced citizens. Disaster housing planning efforts, further outlined in Section 4.3, will address the following:

- Disaster housing options;
- Communication;
- Land use planning;
- Inspections, building permitting, and temporary permit suspension;
- Construction; and
- Other housing recovery-related issues.

D. MITIGATION

Local Hazard Mitigation Planning

The Federal Disaster Mitigation Act (DMA) of 2000 requires communities to develop an approved local hazard mitigation plan to remain eligible to apply for certain federal Hazard Mitigation Assistance grants. Active development of the Local Hazard Mitigation Plan should occur during the Preparedness Phase, as it pertains to assessment of flood risk and identification

of flood-related mitigation actions that would make the community more resistant to damage from future flood events. The current Local Hazard Mitigation Plan for Sacramento was approved by FEMA in 2011 with internal progress reports completed annually. The plan is available here:

- <http://portal.cityofsacramento.org/Utilities/Education/Flood-Ready/City-Flood-Prep>

In addition to the annual progress report, the Local Hazard Mitigation Plan should be reviewed after a flood event. The flood event may have revealed additional vulnerabilities that were previously unknown. If so, this should be added to the Risk Assessment portion of the Hazard Mitigation Plan. In addition, the Mitigation Strategy of the Hazard Mitigation Plan should be reviewed to determine if any of the identified actions should be pursued in the post-flood environment to prevent similar damages from occurring during the next flood event. Documentation of the plan review should include:

- Description of the flood event and damages caused. If known, the flood frequency should be provided.
- New information relating to flood risk. Did the flood occur in areas known to be at risk? Or, were areas flooded, and structures damaged, that are outside the mapped flood hazard areas?
- Are there mitigation initiatives included in the current Local Hazard Mitigation Plan that should be pursued in light of the recent event?
- Are there additional mitigation initiatives that should be added to the Local Hazard Mitigation Plan?

Applications submitted for funding from the FEMA Hazard Mitigation Assistance (HMA) Programs must “be consistent with” the mitigation strategy outlined in the Local Hazard Mitigation Plan. If new mitigation projects are identified for funding as a result of the recent event, a formal amendment to the Local Hazard Mitigation Plan may be necessary if the project is not consistent with the currently approved mitigation strategy.

Grant Funding

It is important to maintain an understanding of the various grant programs and how they relate specifically to flood mitigation. An understanding of the various funding streams and opportunities will enable the City to match up identified mitigation projects with the programs that are most likely to fund them. Additionally, some of the funding opportunities can be utilized together. Mitigation grant funding opportunities available following a disaster include the following:

FEMA Hazard Mitigation Assistance (HMA) Grants

The California Office of Emergency Services (Cal OES) administers the Hazard Mitigation Assistance (HMA) Grants. There are three main types of HMA grants: (1) Hazard Mitigation Grant Program, (2) Pre-Disaster Mitigation Program, and (3) Flood Mitigation Assistance Program. Eligible applicants for the HMA include state and local governments, certain private

non-profits, and federally recognized Indian tribal governments. While private citizens cannot apply directly for the grant programs, they can benefit from the programs if they are included in an application sponsored by an eligible applicant.

- More information about FEMA’s Hazard Mitigation Assistance grants can be found on the FEMA HMA Web site at <http://www.fema.gov/hazard-mitigation-assistance>
- Applications for the FEMA Hazard Mitigation Assistance grants can be found on the Cal OES website at: <http://hazardmitigation.calema.ca.gov/>

FEMA Public Assistance Section 406 Mitigation

The Robert T. Stafford Disaster Relief and Emergency Assistance Act provides FEMA the authority to fund the restoration of eligible facilities that have sustained damage due to a presidentially declared disaster. The regulations contain a provision for the consideration of funding additional measures that will enhance a facility’s ability to resist similar damage in future events.

Community Development Block Grants (CDBG)

The California Department of Housing and Community Development administers the State’s Community Development Block Grant (CDBG) program with funding provided by the U.S. Department of Housing and Urban Development. The program is available to all non-entitlement communities that meet applicable threshold requirements. All projects must meet one of the national objectives of the program – projects must benefit 51 percent low- and moderate-income people, aid in the prevention or clearance of slum and blight, or meet an urgent need.

There are three ways CDBG funds can impact hazard mitigation. First, CDBG funds can be used as local planning grants for up to \$50,000. This is another opportunity for assuring local comprehensive plans and regulations address state and regional hazard mitigation objectives. Second, annual CDBG appropriations are used for community development projects, which often include local mitigation projects. Third, CDBG Disaster Recovery funds are allocated after some federally declared disasters. Grant funds can generally be used in federally declared disaster areas for CDBG eligible activities including the replacement or repair of infrastructure and housing damaged during, or as a result of, the declared disaster.

Small Business Administration (SBA) Loans

SBA offers low interest, fixed rate loans to disaster victims, enabling them to repair or replace property damaged or destroyed in declared disasters. It also offers such loans to affected small businesses to help them recover from economic injury caused by such disasters. Loans may also be increased up to 20 percent of the total amount of disaster damage to real estate and/or leasehold improvements to make improvements that lessen the risk of property damage by possible future disasters of the same kind.

Increased Cost of Compliance Coverage

Increased Cost of Compliance (ICC) coverage is one of several resources for flood insurance policyholders who need additional help rebuilding after a flood. It provides up to \$30,000 to help cover the cost of mitigation measures that will reduce flood risk. ICC coverage is a part of most standard flood insurance policies available under NFIP.

ICC coverage can help pay for four different types of mitigation activities to bring a building into compliance with the community's floodplain management regulations:

- Elevation is this process consists of raising the building to or above the BFE.
- Floodproofing applies only to non-residential buildings. For a building to be certified as floodproofed, it must be watertight below the BFE. The walls must be substantially impermeable to water and designed to resist the stresses imposed by flood waters.
- Relocation involves moving the entire building to another location on the same lot, or to another lot, usually outside the floodplain.
- Demolition may be necessary in cases where damage is too severe to warrant elevation, floodproofing, or relocation; or where the building is in such poor condition that it is not worth the investment to undertake any combination of the above activities.

4.2.2 Departmental Coordination

The City's operating departments serve the public on a day-to-day basis, focusing on their respective disciplines. During an emergency, individual departments naturally tend to determine what best course of action to take before, during, and after the event. Minimal information flow and response coordination often result, especially before an EOC activation. While operating department employees are the subject matter experts in their field, what is frequently lacking is a global sense of the emergency event, and this insight from all departments is needed to determine overall incident significance, projections, response efficiency, resource needs, political concerns, regional impacts, etc.

Departmental coordination efforts include the following, at a minimum:

- Local Agencies/Staff
 - Elected officials – There will be pressures to rebuild quickly and perhaps less on current building requirements. It is essential to brief local officials on the NFIP ordinance requirements and the permitting process, including the damage assessments.
 - Public Information Officer (PIO) can disseminate information to the general public on the recovery process. Coordinate with the PIO regarding applicable topics and information, as provided in Section 4.2.3.
 - Community Development/Building – Community Development will be the primary agency for issuing building permits during recovery. Coordination with this agency is essential in sharing information on substantially damaged structures and enforcement of

the NFIP flood ordinance. The permit official is responsible for seeing that all the applicable requirements of the community's floodplain regulations are met.

- Community Development/Planning – Coordinate regularly with planning officials and participate in planning initiatives in the City. The best form of mitigation is prevention of the risk. As the City is developing other plans such as Comprehensive Plans, Master Plans, Capital Improvement Plans, and Future Growth Plans, provide flood risk information to ensure planned development areas will not increase the City's vulnerability to flooding.
- Utilities Department – Will coordinate cleanup activities within streams and flood control facilities/assets, as well as support the following functions: public information, evacuations, construction and engineering, situation status, and documentation/GIS.
- Public Works – Should provide information on public infrastructure that has been damaged as well as provide insight on how damages could be avoided in the future.
- Information Technology- Coordinate digital mapping data including flood risk layers, broad-scope impact assessments, parcel data, damage assessments, etc. With these GIS services, the City can compare flood risk layers such as the DFRIM with other planning products such as future land use maps. This up-front coordination in the early planning stages can help communities avoid future development in areas at risk to flooding
- Geographic Information System Department and the Assessor's Office, City & County – Will provide parcel information and assessed values.
- Transportation – Provide personnel and resources for road closures and traffic diversion, if required. Provide damage assess for roads and bridges. Open and close specific floodgates.
- Local utilities and electric cooperatives – Should be instructed not to turn service on to damaged homes without an "approved to connect" sign. Public utility providers can also provide information on damages incurred as well as ideas on prevention of similar future damages. This includes the Sacramento Municipal Utility District (SMUD) and Pacific Gas & Electric (PG&E).
- Reclamation District No. 1000 (RD1000) – This special district, formed by the California State Legislature, is one of the joint powers authorities forming SAFCA. RD1000 maintains 42 miles of levees surrounding Natomas, over 30 miles of large drainage canals and seven pump stations that collect and pump the stormwater and agricultural runoff back into the adjacent river system. During a flood event, RD1000 provides field response staff. The District has a stockpile of sandbags and rock to initiate a flood fight. Should the need be greater than the available resources, the District will call upon local contractors who are ready to respond 24 hours a day, seven days a week to an emergency with major equipment, flood fight materials and labor as necessary.
- American River Flood Control District – This special district maintains 40 miles of levees along the American River and portions of Steelhead, Arcade, Dry, and Magpie creeks. During a flood event, the District provides field response staff. Flood fight materials are stockpiled for quick deployment to an emergency site. Early detection of a problem and a quick response are essential to saving a levee during a flood emergency.

-
- Maintenance Area 9 – This special district, run by the California Department of Water Resources, maintains approximately 20 miles of levees along the east side of the Sacramento River from Sacramento to Courtland.

4.2.3 Public Education and Outreach

Chapter 7 outlines a Program for Public Information (PPI) which addresses outreach efforts across the community. Public education, outreach topics, and template messages in case of emergency specific to a flood response and recovery are defined herein. Given Sacramento's unique vulnerability to flooding the City cannot realistically eliminate the need to respond to a major flood event. The City also recognizes the advantage of providing public education for its citizens ahead of such an event. Coping with a disaster is much more difficult and dangerous if the community is unprepared. Indeed, as residents become better prepared for emergencies, fear, confusion and losses before, during and after a disaster can be greatly minimized. This also results in allowing authorities to concentrate on protecting life and ending the emergency because citizens are better equipped to maintain increased levels of self-sufficiency.

If a major flood event threatens Sacramento, local government and disaster organizations will likely be strained beyond their capacities. Emergency preparedness on the part of the community can make a tremendous difference in dealing successfully with the disaster. With adequate planning, families can be educated on how to evacuate their homes, take care of basic medical needs, and make temporary living in public shelters more comfortable. Residents can even be taught how to provide basic lifesaving skills, thus enhancing community-based response efforts.

The City's strategy for public emergency alerts and notifications involves multiple methods of communication. Included in the City's Alert and Notification toolbox are:

- Use of local media outlets
- Emergency Alert System
- Everbridge
- Emergency sirens
- Use of staff or community volunteers
- Use of the SacramentoReady.org website

However, even with access to several different methods, providing adequate and timely notification to the public involves tremendous challenges – especially with sudden or no-notice events, which present even greater problems. A wide variety of factors can limit government's ability to provide complete alert and notification services:

- Power outages may limit phone contact and access to media sources.
- Emergency sirens may not be well-maintained and may not be fully deployed throughout the City.

-
- Not all methods of communication will reach some special needs populations.
 - Many residents who had land-line phones now only use cellular phones.

Education and Outreach Topics

Appendix E includes the draft flood response projects and the distribution procedures.

Flood victims will want to return to their homes to begin the process of clean-up and rebuilding as soon as possible. The following information should be provided to the general public:

- Outline the damage assessment process and substantial damage requirements.
- Describe the ATC-45 green, yellow, and red placards.
- It should be clear that property owners obtain appropriate permits from the Community Development Department before beginning repairs or reconstruction.
- Clearly outline which activities do and do not require permits.
- Special attention should be given to any local, state, or federal regulations that may conflict or overlap, as whichever imposes the more stringent restrictions shall prevail.
- Recommendations on contacting insurance agent to discuss claims.
- Advisory information on contractors. If homeowners hire cleanup or repair contractors, they should check references and be sure they are qualified to do the job. Be wary of people who drive through neighborhoods offering help in cleaning up or repairing your home.
- Where and how to access disaster program assistance and other resources.
- Advisory information on floodwaters. Water may be contaminated by oil, gasoline or raw sewage.
- Service damaged septic tanks, cesspools, pits, and leaching systems as soon as possible. Damaged sewer systems are serious health hazards.
- Listen for news reports to learn whether the community's water supply is safe to drink.
- Clean and disinfect everything that got wet from floodwaters or rain. Mud left from floodwaters can contain sewage and chemicals.
- Rest often and eat well.
- Keep a manageable schedule. Make a list and do jobs one at a time.
- Discuss your concerns with others and seek help. Contact the Red Cross for information on emotional support available in your area.

Figure 4.6. Sample Emergency Broadcast Messages

FOR IMMEDIATE RELEASE:

City of Sacramento

Contact: _____

Street Address

City, CA Zip

DATE & TIME: _____

WHAT: _____ has occurred at _____.

WHERE: _____ (specific location) at _____.

WHEN: _____ am / pm today.

EVACUATIONS in the _____ (be specific) area are underway.

RED CROSS SHELTERS are located at _____.

WHAT SHOULD PEOPLE DO?

Residents are asked to: _____

MESSAGES:

Avoid the areas/intersections of _____.

Remain vigilant, prepared to leave _____.

Be prepared to move animals to: _____.

Animal shelters are located at: _____.

FOR MORE INFORMATION:

o Listen to Emergency Radio

o Monitor Local TV stations

o Call the Emergency Public Information Number 916.264.5011

o Go online to City of Sacramento Website, www.cityofsacramento.org

OTHER IMPORTANT INFORMATION:

ASSISTING FIRE AGENCIES include:	ASSISTING OTHER AGENCIES include:
<ul style="list-style-type: none">• City of Sacramento Fire• California Dept. of Forestry• Sacramento County Fire	<ul style="list-style-type: none">• City Police• Sacramento County Sheriff• CA Highway Patrol• Other

**HAZARD SPECIFIC EMERGENCY BROADCAST FORMAT
WINTER STORM – NWS STREAM ADVISORY**

The U.S. Weather Service has issued a small stream advisory for western Sacramento County during the hours of _____ to _____. City of Sacramento Emergency Operations Center urges you to be aware that the grounds are heavily saturated, which means a heavy rainstorm could cause localized flooding. You are advised to watch the water level of creeks and other drainages in your neighborhood carefully, particularly if you live in an area, which has a history of winter flooding.

Low-lying sections of road and bridges may become impassable and pose a danger due to high water. Avoid areas that are flooded. Do not drive across a flooded road. If your car stalls abandon it immediately and seek higher ground. Never try to walk across a flowing stream where the water is above your knees.

If your home is in a flood-prone area, and flooding seems likely, be prepared to leave while you can get out safely.

Please stay tuned to this station or other local stations for emergency information updates. Do not call 9-1-1 except to report an emergency situation.

You can receive more information by monitoring this local radio or television station, or by visiting the City of Sacramento website at www.cityofsacramento.org.

Figure 4.7. Sample Press Release

FOR IMMEDIATE RELEASE:

City of Sacramento

Street Address

City, CA Zip

Date & Time _____

Contact: 916.264.5011

SACRAMENTO -- Mayor *NAME* has issued an Executive Order to declare a City emergency in response to rising flood waters. The declaration activates the City's Emergency Operations Center to coordinate response among City departments and services, along with outside partner agencies, such as the Sacramento Area Flood Control Agency, Reclamation District 1000, the Red Cross, Salvation Army, and the United Way. It also allows the City to request state resources and reimbursement, as necessary.

The *NAME* River levels are expected to quickly crest by *DATE* to ## feet. City crews have closed ## flood gates along the *NAME* River and have begun a 24-hour watch along both the *NAME* River and the *NAME* to monitor and quickly act upon signs of distress, such as boils.

The City's Department of Utilities will begin a sandbagging operation to fortify parts of the *NAME* River levees between *STREET LOCATION*.

City drivers also should be aware that while flooding can occur on any street, *STREET NAME* will remain closed until flood waters recede.

The Sacramento City Fire Department's Swift Water Rescue Team, which operates ## boats, has been deployed for rescue missions. Emergency responders remind drivers to both slow down and "turn around, don't drown."

Residents should always call 911 for emergencies, but are encouraged to use 311 for non-emergencies. Report City service needs, such as street light and signal outages, downed trees, or flooded roads, to the 311 Call Center at [311](#).

Psychological Impact of Flood Disasters

The City of Sacramento's public outreach efforts should include information on the psychological impacts a flood disaster can have on the affected community as well as the first responders that are involved in the disaster.

Flood Victims

Although often overlooked when it comes to its psychological impact, floods are the most common type of natural disaster in the U.S./territories and therefore can be particularly devastating and distressful for those who experience them, including:

- Survivors in impacted areas (including children and teens)
 - those who have suffered damaged to or who have lost completely their homes or businesses
 - evacuees
- Loved ones of victims
- First responders, rescue and recovery workers.

Feelings such as overwhelming anxiety, constant worrying, trouble sleeping and other depression-like symptoms are common responses to disasters and traumatic events (before, during and after the event), although reactions can vary from person-to-person.

Public outreach efforts should include information that most people impacted by floods are able to 'bounce back' in a short period of time, but others may need additional support in order to cope and move forward on the path of recovery.

Once flood warnings and/or evacuation orders are issued, the risk for distress becomes greater:

- Feeling unprepared, isolated, overwhelmed or confused: "I don't know where to go"; "I'm afraid to leave my home because I don't know what will happen if I leave"; "I'm scared that the shelter won't accept pets"; "I'm afraid I don't have enough medication"
- Not being able to reach a loved one living in an impacted area during the event because cell and land lines are tied up, their power is out and so no access to internet, etc.
- Triggers of difficult memories and emotions associated with similar traumatic experiences in the past for those in/around or anywhere outside of the impacted areas, particularly for those who may have had a difficult recovery from the past experience
- Stress associated with temporary relocation: unfamiliar environment (particularly difficult for teens and children to adjust); accessibility for people with disabilities; separation from pets; difficulty sleeping, etc.
- Those with limited physical mobility, economic means (no car or access to mass transit), limited English-speaking, or those who may have pre-existing mental health concerns are all also particularly vulnerable to isolation.

After evacuation orders are lifted, additional distress may occur upon return to the impacted area if a home, business, school, place of worship or a beloved community landmark such as a neighborhood park or wildlife refuge is damaged or destroyed.

Flood First Responders

Risk factors for emotional distress among first responders and rescue and recovery workers include:

- Prolonged separation from loved ones.
- Mental fatigue brought on from working long hours.
- Working under difficult or challenging conditions that may also be unstable during or immediately after disasters; risk to physical safety and other threats to life during rescue and recovery operations.
- Disruption in home or work life brought on by deployment.
- Vicarious trauma brought on by witnessing or being exposed in some way to difficult stories of survival or loss.
- Difficulty readjusting to home or work life post-deployment.

Signs of emotional distress or psychological issues among first responders related to floods may include:

- Eating or sleeping too much or too little.
- Pulling away from people and things.
- Having low or no energy.
- Feeling numb or like nothing matters.
- Having unexplained aches and pains like constant stomachaches or headaches.
- Feeling helpless or hopeless.
- Excessive smoking, drinking or using drugs (including prescription medication).
- Feeling unusually confused or forgetful.
- Worrying a lot of the time; feeling guilty but not sure why.
- Feeling like you have to keep busy.
- Hyper-vigilant – constantly thinking that something is going to happen, including when forecasts for any storm are issued whether or not they have the chance to produce flooding.
- Constant yelling or fighting with family and friends; irritable.

For more information, visit the U.S. Department of Health and Human Services at <http://www.samhsa.gov/disaster/>.

4.3 Implementation Strategies and Action Items

0 summarizes implementation strategies and action items and provides information on the schedule and current status. The individual action items, as recommended and prioritized by the Utilities Department, are presented in order of priority. Each action item includes the background information and ideas for implementation, responsible office, potential funding, and timeline for each identified action.

Table 4.3. Emergency Management Action Items

Action	Responsible Department	Schedule
1. Continue National Incident Management System (NIMS) and Standardized Emergency Management System (SEMS) Exercises and training <i>within DOU</i>	DOU, OES	Short Term
2. Continue Exercise and Training Program <i>within DOU</i>	DOU	Annually
3. Conduct Ongoing Emergency and Recovery Planning and Development	OES, DOU	Short Term
4. Expand on Existing EOP to Address Mass Care, Emergency Assistance, Housing, and Human Services (ESF #6)	OES, DOU	Short Term
5. Develop a Disaster Housing Plan	DOU, CDD	Short Term
6. Develop Intergovernmental Flood Management and Control	City of Sacramento, DOU, ARFCD, RD1000, SAFCA, USACE, DWR	Long Term
7. Increase Public Education Efforts	OES, PIO, DOU	Short Term
8. Coordinate Outreach Efforts	OES, PIO, DOU	Short Term
9. Enhance Public Alert and Notification	OES, SPD	Long Term
10. Increase Personal Preparedness of City Staff	OES	Short Term
11. Develop a Coordination and Information Reporting System	OES	Short Term
12. Substantial Damage Assessment Training	DOU, CDD	Short Term
13. Develop Briefing Memo for Elected Officials	DOU, CDD	Short Term
14. Participate in RiskMAP Process	DOU	Long Term
15. Review City's Flood Warning System	DOU (for City sensors), OES	Short Term
16. Develop a Post-Earthquake Remediation Plan, if required by ULDC	DOU, OES, SAFCA, RD1000, ARFCD	Long Term
17. Flood Relief Plan, if required by the ULDC	DOU, OES, SAFCA	Long Term

1. Maintain Compliance to the National Incident Management System (NIMS) and Standardized Emergency Management System (SEMS).

Issue/Background Statement: One of the systemic improvements for the emergency management system both statewide and in the City is the implementation of the Standardized Emergency Management System (SEMS), a system for management of multiagency and multijurisdictional emergencies in California. SEMS consists of five organizational levels that are activated as necessary:

- Field response
- Local government (City or special district)
- Operational area (County geographic boundaries)
- Regional agencies
- State agencies

NIMS/SEMS incorporate the use of the ICS, the Master Mutual Aid Agreement, existing mutual aid systems, the operational area concept, and multiagency or interagency coordination. By standardizing key elements of the emergency management systems, NIMS/SEMS facilitate the flow of information within and between levels of the system and enhance coordination among all responding agencies. Use of NIMS/SEMS will improve mobilization, deployment, utilization, tracking, and demobilization of needed resources. NIMS/SEMS is designed to be flexible and adaptive to various disasters and the needs of all emergency responders.

Local governments need to be compliant with NIMS/SEMS to be eligible for funding of their personnel-related costs under state disaster assistance programs and/or federal grant funding. NIMS/SEMS, which is applicable to all facets of emergency management, must be incorporated into the planning process, training and exercise programs, response, and after-action reporting.

Implementation Strategy: FEMA offers independent study courses, as identified in Section 4.2.1 Preparedness, for the Incident Command System, NIMS, and the National Response Framework. Recommend DOU staff take the online courses and once completed, all departmental training should be tracked and updated annually. Details for training are presented in Action Item #2.

Responsible Office: DOU for internal staff; OES for citywide compliance and coordination

Potential Funding: Training courses are free; staff time to complete

Schedule: Short Term

2. Develop a Formal Exercise and Training Program

Issue/Background Statement: It is important to maintain exercise and training programs in which the City can successfully train staff to perform to expectations during emergencies by exercising needed skills in simulated scenarios. This program must become a standard method of conducting business so that employees can truly be part of an exercise and training culture.

Implementation Strategy: Exercise and training is largely funded through grant opportunities. DOU will continue look for ways to obtain grant funding to provide exercises and training for City staff. Online training is also available through FEMA’s Emergency Management Institute (EMI). A variety of training courses are applicable to flood preparedness, response, recovery, and mitigation activities. Information on EMI courses and schedules is available here: <http://training.fema.gov/emicourses/>

Recommended courses include:

- Introduction to Incident Command System for Public Works Personnel (FEMA Independent Study IS-100.PWb)
- National Incident Management System (NIMS): An Introduction (FEMA Independent Study IS-700.a)
- National Response Framework, an Introduction (FEMA Independent Study IS-800.b)
- National Disaster Recovery Framework Overview (FEMA Independent Study IS-2900)
- Certified Floodplain Manager Program (ASFPM-accredited certification program; FEMA 480 Floodplain Management Requirements: A Study Guide and Desk Reference for Local Officials)
- Managing Floodplain Development through the National Flood Insurance Program (EMI Course 273)
- Local Damage Assessment (FEMA Independent Study IS-559)
- Introduction to Individual Assistance (FEMA Independent Study IS-403)
- Introduction to FEMA’s Public Assistance Program (FEMA Independent Study IS-634)
- Substantial Damage Estimator Tool, 2.0 (FEMA Independent Study IS-284)
- Introduction to Hazard Mitigation (FEMA Independent Study IS-393.a)
- Mitigation eGrant System for the Subgrant Applicant (FEMA Independent Study IS-30)
- Benefit-Cost Analysis Fundamentals (FEMA Independent Study IS-276)
- Engineering Principles and Practices for Retrofitting Flood-Prone Residential Structures (FEMA Independent Study IS-279)

Responsible Office: DOU

Potential Funding: Possible grant funding; staff time

Schedule: Figure 4.8, 0, and 0 outline the exercise and training schedules for DOU staff:

Figure 4.8. Training Level Complexity by Course

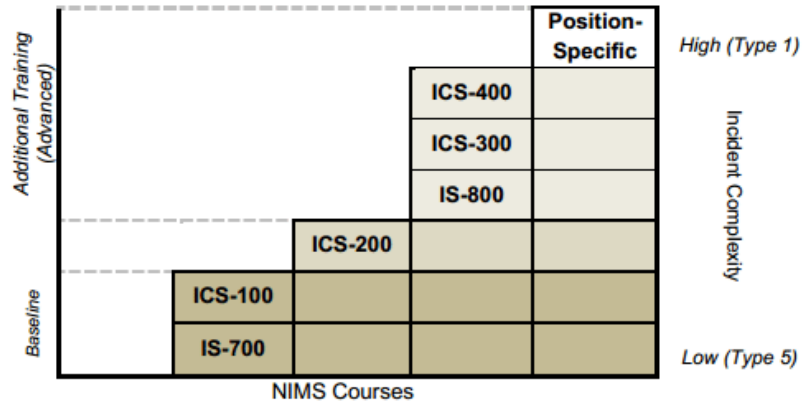


Table 4.4. DOU Exercise Schedule

Exercise Type	Recommended Frequency for DOU	Number for Immediate Implementation (0-6 Months)	Number for Near-Term Implementation (6-18 Months)	Number for Long-Term Implementation (18-36 Months)
Tabletop Exercises	Annually	0	1	2
Drills	Twice Annually	0	2	3
Functional Exercises	Every 2 Years	0	0	1
Other Discussion-Based Exercises per HSEEP (Seminars, Workshops, Games)		As Needed		

Table 4.5. DOU Training Schedule

Course	DOU Employee Categories				Course Type	Course Title
	Awareness Level	Responder Level	Supervisor Level	Command/EOC Level		
	All employees	Entry-level responders	Field command staff, section chiefs, unit leaders, division/group supervisors, and branch directors	Command and general staff, emergency managers, EOC managers, and DOC or EOC staff		
NIMS BASELINE COURSES						
IS-700.a	✓	✓	✓	✓	Independent Study	National Incident Management System (NIMS), and Introduction
ICS-100 IS-100.b	✓	✓	✓	✓	Independent Study	Introduction to Incident Command System, I-100 for Public Works Personnel
IS-800.b	✓	✓	✓	✓	Independent Study	National Response Framework, an Introduction
Cal OES	✓	✓	✓	✓	State Course	SEMS/NIMS/ICS – A Combined Course

Course	DOU Employee Categories				Course Type	Course Title
	Awareness Level	Responder Level	Supervisor Level	Command/EOC Level		
	All employees	Entry-level responders	Field command staff, section chiefs, unit leaders, division/group supervisors, and branch directors	Command and general staff, emergency managers, EOC managers, and DOC or EOC staff		
NIMS ADDITIONAL TRAINING - EOC						
IS-701			✓	✓	Independent Study	Multiage Coordination System (MACS) Course
IS-706			✓	✓	Independent Study	NIMS Intrastate Mutual Aid, an Introduction
G191			✓	✓	State Course	ICS/EOC Interface
IS-775/G775			✓	✓	Independent Study/State Course	EOC Management and Operations
G611				✓	State Course	SEMS EOC Management Section
G626				✓	State Course	Action Planning Workshop
NIMS ADDITIONAL TRAINING – FIELD OPERATIONS						
ICS-200	✓	✓	✓	✓		ICS for Single Resource and Initial Action Incidents
ICS-300						Intermediate ICS for Expanding Incidents
ICS-400						Advanced ICS
OTHER						
IS-906	✓	✓	✓	✓	Independent Study	Basic Workplace Security Awareness
IS-907	✓	✓	✓	✓	Independent Study	Active Shooter: What You Can Do
IS-106.12	✓	✓	✓	✓	Independent Study	Workplace Violence Awareness Training
IS-860.A			✓	✓	Independent Study	National Infrastructure Protection Plan (NIPP)

Course	DOU Employee Categories				Course Type	Course Title
	Awareness Level	Responder Level	Supervisor Level	Command/EOC Level		
	All employees	Entry-level responders	Field command staff, section chiefs, unit leaders, division/group supervisors, and branch directors	Command and general staff, emergency managers, EOC managers, and DOC or EOC staff		
FLOODPLAIN MANAGEMENT						
FEMA 480			✓	✓	Independent Study	Floodplain Management Requirements: A Study Guide and Desk Reference for Local Officials
FEMA-273			✓	✓	EMI Campus Course	Managing Floodplain Development through the National Flood Insurance Program
FLOODPLAIN MANAGEMENT – DISASTER RECOVERY						
IS-559	✓	✓	✓	✓	Independent Study	Local Damage Assessment
IS-284	✓	✓	✓	✓	Independent Study	Using the Substantial Damage Estimator 2.0 Tool
IS-2900	✓	✓	✓	✓	Independent Study	National Disaster Recovery Framework (NDRF) Overview
IS-403			✓	✓	Independent Study	Introduction to Individual Assistance (IA)
IS-634			✓	✓	Independent Study	Introduction to FEMA's Public Assistance Program
IS-279			✓	✓	Independent Study	Retrofitting Flood-Prone Residential Structures
FLOODPLAIN MANAGEMENT – MITIGATION						
IS-393.a			✓	✓	Independent Study	Introduction to Hazard Mitigation
IS-30			✓	✓	Independent Study	Mitigation eGrants for the Subgrant Applicants
IS-276			✓	✓	Independent Study	Benefit-Cost Analysis (BCA) Fundamentals

3. Conduct Ongoing Emergency and Recovery Planning and Development.

Issue/Background Statement: The City must continue its aggressive approach to creating and periodically updating internal emergency plans and exercising those plans regularly. Analysis and modification of existing plans need to be prioritized and adequately resourced. A dedicated planning effort needs to be provided to examine the recovery process and City actions during the recovery phase of the emergency.

The City's emergency management system must be able to provide adequate response activities and supplement and restart community systems. These systems include both the most obvious infrastructure – electric power, communications, and water and sewer systems – and the community's human service support system, including health and medical systems, schools, police and fire departments, and businesses. Extended disruption of community systems can cause additional losses and suffering beyond the direct impact of the flood event, often called the "disaster after the disaster."

Implementation Strategy: The Emergency Operations Plan should be reviewed and updated to reflect changes impacting its effectiveness. The last revision was completed in 2005, and the plan will be reviewed again starting in 2015. Numerous communitywide, economic, geographic, and regulatory changes have occurred within this timeframe that necessitate this update. In addition, the 2007 Utilities Operation Center Plan outlines the emergency management policies identified for the Department of Utilities and provides a response framework consistent with NIMS. This plan should also be updated on a regular basis to reflect changes that may impact its effectiveness. The UOC Plan/Field Response will be updated starting in the fall of 2014 through a grant from DWR.

Responsible Office: City OES with DOU participation

Potential Funding: Cost estimated at \$50,000 to \$75,000; possible grant funding.

Schedule: Short Term

4. Expand on Existing EOP to Address Mass Care, Temporary Housing, and Human Services (ESF #6).

Issue/Background Statement: The Emergency Operations Plan (EOP) for the City of Sacramento includes an Evacuation Plan as an annex for floods and other emergencies. This evacuation plan details roles, responsibilities, and resources for evacuations. Although care and sheltering are included within the Annex, there is need to further detail mass care (sheltering), temporary housing, and human services (recovery/reconstruction elements) and outline responsibilities for the Department of Utilities.

Implementation Strategy: Preparation of ESF#6 will be facilitated by OES, with participation and assistance from DOU, and will address the following elements:

-
- **Shelters:** Emergency shelter includes the use of designated shelter sites in existing structures within the affected area(s), as well as additional sites designated by local government. Shelter sites shall be selected to maximize accessibility for individuals with disabilities, whenever possible.
 - **Temporary Roof Repair:** Quick repairs to damaged roofs on private homes. This assistance allows residents to return to and remain in their own homes while performing permanent repairs.
 - **Repair Program:** Financial assistance to homeowners for repair of their primary residence, utilities, and residential infrastructure.
 - **Replacement Program:** Financial assistance issued to victims to replace their destroyed primary residence.
 - **Existing Housing Resources:** A centralized location for identified available housing resources from the private sector and other federal agencies (i.e., Department of Housing and Urban Development (HUD), Department of Veterans Affairs (VA), and USDA properties).
 - **Rental Assistance:** Financial assistance issued to individuals and families for rental of temporary accommodations.
 - **Non-congregate Facilities:** Facilities that provide private or semiprivate accommodations, but are not considered temporary housing (e.g., cruise ships, tent cities, military installations, school dorm facilities, or modified nursing homes).
 - **Transportation to Other Locations:** Assistance to relocate individuals and families outside of the disaster area where short- or long-term housing resources are available. Transportation services may include return to the pre-disaster location.
 - **Permanent Construction:** Direct assistance to victims and families of permanent or semi-permanent housing construction.
 - **Direct Financial Housing:** Payments made directly to landlords on behalf of disaster victims.
 - **Hotel/Motel Program:** Temporary accommodations for individuals and families in transition from congregate shelters or other temporary environments, but unable to return to their pre-disaster dwelling.
 - **Direct Housing Operations:** Provision of temporary units, usually factory-built. This option is utilized only when other housing resources are not available. Units will be appropriate to the community needs and include accessible units.
 - **Housing Resources** are available from the private sector, FEMA, and other federal agencies (as described below).

Responsible Office: OES, with participation and assistance from DOU

Potential Funding: Cost estimated at \$25,000 to \$50,000; possible grant funding.

Schedule: Short Term

5. Develop a Disaster Housing Plan.

Issue/Background Statement: Following a major flood event, citizens of the City of Sacramento may be displaced due to damage or loss of residential structures, environmental contamination, or other environmental factors. A Disaster Housing Plan will detail a framework for providing temporary housing options for displaced residents and the transition to permanent housing in order to expedite long-term community recovery. This plan would elaborate on the temporary housing outline provided in this Chapter.

Implementation Strategy: Preparation of the Disaster Housing Plan, in conjunction with the ESF#6 elements of the EOP, will be facilitated by DOU and will address the following elements:

- Temporary housing siting criteria, provision, and removal;
- Repairs and the ability to reconstruct homes rapidly;
- Reconstruction and the incorporation of mitigation measures during rebuilding;
- Transitioning residents back to permanent housing; and
- Rebuilding affordable housing.

Responsible Office: CDD

Potential Funding: Cost estimated at \$25,000 to \$50,000; possible grant funding

Schedule: Short Term

6. Develop Intergovernmental Flood Management and Control.

Issue/Background Statement: There are many separate federal, state, special district, County, and City agencies involved in flood control along the Sacramento and American rivers. This has focused flood protection on the funding and construction of flood projects. Although better collaboration in the planning and implementation of such structural enhancements is important, coordination of flood watch and warning as well as the actual response to a flood event are also in need of improvement.

Implementation Strategy: The City should work closely with emergency planners and response personnel from as many organizations as possible such as the DOU, RD 1000, ARFCD, SAFCA, USACE, and DWR to establish a coordinated plan for flood emergency response. This effort should focus on better definition of responsibilities, improved communication, utilization of the ICS and SEMS for flood control management, and development of an interagency table top exercise.

Responsible Office: City of Sacramento, DOU, ARFCD, RD1000, SAFCA, USACE, DWR

Potential Funding: Staff time; cost estimated at \$100,000; possible grant funding

Schedule: Long Term

7. Increase Public Education Efforts

Issue/Background Statement: Physical infrastructure can be repaired or rebuilt, but in many cases the fabric of the community cannot be repaired unless community systems continue to function or are resumed quickly after a disaster. The awareness and involvement of residents in this regard is critical. In addition to the other efforts being undertaken by the City as outlined above, public education for emergency preparedness and flood awareness must be increased. Given current staffing constraints, Emergency Planning’s current Public Education Program is provided only on an “as requested” basis. No ongoing funding exists to support a citywide public education program. Declining budgets have continued to lower the priority of these programs. The issues of prioritization and resulting funding/staff support should be considered throughout the term of this strategic plan.

Implementation Strategy: Coordinate public education and outreach methods with the Program for Public Information.

Responsible Office: See Chapter 7, Table 7.8 PPI Projects and Initiatives

Potential Funding: See Chapter 7, Table 7.8 PPI Projects and Initiatives

Schedule: See Chapter 7, Table 7.8 PPI Projects and Initiatives

8. Coordinate Outreach Efforts

Issue/Background Statement: In order to ensure that the public receives consistent, accurate and timely information, outreach efforts must be effectively coordinated. In addition, to ensure that limited resources are utilized most efficiently in public education and outreach efforts, coordination activities must occur within one central location.

Implementation Strategy: DOU has begun this effort with the development of the Program for Public Information (PPI) as presented within Chapter 7 of this document. DOU will continue to develop a coordinated outreach program working with OES, the City’s Public Information Officer (PIO), and other department PIOs within the first two years of this strategic plan.

Responsible Office: See Chapter 7, Table 7.8 PPI Projects and Initiatives

Potential Funding: See Chapter 7, Table 7.8 PPI Projects and Initiatives

Schedule: See Chapter 7, Table 7.8 PPI Projects and Initiatives

9. Enhance Public Alert and Notification

Issue/Background Statement: It is imperative to have as many ways as possible to reach the public quickly and efficiently in times of need. While the City employs a variety of methodologies to contact its residents, further analysis and development are needed. Systems currently exist that allow for the public to register contact information and receive messages through text or voice format in addition to Reverse 911-like processes. These systems have the capacity to reach a variety of technologies currently in use and gaining greater use frequency such as cellular phones, e-mail, text, etc.

Implementation Strategy: The County OES has replaced the Reverse 911 system with “Everbridge”, a faster system than Reverse 911. Residents who had registered for Reverse 911 were transferred to the new system. Ongoing funding and maintenance of the Everbridge system is essential. Grant funding has covered the initial implementation years, but moving forward regionally, ongoing funding to maintain the system will be need.

Responsible Office: OES and SPD will be the primary responsible office. DOU may assist with grant funding requests and applications by providing flood impact and/or evacuation information.

Potential Funding: Possible grant funding

Schedule: Medium to Long Term

10. Increase Personal Preparedness of City Staff

Issue/Background Statement: The recent Continuation of Operations/Continuation of Government (COOP/COG) planning included an effort to develop personal disaster education for the use of City staff at home. This initiative was designed to enhance the City staff’s ability to survive the emergency at home, enhancing survivability, and provide for an environment that enables staff to have confidence in family safety. If these factors are met, employees are more likely to continue service to the public during a disaster.

Implementation Strategy: The City should provide training and means to raise the level of personal preparedness and safety of its staff during disaster. The City has an obligation to the community to provide for public safety and maintain essential services. Without the availability of City staff, these services are greatly compromised, as is the City’s ability to maintain government operations.

OES will provide personal preparedness information and materials to City staff on the OES intranet site throughout summer 2009. OES will additionally work with City executives in building a citywide understanding of the importance of personal and family preparedness measures.

Responsible Office: OES

Potential Funding: Possible grant funding; staff time

Schedule: Short Term

11. Develop a Coordination and Information Reporting System

Issue/Background Statement: When incidents impact multiple departments or extend beyond day-to-day, routine operations, OES needs a coordination and information reporting system. In order to adequately centralize the global incident picture development, OES must be provided departmental incident reporting. Many incidents may not appear to be significant from a departmental perspective, but may well be important when all information pieces are put together.

Implementation Strategy: The City should determine the appropriate mechanism to ensure departmental participation in a well-coordinated response and/or recovery. This may be through the use of the EOP, City policy or other method. The development of the mechanism may be completed within the first two years of this strategic plan term, but the culture shift may require greater time.

Responsible Office: OES

Potential Funding: Possible grant funding; staff time

Schedule: Short Term

12. Damage Assessment Training

Issue/Background Statement: This update to the CFMP includes the addition of two damage assessment methods for implementation following a flood event. Local staff that is responsible for assessing, collecting, and reporting damages during and after any event should be trained in both data collection/assessment methods. Well-planned data collection will increase the efficiency of the inspectors while ensuring the accuracy and consistency of the data.

Implementation Strategy: FEMA SDE training is offered at the Emergency Management Institute and often by the local chapters of ASFPM. Training for the Rapid Damage Assessment Method using USACE tools may be led by in-house staff or outside contractor. Training for both methods should include:

- Aspects of data collection such as the structure address, photographs, curbside information, exterior and interior inspections, and interaction with the structure owner.
- Group pilot inspections for residential buildings and non-residential buildings to familiarize the inspectors with the required data collection and worksheets.
- Software and field materials

-
- Guidance for resident and occupant interaction

Responsible Office: DOU, CDD

Potential Funding: Online courses, staff time

Schedule: Short Term

13. Develop Post-Disaster Briefing Memo for Elected Officials

Issue/Background Statement: The success of disaster recovery operations is often tied to the speed of recovery. The ability to return to a sense of normalcy after an event is a common goal among those impacted by the event, including elected officials who often face intense pressure to quickly distribute post-disaster assistance, pick up debris and clear roads, restore utilities, re-open schools, rebuild communities, and provide public services

With the intense pressure to show progress with recovery, elected officials may want to either lessen current building requirements or forego the post-disaster planning process altogether. It is essential to brief local officials on the NFIP ordinance requirements and the permitting process, including the damage assessments.

Implementation Strategy: Prepare a memo for elected officials which summarizes the recovery process. This will help elected officials manage public expectations and understand short-term restoration and long-term redevelopment. The briefing memo will be distributed to elected officials at the start of the recovery process following a flood event.

Responsible Office: DOU, CDD

Potential Funding: Staff time

Schedule: Short Term

14. Participate in the Risk MAP Process

Issue/Background Statement: As FEMA moves forward from Map Modernization to Risk MAP (mapping, assessment, and planning) there are improved opportunities to assess flood risks and identify actions to reduce vulnerability to those risks. As mapping activities move into Risk MAP, resilience meetings will be held to review FEMA non-regulatory products and identify flood mitigation actions. The resilience meetings will bring new stakeholders to the Risk MAP table, collaborate efforts across all agencies, and utilize GIS to visualize and communicate risk. The Resilience process will include coordination with the existing mitigation plans, as well as, identification of new action items.

Implementation Strategy: DOU will participate in all aspects of the Risk MAP process and provide data support, as necessary.

Responsible Office: DOU

Potential Funding: Staff time; coordination with FEMA

Schedule: Medium to Long Term

15. Review Flood Warning System

Issue/Background Statement: Sacramento County’s ALERT system consists of 2 base stations and 49 gauging stations. The system provides access to stage and rainfall information during storm events.

Implementation Strategy: Update sensors

Responsible Office: DOU (for City sensors), OES

Potential Funding: Cost estimate presented in table below, funding from DWR Grant

Flood Warning Element	Cost
Base Station Software	\$36,022.00
Base Station Hardware	\$4,502.75
Base Station ALERT1/ ALERT2 Receiver/Decoder	\$14,810.25
Trade-Up 5096 Transmitter to 50386-90 ALERT2 Transmitter Rain and Water Level	\$31,633.18
GRAND TOTAL	\$86,968.18

Schedule: Short Term, Fall 2016

16. Develop a Post-Earthquake Remediation Plan, if required by ULDC

Issue/Background Statement: A Post-Earthquake Remediation Plan is required by the 2012 *Urban Levee Design Criteria* (ULDC) if seismic damage from 200-year-return-period ground motions is expected after an urban level of flood protection is achieved. A seismic vulnerability analysis is to be developed to determine a rough estimate of seismic damage to the levee or floodwall system.

Implementation Strategy: Develop plan by 2025 in accordance with the ULDC. The plan should include emergency preparedness, mobilization, data gathering, actions, interim repairs, long-term repairs, extent of damage, and public notifications.

Responsible Office: DOU, OES, SAFCA, RD1000, ARFCD

Potential Funding: Funding from DWR Grant or Staff Time

Schedule: Long Term, 2025

17. Flood Relief Plan, if required by the ULDC

Issue/Background Statement: A Flood Relief Plan is required by the ULDC in the operation and maintenance manual (or emergency action plan) if flood relief structures such as culverts, gates, weirs, pumping plants, and levee relief cuts are relied upon for performing as designed to the urban level of flood protection.

Implementation Strategy: Develop plan by 2025 in accordance with the ULDC. The plan must include specified triggers, procedures, and responsible agencies for flood relief structures

Responsible Office: DOU, OES, SAFCA, RD1000, ARFCD

Potential Funding: Funding from DWR Grant or Staff Time

Schedule: Long Term, 2025

5 LEVEE AND OTHER STRUCTURAL IMPROVEMENTS

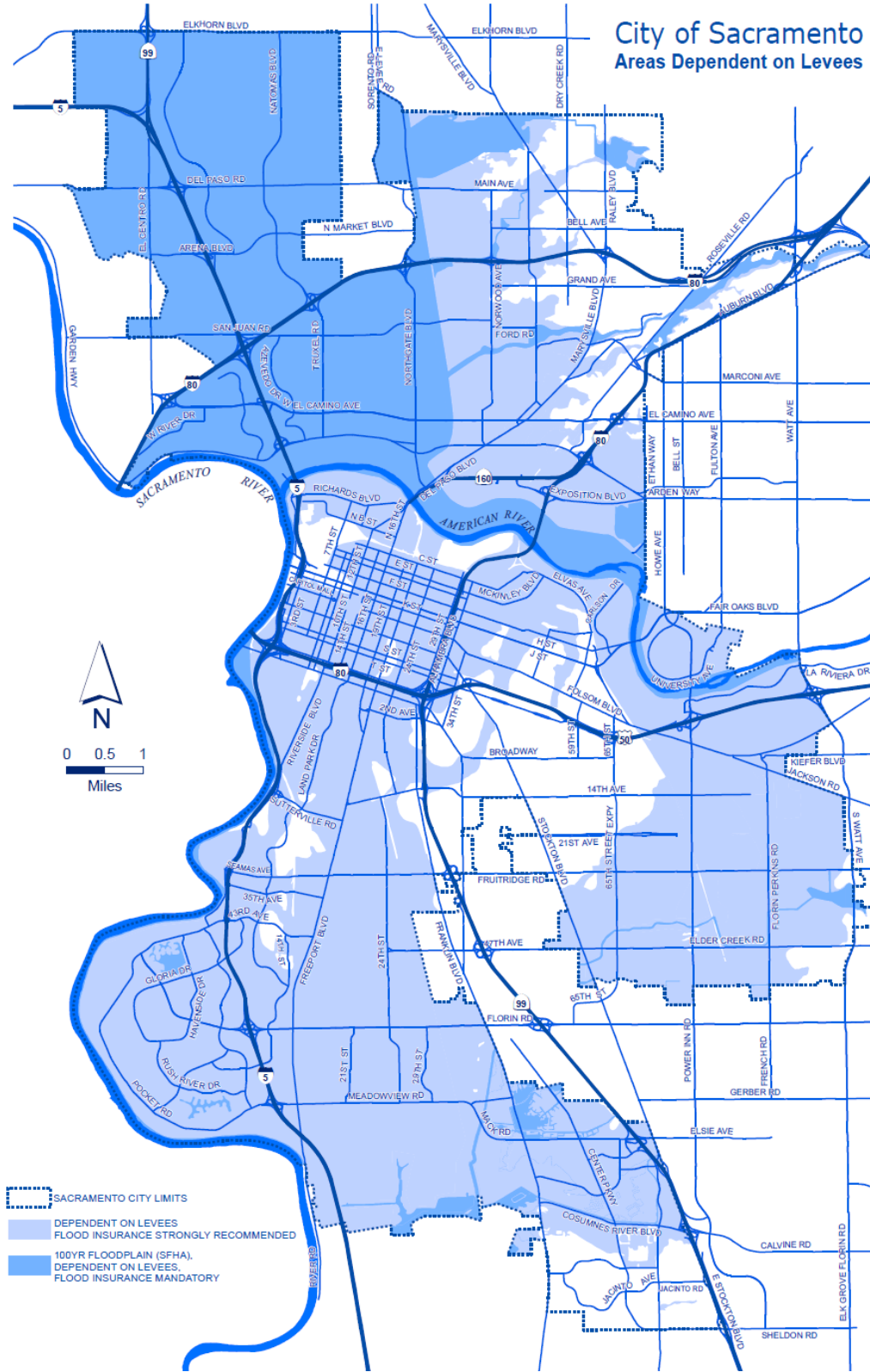
5.1 Introduction and Background

In the aftermath of the 1986 floods, several flood control projects were identified to address the flood risks in the Sacramento area. Some of these projects were designed to correct structural deficiencies observed during the flood, while other projects were added once the water had receded and revealed levee conditions. Additional projects were intended to increase the level of protection provided by the system. The 1997 flood event also highlighted additional deficiencies that are now being corrected to increase the level of community flood protection.

Much of the City is currently dependent on levees to prevent flooding. This can be seen in Figure 5.1.

This chapter provides a brief description of levee and other structural improvement projects that have been implemented to reduce flood risk in the City or that will be implemented over the next five years and beyond.

Figure 5.1. Areas of the City Dependent on Levees



Source: Department of Utilities

5.1.1 Reducing Flood Risk

To more effectively address problems that became evident following the 1986 floods, USACE recommended separation of projects connected with the Sacramento and American Rivers. The Sacramento River improvements would focus predominately on rehabilitating the existing system, while the American River required a significant increase in the system's flood control capacity. The State of California joined these efforts as a non-federal sponsor through DWR and Central Valley Flood Protection Board (CVFPB), formerly known as the State Reclamation Board.

Local agencies responsible for operating and maintaining the Sacramento metropolitan area levee system and managing land use in the floodplain reacted to these developments by requesting that the California State Legislature create SAFCA. Established in 1989, SAFCA is a regional joint-exercise-of-powers agency consisting of the City, Sacramento and Sutter counties, Reclamation District 1000, and the American River Flood Control District. SAFCA's long-term goal is to provide the urbanized portions of Sacramento with a minimum 200-year level of flood protection in order to reduce the risk of catastrophic damages and loss of life associated with a failure of the flood control system in the City.

SAFCA initiated a number of studies to determine the best implementable approach to address the area's flood problems. These flood control projects are in various stages of implementation; some have been completed, others are under construction, and a number are still being planned. The descriptions that follow include the purpose of each project and the anticipated completion schedule for projects still in design or under construction.

5.1.2 Seeking Long-Term Flood Solutions

During the flood season, the level of Folsom Reservoir is controlled by operating Folsom Dam in accordance with criteria set forth by the Secretary of the Army. When Folsom Dam was constructed in the early 1950s, it was believed that Folsom Reservoir would provide Sacramento with a 250-year level of flood protection. However, this estimate has been steadily downgraded over the years as more and better data were gathered on American River flows. In the aftermath of the 1986 and 1997 floods, USACE determined that the reservoir provides little more than a 63-year level of protection to people and property in the American River floodplain based on the operational criteria at the time.

SAFCA and the U.S. Bureau of Reclamation (Bureau) then considered options for reoperation (i.e., modifying the operation) of Folsom Dam and Reservoir.

- Reoperation would provide as much immediate flood protection as possible pending federal authorization and implementation of a long-term project to improve the existing American River flood control system.

-
- SAFCA and the Bureau would achieve this goal through an agreement under which Folsom’s existing flood control diagram governing reservoir storage space allocations and outflows during flood control operations would be revised to permit safe containment of a 100-year or larger flood event in the watershed.
 - In exchange for the additional flood protection, SAFCA would be obligated to reimburse the Bureau for a portion of the costs due to lost water or power resulting from the reoperation.

SAFCA and the Bureau also considered alternatives to increase space available for flood control at Folsom Dam. They decided to require a variable reduction in the reservoir pool when a designated amount of empty space was no longer available for flood storage in the three largest hydropower reservoirs (French Meadows, Hell Hole, and Union Valley) in the watershed upstream from Folsom. Since the dam was not designed for efficient flood releases with a low reservoir pool, substantial increases in empty space in the reservoir would yield only marginal increases in flood protection, thereby limiting the additional protection achieved through a reoperation plan to around a 100-year level. In 1994, SAFCA and the Bureau executed an agreement to operate Folsom Dam and Reservoir to take advantage of incidental flood control provided by upstream water and power reservoirs at French Meadows, Hellhole, and Union Valley. The intent is for reoperation to continue until it either becomes part of the permanent long-term plan for flood control improvements or is replaced by an alternative means of protection.

