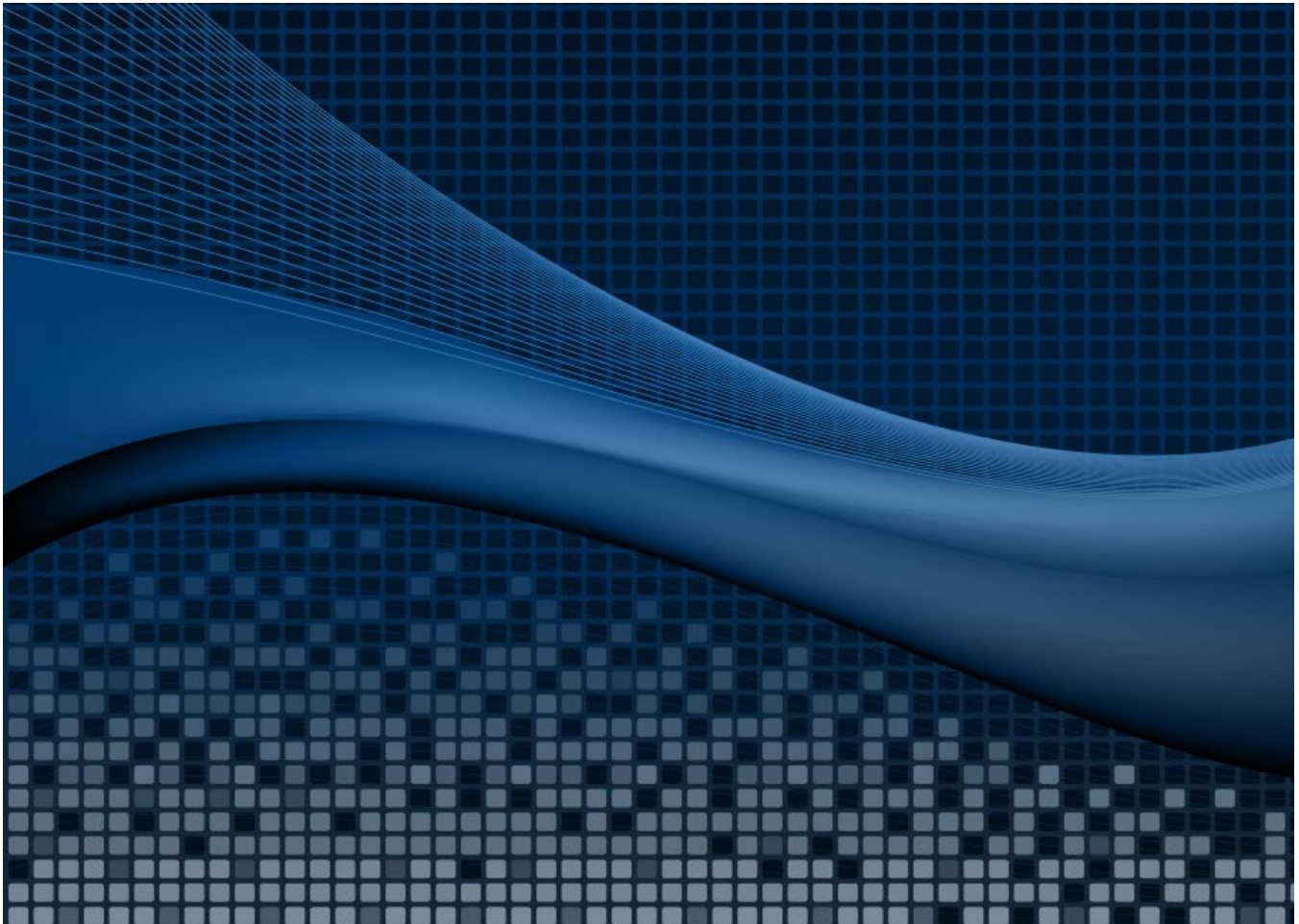




Los Angeles County

Comprehensive Floodplain Management Plan

Repetitive Loss Area Analysis



July 2021

Los Angeles County Repetitive Loss Area Analysis

July 2021

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Los Angeles County Repetitive Loss Area Analysis