American Rivers Common Features & Folsom Dam

SAFCA and the CVFPB have been working with USACE to identify an American River project that will address the low level of flood protection provided by the existing system. As part of this effort, in 1992 SAFCA joined the state and USACE in proposing federal legislation to authorize:

- Construction of an expandable flood control dam along the north fork of the American River near Auburn.
- Improvement of the existing levee system around Natomas.
- Reoperation of Folsom Dam to create additional space for flood storage on an interim basis, pending completion of improvements to the dam.

The proposed dam would have increased the capacity of the existing flood control system to permit safe containment of floods up to a 200-year flood event level in the American River. However, in view of environmental and cost concerns, Congress deferred any action on the flood control dam and reoperation of Folsom, but authorized USACE to either proceed with construction of the Natomas levee improvements or credit SAFCA for undertaking these improvements as a local project.

In 1996, SAFCA again tried to build support for a flood control dam, but as in 1992, failed to gain the support of Congress. SAFCA also identified features that were “common” to any

project associated with controlling flood flows at Folsom Dam. These common features focused on the conveyance of higher flood flows through the leveed portion of the American River. The American River Common Features Authorization was adopted as part of the Water Resources Development Act of 1996. This authorization called for the strengthening of the American River levees to pass a design flow of 160,000 cfs with freeboard.

Being unable to gain support for an Auburn Dam, SAFCA and its state and federal partners identified a way to improve low-level flood releases from Folsom Dam by modifying the existing outlets gates. In 1999, Congress authorized the Folsom Dam Outlet Modifications Project (Mods) to increase low-level flood releases from the dam by enlarging the eight existing outlets and constructing two additional outlets. This would allow larger releases earlier in a storm event, providing additional flood storage in the reservoir. Once implemented, the plan was expected to provide the community with a 140-year level of flood protection.

Also in 1999, additional features were added to the Common Features Authorization to include:

- Additional levee raising on the American River's right bank.
- Levee strengthening on the right bank near the mouth of the Natomas East Main Drain Canal.
- Levee reshaping of the right bank near Jacob's Lane.
- Levee strengthening and raising of the Mayhew Levee.
- A closure structure for the Mayhew Drain.

All these improvements are to provide parity in the system that would allow passage of 160,000 cfs through the American River levee system. These improvements are nearly complete and should be finished in 2015.

In 2002, Congress acted again, approving a plan to raise Folsom Dam by seven feet called the Folsom Dam Raise Project. This project would allow additional flood water to be stored in the reservoir during a major flood event, and when implemented and combined with the outlet modifications and downstream levee improvements, would provide a greater than 200-year level of protection.

In 2005, the Mods project was stopped when construction bids for the first phase of work were significantly higher than expected. This unanticipated high cost created the need to re-evaluate the two authorized projects (Mods and Raise). As a result, USACE, CVFPB, SAFCA, and the Bureau looked at options that could address dam safety concerns and still provide at least 200-year protection.

In June 2006, a joint report was issued entitled Folsom Dam Raise and Auxiliary Spillway Project Alternative Solutions Study II, which identified an auxiliary spillway alternative with a 3.5-foot dam raise that would provide at least 200-year level of protection for the community. Costs of implementing this alternative are similar to the existing authorized projects, but have

significantly less risk in the construction. In addition, this project requires less construction time, resulting in an increased flood protection level sooner.

The auxiliary spillway project has been under construction for several years and is slated for completion in 2017 and will provide increased flood protection for properties in the American River floodplain. The Folsom Dam Raise project is expected to start construction in 2018 with completion of the project by 2022.

Sacramento River Projects

Sacramento Urban Area Levee Reconstruction Project (SUALRP)

During the 1986 flood, through-levee seepage occurred along much of the Sacramento River levees, both in the Natomas and Pocket areas. This was evidenced by serious landside sloughing of the levee in Natomas and “seepage boils” along the landside toe in the Pocket. This system deficiency, caused by porous levee materials and poor compaction, was corrected by the Sacramento Urban Area Levee Reconstruction Project (SUALRP), which addressed through-levee seepage problems within the Sacramento River Flood Control System (SRFCS). The project installed a slurry wall (lean concrete mix) or added a landside stabilizing berm along most of the levee from Verona on the north to Freeport on the south.

SUALRP was completed in 1993 under the direction of USACE. While it improved flood protection for the community, SUALRP did not increase the design level of flood protection. The federal government (through USACE), the CVFPB, and SAFCA shared the project cost of approximately \$37 million.

Sacramento Riverwall

The Sacramento Riverwall, a project feature of the SRFCS, is a concrete floodwall adjacent to Old Sacramento. The Riverwall is located on the east side slope of the Sacramento River between the I Street Bridge and the extension of R Street. Constructed in 1917 by the Southern Pacific Railroad, the Riverwall was determined to be unstable because of serious erosion on the waterside toe and design deficiencies found with the original construction. Failure of this section of the SRFCS at flood stage on the Sacramento River would cause flooding to Old Sacramento, downtown, and portions of Interstate 5. Reconstruction of the Riverwall was addressed by USACE as an additional element of SUALRP described above. The project was completed in the late 1990s.

Levee Slump on Garden Highway south of I-5

In 2002, RD 1000 noticed a gradual dip of the levee south of Interstate 5. The lowest point of the dip occurred near an existing agriculture well. Around the well was a fine sand, likely pumped from the ground during irrigation. Over time enough material was pumped that caused the levee to settle. RD 1000 and SAFCA agreed to put in a slurry cutoff wall to prevent seepage

from going through the levee and to raise the levee back to its original height. The seepage fix was designed to provide 200-year level of protection. The project was completed at a cost of \$1 million.

Little Pocket and Sump 132 Underseepage Remediation

In 2003, SAFCA completed approximately 2,400 feet of a levee underseepage cutoff wall in the Little Pocket area and 400-feet of levee underseepage cutoff wall construction at Sump 132 in the Pocket area. This project addressed known underseepage problems in the respective areas by creating a slurry wall approximately 110' deep to prevent high seepage pressures from weakening the foundation of the levee. The project was designed to protect against the 200-year storm event. The project was completed in 2004 for a cost of \$6.4 million.

Pocket Underseepage – Reach 2 and Reach 9

In order to pass the criteria for providing 100-year event protection against underseepage in the Pocket area, two reaches of levee needed to be treated for underseepage. Approximately 2,500 feet of cutoff wall were constructed in 2006. Completion of this work by USACE, along with erosion repairs, allowed USACE to certify that the Sacramento River levees in the Pocket area provided a minimum of 100-year level of protection.

Sacramento River Bank Protection Program (Sac Bank)

The Sacramento River Bank Protection (Sac Bank) Program is an ongoing effort to address systemic erosion issues along the Sacramento River and its tributaries, including the American River. Erosion constantly eats away at the river banks and can eventually threaten the levee section. The two greatest threats are high water events, which lead to scour and high bank erosion, and summer boat traffic, which creates wave-induced erosion at the levee toe.

In 2004, USACE completed levee toe erosion protection at River Mile (RM) 56.7, located downstream of Miller Park on the Sacramento River; this site is part of the Sac Bank program. This stretch of river is located in an area where there is no waterside berm, and the levee has an extremely steep waterside slope. It was identified as a critical erosion site that would need to be fixed prior to the levee being recognized as providing a 100-year level of flood protection. The erosion fix (a waterside rock berm with a soil planting trench) addressed existing erosion problems by remediating some large holes that were forming in the levee at the low water mark. The project prevents summer wave wash from eroding the levee and provides habitat for out-migrating salmonids.

Pioneer Reservoir

Pioneer Reservoir is located in the area on the proposed “Docks Project” development area along the Sacramento River just upstream of the California Auto Museum. This project constructed a seepage berm and six relief wells to address high seepage pressures in the area. The project was completed in 2007.

Natomas Area Flood Control Improvements (Local Project)

The 1986 flood demonstrated the inadequacy of the levee system protecting the Natomas basin and the lower Dry and Arcade Creek watersheds from high flows in the American River and tributary streams east of the basin. To address this problem, USACE proposed a series of levee improvements and other flood control improvements designed to address through-levee seepage and work in tandem with increased storage on the American River to provide affected areas with better flood protection. After SAFCA completed the work, FEMA recognized the Natomas Basin as having a 100-year level of flood protection. In addition, the project provided a minimum 100-year level of protection to the lower Dry and Arcade Creek watersheds, including portions of Rio Linda and North Sacramento.

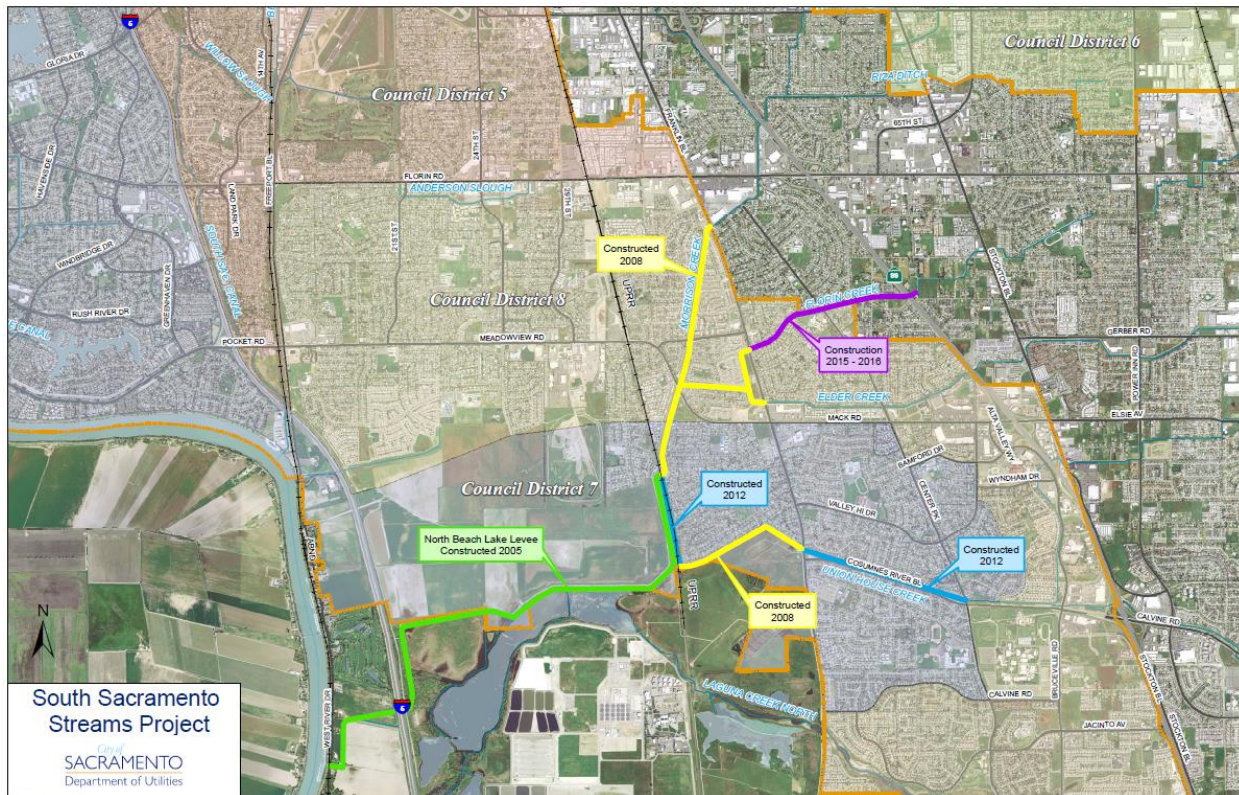
South Sacramento Streams Group (SSSG)

Morrison Creek levee system

The existing levee system along Morrison Creek and its major tributaries was found to have insufficient capacity to carry a 100-year flood event. The decrease in flood protection provided by the system is based on: (1) increased water surface elevations projected in the Delta; and (2) higher flows coming through the system from the upper reaches of the watershed. The problem could be further exacerbated as new development occurs upstream, unless the additional run-off is either detained upstream or the downstream channel capacity is increased.

USACE, in cooperation with SAFCA and the City and County of Sacramento, completed a study of alternatives, including both upstream detention and modifications to the downstream levee system. Results of the study supported work to be done to the existing Morrison Creek levees as well as to the Unionhouse, Florin, and Elder Creek levees. The County is also collecting development impact fees from upstream developers, which will be used to build detention basins to hold the additional run-off generated as new development occurs. A map of the affected area is shown in Figure 5.2 below.

Figure 5.2. Areas benefited by improvements to the Morrison Creek, Unionhouse, Florin, and Elder Creek levees



Source: DOU

In 2005, USACE completed construction of nearly four miles of levee from Freeport Boulevard/Sacramento River Levee on the west to the Union Pacific Railroad to the east, raising the existing levee system to protect against a 200-year storm.

USACE constructed floodwalls along the four creeks (Elder, Unionhouse, Florin, and Morrison) up to Franklin Boulevard. At the end of 2012, the final piece of the Morrison Creek project downstream of Franklin was completed. A 3,300-ft floodwall was constructed along the Union Pacific Railroad tracks on the east bank. The cost of this floodwall was \$5.9 million.

Unionhouse Creek Channel Improvements

In 2012, SAFCA, in partnership with the City of Sacramento and DWR, improved over a mile and a half of Unionhouse Creek between Franklin Blvd. and Bruceville Road. The project increased the amount of water that can be contained in the channel, resulting in 100-year flood protection. The cost of the construction project was a little under \$2.5 million.

Florin Creek Improvements

SAFCA, in partnership with the City of Sacramento and DWR, plans to construct a detention basin along Florin Creek near Persimmon Avenue which, in conjunction with channel improvements planned by USACE in cooperation with the CVFPB and SAFCA, will provide FEMA level of flood protection along much of Florin Creek from Highway 99 downstream to Franklin Blvd. Construction of these projects is to start in 2016.

American River–Related Projects

Mayhew Levee

The Mayhew Levee parallels the American River starting at the mouth of the Mayhew Drain and proceeding upstream for about 4,000 feet. In 2008, the levee was raised about three feet and widened to USACE standards, and a slurry wall was constructed through the center of the levee to a depth of about 60 feet. These levee improvements allowed 160,000 cfs to pass and provided 100-year level of protection. The Mayhew Drain Closure Structure was completed in 2009 and prevents water from the American River from backing up the drain and putting additional strain on drain levees.

Upper Levee Slope Protection

Through the area between Cal Expo to Rio Americano High School, the narrowest portion of the American River Parkway, flood events can create extremely high scour velocities on the upper face of the levee. As a result, high levee slope protection was needed for portions of the parkway. In order to reduce visual impacts of using rock to protect against scour, all the rock that was placed was buried under 6 to 12 inches of soil. In other areas where velocities are lower, creeping wild rye was used to help hold the soil together.

Slurry Wall Construction

After the 1997 flood, USACE recognized that levee underseepage could destabilize the levee foundation due to sand layers under the levee. As a result of this finding, slurry walls were constructed from 60 to 80 feet deep in order to prevent underseepage from affecting the levee foundation. Approximately 23 miles of slurry wall have been constructed. Several gaps in the slurry wall due to existing infrastructure will be addressed by other construction methods and should be completed by 2015; only a few sites remain.

Bank Protection

Portions of the American River are subject to extremely high velocities during a major flood event. These velocities can quickly erode banks and levee toes, leading to levee failure. Five major bank erosion sites along the American River have been fixed to date by USACE (constructed between 1996 and 2000). The lower end of this work is just downstream of Highway 160, while the upstream portion is downstream of Watt Ave. This work prevents

additional erosion from occurring at these sites, thus preserving levee integrity. In addition to the flood protection provided by these sites, they were also designed to provide habitat values. These sites now provide refuge to fish, and the tree plantings are reaching maturity.

SAFCA has done other erosion protection sites outside of USACE program along the American River including work downstream of the Highway 160 bridge on the left bank and upstream of Watt Avenue on the left bank.

Regional Sanitation Perimeter Levee

In order to protect the regional sanitation plant from flooding, a perimeter levee was required. The project was completed in 1996 for a cost of over \$7 million.

5.2 Current Implementation Status

There are currently six federally authorized projects that are being implemented to reduce flood risk to the Sacramento area:

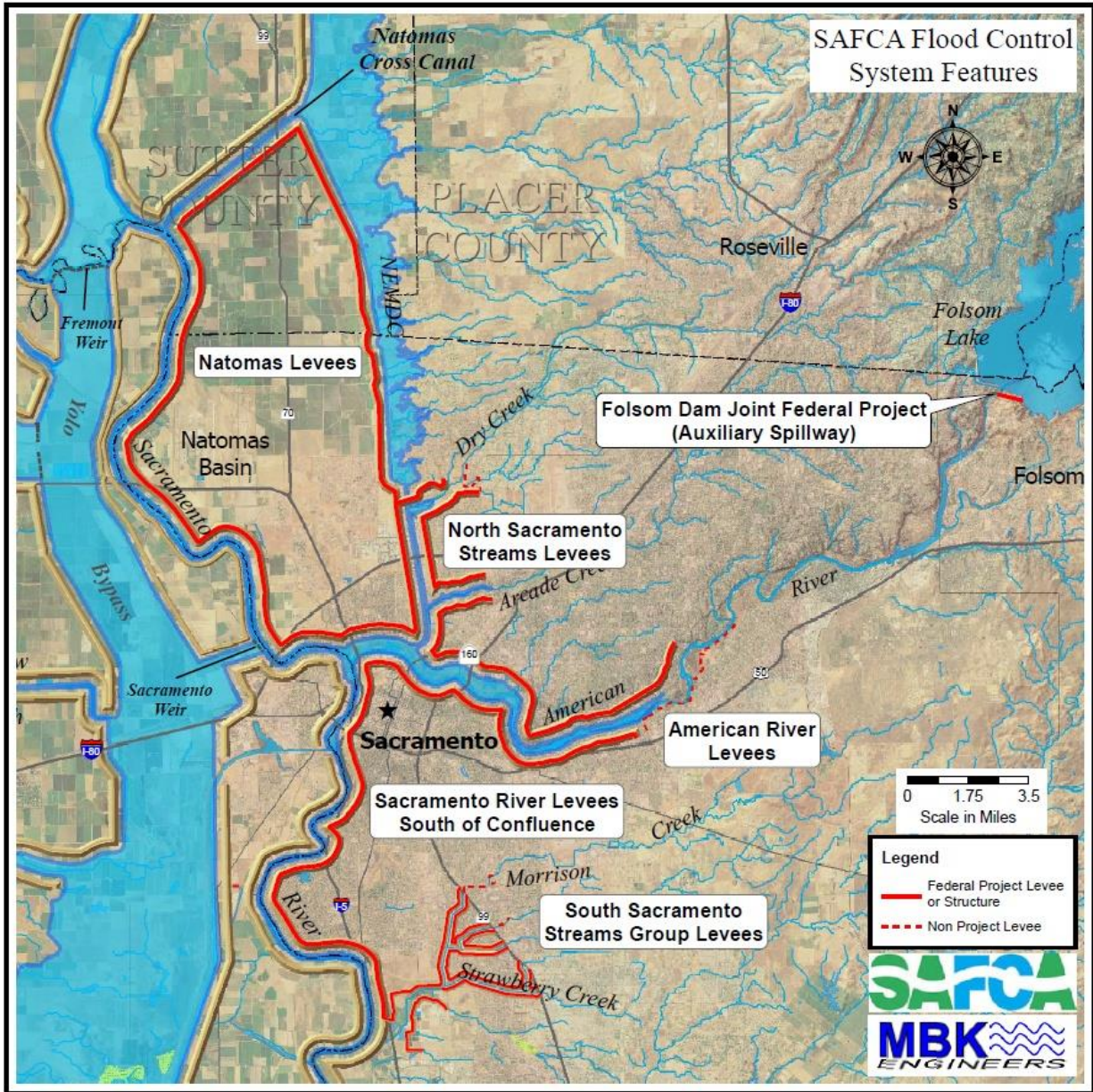
- Natomas Levee Improvement Project
- American River Common Features
- Folsom Dam Modifications/Joint Federal Project
- Folsom Dam Raise Project
- South Sacramento Streams Group Project
- Sacramento River Bank Protection Program

Other efforts are ongoing:

- SAFCA levee accreditation for FEMA level of protection
- Regional planning as part of the Central Valley Flood Protection Plan
- USACE-CVFPB-SAFCA General Reevaluation Report (GRR) planning for 200-year flood protection for Sacramento area
- SAFCA and City plan development for 200-year flood protection to meet state requirements for Urban Level of Protection and Urban Levee Design Criteria

The flood control system features that protect the City are shown in Figure 5.3.

Figure 5.3. Flood Control System Features that Protect the City of Sacramento



Source: SAFCA and MBK Engineers

Natomas Levee Improvement Project (NLIP)

In December 2008, Natomas was mapped into the FEMA 100-year floodplain. SAFCA’s efforts have been to restore at a minimum a 100-year level of protection, while working toward 200-year level of protection. SAFCA, in partnership with DWR and the CVFPB, began constructing levee improvements in 2007 in advance of the full authorization of the federal project, with the expectation of receiving credit for such work towards the non-federal share of the authorized

project. SAFCA's work included levee improvements along the Natomas Cross Canal and the upper reaches of the Sacramento River levees in Natomas. See Figure 5.4 below.

Figure 5.4. Natomas Levee Slurry Wall being constructed



Source: Kleinfelder

With passage of the Water Resources Reform and Development Act of 2014, USACE is taking the lead on completion of the remaining components of the NLIP. USACE' FY 2014 Work Plan includes \$1.0 million for preconstruction engineering and design work for the Natomas Common Features. USACE will commence construction of levee improvements along the southern and eastern portions of the Natomas Basin leading to 100-year and 200-year levels of flood protection over time. This estimated authorized project cost is approximately \$1.1 billion.

American River Common Features

Currently, SAFCA and its partners are studying what improvements are needed to meet a 200-year standard of protection for Sacramento's levee system. These improvements will be identified in a report to be produced by USACE called the Common Features General Re-evaluation Report (GRR). This GRR will identify future improvements to the levee system to meet the goal of 200-year level flood protection and address erosion protection, vegetation, seepage, and access requirements. The levee systems being reviewed are the American River levees, the Sacramento River levees downstream of the American River, and the north area streams (Natomas East Main Drain Canal, Magpie Creek Diversion Channel, and Arcade Creek).

SAFCA expects the final report to be complete in late 2015. Until the report is complete, USACE will continue to strengthen various portions of the American River levee system over

the next year, work that should be completed by the time the GRR is completed. Current authorization is \$280 million. After the study, it is expected that the authorization project will cost over \$1.5 billion.

Folsom Dam Modifications/Joint Federal Project (JFP)

This joint federal project (JFP) shown in Figure 5.5, consists of a six-gated control structure, a 2,100-foot auxiliary spillway with a stilling basin, and an approach channel in the reservoir leading to the control structure. The auxiliary spillway design can be used for flood control as well as ensuring dam safety. As a result of its joint purpose, portions of these improvements were being constructed by the Bureau, which has completed Phase 1 and Phase 2. The two phases of work almost finished the spillway. USACE in 2010 awarded Phase 3 (construction of the control structure itself) with approximate cost of \$220 million. Work on Phase 3 was completed in 2015. Phase 4 (the last part needed for flood control) was awarded in 2013 with a completion of all flood control features to be done in late 2016. Total project cost is estimated at \$810 million.

Figure 5.5. JFP Work on Folsom Dam



Source: SAFCA

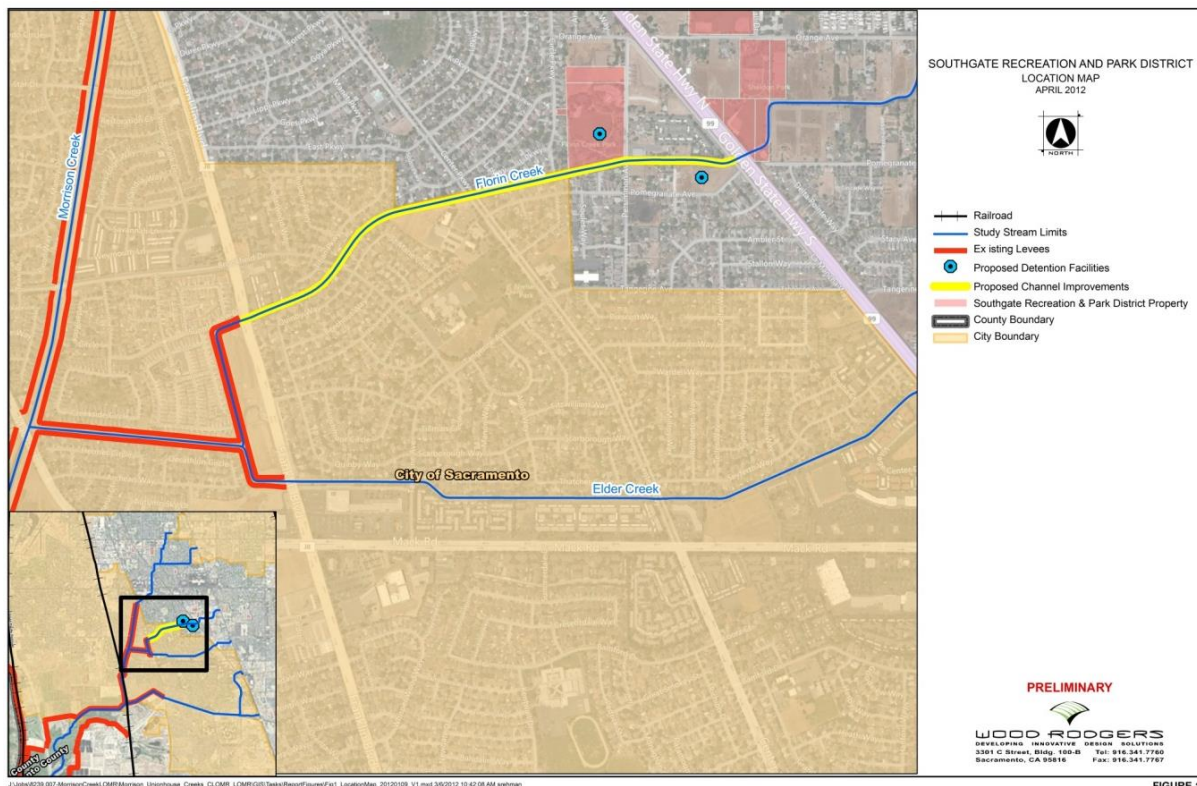
Folsom Dam Raise Project

The Folsom Dam Raise project will raise the height of the dikes around Folsom Lake by about 3.5 feet. Construction on this project will begin sometime around 2017 based on the progress of the JFP. The implementation of the JFP and the Dam Raise, along with downstream levee improvements, will give the City greater than 200-year level of flood protection along the American River. The Raise project should be complete in 2021/2022. The estimated project cost is \$122 million.

South Sacramento Streams Group

This project is complete downstream of Franklin Boulevard. The Union Pacific Railroad embankment was completed at the end 2012. The Florin Creek Channel Project and Florin Creek Multi-Use Basin Project are expected to begin in 2016 to provide channel improvements and construct a detention basin. These projects will allow the 100-year flood event to be non-damaging to surrounding properties. See Figure 5.6.

Figure 5.6. Area that will benefit from the Florin Creek Channel Project and the Florin Creek Multi-use Basin Project



Sacramento River Bank Protection Program (Sac Bank)

USACE receives yearly appropriations to implement the Sac Bank program, which addresses erosion issues. As a result, erosion repair work occurs yearly along the river system. Over the last several years, the Sacramento area has had an average of three to four sites a year repaired, averaging over \$2 million per year.

SAFCA Levee Accreditation for FEMA Level of Protection

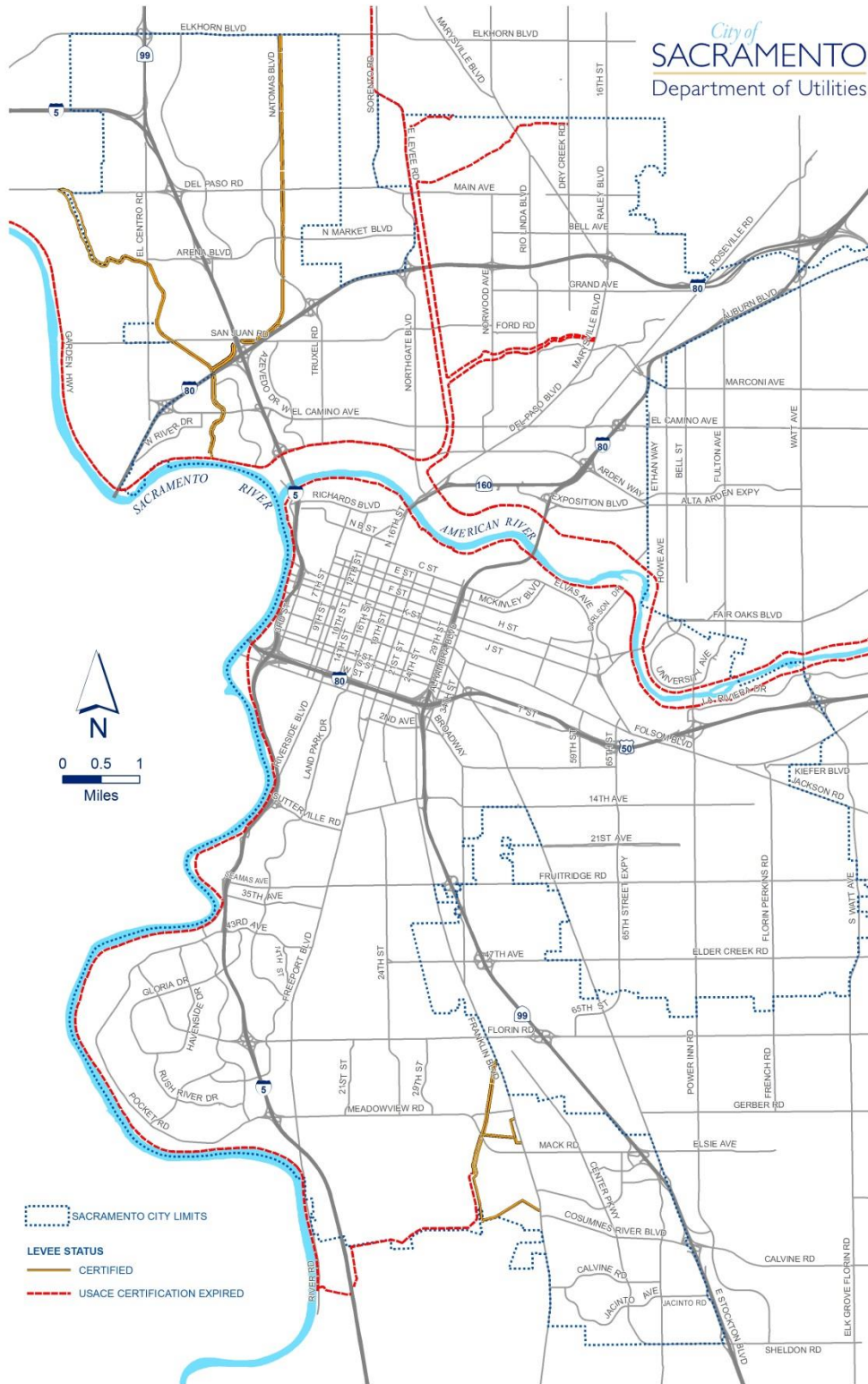
USACE expired the City's levee certifications in 2012 and 2013 because the certifications no longer met USACE's risk & uncertainty criteria and/or were older than 10 years. This is shown in Table 5.1.

Table 5.1. USACE Levee Certification Expiration Dates

Stream	Reach	Expiration Date
Dry Creek	North levee	March 19, 2012
Robla Creek	South levee from approximately Sully Street to City border on the east	August 31, 2013
Robla Creek	South levee from junction with Natomas East Main Drainage Canal to approximately Sully Street	March 19, 2012
Arcade Creek	North and south levees	March 19, 2012
Natomas East Main Drainage Canal	East levee from junction with American River north levee to the pump station north of Dry Creek	March 19, 2012
American River	North and south levee (not including Natomas)	August 31, 2013
Sacramento River	Left bank levee from the junction with the American River to the southern City limits	August 31, 2013
Morrison Creek	Junction with Sacramento River to Unionhouse Creek Right bank from Unionhouse Creek to Brookfield Drive	August 31, 2013

The status of the City's levees is shown in Figure 5.7.

Figure 5.7. City of Sacramento Levee Status



Source: DOU

In 2012, SAFCA along with the local communities and maintaining agencies, began developing a levee accreditation program to determine whether the levees protecting Sacramento along the lower American and Sacramento rivers and their tributaries (outside the Natomas Basin) adequately met the minimum requirements of the NFIP. The following projects need to be completed to accredit the levees:

Federal projects:

- Folsom Dam JFP
- Folsom Dam Raise
- American River Common Features WRDA 96/99
- South Sacramento Streams

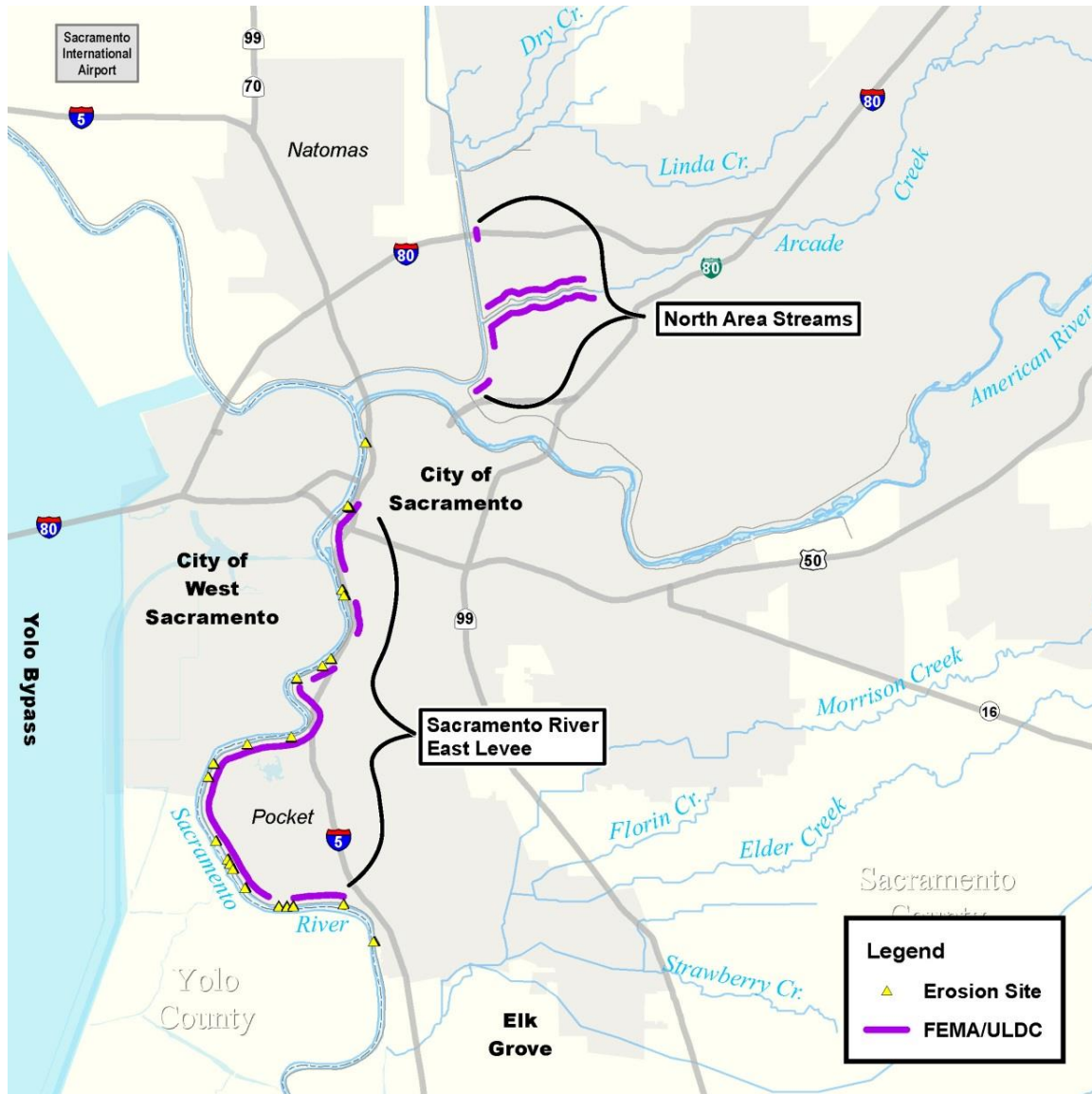
State and local projects:

- North Area Streams
- Sacramento River East Levee downstream of the American River
- Various high hazard encroachments/vegetation

The levees must also meet the State of California's Urban Levee Design Criteria (ULDC). The ULDC requires the city to address additional criteria including encroachments, vegetation, and access to the levees. It was decided that the levee deficiencies would be addressed in two phases – accreditation and modernization.

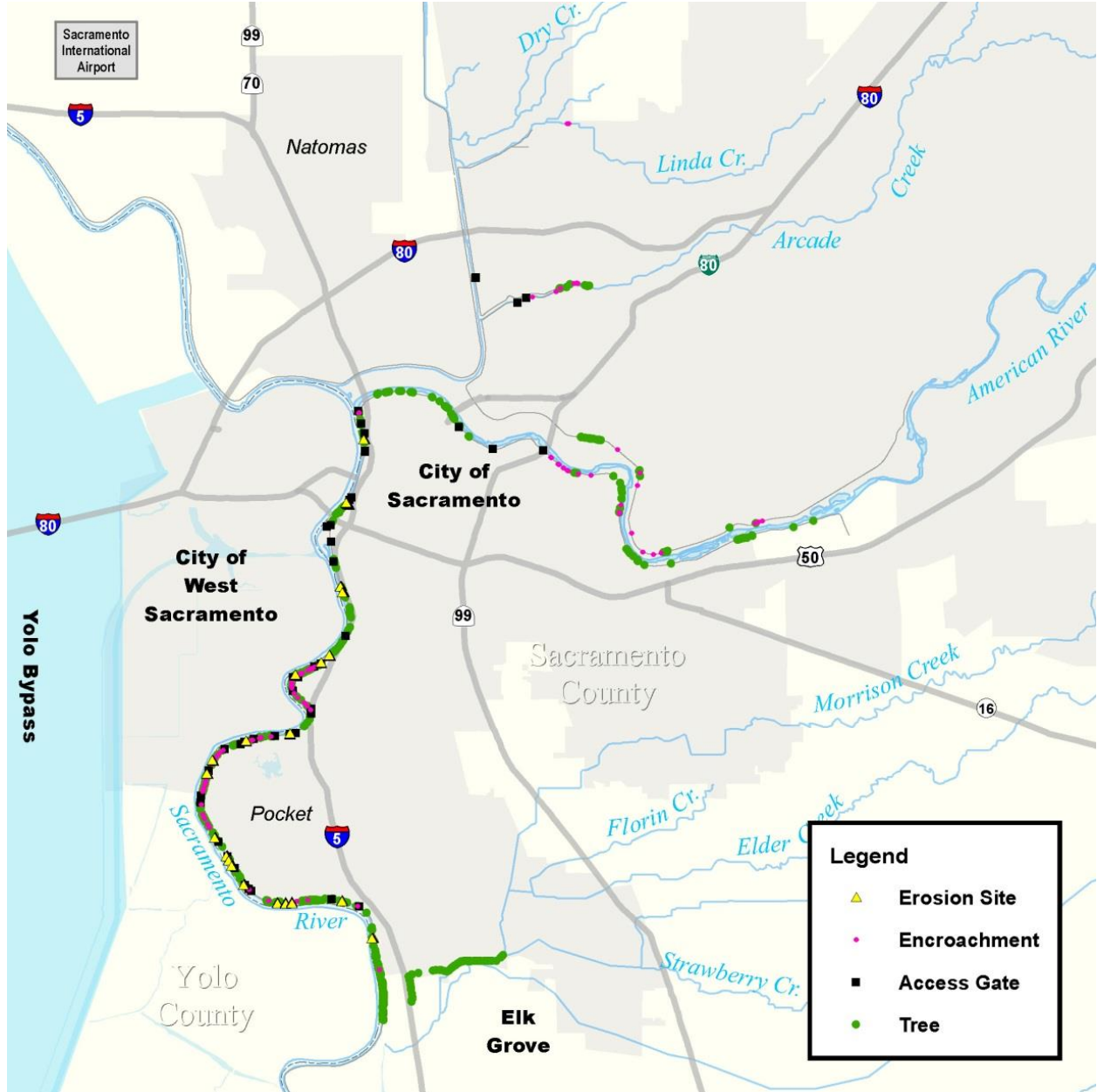
Figure 5.8 shows areas that need to be addressed in the short term (5 to 7 years) to meet the NFIP accreditation and immediate ULDC requirements.

Figure 5.8. Areas That Need to be Addressed in the Short Term to Meet the NFIP Accreditation and Immediate ULDC Requirements



The second phase is the modernization phase, which will be accomplished over 10-30 years. This will address encroachments, access, and vegetation that are categorized as low risk at the sites shown in Figure 5.9.

Figure 5.9. Sites Involved in the Long-Term Modernization Phase



SAFCA issued a Notice of Preparation in May of 2014 indicating its intent to issue an environmental impact report (EIR) for the proposed levee accreditation activities. SAFCA’s environmental firm is developing a draft EIR, which will be available for public review and comment in late Fall 2014.

Regional Planning

DWR launched the Regional Flood Management Plan (RFMP) effort to assist local agencies to develop long-term regional flood management plans that address local needs, articulate local and regional flood management priorities, and establish the common vision of regional partners. DWR is currently providing the funding and resource support to help develop phase 2 of the regional plans consistent with the 2012 CVFPP. There are six regions; the City is part of the Lower Sacramento River/Delta North region. When the regional plans are completed, DWR will incorporate feasible components of the regional plans in the 2017 CVFPP update.

5.3 Implementation Strategies and Action Items

Implementation actions described above are summarized in Table 5.2 and explained in the text that follows.

Table 5.2. Levee and Structural Improvement Action Items

Action	Responsible Department	Schedule
1. Support Local Efforts to Improve Flood Facilities	DOU, Engineering Services, Community Development, elected officials	Short term and ongoing
2. Plan and Implement Modernization Phase of Levee Accreditation and ULDC	DOU, Engineering Services	Long term
3. Participate in Regional Flood Management Plan	DOU, Engineering Services	Short term and ongoing

1. Support Local Efforts to Improve Flood Facilities.

Issue/Background Statement: The major flood projects that protect the City are joint USACE/CVFPP/SAFCA projects. As a parent agency of SAFCA, the City plays an important role in supporting local efforts to achieve timely improvements in flood protection.

Implementation Strategy: City staff and elected officials will continue to advocate for local flood improvements to achieve 200-year level of flood protection.

Responsible Office: DOU, Engineering Services, Community Development, elected officials

Potential Funding: Staff time

Schedule: Short term and ongoing

2. Plan and Implement Modernization Phase of Levee Accreditation and ULDC.

Issue/Background Statement: Along with RD 1000, the ARFCD, and MA 9, the City maintains a portion of the levees protecting it. The modernization phase of this program will occur in 10-30 years, and will address encroachments, access, and vegetation on the levees.

Implementation Strategy: City staff responsible for levee maintenance will carry out a program of bringing encroachments and vegetation into compliance with federal and state requirements. Maintenance access issues will also be addressed at that time.

Responsible Office: DOU, Engineering Services

Potential Funding: Staff time

Schedule: Long term

3. Participate in Regional Flood Management Plan.

Issue/Background Statement: The City has been an active participant in DWR's RFMP for the lower Sacramento River region.

Implementation Strategy: City staff will continue to participate in the RFMP to develop regional flood actions to improve operations and maintenance of existing facilities and formulate new flood projects that increase the level of flood protection.

Responsible Office: DOU, Engineering Services

Potential Funding: Staff time

Schedule: Short term and ongoing

6 INTERNAL DRAINAGE IMPROVEMENTS

6.1 Introduction and Background

In addition to the risk of flooding from levee failure, a considerable flood risk exists due to inadequate internal drainage infrastructure. This chapter discusses the flood risk reduction that can be realized from improvements to the City's internal storm drainage system. The chapter includes background material on the system, a review of the current system's status as a flood risk reduction tool, and a discussion of goals to improve the system.

6.1.1 Internal Drainage System

In Sacramento, as in most areas, runoff from rainwater enters storm drain inlets (DIs), which lead to an extensive underground storm drain pipe system. Because of the flat nature of the terrain in Sacramento, the runoff is then pumped through levees to a creek or river. If this system fails to operate properly (e.g., DIs are clogged, or pump stations are down), there is, depending on the storm intensity, considerable risk of property damage from flooding, see Figures 6.1 and 6.2.

Figure 6.1. Flooding Caused by Internal Drainage Issues, Anita Avenue and 23rd Street



Source: DOU

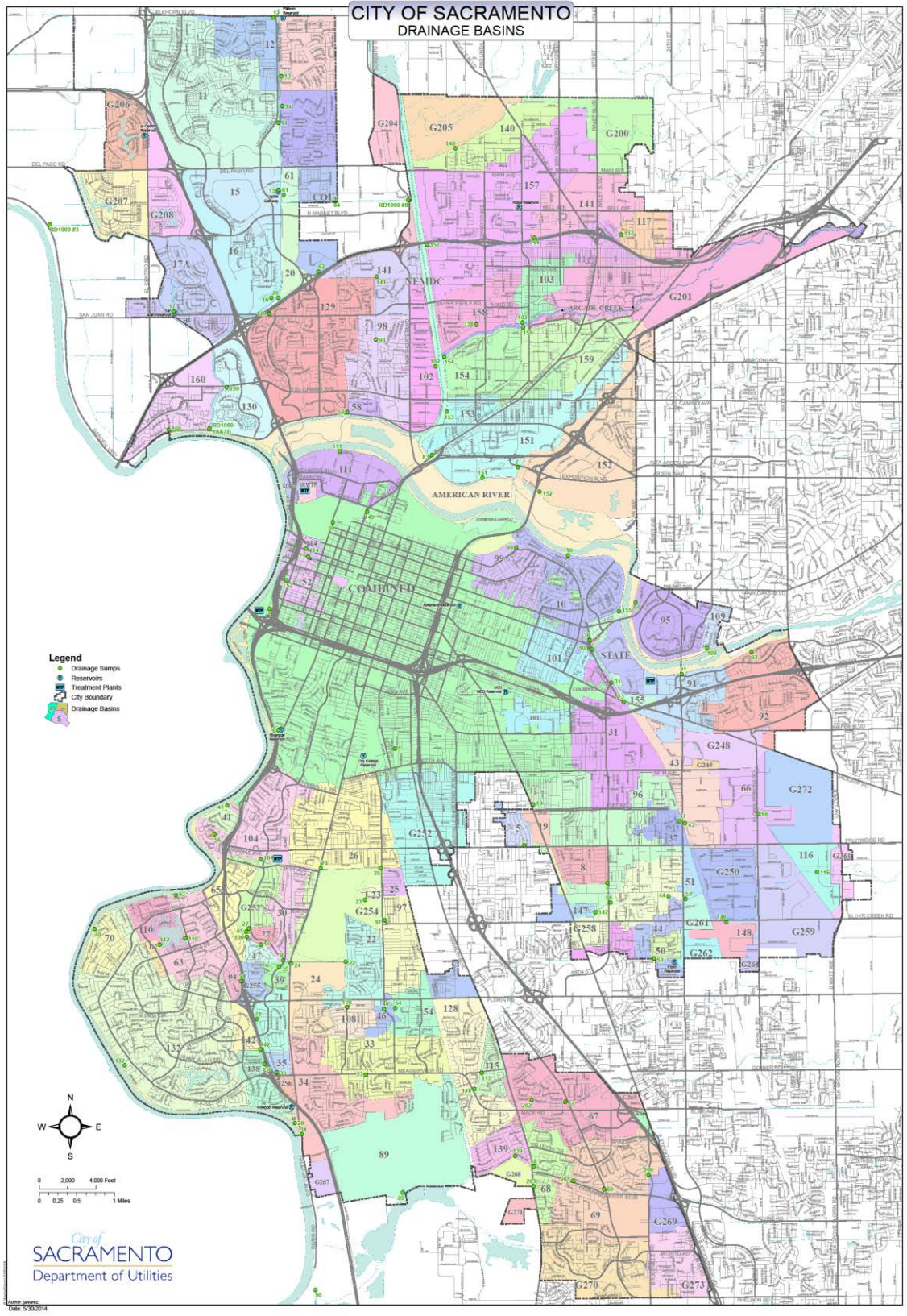
Figure 6.2. Flooding Caused by Internal Drainage Issues, Springman Street and 65th Avenue



Source: DOU

Although levee failure may result in much more catastrophic damage than flooding from internal drainage, most of the City's flood damage since 1955 has resulted from drainage deficiencies. In 1995, for instance, approximately 100 homes in 4 south area drainage basins incurred flood damage due to internal drainage system failure during a particularly intense storm. The City has a total of 1,354 miles of storm drain pipes, 49,914 DIs, and 105 pump stations. The City's drainage basins are shown in Figure 6.3. Much of this infrastructure was constructed before current storm drainage design guidelines were in place. In many areas, the system is sized based on outdated hydrology and does not have capacity to drain a 100-year storm event.

Figure 6.3. City of Sacramento Drainage Basins



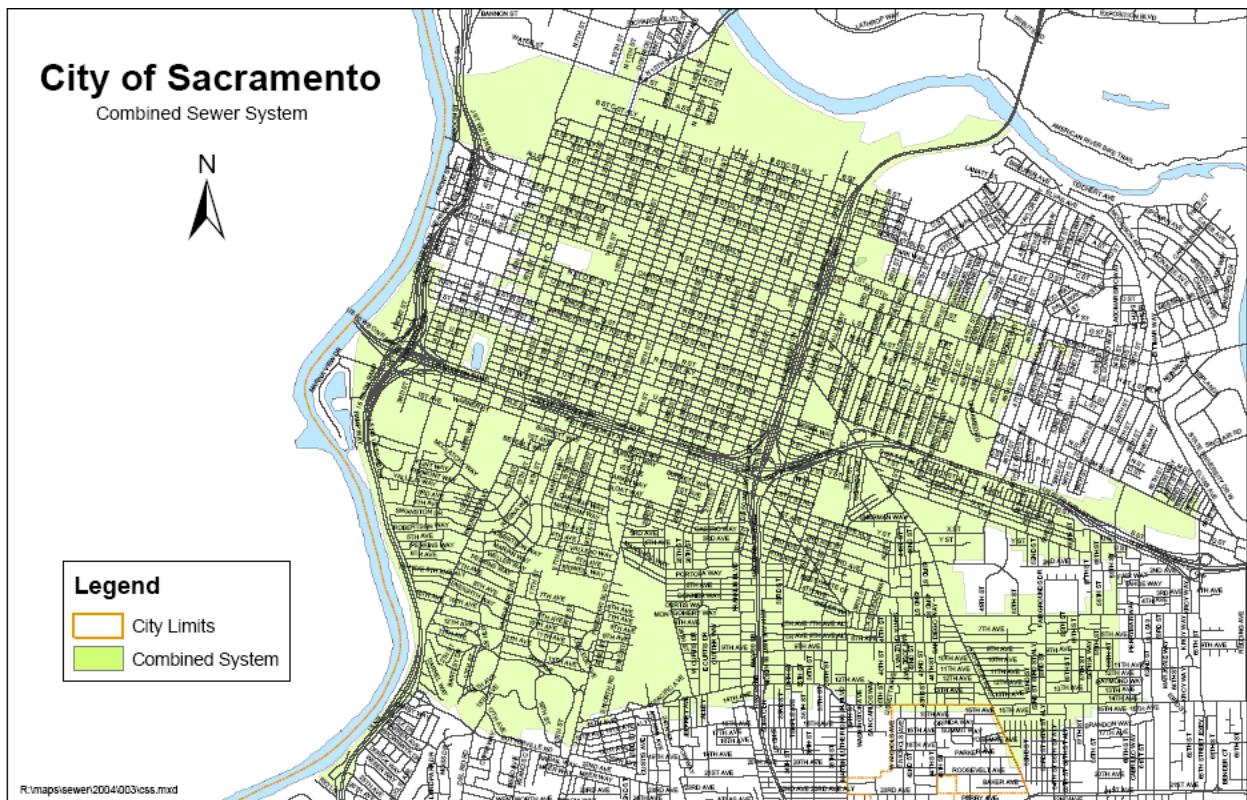
6.2 Current Implementation Status

Drainage Fund Shortfall

The combined sewer system (CSS), located primarily in the central part of the City, is unique in that, within its 7,500 acres, the drainage system and sewer systems are combined into a common network of pipes (see Figure 6.4).

Since utility customers pay both sewer and drainage rates, in the past, DOU has apportioned the cost for the state-mandated CSS Improvement Program between the Sewer Fund and Drainage Fund. However, due to a steady decline of the Drainage Fund, the CSS no longer obtains much financial support from this source, greatly impacting the program. Also, in order to reduce system surcharges and flooding, the City's National Pollution Discharge Elimination System (NPDES) Permit for its CSS requires expenditure of \$10 million per year for rehabilitation and improvements. The sewer fund is required to pick up the shortfall until such time as the Drainage Fund gets increased sufficiently to again support the CSS Improvement Program. However, the City cannot currently muster these funds, thus making Sacramento vulnerable to incurring regulatory penalties as well as to flooding.

Figure 6.4. City of Sacramento Combined Sewer System



Source: DOU 2004

The DOU is responsible for operating, maintaining, and making improvements to the storm drainage system. Upgrades to the system are achieved through drainage capital improvement projects (CIPs). These projects are identified through a master planning process and prioritized based on criticality, including the amount of flood risk reduced by the project. Approximately \$70 million of the highest priority projects have been completed over the last 11 years, but a backlog of over \$113 million identified by CIP prioritization for flooding issues remains, leaving many areas in the City with inadequate protection from a 100-year storm event (see Table 6.1).

Table 6.1. Partial Storm Drainage CIP Backlog List

Project	Cost
Basin 10 Pump Station Improvements	\$ 9,500,000
Basin 10 Conveyance (pipe upsizing) Improvements	\$ 8,400,000
Basin 10 Detention Basin	\$ 663,500
Basin 26 Pump Station Improvement	\$ 3,300,000
Basin 26 Conveyance (pipe upsizing) Improvements	\$ 11,900,000
Basin 26 Detention Basins	\$ 7,200,000
Basin 31, 32, 33, 34 and 113 Detention Basins	\$ 1,200,000
Basin 37 Conveyance Improvements and Detention Basins	\$ 790,000
Basin 43 Conveyance Improvements and Detention Basins	\$ 2,800,000
Basin 157 Pump Station Improvements, Conveyance Improvements and Detention Basins	\$41,500,000
Basin 151 Conveyance Improvements and Detention Basins	\$ 25,800,000
Total	\$113,053,500

Source: DOU records 2014

Repairs and upgrades to the system as well as its operation and maintenance (O&M) are funded from storm drainage user fees and sewer fees in the CSS. From the mid-1990s to 2004, the City spent around \$8 million per year on CIPs. However, due to increased operational, maintenance, and regulatory costs, and zero rate increases since 1996, the money available for storm drainage CIPs has greatly diminished. Now, for the first time in the DOU's history, no money will be available for storm drainage CIPs in the 2015 fiscal year budget.

Tackling this drainage project backlog will require significant investment from the City over the next 50 years. If the City wants to continue to design and construct the backlogged CIPs, it will have to address the health of the Storm Drainage Fund. Storm drainage user fees, like other City utility fees, are set (or approved) by the City Council with consideration of recommendations from the DOU's newly appointed Rate Advisory Commission (RAC). An effort to increase the funds available for CIPs should include the strategies outlined below.

Storm Drain Utility Fee Increase

The viability of the Storm Drainage Fund has been consistently eroding in the recent past due to increasing O&M costs and an ever increasing state and federal regulatory burden. During the past 17 years, there was no rate increase. Thus, any strategy to deal with the backlog of storm drain system improvement projects must include a strategy to raise the storm drain fee. In 1996, California voters passed Proposition 218 requiring that any storm drain rate increase must be put to a vote of the rate payers and approved by at least 50 percent of those who vote. Success will depend on whether the public can be convinced that a rate increase is warranted.

Operational Efficiencies

Currently, the majority of the storm drainage budget goes to O&M. The cost of this effort has outstripped inflation in the recent past due to large increases in the cost of regulatory requirements and fuel, labor, chemicals, and materials. Much work has been done already to increase the efficiency of storm drain O&M. Since every dollar not spent on O&M is a dollar that can be spent on CIPs, and since dollars spent on CIPs often result in lower O&M costs, significant efforts to improve O&M efficiency must be an important part of the strategy to provide money for capital improvements to the storm drain system.

Grants

There are several sources of grant funding for drainage improvement, including grant funds from the FEMA through the California Governor's Office of Emergency Services (Cal OES). For instance, grant funding might be procured to build a detention basin that would eliminate the flooding of homes on the City's NFIP Repetitive Loss list. Funding from the DWR's FloodSafe program and the State Water Resources Control Board's grants and loans program are also available.

Regulatory Fees

A significant portion of the money spent from the Storm Drainage Fund is used to comply with federal and state regulatory requirements. Funding these expenditures through a regulatory fee collected expressly for that purpose would free up a commensurate amount of the drainage fund for CIPs. This fee would not address the Storm Drainage Fund's structural problems, but would increase the amount of money available for CIPs.

6.3 Implementation Strategies and Action Items

The following implementation strategies outline what the DOU will do generally in the long term and specifically in the next five years to reduce flood risk from inadequate internal drainage.

Long-Term Goals (2025)

- 1) Stabilize funding for Drainage CIPs at \$15 million per year.
- 2) Complete 50 percent of drainage CIP back log.
- 3) Continue improved efficiency evaluations for operations, maintenance, and engineering portions of drainage operation.

Implementation Actions (2016-2021)

The overall 5-year goal is to achieve a funding level for Drainage CIPs of \$5 million per year (see Table 6.2). Specific implementation actions are described below the table.

Table 6.2. Internal Drainage Improvement Action Items

Action Item	Responsible Department	Schedule
1. Develop Grant Program for Drainage Improvements	Engineering Services, Business Services	Short term and ongoing
2. Reduce Cost of Drainage Maintenance Operations by 10 Percent	Field and Plant Services, Engineering Services, Business Services	Short term and ongoing
3. Develop Engineering Services Efficiency Plan	Engineering Services, Business Services	Short term
4. Establish Regulatory Fee	DOU Public Information Office, Engineering Services, Business Services	Short term
5. Work for Passage of Proposition 218 Drainage Fee Increase	DOU Public Information Office, Engineering Services, Business Services	Short term
6. Develop Drainage Development Fee	Engineering Services, Business Services	Short term
7. Develop Drainage Master Plans	Engineering Services	Short term and ongoing
8. Update the 2011 Watershed Management Plan (WMP)	Engineering Services	Short term and ongoing

1. Develop Grant Program for Drainage Improvements.

Issue/Background Statement: Pursue grant funding opportunities from FEMA, DWR, and the State Water Resources Control Board for drainage improvement projects.

Implementation Strategy: Develop a grant program that will identify and pursue grant programs that will average \$500,000 per year to augment other funds for drainage

improvements. One full-time City employee or commensurate level of effort from a consultant will be needed.

Responsible Office: Engineering Services, Business Services

Potential Funding: City staff

Schedule: Short term and ongoing

2. Reduce Cost of Drainage Maintenance Operations by 10 Percent.

Issue/Background Statement: A potential source of funding for drainage improvement projects is to reduce costs from the existing maintenance program and redirect the savings.

Implementation Strategy: Evaluate levels of service with impetus and direction from the DOU director and Division managers.

Responsible Office: Field and Plant Services, Engineering Services, Business Services

Potential Funding: City staff

Schedule: Short term and ongoing

3. Develop Engineering Services Efficiency Plan.

Issue/Background Statement: As with Action 2, potential savings from increased efficiencies in Engineering Services could be applied to drainage improvements.

Implementation Strategy: Develop an engineering services efficiency plan to evaluate potential cost savings in Engineering Services staff responsible for design and construction of CIPS and overhead (e.g. electricity, supplies, etc.).

Responsible Office: Engineering Services, Business Services

Potential Funding: City staff

Schedule: Short term

4. Establish Regulatory Fee.

Issue/Background Statement: City staff has completed research and development of a regulatory fee that has the potential to provide up to \$1.5 million per year for drainage improvements.

Implementation Strategy: Present an assessment of the regulatory fee proposal to neighborhood groups and individual City Council members. The current climate is not good for establishing fees like this, so timing will be a key consideration.

Responsible Office: DOU Public Information Office, Engineering Services, Business Services

Potential Funding: City staff. Attempting to put a regulatory fee in place will require significant staff time, but probably no capital outlay.

Schedule: Short term

5. *Work for Passage of Proposition 218 Drainage Fee Increase.*

Issue/Background Statement: Proposition 218 requires an election to increase city drainage fees. The fee increase would first have to be recommended by the DOU's Rate Advisory Commission and then approved by the City Council before it could go on the ballot.

Implementation Strategy: As with the regulatory fee, the current climate for rate increases is poor. Part of the initial strategy would be to determine the best timing to take this to the City Council and then to the voters.

Responsible Office: DOU Public Information Office, Engineering Services, Business Services

Potential Funding: City staff. This would entail significant effort in both staff time and consultant expenses. An effective outreach campaign could cost over \$1 million with no guarantee of success.

Schedule: Short term

6. *Develop Drainage Development Fee.*

Issue/Background Statement: A drainage development fee could generate up to \$1 million per year to fund drainage improvements.

Implementation Strategy: Develop a report to the City Council to propose a development fee, how the fees would be assessed, and how the funds would be used.

Responsible Office: Engineering Services, Business Services

Potential Funding: City staff

Schedule: Short term

7. Develop Drainage Master Plans.

Issue/Background Statement: The City has completed 29 Basin Master Plans. Nearly all master plans have been completed for all the A (highest) priority basins. A number of master plans have been completed for B (medium) priority and C (low) priority basins where problem areas have been identified based on flooding and subsequent analysis.

Implementation Strategy: Over the next 5 years, complete Drainage Master Plans for 10-15 prioritized basins.

Responsible Office: Engineering Services

Potential Funding: City staff

Schedule: Short term and ongoing

8. Update the 2011 Watershed Management Plan (WMP).

Issue/Background Statement: The WMP should be updated every 5 years along with the County-wide LHMP. The WMP is located in Appendix G of the 2011 LHMP. The FEMA CRS, under the Insurance Services Office, recommends watershed management planning that is not limited to corporate boundaries. Under CRS Activity 450, a participating community may receive points toward improved rating and lowered flood insurance premiums for preparing a plan such as this and updating that plan every 5 years.

Implementation Strategy: Update the WMP by 2016 and coordinate as needed with FEMA for CRS credit.

Responsible Office: Engineering Services

Potential Funding: City staff

Schedule: Short term and ongoing

7 RISK COMMUNICATION

7.1 Introduction and Background

The Community Rating System (CRS) is a part of the NFIP. It provides reductions to flood insurance premiums in participating communities. The reductions are based on community floodplain management programs, including public information activities. To keep those discounts, communities must continue to implement their programs and provide status reports to the NFIP each year. Sacramento has been an active participant of the CRS since October of 1991. The City is currently rated as a Class 5 which rewards residents with a 25-percent reduction in their flood insurance premiums in the Special Flood Hazard Areas (SFHA) (Zones A, AE, A1-30, AO and AH) and a 10-percent reduction in non-SFHA areas (Zones X, B, C, A99, AR, and D).

A Program for Public Information (PPI) is 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 CRS credit for a 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. Sacramento has developed its PPI in accordance with the *2013 CRS Coordinator's Manual* credit criteria found within Activity 330.

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. Because of the independent approaches to outreach, this Chapter of the CFMP was prepared to bring together all of the ideas from the various departments under one comprehensive document. The City has been working on stormwater issues for several years based on the unique conditions of a combined stormwater and sewer system, flat terrain, and levees which create bathtubs if pumps are not operating properly.

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 provides the ability for communities to decide how to best deliver messages to various groups in throughout the City; and for Sacramento, this was a welcomed change.

Step 1: Establish a PPI Committee

A PPI should assess all the community's needs for flood-related information and coordinate all the resources that can deliver information. It should recommend a range of activities that convey information to residents, businesses, tourists, school children, and other audiences in and around the community. It should have an objective review of what is being done and how public

information activities could be improved. Therefore, a PPI needs to be developed by a committee that consists of members from both inside and outside local government.

Membership and Stakeholders

The PPI Committee’s membership must meet the following CRS criteria:

- There must be at least five people on the committee.
- There must be representation from the community’s floodplain management office.
- There must be representation from the community’s public information office, if there is one.
- At least half of the members must be from outside the local government (“stakeholders”).

The CRS encourages engagement of groups and people outside the local government in planning and conducting outreach projects. As outlined above, at least one-half of the members of the PPI committee must be representatives from outside the local government. Sacramento focused on a diverse membership including city staff, citizens located in floodprone areas, and other outside stakeholders involved most directly in the buying and selling of real estate.

The participants comprising the PPI Committee for Sacramento were selected in accordance with the above CRS criteria and include the following:

- 1) Connie Perkins, PE, CFM –Floodplain Manager (DOU)
- 2) Jessica McCabe – Public Affairs/ Outreach and Education (DOU)
- 3) Jim McDonald, AICP, CFM – Sacramento Community Development Department
- 4) Lisa Deklinski – Security and Emergency Preparedness (DOU)
- 5) Yanelis Rios– Junior Engineer (DOU)
- 6) BG Heiland – Sacramento Resident (Natomas)
- 7) Tom Reavey – Sacramento Resident (Natomas)
- 8) Sam Yee –Lyon Realty, Realtor (Sam4Homes Realty in Pocket Area)
- 9) Jeffery Beck – Flood Insurance Agent (Jeffery Beck Insurance Services)
- 10) Ashley Sanchez – Mortgage Lender (Vitek Mortgage Group)
- 11) Kevin Littlefield – Mortgage Lender (West Coast Mortgage Group)

Figure 7.1. PPI Committee



Source: David Stroud

Committee Meetings

The PPI Committee met three times during the planning process to complete the outreach program. Each of the PPI meetings was held at the Belle Cooleedge Library at 5600 South Land Park Drive, Sacramento, CA 95822. The meeting dates and objectives covered included:

- Meeting # 1 – July 23rd, 2014 – Assessing the community’s current public information needs (PPI planning process, assessment of flood hazards, exposed buildings, flood insurance coverage, identification of target audiences and identification of target areas)
- Meeting # 2 – September 10th, 2014 – Define outreach messages and potential outreach projects (Review July 23rd meeting, discuss and debate outreach project messages to target audiences and target areas and discuss and debate the outreach projects (six CRS priority topics) to deliver those messages along with the dissemination methods)
- Meeting # 3 – October 29th, 2014 – Examine other outreach project initiatives and evaluate flood response preparations. (Reviewed September 10th meeting including the six CRS priority topics and outreach messages, discussion of existing CRS outreach project initiatives and flood response preparations.)

Each committee meeting was held in the evening to allow fuller participation. Based on discussion from the PPI Committee, the meetings lasted approximately 1.5 to 2 hours with the first meeting lasting just over 2 hours.

The responsibilities of the PPI Committee included not only participation throughout the development of the PPI through the 3 meetings, but will also include meeting on an annual basis to review the progress on implementing this plan.

Appendix A includes the invitations, agendas, and sign-in sheets from the three PPI Committee Meetings.

Step 2: Assess the Community's Public Information Needs

Sacramento is located in north central Sacramento County. The City comprises approximately 99 square miles in total area. The United States Census Bureau estimates the 2013 City of Sacramento population at 479,676. The majority of the land use within Sacramento is residential (rural, suburban, traditional, and urban) according to the City of Sacramento 2035 General Plan Land Use.

Most buildings are slab-on-grade (Diagram 1 on the FEMA Elevation Certificate) and therefore susceptible to flood damage from shallow flooding and drainage problems. Because the City is located in a unique low-lying area, it is particularly susceptible to flooding from major rain events.

Flood Hazards:

The City is located among a complex system of waterways and levees creating potentially the most floodprone community in the nation. Sacramento is located at the confluence of the Sacramento and American Rivers. The Sacramento River is fed by the Feather River and the Sutter Bypass to the north and runs along the western edge of the City. The Sacramento River splits and forms the Yolo Bypass in the Natomas Basin area. Additionally, the American River runs eastward from the Sacramento River and forms a linear transects through the City.

Much of the City, approximately 75-percent, is currently dependent on levees to prevent flooding. The USACE expired the certifications for the City's levees in 2012 and 2013 because the certifications no longer met the USACE's risk & uncertainty criteria and/or were older than 10 years. In 2012, SAFCA along with the local communities and maintaining agencies, began developing a levee accreditation program to determine whether the levees protecting the City along the lower American and Sacramento rivers and their tributaries adequately met the minimum requirements of the NFIP. This ongoing accreditation program is discussed in further detail in Chapter 5. Currently, the areas behind the levees are still identified on the Flood Insurance Rate Maps (FIRMs) as providing 100-year flood protection.

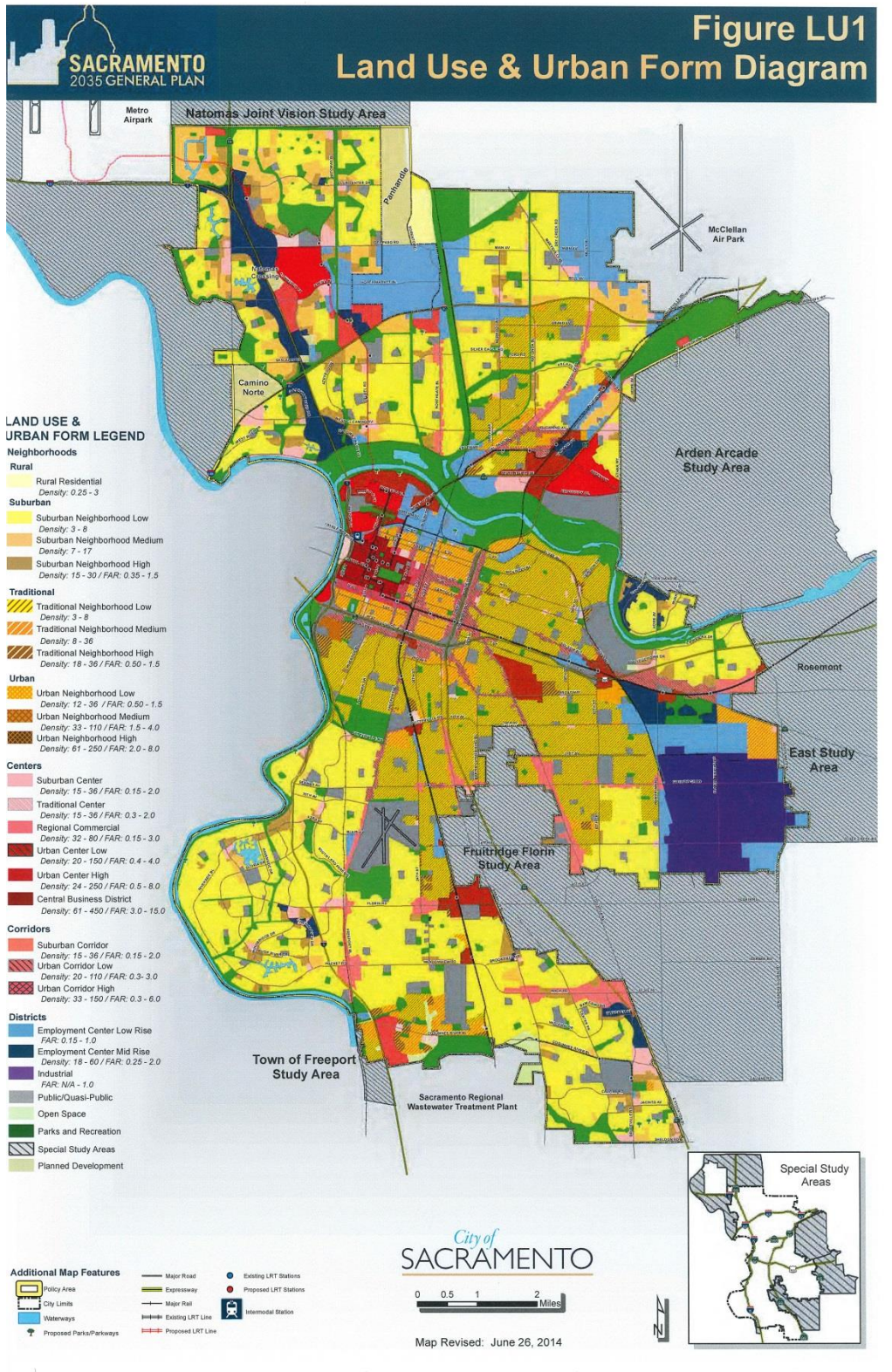
Internal drainage creates a considerable risk in the City for shallow flooding. Internal storm drainage creates flood issues for many buildings because of the flat nature of terrain and runoff which is pumped through levees to a creek or river. If drainage inlets are clogged or pump stations fail there 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.

The PPI Committee's assessment of the major causes of flooding include:

- Internal drainage issues/combined sewer system
- Levee river flooding
- Dam breach
- Upstream development

The PPI Committee is concerned about the message that the new FIRMs for Sacramento provide to residents, since many of the levee certifications have expired, but are recognized as providing 100-year flood protection. Because many residents are not shown to be in a 1-percent annual chance flood zone, the perception of being damaged from flooding is highly reduced.

Figure 7.2. 2035 General Plan, Land Use



Source: City of Sacramento 2035 General Plan

The City of Sacramento realizes the importance of respecting, protecting, and maintaining the natural flood protection benefits and wetlands within the City. Several land use policies in the 2035 General Plan are designed to achieve these goals. They include:

- Resource Protection
- Conservation Open Space
- Natural Lands Management
- Retain Habitat Areas
- Riparian Habitat Integrity
- Wetland Protection
- Annual Grasslands
- Oak Woodlands
- Wildlife Corridors
- Habitat Assessment
- Agency Coordination
- Natomas Basin Habitat Conservation Plan
- Support Habitat Conservation Plan Effects
- Public Education
- Community Involvement

The PPI Committee is aware that the environmental preservation and protection of floodplain functions, which includes hydrologic and hydraulic processes, geomorphic processes and biologic processes, are important. The seasonal and storm-generated variations in water flow, including periodic flooding, are part of the normal functions of the floodplain. These variations keep erosion and accretion in equilibrium, replenish soils, recharge groundwater, and filter impurities. Therefore, maintaining the natural areas of the City can be helpful in reducing flood damage.

Social and Economic Needs

According to the 2010 US Census, 18.3% of Sacramento residents are Asian while 26.9% of residents are Hispanic or Latino. Additionally, 36.5% of residences have a language other than English spoken in the home. It is estimated from 2008 to 2012 that approximately 20.2% of the population is considered as living below the poverty level. Additionally, 17.5% of the population has not obtained a high school diploma or equivalent. These social and economic factors were considered by the committee in ensuring that the right messages, tools and resources were used to overcome obstacles. The committee recognized that messages would need to be distributed in different forms and using different sources in order to reach all target audiences.

The following groups have been identified by the PPI Committee as target audiences who need special messages on flood protection:

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

An analysis of FEMA flood zones and repetitive loss properties shows that the entire City and all flood zones including X zones are subject to flooding, and the PPI should strive to reach all businesses and residents (both homeowners and renters).

Target Audience #2: School Children

School children tend to take the messages they learn back home which can change behavior within the family itself.

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

These groups play a key role in conveying information about flood insurance to homeowners. The PPI Committee will make sure these groups are informed and equipped with the tools needed to convey flood risk and flood insurance information to residents, especially before final transactions for buying property takes place.

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

An unknown number of residents in Sacramento are vulnerable in terms of their condition and ability to safely evacuate in case of an emergency. This group can include: blind/visually impaired, cognitive impairments, culturally diverse, deaf/hard of hearing, homeless, mental health conditions, mobility impaired, and seniors.

Target Audience #5: Political Leaders

Change in promoting flood safety and flood response occurs when political leaders understand the value of such efforts. Many on the PPI Committee wanted the City Council and other elected officials to be listed as a Target Audience since they are in charge of the purse strings which can benefit flood protection and flood response programs. Therefore, this PPI will encourage political leaders to provide the appropriate resources necessary to protect the residents and businesses within Sacramento.

Target Audience #6: Language Barriers

Many languages are represented within the City of Sacramento. Many complex issues related to floodplain management including the 1% annual chance flood, elevation certificates, substantial improvement, etc. may need to be explained in languages other than English. Between 2009 and 2013, the United States Census Bureau indicated that 17% of the City's total population spoke Spanish at home most or all of the time while 13% of the total population speak Asian or Pacific Islander languages at home most or all of the time. As such, providing materials in native languages could make for better understanding of flood protection materials.

In addition to the target audiences detailed above, the PPI Committee identified the following stakeholders as being able to provide support and informational materials to supplement and enhance the outreach efforts detailed in this PPI:

- FEMA
- California Department of Water Resources
- California NFIP State Coordinator
- California Office of Emergency Services
- City Office of Emergency Services/County Office of Emergency Services
- Sacramento Ready
- Floodsmart.gov
- Ready.gov
- Red Cross

Delineate Target Areas

In order to develop an effective local outreach program that raises public awareness about flood related issues, it is necessary to identify and assess the areas within the community that are considered to be flood-prone. The PPI Committee identified the following target areas and concluded that outreach projects should be directed to all properties (residential, commercial and public) within these areas:

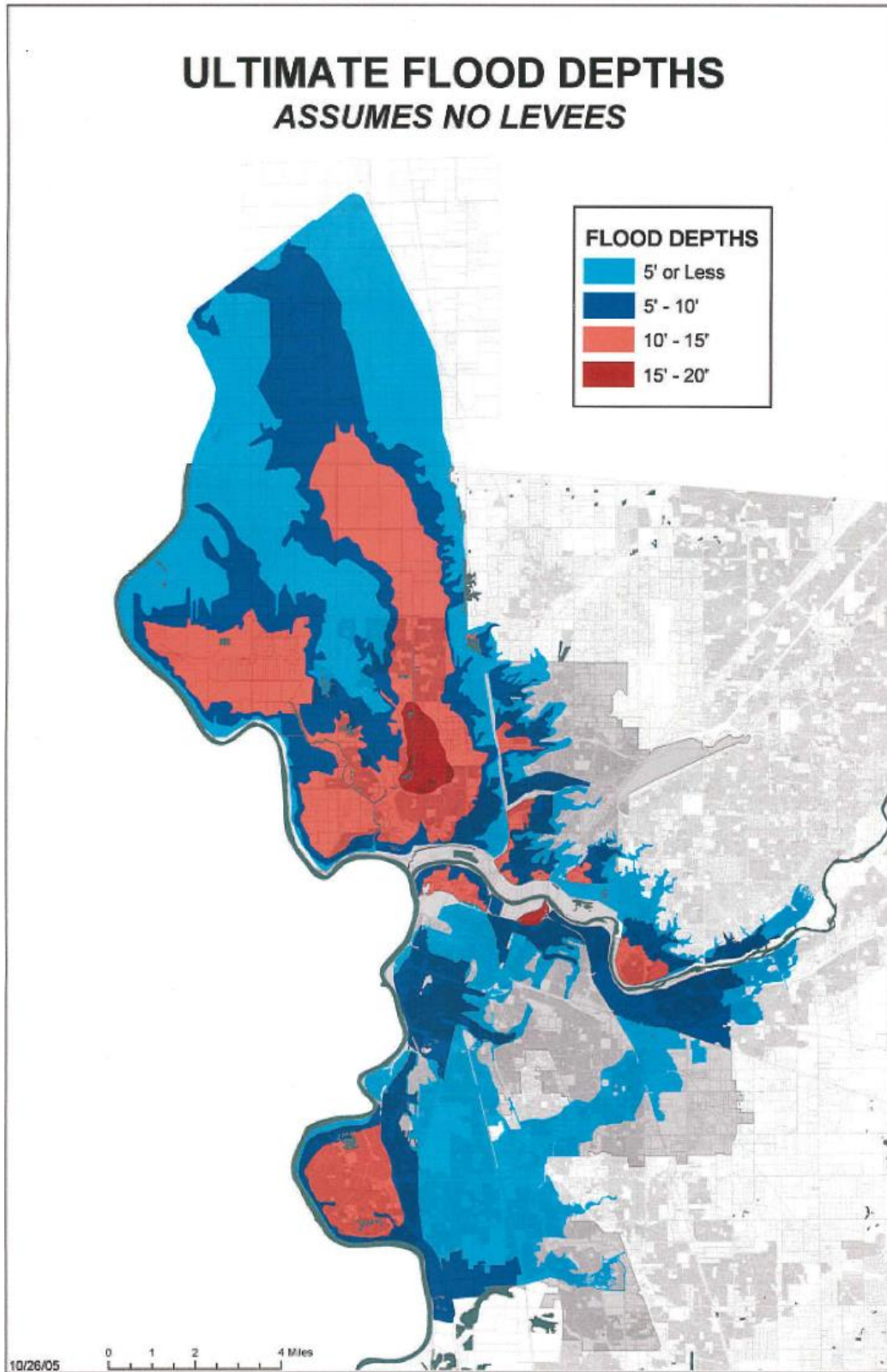
Target Area #1: The Entire City of Sacramento

The City of Sacramento is approximately 99 square miles and contains 316.96 acres of inland waters. According to an August 16, 2012 Flood Insurance Study prepared by FEMA, approximately a quarter of the City is located within an SFHA. Figure 2.6 in Section 2.1 reflects the flood insurance zones for Sacramento. Figure 7.3 depicts the depth of flooding that can be expected within the City during the 100-yr flood event assuming there are no levees.

Summary

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.

Figure 7.3. Flood Depths in the City of Sacramento Area



Source: City of Sacramento

Target Area #2: Repetitive Loss Properties (areas)

Properties categorized as repetitive loss properties have a greater need for flood protection. According to 2016 NFIP records, there are 21 unmitigated repetitive loss properties in Sacramento. Figure 7.4 illustrates the location of the repetitive loss properties classified as unmitigated and the location of past flood insurance claims within the City. FEMA places a high priority on mitigating repetitive losses. The City has mitigated 19 properties. The City has investigated the causes of repetitive flooding and some of the causes include:

- Properties have combined storm and sanitary system;
- Properties in low lying area of drainage basin have undersized conveyance systems;
- Properties receive drainage from adjoining property at higher elevations;
- Properties have created problems with lot grading and obstructions to flow; and
- Properties need further investigation.

Information on property protection and financial assistance program for mitigation measures is needed for each property located in the repetitive loss properties target area. Residents in this area will also have an increased need for site visit services.

Table 7.1 below details the repetitive loss building count categorized by FEMA flood zone. Figure 7.4 shows the approximate locations of these properties in the City.

Table 7.1. Repetitive Loss Building Count by FEMA Flood Zone

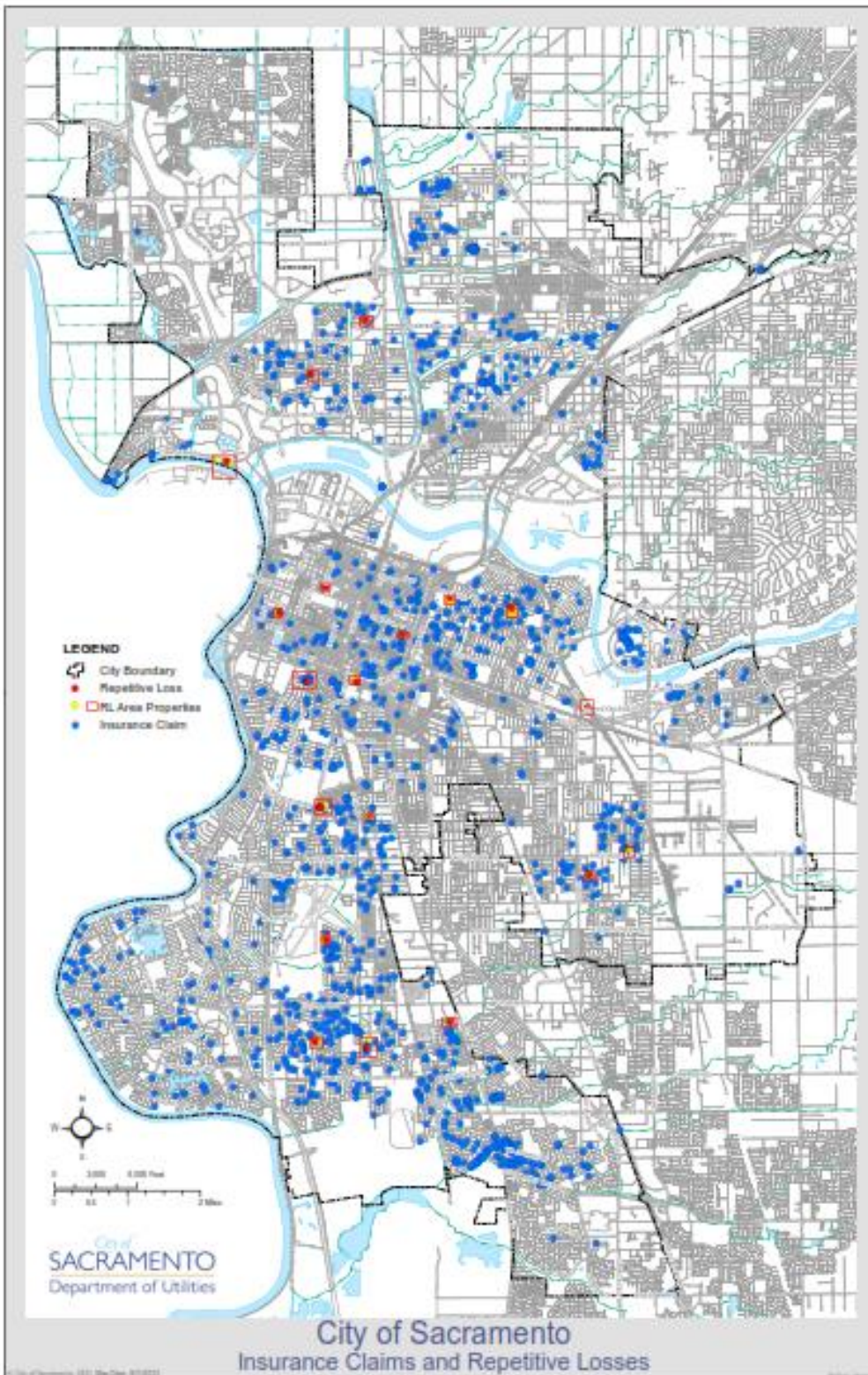
Flood Zone	Repetitive Loss Building Count
AE, A1-30, AO, AH, A99, & A	3
B, C, X	18
Total	21

Source: FEMA 2013 Data

Summary

Repetitive loss property locations and insurance claims are fairly evenly distributed across flood zones within the City. All repetitive loss areas are notified of this problem, information on property protection measures, risk factors, insurance requirements, and types of grant funding which can provide mitigation monies. Appendix D contains the Repetitive Loss Area Analysis which shows the details of the City's repetitive loss areas and outreach project.

Figure 7.4. Repetitive Loss Properties and Insurance Claims

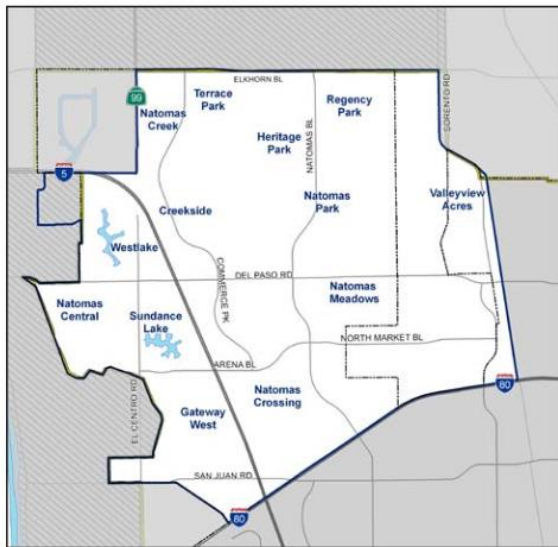


Source: City of Sacramento, Department of Utilities

Target Area #3: Natomas (North Natomas/South Natomas)

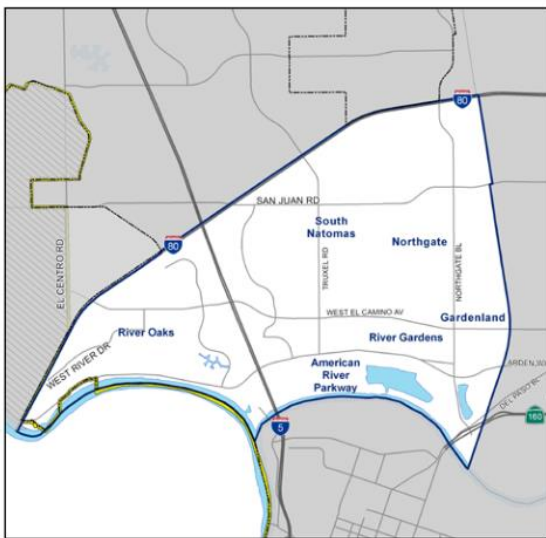
The greater Natomas basin is 55,000 acres in size and extends into the northwest portion of Sacramento County running south to just north of downtown at the American River Parkway (3 miles from downtown). Within the City, the area of the Natomas basin is approximately 12,500 acres and is surrounded by levees. This area of the Natomas basin is identified within the SFHA and is at risk to internal drainage issues, riverine flooding and potential levee breach. The Natomas area is broken into North Natomas (see Figure 7.5) and South Natomas (see Figure 7.6) with Interstate 80 as the dividing line.

Figure 7.5. North Natomas



Source: Sacramento 2035 General Plan

Figure 7.6. South Natomas



Source: Sacramento 2035 General Plan

Summary

The Natomas area in the northwest portion of the City is 12,500 acres and bounded by both the Sacramento and American rivers. Major levees (recently decertified) provide flood protection to this vulnerable area. Identifying evacuation routes, discussing property protection measures and promoting flood insurance are essential tools to be implemented in this area.

Target Area #4: Greenhaven/Pocket (Pocket Area)

The Pocket area is in the southwest portion of Sacramento just south of downtown. This area is approximately 7.9 square miles and just over 5,000 acres in size. The Pocket is an area of the City located in a bend of the Sacramento River and subject to flood damage. This area is subject to internal drainage issues, riverine flooding, and potential levee breaches. The Sacramento River curves around the west side of the Pocket Area making it difficult to evacuate. Major canals are also present in the Pocket Area as shown in Figure 7.7.

Figure 7.7. The Greenhaven/Pocket Area



Source: Wikipedia



Source: Pocket Area.com

Figure 7.8. Greenhaven/Pocket Funnel Area



Source: Protect the Pocket.com

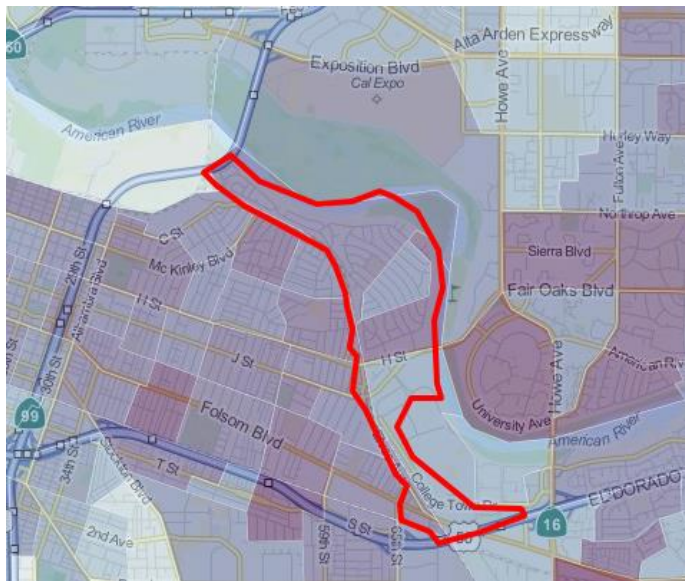
Summary

The Greenhaven/Pocket (Pocket Area) is over 7.9 square miles in the southwest portion of the City and is located at the bend of the Sacramento area. The Sacramento River narrows as it enters the Pocket Area and speeds up which adds to erosion on the Pocket side. There are limited egress routes out of this area if evacuations are necessary. Providing increased awareness of evacuation routes is necessary for the life safety of residents.

Target Area #5: River Park Neighborhood by Sacramento State

The River Park neighborhood is located near Sacramento State University and follows the American River (see Figure 7.9). This neighborhood is 1.23 square miles with a 2010 population of approximately 5,157. Because this neighborhood is adjacent to the American River, the potential for flood damage is also high. If a levee were to break along the American River in River Park, the majority of water would remain in River Park because of the elevated railroad tracks along Elvas Avenue.

Figure 7.9. River Park Neighborhood



Source: City-Data.com

Summary

The River Park Neighborhood is just south of the American River and is vulnerable to levee break flooding and other internal drainage issues. As other areas of Sacramento, this is a densely developed area which requires residents to understand the hazards of living adjacent to a major river and the property protection and life safety issues associated with living in this location.

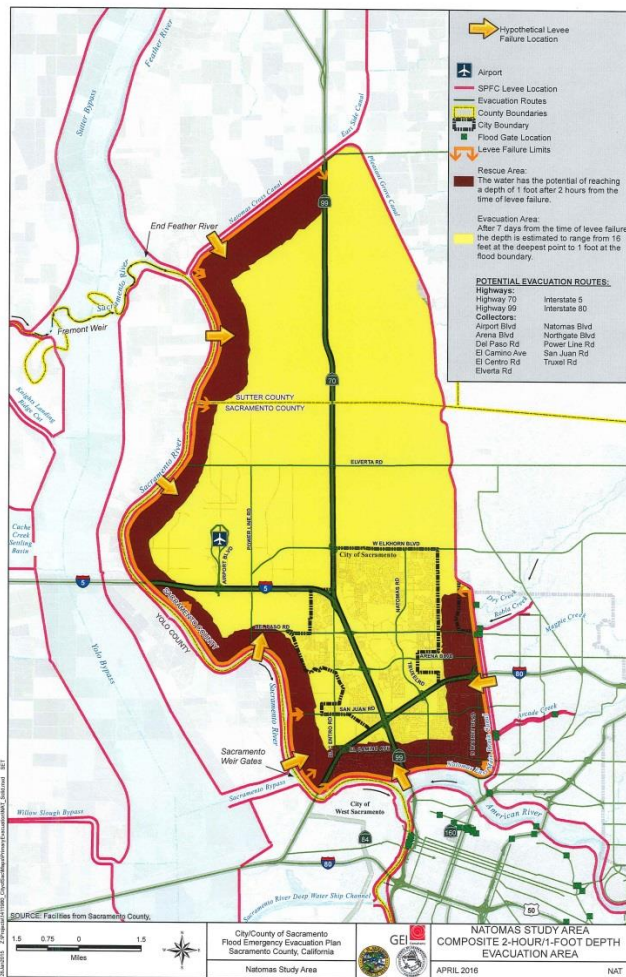
Target Area #6: Rescue Areas (Defined by Levee Breach Scenarios)

As discussed in Section 4.2.1, the City has identified rescue areas where evacuation can be problematic. The rescue areas are adjacent to the Sacramento and American Rivers and major creeks. The rescue areas were determined based on probable levee breach scenarios by showing which parts of the City would have two feet of water within an hour.

Summary

Rescue areas identified by the City and these areas were mapped to provide emergency responders information on which areas residents will need to be rescued because they will not have time to evacuate. Figure 7.10 shows the rescue areas identified in Natomas. Appendix C shows the detailed rescue areas.

Figure 7.10. Rescue Areas in Natomas



Source: 2016 City of Sacramento Rescue and Evacuation Maps

Real Estate Disclosure Evaluation

California Civil Code 1103 relating to a Natural Hazard Disclosure requires that the seller or the seller's agent make appropriate disclosures if the property is in a Special Flood Hazard Area (SFHA) or in an area of potential flooding shown on a dam failure inundation map. However, this regulation only applies if the agent has actual knowledge that a property is located in the SFHA or the local jurisdiction has compiled and posted a list of parcels in the SFHA.

Based on feedback from members of the PPI committee it was evident that disclosures provided to the buyers are not consistent. Mainly disclosures outside of the SFHAs do not clearly indicate the floodplain status. Additionally, the official disclosure or notification of mandatory flood insurance requirements within the community's SFHAs can be improved upon.

The local Relator association has agreed to partner with the City of Sacramento to increase educational information on flood insurance and flood hazards provided to its membership.

The committee recommended the following two action items to improve real estate disclosure compliance within the City of Sacramento.

1. Increase communication and education efforts with the real estate community. The City will develop an information bulletin or brochure which explains to real estate agents the importance of disclosures and mandatory flood insurance laws. (OP 21)
2. The City will research the possibility of posting a list of all parcels located in the SHFA. This list would be published on a secure webpage which link would only be provided to real estate agents within the community.

Flood Insurance Coverage Assessment

One valuable source of information on flood hazards is current flood insurance data for both active policies and past claims. Flood insurance is required as a condition of federal aid or a mortgage or loan that is federally insured for a building located in a FEMA high hazard flood zone (A or V Zone). An analysis of the NFIP data provided the following insight into areas susceptible to flooding in the City:

- 1) Where do active flood insurance policies exist?
- 2) Where have flood insurance claims been paid in the past?
- 3) How many buildings are exposed to the flood hazard versus how many buildings have coverage?
- 4) How does the average amount of coverage compare to the amount of expected flood damage from the 100-yr flood?

Figure 7.11 shows the location of active flood insurance policies as well as policies with claims. There is clear evidence that in two "target areas" there is a significant lack of insurance coverage. The north Natomas and Pocket areas of the City don't have significant flood insurance

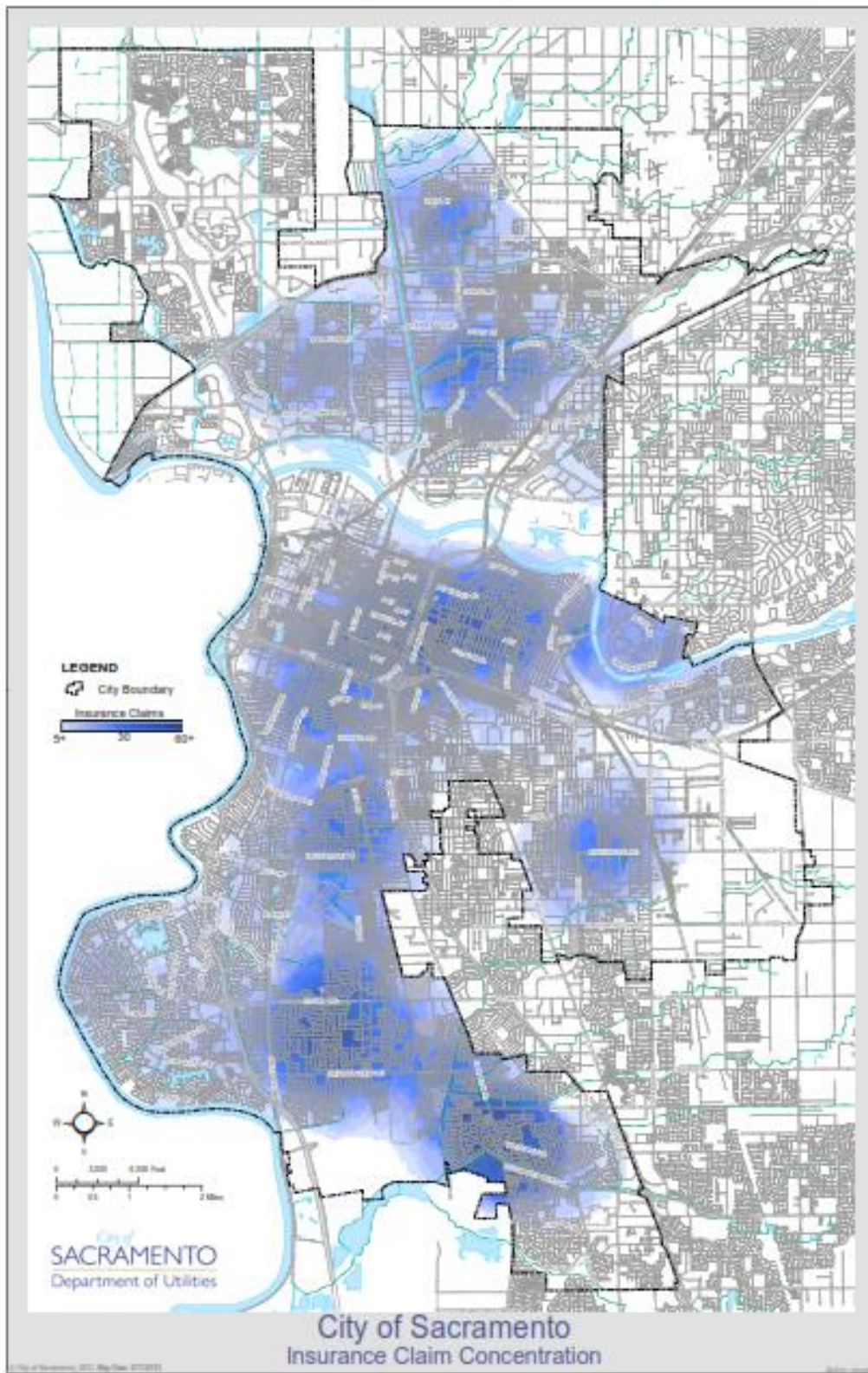
coverage in place. Both of these areas are subject to potential flood damage from the levee issue and from erosion due the “funnel” of the Sacramento River. However, the number of flood insurance claims in the north Natomas area is quite small compared to south Natomas and the Pocket area.

There are 43,937 active flood insurance policies in the City of Sacramento as of January 31, 2016 according to FEMA’s Community Information System (CIS). Of these, just over 21,407 are Preferred Risk Policies (PRP). The CIS show polices located in flood zones that no longer exist in Sacramento because of updates to the Sacramento County FIRM. Flood zones such as A, AO, and AR have become X Zones, but because policies were issued under these zone classifications, they still show up in CIS.

The 43,937 flood insurance policies generate annual premiums of more than \$20 million for the NFIP. This produces flood insurance coverage within Sacramento of over \$14 billion. To date there have been 960 total paid claims against the NFIP totaling more than \$9.8 million dollars.

Because of the updated FIRM (based on levee de-certifications), the X-Zone has the highest percentage of flood insurance coverage within the City presently. More than 29% of buildings in the B, C, and X-Zones have an active flood insurance policy. This compares to less than 1% of the buildings in the A99-Zones that have a flood insurance policy. There are over 27,000 buildings in the A99-Zone, yet there are only 1,641 flood insurance policies.

Figure 7.11. Flood Insurance Policies Claims Concentration



Source: City of Sacramento, Department of Utilities

Table 7.2 summarizes key statistics of policies in force and past claims by flood zone.

Table 7.2. NFIP Policy and Claims Data by Flood Zone

	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	\$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	209	\$300,475	\$46,734,900	44	\$465,140.87	\$18,539.98
A Zones	9	20,500	\$2,736,500	21	\$239,984.28	\$9,972.87
AO Zones	43	\$29,374	\$9,776,600	9	\$255,574.76	\$7,775.00
AH Zones	99	\$77,150	\$21,666,400	14	\$186,562.71	\$6,975.00
AR Zones	152	\$161,180	\$35,614,900	15	\$376,173.26	\$14,557.02
A99 Zones	1,641	\$1,556,635	\$350,476,700	715	\$6,265,285.28	\$300,944.93
Standard x	20,377	\$9,610,229	\$6,700,808,500	115	\$1,764,167.91	\$55,762.65
Preferred x	21,407	\$8,978,511	\$7,187,264,000	27	\$324,467.81	\$17,800.00
Total	43,937	\$20,734,054	\$14,355,078,500	960	\$9,877,352	\$432,324.00

Source: FEMA Community Information System 2016

Table 7.3 compares the number of policies in force with the number of buildings located within each flood zone and identifies the percent of building insured.

Table 7.3. Percentage of Buildings Insured

Flood Zone	Number of Policies in Force	Number of Buildings	% Insured
A01-30 & AE Zones	209	576	36.28%
A Zones	9	38	23.68%
AO Zones	43	0	0%
AH Zones	99	262	37.79%
AR Zones	152	0	0%
A99 Zones	1,641	31,721	5.17%
B, C, & X Zones	41,784	116,407	35.89%
Total	43,937	149,004	29.49%

Source: FEMA Community Information System 2016

Table 7.4 compares number of buildings present, number of policies in force, total coverage and a calculation of loss estimate values for the 100-yr flood.

Table 7.4. Flood Loss Estimates by Flood Zone

Flood Zone	Number of Buildings	Number of Policies in Force	Total Coverage	Loss Estimate
A01-30 & AE Zones	576	209	\$46,734,900	\$1,284,068,727

Flood Zone	Number of Buildings	Number of Policies in Force	Total Coverage	Loss Estimate
A Zones	38	9	\$2,736,500	
AO Zones	0	43	\$9,776,600	
AH Zones	262	99	\$21,666,400	
AR Zones	0	152	\$35,614,900	
A99 Zones	31,721	1,641	\$350,476,700	
B,C, & X Zones	116,407	41,784	\$13,888,072,500	\$4,097,593,575
Total	149,004	43,937	\$14,355,078,500	\$5,381,662,302

Source: Sacramento County 2010 Secured Roll Assessor & Parcel Data, Sacramento County DFIRM June 2015

The notable statistic in Table 7.4 is that while there are over 32,000 buildings located within the 100-yr flood zone (1-percent annual chance flood), only 6.60 percent of these buildings carry an active flood insurance policy. This is most likely a low percentage because Natomas is in a special program called Properties Newly Mapped where residents are receiving the X Zone rate (preferred risk policy), but their flood zone is A99. Also, citywide 29.49% percent of buildings within the B, C, & X zones are insured, but this may be a high percentage also because the Properties Newly Mapped program in Natomas.

Many of these policies in the B, C, & X Zones are preferred risk. In fact, of the 43,937 total flood insurance policies in the City of Sacramento, 21,407 are preferred risk policies.

An analysis of existing flood insurance coverage shows that existing building coverage does exceed the loss estimate for the 100-yr flood zone; however, this statistic does not take into account the large number of uninsured properties (93.4%) that would have no coverage in the event of a flood loss.