PART 1—PLANNING PROCESS AND PROJECT BACKGROUND

1. INTRODUCTION

1.1 REPETITIVE LOSS PROPERTIES AND THE COMMUNITY RATING SYSTEM

A repetitive loss property is defined by the Federal Emergency Management Agency (FEMA) as a property for which two or more National Flood Insurance Program (NFIP) losses of at least \$1,000 each have been paid within any 10-year rolling period since 1978 (FEMA 2017). From 1978 through 2017, about a quarter of all claims paid under the NFIP nationwide were for repetitive loss properties, even though such properties make up fewer than 2 percent of all NFIP insurance policies (FEMA 2017).

FEMA's Community Rating System (CRS) encourages communities to identify and mitigate the causes of repetitive losses. The first step is to map repetitive loss areas, which are contiguous areas that include one or more properties on FEMA's list of repetitive loss properties and all nearby properties with exposure to the same or similar flooding conditions. FEMA considers listed repetitive loss properties to be indicative of an overall repetitive loss problem that may affect other nearby properties. Designation of repetitive loss areas around listed repetitive loss properties allows an evaluation of actual or potential flooding problems at properties that may not have flood insurance or may have had only a single previous claim. This ensures that all properties with the same exposure to a flood risk are addressed equally. The CRS, which provides reduced flood insurance premiums for communities that carry out flood mitigation activities, requires the following from participating communities with 50 or more repetitive loss properties (Category C communities):

- Prepare a map of repetitive loss areas.
- Review and describe each area's repetitive loss problem.
- Prepare a list of the addresses of all properties in the repetitive loss areas with insurable buildings, which are defined to include the following (FEMA 2017):
 - A structure that is affixed to a permanent site and has two or more outside rigid walls and a fully secured roof
 - A manufactured home (also known as a mobile home) built on a permanent chassis, transported to its site in one or more sections, and affixed to a permanent foundation
 - A travel trailer without wheels, built on a chassis and affixed to a permanent foundation, that is regulated under the community's floodplain management and building ordinances or laws.
- Undertake an annual outreach project to those addresses.
- Prepare a floodplain management plan or area analysis for the repetitive loss areas.

1.2 LOS ANGELES COUNTY REPETITIVE LOSS AREA ANALYSIS

Los Angeles County had 54 FEMA-designated repetitive loss properties in its unincorporated areas as of September 2018 (the dataset the County used for this analysis), including four that FEMA has approved as being mitigated (see Table 1-1). The 50 remaining unmitigated properties have been mapped into 24 repetitive loss areas, and an analysis has been conducted for each area.

Table 1-1. Naming and Numbering of Los Angeles County Repetitive Loss Properties and Areas

Repetitive Loss Area Name	Repetitive Loss Properties in the Repetitive Loss Area	
	Los Angeles County 2015 RL Map Number	FEMA RL #
Agua Dulce	37	0091339
Altadena A	35	0056933
Altadena B	36	0091348
Calabasas A	26	0072498
Calabasas B	41	0136718
Cold Creek A	27	0071255
Cold Creek B	45	0148768
Del Sur	55	0138781
Lower Topanga Canyon	19	0014900
	20	0017941
	21	0017942
	22	0028440
	23	0017940
Malibou Lake	46	0046576
	46	0001165
	46	0039962
	46	0028487
	46	0040087
	46	0012820
	46	0049496
	46	0028444
	46	0071413
	46	0073653
	46	0072406
	46	0071417
	46	0035727
	46	0052974
	46	0093872
	46	0057971
Malibu	28	0070079
Quartz Hill A	38	0057385
Quartz Hill B	39	0091087
Quartz Hill C	40	0131222
Roosevelt	42	0137354
Rowland Heights	44	0138651
Topanga Canyon A	30	0028394
Topanga Canyon B	34	0012818
Topanga Canyon C	48	0111971
Topanga Canyon D	49	0137970
Topanga Canyon E	50	0138321
Triunfo Canyon A	24	0095737
Triunfo Canyon B	43	0137793