Insurance conclusions:

1. There are almost 44,000 flood insurance policies in the City and only 29% of the buildings are insured.
2. Even though over 75% of the City is protected by a levee, the entire City is subject to flooding and the PPI should reach all residents and businesses.
3. Just over 6% of the buildings in the Special Flood Hazard Areas are shown to have flood insurance policy according to the NFIP. However, a much higher percentage of buildings do have insurance through the preferred risk policy program. This discrepancy is due to the decertification of levees, change in flood zones, and the Properties Newly Mapped program. FEMA recognizes the policy for a building for the flood zone that the policy was originally issued under.
4. The small AH Zone in the City has 99 flood insurance policies with just over 38% of the buildings insured.

5. 49% (21,407) of all flood insurance policies in the City are PRP policies.

Desired Coverage Improvement Outcomes:

Based on the information the PPI committee has learned from the insurance coverage assessment, the goals are to:

1. Increase the number of flood insurance policies within the SFHA.
2. Increase the number of PRP policies in areas that have been remapped.
3. Reduce the amount of policy rating errors found within the community.

In Table 7.8, outreach projects containing messaging related to “Topic B You need flood insurance” align with the committee’s coverage improvement goals. These projects were designed by the committee to reach the entire community and specific target areas. The desired outcomes of each project and the responsible parties are outlined in Table 7.7. Additionally, the City annually hosts Emergency Preparedness Meetings (OP. 15) which highlight the importance of flood insurance as part of one’s preparedness planning. These meetings are hosted and facilitated by a City Council Member.

Repetitive Flooding

An analysis of repetitive loss was completed to examine the number of insured repetitive loss properties against FEMA flood zones. According to 2013 NFIP records, there are 21 unmitigated properties with total payments of \$569,998. Of the 21 unmitigated repetitive loss properties, 52% of the properties are currently insured. There have been 49 total paid claims (at least two claims of \$1,000 over a 10 year period – FEMA’s definition of a “repetitive loss” property) with 9 being in the 100-year (1-percent annual chance flood) floodplain zones and 40 in the B, C & X-Zones. Figure 7.4 shows the repetitive loss properties with a red dot and all flood insurance claims with a blue dot. Table 7.5 details repetitive loss building counts, FEMA flood zones and total payments.

Table 7.5. Repetitive Loss Summary (Unmitigated Properties)

Flood Zone	Building Count		Total Number of Losses	Total Building Payment	Total Content Payment	Total Paid
	Insured	Uninsured				
B, C, X	10	8	40	\$359,618	\$80,424	\$440,042
AE, A1-30, AO, AH, A	1	2	9	\$93,471	\$36,485	\$129,956
Total	11	10	49	\$453,089	\$116,909	\$569,998

Source: NFIP Repetitive Loss Data, 2013

Repetitive flooding conclusions:

1. Repetitive flooding can occur anywhere in Sacramento. The location of repetitive loss areas and associated repetitive loss properties are evenly distributed throughout the City and amongst various flood zones.
2. Internal drainage plays a major role in these properties flooding.

Inventory Other Public Information Efforts

A key part of developing a public information program is becoming aware of other public information activities targeted at Sacramento residents. The information in Table 7.6 summarizes information obtained from past projects, staff research, and PPI Committee members.

Table 7.6. Public Information and Flood Response Projects

Project Number	Organization	Project	Subject Matter	Frequency
OP 1.	City of Sacramento Department of Utilities, Floodplain Management, & PIO Staff	Flyer in Utility Bill	Be Flood Ready Brochure	Annually - November
OP 2.	City of Sacramento Department of Utilities, & Floodplain Management	Repetitive Loss Outreach	Letter with advice on property protection, site visits, and financial assistance for mitigation measures and Be Ready Flood Brochure	Annually – Late Fall
OP 3.	City of Sacramento Department of Utilities, & Floodplain Management	Map Inquiry Service	Flood, Hazard Areas, Insurance, mandatory purchase	Year-round
OP 4.	City of Sacramento Department of Utilities, Floodplain Management, & PIO Staff	High Water Marks	Program to monitor and establish high water marks after flood events	Year-round
OP 5.	City of Sacramento Department of Utilities, Floodplain Management, & PIO Staff	Outdoor Ad Placement	Flood related messaging	Annually - Fall
OP 6.	City of Sacramento Department of Utilities, Water Quality & PIO Staff	No Dumping Signs	Signs throughout floodplain	Year-round
OP 7.	City of Sacramento Department of Utilities, Floodplain Management, Drainage, & PIO Staff	Flood Protection Assistance	Drainage problems, flood protection, historical flood damage	Year-round
OP 8.	City of Sacramento Department of Utilities, Floodplain Management, Water Quality, California Department of Water Resources & PIO Staff	Various Brochures at City Offices	How to develop in a floodplain, living next to a levee, stormwater pollution, substantial improvement rule, permit requirements	Year-round
OP 9.	California Department of Water Resources	Levee Flood Protection Zone Map (Flood Risk Notification: Living with Levees)	Indication of properties estimated to be at a depth of greater than 3 feet	Year-round

Project Number	Organization	Project	Subject Matter	Frequency
OP 10.	Federal, State, City of Sacramento and Sacramento County	Flood Preparedness Week	Promote awareness of flood damage	Annually November
OP 11.	City of Sacramento Department of Utilities, & Water Quality	No Dumping Stencils & Permanent Markers	Promote on storm drains that only rain water should go down drain	Year-round
OP 12.	Office of Emergency Services	Booklets	"Are You Prepared" Information	Year-round
OP 13.	Sacramento Area Flood Control Agency	Newsletter	Flood and Levee Information	At least Annually
OP 14.	American River Flood Control District	Newsletter	Flood Control Information	At least Annually
OP 15.	Neighborhood Services with Council Members	Community Meetings	Emergency Preparedness Fair	At least 2 per year
OP 16.	City of Sacramento – Several Departments participate	Earth Day	Information provided on flood insurance, emergency kits, pay attention during storm events	Annually - April
OP 17.	City of Sacramento – Several Departments participate with Council Members	Celebrate Sacramento	Information provided on flood insurance, why you should pay attention in a flood event, water quality, how to volunteer, etc.	Annually - May
OP 18.	City of Sacramento – Several Departments participate with Council Members	Celebrate Natomas	Information provided on flood insurance, why you should pay attention in a flood event, water quality, how to volunteer	Annually - September
OP 19.	City of Sacramento Department of Utilities, Floodplain Management & PIO Staff	Dam Safety Outreach	Brochure that describes inundation area and identification of risks, evacuation procedures and routes	Annually
OP 20.	City of Sacramento Department of Utilities, Floodplain Management, Water Quality, & PIO Staff	SPLASH program	Provide messages to elementary students on flood protection, stormwater pollution	Quarterly
OP 21.	Real Estate Agents	Disclosure of the Flood Hazard Informational Guide	Explains State Requirement for Flood Disclosure to Real Estate Agents	Year-round
OP 22.	City of Sacramento Department of Utilities, OES, PIO	Translation Services Provided	City will provide translation services to help understand all flood-related information	Year-round
OP 23.	Insurance Agencies	Bi-lingual Insurance Agents	Flood Insurance information presented in native language	Year-round
OP 24.	City of Sacramento Department of Utilities, & OES	Levee Breach Scenario Maps – 18 Rescue Areas	Website mapping which shows "Red " rescue areas where water has the potential to reach 1' in 2 hours	Year-round
OP 25.	California Nature Conservancy	Conserving Natural Resources in California	Newsletters and website Information on natural & beneficial functions of floodplains	Year-round
OP 26.	Real Estate Agents and Lenders	Real Estate Agent's Brochure	Brochure for potential homebuyers to provide floodplain information	Year-round

Project Number	Organization	Project	Subject Matter	Frequency
OP 27.	City of Sacramento Department of Utilities	Flood Ready Website	Provides information on all flood related topics	Year-round
OP 28.	American River Parkway Foundation	The American River Parkway Brochure	Provides information on wildlife, habitat protection, and recreational activities	Year-round
OP. 29	National Flood Insurance Program (NFIP)	NFIP Risk Notification Mailing	Provides flood insurance holders with flood risk information for their area	Annually
OP.30	Congresswoman Doris Matsui's Office	Flood Insurance Promotion: Web Page and Community Newsletter	Congresswoman Matsui promotes the importance of flood insurance through her website and newsletter	Year-round
OP. 31	City of Sacramento Department of Utilities	CIP Flood Insurance Outreach Letter	Advise owners of incorrect flood zone ratings on policy or potentially high rate for flood zone	Annually
OP. 32	Federal Emergency Management Agency (FEMA)	Hazard Mitigation Grant Program Brochures	Provides information on grants that are available for structure retrofit and flood mitigation.	Year-round
Flood Response Projects				
Project Number	Organization	Project	Subject Matter	Frequency
FRP 1.	Primary: Public Information Officer and City Manager Secondary: Community Development Department and Depart of Utilities	Media Release (TV and Radio and Newspapers)	Various flood-related topics (Turn around, evacuation, sandbags, Substantial Damage, etc.)	During and after a flood event
FRP 2.	Emergency Operations Center and Public Information Officer	Everbridge/Emergency Broadcast System	Use Everbridge and EBS to notify residents of information during a flood	During a flood event
FRP 3.	Primary: Public Information Officer and Neighborhood Services Secondary: Community Development Department and Depart of Utilities	Media Release and Post of Social Media (Facebook, Twitter, Next Door, and others)	Various flood-related topics (Turn around, evacuation, sandbags, Substantial Damage, etc.)	During and after a flood event
FRP 4.	Department of Utilities, Operations & Maintenance, Water Quality Lab	Drinking Water Quality Incident Response	Prevent consumption of contaminated water after a flood. Outreach materials drafted, translated and delivered to warehouse.	During and after a flood event, if needed
FRP 5.	Department of Utilities, Operations & Maintenance	Combined Sewer System Warning Signs	Signage posted after flood to prevent people from entering potentially contaminated water	During and after a Combined Sewer System flood event (including street flooding events)
FRP 6.	Primary: Police Secondary: Code Enforcement, Building Department, and Department of Utilities	After flood event handouts when in the field	Re-entry safety, permit & reconstruction requirements, flood protection methods	Upon re-entry of flooded areas

FRP 7.	Neighborhood Services and Department of Utilities	Handouts on flood Insurance claim information and grant funding opportunities	Provide information to residents and business on how to file a flood insurance claim and what grant funding opportunities may be available for recovery	After a flood event	Upon re-entry of flooded areas
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Following are some examples of past public information efforts and outreach materials provided by the City of Sacramento and other organizations and agencies which benefit the City.

Figure 7.12. Public Information Examples

SAFCA The Sacramento Area Flood Control Agency

Board of Directors | Board Meetings | Flood Insurance | Development Impact Fee Program | Assessments | Finances

South Sacramento Streams Group Project

OVERVIEW:
The southern portion of the Sacramento urbanized area has historically been vulnerable to flooding from high water events in the Sacramento-San Joaquin Delta as well as high flows on Morrison Creek, Florin Creek, Elder Creek and Unionhouse Creek. The South Sacramento Streams Group Project (SSSG), which encompasses these creeks has been the vehicle to improve these creeks. The SSSG project consists of levee improvements starting south of the town of Freeport and running easterly along the southern edge of the urbanized area.

This levee eventually meets up with the Union Pacific Railroad (UPRR) tracks, near Detroit Way. From UPRR heading eastward, the project extends up four creeks. Along these four creeks, a combination of raising the levee, constructing floodwall and channel improvements are being used to provide protection to the community.

Cost: Authorized cost for the entire project is \$100,000,000

Click to be routed directly to the following Projects:

- FLORIN CREEK MULTI-USE DETENTION BASIN CREEK PROJECT
- FLORIN CREEK CHANNEL PROJECT
- MORRISON CREEK UNION PACIFIC RAILROAD PROJECT
- UNIONHOUSE CREEK CHANNEL IMPROVEMENTS

Facebook

Fun, Family Friendly Event! Celebrate Natomas is on Facebook.

To connect with Celebrate Natomas, sign up for Facebook today.

Sign up Log In

Celebrate Natomas Community

Timeline | About | Photos | Likes | More

162 likes

Celebrate Natomas Festival - City of Sacramento

The deadline to become a Celebrate Natomas sponsor is August 15, 2014. Please make your tax deductible sponsorship check payable to "Gifts to Share - Celebrate Natomas," and mail to City of Sacramento, 915 I Street, 3rd Floor, City Hall, Sacramento, CA 95814. The Tax ID number is 94-2985546.

Levees are not Sacramento's only Flood Risk

Potential dam failure brings flooding risk to Sacramento

Treat your students to a fun and educational experience! Splash-in-the-Class presentations are an engaging, hands-on way – 6th grade students about quality and how they can be the stormwater pollution.



Photo by David Rosen

Fill out the form below. Our program will normally confirm your requests within 48 hours except during vacation periods. If you do not hear from us within one week, please feel free to contact us at david@sacsplash.org.

We look forward to spending time with you and your students very soon!

Our Festivals

Please join us as we celebrate everything our community has to offer.

Assemblymember Roger Dickinson

- Celebrate Sacramento Williams Land Park Saturday, May 11, 2013
- Celebrate Natomas South Natomas Community Park Saturday, September TBA
- Celebrate Sacramento October - TBA
- North Highlands Jubilee Freedom Park Saturday, October TBA

Celebrate Natomas Free!

Art Exchange | Food Trucks | Local Vendors & Organizations | Youth Talent & Live Band

Presented by Mayor For Tom Amodeo and City Councilmembers Steve Cohen and Councilmember Steve Stender

October 11, 2014 | 12:00PM - 4:00PM

South Natomas Community Park
2521 Travel Road | Sacramento, CA 95833

Figure 7.13. Public Information Examples (continued)

Be Flood Ready
Protect yourself today and tomorrow- a guide for Sacramento residents





FloodWise

WINTER 2014
PROTECTING LIVES AND PROPERTY IN OUR COMMUNITY SINCE 1927

Preparing for the Next Big Flood

DURING THE DRIEST YEAR ON RECORD, IT'S EASY TO FORGET THAT WE LIVE IN AN AREA MANY CONSIDER SECOND ONLY TO NEW ORLEANS FOR DANGEROUS FLOODING RISK. The flood control system built in the last hundred years has protected the Sacramento Valley from being submerged under an inland sea that once routinely stretched 100 miles long by 20 miles wide during the rainy season.

To ensure our continued safety, we must also protect the man-made system from developing problems that put us at risk. At American River Flood Control District (ARFCD), it's our job to maintain 40 miles of levees along the American River and parts of Slough, Arcata, Dry and Maggie Creeks so that they're ready to perform when the inevitable next big flood comes.

Frequency of Multiyear Droughts & Flood Years



It's Our Job To:

- Ensure levee integrity
- Perform inspections from land and water
- Repair erosion
- Plant native grasses to control erosion
- Mow levees
- Trim trees and shrubs
- Control burrowing rodents
- Work with neighbors to keep levees clear
- Maintain access roads, gates, and equipment
- Undergo yearly flood fight training
- Stockpile flood-fight supplies
- Participate in special projects, such as completing slurry-wall construction
- Remove encroachments—We're also charged with enforcing a new law (SB-759) that requires removal of private structures and levee alterations (also called encroachments) that could weaken levees. Although the law gives us enforcement powers, our approach of working with levee neighbors has so far proven successful.

The tasks we perform – big and small – will make all the difference in how well our levees hold back the next big flood.

FOR MORE INFORMATION about our activities, please visit our website at www.arfd.org.

The Nature Conservancy

Magazine • News & Media • Blogs • My Nature

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Membership & Giving

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California

Sacramento River



GET INVOLVED AT CONSERVE.ORG

Facebook
Twitter
Email

Without these riparian forests, California would lose some of its most precious resources.

Be Flood Ready.

Buy Flood Insurance.

www.cityofsacramento.org/utilities/flood-ready

City of SACRAMENTO
Department of Utilities

Figure 7.14. High Water Mark Initiative Kick-Off – November 2013



Source: City of Sacramento Department Of Utilities. Pictured left to right: Bill Edgar (President – Central Valley Flood Protection Board), Darrell Fong (Sacramento City Council), Keith Swanson (DWR Chief of the Division of Flood Management), Congresswoman Doris Matsui (CA 6th District), Nancy Ward (FEMA Region IX), Tambour Eller (USACE Sacramento District Deputy), and Vice Mayor Carol Garcia (City of Roseville)

Step 3: Formulate Messages

After reviewing the Community Needs Assessment, the PPI Committee identified the following priority messages. Table 7.7 summarizes each message and the desired outcome(s).

Table 7.7. Messages and Desired Outcomes

Topic	Message	Outcome(s)
A. Know your flood hazard	1. Your property is subject to flooding. Call the flood information hotline for details	Increase number of map information services inquires
	2. Your property is in a repetitively flooded area	Reduce future repetitive loss properties
	3. Don't drive through flooded streets (know where to drive and where not to drive)	Reduce damages to vehicles, emergency rescues, and deaths
	4. Pay attention to your escape routes in the rescue area	Reduce emergency rescues and injury
	5. You are in a combine sewer system area. Drainage water may be contaminated.	Prevent sickness related to contaminated water

Topic	Message	Outcome(s)
B. You need flood insurance	1. Protect yourself now! You need flood insurance	Increase number of flood insurance policies
	2. You need flood insurance because your homeowner's policy does not cover flood damage	Increase number of flood insurance policies
	3. Renters should protect contents with flood insurance	Reduce damage to contents
	4. Lower cost Preferred Risk Policies (PRP) are available. Check your rate with your insurance agent	Increase number of PRP policies
C. Protect people from the hazard	1. Turn around don't drown	Reduce rescues and deaths
	2. Know the flood warning signals	Reduce rescues and deaths
	3. Know how to sign up for reverse-911 Everbridge (Sacramento-Alert)	Increase in number of Everbridge (Sacramento-Alert) subscriptions
	4. Go to the City's website or call 311 for drinking water quality updates	Increased awareness of water quality and prevents sickness
	3. You are in a combine sewer system area. Drainage water may be contaminated.	Prevent sickness related to contaminated water
D. Protect your property from the hazard	1. Elevate HVAC exterior units	Reduce number of flood damaged HVAC units
	2. Don't dig, plant or build at the base of a levee	Prevent seepage and other problems from human intervention on levees
	3. Know encroachment levee regulations. Visit http://www.cvpfb.ca.gov	Prevent seepage and other problems from human intervention on levees
	4. Don't begin work without proper permits	Reduce red tag violations
	5. Don't throw trash or debris in streams, channels or open bodies of water	Reduce pollution and overbank flow
	6. Grant monies are available to help elevate your home	Increase financial opportunities
E. Build responsibly	1. Get a permit before you start construction	Reduce citations
	2. Know the substantial damage rules	Reduce citations
	3. Keep areas open (setbacks) between homes and property lines	Maintain proper drainage
F. Protect natural floodplain functions	1. Don't dump in storm drains	Improve water quality
	2. Report erosion control measures not working	Contain erosion on construction sites
	3. Don't disturb natural floodplain areas	Reduce grading, fill, and earth movement
	4. Protect, preserve, and appreciate our natural resources	Maintain open space and habitat protection
G. Levee Preparedness	1. Pay attention when your evacuation route is identified	Reduce number of evacuation rescues
	2. Call 311 to report water seepage or suspicious activities along the levees	Increase community awareness and quicker response time to potential problems
H. Flood Education	1. Promote floodplain management and NAI concepts	Reduce damage to buildings and natural floodplain functions

Topic	Message	Outcome(s)
	2. Promote flood education for children	Increase flood awareness
	3. Promote FEMA's High Water Mark Initiative	Increase flood awareness
I. General Preparedness	1. Identify and document your personal belongings	Reduce delays in receiving insurance payments
	2. Prepare emergency flood kit & plan	Save important insurance, real estate, and other important documents, pictures, etc. and know how to contact other family members
	3. Don't forget your pet!	Pet owners will be prepared with necessary pet care items during an emergency and at a shelter

Step 4: Identify Outreach Projects to Convey the Messages

The PPI Committee identified 25 projects and initiatives that would be implemented during 2016. These are organized by target audience and message in Table 7.8.

Flood Response Preparations

In addition to projects that are implemented every year, the PPI Committee recommends projects that will be implemented during and after a flood. These projects are drafted and made ready for production and dissemination after a flood warning. The PPI Committee also discussed the use of the City's website during a flood event. General emergency preparedness information and citywide evacuation routes are available on the city's website, however, special elements will need to be added during a flood threat. Press releases providing information about the flood threat levels, conditions, evacuation routes, and preparedness actions will be posted on the City's website. If necessary, notices regarding the community's water quality will also be placed on the City's website. These projects are listed at the end of Table 7.8 and are marked with the heading "Flood Response Projects". The draft copy of the projects and procedures to disseminate the information is located in Appendix E.

Flood Protection Assistance

The City of Sacramento provides residents with two avenues to discuss flooding or to request assistance. Typically, flooding reports and drainage problems are received through our 311 system and routed to the Department of Utilities' Operations and Maintenance. If the resident wants property protection advice, it is routed to floodplain management staff or the floodplain hotline, (916) 808-5061. Staff will discuss the resident's concern with them and provide information and resources. For complex issues, staff will visit the site to fully assess the situation. Protection, mitigation, and insurance information is provided during site visits. Information about financial assistance is provided if applicable. These services are mainly publicized through OP 1, OP 2, and OP 7. No committee recommendations to change current activities.

Open Space Education

The main natural functions open space within the City is the American River Parkway (Parkway). The American River Parkway Foundation (ARPF) is a volunteer organization that supports the preservation of the Parkway. The ARPF has created many recreational activities including hiking paths, bike trails, equestrian trails, picnic areas, and more. At the volunteer station visitors can obtain an American River Parkway map (OP 28) which highlights the recreational areas, the Parkway's history, and the many habitats located within the Parkway. The committee recommended that the City coordinate future information materials with the ARPF and consider added ARPF resources to the City's website.

Stream Dumping Regulations

The City of Sacramento prohibits a person from dumping refuse in any water or waterway, or upon the levees or banks. A citywide mailer (OP 1), permanent signage (OP 6) and stenciling (OP 11) are the three main methods of publicizing these regulations. No committee recommendations to change current activities.

Step 5: Examine Other Public Information Initiatives

The PPI Committee looked at other outreach initiatives including more coordination among city, county, and state agencies to reduce duplicative efforts and to share resources. The committee also recognized that enhancements to the City's website will be required to make it more usable by the public through more interactive approaches. The current website provides a great deal of information on Sacramento's flood hazards, flood insurance, and emergency preparedness. The committee determined that additional content focusing on building requirements within the floodplain and the floodplain's natural benefits are necessary.

The committee also discussed what kinds of technical assistance might be necessary beyond what is already provided by individual agencies. Many of the technical inquiries are received through the City's Floodplain Hotline. This hotline is used for map question, flood insurance, flood mitigation, and any other flood question. The Floodplain Hotline is publicized through the City's website and various outreach materials. The Hotline is also used a resource for elected officials and other agencies to provide to constituents. Additionally, they looked at other potential ways to publicize flood protection methods.

Most of these challenges cover the following CRS flood protection activities:

- Activity 320 – Map Information Service
- Activity 330 – Outreach Projects (other sections of the PPI)
- Activity 350 - Websites
- Activity 360 – Flood Protection Assistance
- Activity 630 – Dam Safety (outreach requirement)

Step 6: Implement, Monitor and Evaluate the Program

Adoption

This document will become effective when it is adopted by the City Council.

Evaluation

The City of Sacramento Department of Utilities Floodplain Manager will monitor the projects as they are developed, as well as the results. They will record inputs from PPI Committee members and suggestions from other City employees and stakeholders participating in the activities. That input will be sent by e-mail to committee members for consideration and evaluation.

The PPI Committee will meet at least twice each year to review the implementation of these projects and initiatives. At that time, the status of the projects will be explained and progress toward the outcomes will be discussed. The Committee will recommend to the appropriate City offices and the stakeholders who implement projects whether the projects should be changed or discontinued.

At least once each year, staff will draft an update to the table and send it to the Committee members. The Committee will meet and review the outcomes of each individual activity to change, add, or approve them. Table 7.8 will be revised as needed. The outcomes and revisions will be included in an evaluation report which will be provide to City Council and submitted as part of the City’s annual recertification package to the Community Rating System.

Table 7.8. PPI Projects and Initiatives

Target Audience	Message(s) (See Table 7.7)	Outcome (See Table 7.7)	Project(s)	Assignment	Schedule	Stakeholder
Outreach Projects						
1. Entire City (homeowners, businesses and renters)	A. Know your flood hazard B. You need flood insurance C. Protect people from the flood hazard D. Protect your property from the hazard	A. 1, 3 & 4 B. 1,2, 3 & 4 C. 2 & 3 D.1,2,3,4,5,6 E. 1 & 2 F. 1,2,&3 I. 1, 2 & 3	OP 1. Be Ready Flood Brochure	City of Sacramento Department of Utilities, & PIO	November each year	N/A
			OP 3. Map Inquiry Service	City of Sacramento Department of Utilities -FPM	Year-round	N/A
			OP 4. High Water Mark Initiative	City of Sacramento Department of Utilities -FPM	Year-round	DRW/USACE/FEMA/USGS
			OP 5. Outdoor ad placement	City of Sacramento Department of Utilities & PIO	Oct. each year	N/A

Target Audience	Message(s) (See Table 7.7)	Outcome (See Table 7.7)	Project(s)	Assignment	Schedule	Stakeholder
1. Entire City (continued)	(continued) E. Build Responsibly F. Protect Natural Floodplain Functions I. General Preparedness	(continued)	OP 6. No Dumping Signs	City of Sacramento Department of Utilities, Water Quality, & Solid Waste	Year-round	N/A
			OP 8. Various Brochures at City offices	City of Sacramento Department of Utilities -FPM	Year-round	DWR/ CVFPB
			OP 10. Flood Preparedness Week	City of Sacramento Department of Utilities – FPM & PIO	Nov. each year	Sacramento County/DWR/USACE/ USGS
			OP 11. No dumping stencils & permanent markers	City of Sacramento Department of Utilities & Water Quality	Year-round	N/A
			OP 12. "Are You Prepared" Booklets	Office of Emergency Services	Year-round	UC Davis Medical Center & Sacramento County
			OP 13. Flood and Levee Newsletter	SAFCA	Annually	SAFCA
			OP 14. Flood Wise Newsletter	ARFCD	Annually	ARFCD
			OP 15. Emergency Preparedness fair	Department of Parks and Recreation-Neighborhood Services and City Council	Twice+ per year	N/A
			OP 16, 17 & 18. Earth Day, Celebrate Sacramento, Natomas	City of Sacramento Department of Utilities, PIO, OES, Police, Fire	April, May, September	N/A
			OP 19. Dam Safety Outreach	City of Sacramento Department of Utilities	Annually late fall	N/A
			OP 7. Flood Protection Assistance	Dept. Utilities	Year-round	N/A

Target Audience	Message(s) (See Table 7.7)	Outcome (See Table 7.7)	Project(s)	Assignment	Schedule	Stakeholder
1. Entire City (continued)	(continued)	(continued)	OP 25. Website & Newsletter on NBF of Floodplain	California Nature Conservancy	Year-round	California Nature Conservancy
			OP 26. Real Estate Agent's Brochure	City of Sacramento Department of Utilities & Real Estate Agents	Year-round	Real Estate Agents and Lenders
			OP 27. Flood Ready Website	City of Sacramento Department of Utilities	Year-round	N/A
			OP 28. The American River Parkway Brochure	American River Parkway Foundation	Year-round	American River Parkway Foundation
			OP. 29 Flood Zone Risk Notification	NFIP Risk Notification Mailing	Annually	National Flood Insurance Program (NFIP)
			OP.30. Flood Insurance Promotion of Website & Newsletter	Congresswoman Doris Matsui's Office	Year-round	Congresswoman Doris Matsui's Office
			OP 31. CIP Flood Insurance Outreach Letter	City of Sacramento Department of Utilities	Annually	N/A
			OP 32. FEMA Grant Brochures	City of Sacramento Department of Utilities	Year-round	FEMA
2.School Children	A. Know your flood hazard C. Protect people from the flood hazard D. Protect your property from the hazard	A. 1,3 & 4 C. 1,2 & 3 D. 2,4 & 5 F. 1, 2, 3 H. 1 & 2	OP 20. SPLASH Program	City of Sacramento Department of Utilities & Water Quality	Quarterly	Sacramento Splash

Target Audience	Message(s) (See Table 7.7)	Outcome (See Table 7.7)	Project(s)	Assignment	Schedule	Stakeholder
	F. Protect Natural Floodplain Functions H. Flood Education		OP 27. Flood Ready Website	City of Sacramento Department of Utilities	Year-round	N/A
			OP 1. Be Flood Ready Brochure	City of Sacramento Department of Utilities	Year-round	NA
3.Real Estate, Lending, and Insurance Companies	A. Know your flood hazard B. You need flood insurance E. Build Responsibly	A. 1 & 2 B. 1,2,3&4 E. 1,2&3	OP 3. Map Inquiry Service	City of Sacramento Department of Utilities	Year-round	NA
			OP 21. Real Estate Disclosure – State Requirement	Real Estate Agents	Year-round	Real Estate Agents
			OP 23. Flood Insurance Information	Insurance Agents	Year-round	Insurance Agents
			OP 26. Real Estate Agent's Brochure	City of Sacramento Department of Utilities & Real Estate Agents	Year-round	Real Estate Agents and Lenders
			OP 27. Flood Ready Website	City of Sacramento Department of Utilities	Year-round	N/A
			OP 2. Repetitive Loss Outreach Mailing	City of Sacramento Department of Utilities	Annually late fall	N/A
Target Area 2.Repetitive Loss Properties (Areas)	A. Know your flood hazard B. You need flood insurance C. Protect	A. 1, 3 & 4 B. 1,2, 3 & 4 C. 2 & 3 D.1,2,3,4,5,6 E. 1 & 2 F. 1,2,& 3 I. 1, 2 & 3	OP 7. Flood Protection Assistance	City of Sacramento Department of Utilities	Year-round	N/A

Target Audience	Message(s) (See Table 7.7)	Outcome (See Table 7.7)	Project(s)	Assignment	Schedule	Stakeholder
	people from the flood hazard D. Protect your property from the hazard E. Build Responsibly F. Protect Natural Floodplain Functions I. General Preparedness		OP 1. Be Ready Flood Brochure	City of Sacramento Department of Utilities & PIO	Nov. each year	N/A
4. Vulnerable Populations	A. Know your flood hazard B. You need flood insurance C. Protect people from the flood hazard D. Protect your property from the hazard E. Build Responsibly I. General Preparedness	A. 1,2, 3 & 4 B. 1,2, 3 & 4 C. 2 & 3 D.1,2,3,4,5,6 E. 1 & 2 I. 1, 2 & 3	OP 5. Outdoor Ad Placement	City of Sacramento Department of Utilities & PIO	Annually - October	N/A
			OP 9. Levee Zone Protection Map	California Department of Water Resources	Annually September	DWR
			Adopt and Fund the PPI	Mayor and City Council	N/A	N/A
5. Political Leaders (See Entire list of City Wide Projects in 1. Above)	See 1 above	See 1 above	OP 22. Translation services available on flood-related information	City of Sacramento Department of Utilities PIO, OES	Year-round	N/A
6. Language Barriers	A. Know your flood hazard B. You need flood insurance C. Protect people from the flood hazard	A. 1, 2,3 & 4 B. 1,2, 3 & 4 C. 2 & 3 D.1,2,3,4,5,6 E. 1 & 2 F. 1,2,& 3 I. 1, 2 & 3	OP 23. Bi-Lingual Insurance Agents (Spanish and Asian Languages)	Bi-Lingual Insurance Agents (Spanish and Asian Languages) As Needed	Year-round	Insurance Agents

Target Audience	Message(s) (See Table 7.7)	Outcome (See Table 7.7)	Project(s)	Assignment	Schedule	Stakeholder
	D. Protect your property from the hazard E. Build Responsibly F. Protect Natural Floodplain Functions I. General Preparedness		OP 23. Bi-Lingual Insurance Agents (Spanish and Asian Languages)	Bi-Lingual Insurance Agents (Spanish and Asian Languages) As Needed	Year-round	Insurance Agents
Target Areas 3.Natomas (North Natomas/ South Natomas) 4.Greenhaven/ Pocket 5.Riverpark Neighborhood by Sac State 6. Rescue Areas (Defined by Levee Breach Scenarios) Note: All projects in Target Audience #1 (Entire City) also apply to these target areas	A. Know your flood hazard B. You need flood insurance C. Protect people from the flood hazard D. Protect your property from the hazard E. Build Responsibly F. Protect Natural Floodplain Functions G. Levee Preparedness I. General Preparedness	A. 1, 2,3 & 4 B. 1,2,3 & 4 C. 2 & 3 D.1,2,3,4,5,6 E. 1 & 2 F. 1,2,& 3 G. 1,2 I. 1, 2 & 3	OP 4. FEMA's High Water Mark Initiative	City of Sacramento Department of Utilities & PIO	Year-round	DWR/USACE/USGS/ FEMA
			OP 9. Levee Flood Protection Zone Map (DWR Flood Risk Notification)	DWR	Annually - September	DWR/FEMA/ Cal EMA/ CVFPB/ USACE
			OP 15. Emergency Preparedness Fair	Office of Emergency Services	2 per year	N/A
			OP 24. Levee Breach Scenario Mapping for 18 Rescue Areas	City of Sacramento Department of Utilities	Year-round	Sacramento County
			OP 27. Flood Ready Website	City of Sacramento Department of Utilities	Year-round	N/A
			OP.30. Flood Insurance Promotion of Website & Newsletter	Congresswoman Doris Matsui's Office	Year-round	Congresswoman Doris Matsui's Office
			Flood Response Projects			
1.Entire City	A. Know your flood hazard Risks C. Protect	A. 1, 2, 3, 4 & 5 C. 1, 2, 3, 4 & 5	FRP 1. Press Release (TV, Radio, Newspaper)	City of Sacramento Department of Utilities & PIO	Release at first flood notice	N/A

Target Audience	Message(s) (See Table 7.7)	Outcome (See Table 7.7)	Project(s)	Assignment	Schedule	Stakeholder
	people from the flood hazard		FRP 3. Press Release (Website, Social Media)	City of Sacramento Department of Utilities & PIO	Release at first flood notice	N/A
			FRP 6. After flood event handouts	Community Development & City of Sacramento Department of Utilities	Develop by May 1, 2015	N/A
			FRP 2. Everbridge	OES & PIOs	Release at first flood notice	N/A
			FRP 4. Drinking Water Quality Communication (Website)	City of Sacramento Department of Utilities	Release once water is determined to be compromised	N/A
2. Combined Sewer System/Internal Drainage	A. Know your flood hazard Risks C. Protect people from the flood hazard	A. 1, 2, 3, 4 & 5 C. 1, 2, 3, 4 & 5	FRP 5. CSS Signage	City of Sacramento Department of Utilities Operations	Release at first flood notice	N/A
3. Flood Damaged Property	D. Protect your property from the hazard E. Build Responsibly	D. 1,2,4,6 E. 1,2,3	FRP 6. After flood event handouts	Community Development & City of Sacramento Department of Utilities	Leave at damaged structure during inspection and/or provide to owners upon re-entry of area	N/A

Target Audience	Message(s) (See Table 7.7)	Outcome (See Table 7.7)	Project(s)	Assignment	Schedule	Stakeholder
			FRP 7. Flood insurance and grant information handouts	Neighborhood Services & City of Sacramento Department of Utilities	Leave at damaged structure during inspection and/or provide to owners upon re-entry of area	N/A

7.2 Implementation Strategies and Action Items

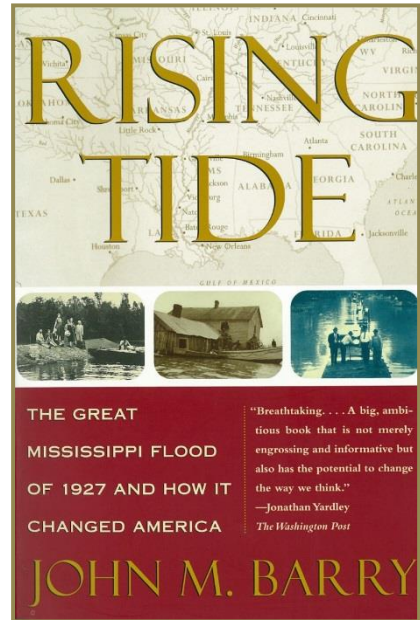
The implementation strategies outlined in Table 7.8 above indicate what the City will do to increase risk communications with residents of the City. Table 7.8 outlines the specific implementation actions, the agency, department, or organization responsible for implementation, and Table 7.8 also provides the schedule for implementation (when the project is to be conducted).

8 National Flood Insurance Program/Community Rating System

8.1 Introduction and Background

8.1.1 National Flood Insurance Program Background

The evolution of the National Flood Insurance Program (NFIP) started prior to the 1960s. The Galveston hurricane in 1909 and the great Mississippi River flood of 1927 are two major flood events in the United States where there was no flood insurance available and no effort to mitigate loss to life and property. Throughout the 1920's and 1930's, the federal government responded to major flood events by constructing structural flood-control projects such as dams and levees with the passage of the Flood Control Act of 1936. These two catastrophic events along with other flood events caused the insurance industry to consider flood insurance as a component of a standard homeowner's policy. Before 1950, flood insurance was included in a standard homeowner's policy. The insurance industry then reconsidered this offering because of a high correlation of losses by holders of flood policies from a single company. Insurance companies began excluding flood coverage from standard insurance policies and started selling flood insurance separately. Over the next few years, the collection of insurance premiums was insufficient to cover payouts after major flooding events. A study prepared in 1956 by the American Insurance Association confirmed that the private insurance industry could not provide this service to the public and remain solvent. Additionally, only those who were exposed to the highest risk were purchasing flood insurance. In the 1960's flood insurance became completely unprofitable and private insurance companies no longer offered flood insurance.



Since homes and businesses were left without any flood insurance coverage, Congress stepped in and established the NFIP with the passage of the National Flood Insurance Act of 1968. This program allows property owners in participating communities to purchase insurance against flood losses in exchange for state and community floodplain regulations that reduce future flood damages. Participation in the NFIP is based on an agreement between communities and the federal government. If a community adopts and enforces minimum floodplain regulations for new construction and substantial improvements to reduce future flood risk in designated floodplain areas, the federal

government will make insurance available within that community as a financial protection against flood losses.

The NFIP has three specific components:

- 1) Floodplain identification and mapping;
- 2) Floodplain management; and
- 3) Flood insurance.

When the NFIP was created in 1968, Congress realized that insuring existing buildings constructed before a community joined the NFIP would be prohibitively expensive if the flood insurance premiums were not subsidized. Therefore, this subset of buildings was provided with insurance coverage which did not accurately reflect the true hazard risk. Most every community in the NFIP has some of these pre-FIRM properties, including Sacramento.

The NFIP was first amended in 1973 with the Flood Disaster Protection Act which made the purchase of flood insurance mandatory within the SFHA or the 1-percent-annual-chance flood area. The NFIP was amended again in 1982 by the Coastal Barrier Resources Act (CBRA) in which flood insurance for new construction and substantial improvements would be unavailable for certain coastal environmentally sensitive lands. In 1994, the NFIP was amended to define penalties for lending institutions which were not requiring the mandatory purchase of flood insurance; it created the ICC coverage; created the Flood Mitigation Assistance (FMA) Fund; and it also codified the Community Rating System (CRS) Program and made it a permanent part of the NFIP. Then in 2004, the NFIP was amended again with the goal of reducing losses to repetitive flooded properties.

Today over 21,500 communities and tribal governments participate in the NFIP in 56 states and territories. As of December 2011, there were almost 5.6 million residential and commercial flood insurance policies in place with nearly \$1.26 trillion in written coverage. This generates approximately \$3.5 billion in annual premiums for the NFIP.

The City of Sacramento joined the NFIP and its FIRM became effective on September 15, 1978. By joining the NFIP, the City agreed to adopt floodplain regulations and enforce those regulations on new construction and substantial improvements of existing buildings according to the requirements of the FIRM maps in affect at the time of construction. Structures built in the City prior to September 15, 1978 are considered pre-FIRM buildings and are subject to increased flood insurance premiums from the Biggert-Waters Flood Insurance Reform Act of 2012 and the Homeowner Flood Insurance Affordability Act of 2014.

8.2 Current Implementation Status

Because the NFIP is approximately \$24 billion in debt, Congress passed the Flood Insurance Reform Act of 2012 (Biggert-Waters), which calls on FEMA to make a number of changes to the NFIP. The legislation requires the NFIP to gradually raise flood insurance rates on pre-FIRM

subsidized buildings until the true hazard risk for that building is reached, make the program more financially stable, and change how FIRM updates impact policyholders.

In 2014, Congress passed the Homeowner Flood Insurance Affordability Act which is designed to delay some premium increases for buildings where residents reside full time; however, those who own second homes or vacation homes where they are not considered full time residences and all businesses are not protected from premium increases under the 2012 Biggert-Waters Flood Insurance Reform Act. Premiums for these buildings will increase until the true risk value for that structure is achieved. An elevation certificate should be obtained from each property owner (if one does not exist) to confirm the elevation of the lowest livable level of that building to ensure that the proper premium rate for that elevation is assigned by the insurance company or the NFIP.

8.2.1 Flood Zones and Insurance Rates

Flood Zone Designations

Flood zones are geographic areas that the FEMA has defined according to varying levels of flood risk. The FIRM for the City of Sacramento contains the following zone designations:

A Zone: These areas on the FIRM represent the 1-percent-annual-chance flood where no BFEs have been established. Areas designated as A zones traditionally have shallow flooding to flood depths of up to 30 feet. For areas which are developed, the property owner or the developer is required to establish BFEs. Flood insurance can be required in the A zone depending on the BFE which is established.

AE Zone: These areas represent the 1-percent-annual-chance flood where BFEs have been established. The City does have several areas designated as AE zones including the entire Natomas Basin. Flood insurance is required in the AE zone.

AH Zone: Flood depths of one to three feet (usually sheet flow) designate AH zones, where the BFE is determined on the FIRMs. The City does have a very small AH zone on the north side of Arcade Creek. Flood insurance is required in the AH-Zone.

The zones defined above, along with AR, AO, V, VE and D zones are all designated by FEMA as SFHA. The City does not currently have any areas designated as AR, AO, V, VE, or O zones. See the FIRMs for definitions of these zones.

A99 Zone: Areas to be protected from the 1-percent-annual-chance flood by a federal flood protection system under construction are called A99 zones. As of 2009, the only remaining A99 zones in the City are around Morrison, Unionhouse, and Elder Creeks. Levee projects are currently under construction in these areas.

Shaded X- Zone: Areas with less than the 0.2-percent-annual-chance flood protection; areas less than the 1-percent-annual-chance flood with average depths of less than one foot (or drainage

areas less than one square mile); or areas protected by levees from the 1-percent-annual-chance flood. Flood insurance is not mandatory, and there are no federally imposed restrictions on development in the Shaded X zone. Most of Sacramento lies in a Shaded X zone.

X Zone: Areas determined to be outside the 0.2-percent-annual-chance flood. There are no restrictions on development or mandatory flood insurance. Residents may purchase Preferred Risk (PRP) flood insurance policies at the same PRP rates available in Shaded X zones.

Zones B and C also represent areas outside the SFHA. These zones, however, are no longer depicted on Flood Insurance Rate Maps. The current Shaded X-Zone corresponds to the former Zone B and the Unshaded X-Zone corresponds to the former Zone C.

Flood Insurance Policy Rates

The following is a discussion of flood insurance rates and building restrictions in SFHAs:

- Flood insurance premiums for A99 and AR zones reflect the Standard X zone rate, which is approximately \$900 for structure coverage only.
- For A, AE, AH, and AO zones, the policy cost is based on the difference between the elevation of the building's lowest floor (determined by having a surveyor filling out an elevation certificate) and the BFE.
- Floodproofing is an alternative option to elevating the structure for commercial buildings.



Property owners of buildings in an X zone can purchase flood insurance at a Preferred Risk Policy (PRP) rate, which costs under \$500 a year. Areas designated as X zones with over 1-percent-annual-chance flood level protection do not require flood insurance, although it is recommended.

Structures that were issued building permits prior to the effective FIRM date (September 15, 1978) are considered pre-FIRM. These structures have a special subsidized flood insurance rate separate from the flood zones mentioned above.

Lower flood insurance premiums are available for post-FIRM structures by using the FEMA “grandfathering rule,” where the rate is based on the zone in place when the building permit was issued. For example, if the FIRM for a specific area changes to a SFHA, but a building permit in that area was issued in an X-Zone, then the building can be grandfathered using the Standard X zone rate.

8.2.2 Flood Insurance in Sacramento

Most every primary building or substantial improvement within the City of Sacramento’s SFHA must have a flood insurance policy if there is a federally-backed mortgage. The majority of mortgage loans are backed by the federal government through either Fannie Mae or Freddie Mac. Since flood insurance rates are driven by location of the building and the BFE, structures in the SFHA usually pay higher rates than do those buildings located outside the designated higher risk areas. Typically when BFEs increase, flood insurance premiums also increase, unless some type of mitigation is implemented on that building.

While flood insurance can do nothing to prevent actual flood damage or loss of life it can mitigate the economic risk associated with flooding to the insured in many ways. Flood insurance is a property owner’s first line of defense against flood damage. A property which is damaged or destroyed can be replaced more quickly without using financial resources devoted to other things such as the mortgage, utilities or maintenance. Additionally, compensation for flood losses (through flood insurance payments) can help families get back on their feet with minimal financial hardship and can also aid businesses in getting back open to avoid potential financial ruin.

Table 8.1 shows historically the number of flood insurance policies in the A, AE, AH and AO-Zones, the number of Standard X-Zone policies in AR, A99-Zones, and the number of Preferred Risk Policies in the B, C or X-Zones. The table also shows the average number of flood insurance policies by flood zone from August 2008 through March of 2012.

Table 8.1. Flood Insurance Policies in Sacramento by Zone and Year

Year	Zone A,AE, AH, AO	Zone AR,A99,*	Zone B,C,X,**	Total
Aug 2008	737	12,360	30,050	43,147
May 2009	1,318	16,984	30,107	48,409
Aug 2009	924	30,974	19,459	51,357
May 2010	1,047	15,091	33,434	49,572
Sept 2010	1,106	15,372	32,722	49,200
Jan 2011	708	4,656	40, 637	46,001
Mar 2012	791	10,676	36,459	47,926
Oct 2013	571	8,020	36,045	44,636
April 2015	372	13,350	28,245	41,967
Jan 2016	360	22,170	21,407	43,937
Average	793	14,965	26,793	46,615

Source: FEMA’s Community Information System

* Standard X-Zone Policies ** Preferred Risk Policies

Table 8.2 indicates that as of January 31, 2016, the City of Sacramento had 43,937 active flood insurance policies in force with total premiums of more than \$20 million. These active policies represent more than \$14 billion of insurance in place covering both structure and contents.

Historically, the City has had 967 claims paid against the NFIP totaling \$9.9 million in paid losses.

Table 8.2. Flood Insurance Policies by Occupancy (Data as of 01/31/2016)

	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	\$ of Closed Paid Losses	Adjustment Expense
Single Family	37,691	\$16,291,601	\$12,278,053,400	799	\$7,237,612.26	\$332,146.93
2-4 Family	1,474	\$606,999	\$430,073,500	73	\$533,676.99	\$29,085.00
All Other Residential	3,662	\$1,644,288	\$1,053,055,600	32	\$385,040.51	\$16,950.26
Non Residential	1,110	\$2,191,166	\$593,896,000	63	\$1,749,978.23	\$57,185.26
Total	43,937	\$20,734,054	\$14,355,078,500	967	\$9,906,306.00	\$435,366.00

Table 8.3 presents the number of insurance policies in force, as of January 1, 2016, by occupancy type in relation to condominiums.

Table 8.3. Flood Insurance Policies by Occupancy (Data as of 01/31/2016)

	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	\$ of Closed Paid Losses	Adjustment Expense
Condo	3,391	\$1,332,563	\$733,995,500	28	\$210,664.78	\$11,403.89
Non Condo	40,546	\$19,401,491	\$13,621,083,000	939	\$9,695,643.20	\$423,963.56
Total	43,937	\$20,734,054	\$14,355,078,500	967	\$9,906,307.00	\$435,366.00

Source: FEMA's Community Information System

Table 8.4 indicates the number of flood insurance policies by flood zone as of January 31, 2016. The total number of flood insurance policies in the A, AE, AH and AO-zones decreased by 12 from 372 in April 2015 to 360 in January of 2016. The number of flood insurance policies in the A99, AR, and Standard X increased from 13,350 in April of 2015 to 22,170 in January of 2016. The total number of flood insurance policies dropped in the B, C and X-zones from 28,245 to 21,407, a net decrease of 6,838 policies or 24.2%. The total number of flood insurance policies in the City decreased from 2015 to 2016. In April 2015, the City had 41,967 flood insurance policies in force and in January of 2016 the total policies in force increased to 43,937 or 4.69%.

Table 8.4. Flood Insurance Policies by Flood Zone (Data as of 01/31/2016)

	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	\$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	209	\$300,475	\$46,734,900	37	\$465,140.87	\$18,539.98
A Zones	9	\$20,500	\$2,736,500	21	\$239,984.28	\$9,972.87
AO Zones	43	\$29,374	\$9,776,600	16	\$255,574.76	\$7,775.00
AH Zones	99	\$77,150	\$21,666,400	14	\$186,562.71	\$6,975.00
AR Zones	152	\$161,180	\$35,614,900	15	\$376,173.26	\$14,557.02
A99 Zones	1,641	\$1,556,635	\$350,476,700	715	\$6,265,285.28	\$300,944.93
B, C & X Zones						
Standard	20,377	\$9,610,229	\$6,700,808,500	115	\$1,764,167.91	\$55,762.65
Preferred	21,407	\$8,978,511	\$12,122,796,000	27	\$324,467.81	\$17,800.00
Total	43,937	\$20,734,054	\$14,355,078,500	960	\$9,854,918.00	\$432,324.00

Source: FEMA's Community Information System

As of January 31, 2016, the City of Sacramento had 14,768 pre-FIRM flood insurance policies in force as shown in Table 8.5. These pre-FIRM policies in the AE, A, and AH zones have the potential to be affected by rate increases through the Biggert-Waters Flood Insurance Reform Act of 2012 and the Homeowner's Flood Insurance Affordability Act of 2014. The City does not have any AO or AR zone currently. These policies need to be corrected with the current flood zone.

Table 8.5. Pre-FIRM Flood Insurance Policies by Zone (Data as of 01/31/2016)

	Policies in Force	Premium	Insurance in Force	# of Closed Paid Losses	\$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	147	\$249,203	\$26,677,500	30	\$413,959.08	\$15,789.98
A Zones	7	\$19,313	\$1,986,500	20	\$235,967.81	\$9,622.87
AO Zones	31	\$21,214	\$7,075,900	7	\$24,882.14	\$2,300.00
AH Zones	58	\$47,395	\$11,846,600	3	\$19,019.64	\$1,275.00
AR Zones	66	\$73,591	\$14,424,200	11	\$369,349.34	\$13,802.02
A99 Zones	658	\$670,171	\$139,093,600	500	\$3,298,247.38	\$193,500.69
B, C & X Zones	13,801	\$5,714,882	\$4,561,985,200	111	\$1,691,090.71	\$58,807.65
Standard	1,582	\$831,287	\$494,537,200	91	\$1,492,497.04	\$45,252.65
Preferred	12,219	\$4,883,595	\$4,766,089,500	20	\$198,116.67	\$13,555.00
Total	14,768	\$6,795,769	\$4,766,089,500	681	\$6,052,243.00	\$294,375.00

Source: FEMA's Community Information System

Table 8.6 shows there were 29,169 post-FIRM flood insurance policies as of January 31, 2016; 18,795 were Standard Flood Insurance Policies and just over 9,188 were PRP.

Table 8.6. Post-FIRM Flood Insurance Policies by Zone (Data as of 01/31/2016)

	Policies in Force	Premium	Insurance in Force	# of Closed Paid Losses	\$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	62	\$51,272	\$17,057,400	7	\$51,181.79	\$2,750.00
A Zones	2	\$1,187	\$750,000	1	\$4,286.47	\$350.00
AO Zones	12	\$8,160	\$2,700,700	9	\$230,692.62	\$5,475.00
AH Zones	41	\$29,755	\$9,819,800	11	\$167,543.07	\$5,700.00
AR Zones	86	\$87,589	\$21,190,700	4	\$6,823.92	\$1,475.00
A99 Zones	983	\$886,464	\$211,383,100	215	\$2,967,037.90	\$107,444.24
B, C & X Zones	27,983	\$12,873,858	\$9,326,087,300	33	\$415,563.65	\$16,705.00
Standard	18,795	\$8,778,942	\$6,206,271,300	24	\$271,193.87	\$10,510.00
Preferred	9,188	\$4,094,916	\$3,119,816,000	9	\$144,369.78	\$6,195.00
Total	29,169	\$13,938,285	\$9,588,989,000	280	\$3,843,125.00	\$139,899.00

Source: FEMA's Community Information System

Many factors change the number of flood insurance policies in the City. In 2015, the City saw a drop in the number of A99 policies in Pre-FIRM and Post-FIRM policies because over 3,000 residents were moved from the A99 Zone on May 12, 2014 in South Sacramento. Hopefully, the City will see an increase in PRP policies as residents convert in this area over the next couple years. On another note, Natomas was remapped from an AE to A99 zone in June 2015, so the City expects to see an increase in A99 policies in the first part of 2016. Also, the numbers may conflict in the table above because Natomas residents have been in multiple subsidized programs since 2008 – Preferred Risk Policy Eligibility Extension and Properties Newly Mapped.

Public Perception of Flood Insurance

Participation by communities in the NFIP and the purchase of policies by individual homeowners and businesses has been shown to lower the financial risk of flooding. However, the majority of people who live in an area at risk of flooding and who are not required to purchase flood insurance, usually do not. There are many reasons why residents and businesses avoid purchasing flood insurance. Some of these include:



- Levees and dams provide a false sense of security. These structural barriers convince people that they are protected from flooding without realizing that factors such as lack of

maintenance, earthquakes, and that the next flood could be higher may undermine these structural components and cause flooding to occur.

- Some surveys suggest that the risk of being flooded in your home during the life of a 30-year mortgage is only between 0 to 10 percent. However, the fact is that there is a 26 percent chance of being flooded in your home over the life of a 30-year mortgage for a structure located in the SFHA. This lack of knowledge creates a retention problem for the NFIP.
- Many people believe that because they are not located in a higher risk zone such as an AE, A, or any other 1 percent change annual flood area that they are not subject to flood damage. The truth is that approximately 20% of all flood losses on an annual basis occur within the moderate to low risk flood zones such as a B, C, or X zone. In addition, many believe that their homeowner's policy covers flood damage when in fact it does not.
- There is a misconception about the cost of flood insurance. The average cost of a flood insurance policy is approximately \$650 per year. Many consider the fire hazard or other risks to a home to be more important than the flood risk.



Nearly 20% of flood insurance claims come from moderate-to-low risk areas.

8.3 Community Rating System Background

The NFIP's CRS program is an incentive program that encourages communities to exceed the minimum federal requirements for development within the floodplain. The better job a community does of protecting buildings from flood damage, the cheaper flood insurance rates are for policy holders. Under the CRS, flood insurance premiums are adjusted (discounted) to reflect a community's work in reducing flood damage to existing buildings, manage development in areas not yet mapped by the NFIP, protecting new buildings or substantial improvements above the minimum NFIP flood protection levels, preserving or renewing natural floodplain functions, helping real estate and insurance agents obtain flood-related data, and informing the public of flood hazards and helping them to obtain flood insurance.

The CRS program is based upon the following three primary goals:

- 1) Reduce and avoid damage to insurable buildings,
- 2) Strengthen and support the insurance aspects of the NFIP, and
- 3) Foster comprehensive floodplain management

The CRS is a point-based program where 19 floodplain management activities can be implemented to obtain one of 10 CRS classifications. A community must obtain at least 500 points to achieve a Classification 9 and enable their policy holders to receive a 5% discount on their flood insurance. Table 8.7 shows the 10 CRS classes and the associated points necessary to achieve each class:

Table 8.7. CRS Classes, Credit Points, and Premium Discounts

Table 110-1. CRS classes, credit points, and premium discounts.			
CRS Class	Credit Points (cT)	Premium Reduction	
		In SFHA	Outside SFHA
1	4,500+	45%	10%
2	4,000–4,499	40%	10%
3	3,500–3,999	35%	10%
4	3,000–3,499	30%	10%
5	2,500–2,999	25%	10%
6	2,000–2,499	20%	10%
7	1,500–1,999	15%	5%
8	1,000–1,499	10%	5%
9	500–999	5%	5%
10	0–499	0	0

SFHA: Zones A, AE, A1–A30, V, V1–V30, AO, and AH
Outside the SFHA: Zones X, B, C, A99, AR, and D

Preferred Risk Policies are not eligible for CRS premium discounts because they already have premiums lower than other policies. Preferred Risk Policies are available only in B, C, and X Zones for properties that are shown to have a minimal risk of flood damage.

Some minus-rated policies may not be eligible for CRS premium discounts.

Premium discounts are subject to change.

Source: National Flood Insurance Program’s 2013 Community Rating System (CRS) Manual, FIA15

The 19 CRS floodplain management activities are divided into four series which include:

- 1) 300 Series – Public Information Activities,
- 2) 400 Series – Mapping and Regulations,
- 3) 500 Series – Flood Damage Reduction Activities; and
- 4) 600 Series – Warning and Response

Each series has from three to seven floodplain management activities. Certain activities also have elements of credit which further define each activity. The elements further break down the credit within each activity, usually through the use of an acronym.

A CRS Coordinator's Manual outlines the credit points, background information on each activity and element, and the documentation required to support the credit. The current *CRS Coordinator's Manual* is dated May 2013.

8.3.1 Community Rating System in Sacramento

Sacramento applied to the CRS in December of 1990 and modified its application in December of 1992. The CRS program requires that communities recertify their application every October and complete a cycle application every three or five years depending on its classification. Sacramento completed cycle applications in 1995, 2000, 2006, and 2010. In 2008, the City's CRS classification went from a 6 to 5, allowing policy holders in the SFHA to reduce their flood insurance rates by an extra 5% for a total reduction of 25%.

The City of Sacramento implements the following CRS activities. These activities were verified in September 17, 2013. Additional implementation goals are listed at the end of this chapter.

Activity 310: Elevation Certificates

The Community Development Department (CDD) requires that any new construction or substantial improvement in the SFHA file an elevation certificate. A99 zones are excluded from SFHAs because no special floodplain development regulations apply to A99 zones. However, the City does require a flood risk acknowledgement agreement (hold harmless) for all developments in A zones. The Department of Utilities (DOU) has been maintaining FEMA elevation certificates for buildings built in the SFHA. The elevation certificates are in the DOU's files and also maintained electronically. The City plans to continue updating the certificates electronically to make them more easily accessible to the public.

Activity 320: Map Information Service

The City will continue to provide floodplain information to Sacramento citizens at the DOU office (1395 35th Avenue) as well as over the phone and by email. Telephone and email requests will be responded to within two business days. A Floodplain Hotline (916-808-5061) and email (floodinfo@cityofsacramento.org) have been reserved for this purpose. The City will provide grandfather letters and Preferred Risk Policy Eligibility Extension (PRPEE) letters for residents upon request. The City publicizes this service through various outreach projects and is also looking into other options such as a website page for floodplain information requests.

Activity 330: Outreach Projects

The City will continue to provide floodplain information through utility inserts, mailings to residents in the SFHAs, floodplain information booths at community events, billboards, buses, and other methods. The City is also preparing a PPI, as presented in Chapter 7, which provides a 40% multiplier for outreach projects the City undertakes. (*Note: For more details on proposed outreach projects and other outreach plans to inform the public, see Chapter 7, Risk Communication.*)

Activity 340: Hazard Disclosure

The State of California requires real estate agents to notify prospective buyers of SFHAs. The City will notify real estate agencies and/or boards on an annual basis of this requirement and where they can obtain disclosure statement forms.

Activity 350: Flood Protection Information

DOU will continue to provide flood information materials to the Sacramento Central Library. The library collection contains materials on natural and beneficial functions, including the National Wetlands Inventory Maps for Sacramento and “Classification of Wetlands and Deepwater Habitats of the United States.” The City also continues to provide flood protection information on the DOU website, where it is continually maintained and updated, and work to increase public awareness of these resources.

Activity 360: Flood Protection Assistance

The DOU will continue to help citizens with their individual flood protection needs, including providing site visits to determine cause of flooding, identifying solutions to local flooding problems, and providing assistance with flood fights. CDD and DOU will provide information on how to select a contractor and retrofitting structures, and the City will continue its efforts to make the public aware of this resource through proper outreach.

Activity 370: Flood Insurance Promotion

This is a new activity in the *2013 CRS Coordinator’s Manual*. The activity includes conducting a flood insurance coverage assessment (FIA), coverage improvement plan (CP), and implementation of the CP (CPI). The FIA is a document to identify target areas, map flood insurance coverage and determine the level of flood insurance coverage. The CP is a plan to improve the insurance coverage identified in the FIA. The City has analyzed flood insurance coverage in the past, and these new activities are implemented as part of the PPI.

Activity 410: Floodplain Mapping

The City continues to conduct new studies that produce base flood elevations or floodways. These studies are usually conducted when flood control improvements are constructed or better data such as hydrology or topography is available that makes the floodplain contours more accurate. Some projects and studies are funded partially by local and state funds. Depending on the circumstance, the City enforces development restrictions on special flood-related hazards that are not mapped on the DFIRMs such as Magpie Creek and the CFMP Rescue and Evacuation Maps.

The City signed a Cooperating Technical Partner (CTP) agreement with FEMA Region IX on February 18, 2003. California’s Department of Water Resources also signed a CTP with FEMA Region IX on March 4, 2009.

Activity 420: Open Space Preservation

The City's General Plan contains policy to conserve and protect natural resources and planned open space areas. The City will continue to provide open space for the preservation and conservation of natural resources. Riparian forests and grassland vegetation will also be conserved. The City protects planned open space areas that support wildlife habitat, working with the County of Sacramento to protect unique physical features. Open space for recreation will be provided, and the American and Sacramento River parkways will be conserved and protected.

The City has other open space areas that can also be developed to their recreational use potential. These areas, which include easements, floodways and floodplains, are either: (1) located in a floodplain and in an undeveloped, natural state; (2) have been restored to a natural state; or (3) protect natural and beneficial functions. These areas include the American River Parkway, Del Paso Park, Bannon Creek Parkway, Chorley Park, Laguna Creek, Magpie Creek, Marconi Station Park, and Reichmuth Park. The American River is considered to protect the natural and beneficial functions.

Activity 430: Higher Regulatory Standards

The City requires several higher regulatory standards for new development above the minimum NFIP regulations. All new construction or substantial improvements must have the lowest floor, including the basement, elevated one foot above the BFE. Compensatory storage is required for development through the Stormwater Quality Improvement Program (SQIP) hydromodification program. The City maintains a Building Code Effectiveness Grading Schedule (BCEGS) classification of 2/2 and adopted the California State Building Codes in 2007. City Code Section 16.40 requires adequate, positive drainage for all lots. The City requires "non-conversion" agreements for crawl spaces.

The City continues to employ staff members who have obtained their Certified Floodplain Manager (CFM) certificate and individuals who have attended credited training courses. The City will continue to encourage staff to obtain this CFM certification and attend more floodplain management training.

Activity 440: Flood Data Maintenance

The City continues to maintain its online GIS DFIRM viewer. This GIS viewer helps improve access, quality, and ease of updating flood data for development and flood insurance purposes. The City maintains copies of all FIRMs that have been issued for the community. The City Surveyor maintains the City's benchmarks, so surveyors completing elevation certificates can find them and obtain accurate information.

Activity 450: Stormwater Management

The City will continue efforts to improve the quality of stormwater runoff and protect receiving water bodies to the maximum extent practicable (MEP) through the City's SQIP. The City will also continue to implement the federally mandated NPDES Stormwater Discharge Permit. The SQIP identifies and measures the effectiveness of best management practices (BMPs) implementation. This program includes implementation of BMPs for construction activities in accordance with the City's Grading, Erosion and Sediment Control Ordinance and associated manual. The Stormwater Program, through low impact development standards and the hydromodification program, requires new developments to implement BMPs such as grassy swales and detention basins to reduce increases of stormwater pollution and peak flows to the MEP.

The City and County have a WMP that is a tool for making decisions that will reduce the increased flooding from development on a watershed-wide basis. A list of all existing drainage master plans is documented in the WMP. This WMP is an appendix to the 2011 Local Hazard Mitigation Plan and will be updated every 5 years.

The goal of the drainage master plans listed in the WMP is to provide a higher level of flood protection to the residents of Sacramento. In conjunction with improving the drainage system, the City's overall planning program encourages consideration of water quality; preservation and restoration of natural areas such as wetlands, riparian corridors, streams, and heritage oaks; and public facility enhancements in the master planning process. For example, the staff has identified several opportunities for creation of detention basins that can also serve as public parks.

Activity 510: Floodplain Management Planning

DOU will continue to provide an annual progress report on the *2011 Sacramento County Local Hazard Mitigation Plan* to the City Council, local media, and the state NFIP Coordinating Office.

DOU continues to map all repetitive loss sites, conduct a repetitive loss area analysis, and mail letters to all repetitive loss areas on an annual basis. A spreadsheet of all repetitive loss sites and reasons for flooding is updated annually and used for applying for FEMA grants when appropriate.

Activity 520: Acquisition and Relocation

The City will continue to make efforts to acquire and relocate buildings from SFHAs, especially repetitively flooded properties.

Activity 530: Flood Protection

The City will continue to flood proof, elevate, or otherwise modify buildings to protect them from flood damage.

Activity 540: Drainage System Maintenance

The City along with other local maintaining agencies will continue to maintain all above-ground channels, basins, canals, ditches, and culverts. Maintenance work includes weeding, clearing, minor repairs, and debris removal. Drainage fees are collected to maintain the local system. The City is aware of problem sites and inspects them on a more frequent basis. The City has also developed an ordinance for stormwater management and discharge control that prohibits dumping of pollutants in streams.

DOU has a CIP that ranks drainage projects and corrects drainage problems.

Activity 610: Flood Warning Program

The State of California has the California Data Exchange Center website, which contains all types of water level gages. The City has an ALERT system, which gages stream and creek levels by the use of six monitoring stations that warn of impending floods. The County of Sacramento runs the website for the City's ALERT stations along with theirs for streams and creeks in the County. Water levels on the H Street and I Street Bridges are used to determine when to initiate evacuation procedures. The City has 31 sirens located throughout its boundaries and also broadcasts emergencies on two radio stations. In the event of an evacuation, the City will utilize loud speakers and roving police patrols. City Office of Emergency Services (OES) has a Reverse 911 system and is currently pursuing Everbridge, a faster system than Reverse 911. Residents who have registered for Reverse 911 will be transferred to the new system. The Everbridge System can call homes and cell phones in designated areas and alert residents if there is a need to evacuate.

Sacramento County is also designated as a StormReady community by NOAA.

Activity 620: Levees

The City will continue to support flood protection projects developed by the SAFCA, DWR, and USACE. The City will continue to help the DWR in performing its annual levee inspection and maintain the levees in accordance with the O&M plans.

The City will continue to monitor levee conditions and open the Utilities Operation Center and/or the Office of Emergency Service's Emergency Operation Center when predicted flood levels may be reached or a levee breach may occur. The City will continue to maintain a list of critical facilities and emergency response plans.

Activity 630: Dam Safety

FEMA has accepted the State's dam safety program. The City will continue to participate in this program as well as in a dam failure emergency action plan.

8.4 Implementation Strategies and Action Items

The following actions are recommended to reduce risk of flooding by increasing the number of flood insurance policies in Sacramento.

Table 8.8. NFIP/CRS Action Items

Action Item	Responsible Department	Schedule
1. Reassess the Flood Insurance Coverage Assessment (FIA) and Coverage Improvement Plan (CP) as Part of the Program for Public Information (PPI) every CRS verification cycle visit	DOU	Short term and ongoing
2. Develop a Brochure for Real Estate Agents to Provide to Their Potential Buyers	DOU Public Relations	Short term and ongoing
3. Provide Property Owners with an Opportunity for a City Staff Site Visit for Providing Property Protection Advice	DOU Engineering Staff	Short term and ongoing
4. Sign a Memorandum of Agreement with the County of Sacramento for Flood Control Planning of the South Sacramento County Streams	DOU	Short term
5. Increase the Freeboard for Development to 2.0 Feet above the Base Flood Elevation (BFE)	DOU, CDD	Medium term
6. Write a Levee Failure Response Plan for Critical Facilities	DOU, OES	Short to medium term
7. Petition FEMA for Modifications to the NFIP that would make Reduced-Cost Flood Insurance Available for Urban Areas Protected by Levees by Creating a New Flood Zone	DOU	Long term
8. Alleviate the Workload in Administering the NFIP Program	DOU	Short to medium term
9. Partner with the State, FEMA and Local Entities on Flood Risk Outreach	DOU Public Relations	Short term and ongoing
10. The City will move toward Obtaining a CRS Level 3 or 4 Designation	DOU	Medium term and ongoing
11. Develop a Dam Outreach Brochure on an annual basis	DOU	Short term and ongoing
12. Continue to participate in the Northern Central CRS User Group	DOU	Short term and ongoing

1. Reassess the Flood Insurance Coverage Assessment (FIA) and Coverage Improvement Plan (CP) as Part of the Program for Public Information (PPI)

Issue/Background Statement: Efforts, on the part of FEMA, to market flood insurance and enforce lender compliance for areas within the 1-percent-annual-chance floodplain are encouraged. In the absence of mandatory flood insurance for areas behind levees with more than the 1-percent-annual-chance flood protection, comprehensive efforts to educate the public would be beneficial. This includes education on the residual risk behind levees, the potential flood depths that could be expected in those areas, and the availability of flood insurance to mitigate

property damage should a flood occur. Assembly Bill 156 requires DWR to annually notify property owners at risk of flooding in a levee protection zone.

Implementation Strategy: Under CRS Activity 370 - Flood Insurance Promotion, credit is given for conducting a flood insurance coverage assessment, coverage improvement plan, and implementation of the CP. These documents were completed as part of the Program for Public Information (PPI), Chapter 7 of this CFMP. As a general goal, the City would like to increase the number of PRP policies over the next 5 years.

Responsible Office: DOU

Potential Funding: Staff time

Schedule: Short term and ongoing. The FIA and CP as part of the PPI will be reassessed every CRS verification cycle visit.

2. Develop a Brochure for Real Estate Agents to Provide to Their Potential Buyers.

Issue/Background Statement: Many residents who call the floodplain hotline complain that they were not informed that they were in a floodplain or are going to be placed into a floodplain requiring mandatory insurance.

Implementation Strategy: Under Activity 340, credit is given for creating a brochure or handout for real estate agents to give to their potential buyers encouraging them to investigate the flood hazards for a property. The brochure/handout will be completed as part of the Program for Public Information (PPI), Chapter 7 of this CFMP.

Responsible Office: DOU Public Relations

Potential Funding: Operating Budget

Schedule: Short term and ongoing

3. Continue to Provide Property Owners with an Opportunity for a City Staff Site Visit for Providing Property Protection Advice.

Issue/Background Statement: Many residents have drainage issues and complaints, as well as, questions on how they can protect their property or potentially retrofit their structure.

Implementation Strategy: Under Activity 360, the City can provide site visits to individual homeowners to give them advice on retrofitting techniques and drainage improvements. Also, City staff should provide these homeowners with financial assistance programs. The City staff providing these site visits should take an EMI course on retrofitting and/or grant programs.

Responsible Office: DOU Engineering Staff

Potential Funding: Operating Budget/Staff time

Schedule: Short term and ongoing.

4. *Sign a Memorandum of Agreement with the County of Sacramento for Flood Control Planning of the South Sacramento County Streams*

Issue/Background Statement: Section 402 of the Water Resources Development Act of 1986, as amended, requires the non-federal sponsor to have prepared a floodplain management plan within one year after the date of signing the Project Cooperation Agreement (PCA). The plan shall be designed to reduce the impacts of future flood events in the project area, including but not limited to addressing those measures to be undertaken by the local sponsor to preserve the level of flood protection provided by the project.

Implementation Strategy: A Watershed Management Plan was written by the City and County as part of Activity 450 that specifically addresses the flows on Morrison, Elder, Florin, Unionhouse, Strawberry, and Laguna creeks. This was conducted in conjunction with the 2011 Sacramento County Local Hazard Mitigation Plan Update.

The modeling of the South Sacramento Streams is currently being conducted and will be submitted to FEMA for implementation and update to the DFIRMs. A Memorandum of Agreement (MOA) will be signed between the County and City.

Responsible Office: DOU

Potential Funding: Staff time

Schedule: Short term.

5. *Increase the Freeboard for Development to 2.0 Feet above the Base Flood Elevation (BFE)*

Issue/Background Statement: The City of Sacramento currently uses 1.0 foot above the BFE as a requirement for development in a Special Flood Hazard Area.

Implementation Strategy: CRS Activity 430 encourages using a higher standard for development within the floodplain areas. A higher standard of 2.0 feet above the BFE was also recommended by the Task Force as part of the 2010 Corrective Action Plan. The City should work with the local building industry and investigate the potential for raising the current freeboard requirement.

Responsible Office: DOU, CDD

Potential Funding: Staff Time

Schedule: Medium term.

6. Write a Levee Failure Response Plan for Critical Facilities

Issue/Background Statement: The levee system in Sacramento can provide residents with a false sense of protection. Likewise, critical facilities which can include shelters, police and fire facilities, etc. can be unusable if a levee were to breach. Identification and flood protection of critical facilities is important to ensure the safety of the public.

Implementation Strategy: Create a plan that lists all critical facilities that would be considered critical in a levee failure emergency. Make a list of the names and phone numbers of the operators of all the public and private critical facilities affected by a levee failure. Work with facilities to create their own levee failure response plan. Also, identify those facilities which may need to be flood protected.

Responsible Office: DOU, OES

Potential Funding: State of California Emergency Management Grants

Schedule: Short to medium term.

7. Petition FEMA for Modifications to the NFIP that Would Make Reduced-Cost Flood Insurance Available for Urban Areas Protected by Levees by Creating a New Flood Zone

Issue/Background Statement: If a levee does not provide 100-year flood protection, it will not be accredited by FEMA. However, some levees do provide less than a 100-year flood protection and do protect buildings. Affordable insurance could encourage more residents to purchase coverage.

Implementation Strategy: If a levee is not accredited, FEMA maps the floodplain assuming the levee is not there, which makes the BFE unrealistic. Creating a new flood zone that is modeled based on levee breaks at weaker areas, overtopping, or seepage would be more realistic. The City should petition FEMA to make modifications to the NFIP that would (1) recognize this new levee flood zone and (2) make flood insurance available at a reduced cost.

Responsible Office: DOU

Potential Funding: Staff Time

Schedule: Long term.

8. Alleviate the Workload in Administering the NFIP Program

Issue/Background Statement: City staff is spending an inordinate amount of time on two specific aspects of administering the NFIP program:

-
- 1) Educating insurance and mortgage companies regarding insurance requirements in flood zones; and
 - 2) Providing grandfather letters to individuals needing to purchase insurance

This has become especially problematic since the Natomas Basin was converted to an AE zone in December of 2008.

Implementation Strategy: The City coordinate education efforts with FEMA to reach insurance and mortgage companies regarding the flood insurance requirements in SFHAs. The City will also consider charging a nominal fee for grandfather letters to offset the cost of the staff time.

Responsible Office: DOU

Potential Funding: User Fees

Schedule: Short to medium term.

9. Partner with the State, FEMA and Local Entities on Flood Risk Outreach

Issue/Background Statement: The City, County, SAFCA, the State, and FEMA all perform outreach to educate the public regarding flood-risk. Each of these outreach efforts takes place independently, resulting in inefficiencies and conflicting messages.

Implementation Strategy: The City will work to coordinate all outreach efforts and develop cost-share opportunities.

Responsible Office: DOU Public Relations

Potential Funding: Operating Budget/Staff time

Schedule: Short term and ongoing

10. The City Will Move Toward Obtaining a CRS Level 3 or 4 Designation

Issue/Background Statement: Currently the City has achieved a CRS Classification 5. This provides policyholders with up to a 25% discount on certain flood insurance policies within the City.

Implementation Strategy: The City will work toward achieving a Classification 3 or 4, thus providing policy holders a 30 to 35% discount on certain flood insurance policies within the City.

Responsible Office: DOU

Potential Funding: Operating Budget/Staff time

Schedule: Medium term and ongoing.

11. Continue to Participate in the Northern Central CRS User Group

Issue/Background Statement: The Northern Central CRS User Group meets on a quarterly basis to discuss CRS activities, share tips on how to get the most credit, band together to improve floodplain management programs, and brainstorm on new methods of outreach.

Implementation Strategy: The City should continue to participate in the Northern Central CRS User Group and continue to improve CRS performance for the benefit of all community residents.

Responsible Office: DOU

Potential Funding: Operating Budget/Staff time

Schedule: Short term and ongoing.

9 LEVEE SECURITY PLAN

9.1 Introduction and Background

The Sacramento Region is considered to be the country's most at-risk major metropolitan areas for hazardous flooding. One of the major risks of flooding in the City of Sacramento (City) stems from the possibility of the failure of area levees. Although there has been no credible information indicating that terrorists have identified levees as potential targets, the Department of Homeland Security (DHS) advises that levee owners and operators should be aware of the possibility of a terrorist attack targeting levees and other flood risk reduction structures. A Vulnerability Assessment (VA) conducted by the Sacramento Department of Utilities (DOU) in 2015 found that while the risk of a terrorist attack against DOU is unlikely, but it is still a possibility.

The VA did find that DOU is at risk of malevolent threats by criminals and vandals, and that any enhancements to the security of DOU facilities, including the levee system, would provide benefits in the event of any type of attack. This chapter deals with current and proposed efforts to enhance the security of Sacramento's levee system and identifies security personnel, responsibilities, resources, and measures.

This chapter also meets the requirements for a Levee Maintaining Agency (LMA) by California law for urban and urbanizing areas. The guidance for a Levee Security Plan is found in the California Department of Water Resources' May 2012 *Urban Levee Design Criteria* (ULDC).

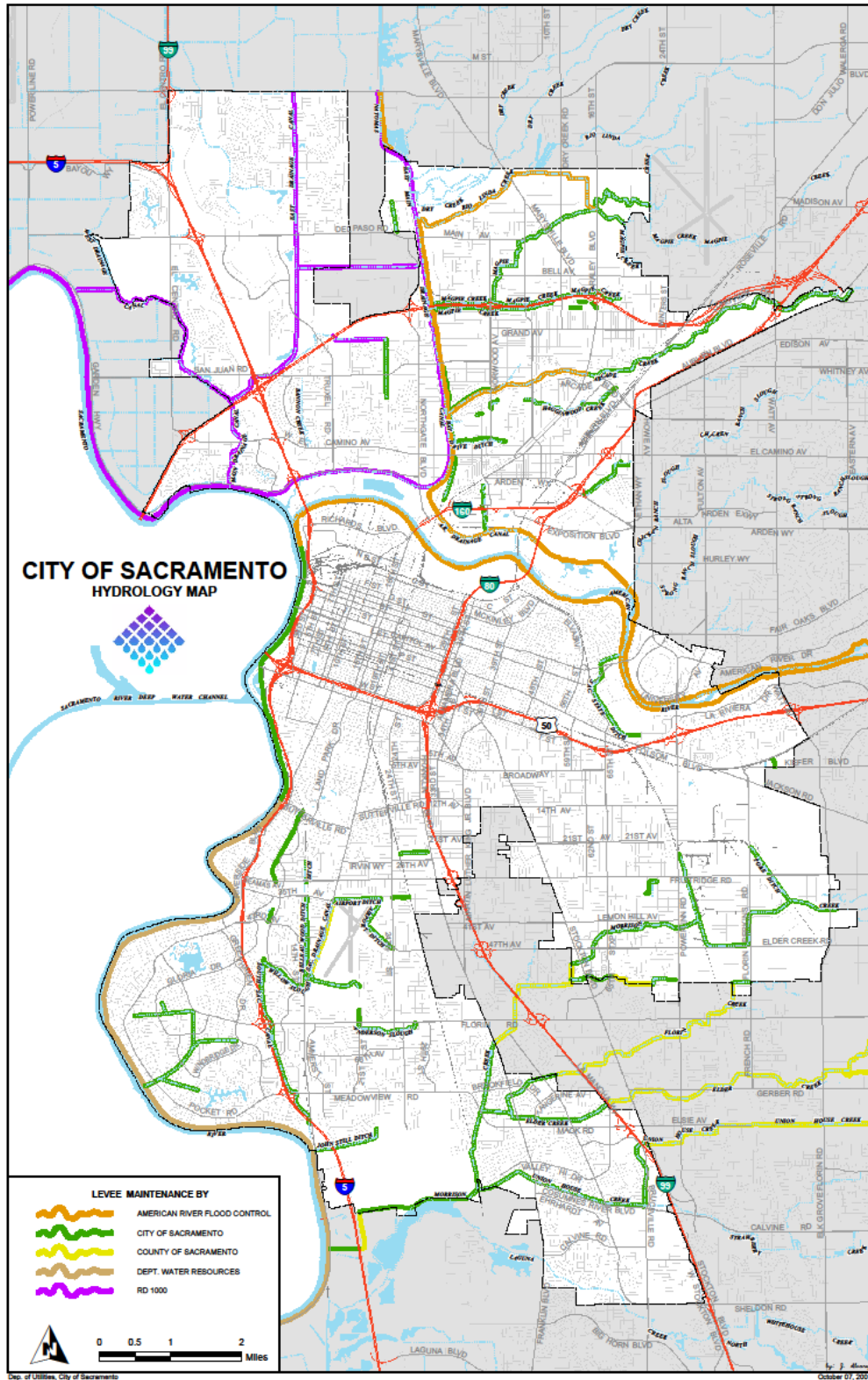
Background

The levee system protecting the City from local creeks and the Sacramento and American Rivers is well over 100 miles long. Several dozen pump stations are incorporated into the system, pumping local storm drainage into the adjacent river or creek. Although there is significant security at the pump stations and lesser security in several other places along the levees, the system is largely open to the public and vulnerable to activities such as the planting of explosive devices or illegal digging on a levee to weaken its structure.

If such a weakened levee were to fail during a significant storm event, the results could be catastrophic, especially since there would be little or no warning to allow for emergency preparations and evacuation of residents.

The City is the LMA for a small portion of the levee system. Figure 9.1 shows the areas that the City is responsible for as the LMA.

Figure 9.1 Levee Maintaining Agencies in the City of Sacramento



9.2 Current Implementation Status

The ULDC requires each LMA to develop a levee security plan to protect urban and urbanized area levee systems from acts of terrorism and other malicious or negligent acts. The ULDC also provides guidance on developing this plan.

The City appointed the Security and Emergency Preparedness section of DOU to be the Security Director for this Levee Security Plan. The Security Director will manage the security planning efforts and establish a chain of command for emergency operations. The Security Director is also responsible for annual review and update of this plan as part of CFMP annual progress report, which is led by the Floodplain Management staff in Engineering and Water Resources Division of DOU.

The ULDC criteria require agencies to consider and prioritize vulnerabilities and employ an array of security measures from four basic categories to address vulnerabilities.

These required security measures are:

- Networked detection
- Deterrence
- Physical security
- Intrusion interdiction during high threat periods

The ULDC criteria provide recommendations and options for consideration in each of the four areas. The Department of Utilities (DOU) already employs a number of these recommended security measures from the four basic categories:

Networked Detection provides for monitoring and reporting of security information between the levee maintaining agencies and the Intelligence Community, which is comprised of multiple federal, state, and local agencies. Recommended detection measures include improved personnel and public awareness, suspicious activity reporting, and integration with the existing Terrorism Liaison Officer (TLO) program.

The DOU Security and Emergency Preparedness Section currently participates in the FBI's InfraGard and the Homeland Security Information Network and is integrated into the existing TLO program through the Sacramento Police Department (SPD) and the Sacramento Regional Terrorism Threat Assessment Center (RTTAC). In addition, the Security Section routinely uses the National Suspicious Activity Reporting System (SAR) to report suspicious activity to the local fusion center for analysis and regularly provides awareness training to personnel on a number of topics including levee security, and recognizing and reporting suspicious activity.

Deterrence consists of visible security measures such as signs, gates, visible patrols, and controlled access to levees and associated critical facilities that create an atmosphere of vigilance and security. These measures are designed to hinder criminal activity and maximize the potential for security and law enforcement intervention.

DOU currently uses a combination of patrols, signs, and gates that prohibit trespassing at critical facilities and prohibit motor vehicles at all gated accesses.

DOU personnel patrol the levees on a daily basis during normal conditions, monitoring levee conditions, suspicious activity, and the conditions of signs, locks and gates. During high water levels or elevated threat periods, the levees are patrolled continuously. Contract private security patrols are also used at critical sites to deter and report suspicious or criminal activity.

Physical Security is divided between deterrence (discussed above), access control, intrusion detection, and levee performance alerting mechanisms.

Access Control

DOU levee access controls are generally to be limited to restricting motor vehicle access. Non-vehicular public access along levees is not considered to be a security problem, except at specific critical locations such as treatment plants or sumps. DOU currently uses a combination of physical security measures (signs, fences, locks, lighting, and security patrols) to stop, inhibit, or delay access by unauthorized persons.

Intrusion Detection

DOU currently uses intrusion alarms and patrols by DOU personnel and contract security guards to detect unauthorized intrusion. DOU has high water levee patrolling protocols that provide for the safety of patrollers and emphasize detection of vehicular trespass.

Levee Performance

DOU currently uses water elevation sensors and levee patrols to monitor levee performance.

The elevation sensors can be remotely monitored through the Sac City Alert 2 System.

Intrusion Interdiction capabilities are determined by the preparedness and willingness of the local first responders. The goal is to facilitate awareness of and investment in swift response to reported intrusions during high water or increased threat periods.

DOU regularly participates in seminars, workshops, and tabletop exercises with local agencies to familiarize, update and validate the security and evacuation plans related to levee security and breaches.

9.3 Implementation Strategies and Action items

The following implementation strategies outline what the DOU will do generally in the long term and specifically in the next five years to improve levee security and reduce flood risk from levee failure caused by acts of terrorism and other malicious or negligent acts.

Given the challenge of increasing security for such a large and open system, the general goals of this risk reduction tool would be to: (1) increase public awareness of levee safety and security issues and develop a coordinated partnership with the community to report suspicious activity/intrusions to the appropriate authorities; and (2) Provide incremental increases in levee safety and security by enhancing DOU's ability to monitor levee penetration and performance, and to detect unauthorized intrusion at critical sites.

Meeting these goals would involve promoting increased public and local agency awareness of the nature of the threats to the levee system. These strategies would also require the identification and acquisition of sensor systems designed to remotely detect levee penetrations and performance problems, and the addition of monitoring systems to enhance DOU's ability to detect intrusion at critical sites.

Implementation Actions (2016-2021)

FOR INTERNAL USE ONLY: Implantation actions are keep confidential.

APPENDIX A

SUMMARY IMPLEMENTATION PLAN

Table A.1. Summary Action Items for Risk Reduction Tools

ACTION	RESPONSIBLE OFFICE	SCHEDULE
LAND USE PLANNING AND DEVELOPMENT ACTION ITEMS		
1. Update the Floodplain Management ordinance for development within a 200-year floodplain.	DOU, Community Development	Short Term
2. Update City Code for New Development Adjacent to Levees.	DOU, Community Development	Short Term
3. Improve Methods for Providing Development Guideline Information to the Public and Developers.	DOU, Community Development	Short Term
4. Update the Floodplain Management Ordinance for Development in Rescue and Evacuation Areas.	DOU, Community Development	Short Term
5. Enforce Existing Development Guidelines.	DOU, Community Development	Short Term and Ongoing
6. Adopt a Plan for 200-year Flood Protection by July 2016.	DOU, Community Development	Short Term
7. Improve the Building Permit Process with Respect to Floodplain Management.	DOU, Community Development	Short Term and Ongoing
8. Continue Implementation of Phased Development for A99 Natomas Floodplain.	Community Development	Short Term
EMERGENCY MANAGEMENT ACTION ITEMS		
1. Continue National Incident Management System (NIMS) and Standardized Emergency Management System (SEMS) Exercises and training <i>within DOU</i>	DOU, OES	Short Term
2. Continue Exercise and Training Program <i>within DOU</i>	DOU	Annually
3. Conduct Ongoing Emergency and Recovery Planning and Development.	OES, DOU	Short Term
4. Expand on Existing EOP to Address Mass Care, Emergency Assistance, Housing, and Human Services (ESF #6)	OES, DOU	Short Term
5. Develop a Disaster Housing Plan	DOU, CDD	Short Term
6. Develop Intergovernmental Flood Management and Control	City of Sacramento, DOU, ARFCD, RD1000, SAFCA, USACE, DWR	Long Term
7. Increase Public Education Efforts	OES, PIO, DOU	Short Term
8. Coordinate Outreach Efforts	OES, PIO, DOU	Short Term
9. Enhance Public Alert and Notification.	OES, SPD	Long Term
10. Increase Personal Preparedness of City Staff.	OES	Short Term

ACTION	RESPONSIBLE OFFICE	SCHEDULE
11. Develop a Coordination and Information Reporting System.	OES	Short Term
12. Substantial Damage Assessment Training	DOU, CDD	Short Term
13. Develop Briefing Memo for Elected Officials	DOU, CDD	Short Term
14. Participate in RiskMAP Process	DOU	Long Term
15. Review City's Flood Warning System	DOU (for City sensors), OES	Short Term
16. Develop a Post-Earthquake Remediation Plan, if required by ULDC	DOU, OES, SAFCA, RD1000, ARFCD	Long Term
17. Flood Relief Plan, if required by the ULDC	DOU, OES, SAFCA	Long Term
LEVEE AND STRUCTURAL IMPROVEMENT ACTION ITEMS		
1. Support Local Efforts to Improve Flood Facilities	DOU, Engineering Services, Community Development, elected officials	Short term and ongoing
2. Plan and Implement Modernization Phase of Levee Accreditation and ULDC	DOU, Engineering Services	Long term
3. Participate in Regional Flood Management Plan	DOU, Engineering Services	Short term and ongoing
INTERNAL DRAINAGE IMPROVEMENT ACTION ITEMS		
1. Develop Grant Program for Drainage Improvements	Engineering Services, Business Services	Short term and ongoing
2. Reduce Cost of Drainage Maintenance Operations by 10 Percent	Field and Plant Services, Engineering Services, Business Services	Short term and ongoing
3. Develop Engineering Services Efficiency Plan	Engineering Services, Business Services	Short term
4. Establish Regulatory Fee	DOU Public Information Office, Engineering Services, Business Services	Short term
5. Work for Passage of Proposition 218 Drainage Fee Increase	DOU Public Information Office, Engineering Services, Business Services	Short term
6. Develop Drainage Development Fee	Engineering Services, Business Services	Short term
7. Develop Drainage Master Plans	Engineering Services	Short term and ongoing
8. Update the 2011 Watershed Management Plan (WMP)	Engineering Services	Short term and ongoing

ACTION	RESPONSIBLE OFFICE	SCHEDULE
NFIP/CRS ACTION ITEMS		
1. Reassess a Flood Insurance Coverage Assessment (FIA) and Coverage Improvement Plan (CP) as Part of the Program for Public Information (PPI)	DOU	Short term and ongoing
2. Develop a Brochure for Real Estate Agents to Provide to Their Potential Buyers	DOU Public Relations	Short term and ongoing
3. Provide Property Owners with an Opportunity for a City Staff Site Visit for Providing Property Protection Advice	DOU Engineering Staff	Short term and ongoing
4. Sign a Memorandum of Agreement with the County of Sacramento for Flood Control Planning of the South Sacramento County Streams	DOU	Short term
5. Increase the Freeboard for Development to 2.0 Feet above the Base Flood Elevation (BFE)	DOU, CDD	Medium term
6. Write a Levee Failure Response Plan for Critical Facilities	DOU, OES	Short to medium term
7. Petition FEMA for Modifications to the NFIP that Would Make Reduced-Cost Flood Insurance Available for Urban Areas Protected by Levees by Creating a New Flood Zone	DOU	Long term
8. Alleviate the Workload in Administering the NFIP Program	DOU	Short to medium term
9. Partner with the State, FEMA and Local Entities on Flood Risk Outreach	DOU Public Relations	Short term and ongoing
10. The City will move toward Obtaining a CRS Level 3 or 4 Designation	DOU	Medium term and ongoing
11. Develop a Dam Outreach Brochure on an annual basis	DOU	Short term and ongoing
12. Continue to participate in the Northern Central CRS User Group	DOU	Short term and ongoing
LEVEE SECURITY ACTION ITEMS		
CONFIDENTIAL ACTION ITEMS		

Table A.2. Program for Public Information - Summary of Projects and Initiatives

Target Audience	Message(s)	Outcome	Project(s)	Assignment	Schedule	Stakeholder
Outreach Projects						
1. Entire City (homeowners, businesses and renters)	A. Know your flood hazard	A. 1, 3 & 4 B. 1,2, 3 & 4 C. 2 & 3 D. 1,2,3,4,5,6 E. 1 & 2 F. 1,2,&3 I. 1, 2 & 3	OP 1. Be Ready Flood Brochure	City of Sacramento Department of Utilities, & PIO	November each year	N/A
	B. You need flood insurance C. Protect people from		OP 3. Map Inquiry Service	City of Sacramento Department of Utilities -FPM	Year-round	N/A

Target Audience	Message(s)	Outcome	Project(s)	Assignment	Schedule	Stakeholder
1. Entire City (continued)	the flood hazard D. Protect your property from the hazard	(continued)	OP 4. High Water Mark Initiative	City of Sacramento Department of Utilities -FPM	Year-round	DRW/USACE/FEMA/USGS
			OP 5. Outdoor ad placement	City of Sacramento Department of Utilities & PIO	Oct. each year	N/A
			OP 6. No Dumping Signs	City of Sacramento Department Dept. of Utilities, Water Quality, & Solid Waste	Year-round	N/A
			OP 8. Various Brochures at City offices	City of Sacramento Department of Utilities -FPM	Year-round	DWR/ CVFPB
			OP 10. Flood Preparedness Week	City of Sacramento Department of Utilities – FPM & PIO	Nov. each year	Sacramento County/DWR/USACE/USGS
	(continued)		OP 12. "Are You Prepared" Booklets	Office of Emergency Services	Year-round	N/A
	E. Build Responsibly		OP 13. Flood and Levee Newsletter	SAFCA	Annually	SAFCA
	F. Protect Natural Floodplain Functions		OP 14. Flood Wise Newsletter	ARFCD	Annually	ARFCD
	I. General Preparedness		OP 15. Emergency Preparedness fair	Department of Parks and Recreation- Neighborhood Services and City Council	Twice+ per year	N/A
			OP 16, 17 & 18. Earth Day, Celebrate Sacramento, Natomas	City of Sacramento Department of Utilities, PIO, OES, Police, Fire	April, May, September	N/A
	OP 19. Dam Safety Outreach	City of Sacramento Department of Utilities	Annually late fall	N/A		

Target Audience	Message(s)	Outcome	Project(s)	Assignment	Schedule	Stakeholder
1. Entire City (continued)	(continued)	(continued)	OP 7. Flood Protection Assistance	Dept. Utilities	Year-round	N/A
			OP 25. Website & Newsletter on NBF of Floodplain	California Nature Conservancy	Year-round	California Nature Conservancy
			OP 26. Real Estate Agent's Brochure	City of Sacramento Department of Utilities & Real Estate Agents	Develop by October 1, 2016	Real Estate Agents and Lenders
			OP 27. Flood Ready Website	City of Sacramento Department of Utilities	Year-round	N/A
			OP 28. The American River Parkway Brochure	American River Parkway Foundation	Year-round	American River Parkway Foundation
			OP. 29 Flood Zone Risk Notification	NFIP Risk Notification Mailing	Annually	National Flood Insurance Program (NFIP)
			OP.30. Flood Insurance Promotion of Website & Newsletter	Congresswoman Doris Matsui's Office	Year-round	Congresswoman Doris Matsui's Office
			OP 31. CIP Flood Insurance Outreach Letter	City of Sacramento Department of Utilities	Annually	N/A
			OP 32.	City of Sacramento	Year-round	FEMA
2.School Children	A. Know your flood hazard C. Protect people from the flood hazard D. Protect	A. 1,3 & 4 C. 1,2 & 3 D. 2,4 & 5 F. 1, 2, 3 H. 1 & 2	OP 11. No dumping stencils & permanent markers	City of Sacramento Department of Utilities & Water Quality	Year-round	N/A

Target Audience	Message(s)	Outcome	Project(s)	Assignment	Schedule	Stakeholder
	your property from the hazard F. Protect Natural Floodplain Functions H. Flood Education		OP 20. SPLASH Program	City of Sacramento Department of Utilities & Water Quality	Quarterly	N/A
			OP 27. Flood Ready Website	City of Sacramento Department of Utilities	Year-round	N/A
3.Real Estate, Lending, and Insurance Companies	A. Know your flood hazard B. You need flood insurance E. Build Responsibly	A. 1 & 2 B. 1,2,3&4 E. 1,2&3	OP 1. Be Flood Ready Brochure	City of Sacramento Department of Utilities	Year-round	NA
			OP 3. Map Inquiry Service	City of Sacramento Department of Utilities	Year-round	NA
			OP 21. Real Estate Disclosure – State Requirement	Real Estate Agents	Developed by October 1, 2016	Real Estate Agents
			OP 23. Flood Insurance Information	Insurance Agents	Year-round	Insurance Agents
			OP 26. Real Estate Agent's Brochure	City of Sacramento Department of Utilities & Real Estate Agents	Develop by October 1, 2016	Real Estate Agents and Lenders
			OP 27. Flood Ready Website	City of Sacramento Department of Utilities	Year-round	N/A
Target Area 2.Repetitive Loss Properties (Areas)	A. Know your flood hazard B. You need flood insurance C. Protect	A. 1, 3 & 4 B. 1,2, 3 & 4 C. 2 & 3 D.1,2,3,4,5,6 E. 1 & 2 F. 1,2,& 3 I. 1, 2 & 3	OP 2. Repetitive Loss Outreach Mailing	City of Sacramento Department of Utilities	Annually late fall	N/A

Target Audience	Message(s)	Outcome	Project(s)	Assignment	Schedule	Stakeholder
	people from the flood hazard D. Protect your property from the hazard E. Build Responsibly F. Protect Natural Floodplain Functions I. General Preparedness		OP 7. Flood Protection Assistance	City of Sacramento Department of Utilities	Year-round	N/A
4. Vulnerable Populations	A. Know your flood hazard B. You need flood insurance C. Protect people from the flood hazard D. Protect your property from the hazard E. Build Responsibly I. General Preparedness	A. 1,2, 3 & 4 B. 1,2, 3 & 4 C. 2 & 3 D.1,2,3,4,5,6 E. 1 & 2 I. 1, 2 & 3	OP 1. Be Ready Flood Brochure	City of Sacramento Department of Utilities & PIO	Nov. each year	N/A
			OP 5. Messages on Transit Buses	City of Sacramento Department of Utilities & PIO	Annually - October	N/A
			OP 9. Levee Zone Protection Map	California Department of Water Resources	Annually September	DWR
5. Political Leaders (See Entire list of City Wide Projects in 1. Above)	See 1 above	See 1 above	Adopt and Fund the PPI	Mayor and City Council	N/A	N/A
6. Language Barriers	A. Know your flood hazard B. You need flood insurance C. Protect people from the flood hazard	A. 1, 2,3 & 4 B. 1,2, 3 & 4 C. 2 & 3 D.1,2,3,4,5,6 E. 1 & 2 F. 1,2,& 3 I. 1, 2 & 3	OP 22. Translation services available on flood-related information	City of Sacramento Department of Utilities PIO, OES	Year-round	N/A

Target Audience	Message(s)	Outcome	Project(s)	Assignment	Schedule	Stakeholder
	D. Protect your property from the hazard E. Build Responsibly F. Protect Natural Floodplain Functions I. General Preparedness		OP 23. Bi-Lingual Insurance Agents (Spanish and Asian Languages)	Bi-Lingual Insurance Agents (Spanish and Asian Languages) As Needed	Year-round	Insurance Agents
Target Areas 3.Natomas (North Natomas/ South Natomas) 4.Greenhaven/ Pocket 5.Riverpark Neighborhood by Sac State 6. Rescue Areas (Defined by Levee Breach Scenarios) Note: All projects in Target Audience #1 (Entire City) also apply to these target areas	A. Know your flood hazard B. You need flood insurance C. Protect people from the flood hazard D. Protect your property from the hazard E. Build Responsibly F. Protect Natural Floodplain Functions G. Levee Preparedness I. General Preparedness	A. 1, 2,3 & 4 B. 1,2,3 & 4 C. 2 & 3 D.1,2,3,4,5,6 E. 1 & 2 F. 1,2,& 3 G. 1,2 I. 1, 2 & 3	OP 4. FEMA's High Water Mark Initiative	City of Sacramento Department of Utilities & PIO	Year-round	DWR/USACE/USGS/ FEMA
			OP 9. Levee Flood Protection Zone Map (DWR Flood Risk Notification)	DWR	Annually - September	DWR/FEMA/ Cal EMA/ CVFPB/ USACE
			OP 15. Emergency Preparedness Fair	Office of Emergency Services	2 per year	N/A
			OP 24. Levee Breach Scenario Mapping for 18 Rescue Areas	City of Sacramento Department of Utilities	Year-round	Sacramento County
			OP 27. Flood Ready Website	City of Sacramento Department of Utilities	Year-round	N/A
			OP.30. Flood Insurance Promotion of Website & Newsletter	Congresswoman Doris Matsui's Office	Year-round	Congresswoman Doris Matsui's Office
			Flood Response Projects			
1.Entire City	A. Know your flood hazard Risks C. Protect	A. 1, 2, 3, 4 & 5 C. 1, 2, 3, 4 & 5	FRP 1. Press Release (TV, Radio, Newspaper)	City of Sacramento Department of Utilities & PIO	Release at first flood notice	N/A

Target Audience	Message(s)	Outcome	Project(s)	Assignment	Schedule	Stakeholder
	people from the flood hazard		FRP 3. Press Release (Website, Social Media)	City of Sacramento Department of Utilities & PIO	Release at first flood notice	N/A
			FRP 6. After flood event handouts	Community Development & City of Sacramento Department of Utilities	Develop by May1, 2015	N/A
			FRP 2. Everbridge	OES & PIOs	Release at first flood notice	N/A
			FRP 4. Drinking Water Quality Communication (Website)	City of Sacramento Department of Utilities	Release once water is determined to be compromised	N/A
2. Combined Sewer System/Internal Drainage	A. Know your flood hazard Risks C. Protect people from the flood hazard	A. 1, 2, 3, 4 & 5 C. 1, 2, 3, 4 & 5	FRP 5. CSS Signage	City of Sacramento Department of Utilities Operations	Release at first flood notice	N/A
3. Flood Damaged Property	D. Protect your property from the hazard E. Build Responsibly	D. 1,2,4,6 E. 1,2,3	FRP 6. After flood event handouts	Community Development & City of Sacramento Department of Utilities	Leave at damaged structure during inspection and/or provide to owners upon re-entry of area	N/A

Target Audience	Message(s)	Outcome	Project(s)	Assignment	Schedule	Stakeholder
			FRP 7. Flood insurance and grant information handouts	Neighborhood Services & City of Sacramento Department of Utilities	Leave at damaged structure during inspection and/or provide to owners upon re-entry of area	N/A

APPENDIX B

RISK COMMUNICATION (PPI)

PLANNING PROCESS DOCUMENTATION

Program for Public Information (PPI) Committee

- Meeting # 1 – July 23rd, 2014 – Agenda and Sign-In Sheet
- Meeting # 2 – September 10th, 2014 – Agenda
- Meeting # 3 – October 29th, 2014 – Agenda and Email Announcement

City of Sacramento

Program for Public Information Committee (PPIC) Agenda

July 23rd, 2014 – 6:00 PM

1. Introductions
2. Background on the Community Rating System (CRS) Program and Activity 330 - Program for Public Information
3. Identification of flooding problems affecting Sacramento (flood hazards, exposed buildings, and flood insurance coverage)
4. Inventory of existing public information and outreach efforts
5. Identify target areas (portions of the community that should be covered by the PPI Program)
6. Identify target audiences (Identify groups of people who needs special messages on flood protection)
7. Questions
8. Adjourn

PROGRAM FOR PUBLIC INFORMATION COMMITTEE

Wednesday, July 23, 2014 & Wednesday, September 10, 2014 - 6:00PM

Belle Coolidge Community Center - 5699 S Land Park Dr., Sacramento, CA 95822

Name	Title	Email	Phone Number	July 23, 2014	Sept. 10, 2014	OCT 21, 2014
Connie Perkins	City Floodplain Mgmt	cperkins@cityofsacramento.org	916-808-1914	<i>CP</i>	<i>CP</i>	<i>CP</i>
Jessica McCabe	City Public Relations	JMcCabe@cityofsacramento.org	916-808-5921	<i>JM</i>	<i>JM</i>	
Jim McDonald	City Community Development Dept	jmcDonald@cityofsacramento.org	916-808-5723	<i>JM</i>	<i>JM</i>	<i>JM</i>
Jason Sirney or Steve Winton	City EOC	SWinton@pd.cityofsacramento.org jsirney@cityofsacramento.org	916-808-6457			
Pete Willmore or Dorothy Hansen Lisa Deklins	City DOC	PMillino@cityofsacramento.org DJohnson@pd.cityofsacramento.org				
Nancy Dorfer	City Floodplain Mgmt	ndorfer@cityofsacramento.org		<i>ND</i>	<i>ND</i>	<i>ND</i>
Yanelis Rios	City Floodplain Mgmt	YRios@cityofsacramento.org	916-808-8891	<i>YR</i>	<i>YR</i>	
BG Heiland	Floodplain Resident	Brian.Heiland@water.ca.gov	(916) 207-6620	<i>BH</i>		
Tom Reavey	Floodplain Resident	treavey@yahoo.com	N/A	<i>TR</i>	<i>TR</i>	
Alan Haynes	Floodplain Resident	alan.haynes@noaa.gov	916-979-3056 x328	<i>AH</i>	<i>AH</i>	<i>AH</i>
Sam Yee - Lyons	Real Estate Agent	Sam4Homes@aol.com	(916) 505-7722	<i>SY</i>	<i>SY</i>	
Jeff Beck - Jeffrey Beck Insurance Services	Flood Insurance Agent	jeff@sactoflood.com	(916)684-3753	<i>JB</i>	<i>JB</i>	
Bobby Peterson	Flood Insurance Agent	Robert.Peterson@libertymutual.com	(916) 681-3300 Ext. 59808	<i>BP</i>	<i>BP</i>	
Ashley Sanchez Willard	Local mortgage lender/bank	asanchez@teamvitek.com	916-834-5999	<i>AS</i>	<i>AS</i>	<i>AS</i>
Kevin Littlefield	Local mortgage lender/bank	kevin@wcmig.com	866-868-2022	<i>KL</i>	<i>KL</i>	<i>KL</i>

City of Sacramento

Program for Public Information Committee (PPIC) Agenda

September 10th, 2014 – 6:00 PM

1. Introductions
2. Review of previous meeting
 - a. Identification of target areas
 - b. Identification of target audiences
3. Define outreach project messages
4. Identify outreach projects to disseminate the messages
5. Questions
6. Adjourn

City of Sacramento

Program for Public Information Committee (PPIC) Agenda

October 29th, 2014 – 6:00 PM

Belle Cooleage Library, 5600 S. Land Park Dr., Sacramento, CA

1. Review of previous meeting (September 11th)
 - a. Six priority topics
 - b. Other topics
 - c. Formulate messages and outcomes
2. Examine other outreach project initiatives
3. Evaluate Flood Response Preparations
4. Questions
5. Adjourn

From: Connie Perkins [mailto:CPerkins@cityofsacramento.org]
Sent: Friday, October 24, 2014 6:13 PM
To: Brian.Heiland@water.ca.gov; Tom Reavey (treavey@yahoo.com); Sam4Homes@aol.com; jeff@sactoflood.com; asanchez@teamvitek.com; kevin@wcmtg.com; Robert.Peterson@libertymutual.com; alan.haynes@noaa.gov
Cc: Foster, Jeanine; Stroud, David A; Pete Millino; Jessica McCabe; Jim McDonald; Yanelis Rios; Tony Bertrand
Subject: Program for Public Information Meeting - City of Sacramento

Good afternoon. This a reminder that our last meeting is next **Wednesday, October 29, 2014, 6pm**, at Belle Cooledge Library, 5600 S. Land Park Dr., Sacramento, CA (same location). We look forward to wrapping up this outreach program.