Repetitive Loss Area Name	Repetitive Loss Properties in the Repetitive Loss Area	
	Los Angeles County 2015 RL Map Number	FEMA RL #
Upper Topanga Canyon	29	0074656
	31	0074334
	32	0074553
	33	0076269
	47	0074498
Mitigated and Approved by FEMA	46	0014896
	46	0017933
	53	0028337
	54	0049465

FEMA prescribes the following five-step process for conducting an area analysis:

- Step 1—Advise all the property owners in the repetitive flood loss area that the analysis will be conducted and request their input on the flood hazard and recommended actions.
- Step 2—Contact agencies or organizations that may have plans that could affect the cause or impacts of the flooding.
- Step 3—Collect data on the analysis area and each building in it to determine the causes of the repetitive damage and mitigation measures that would be appropriate.
- Step 4—Review alternative mitigation approaches and determine whether any property protection measures or drainage improvements are feasible.
- Step 5—Document the findings in a report.

This Repetitive Loss Area Analysis (RLAA) documents the fulfillment of the CRS requirements for Category C communities, following the five-step area-analysis process. As required under Step 5, it provides the following information:

- A summary of the process followed (Chapters 2 and 3)
- Problem statements with maps for each area (Chapters 7 – 30)
- A table of basic information about each building in the area (Chapters 7 – 30)
- A description of alternative approaches considered to address the problem (Chapter 6)
- A set of recommended action items to address the problem (Chapters 7 – 30).

Individual properties and structures are counted and described in this document, but specific address information is withheld under the federal Privacy Act of 1974. A separate document on file with Los Angeles County for internal use only correlates the property ID numbers presented here with specific address information.

1.3 NUMBERING AND NOMENCLATURE

In designating federally recognized repetitive loss properties, FEMA assigns a seven-digit repetitive loss number (RL #) to each property, using a nationally defined numbering system. The previous Los Angeles County RLAA (from 2015) assigned new sequential numbering to each property, referred to in that document as RL Map numbers. Based on geographic distribution, repetitive loss areas were defined for the current RLAA that include one or more repetitive loss properties. Areas were designated with a place name indicating the general location of the area. Table 1-1 summarizes area naming used in this analysis, the FEMA numbering of repetitive loss properties in each area, and the corresponding map number from the 2015 RLAA.

2. REPETITIVE LOSS AREA ANALYSIS METHODOLOGY

2.1 BASIC REQUIREMENTS

There are two key sets of requirements to be met for a repetitive loss area analysis (RLAA):

- **Repetitive loss area mapping** requirements contained in Section 503 of the CRS Coordinator’s Manual and in the supplemental publication, *Mapping Repetitive Loss Areas* (FEMA 2015).
- **Building data collection** requirements contained in Section 512.b of the CRS Coordinator’s Manual (FEMA 2017):
 - Visit each building in the repetitive loss area and collect basic data.
 - Collect data during the site visit that is sufficient to make a preliminary determination of the cause of the repetitive flooding and of mitigation measures that would be appropriate to address the problem. This usually includes a review of drainage patterns around the building, the condition of the structure, and the condition and type of foundation.
 - The person conducting the visit should not have to enter the property—adequate information should be collected from observations from the street.
 - Floor elevations or historical flood levels are not required, but can be helpful if available.
 - The date of each building’s insurance claim can help identify the cause of flooding (e.g., rainfall or overbank flooding). The amount of the claim can help determine the amount of damage. Every year, each repetitive loss community is provided with a list of its historical insurance claims. This includes single-claim properties. Non-repetitive-loss communities that elect to do an RLAA may request these data from the CRS program.

More information on building data can be found in *Selecting Appropriate Mitigation Measures for Floodprone Structures* (FEMA-551).

2.2 REVERSE DAMAGE FUNCTION METHODOLOGY (INITIAL IDENTIFICATION)

2.2.1 Rationale for Alternative Approach

For the Los Angeles County RLAA, building data collection requirements were met using an alternative to the approach outlined in the CRS Coordinator’s Manual. The RLAA planning team selected the alternative approach—a “reverse damage function” methodology—for initial identification of repetitive loss areas for the following reasons:

- Los Angeles County used the September 2018 repetitive loss data that it received from the Insurance Services Office (ISO) for this RLAA.
- A Level 2, user-defined flood model using FEMA’s Hazus hazard-evaluation software (version 4.2) was constructed in 2019 to support the development of the *2020 Los Angeles County Comprehensive*

Floodplain Management Plan. The model was possible due to the quality of Los Angeles County Assessor data available to the planning team. The County Assessor data provided key building attributes to model flood risk, such as date of construction, foundation type, occupancy class, square footage and permit history. The detailed model data allowed the use of the selected alternative approach.

2.2.2 Description of Selected Approach

The selected reverse damage function approach used available data and capabilities to prepare the RLAA. The alternative approach achieves the same objectives as the approach prescribed in the 2017 CRS Coordinator’s Manual (Section 512b), while providing the County a better protocol for maintaining data in the future to identify properties in a defined repetitive loss area and determine the cause of repetitive flooding.

The reverse damage function approach is a quantitative process based on modeling principles rather than the qualitative process outlined in the 2017 CRS Coordinator’s Manual. It uses an existing model to apply the principles of the “depth-damage function,” which is the cornerstone of risk assessment in FEMA’s Hazus and Benefit-Cost Analysis programs. Both of these programs estimate damage using curves that show the percentage of asset value that will be damaged as a function of the depth of floodwaters. These depth-damage curves are well-established as a basis for estimating losses caused by flooding.

The reverse damage function methodology uses known values of damage from a flood event, based on filed claims, to estimate what the floodwater depth was for that event. The following protocol was followed:

- Each repetitive loss property from the ISO 2018 data set was mapped in GIS to look for possible groupings based on proximity. The GIS mapping was based on the LiDAR-generated digital elevation model used to prepare the *2020 Los Angeles County Comprehensive Floodplain Management Plan*. This digital elevation model has a 3-foot resolution.
- The average loss for each repetitive-loss property was determined by taking the average of all claims for that property.
- Replacement cost for each structure was calculated by applying the size and construction class for each repetitive-loss property to the construction-cost-per-square-foot tables in *2015 BNi Home Builder’s Costbook* (Building News International, 2015).
- The percent damage “X” was calculated as:

$$X = Z \div Y$$

where:

X is the percent damage (to be determined)

Y is the replacement cost of the structure (based on assessor information)

Z is the estimated loss (based on the flood insurance claim)

- Once the percent damage was determined, the corresponding flood depth was determined by looking at the U.S. Army Corps of Engineers 2003 *Generic Depth-Damage Relationships for Residential Structures* (see Appendix A). These damage functions represent projected flood depths above the top of the finished floor.
- The determined flood depth was applied to the repetitive loss structure. Using the foundation type from the Assessor’s data, the depth was added to the top of the finished floor. For a structure with a slab foundation, the top of the finished floor was set at 8 inches above adjacent grade. For a structure with a crawlspace foundation, the finished floor was set at 24 inches above adjacent grade. These parameters are based on standard building practices. None of the repetitive-loss properties were shown to have basements, according to the Assessor’s data.
- Once the depth was applied to the finished floor, it was extended across the digital elevation model until it ran to zero depth (high ground) and a boundary was delineated. These boundaries were projected north,

south, east and west for each property. In areas with multiple repetitive-loss properties, the property with the highest depth above finished floor was used for this exercise.

- The boundary for each repetitive loss area was intersected with an ortho-photo and parcel boundary map. Each parcel with a structure within the delineated boundary was determined to be a property potentially subjected to repetitive flooding and was added to a repetitive loss area list for Los Angeles County. These additional properties are not FEMA-recognized repetitive-loss properties.
- Property condition assessments included in existing Los Angeles County Assessor's data were used for this RLAA.

Utilizing this methodology, 24 repetitive loss areas were delineated. Maps and descriptions of the causes of flooding for each area can be found in Chapters 7 to 30.