Thank you and have a great weekend,
Connie Perkins, PE, CFM
Senior Engineer
916-808-1914

From: Connie Perkins
Sent: Thursday, October 02, 2014 8:59 AM
To: 'Brian.Heiland@water.ca.gov'; Tom Reavey (treavey@yahoo.com); 'Sam4Homes@aol.com'; 'jeff@sactoflood.com'; 'asanchez@teamvitek.com'; 'kevin@wcmtg.com'; 'Robert.Peterson@libertymutual.com'; 'alan.haynes@noaa.gov'
Cc: 'Foster, Jeanine'; 'Stroud, David A'; Pete Millino; Jessica McCabe; Jim McDonald; Yanelis Rios; Tony Bertrand
Subject: Final Program for Public Information Meeting - City of Sacramento

Good afternoon. Thank you to everyone who responded to the poll. Our last meeting will be on **Wednesday, October 29, 2014, 6pm**, at Belle Cooledge Library, 5600 S. Land Park Dr., Sacramento, CA (same location). At this meeting, we will examine other outreach project initiatives and determine other flood response efforts.

I have attached the presentation from the September 11 meeting for those who were unable to make it.

Please let me know if you have any questions.

City of Sacramento
Program for Public Information Committee (PPIC)

Research has shown that awareness of the flood hazard is not enough to make most people to take action to protect themselves or their homes. To change people's behavior, they often need to be told several times of the hazard, through various dissemination methods, and what specific actions to take. Based on this research, the Community Rating System (CRS) program encourages communities to be "critical thinkers" in their public information needs and what their citizens need to know about the available floodplain resources and flood hazards.

Based on your specialized area of expertise and interest, you have been identified as a participant to help Sacramento develop a Program for Public Information (PPI) which is a strategy that looks holistically at a community's public information program. This evaluation will examine the effectiveness of the existing program and determine if there are any gaps (for example, not reaching a certain constituency).

The resulting PPI will be an ongoing public education program that provides the most important flood safety messages along with messages for the protection of a floodplain's natural functions. These messages must be disseminated to a variety of target audiences such as children or elderly citizens, etc.

We realize your time is valuable; therefore, the City is estimating that two meetings will be required to complete this project, but a third meeting may be necessary. The PPI meetings and meeting objectives are scheduled as follows:

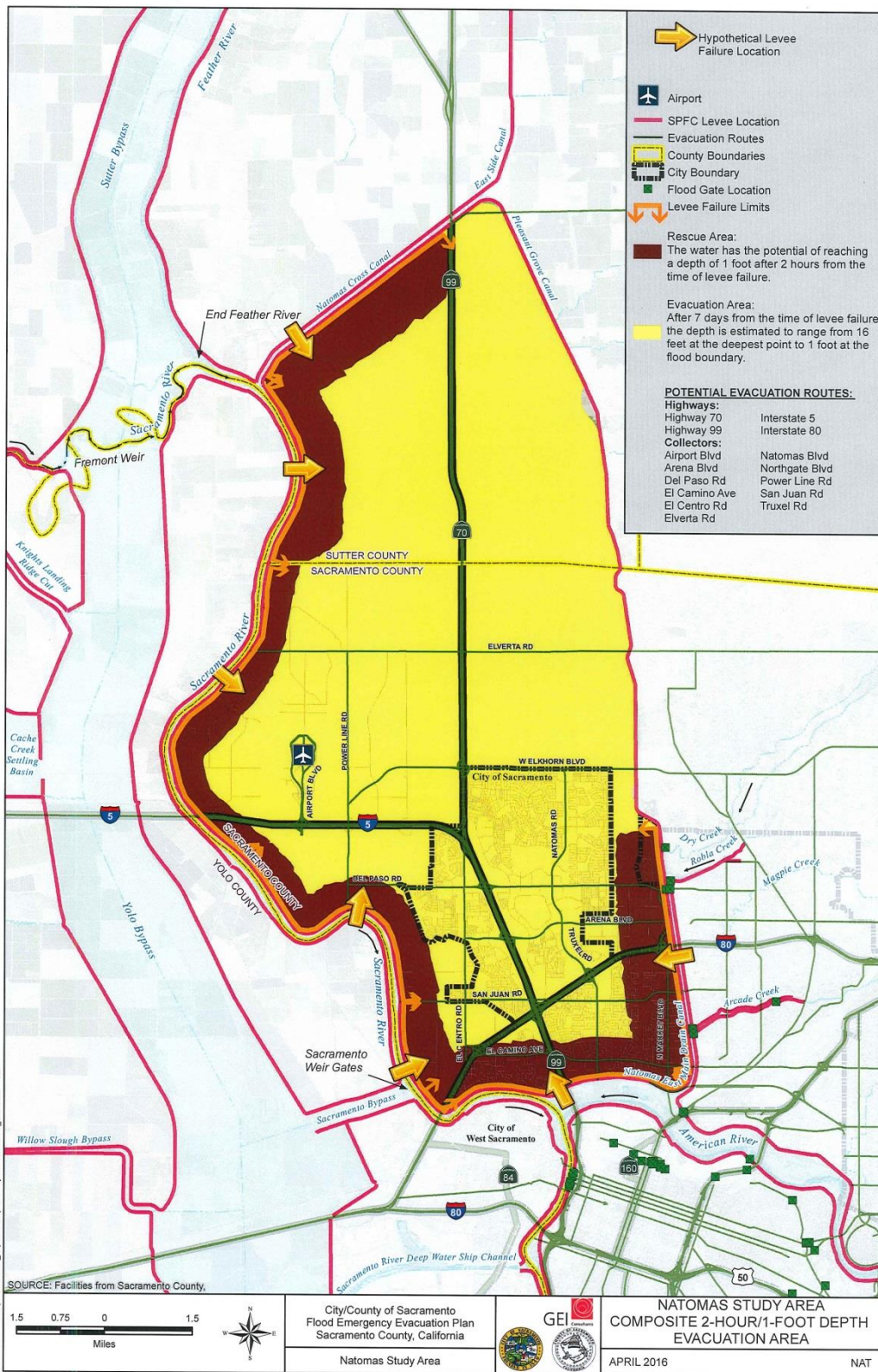
- Meeting # 1 (July 23, 2014, Belle Cooleedge Library, 5600 S. Land Park Dr.) – Assessing the community's current public information needs – See attached agenda
- Meeting # 2 (September 10, 2014, Belle Cooleedge Library, 5600 S. Land Park Dr.) – Defining outreach messages and potential outreach projects
- Meeting # 3 (Date and Location TBD) – Examining other outreach project initiatives and determining other flood response efforts

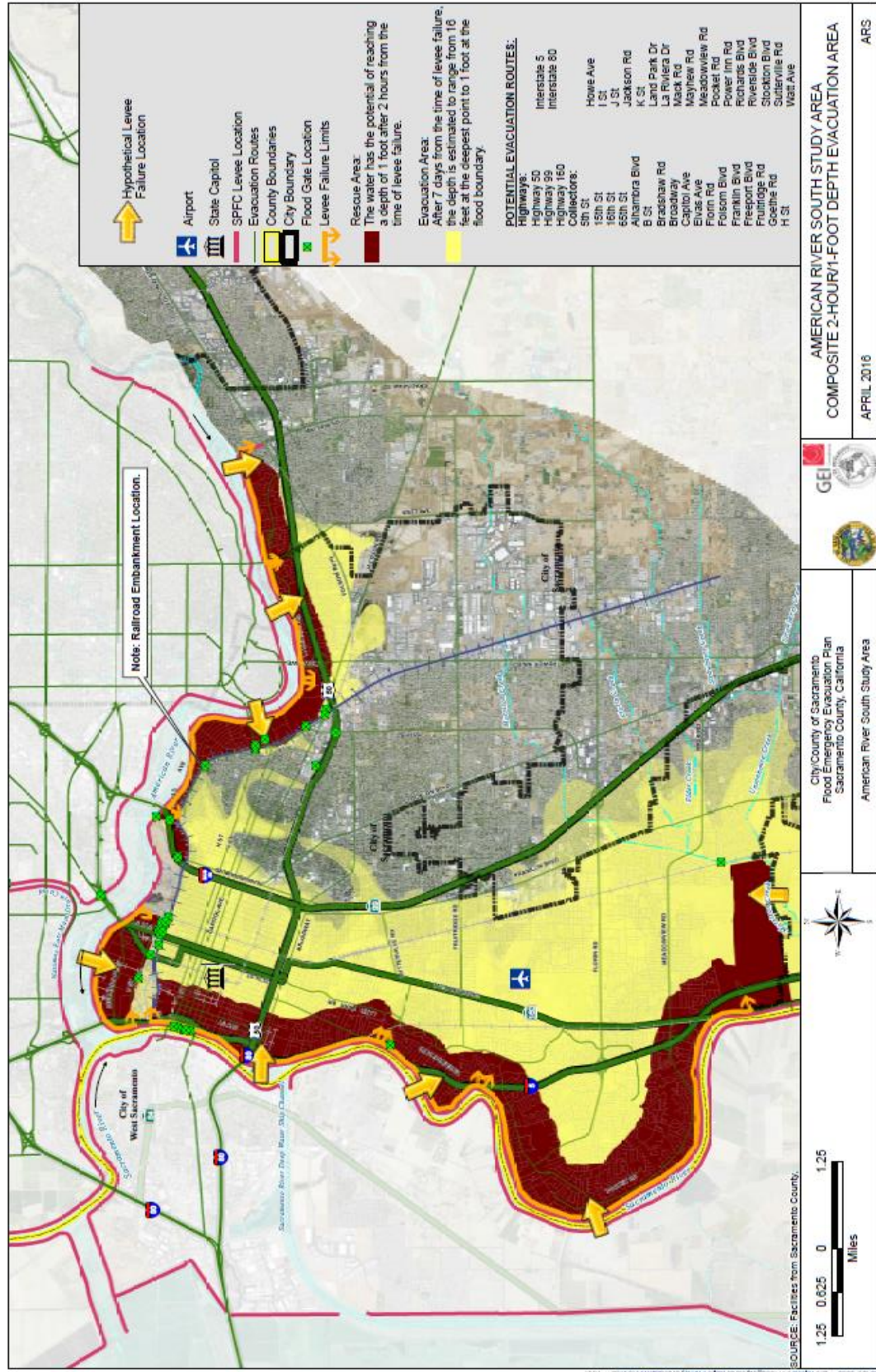
Once again thank you for your willingness to serve on this important PPI Committee which will help the City further reduce the cost of flood insurance for its citizens. Additional questions can be directed to me at 916-808-1914 or cperkins@cityofsacramento.org.

Connie Perkins, PE, CFM
Senior Engineer
City of Sacramento, Department of Utilities
Floodplain Management

APPENDIX C

RESCUE & EVACUATION AREA MAPS

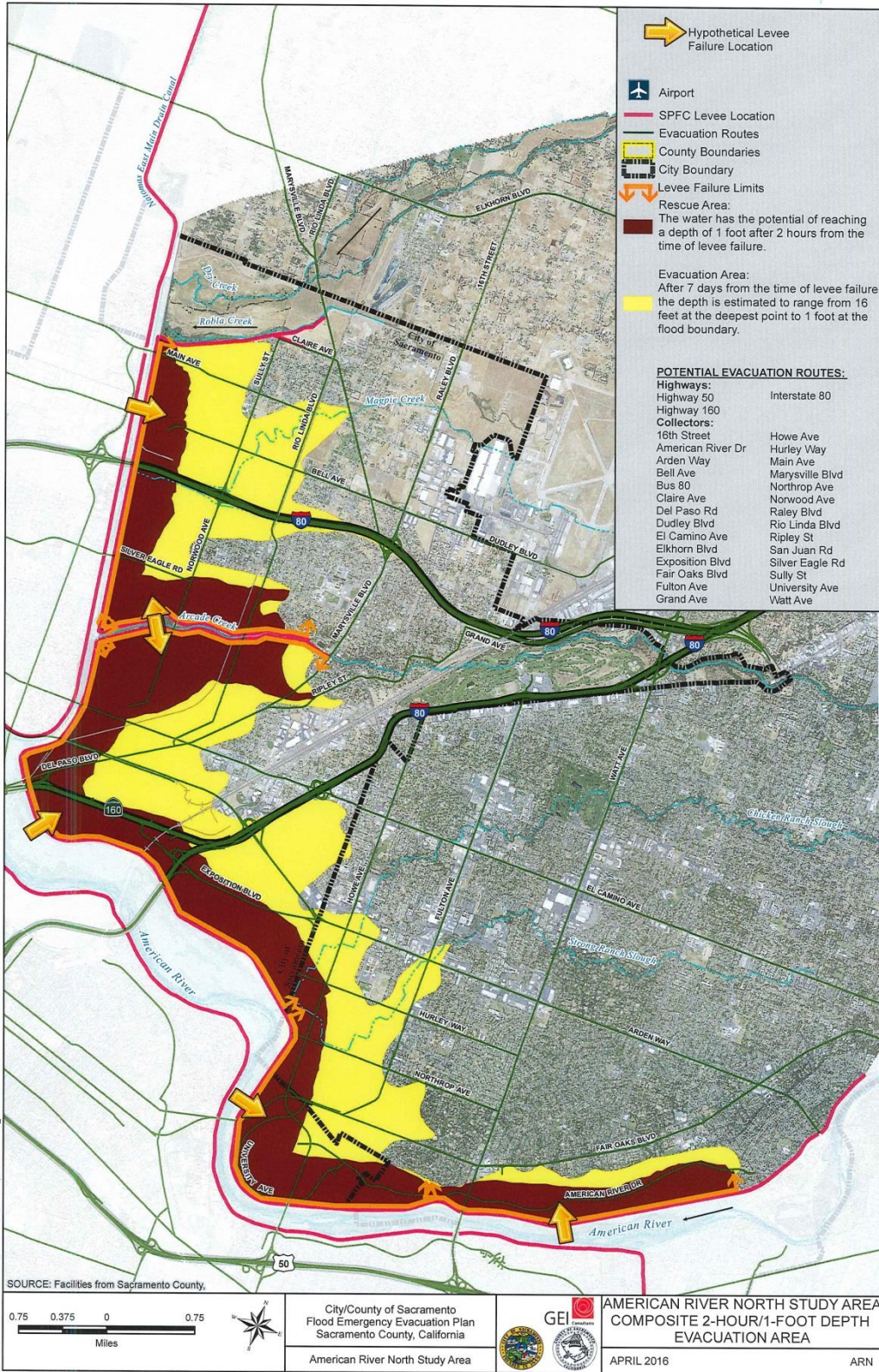




City/County of Sacramento
Flood Emergency Evacuation Plan
Sacramento County, California
American River South Study Area

GEI

AMERICAN RIVER SOUTH STUDY AREA
COMPOSITE 2-HOUR/1-FOOT DEPTH EVACUATION AREA
APRIL 2016
ARS



APPENDIX D

REPETITIVE LOSS AREA 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. Since its initial adoption, additional investigations have been performed in the city’s repetitive loss areas. This report reflects all current and past findings.

Based on data received by the National Flood Insurance Program (NFIP), there are currently 21 repetitive loss buildings within the City. Only five repetitive loss buildings are insured with flood insurance. The City has had a total of 49 repetitive loss buildings, 28 of these buildings have been mitigated.

D.1 Repetitive Loss Area Analysis Process

The RLAA planning process incorporated requirements from Section 510 of the 2013 *CRS Coordinator’s Manual*. The planning process also incorporated requirements from the following guidance documents: 1) Federal Emergency Management Agency (FEMA) publication *Reducing Damage from Localized Flooding: A Guide for Communities*, Part III Chapter 7; 2) CRS publication *Mapping Repetitive Loss Areas* dated August 15, 2008; and 3) 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 2013 *CRS Coordinator’s Manual*:

Table D.1. Five Planning Steps

Step 1	Advise all the properties in the repetitive loss areas that the analysis will be conducted and request their input on the hazard and recommended actions.
Step 2	Contact agencies and 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.

The majority of the repetitive loss area experience the same cause of flooding, local drainage, however each region has unique characteristic 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.

Advise all Property Owners

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. However, for this process the city developed a questionnaire, Figure D.1, that would allow homeowners to share important information about flooding in their neighborhoods. City staff walked each repetitive loss area and delivered the questionnaire directly to each structure. The questionnaire included an explanation of what a repetitive loss area was and also requested historical information on the properties flood history.

The City received four completed questionnaires from three repetitive loss areas. One homeowner was also able to provide pictures of flooding that occurred during recent storms.

Figure D.1. Sample Repetitive Loss Area Property Questionnaire

WAS THERE FLOODING IN YOUR AREA?


FLOOD PROTECTION QUESTIONNAIRE

Name: _____ Email: _____

Address: _____

1. How many years have you occupied the home/building at this address? _____
2. Do you rent or own this home/building? Rent Own
3. What type of foundation does the home/building have?
 Slab Crawl Space Basement Other _____
4. Has this home/building or property ever been flooded or has a water problem?
 Yes No (if "no" please complete only 10-14)
5. In what year(s) did it flood? _____
6. 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: _____
7. How did the water enter your home/building? _____
8. How deep did the water get?
 Yard Only: _____ feet Crawl Space: _____ feet
 Over First Floor: _____ feet Basement: _____ feet
 Water kept out of house by sandbagging, sewer valve, or other protective measures
9. What was the longest timeframe that water stayed in the house/building? ____ hours or ____ days
10. 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 _____
11. Did any of the measures checked in item 10 work? If so, which ones? If not, do you know why they failed? _____
12. Do you have flood insurance? Yes No
13. Are you interested in mitigating your flooding issues through grant programs and/or floodproofing actions? Yes No
14. Include any additional information and comments you may have about flooding in your area:

Please help us by completing this survey by **February 24, 2017** and returning it to:
 EMAIL: floodinfo@cityofsacramento.org FAX: (916) 808-1497
 MAIL: Kelly Sherfey, Department of Utilities, 1395 35th Avenue, Sacramento, California 95822


SIGN UP FOR EMERGENCY ALERTS | WWW.SACRAMENTO-ALERT.ORG

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.**

The Repetitive Loss Area Analysis, which includes information from this survey, will be published online for review by March 10, 2017. You can review and comment on this document by visiting our website at <http://www.cityofsacramento.org/floodready>. If you would like to receive an email notification when the 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. 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 Kelly Sherfey at (916) 808-2539 or ksherfey@cityofsacramento.org. **In the case of active flooding, please contact 311.**

Has your neighborhood experienced flooding?

Please take a moment to fill out this survey
or call us at 916-808-2539.

We may be able to help.



Contact Agencies & Organizations

The City reached out to external agencies and internal departments to access plans and studies that could affect or help determine the cause 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 (BAM)
 - California Data Exchange Center (CDEC)
- US Army Corps of Engineers
 - Sacramento District Levee Systems Inspection Status
- Federal Emergency Management Agency
 - 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

Summary of Studies and Reports

City of Sacramento Comprehensive Flood Management Plan

The purpose of the City of Sacramento's Comprehensive Flood Management Plan is to identify, assess and mitigate flood hazards and flood risk in the City using non-structural 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 plans 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 levee and dam breaks 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.

Capital Improvement Plan and Utilities Drainage Master Plans

The 2015-2020 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 CIP budget for fiscal year 2015/16 is \$92.9 million. Of that only \$600,000 is designated for drainage projects.

Department of Utilities Drainage Master Plans exist for approximately half of the drainage basins within the City. The plans analyze piping and pump station drainage.

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 the Federal Emergency Management Agency's (FEMA) 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 (HMPC) comprised of key representatives and other regional stakeholders. The HMPC 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.

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

The FloodSAFE program is a sustainable integrated flood management and emergency response system though out 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.

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, 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 provide levee inspection reports.

California Data Exchange Center (CDEC)

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.

CDEC stores and processed real-time hydrologic information gathered by various cooperators throughout the State; and 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 2 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 provide updated Special Flood Hazard Areas (SFHAs) and flood zones for the City.

Repetitive Loss & 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.C. 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 is a source that 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 provided assistance to the City of Sacramento, Department of Utilities in determining why three repetitive loss areas flooded. This investigation reviewed the capacity of the local drainage system and the topographic/field survey to determine if the building finished floor elevations have adequate freeboard.

Regional Reports

Many methods were utilized to collect data for the RLAA. While delivering the flood protection questionnaires discussed in Step 2, 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, some onsite 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 undersize drainage conveyance systems, power outages at the pump stations, and low-lying properties within their respective neighborhood.

For reporting purposes, the 21 repetitive loss properties have been categorized into five 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 may not have experienced flood losses.

Table D.2 illustrates the percentages of the properties that are located in each flood zone.

Table D.2. Percentage of Repetitive Loss Properties in Each Flood Zone

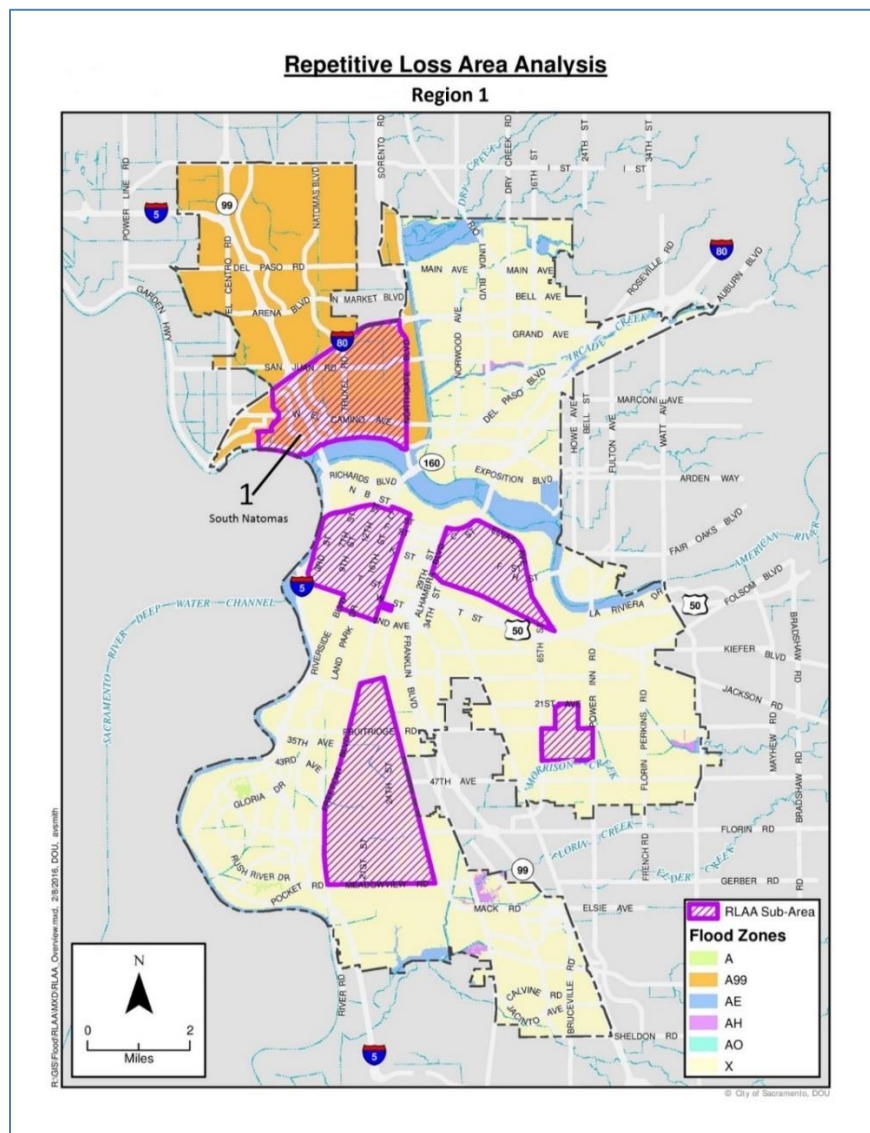
Repetitive Loss Area	Percentage of Area			
	Zone AE	X Zone Minimal Flood Hazard	X Zone Protected by Levees	Zone A99
Region 1	33%	0%	0%	67%
Region 2	0%	33%	67%	0%
Region 3	0%	0%	100%	0%
Region 4	0%	0%	100%	0%
Region 5	0%	0%	100%	0%
Total # of Properties	1	1	17	2

Many of the properties are located in areas 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. The exception is found in 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 that was built on the waterside of the levee. 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 area are affected by grading and draining issues during heavy, long duration storms.

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% 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 D.2. Repetitive Loss Area Regions Map – Region 1



RLAA Region 1 – Area 1

Location: Garden Valley Park, West of Northgate Blvd.

Number of Properties in Defined Area: 10

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 14, 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, insure proper grading on the property to allow runoff to reach street drains. Other options include, installation of a drain or diversion, elevate the portion of the structure that is built below or at grade, and sandbagging can provide additional protection from localized flooding.



*Example of different front yard grading found within the neighborhood.
Also, front rooms are built at or below grade.*

RLAA Region 1 – Area 2

Location: Northgate Park, East of Truxel Road

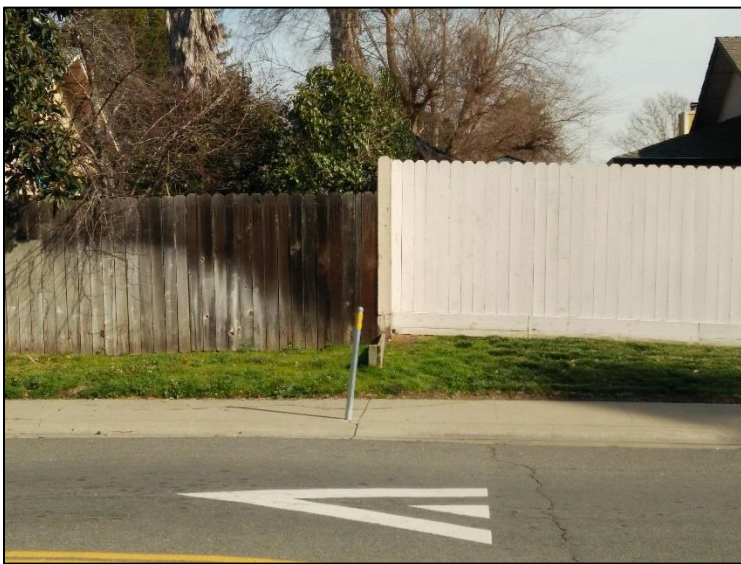
Number of Properties in Defined Area: 27

Number of RL Properties in Area: 1

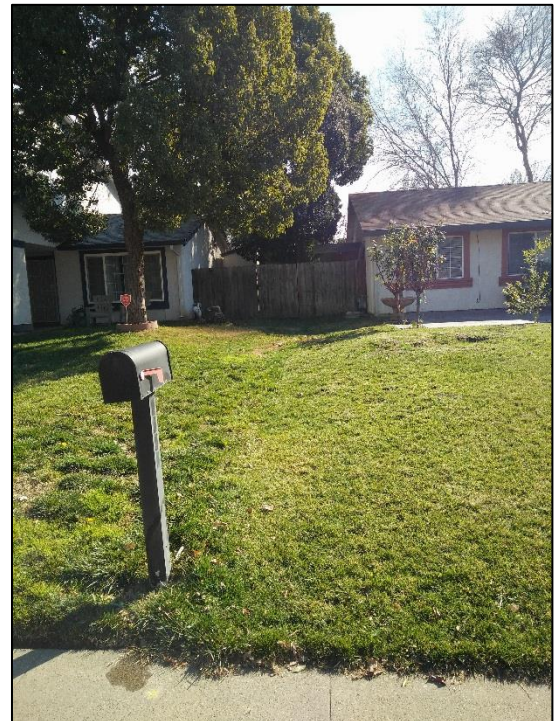
Flood Zone: A99

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:* Grading to redirect the flow of water, installation of drains to divert pooling water, construction of a floodwall, or sandbags.



Example of the change in ground elevation between adjacent properties within the neighborhood.



Diversion was created to direct water away from structures.

RLAA Region 1 – Area 3

Location: Garden Highway, North of Sacramento River

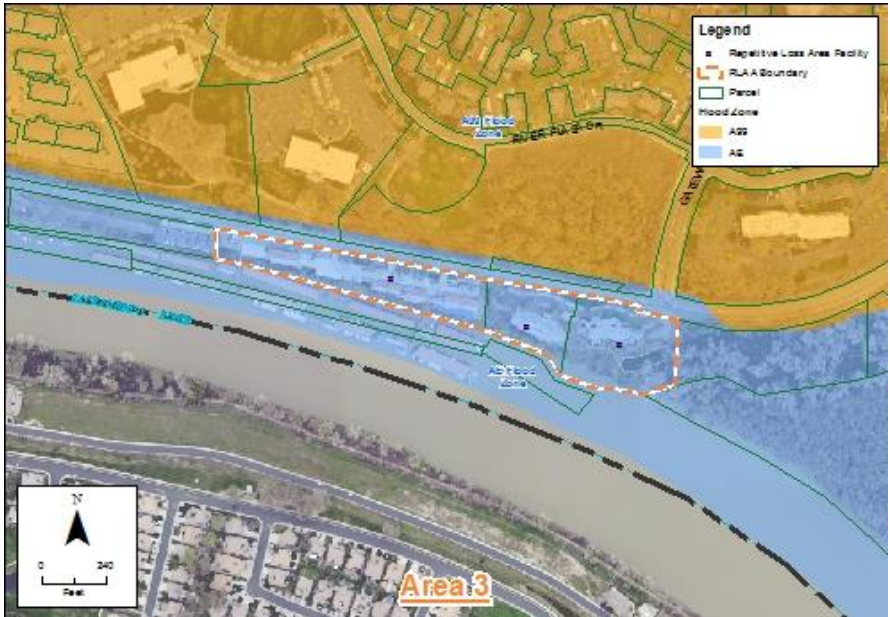
Number of Properties in Defined Area: 3

Number of RL Properties in Area: 1

Flood Zone: AE

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

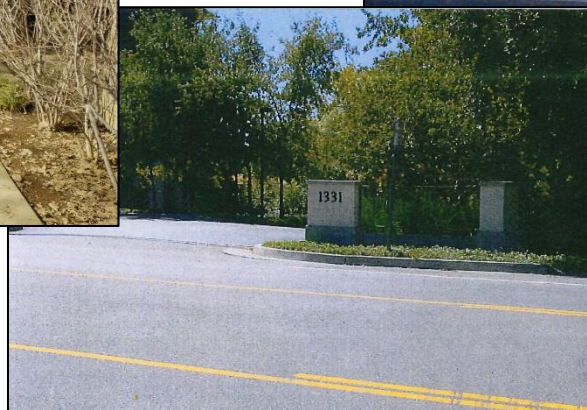
Source of RL Flooding: During winter storms, this strip of commercial development will experience a large amount of water draining down into the parking structures and overflow from the Sacramento River. Flooding has occurred when the pump system located in the parking structures fail. *Mitigation Recommendations:* 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 in a natural area. Care should be given to preserve the natural quality of its surrounding to promote natural flood control qualities found near the river.



Parking garage located near the edge of the Sacramento River.



Habitable spaces of structures are elevated.



Entrance to parking garages below main structures.

Region 1 – Field Visits

Table D.3 provides field visit information collected for all structures located 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.

Table D.3. Region 1 Field Visit Summary

Region	Area	Address	Elevation (NAVD 88) (FT.)	Onsite Contact	Foundation	Condition
1	1	3485 BINGHAMPTON DR.	15.1746		Slab	Average
1	1	3491 BINGHAMPTON DR.	15.2789		Slab	Average
1	1	3497 BINGHAMPTON DR.	15.6841		Slab	Average
1	1	3503 BINGHAMPTON DR.	15.7027		Slab	Average
1	1	3509 BINGHAMPTON DR.	16		Slab	Average
1	1	3515 BINGHAMPTON DR.	16.1021		Slab	Average
1	1	3521 BINGHAMPTON DR.	16.6888		Slab	Average
1	1	3527 BINGHAMPTON DR.	16.3052		Slab	Average
1	2	1320 OAK NOB WAY	14		Slab	Average
1	2	1330 OAK NOB WAY	14.1143		Slab	Average
1	2	1340 OAK NOB WAY	14.2517		Slab	Average
1	2	1350 OAK NOB WAY	14.5096		Slab	Average
1	2	1360 OAK NOB WAY	14.1886		Slab	Average
1	2	1370 OAK NOB WAY	14.5409		Slab	Average
1	2	1380 OAK NOB WAY	14.0413		Slab	Average
1	2	1390 OAK NOB WAY	13.4144		Slab	Average
1	2	1400 OAK NOB WAY	13.571		Slab	Average
1	2	1410 OAK NOB WAY	13.7153		Slab	Average
1	2	1420 OAK NOB WAY	13.7407		Slab	Average
1	2	1430 OAK NOB WAY	13.6304	✓	Slab	Average
1	2	1440 OAK NOB WAY	13.5395		Slab	Average
1	2	1450 OAK NOB WAY	13.8545		Slab	Average
1	2	1431 WOODSIDE GLEN WAY	12.9108		Slab	Average
1	2	1423 WOODSIDE GLEN WAY	13.7833		Slab	Average
1	2	1415 WOODSIDE GLEN WAY	13.8217		Slab	Average
1	2	1407 WOODSIDE GLEN WAY	14.1763		Slab	Average
1	2	1399 WOODSIDE GLEN WAY	14.4965		Slab	Average

1	2	1391 WOODSIDE GLEN WAY	14.8546		Slab	Average
1	2	1383 WOODSIDE GLEN WAY	14.0629		Slab	Average
1	2	1375 WOODSIDE GLEN WAY	14.215		Slab	Average
1	2	1367 WOODSIDE GLEN WAY	14.5882		Slab	Average
1	2	1359 WOODSIDE GLEN WAY	14.343		Slab	Average
1	2	1351 WOODSIDE GLEN WAY	14.1717		Slab	Average
1	2	1343 WOODSIDE GLEN WAY	14.7193		Slab	Average
1	2	1335 WOODSIDE GLEN WAY	14.3229		Slab	Average
1	3	1331 GARDEN HWY	27.4152	✓	Slab	Average
1	3	1321 GARDEN HWY	39.0228	✓	Slab	Average
1	3	1383 GARDEN HWY #200	26.1868		Elev. Slab on Supports	Average

Region 1 - Mitigation and Action Items

Various mitigation activities were considered when analyzing Region 1's hazard assessment. Table D.4 lists all considered mitigation activities and identifies appropriate mitigation activities for each repetitive loss area.

Table D.4. Region 1 Review of Alternative Approaches

Mitigation Activity	Region 1		
	Area 1	Area 2	Area 3
Prevention			
Continue Enforcement of Stormwater Regulations	X	X	X
Continue Drainage System Maintenance	X	X	X
Continue Enforcement of Floodplain Management Regulations			X
Property Protection			
Building Elevation	X		
Relocation			
Improvement or Installation of Private Sumps			X
Sewer Backup Protection			
Floodproofing			
Flood Insurance	X	X	X
Grading	X	X	
Sandbags	X	X	

Elevate Utilities			
Natural Resource Protection			
Natural Area Preservation			X
Natural Area Restoration			
Emergency Services			
Hazard Threat Recognition	X	X	X
Hazard Warnings	X	X	X
Health & Safety Maintenance			X
Structural Projects			
Floodwalls		X	
Diversions	X	X	
Conveyance System Improvements (Structural)			
Detention Basin	X		
Increased Pumping Capacity	X		
Pipe Improvements	X		
Public Information			
Outreach Projects	X	X	X
Map Information	X	X	X
Technical Assistance	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 D.5. Region 1 Action Items

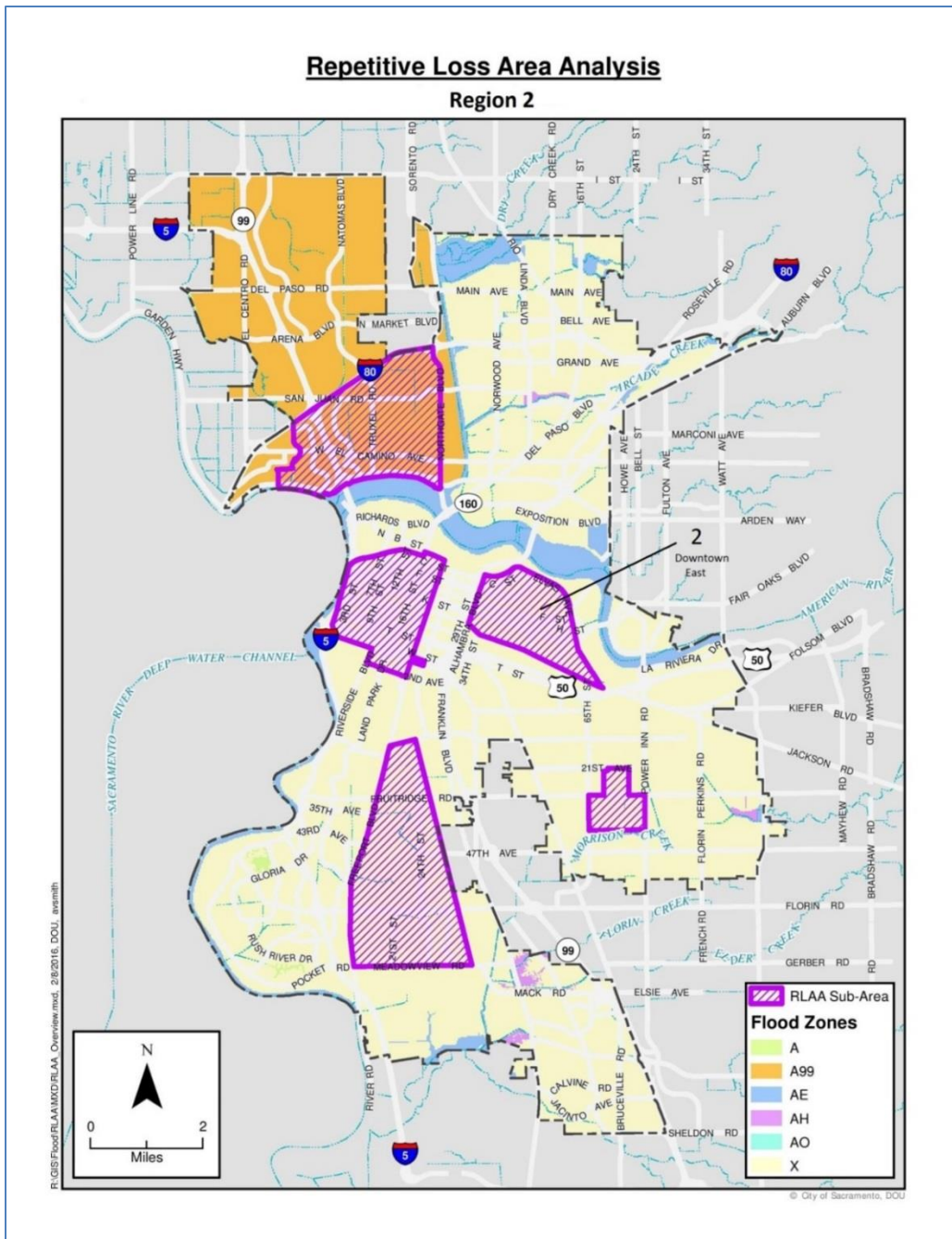
Action Item	Responsible Office	Schedule	Potential Funding
Elevate structures that are built at or below grade	Department of Utilities, Floodplain Management	Dependent of property owner interest and grant opportunities	Grants and Private Funding
Improvement and maintenance of private sumps	Property Owner	Ongoing	Private Funding
Onsite grading to divert water to city conveyance system	Property Owner	Dependent of property owner interest	Private Funding or Grants
Sandbagging	Department of Utilities, Operations & Maintenance (supplies only); Property Owner	During Flood Event	Department Funding (supplies only)
Develop sandbag locations closer to repetitive loss area	Department of Utilities	October 2018	Department Funding
Diversions to direct stormwater to City conveyance system	Property Owner	Dependent of property owner interest	Private Funding or Grants

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
Enforcement of floodplain management regulations	Department of Utilities, Floodplain Management	Ongoing	Department Funding
Promotion of flood insurance	Department of Utilities, Floodplain Management	Ongoing	Department Funding
Hazard threat recognition system	Department of Utilities	Ongoing	Department Funding
Hazard warnings	Department of Utilities; Emergency Services; Public Information Office	During Flood Event	Department Funding
Flood/Map information hotline	Department of Utilities, Floodplain Management	Ongoing	Department Funding
Technical Assistance Visits	Department of Utilities, Floodplain Management	Ongoing	Department Funding

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 is vulnerable to overbanking, erosion, and seepage from the American River levees nearby and has other risks such as interior drainage issues (i.e., undersized and aged pipes).

Figure D.3. Repetitive Loss Area Regions Map – Region 2



RLAA Region 2 – Area 4

Location: River Park
Neighborhood, West of
Sacramento State

**Number of properties in
defined area: 5**

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

Flood Zone: Shaded-X Zone

Dates of RL Flooding:

2/18/1986

6/04/1993

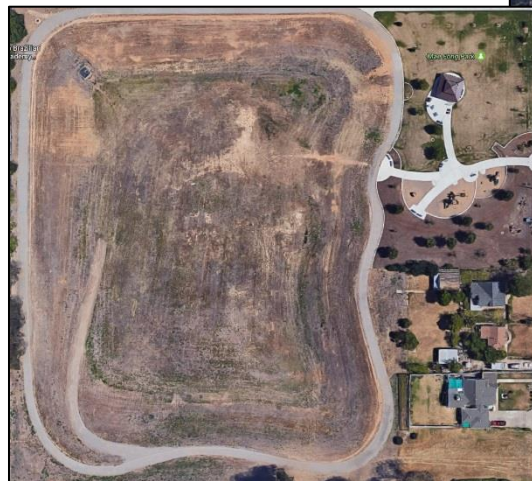
1/22/1997



Source of RL Flooding: This industrial park is in a low-lying area in River Park, which is west of California State University, Sacramento and follows the American River levee. The industrial park is also next to the City’s secondary levee. At the time when flooding occurred, the area had an undersized drainage conveyance system with no onsite drainage. *Mitigation Recommendations:* It is recommended that this area be removed from the repetitive loss list because of the completion of two key mitigation projects in 2007. Sump 31 was enlarged and a new force main was constructed to the American River. Additionally, the Redding Avenue detention basin was constructed to help mitigate flooding in the basin. As always, flood insurance and general flood preparedness is advised for property owners in the area.



*Improved drainage system
project on Elvas Avenue that
was completed in 2009.*



*Overview image of Redding Avenue detention
basin that was completed in 2007.*



Overview of Area 4

RLAA Region 2 – Area 5

Location: 45th Street, 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:

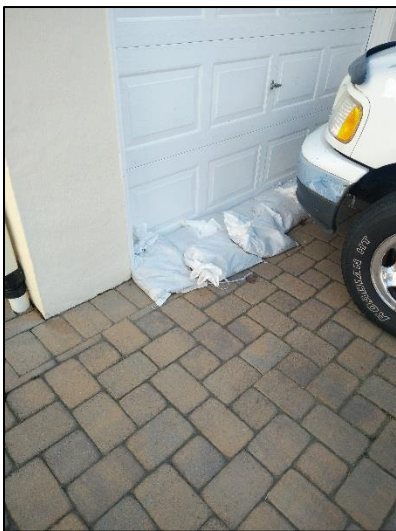
4/08/1995

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 Basin 10's Drainage Master Plan, it is suggested that 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.



Left: Residents use sandbags to protect their garage from street flooding during January 2017 storms.

Right: Debris collecting on a storm drain at the corner of 45th and C Streets.



RLAA Region 2 – Area 6

Location: McKinley Park, East of the Capitol City Freeway

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 Department of Utilities is currently in the pre-design stage for a water vault that will reduce flooding in this area. The estimated completion date is 2019. In the meantime, flood insurance, using sandbags, sumps, sewer backup protection, and preparedness outreach are all mitigation activities that will increase area flood protection.



Street flooding from February 2017 storm. Overwhelmed conveyance system.



Above: Some homes in this area have basements and doorways located at grade level.

Left: Example of the City's warning that the area may contain sewage.



Region 2 – Field Visits

Table D.6 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.

Table D.6. Region 2 Field Visit Summary

A	SA	Address	Elevation (NAVD 88) (FT.)	On-site Contact	Foundation	Condition
2	4	6661 ELVAS AVE.	37.6479		Slab	Average
2	4	6667 ELVAS AVE.	38.9518		Slab	Average
2	4	6801 ELVAS AVE.	39.2869		Slab	Average
2	4	6601 ELVAS AVE.	38.4684		Slab	Average
2	5	421 45TH ST.	34.0295		Crawlspace	Average
2	5	411 45TH ST.	34.1746		Crawlspace	Average
2	5	4508 D ST.	34.6069		Crawlspace	Average
2	5	410 45TH ST.	34.0805	✓	Crawlspace	Average
2	5	300 45TH ST.	28.0695		Crawlspace	Average
2	5	4500 C ST.	27.4958	✓	Crawlspace	Average
2	5	420 45TH ST.	32.3734	✓	Crawlspace	Average
2	5	4467 D ST.	32.2387		Crawlspace	Average
2	5	4501 D ST.	32		Crawlspace	Average
2	6	3300 PARK WAY	21.9656		Slab	Average
2	6	577 33RD ST.	22		Crawlspace	Average
2	6	570 34TH ST.	21.1883	Survey Returned	Crawlspace & Basement	Average
2	6	576 34TH ST.	22.0575		Crawlspace	Average
2	6	569 34TH ST.	22.339		Crawlspace	Average
2	6	577 34TH ST.	22.4859		Crawlspace	Average
2	6	568 35TH ST.	24.1344		Crawlspace	Average
2	6	576 35TH ST.	24.9616		Crawlspace	Average
2	6	569 35TH ST.	23.3812		Slab	Average
2	6	577 35TH ST.	25.3244		Crawlspace	Average
2	6	551 35TH ST.	21.3513	Survey Returned	Basement	Average
2	6	568 SANTA YNEZ WAY	22.7485		Crawlspace	Average
2	6	548 SANTA YNEZ WAY	23.259		Crawlspace	Average

Region 2 - Mitigation and Action Items

The following mitigation activities were considered to address the hazards found in Region 2. Table D.7 lists all considered mitigation activities and identifies appropriate mitigation activities for each repetitive loss area.

Table D.7. Region 2 Review of Alternative Approaches

Mitigation Activity	Region 2		
	Area 4	Area 5	Area 6
Prevention			
Continue Enforcement of Stormwater Regulations	X	X	X
Continue Drainage System Maintenance	X	X	X
Continue Enforcement of Floodplain Management Regulations	X	X	X
Property Protection			
Building Elevation			X
Relocation			
Improvement or Installation of Private Sumps			X
Sewer Backup Protection			X
Floodproofing			
Flood Insurance	X	X	X
Grading			
Sandbags		X	X
Elevate Utilities		X	X
Natural Resource Protection			
Natural Area Preservation			
Natural Area Restoration			
Emergency Services			
Hazard Threat Recognition	X	X	X
Hazard Warnings	X	X	X
Health & Safety Maintenance			X
Structural Projects			
Floodwalls		X	
Diversions			
Conveyance System Improvements (Structural)			
Detention Basin/Vault	X	X	X
Increased Pumping Capacity	X		X
Pipe Improvements		X	X
Public Information			
Outreach Projects		X	X
Map Information	X	X	X
Technical Assistance		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 D.8. Region 2 Action Items

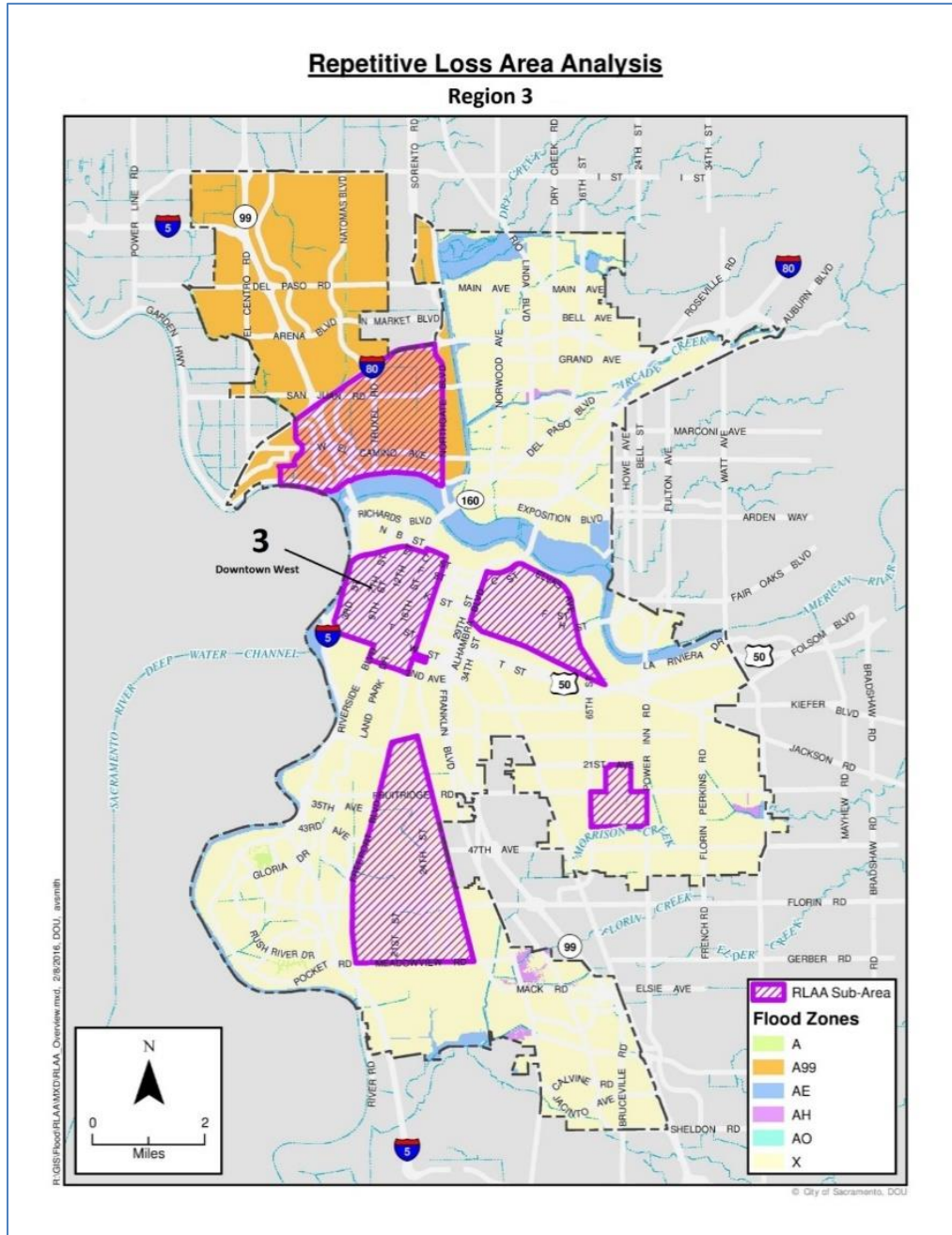
Action Item	Responsible Office	Schedule	Potential Funding
Conveyance system improvements identified in Drainage Master Plan for Basin 31	Department of Utilities	Complete	Capital Improvement Program
Elevate structures that are built at or below grade	Department of Utilities, Floodplain Management	Dependent of property owner interest and grant opportunities	Grants and Private Funding
Improvement and maintenance of private sumps	Property Owner	Ongoing	Private Funding
Sandbagging	Department of Utilities, Operations & Maintenance (supply only); Property Owner	During Flood Event	Department Funding (supply only)
Develop grant proposal for installation of sumps to protect garages and basements	Department of Utilities, Floodplain Management	Summer 2018	Department Funding
Sewer backup protection system	Property Owner	Dependent of property owner interest	Private Funding or Grants
Health & safety warnings and inspection of combined sewer system area	Department of Utilities, Operations & Maintenance	During/After Flood Event	Department Funding
Construction of a floodwall	Property Owner	Dependent of property owners interest	Private Funding or Grants
Provide neighborhood with storm/flood ready information - include emergency alert information	Department of Utilities, Floodplain Management	Annual	Department Funding
McKinley Water Vault Protect	Department of Utilities	2019	Capital Improvement Program
Enlarge critical pipes and construct detention basin in Drainage Basin 10	Department of Utilities	Dependent on Funding	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

Enforcement of floodplain management regulations	Department of Utilities, Floodplain Management	Ongoing	Department Funding
Promotion of flood insurance	Department of Utilities, Floodplain Management	Ongoing	Department Funding
Hazard threat recognition system	Department of Utilities	Ongoing	Department Funding
Hazard warnings	Department of Utilities; Emergency Services; Public Information Office	During Flood Event	Department Funding
Flood/Map information hotline	Department of Utilities, Floodplain Management	Ongoing	Department Funding
Technical Assistance Visits	Department of Utilities, Floodplain Management	Ongoing	Department Funding

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 D.4. Repetitive Loss Area Regions Map – Region 3



RLAA Region 3 – Area 7

Location: Broadway near St. Josephs Cemetery.