The final step was to determine the cause of flooding, giving consideration to the following findings from the initial identification:

- Only the 50 unmitigated repetitive loss properties were included in the analysis.
- 26 of 50 properties (52 percent) are located in a FEMA-designated 1 percent annual chance (100-year) flood zone.
- 4 of 50 properties (8 percent) are located in a FEMA-designated 0.2 percent annual chance (500-year) flood zone.
- The average number of claims per property was 4.
- The average claim paid, adjusted to 2019 dollars (BLS, 2020), was \$23,315. The highest average claim per property was \$116,165 and the lowest was \$2,169.
- The average replacement cost for the repetitive-loss properties was \$329,907.
- The average percent-damage (the average recorded claim divided by the replacement cost) was 6.2 percent.
- This correlated to an average flood depth of less than 1 foot above adjacent grade.

The planning team concluded that the majority of the repetitive losses are associated with localized urban drainage flood problems, even for properties within a FEMA-designated flood zone. There is no record of costly loss events that would indicate the maximum flood risk reflected in FEMA mapping. These findings were validated by the conclusions of the *2020 Los Angeles County Comprehensive Floodplain Management Plan*.

2.3 SECONDARY IDENTIFICATION

Once the initial identification of the repetitive loss areas was completed using the reverse-damage-function methodology, the planning team performed a secondary review of each repetitive loss area based on three questions about each area:

- Is there really a repetitive loss problem in this area, based on local knowledge?
- Does the list of properties make sense based on what we know about the area?
- Does the County have any additional qualifying data on the area to justify adding or removing properties?

Adjustments were made after applying these questions to each repetitive loss area. Based on the analysis and Steering Committee feedback, there are 199 properties in repetitive loss areas, with 330 insurable structures. The list of properties became the final repetitive loss area mailing list for the unincorporated areas of Los Angeles County.

2.4 PROPERTY CONDITION ASSESSMENT

To assess the condition of the structures in the repetitive loss areas, the planning team relied on the Quality Class value in the Los Angeles County Assessor's data. That value identifies the condition of the building relative to the following characteristics:

- Construction Type
 - Class A: Fireproof construction – structural steel frame
 - Class B: Fireproof construction – reinforced concrete frame
 - Class C: Fire-resistant construction – masonry walls, combustible roof and interior
 - Class D: Non-fireproof construction – usually wood frame
 - Class S: Specialized buildings that do not fit in any of the above categories
- Quality Range (1.0 to 14.5 or “X”)
 - The quality class concept is a function of all construction features, depending on quality of materials, construction methods, and workmanship. It considers specifications for foundation, structure, roof, floor, interior, exterior, heat, and bathrooms. 1.0 = lowest quality.
 - “X” Quality: Unique or unusual construction that does not lend itself to being classified using the standard classification system.
- Shape Class (A, B, C, D)
 - The shape class is based on the building's perimeter in relation to the total square footage.
 - A structure with a relatively large perimeter in relation to its square footage (many angles, turns, a ‘cut-up’ custom shape, etc.) typically costs more to construct than a simple square/rectangle structure.
 - Shape A represents a relatively-square/rectangle structure. It has a relatively small perimeter compared to its total square footage.
 - Shape D represents a structure with many angles, turns, etc. (a “cut-up” custom shape). It has a relatively-large perimeter compared to its total square footage.
 - A structure with a “DX” Construction Type and Quality Range will usually not have a Shape Class.

2.5 FOUNDATION TYPE

In Los Angeles County, there are generally three types of foundations (see Figure 2-1):

- A basement foundation has its floor below grade on all sides. Walls may be poured concrete or blocks.
- A slab foundation is usually concrete poured directly onto the ground. This type of foundation uses concrete rather than wood to help support the weight of the home.
- A crawlspace, or raised foundation, is built above the ground, with just enough room to crawl underneath. There are stem walls on the perimeters, pierced in-between, with a girder system and floor joists on top of that. The foundation is high enough to leave at least 2 feet below to crawl into for access to the home's mechanical systems.