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, floodproof 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.



*Left: On-site drainage added to aid in storm water drainage.
Right: A fractured basement wall caused by hydrostatic pressure. The cracks have led to water seeping into the basement.*

RLAA Region 3 – Area 8

Location: Land Park Dr. & 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 and can be inundated by water during large storms. *Mitigation Recommendations:* Improvement of Combined Sewer System, floodproof basements, installation of sumps, sewer system backup protection, sandbags, elevate utilities, outreach on storm/flood preparedness, and flood insurance.



Example of debris in the storm drain. Leaf piles are allowed to be left on streets for City pick up. Many times, these leaves can be sweep down into the storm drain.



Example of a typical home in this area that wouldn't flood. Elevated on a crawlspace and the garage located in the back of the property. Some homes have basements.

RLAA Region 3 – Area 9

Location: N Street West of the Capital City Freeway

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

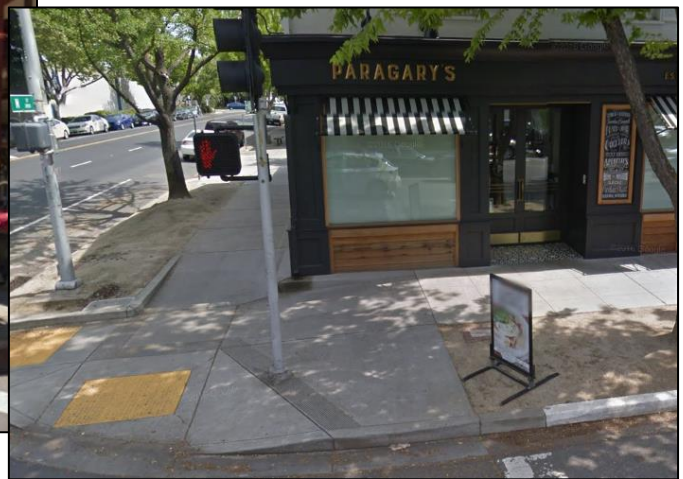
1/25/1997

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.



The majority of the buildings in Area 9 do not have elevated entry ways

RLAA Region 3 – Area 10

Location: Q Street north of Southside Park

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

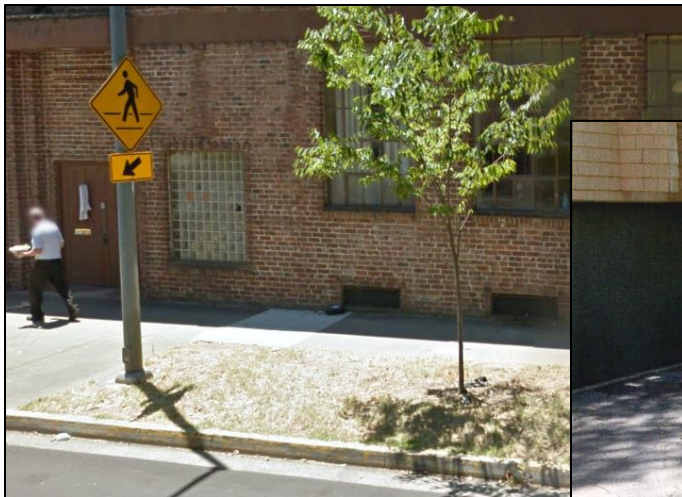
1/25/1997

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 and can be inundated by water during large storms. *Mitigation Recommendations:* The Drainage Master Plan for Basin 52 recommends the improvement of critical pipes and the installation of a new vault and pumping plant to reduce flooding in the area. For individual property mitigation, using sandbags, installation of a temporary floodwall, elevate buildings, outreach on storm/flood preparedness, and flood insurance are recommended.



Basement windows and entry door are not elevated.



Garages are located below grade.

RLAA Region 3 – Area 11

Location: North of the Capitol Building by the Convention Center

Number of Properties in Defined Area: 3

Number of RL Properties in Area: 1

Flood Zone: X-Zone

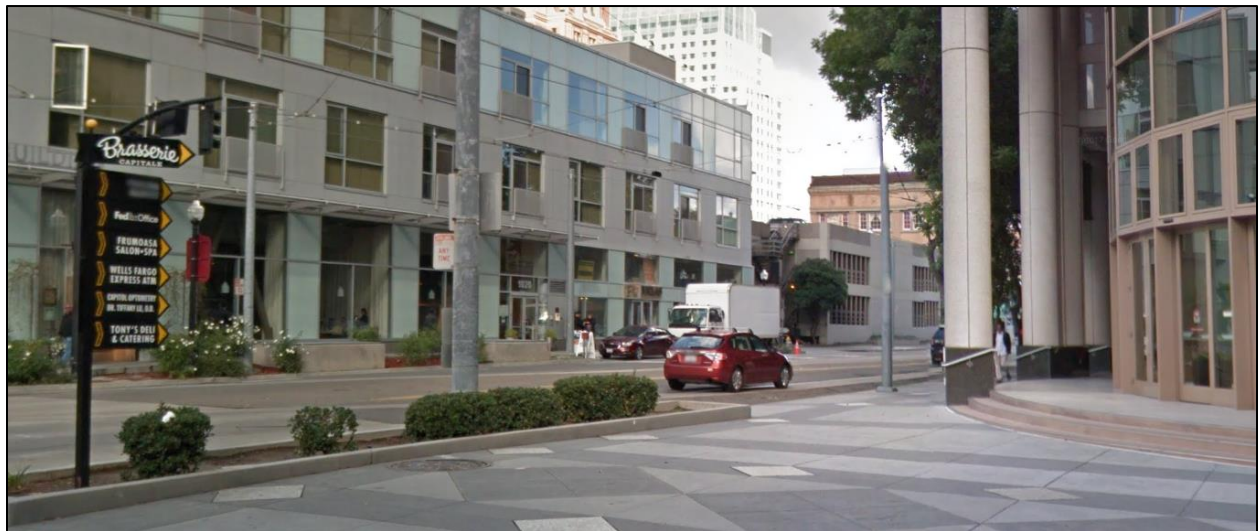
Dates of RL Flooding:

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.



Area 11 is located in the middle of downtown Sacramento. Many of the entryways are elevated, but the parking structures are below ground.

Region 3 – Field Visits

Table D.9 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.

Table D.9. Region 3 Field Visit Summary

A	SA	Address	Elevation (NAVD 88) (FT.)	On-site Contact	Foundation	Condition
3	7	2222 X ST.	18.8002		Crawlspace	Average
3	7	2400 23RD ST.	18.664		Crawlspace	Average
3	7	2406 23RD ST.	18.6949		Crawlspace	Average
3	7	2300 X ST.	18.9901		Crawlspace	Average
3	7	2405 23RD ST.	18.9878	Survey Returned	Basement	Average
3	7	2409 23RD ST.	19.461		Parking Lot	Average
3	7	2415 23RD ST.	19.176		Parking Lot	Average
3	8	2601 14TH ST.	14.4933		Crawlspace	Average
3	8	2607 14TH ST.	14.3069		Crawlspace	Average
3	8	2613 14TH ST.	14.0657		Crawlspace	Average
3	8	2619 14TH ST.	14.2442		Crawlspace	Average
3	8	2625 14TH ST.	14.3534		Crawlspace	Average
3	8	2631 14TH ST.	14.3956	Survey Returned	Crawlspace & Basement	Average
3	8	2637 14TH ST.	14.6973		Crawlspace	Average
3	8	2643 14TH ST.	14.4287		Crawlspace	Average
3	8	2649 14TH ST.	15.0664		Crawlspace	Average
3	8	2655 14TH ST.	15.762		Crawlspace	Average
3	8	2661 14TH ST.	16.0271		Crawlspace	Average
3	8	2667 14TH ST.	16		Crawlspace	Average
3	8	2673 14TH ST.	16.1603		Crawlspace	Average
3	8	2679 14TH ST.	16.0504		Crawlspace	Average
3	8	2685 14TH ST.	16.0504		Crawlspace	Average
3	8	2691 14TH ST.	15.5941		Crawlspace	Average
3	8	2697 14TH ST.	16		Crawlspace	Average
3	8	2600 14TH ST.	14.0877		Crawlspace	Average
3	8	2610 14TH ST.	13.494		Crawlspace	Average
3	8	2616 14TH ST.	13.8971		Crawlspace	Average
3	8	2622 14TH ST.	14.0953		Crawlspace	Average

3	8	2628 14TH ST.	13.9878		Crawlspace	Average
3	8	2634 14TH ST.	14.5663		Crawlspace	Average
3	8	2640 14TH ST.	14.6859		Crawlspace	Average
3	8	2646 14TH ST.	14.0221		Crawlspace	Average
3	8	2652 14TH ST.	15.7929		Crawlspace	Average
3	8	2658 14TH ST.	15.7667		Crawlspace	Average
3	8	2664 14TH ST.	15.2215		Crawlspace	Average
3	8	2670 14TH ST.	16.4142		Crawlspace	Average
3	8	2676 14TH ST.	15.9408		Crawlspace	Average
3	8	2682 14TH ST.	15.9276		Crawlspace	Average
3	8	2688 14TH ST.	16.1479		Crawlspace	Average
3	8	2694 14TH ST.,	15.9632		Crawlspace	Average
3	9	2730 N ST.	21.5453		Slab	Average
3	9	2720 CAPITOL AVE.	21.7841		Parking Garage	Average
3	9	1404 28TH ST.	22		Slab	Average
3	9	1408 28TH ST.	21.8811		Parking Lot	Average
3	9	1401 28TH ST.	15.9403		Slab	Average
3	10	530 Q ST.	16		Slab	Average
3	10	600 Q ST.	18		Slab	Average
3	10	520 P ST.	16.9776		Slab	Average
3	10	512 Q ST.	16.0094		Slab	Average
3	11	1201 K ST.	23.2315	✓	Slab	Average
3	11	1131 K ST.	25.0543		Slab	Average
3	11	1130 K ST.	23.5534		Slab	Average
3	11	1205 L ST.	21.7848		Slab	Average
3	11	1209 K ST.	23.8316		Slab	Average

Region 3 - Mitigation and Action Items

The following mitigation activities were considered to address the hazards found in Region 3. Table D.10 lists the considered mitigation activities and identifies appropriate mitigation activities for each repetitive loss area.

Table D.10. Region 3 Review of Alternative Approaches

Mitigation Activity	Region 3				
	Area 7	Area 8	Area 9	Area 10	Area 11
Prevention					
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
Property Protection					
Building Elevation			X	X	
Relocation					
Improvement or Installation of Private Sumps	X	X			
Sewer Backup Protection	X	X	X		
Floodproofing	X	X			
Flood Insurance	X	X	X	X	X
Grading					
Sandbags	X	X	X	X	X
Elevate Utilities	X	X	X	X	
Natural Resource Protection					
Natural Area Preservation					
Natural Area Restoration					
Emergency Services					
Hazard Threat Recognition	X	X	X	X	X
Hazard Warnings	X	X	X	X	X
Health & Safety Maintenance	X				
Structural Projects					
Floodwalls				X	X
Diversions					
Conveyance System Improvements (Structural)					
Detention Basin/Vault				X	
Increased Pumping Capacity	X	X	X	X	
Pipe Improvements	X	X	X	X	
Public Information					
Outreach Projects	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 D11. Region 3 Action Items

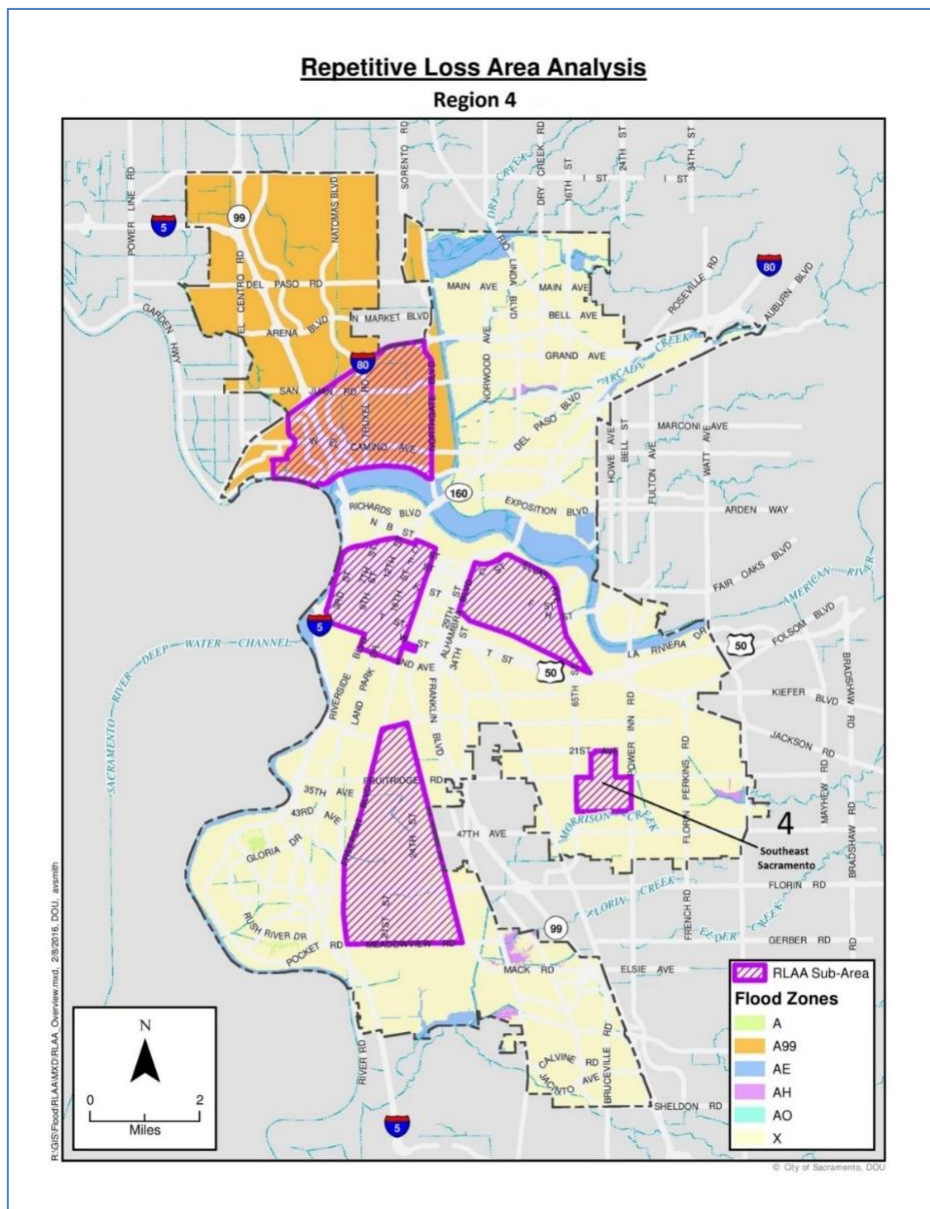
Action Item	Responsible Office	Schedule	Potential Funding
Elevate structures and utilities that are built at or below grade	Department of Utilities, Floodplain Management	Dependent of property owner interest and grant opportunities	Grants and Private Funding

Floodproofing	Department of Utilities, Floodplain Management	Dependent of property owner interest and grant opportunities	Grants and Private Funding
Improvement and maintenance of private sumps	Property Owner	Ongoing	Private Funding
Sandbagging	Department of Utilities, Operations & Maintenance (supply only); Property Owner	During Flood Event	Department Funding (supply only)
Develop grant proposal for installation of sumps to protect garages and basements	Department of Utilities, Floodplain Management	Summer 2018	Department Funding
Sewer backup protection system	Property Owner	Dependent of property owner interest	Private Funding or Grants
Health & safety warnings and inspection of combined sewer system area	Department of Utilities, Operations & Maintenance	During Flood Event	Department Funding
Provide neighborhoods with storm/flood ready information - include emergency alert information	Department of Utilities, Floodplain Management	Annual	Department Funding
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 52	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
Enforcement of floodplain management regulations	Department of Utilities, Floodplain Management	Ongoing	Department Funding
Promotion of flood insurance	Department of Utilities, Floodplain Management	Ongoing	Department Funding
Hazard threat recognition system	Department of Utilities	Ongoing	Department Funding
Hazard warnings	Department of Utilities; Emergency Services; Public Information Office	During Flood Event	Department Funding
Flood/Map information hotline	Department of Utilities, Floodplain Management	Ongoing	Department Funding
Technical Assistance Visits	Department of Utilities, Floodplain Management	Ongoing	Department Funding

Region 4 – Southeast Sacramento

Region 4 of the RLAA is located in the Southeast portion of Sacramento’s city limits. This entire region is comprised 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 D.5. Repetitive Loss Area Regions Map – Region 4



RLAA Region 4 – Area 12

Location: Fruitridge Road near Earl Warren Park

Number of Properties in Defined Area: 14

Number of RL Properties in area: 1

Flood Zone: X-Zone

Dates of RL flooding:

1/10/1995

12/21/1996



Source of RL Flooding:

This area is in a low-lying area of an undersized conveyance system which floods during heavy storms. *Mitigation Recommendations:* Elevation of buildings, elevation of utilities, sandbags, outreach on storm/flood preparedness, and flood insurance. Based on the Drainage Master Plan for Basin 96, the installation of a new detention basin at Wilkinson Street and 32nd Avenue will reduce flooding in the area.



Debris along the sidewalk that can contribute to backed up drains.



Debris obstructing the flow of water from exiting the property during storm events.



Drains filled with debris as a result of inadequate street cleaning and yard maintenance.

RLAA Region 4 –Area 13

Location: Near the 65th Street Expressway & Will C Wood Middle School.

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.



Structure built upon a crawlspace and HVAC unit is elevated as a flood proofing measures.



Ponding caused by landscaping obstructions.

Region 4 – Field Visits

Table D.12 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.

Table D.12. Region 4 Field Visit Summary

A	SA	Address	Elevation (NAVD 88) (FT.)	On-site Contact	Foundation	Condition
4	12	5501 PRISCILLA LN.	36		Slab	Average
4	12	5521 PRISCILLA LN.	36.0314		Slab	Average
4	12	5539 PRISCILLA LN.	36	✓	Slab	Average
4	12	5551 PRISCILLA LN.	36.175		Slab	Average
4	12	5571 PRISCILLA LN.	37.3519		Slab	Average
4	12	5500 PRISCILLA LN.	35.9806		Slab	Average
4	12	5520 PRISCILLA LN.	35.981		Slab	Average
4	12	5538 PRISCILLA LN.	35.9781		Slab	Average
4	12	5550 PRISCILLA LN.	35.9856		Slab	Average
4	12	5570 PRISCILLA LN.	37.1775		Slab	Average
4	12	5570 BRADFORD DR.	37.0798		Slab	Average
4	12	5550 BRADFORD DR.	36.4313		Slab	Average
4	12	5571 STANDISH RD.	36.8029		Slab	Average
4	12	5551 STANDISH RD.	36.4516		Slab	Average
4	13	5747 66TH ST.	36.7		Crawlspace	Average
4	13	5749 66TH ST.	34.509		Crawlspace	Average
4	13	5811 66TH ST.	34		Crawlspace	Average
4	13	6631 37TH AVE.	34.0371		Crawlspace	Average
4	13	6701 37TH AVE.	34		Crawlspace	Average
4	13	6711 37TH AVE.	34.04		Crawlspace	Average
4	13	6721 37TH AVE.	34.5299		Crawlspace	Average
4	13	6731 37TH AVE.	34.5429		Crawlspace	Average
4	13	6801 37TH AVE.	34.7181		Crawlspace	Average
4	13	6811 37TH AVE.	34.9229		Crawlspace	Average
4	13	6821 37TH AVE.	35.1515		Crawlspace	Average
4	13	6831 37TH AVE.	35.6577		Crawlspace	Average

Region 4 - Mitigation and Action Items

The following mitigation activities were considered to address the hazards found in Region 4. Table D.13 lists the considered mitigation activities and identifies appropriate mitigation activities for each repetitive loss area.

Table D.13. Region 4 Review of Alternative Approaches

Mitigation Activity	Region 4	
	Area 12	Area 13
Prevention		
Continued Enforcement of Stormwater Regulations	X	X
Continue Drainage System Maintenance	X	X
Continued Enforcement of Floodplain Management Regulations	X	X
Property Protection		
Building Elevation	X	
Relocation		
Improvement or Installation of Private Sumps		
Sewer Backup Protection		
Floodproofing		
Flood Insurance	X	X
Grading		X
Sandbags	X	X
Elevate Utilities	X	X
Natural Resource Protection		
Natural Area Preservation		
Natural Area Restoration		
Emergency Services		
Hazard Threat Recognition	X	X
Hazard Warnings	X	X
Health & Safety Maintenance		
Structural Projects		
Floodwalls		X
Diversions		X
Conveyance System Improvements (Structural)		
Detention Basin/Vault	X	
Increased Pumping Capacity		
Pipe Improvements		

Public Information		
Outreach Projects	X	X
Map Information	X	X
Technical Assistance	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.

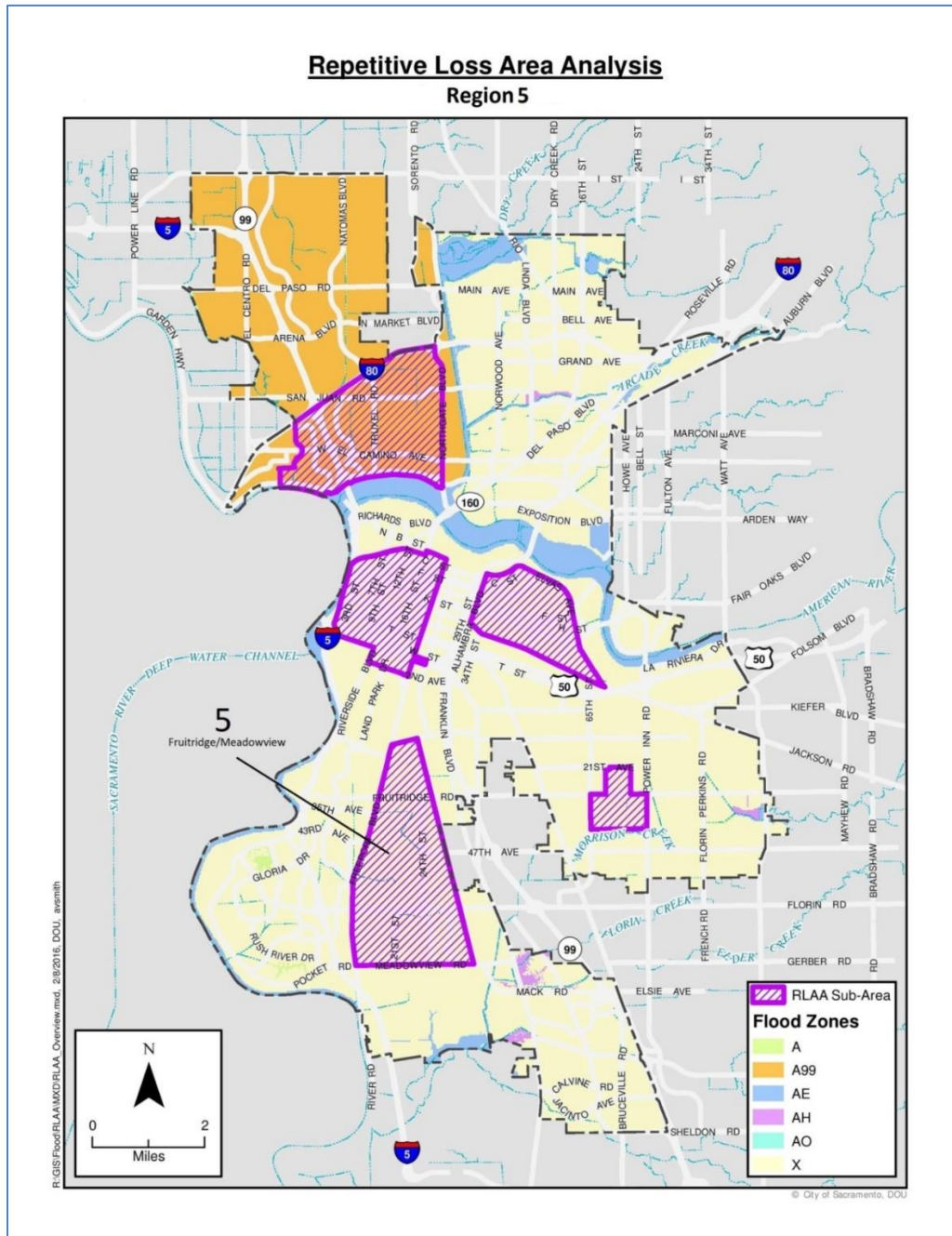
Table D14. Region 4 Action Items

Action Item	Responsible Office	Schedule	Potential Funding
Conveyance system improvements identified in Drainage Master Plan for Basin 96	Department of Utilities, Wastewater & Stormwater Engineering Program	Long-Term	Capital Improvement Program
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
Sandbagging	Department of Utilities, Operations & Maintenance; Property Owner	During Flood Event	Department Funding
Elevate utilities that are at or below grade	Property Owner	Dependent of property owner interest	Private Funding
Grading or diversion to redirect the flow of stormwater to drainage system	Property Owner	Dependent of property owner interest	Private Funding
Enforcement of stormwater regulations	Department of Utilities, Environmental & Regulatory Compliance	Ongoing	Department Funding
Drainage system maintenance	Department of Utilities, Operations & Maintenance	Ongoing	Department Funding
Enforcement of floodplain management regulations	Department of Utilities, Floodplain Management	Ongoing	Department Funding
Promotion of flood insurance	Department of Utilities, Floodplain Management	Ongoing	Department Funding
Hazard threat recognition system	Department of Utilities	Ongoing	Department Funding
Hazard warnings	Department of Utilities; Emergency Services; Public Information Office	During Flood Event	Department Funding
Flood/Map information hotline	Department of Utilities, Floodplain Management	Ongoing	Department Funding
Technical Assistance Visits	Department of Utilities, Floodplain Management	Ongoing	Department Funding

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 a X-Zone with a low risk of flooding due to surrounding levees.

Figure D.6. Repetitive Loss Area Regions Map – Region



RLAA Region 5 – Area 15

Location: 22nd Avenue near William Land Park

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

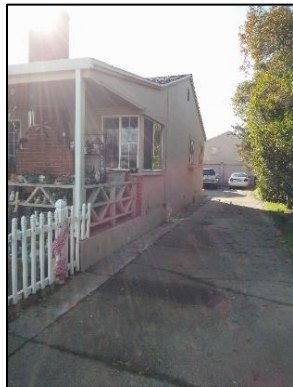
Property 3: 1/10/1995 1/22/1997

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:* The Drainage Master Plan for Basin 26 recommends the construction of a detention basin and improvement of critical pipes to provide flood protection to the area. For individual property protection, flood insurance, sandbags, diversions, and elevation of utilities will provide additional flood protection.



Examples of floodproofing measure such as a crawlspace to the left and additional onsite drainage pipe to the right.

RLAA Region 5 – Area 16

Location: South of Florin Rd. near Luther Burbank High

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

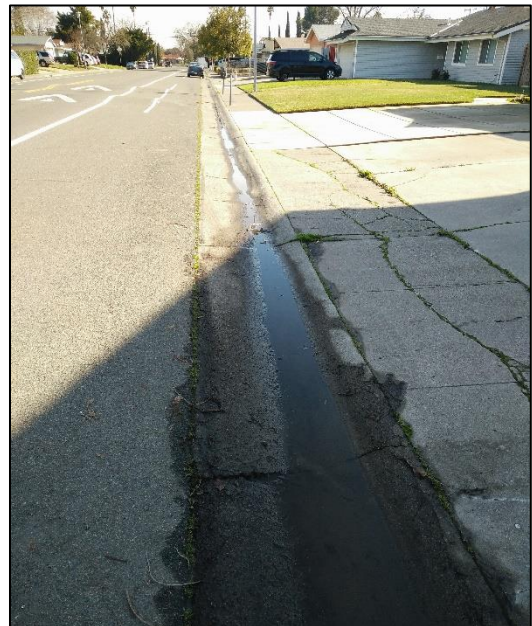
1/27/1997



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, insure proper onsite drainage to allow water to flow to storm drains, elevate utilities, sandbags, storm readiness outreach, and flood insurance.



Crawlspace utilized as a floodproofing measure to prevent flooding in the structure.



Standing water after a large January storm unable to drain properly.

RLAA Region 5 – Area 17

Location: Neighborhood of 68th Ave. & Henrietta Dr.

Number of Properties in Defined Area: 13

Number of RL Properties in Area: 1

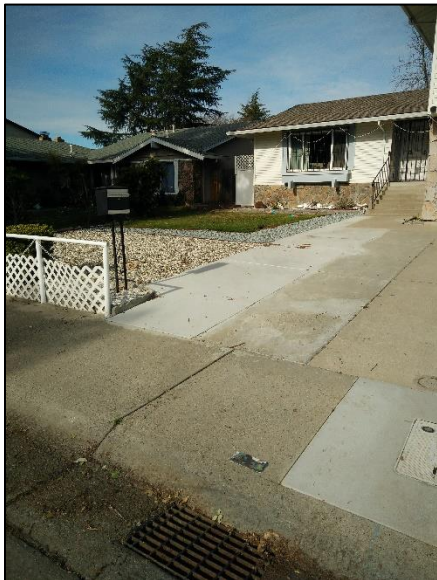
Flood Zone: X-Zone

Dates of RL Flooding:

1/10/1995 2/26/2000

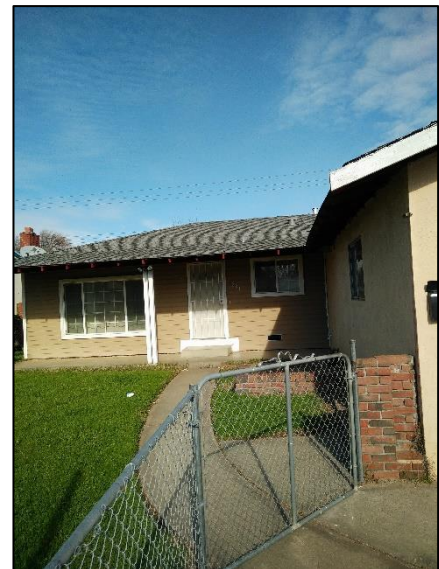
Source of RL Flooding:
Based on GEI Consultants'

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 recommends the upsize of pipes and the addition of a detention basin. Residents can add diversion to promote the flow of water to the main drainage system, purchase flood insurance, and use sandbags to mitigate flooding.



Left: Elevated home with landscaping assisting in on-site drainage.

Right: Elevated structure with a crawlspace below as a flood protection method.



RLAA Region 5 – Area 18

Location: Florin Road,
Northeast of William
Chorley Park

**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 recommends critical pipe improvements and the addition of a detention basin to provide adequate flood protection to the area. Other mitigation options are flood preparedness education, elevate utilities, flood insurance, and sandbags.



Left: Example of flooded yard from January 2017 storms.

Below: Drain clogged with debris resulting in a slower draining process.



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

Table D.15 provides field visit information collected for all structures located 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.

Table D.15. Region 5 Field Visit Summary

A	SA	Address	Elevation (NAVD 88) (FT.)	On-site Contact	Foundation	Condition
5	14	7480 24TH ST.	17.2455		Slab	Average
5	14	7481 24TH ST.	17.922		Slab	Average
5	14	7485 24TH ST.	17.6427		Slab	Average
5	14	7489 24TH ST.	17.9666		Slab	Average
5	14	7493 24TH ST.	17.9146	✓	Slab	Average
5	14	7497 24TH ST.	17.9769		Slab	Average
5	14	7501 24TH ST.	17.5133		Slab	Average
5	14	2536 MATSON DR.	17.2175		Slab	Average
5	14	2352 MATSON DR.	17.3739		Slab	Average
5	14	2348 MATSON DR.	17.1415		Slab	Average
5	15	2030 20TH AVE.	21.4324		Slab	Average
5	15	2024 20TH AVE.	22		Slab	Average
5	15	2044 20TH AVE.	21.8251		Crawlspace	Average
5	15	2036 20TH AVE.	21.2717		Slab	Average
5	15	2040 20TH AVE.	21.5534		Slab	Average
5	15	4305 FREEPORT BLVD.	21.9972		Slab	Average
5	15	4301 FREEPORT BLVD.	21.8313		Slab	Average
5	15	4227 FREEPORT BLVD.	22.0666	✓	Slab	Average
5	15	4228 LOTUS AVE.	21.9853	✓	Slab	Average
5	15	2041 20TH AVE.	22.0068		Crawlspace	Average
5	16	7274 ALCEDO CIR.	18.3579		Slab	Average
5	16	7278 ALCEDO CIR.	18		Slab	Average
5	16	7282 ALCEDO CIR.	18.0525		Slab	Average
5	16	7286 ALCEDO CIR.	18.2301		Slab	Average
5	16	7290 ALCEDO CIR.	18.1318		Slab	Average
5	16	7306 WINNET WAY	18.2997		Slab	Average

5	16	7305 WINNET WAY	17.982		Slab	Average
5	17	1943 68TH AVE.	18.5045		Slab	Average
5	17	1957 68TH AVE.	18.5664	✓	Slab	Average
5	17	1971 68TH AVE.	19.0716		Slab	Average
5	17	1928 68TH AVE.	19.5324		Slab	Average
5	17	1942 68TH AVE.	19.4373		Slab	Average
5	17	1956 68TH AVE.	19.3207		Slab	Average
5	17	1970 68TH AVE.	18.8617	✓	Slab	Average
5	17	1984 68TH AVE.	18.7234		Slab	Average
5	17	1933 ONEIL WAY	19.6116		Crawlspace	Average
5	17	1949 ONEIL WAY	19.6163		Slab	Average
5	17	1965 ONEIL WAY	19.4906		Slab	Average
5	17	1981 ONEIL WAY	19.9296		Slab	Average
5	17	2001 ONEIL WAY	19.5157		Slab	Average
5	18	2000 48TH AVE.	16.6593		Crawlspace	Average
5	18	2010 48TH AVE.	15.8566		Crawlspace	Average
5	18	2020 48TH AVE.	16		Crawlspace	Average
5	18	2030 48TH AVE.	16.0595	✓	Crawlspace	Average
5	18	2040 48TH AVE.	16.6144		Crawlspace	Average
5	18	2050 48TH AVE.	16.5618		Crawlspace	Average
5	18	2060 48TH AVE.	16.8266		Crawlspace	Average
5	18	2061 48TH AVE.	16.5033		Crawlspace	Average
5	18	2051 48TH AVE	16.8231		Crawlspace	Average
5	18	2041 48TH AVE.	17.0777		Crawlspace	Average
5	18	2031 48TH AVE.	16.5716		Crawlspace	Average
5	18	2021 48TH AVE.	16.4975		Crawlspace	Average
5	18	2011 48TH AVE.	16.6779		Crawlspace	Average
5	18	2001 48TH AVE.	16.1945		Crawlspace	Average

Region 5 - Mitigation and Action Items

The following mitigation activities were considered to address the hazards found in Region 5. Table D.16 lists the considered mitigation activities and identifies appropriate mitigation activities for each repetitive loss area.

Table D.16. Region 5 Review of Alternative Approaches

Mitigation Activity	Region 5				
	Area 14	Area 15	Area 16	Area 17	Area 18
Prevention					
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
Property Protection					
Building Elevation	X		X		
Relocation					
Improvement or Installation of Private Sumps					
Sewer Backup Protection					
Floodproofing					
Flood Insurance	X	X	X	X	X
Grading	X			X	X
Sandbags	X	X	X	X	X
Elevate Utilities		X	X	X	X
Natural Resource Protection					
Natural Area Preservation					
Natural Area Restoration					
Emergency Services					
Hazard Threat Recognition	X	X	X	X	X
Hazard Warnings	X	X	X	X	X
Health & Safety Maintenance					
Structural Projects					
Floodwalls	X				
Diversions	X	X		X	X
Conveyance System Improvements (Structural)					
Detention Basin/Vault				X	X
Increased Pumping Capacity					
Pipe Improvements	X	X		X	X
Public Information					
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 D14. Region 5 Action Items

Action Item	Responsible Office	Schedule	Potential Funding
Conveyance system improvements identified in Drainage Master Plan for Basin 33	Department of Utilities, Wastewater & Stormwater Engineering Program	Long-Term	Capital Improvement Program
Conveyance system improvements identified in Drainage Master Plan for Basin 26	Department of Utilities, Wastewater & Stormwater Engineering Program	Long-Term	Capital Improvement Program
Diversion identified in Drainage Master Plan for Basin 108	Department of Utilities, Wastewater & Stormwater Engineering Program	Long-Term	Capital Improvement Program
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
Sandbagging	Department of Utilities, Operations & Maintenance; Property Owner	During Flood Event	Department Funding
Grading or diversion to redirect the flow of stormwater to drainage system	Property Owner	Dependent of property owner interest	Private Funding
Construction of a floodwall	Property Owner	Dependent of property owner interest	Private Funding or Grants
Elevate utilities that are at or below grade	Property Owner	Dependent of property owner interest	Private Funding
Provide neighborhoods with storm/flood ready information - include emergency alert information	Department of Utilities, Floodplain Management	Annual	Department Funding
Conveyance system improvements identified in Drainage Master Plan for Basin 22	Department of Utilities, Wastewater & Stormwater Engineering Program	Long-Term	Capital Improvement Program

Conveyance system improvements identified in Drainage Master Plan for Basin 108	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
Enforcement of floodplain management regulations	Department of Utilities, Floodplain Management	Ongoing	Department Funding
Promotion of flood insurance	Department of Utilities, Floodplain Management	Ongoing	Department Funding
Hazard threat recognition system	Department of Utilities	Ongoing	Department Funding
Hazard warnings	Department of Utilities; Emergency Services; Public Information Office	During Flood Event	Department Funding
Flood/Map information hotline	Department of Utilities, Floodplain Management	Ongoing	Department Funding
Technical Assistance Visits	Department of Utilities, Floodplain Management	Ongoing	Department Funding

Repetitive Loss Area Analysis Summary

The City of Sacramento is highly vulnerable to localized flooding. The City local drainage system services approximately 100 square miles and is handled by a combination of gravity and lift stations which a total of approximately some 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 rain storms 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 ½" 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 that are recommended within this report include increased outreach on hazard awareness and warning. Additional efforts in repetitive loss area to insure 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.



Field Visit Notes

Field visits were conducted for all 18 identified repetitive loss areas. During the field visits, staff collected general information and spoke with residents about flooding issues experienced in their neighborhood. Figure D.7 are the notes taken during the field visits.

Figure D.7. Field Visit Notes

A	SA	Address	Deliv.	Spoke to Owner	Foundation	Condition	Notes
1	1	3485 BINGHAMPTON DR., SACRAMENTO, CA 95834	✓		SLAB ✓		
1	1	3491 BINGHAMPTON DR., SACRAMENTO, CA 95834	✓		SLAB ✓		
1	1	3497 BINGHAMPTON DR., SACRAMENTO, CA 95834	✓		SLAB ✓		
1	1	3503 BINGHAMPTON DR., SACRAMENTO, CA 95834	✓		SLAB ✓		
1	1	3509 BINGHAMPTON DR., SACRAMENTO, CA 95834	✓		SLAB ✓		
1	1	3515 BINGHAMPTON DR., SACRAMENTO, CA 95834	✓		SLAB ✓		
1	1	3521 BINGHAMPTON DR., SACRAMENTO, CA 95834	✓		SLAB ✓		
1	1	3527 BINGHAMPTON DR., SACRAMENTO, CA 95834	✓		SLAB ✓		
1	2	1320 OAK NOB WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1330 OAK NOB WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1340 OAK NOB WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1350 OAK NOB WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1360 OAK NOB WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1370 OAK NOB WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1380 OAK NOB WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1390 OAK NOB WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1400 OAK NOB WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1410 OAK NOB WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1420 OAK NOB WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1430 OAK NOB WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1440 OAK NOB WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1450 OAK NOB WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1431 WOODSIDE GLEN WAY, SACRAMENTO, CA 95833	NO	✓	SLAB ✓		Did not exp flooding - elderly
1	2	1423 WOODSIDE GLEN WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1415 WOODSIDE GLEN WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1407 WOODSIDE GLEN WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1399 WOODSIDE GLEN WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1391 WOODSIDE GLEN WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1383 WOODSIDE GLEN WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1375 WOODSIDE GLEN WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1367 WOODSIDE GLEN WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		
1	2	1359 WOODSIDE GLEN WAY, SACRAMENTO, CA 95833	✓		SLAB ✓		

1	2	1351 WOODSIDE GLEN WAY, SACRAMENTO, CA 95833	✓	✗	SLAB ✓		
1	2	1343 WOODSIDE GLEN WAY, SACRAMENTO, CA 95833	✓	✗	SLAB ✓		
1	2	1335 WOODSIDE GLEN WAY, SACRAMENTO, CA 95833	✓	✗	SLAB ✓		not a slab
1	3	1331 GARDEN HWY, SACRAMENTO, CA 95833	✓	yes ↓	SLAB elevated on columns 1st floor	experiential floor	
1	3	1321 GARDEN HWY, SACRAMENTO, CA 95833	✓	↓	SLAB		
1	3	1383 GARDEN HWY #200, SACRAMENTO, CA 95833	mail		ELEV. SLAB ON SUPPORTS		
2	4	6661 ELVAS AVE., SACRAMENTO, CA 95819	✓		SLAB ✓		
2	4	6667 ELVAS AVE., SACRAMENTO, CA 95819	✓		SLAB ✓		
2	4	6801 ELVAS AVE., SACRAMENTO, CA 95819	✓		SLAB ✓		
2	4	6601 ELVAS AVE., SACRAMENTO, CA 95819	✓		SLAB ✓		
2	5	421 45TH ST., SACRAMENTO, CA 95819	✓		CRAWLSPACE ✓		
2	5	411 45TH ST., SACRAMENTO, CA 95819	✓		CRAWLSPACE ✓		
2	5	4508 D ST., SACRAMENTO, CA 95819	✓		CRAWLSPACE ✓		
2	5	410 45TH ST., SACRAMENTO, CA 95819	✓			↓	
2	5	300 45TH ST., SACRAMENTO, CA 95819	✓		Crawl space		
2	5	450 MC ST., SACRAMENTO, CA 95819	✓		Crawl space		
2	5	420 45TH ST., SACRAMENTO, CA 95819	✓		Crawl space		retaining wall B st.
2	5	4467 D ST., SACRAMENTO, CA 95819	✓		Crawl space		
2	5	4501 D ST., SACRAMENTO, CA 95819	✓		Crawl space		
2	6	3300 PARK WAY, SACRAMENTO, CA 95816	✓		SLAB crawl	is a slab	
2	6	577 33RD ST., SACRAMENTO, CA 95816	✓		SLAB spaces		
2	6	570 34TH ST., SACRAMENTO, CA 95816	✓		SLAB (all)		
2	6	576 34TH ST., SACRAMENTO, CA 95816	✓		SLAB		
2	6	569 34TH ST., SACRAMENTO, CA 95816	✓		SLAB		
2	6	577 34TH ST., SACRAMENTO, CA 95816	✓		SLAB		
2	6	568 35TH ST., SACRAMENTO, CA 95816	✓		SLAB		
2	6	576 35TH ST., SACRAMENTO, CA 95816	✓		SLAB		
2	6	569 35TH ST., SACRAMENTO, CA 95816	✓		SLAB slab		SA
2	6	577 35TH ST., SACRAMENTO, CA 95816	✓		SLAB		
2	6	551 35TH ST., SACRAMENTO, CA 95816	✓		SLAB		
2	6	568 SANTA YNEZ WAY, SACRAMENTO, CA 95816	✓		SLAB		
2	6	548 SANTA YNEZ WAY, SACRAMENTO, CA 95816	✓		SLAB		

run by same Group

MAIL #17

3	7	2222 X ST., SACRAMENTO, CA 95818	.		SLAB		
3	7	2400 23RD ST., SACRAMENTO, CA 95818	.				Elevated HVAC
3	7	2406 23RD ST., SACRAMENTO, CA 95818	.				Units
3	7	2300 X ST., SACRAMENTO, CA 95818			CRAWLSPACE	←	
3	7	2405 23RD ST., SACRAMENTO, CA 95818			CRAWLSPACE	✓	Basement
3	7	2409 23RD ST., SACRAMENTO, CA 95818			CRAWLSPACE	✓	Parking lot
3	7	2415 23RD ST., SACRAMENTO, CA 95818			CRAWLSPACE	✓	Parking lot
3	8	2601 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	all homes in the area are on crawlspaces Do not understand why flooding occurs. Could be clogged drains during a heavy storm due to leaves from trees (all of area 8)
3	8	2607 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2613 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2619 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2625 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2631 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2637 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2643 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2649 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2655 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2661 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2667 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2673 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2679 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2685 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2691 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2697 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2600 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2610 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2616 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2622 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2628 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2634 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2640 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2646 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	
3	8	2652 14TH ST., SACRAMENTO, CA 95818	N		CRAWLSPACE	✓	
3	8	2658 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE	✓	

3	8	2664 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE ✓		
3	8	2670 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE ✓		
3	8	2676 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE ✓		
3	8	2682 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE ✓		
3	8	2688 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE ✓		
3	8	2694 14TH ST., SACRAMENTO, CA 95818	✓		CRAWLSPACE ✓		
3	9	2730 N ST., SACRAMENTO, CA 95816			SLAB		
3	9	2720 CAPITOL AVE., SACRAMENTO, CA 95816			Parking Garage		
3	9	1404 28TH ST., SACRAMENTO, CA 95816			Slab		
3	9	1408 28TH ST., SACRAMENTO, CA 95816			slab - parking lot		
3	9	1401 28TH ST., SACRAMENTO, CA 95816			Slab		
3	10	530 Q ST., SACRAMENTO, CA 95811			SLAB		
3	10	600 1 ST., SACRAMENTO, CA 95811			SLAB		
3	10	520 P ST., SACRAMENTO, CA 95811			SLAB		
3	10	512 Q ST., SACRAMENTO, CA 95811			SLAB		
3	11	1201 K ST., SACRAMENTO, CA 95814			SLAB		appears to be on
3	11	1131 K ST., SACRAMENTO, CA 95814			SLAB		elevator slab
3	11	1130 K ST., SACRAMENTO, CA 95814			SLAB		Multi story
3	11	1205 K ST., SACRAMENTO, CA 95814			SLAB		Complex
3	11	1209 K ST., SACRAMENTO, CA 95814			SLAB		
4	12	5501 PRISCILLA LN., SACRAMENTO, CA 95820	✓		SLAB		
4	12	5521 PRISCILLA LN., SACRAMENTO, CA 95820	✓		SLAB		
4	12	5539 PRISCILLA LN., SACRAMENTO, CA 95820	✓	✓	SLAB		Spoke to owner - said
4	12	5551 PRISCILLA LN., SACRAMENTO, CA 95820	✓		SLAB		Drains out side his home
4	12	5571 PRISCILLA LN., SACRAMENTO, CA 95820	✓		SLAB		are always clogging
4	12	5500 PRISCILLA LN., SACRAMENTO, CA 95820	✓		SLAB		constant cleaning.
4	12	5520 PRISCILLA LN., SACRAMENTO, CA 95820	✓		SLAB		
4	12	5538 PRISCILLA LN., SACRAMENTO, CA 95820	✓		SLAB		
4	12	5550 PRISCILLA LN., SACRAMENTO, CA 95820	✓		SLAB		
4	12	5570 PRISCILLA LN., SACRAMENTO, CA 95820	✓		SLAB		
4	12	5570 BRADFORD DR., SACRAMENTO, CA 95820	✓		SLAB		
4	12	5550 BRADFORD DR., SACRAMENTO, CA 95820	✓		SLAB		
4	12	5571 STANDISH RD., SACRAMENTO, CA 95820	✓		SLAB		
4	12	5551 STANDISH RD., SACRAMENTO, CA 95820	✓		SLAB		

A	SA	Address	Deliv.	Spoke to Owner	Foundation	Condition	Notes
4	13	5747 66TH ST., SACRAMENTO, CA 95824	✓		Crawlspace		
4	13	5749 66TH ST., SACRAMENTO, CA 95824	✓				
4	13	5811 66TH ST., SACRAMENTO, CA 95824	✓				
4	13	6631 37TH AVE., SACRAMENTO, CA 95824	✓		Slab		
4	13	6701 37TH AVE., SACRAMENTO, CA 95824	✓		Slab		
4	13	6711 37TH AVE., SACRAMENTO, CA 95824	X		Slab		
4	13	6721 37TH AVE., SACRAMENTO, CA 95824	X		Slab		
4	13	6731 37TH AVE., SACRAMENTO, CA 95824	X		Slab		
4	13	6801 37TH AVE., SACRAMENTO, CA 95824	X		Slab		
4	13	6811 37TH AVE., SACRAMENTO, CA 95824	✓		Slab		
4	13	6821 37TH AVE., SACRAMENTO, CA 95824	✓		Slab		
4	13	6831 37TH AVE., SACRAMENTO, CA 95824	✓		Slab	↓	
5	14	7480 24TH ST., SACRAMENTO, CA 95822	✓		Slab	✓	
5	14	7481 24TH ST., SACRAMENTO, CA 95822	✓		Slab	✓	
5	14	7485 24TH ST., SACRAMENTO, CA 95822	✓		Slab	✓	
5	14	7489 24TH ST., SACRAMENTO, CA 95822	✓		Slab	✓	
5	14	7493 24TH ST., SACRAMENTO, CA 95822	✓	✓	Slab	✓	Front yard exp. Flooding
5	14	7497 24TH ST., SACRAMENTO, CA 95822	✓		Slab	✓	Ply wood on the wall - in front
5	14	7501 24TH ST., SACRAMENTO, CA 95822	✓		Slab	✓	Ground Front yard very wet
5	14	2536 MATSON DR., SACRAMENTO, CA 95822	✓		Slab	✓	Running water from backyard
5	14	2352 MATSON DR., SACRAMENTO, CA 95822	✓		Slab	✓	
5	14	2348 MATSON DR., SACRAMENTO, CA 95822	✓		Slab	✓	
5	15	2030 20TH AVE., SACRAMENTO, CA 95822	✓		slab		
5	15	2024 20TH AVE., SACRAMENTO, CA 95822	✓		slab		
5	15	2044 20TH AVE., SACRAMENTO, CA 95822	✓		crawlspace		slanted
5	15	2036 20TH AVE., SACRAMENTO, CA 95822	✓		slab		
5	15	2040 20TH AVE., SACRAMENTO, CA 95822	✓				
5	15	4305 FREEPORT BLVD., SACRAMENTO, CA 95822	✓				
5	15	4301 FREEPORT BLVD., SACRAMENTO, CA 95822	✓				
5	15	4227 FREEPORT BLVD., SACRAMENTO, CA 95822	✓	✓			elevated slab
5	15	4228 LOTUS AVE., SACRAMENTO, CA 95822	✓	✓			
5	15	2041 20TH AVE., SACRAMENTO, CA 95822	✓		Crawlspace		
5	16	7274 ALCEDO CIR., SACRAMENTO, CA 95823	✓		Slab		
5	16	7278 ALCEDO CIR., SACRAMENTO, CA 95823	✓		Slab		

Flooding may be specific to property

5	16	7282 ALCEDO CIR., SACRAMENTO, CA 95823	✓		SLAB			
5	16	7286 ALCEDO CIR., SACRAMENTO, CA 95823	✓		SLAB	✓		
5	16	7290 ALCEDO CIR., SACRAMENTO, CA 95823	✓		SLAB	✓		
5	16	7306 WINNET WAY, SACRAMENTO, CA 95823			SLAB			
5	16	7305 WINNET WAY, SACRAMENTO, CA 95823			SLAB			
5	17	1943 68TH AVE., SACRAMENTO, CA 95822	✓		SLAB	✓		
5	17	1957 68TH AVE., SACRAMENTO, CA 95822	✓	✓	SLAB	✓		
5	17	1971 68TH AVE., SACRAMENTO, CA 95822	✓		SLAB	✓		
5	17	1928 68TH AVE., SACRAMENTO, CA 95822			SLAB	✓		
5	17	1942 68TH AVE., SACRAMENTO, CA 95822			SLAB	✓		
5	17	1956 68TH AVE., SACRAMENTO, CA 95822	✓		SLAB	✓		
5	17	1970 68TH AVE., SACRAMENTO, CA 95822	✓	✓	SLAB	✓		Ponding out front
5	17	1984 68TH AVE., SACRAMENTO, CA 95822	✓		SLAB	✓		
5	17	1933 ONEIL WAY, SACRAMENTO, CA 95822	✓		SLAB	CRAWLSPACE	Good	
5	17	1949 ONEIL WAY, SACRAMENTO, CA 95822	✓		SLAB			
5	17	1965 ONEIL WAY, SACRAMENTO, CA 95822	✓		SLAB			
5	17	1981 ONEIL WAY, SACRAMENTO, CA 95822	✓		SLAB	✓		
5	17	2001 ONEIL WAY, SACRAMENTO, CA 95822	✓		SLAB	✓		elevated foundation
5	18	2000 48TH AVE., SACRAMENTO, CA 95822	✓		CRAWLSPACE	✓	GOOD	
5	18	2010 48TH AVE., SACRAMENTO, CA 95822	✓		CRAWLSPACE	✓	GOOD	
5	18	2020 48TH AVE., SACRAMENTO, CA 95822	✓		CRAWLSPACE	✓	GOOD	
5	18	2030 48TH AVE., SACRAMENTO, CA 95822	✓	✓	CRAWLSPACE	✓	GOOD	CONVERTED GARAGE FLOODED
5	18	2040 48TH AVE., SACRAMENTO, CA 95822	✓		CRAWLSPACE	✓	GOOD	
5	18	2050 48TH AVE., SACRAMENTO, CA 95822	✓		CRAWLSPACE	✓	GOOD	
5	18	2060 48TH AVE., SACRAMENTO, CA 95822	✓		CRAWLSPACE	✓	GOOD	
5	18	2061 48TH AVE., SACRAMENTO, CA 95822	✓		CRAWLSPACE	w/ vents	GOOD	
5	18	2051 48TH AVE., SACRAMENTO, CA 95822	✓		CRAWLSPACE	✓	GOOD	
5	18	2041 48TH AVE., SACRAMENTO, CA 95822	✓		CRAWLSPACE	✓	GOOD	
5	18	2031 48TH AVE., SACRAMENTO, CA 95822	✓		CRAWLSPACE	✓	GOOD	
5	18	2021 48TH AVE., SACRAMENTO, CA 95822	✓		CRAWLSPACE	✓	GOOD	CONVERTED GARAGE
5	18	2011 48TH AVE., SACRAMENTO, CA 95822	✓		CRAWLSPACE	✓	GOOD	
5	18	2001 48TH AVE., SACRAMENTO, CA 95822	✓		CRAWLSPACE	✓	GOOD	

elevated steps, Drum out front

Ponding out front

TALKED TO POST MANN AND HE SAID AREA BACKED UP DURING STORMS. ESPECIALLY THE CORNERS.