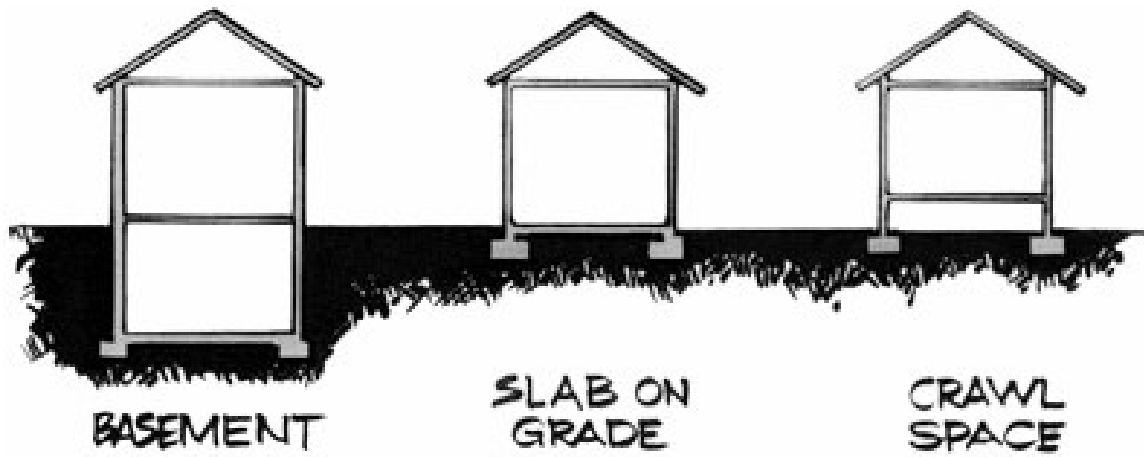


Figure 2-1. Foundation Types

3. REPETITIVE LOSS AREAS OUTREACH

3.1 CRS OUTREACH REQUIREMENTS FOR RLAA

RLAA Step 1 (2017 CRS Coordinator’s Manual Section 512.b) requires notification that an analysis is being conducted to all properties in the repetitive loss areas, with a request for input on the hazard and recommended actions. The notice (or any public document) must not identify which properties are on FEMA’s repetitive loss list. There are no restrictions on publicizing what properties are in repetitive loss areas that have more than one property and there are no restrictions on publishing aggregate data, such as how many properties received claims or the average value of those claims. Floodplain management staff in the Stormwater Engineering Division may share insurance claim information with the owner of a property but may not make it available to anyone else.

- The notice can be sent to owners OR residents, at the community’s discretion, as long as a representative of each property is notified.
- The notice cannot be done via a newspaper or newsletter notice or article.
- The notice must advise the recipients when and how copies of the draft report can be obtained and ask for their comments on the draft.

Several methods were deployed to engage repetitive loss area property owners during the course of this RLAA process. This chapter highlights those efforts.

RLAA Step 2 requires contact with agencies or organizations that may have plans or studies that could affect the cause or impacts of the flooding. The analysis report must identify contacted agencies and organizations.

3.2 COUNTYWIDE FLOODPLAIN MANAGEMENT PLANNING EFFORT

This Repetitive Loss Area Analysis is considered by Los Angeles County Public Works to be the companion document to the *2020 Los Angeles County Comprehensive Floodplain Management Plan* (FMP). The two plans were created in concert, with oversight by the same planning team. The development of this RLAA benefited from the planning process conducted to develop the FMP. The outreach effort used to develop the FMP included properties in the repetitive loss areas and provided a tangible benefit to the RLAA effort. This section provides an overview of the outreach conducted for the FMP.

3.2.1 Contact with Agencies and Organizations

The following agencies were invited to participate in the planning process from the beginning and were kept apprised of plan development milestones:

Steering Committee

- Altadena Town Council
- Antelope Valley Resident
- Cal State Los Angeles Geosciences & Environment
- California Department of Water Resources
- City of Los Angeles Bureau of Engineering
- County of Los Angeles Fire Department
- Environmental Restoration Group
- Los Angeles Chamber of Commerce
- Los Angeles County Department of Regional Planning
- Malibou Lake Mountain Club
- Public Works Building & Safety
- Public Works Community Government Relations Group
- Public Works Disaster Services Group
- Public Works Stormwater Engineering - CRS Coordinator
- Public Works Stormwater Engineering – Hydrology & Hydraulics
- Public Works Stormwater Maintenance
- Public Works Stormwater Planning
- Red Cross of Greater Los Angeles

Other Stakeholders

- Acton Town Council
- Ana Verde Hills Town Council
- Antelope Acres Town Council
- Association of Rural Town Councils
- California Office of Emergency Services
- Castaic Town Council
- City of Agoura Hills
- City of Arcadia
- City of Bradbury
- City of Calabasas
- City of Claremont
- City of Compton
- City of Glendale
- City of Glendora
- City of Hidden Hills
- City of La Canada Flintridge
- City of La Verne
- City of Lancaster
- City of Long Beach
- City of Malibu
- City of Monrovia
- City of Palmdale
- City of Pasadena
- City of San Dimas
- City of Santa Clarita
- City of Sierra Madre
- City of Westlake Village
- County of Los Angeles Chief Executive Office, Office of Emergency Management
- Crescenta Valley Town Council
- Fairmont Town Council
- FEMA Region IX
- Green Valley Town Council
- Insurance Services Office (ISO)-ISO/CRS Specialist
- Juniper Hills Town Council
- Kern County
- Lake Los Angeles Town Council
- Lakes Town Council
- Leona Valley Town Council
- Littlerock Town Council
- Los Angeles County Community Emergency Response Team
- Orange County Public Works
- Oso Town Council
- Quartz Hill Town Council
- Roosevelt Town Council
- San Bernardino County Flood Control District
- San Gabriel Council of Governments
- Southern California Association of Governments
- Sun Village Town Council
- Three Points-Liebre Mountain Town Council
- U.S. Army Corps of Engineers, Los Angeles District
- Ventura County Watershed Protection District

These agencies received meeting announcements, meeting agendas, and meeting minutes by email throughout the FMP development process, which also informed the RLAA development. All public meetings, such as the Steering Committee meetings and Open Houses, provided accommodations compliant with the Americans with Disabilities Act and Title IV.

3.2.2 Strategy

The strategy for involving the public in developing the RLAA emphasized the following elements:

- Include members of the public on the FMP Steering Committee (see Section 3.2.1).
- Attempt to reach as many citizens as possible using multiple media.
- Use a survey to determine public perception of flood risk and support of mitigation actions.
- Identify and involve stakeholders
- Develop a Program for Public Information.
- Conduct public meetings to invite the public’s input.

Website

At the beginning of the development of the current plan, an FMP page was developed on Los Angeles County Public Work’s website to keep the public informed about planning activities and to solicit input (see Figure 3-1). The site’s address (<https://www.dpw.lacounty.gov/WMD/NFIP/FMP2020/>) was publicized in all social media releases, mailings and public meetings. The site provided the public with information on the plan development process, the Steering Committee, a project survey, and drafts of the plan. Los Angeles County Public Works will keep the website active after the plan’s completion to keep the public informed about mitigation projects and future plan updates. The website was advertised to the public via social media (see Figure 3-2 and Figure 3-3)