CONVERTED GARAGE FLOODED

w/ LAST STORM. CAME FROM STREET

CONVERTED GARAGE

NOT ELEV.

Flood Protection Questionnaire

As part of the field visits, questionnaires were distributed to over 200 properties in the 18 identified areas. This was completed in an effort to gather further information about past flooding within the area. This information helped the City better understand flooding patterns within the region. Of the questionnaires that were delivered, four were returned completed. The responses are shown in Figure D.8.

Figure D.8. Completed Flood Protection Questionnaires

1. How many years have you occupied the home/building at this address? 33 yrs

2. Do you rent or own this home/building? Rent Own

3. What type of foundation does the home/building have?
 Slab Crawl Space Basement Other _____

4. Has this home/building or property ever been flooded or has a water problem?
 Yes No (if "no" please complete only 10-14)

5. In what year(s) did it flood? 1986, 2004, 2012 + more (no definite records)

6. 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: Sewer overload

7. How did the water enter your home/building? basement walls & window. also floods garage.

8. How deep did the water get?
 Yard Only: 6"-2' feet Crawl Space: _____ feet
 Over First Floor: _____ feet Basement: _____ feet
 Water kept out of house by sandbagging, sewer valve, or other protective measures { sump pump.

9. What was the longest timeframe that water stayed in the house/building? _____ hours or days

10. 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 _____

11. Did any of the measures checked in item 10 work? If so, which ones? If not, do you know why they failed? Sump pump works.

12. Do you have flood insurance? Yes No

13. Are you interested in mitigating your flooding issues through grant programs and/or floodproofing actions? Yes No

14. Include any additional information and comments you may have about flooding in your area:
When water flows out of sewer, it brings TP & fecal matter all over property. Could be a serious health problem.

1. How many years have you occupied the home/building at this address? 4 months

2. Do you rent or own this home/building? Rent Own

3. What type of foundation does the home/building have?
 Slab Crawl Space Basement Other _____

4. Has this home/building or property ever been flooded or has a water problem?
 Yes No (if "no" please complete only 10-14)

5. In what year(s) did it flood? 2017

6. 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: _____

7. How did the water enter your home/building? seeping up, Backyard flooded & Entered garage

8. How deep did the water get?
 Yard Only: 5-1.00 feet Crawl Space: _____ feet
 Over First Floor: _____ feet Basement: 2 feet
 Water kept out of house by sandbagging, sewer valve, or other protective measures

9. What was the longest timeframe that water stayed in the house/building? _____ hours or 2 days

10. 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 Moved Things from garage

11. Did any of the measures checked in item 10 work? If so, which ones? If not, do you know why they failed? Sump

12. Do you have flood insurance? Yes No

13. Are you interested in mitigating your flooding issues through grant programs and/or floodproofing actions? Yes No

14. Include any additional information and comments you may have about flooding in your area:
We noticed our neighbors sump sends water to our property too. Storm drain looks too small to handle flow. Sticks from nearby sycamore trees on city property clog drain & gutter.

Please help us by completing this survey by **February 24, 2017** and returning it to:
 (916) 808-1497

1. How many years have you occupied the home/building at this address? 18

2. Do you rent or own this home/building? Rent Own

3. What type of foundation does the home/building have?
 Slab Crawl Space Basement Other _____

4. Has this home/building or property ever been flooded or has a water problem?
 Yes No (if "no" please complete only 10-14) NOT OUR HOME OR BASEMENT

5. In what year(s) did it flood? YES - OR PROPERTY + GARAGE FLOODED IN 2013

6. 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: WATER CAME OUT OTHER OF MAN HOLE COVERS

7. How did the water enter your home/building? UNDER GARAGE DOOR

8. How deep did the water get?
 Yard Only: 1 feet GARAGE Crawl Space: 1 feet
 Over First Floor: _____ feet Basement: _____ feet
 Water kept out of house by sandbagging, sewer valve, or other protective measures

9. What was the longest timeframe that water stayed in the house/building? _____ hours or 2 days

10. 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 _____

11. Did any of the measures checked in item 10 work? If so, which ones? If not, do you know why they failed? _____

12. Do you have flood insurance? Yes No

13. Are you interested in mitigating your flooding issues through grant programs and/or floodproofing actions? Yes No

14. Include any additional information and comments you may have about flooding in your area:
THERE IS NOTHING WE CAN DO AS HOMEOWNERS - FROM CITY
SEWER BACK-UP

1. How many years have you occupied the home/building at this address? 33 1/2 yrs

2. Do you rent or own this home/building? Rent Own

3. What type of foundation does the home/building have?
 Slab Crawl Space Basement Other _____

4. Has this home/building or property ever been flooded or has a water problem?
 Yes No (if "no" please complete only 10-14)

5. In what year(s) did it flood? 1986 (f), 1990, 2011, ~ 2000

6. 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: _____

7. How did the water enter your home/building? Through air vents & bed door

8. How deep did the water get?
 Yard Only: 2-3 feet Crawl Space: _____ feet
 Over First Floor: _____ feet Basement 5-6 feet
 Water kept out of house by sandbagging, sewer valve, or other protective measures

9. What was the longest timeframe that water stayed in the house/building? _____ hours or 4-5 days

10. 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 _____

11. Did any of the measures checked in item 10 work? If so, which ones? If not, do you know why they failed? Have not really had an opportunity to see.

12. Do you have flood insurance? Yes No

13. Are you interested in mitigating your flooding issues through grant programs and/or floodproofing actions? Yes No

14. Include any additional information and comments you may have about flooding in your area:
Most all of my flooding problems have been from the poor sewer & storm drain issues of the City of Sacramento. So far, the city has never taken responsibility for this problem. Therefore, flood insurance is a terrible expensive for me!

D.2 Annual Outreach Project

As a part of the repetitive loss outreach process, individual letters are mailed annually to all properties within the repetitive loss areas. In addition to the 21 repetitive loss properties an additional 184 properties receive the letter in Figure D.9 as well as the brochure listed in Figure D.10. This brings the total number of letters and brochures sent to property owners to 205.

Figure D.9. Sample Outreach Project



September 15, 2016

«FIRST»«LAST»
«MAIL_ADDRE»
«MAIL_CITY», «MAIL_STATE» «MAIL_ZIP»

Dear Property Owner:

Based on a list compiled by the Federal Emergency Management Agency (FEMA), your property at «STREET_NBR» «STREET_NAM», SACRAMENTO, CA («GIS_APN») has been identified in a flood prone area that has been flooded more than once. Our community is concerned about repetitive flooding and has an active program to help you protect yourself and your property from future flooding, but there are several things you can do.

For your information, 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.** Please contact your insurance agent for more information on rates and coverage.

Flood Insurance Rate Maps (FIRMs) are available online at www.msc.fema.gov. Hard copies of maps are available for review at the Department of Utilities, Engineering Services Division, 1395 35th Avenue, Sacramento, CA 95822.

You can check with the City's Floodplain Management Section on the extent of past flooding in your area. City staff can tell you about the causes of repetitive flooding, what the City is doing about it, and what would be an appropriate flood protection level. The staff can visit your property to discuss flood protection alternatives.

Consider some permanent flood protection measures:

- Check your building for water entry points. These can be protected with low walls or temporary shields.
- Install a floor drain plug, standpipe, overhead sewer, or sewer backup valve to prevent sewer backup flooding.
- Consider elevating your house above flood levels.
- Consider flood insurance for your property. Visit www.floodsmart.gov for more information.
- More information can be found at FEMA's website, www.ready.gov/floods or www.sacramentoready.org.
- If you are interested in elevating or floodproofing your building above the flood level, you may be able to apply for a Federal grant to cover the majority of the cost.

We would like to hear from you in regards to flooding in your area. If you know of past flooding or a problem area within your neighborhood, please contact us at (916) 808-5061 and provide this valuable information. In the case of active flooding, please contact 311.

For on-site visits, grant information, or general flood information, please contact Kelly Sherfey at (916) 808-5061 or ksherfey@cityofsacramento.org.

City of Sacramento Department of Utilities
916-808-1400
1395 35th Avenue
Sacramento, CA 95822



SIGN UP FOR EMERGENCY ALERTS
WWW.SACRAMENTO-ALERT.ORG

Figure D.10. Sample Brochure

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 25 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 one-in-100 chance of becoming flooded. But all homes, in and out of the SFHA, are subject to floods, which have a higher percentage of occurring in any given year.

Important Numbers
Floodplain Information Line- (916) 808-5061
www.cityofsacramento.org/FloodReady

To obtain general floodplain information, structural retrofit and permit information, or if you need a site visit for flooding and/or drainage problems, please 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 2 business days.

National Flood Insurance Program Referral Center
(888) 379-9531 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.

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


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 808-4H2O (808-4426) or visit www.sacramentostormwater.org.

BE FLOOD READY

Protect yourself today and tomorrow- a guide for Sacramento residents


City of
SACRAMENTO
Department of Utilities

101691

 Printed on recycled paper

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

CALL 311 (916) 264-5011
我們講中文 • Hablamos español
MEO THONGPHOU THOU PHOU THOU • ພວກເຮົາເວົ້າພາສາລາວ
Peb hais lus Hmoob • Chúng tôi nói tiếng Việt



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 homeowner and renter 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). Renters can purchase flood insurance to cover their possessions. Residents outside the SFHA may qualify to purchase a Preferred-Risk Policy (PRP) that provides the same coverage as standard flood insurance but at a discounted rate. Additionally, because the City participates in the National Flood Insurance Program and its Community Rating System (CRS), residents who do not qualify for a PRP and live within the Sacramento City limits are eligible to receive flood insurance coverage at a discounted rate.

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 (888) 379-9531 to get your policy before the winter rains.

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 hydrologic information gathered by various co-operators 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 report from river and creek levels and rainfall gauges online at www.cdec.water.ca.gov. With it, we can receive advanced warning of impending high water levels.

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.

- **Everbridge Call to Your Home**
Sacramento Emergency Communications Personnel may use Everbridge to alert you via email or on your home or cell phone 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.SacramentoAlert.org
- **Listen for Sirens.** In the case of an emergency, police and fire 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, if you hear sirens, 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/make-a-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. 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 maybe 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.
8. Consider improvements to your property, such as grading or correcting drainage problems that will help keep water away from your structure.
9. Keep areas open between homes, property lines, and levees.

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 drainage and 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 (916) 808-5061, and a City representative will return your call within 2 business days. Floodplain maps and filed elevation certificates can be viewed at the City of Sacramento Department of Utilities, 1395 35th Ave.

Get a permit before you start construction. Remember, all floodplain development and redevelopment, including grading, building and retrofitting, require 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. Technical assistance for retrofitting homes and additional information can be obtained from the Floodplain Information Line at (916) 808-5061.

APPENDIX E

PROCEDURES FOR FLOOD RESPONSE PROJECTS

Public notification during an emergency is critical and plays a significant role in public safety. The following materials have been developed in advance to allow for quick implemented during and after a flood event. This document outlines the procedures for the duplication and dissemination of this information.

References to the City of Sacramento’s 2005 Emergency Operations Plan (EOP) have been added to allow the user to find context and details related to the broader emergency response plan.

Flood Response Projects

PPI Project Number*	Lead Organization	Project	Subject Matter	Frequency
FRP 1.	Primary: Public Information Officer and City Manager Secondary: Community Development Department and Depart of Utilities	Media Release (TV and Radio and Newspapers)	Various flood-related topics (Turn around, evacuation, sandbags, Substantial Damage, etc.)	During and after a flood event – Media Releases will be distributed when critical information develops, street closures, disruption in utilities, flood warning stage, flood stage, evacuation notice, and danger stage, all clear notice
FRP 2.	Emergency Operations Center and Public Information Officer	Everbridge/Emergency Broadcast System	Use Everbridge and EBS to notify residents of information during a flood	During a flood event – alerts will be sent if there is a threat to public safety, flood warning stage, flood stage, and danger stage, and evacuation notice
FRP 3.	Primary: Public Information Officer and Neighborhood Services Secondary: Community Development Department and Depart of Utilities	Media Release and Posts for Social Media (Facebook, Twitter, Next Door, and others)	Various flood-related topics (Turn around, evacuation, sandbags, Substantial Damage, etc.)	During and after a flood event – Same frequency and traditional media release, plus correction of misinformation, and flood recovery information
FRP 4.	Department of Utilities, Operations & Maintenance, Water Quality Lab	Drinking Water Quality Incident Response	Prevent consumption of contaminated water after a flood. Outreach materials drafted, translated and delivered to warehouse.	During and after a flood event, if needed – if water has been compromised – voluntary boil or mandatory boil alerts
FRP 5..	Department of Utilities, Operations & Maintenance, Wastewater Management	Combined Sewer System Warning Signs	Signage posted after flood to prevent people from entering potentially contaminated water	During and after a Combined Sewer System flood event (including street flooding events)
FRP 6.	Primary: Police Secondary: Code Enforcement, Building Department, and Department of Utilities	After flood event handouts when in the field	Re-entry safety, permit & reconstruction requirements, flood protection methods	Upon re-entry of flooded areas
FRP 7.	Neighborhood Services and Department of Utilities	Handouts on flood insurance claim information and grant funding opportunities	Provide information to residents and business on how to file a flood insurance claim and what grant funding opportunities may be available for recovery	After a flood event

*The PPI Project Number corresponds with the Program of Public Information located in the 2016 Comprehensive Flood Management Plan.

Dissemination Procedures and Draft Documents

FRP 1. Media Release

The City's media releases will be coordinate through the Emergency Operations Center or Joint Information Center. The primary individual responsible for this activity is the Public Information Officer. The City Manager reviews all media releases.

Media Releases

The Public Information Officer will draft each media release with critical incident information. The City Manager will approve all media releases. Media releases are distributed by the Public Information Officer to the media through the AP wire and local news agencies. Media releases are also posted on the city's website and social media networks.

 EOP, Annex A, Attachment 4-A, Page A-47

Media Hot Line

The Media Hot Line is used by the Fire and Police Departments to make the media aware of an incident. The Fire, Police or Utilities Department PIO, or the lead PIO at the Joint Information Center, is responsible to supply messages to the Media Hot Line. The PIOs have access to place messages on the hotline.

Media Release

FOR IMMEDIATE RELEASE:

City of Sacramento

Street Address

City, CA Zip

Date & Time _____

Contact: 916.264.5011

SACRAMENTO -- Mayor *NAME* has issued an Executive Order to declare a City emergency in response to rising flood waters. The declaration activates the City's Emergency Operations Center to coordinate response among City departments and services, along with outside partner agencies, such as the Sacramento Area Flood Control Agency, Reclamation District 1000, the Red Cross, Salvation Army, and the United Way. It also allows the City to request state resources and reimbursement, as necessary.

The *NAME* River levels are expected to quickly crest by *DATE* to *##* feet. City crews have closed *##* flood gates along the *NAME* River and have begun a 24-hour watch along both the *NAME* River and the *NAME* to monitor and quickly act upon signs of distress, such as boils.

The City's Department of Utilities will begin a sandbagging operation to fortify parts of the *NAME* River levees between *STREET LOCATION*.

City drivers also should be aware that while flooding can occur on any street, *STREET NAME* will remain closed until flood waters recede.

The Sacramento City Fire Department's Swift Water Rescue Team, which operates *##* boats, has been deployed for rescue missions. Emergency responders remind drivers to both slow down and "turn around, don't drown."

Residents should always call 911 for emergencies, but are encouraged to use 311 for non-emergencies. Report City service needs, such as street light and signal outages, downed trees, or flooded roads, to the 311 Call Center at [311](#).

###

FRP 2. Everbridge & Emergency Broadcast System Alerts

The City of Sacramento's EOP provides detailed steps to activate emergency broadcast systems during an emergency.

Emergency Alert System

The City Manager, Fire Chief or Police Chief have authority to activate the Emergency Alert System (EAS), and must supply the message through the PIO. The details of EAS activation are in the City EOP, and also reside with the EOC or Joint Information Center PIO.

 EOP, Annex A, Attachment 4-B, Page A-55

The Emergency Alert System should only be activated in extreme emergencies by the authorized individuals. In the Sacramento Regions, the following broadcast companies are part of the EAS.

Primary Radio Station: KFBK, 1530 AM

Secondary Radio Station: KEDR, 88.1 FM

Primary Television Station: KCRA, Channel 3

Cable Television System

The emergency override shall be used only as often as is necessary to communicate emergency instructions and information by the duly authorized individuals of the constituent jurisdictions of the Sacramento Metropolitan Cable Television Commission. The purpose of the cable television emergency override shall be to provide lifesaving instructions and information.

Using either the specially designated tough-tone telephone at the City Communication Center, or at the County Emergency Operations Center, the emergency override will be activated by dialing Sacramento Cable's Television (SCT) head end override line.

 EOP, Annex A, Attachment 4-B, Page A-57

Emergency Use of Local Government Channel 28

The individuals authorized to activate the systemwide emergency override are also authorized, in their sole discretion to assume programming control of Channel 28 before, during, and after an emergency for the purposes of providing information to cable viewers.

Access via Metrocable 28 Staff: The authorized individual shall contact the Commission staff at 440-6661 to access Channel 28.

Direct Access via SCT: To access Channel 28 in the event that Commission staff are unavailable, the respective authorized persons must contact the SCT Director of Engineering or Headend Engineer at 927-2225, identify themselves, and arrange physical access to the Headend at 13th and N Street (13th Floor of Park Place).

 EOP, Annex A, Attachment 4-B, Page A-58

Everbridge/Emergency Broadcast Alerts – General Template

FOR IMMEDIATE RELEASE:

City of Sacramento

Street Address

City, CA Zip

Date & Time _____

Contact: _____

FROM WHO: _____

WHAT: _____ has occurred at

WHERE: _____ (specific location) at

WHEN: _____ am / pm today.

EVACUATIONS in the _____ (be specific) area are underway.

RED CROSS SHELTERS are located at _____

WHAT SHOULD PEOPLE DO?

Residents are asked to _____

Include information about:

Avoid the areas/intersections of _____. Remain vigilant, prepared to leave _____

Be prepared to move animals to _____. Animal shelters are located at: _____

FOR MORE INFORMATION:

o Listen to Emergency Radio

o Monitor Local TV stations

o Call the Emergency Public Information Number 916.264.5011 or 311

o Go online to City of Sacramento Web site, www.cityofsacramento.org


OTHER IMPORTANT INFORMATION:

ASSISTING FIRE AGENCIES include:

- City of Sacramento Fire
- California Dept. of Forestry
- Sacramento County Fire
- Other

ASSISTING AGENCIES include:

- City Police
- Sacramento County Sheriff
- CA Highway Patrol
- Other

 Additional Samples: EOP, Annex A, Attachment 4-D, Page A-62

Everbridge/Emergency Broadcast Alert – Winter Storm

HAZARD SPECIFIC EMERGENCY BROADCAST FORMAT WINTER STORM - NWS WINTER STORM WARNING

The U.S. Weather Service has issued a winter storm warning for _____ City of Sacramento during the hours of _____ to _____. The City of Sacramento Emergency Operations Center urges you to be cautious and avoid unnecessary driving.

Be aware that the grounds are saturated, which means a heavy rainstorm could cause localized street flooding. Do not drive through flood waters. Turn around, don't drown.

You are advised to watch the water level of creeks and other drainages in your neighborhood if you live in an area, which has a history of winter flooding.

Windy conditions can cause downed trees and broken power lines.

Please stay tuned to this station or other local stations for emergency information updates. Do not call 9-1-1 except to report an emergency situation.

You can receive more information by monitoring this local radio or television station, by visiting the City of Sacramento website at www.cityofsacramento.org, or by call 311.

 EOP, Annex A, Attachment 4-D, Page A-71

FRP 3. Media Releases and Posts for Social Media

Social media is an effective way to communicate quickly with many residents and business owners. The main social media networks that are utilized by the City are Facebook, Twitter, and Next Door. The messages developed for these selected networks can also be used for other social media mediums. The City's Public Information Officer and the Department of Utilities' Public Information Officer will coordinate the release of information.

Typically, media releases are distributed through the City's social media networks. This document provides supplemental informational posts that provides pertinent life safety and flood protection information.

Posts for Flood Stage

Facebook and Next Door

Do you know the difference between a Flood Stage and Danger Stage? A Danger Stage means "Take Action Now!" because flooding is imminent or already occurring. If advised to evacuate, do so immediately. Flood Stage means "Be Prepared" because flooding is possible within your area.

[<Link to DWR Stages>](#) #FloodSafety

Twitter

Learn the difference between a Flood Stage and Danger Stage.

[<Link to DWR Stages>](#) #FloodSafety



**Flood Stage means
be prepared:
Flooding is possible**

-  Check for forecast updates
-  Prepare to move to higher ground
-  Stay weather ready

weather.gov/flood 

Posts for Danger Stage

Facebook and Next Door

Do you know the difference between a Danger Stage and Flood Stage? Danger Stage means “Take Action Now!” because flooding is imminent or already occurring. If advised to evacuate, do so immediately. Flood Stage means “Be Prepared” because flooding is possible within your area.

<[Link to DWR](#)> #FloodSafety

Twitter

Learn the difference between a Danger Stage and Flood Stage.

<[Link to DWR](#)> #FloodSafety



Danger Stage means take action!
Flooding is expected

- Move to higher ground immediately
- Use extra caution if driving
- Check forecast updates
- Stay weather ready

Photo credit: USGS weather.gov/flood 

Post for Evacuation Notice

Mandatory evacuations have been ordered for _____. Evacuations recommended for _____, but are not mandatory. Tune to local news station and radio. <Add link to city website with details and evac locations.>

Posts for Street Flooding

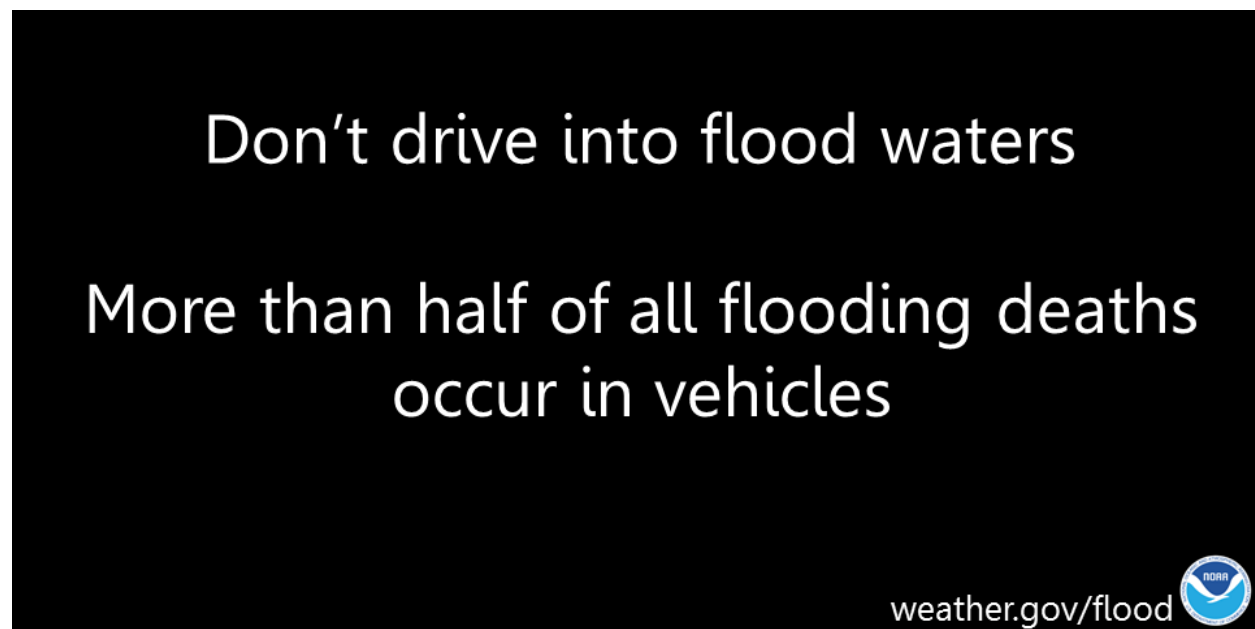
Facebook and Next Door

Road closures at _____. Driving into floodwaters could be the last decision you ever make. Turn Around Don't Drown! <http://youtu.be/el6mllHKrVY> #FloodSafety

Twitter

Driving into floodwaters could be the last decision you ever make. Turn Around Don't Drown!
<http://youtu.be/el6mllHKrVY> #FloodSafety

Link to video: <https://www.weather.gov/wrn/spring2017-flood-sm>



Posts for After a Flood Event

- Watch your step! #Flood waters often hide sharp and dangerous debris like broken glass and metal! #FloodSafety
- Wear the appropriate protective clothing and gear like boots, gloves and safety glasses when it comes to moving debris! #FloodSafety
- Hands off! Stay away from electrical utility equipment after a storm or if it is wet to prevent being electrocuted! #FloodSafety
- Flooded homes are hazards! Get a professional to check for loose wires, mold and hidden damage before re-entering! #FloodSafety
- Avoid walking in floodwater. It can be contaminated with oil, gasoline, or sewage. #FloodSafety
- Use generators or other gas powered machinery only outdoors and away from windows. #FloodSafety

FRP 4. Drinking Water Quality Incident Response

Once the determination has been made that the City's drinking water has been compromised, the City's PIO or the Department of Utilities' PIO will issue a media release informing the community of a voluntary or mandatory water boil advisory. Alerts will also be sent to the impacted area via the Everbridge system. The city's website will provide more information and a map of the impacted areas.

Media Release – Water Boil Advisory

CITY ISSUES VOLUNTARY WATER BOIL ADVISORY FOR _____
THE CITY WILL NOTIFY THE COMMUNITY WHEN THE ADVISORY IS LIFTED
DATE

A voluntary water boil advisory has been issued for _____, in the City water system.

The advisory was issued due to presence of _____ during a routine weekly water sampling in _____. We are not aware of any health issues. The City is advising customers to use boiled tap water for drinking and cooking purposes as a safety precaution.

Bring all water to a boil, let it boil for one (1) minute, and let it cool before using. Boiled water should be used for drinking and food preparation until further notice. Boiling kills bacteria and other organisms in the water.

The advisory is a precautionary measure and recommends that residents in the affected area voluntarily boil their water for at least one minute before consuming it until the advisory is lifted. The advisory pertains only to water used for consumption. Again, the advisory is only a precautionary measure. This is a boil advisory, not a boil order.

The city will notify the community when the advisory is lifted.

For more information call 3-1-1 or [916-264-5011](tel:916-264-5011).

Contact (Media inquiries only): NAME, Public Information Officer, [PHONE](tel:PHONE)

###

Water Boil Advisory Information Website Page

VOLUNTARY BOIL WATER ADVISORY FAQ

WHY WAS A VOLUNTARY BOIL WATER ADVISORY ISSUED FOR MY WATER?

A voluntary boil water advisory has been issued by the City of Sacramento Department of Utilities for the _____ area (see map on web site) as a precaution to protect consumers from drinking water that may have potentially harmful bacteria present.

To ensure a safe water supply the City has been monitoring bacteria levels across the City. Repeated samples at a location in the _____ area indicated the presence of _____. A voluntary boil water advisory is being issued for this area until the cause can be investigated and remediated.

WHAT IS BEING DONE TO ADDRESS THE POTENTIAL CONTAMINATION?

Additional water samples are being taken to find and eliminate potential sources. If any sources are identified, actions such as system repairs, flushing, and adding chlorine for a short period of time will be used to fix the issue.

WHAT ARE COLIFORM BACTERIA? <EXAMPLE: CHANGE TO THREAT>

Coliforms are bacteria which are naturally present in the environment and are used as an indicator that other, potentially harmful bacteria may be present.

HOW LONG WILL THE BOIL WATER ADVISORY CONTINUE?

Public notification will be given when the voluntary boil water advisory is rescinded.

WHAT IF I HAVE ALREADY CONSUMED THE WATER?

The likelihood of becoming ill is _____. However, illness is certainly possible, especially for people that have a chronic illness or may be immunocompromised. Seek medical advice as necessary.

FRP 5. Combined Sewer System Warning Signs

The Combined Sewer System (CSS) warning signs are placed in neighborhoods that are affected by localized flooding in the CSS area. The CSS drainage system can be overwhelmed during a long duration storm which results in flooding. The Department of Utilities' wastewater maintenance crew places these signs when flooding is reported or observed during routine storm patrol. The City has 25 signs in stock.

Example of Combined Sewer System Warning Sign



Sign Text: Caution: Area may contain sewage, which can be a health hazard. Please avoid contact.

FRP 6. After Flood Handouts

The City print shop (Central Services) will prepare and print written material. Arrangements for printing will be made by the General Services Department representative in the EOC. Written notices may also be duplicated on copy machines located in the EOC.

If Central Services is damaged or unavailable, the City has a list of on-call printers available to print written materials.

 EOP, Annex A, Attachment 4-D, Page A-59

The After Flood handouts will be provide to residents and business owners re-entering an impacted area. The handouts will be printed and provided to individuals staffing the re-entry check points, most likely City Police.

These flyers will also be placed on the City website, social media feeds, and can be placed at shelters if desired.

After Flood Handouts

Getting Help

- The American Red Cross can help you by providing you with a voucher to purchase new clothing, groceries, essential medications, bedding, essential furnishings, and other items to meet emergency needs. Listen to local radio stations to find out where to go for this assistance, or look up American Red Cross in the phone book and call.
- The Red Cross can provide you with a cleanup kit: mop, broom, bucket, and cleaning supplies.
- Contact your insurance agent to discuss claims.
- Listen to your radio for information on assistance that may be provided by the state or federal government and other organizations.
- If you hire cleanup or repair contractors, be sure they are qualified to do the job. Be wary of people who drive through neighborhoods offering help in cleaning up or repairing your home. Check references.

Issued in furtherance of the International Decade for Natural Disaster Reduction.

ARC 4476
FEMA L-198
Aug. 1992

After a Flood:

The First Steps



**American
Red Cross**



Your home has been flooded. Although floodwaters may be down in some areas, many dangers still exist. Here are things to remember in the days ahead.

- Roads may be closed because they have been damaged or are covered by water. Barricades have been placed for your protection. If you come upon a barricade or a flooded road, go another way.
- Keep listening to the radio for news about what to do, where to go, or places to avoid.
- Emergency workers will be assisting people in flooded areas. You can help them by staying off the roads and out of the way.
- If you must walk or drive in areas that have been flooded —
 - Stay on firm ground. Moving water only 6 inches deep can sweep you off your feet. Standing water may be electrically charged from underground or downed power lines.
 - Flooding may have caused familiar places to change. Floodwaters often erode roads and walkways. Flood debris may hide animals and broken bottles, and it is also very slippery. Avoid walking or driving through floodwaters.
- Play it safe. Additional flooding or flash floods can occur. Listen for local warnings and information. If your car stalls in rapidly rising waters, get out immediately and climb to higher ground.

Staying Healthy

- A flood can cause emotional and physical stress. You need to look after yourself and your family as you focus on cleanup and repair.
 - Rest often and eat well.
 - Keep a manageable schedule. Make a list and do jobs one at a time.
 - Discuss your concerns with others and seek help. Contact the Red Cross for information on emotional support available in your area.

Cleaning Up and Repairing Your Home

- Turn off the electricity at the main breaker of fuse box, even if the power is off in your community. That way, you can decide when your home is dry enough to turn it back on.
- Get a copy of the book *Repairing Your Flooded Home*. It will tell you:
 - How to enter your home safely.
 - How to protect your home and belongings from further damage.
 - How to record damage to support insurance claims and requests for assistance.
 - How to check for gas or water leaks and how to have service restored.
 - How to clean up appliances, furniture, floors, and other belongings.

Repairing Your Flooded Home is available free from the American Red Cross or your state or local emergency manager.

FRP 7. Flood Insurance Claim and Grant Information

The City print shop (Central Services) will prepare and print written material. Arrangements for printing will be made by the General Services Department representative in the EOC. Written notices may also be duplicated on copy machines located in the EOC.

If Central Services is damaged or unavailable, the City has a list of on-call printers available to print needed materials.

 EOP, Annex A, Attachment 4-D, Page A-59

The handouts will be provide to residents and business owners re-entering an impacted area. The handouts will be printed and provided to individuals staffing the re-entry check points, most likely City Police.

These flyers will also be placed on the City website, social media feeds, and can be placed at shelters if desired.

Flood Insurance Claim and Grant Information Handouts

Filing Your Flood Insurance Claim

If your community has been flooded and your property or home has suffered flood damage, please follow these instructions to file your flood insurance claim.

IMMEDIATELY

- **Call your agent or insurance company.** Have the following information with you when you place your call: (1) the name of your insurance company (your agent may write policies for more than one company); (2) your policy number; and (3) a telephone number/e-mail address where you can be reached.
- **When you file your claim,** ask for an approximate time frame during which an adjuster can be expected to visit your home so you can plan accordingly.

ONCE YOU HAVE REPORTED YOUR LOSS

- **An adjuster will work with you** to calculate the value of the damage and prepare a repair estimate.
- **Please keep your agent advised if your contact information changes.** If you are still in a shelter or cannot be easily reached, please provide the name of a designated relative or point-of-contact person who can reach you.

BEFORE THE ADJUSTER ARRIVES

- **Local officials may require the disposal of damaged items.** If you dispose of items, please keep a swatch or other sample of damaged items for the adjuster.
- **Separate damaged items from undamaged items.** If necessary, place damaged items outside the home.
- **Take photographs.** Take photos of any water in the house and any damaged personal property. Your adjuster will need evidence of the damage and damaged items (e.g., cut swatches from carpeting, curtains, chairs) to prepare your repair estimate.
- **Make a list of damaged or lost items and include their age and value when possible.** If possible, have receipts for all items available for the adjuster.
- **If you have damage estimates prepared by a contractor, provide them to your** adjuster since they will be considered in the preparation of your repair estimate.
- **Contact your insurance company** if an adjuster has not been assigned to you within several days.

FOR MORE INFORMATION

For Federal Emergency Management Agency (FEMA) Disaster Assistance, call 1-800-621-3362. For general flood insurance questions, call 1-800-427-4661 or contact your insurance company or agent.





Who Is eligible to apply?

- States, territories, federally-recognized tribes, and local governments
- Certain private nonprofit organizations and institutions

Additional Grant Programs

FEMA has two additional Hazard Mitigation Assistance (HMA) grant programs which provide funding for similar activities on an annual basis, regardless of disaster activity:

- Pre-Disaster Mitigation
- Flood Mitigation Assistance

Projects may also be eligible for assistance under these programs.

Resources for More Information

For more information about HMGP, visit <https://www.fema.gov/hazard-mitigation-grant-program>



OR SCAN HERE

For specific criteria for each HMA program, visit <http://www.fema.gov/hazard-mitigation-assistance>

To find your State Hazard Mitigation Officer, visit <http://www.fema.gov/state-hazard-mitigation-officers>

To plan, prepare, and mitigate a disaster, visit <http://www.fema.gov/plan-prepare-mitigate>

Learn more about flood risks and flood insurance at <http://www.floodsmart.gov/floodsmart>

To register for disaster assistance call 1-800-621-FEMA (3362) or visit <http://www.disasterassistance.gov>

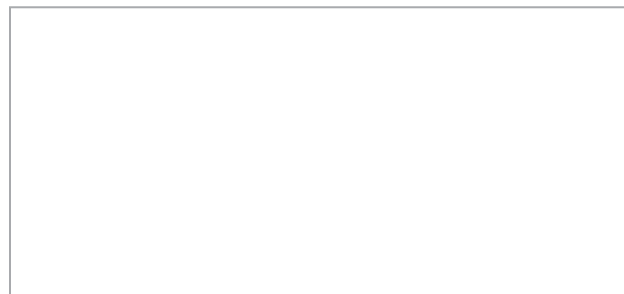
HMA Helpline: 1-866-222-3580

FEMA eGrants Helpdesk: 1-855-228-3362

Benefit-Cost Analysis Helpline:
BCHelpline@fema.dhs.gov

For HMA independent study and classroom training courses, visit <http://training.fema.gov>

For information about the HMA programs, contact your community officials.



Hazard Mitigation Grant Program



FEMA

Hazard Mitigation Grant Program (HMGP)

What is the purpose of the HMGP?

The HMGP assists States, territories, federally-recognized tribes, and local communities by:

- Significantly reducing or permanently eliminating future risk to lives and property from natural hazards
- Providing funds to implement projects in accordance with priorities identified in State, tribal, or local hazard mitigation plans
- Enabling mitigation measures to be implemented during the recovery following a major disaster declaration

How is HMGP funding determined following a major disaster?

Federal funding under the HMGP is available if requested by the Governor. HMGP funding is allocated using a “sliding scale” formula based on the percentage of funds spent on Public and Individual Assistance for each Presidentially declared disaster.

Federal law requires States, territories, federally-recognized tribes and local jurisdictions to have a mitigation plan prior to receipt of HMGP funds. The plan identifies hazards, assesses community needs, and describes a community-wide strategy for reducing risks associated with natural disasters.

For States/territories/federally-recognized tribes with a FEMA-approved Standard State or Tribal Mitigation Plan, the formula provides for up to 15% of the first \$2 billion of estimated aggregate amounts of disaster assistance, up to 10% for amounts between \$2 billion and \$10 billion, and 7.5% for amounts between \$10 billion and \$35.333 billion.

For States/territories with a FEMA-approved Enhanced Mitigation Plan, up to 20% of the total of Public and Individual Assistance funds authorized for the disaster (up to \$35.333 billion of such assistance) are available.

What types of projects can be funded?

The HMGP can be used to fund projects to protect either public or private property, as long as the project fits within State/territorial/federally-recognized tribal, and local government mitigation strategies to address areas of risk and complies with HMGP guidelines.

Eligible Activities

Mitigation Projects
Property Acquisition and Structure Demolition
Property Acquisition and Structure Relocation
Structure Elevation
Mitigation Reconstruction
Dry Floodproofing of Historic Residential Structures
Dry Floodproofing of Non-Residential Structures
Generators
Localized Flood Risk Reduction Projects
Non-Localized Flood Risk Reduction Projects
Structural Retrofitting of Existing Buildings
Non-Structural Retrofitting of Existing Buildings and Facilities
Safe Room Construction
Wind Retrofit for One- and Two-Family Residences
Infrastructure Retrofit
Soil Stabilization
Wildfire Mitigation
Post-Disaster Code Enforcement
Advance Assistance
5 Percent Initiative Projects*
Miscellaneous/Other**
Hazard Mitigation Planning
Planning-Related Activities
Management Costs

* FEMA allows increasing the 5% Initiative amount up to 10% for a Presidential major disaster declaration under HMGP. The additional 5% Initiative funding can be used for activities that promote disaster-resistant codes for all hazards. As a condition of the award, either a disaster-resistant building code must be adopted or an improved Building Code Effectiveness Grading Schedule is required.

** Miscellaneous/Other indicates that any proposed action will be evaluated on its own merit against program requirements. Eligible projects will be approved provided funding is available.

How much will FEMA pay for a project under the HMGP?

Typically projects are funded by a combination of Federal and non-Federal funds. HMGP funds may be used to pay up to 75% of the eligible costs. The non-Federal match does not need to be cash; in-kind services or materials may be used.

What are the roles of local communities, federally-recognized tribes, territories, States, and FEMA?

During the recovery phase of a disaster, local jurisdictions select projects that could reduce property damage from future disasters, and submit applications to the State, territory, or federally-recognized tribe. Certain nonprofit organizations may also apply.

The States, territories, and federally-recognized tribes administer the HMGP by establishing their mitigation priorities, facilitating the development of applications, and submitting applications to FEMA based on funding criteria and available funding. They also manage the projects, monitor progress, and evaluate the effectiveness of projects implemented.

FEMA conducts a final eligibility review to ensure compliance with Federal regulations. HMGP projects must comply with Federal environmental laws and regulations, be cost-effective, and be technically feasible.

What are the roles of property and business owners?

Individuals, property and business owners may not apply directly to the State, territory, or FEMA, but eligible local governments or private nonprofit organizations may apply on their behalf.

FEMA encourages property and business owners interested in implementing mitigation activities to contact their local community planning, emergency management, or hazard mitigation office for more information.



FEMA

The Hazard Mitigation Assistance Grant Programs



Hazard Mitigation Assistance

The Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance (HMA) programs present a critical opportunity to reduce the risk to individuals and property from natural hazards while simultaneously reducing reliance on Federal disaster funds.

A Common Goal

While the statutory origins of the programs differ, all share the common goal of reducing the loss of life and property due to natural hazards.

Funding Disaster Recovery Efforts

The Hazard Mitigation Grant Program (HMGP) may provide funds to States, territories, federally-recognized tribes, local governments, and eligible private non-profits following a Presidential major disaster declaration.

The Hazard Mitigation Grant Program (HMGP)



is authorized by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (the Stafford Act), Title 42, United States Code (U.S.C.) 5170c. The key purpose of

HMGP is to ensure that the opportunity to take critical mitigation measures to reduce the risk of loss of life and property from future disasters is not lost during the reconstruction process following a disaster. HMGP is available, when authorized under a Presidential major disaster declaration, in the areas of the State or territory requested by the Governor. The amount of HMGP funding available to the Applicant is based upon the total Federal assistance to be provided by FEMA for disaster recovery under the Presidential major disaster declaration. Federally-recognized tribal governments can submit a request for a major disaster declaration within their impacted areas.

The Pre-Disaster Mitigation (PDM)

program is authorized by Section 203 of the Stafford Act, 42 U.S.C. 5133. The PDM program is designed to assist States, territories, federally-recognized tribes, and local communities in implementing a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding from future disasters.



The Flood Mitigation Assistance (FMA)

program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended (NFIA), 42 U.S.C. 4104c, with the goal of mitigating flood damaged properties to reduce or eliminate claims under the National Flood Insurance Program (NFIP).



Additional HMA resources, including the HMA Guidance, may be accessed at <http://www.fema.gov/hazard-mitigation-assistance>



OR SCAN HERE

Program Comparisons

Available Funding

PDM and FMA funding depend on the amounts Congress appropriates each year.

HMGP funding is usually 15 percent of the amount of Federal assistance provided to a State, territory, or federally-recognized tribe following a Presidentially declared disaster.

General Requirements

All mitigation projects must be cost-effective, technically feasible and effective, and meet Environmental Planning and Historic Preservation (EHP) requirements in accordance with HMA Guidance. In addition, all mitigation activities must adhere to all relevant statutes, regulations, and requirements including other applicable Federal, State, territorial, federally-recognized tribal, and local laws, implementing regulations, and Executive Orders.

All Applicants and subapplicants must have hazard mitigation plans that meet the requirements of 44 CFR Part 201.

Cost Sharing

In general, HMA funds may be used to pay up to 75 percent of the eligible activity costs. The remaining 25 percent of eligible costs are derived from non-Federal sources.

The table below outlines the Federal and State cost share requirements.

Program Cost Share Requirements	Mitigation Activity Award (Percent of Federal/ Non-Federal Share)
HMGP	75 / 25
PDM	75 / 25
PDM (subrecipient is small impoverished community)	90 / 10
PDM (federally-recognized tribal Recipient is small impoverished community)	90 / 10
FMA (Insured properties and planning grants)	75 / 25
FMA (repetitive loss property with repetitive loss strategy)	90 / 10
FMA (severe repetitive loss property with repetitive loss strategy)	100 / 0

Eligible Applicants and Subapplicants

States, territories, and federally-recognized tribal governments are eligible HMA Applicants. Each State, territory, and federally-recognized tribal government shall designate one agency to serve as the Applicant for each HMA program. All interested subapplicants must apply to the Applicant.

Individuals and businesses may not apply directly to the State, territory, or FEMA, but eligible local governments may apply on their behalf.

The table below identifies, in general, eligible subapplicants.

Eligible Subapplicants	HMGP	PDM	FMA
State agencies	✓	✓	✓
Federally-recognized tribes	✓	✓	✓
Local governments/communities*	✓	✓	✓
Private nonprofit organizations (PNPs)	✓		

✓ = Subapplicant is eligible for program funding

* Local governments/community may include non federally-recognized tribes, or consistent with definition of local government at 44 CFR 201.2, may include any Indian tribe or authorized tribal organization, or Alaska Native village or organization that is not federally-recognized per 25 U.S.C. 479a et seq.



Eligible Activities

The table below summarizes eligible activities that may be funded by HMA programs. Detailed descriptions of these activities can be found in the HMA Guidance.

Eligible Activities	HMGP	PDM	FMA
1. Mitigation Projects	✓	✓	✓
Property Acquisition and Structure Demolition	✓	✓	✓
Property Acquisition and Structure Relocation	✓	✓	✓
Structure Elevation	✓	✓	✓
Mitigation Reconstruction	✓	✓	✓
Dry Floodproofing of Historic Residential Structures	✓	✓	✓
Dry Floodproofing of Non-Residential Structures	✓	✓	✓
Generators	✓	✓	
Localized Flood Risk Reduction Projects	✓	✓	✓
Non-Localized Flood Risk Reduction Projects	✓	✓	
Structural Retrofitting of Existing Buildings	✓	✓	✓
Non-Structural Retrofitting of Existing Buildings and Facilities	✓	✓	✓
Safe Room Construction	✓	✓	
Wind Retrofit for One- and Two-Family Residences	✓	✓	
Infrastructure Retrofit	✓	✓	✓
Soil Stabilization	✓	✓	✓
Wildfire Mitigation	✓	✓	
Post-Disaster Code Enforcement	✓		
Advance Assistance	✓		
5 Percent Initiative Projects*	✓		
Miscellaneous/Other**	✓	✓	✓
2. Hazard Mitigation Planning	✓	✓	✓
Planning-Related Activities	✓		
3. Technical Assistance			✓
4. Management Costs	✓	✓	✓

* FEMA allows increasing the 5% Initiative amount up to 10% for a Presidential major disaster declaration under HMGP. The additional 5% Initiative funding can be used for activities that promote disaster-resistant codes for all hazards. As a condition of the award, either a disaster-resistant building code must be adopted or an improved Building Code Effectiveness Grading Schedule is required.

** Miscellaneous/Other indicates that any proposed action will be evaluated on its own merit against program requirements. Eligible projects will be approved provided funding is available.

Management Costs

For HMGP only: The Recipient may request up to 4.89 percent of the HMGP allocation for management costs. The Recipient is responsible for determining the amount, if any, of funds that will be passed through to the subrecipient(s) for their management costs.

Applicants for PDM and FMA may apply for a maximum of 10 percent of the total funds requested in their award application budget (Federal and non-Federal shares) for management costs to support the project and planning subapplications included as part of their application.

Subapplicants for PDM and FMA may apply for a maximum of 5 percent of the total funds requested in a subapplication for management costs.

National Flood Insurance Program (NFIP) Participation



There are a number of ways that HMA eligibility is related to the NFIP:

Subapplicant Eligibility:

All subapplicants for FMA must be participating in the NFIP, and not be withdrawn or suspended, to be eligible to apply for grant funds. Certain political subdivisions (i.e., regional flood control districts or county governments) may apply and act as subrecipients if they are part of a community that is participating in the NFIP where the political subdivision provides zoning and building code enforcement or planning and community development professional services for that community.

Project Eligibility:

HMGP and PDM mitigation project subapplications for projects sited within a Special Flood Hazard Area (SFHA) are eligible only if the jurisdiction in which the project is located is participating in the NFIP. There is no NFIP participation requirement for HMGP and PDM project subapplications located outside of the SFHA.

Property Eligibility:

Properties included in a project subapplication for FMA funding must be NFIP-insured at the time of the application submittal. Flood insurance must be maintained for the life of the structure.

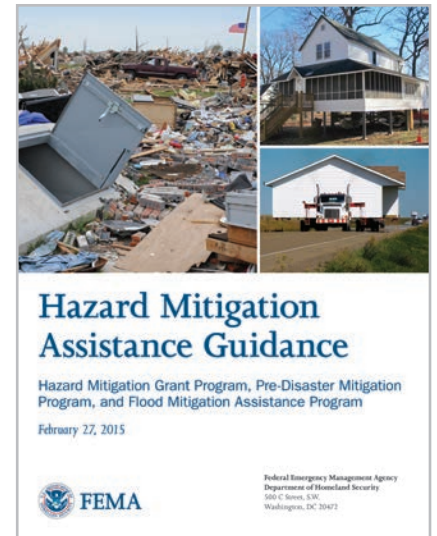
Application Process

Applications for HMGP are processed through the HMGP system (formerly known as National Emergency Management Information System [NEMIS]). Applicants use the Application Development Module of the HMGP System, which enables each Applicant to create project applications and submit them to the appropriate FEMA Region within 12 months of a disaster declaration.

Applications for PDM and FMA are processed through a web-based, electronic grants management system (eGrants), which encompasses the entire grant application process. The eGrants system allows Applicants and subapplicants to apply for and manage their mitigation grant application processes electronically. Applicants and subapplicants can access eGrants at <https://portal.fema.gov>.

FEMA Review and Selection

FEMA will review all subapplications for eligibility and completeness, cost-effectiveness, technical feasibility and effectiveness, and for EHP compliance. Subapplications that do not pass these reviews will not be considered for funding. FEMA will notify Applicants of the status of their subapplications and will work with Applicants on subapplications identified for further review.



Details about the HMA grant application process can be found in the HMA Guidance, which is available at <http://www.fema.gov/hazard-mitigation-assistance>



GovDelivery Notifications

Stay up-to-date on the HMA Programs by subscribing to GovDelivery notifications. Have updates delivered to an e-mail address or mobile device. To learn more, visit <http://www.fema.gov>

Contact Information

HMA Helpline: 866-222-3580

FEMA eGrants Helpdesk: 1-855-228-3362

Benefit-Cost Analysis Helpline: BCHelpline@fema.dhs.gov

For HMA independent study and classroom courses, visit <http://training.fema.gov>

To find your State Hazard Mitigation Office, visit <http://www.fema.gov/state-hazard-mitigation-officers>



FEMA

Translator Services

Emergency Translation Services - An emergency translation service is available through the Public Safety Communications Center. Contact the Communications Center through the Police EOC representative, by radio, or telephone: 916-264-5721.

Other Translation Services:

- Language Line: 1-800-874-9426
- Contact Red Cross: 916-368-3111
- Info Line Sacramento: 916-498-1000
- Sacramento County Human Assistance Department: 916-978-2170

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