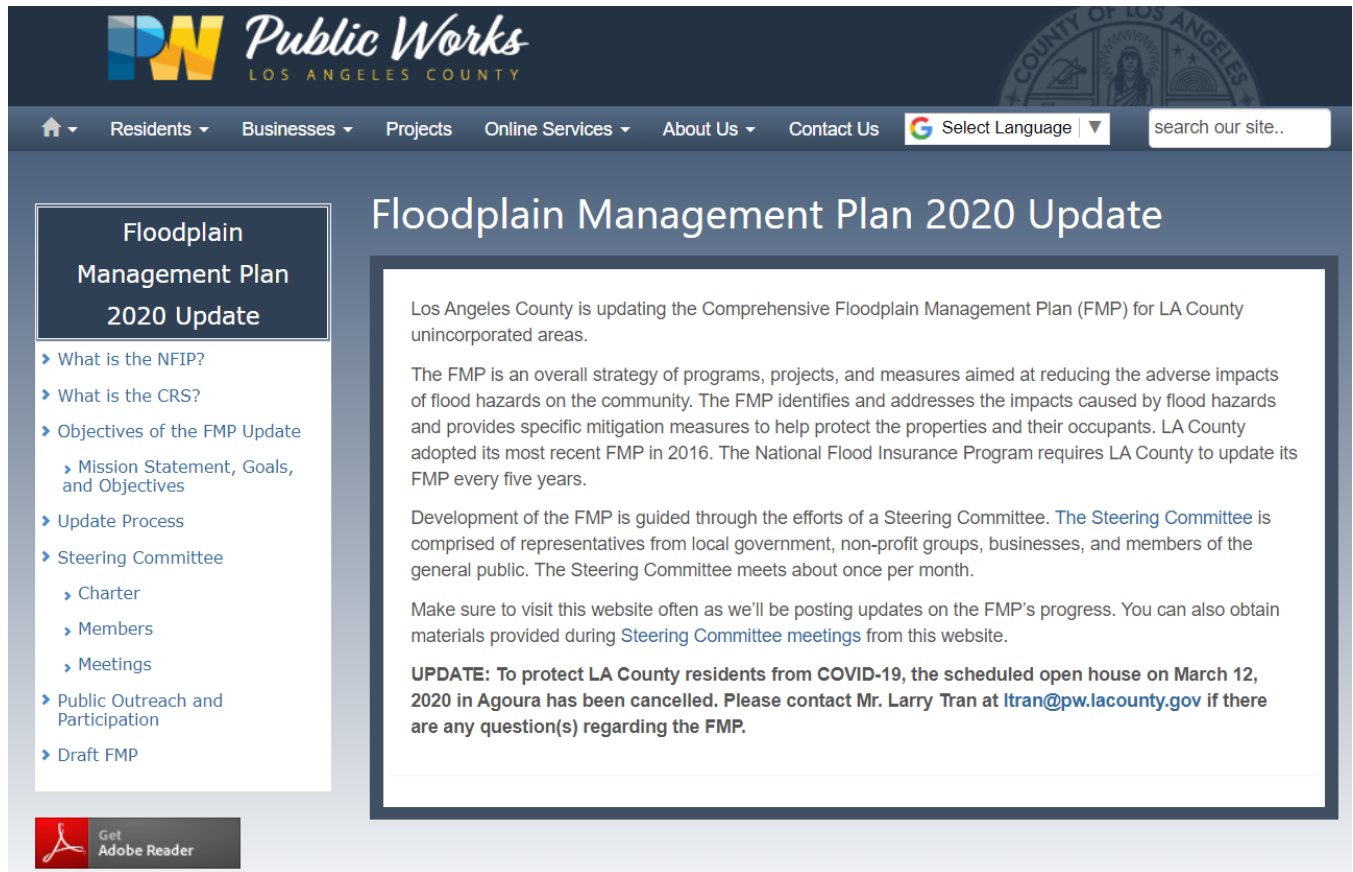


Figure 3-1. Sample Page from Floodplain Management Plan Web Site



Figure 3-2. Twitter Post



Figure 3-3. Facebook Post

Survey

A survey (see Figure 3-4) was developed by the planning team with guidance from the Steering Committee. The survey was used to gauge household preparedness for the flood hazard and the level of knowledge of tools and techniques that assist in reducing risk and loss from flooding. This survey was designed to help identify areas vulnerable to floods. The answers to its questions helped guide the Steering Committee in affirming the goals and objectives identified during the planning process and in selecting mitigation actions.

Multiple methods were used to solicit survey responses:

- A web-based version of the survey was made available on the plan website.
- Mailings to residents and property owners notifying them of public meetings included links to the online survey (see Figure 3-5).
- All attendees at public meetings were asked to complete a survey, using the web site or hard copies of the survey form available at the meetings.
- A flyer was prepared advertising the survey.
- E-mail was sent from Public Works to several town councils.
- Individual Steering Committee members contacted organizations to request that they publicize the link to the online survey.

Open House Public Meetings

Meaningful public participation was essential for the planning process. Public meetings were held to disseminate information and to solicit input from community members, as summarized in Table 3-1.

Table 3-1. Floodplain Management Plan Open House Public Meetings

When	Where
October 7, 2019, 5:30 to 8:00 p.m.	Agoura: Malibou Lake Mountain Club 29033 Lake Vista Drive, Agoura, CA 91301
March 11, 2020, 6:00 PM to 8:00 p.m.	Antelope Valley: Lancaster Library 601 West Lancaster Boulevard, Lancaster, CA 93534



Los Angeles County 2020 Floodplain Management Plan Update
Flood Preparedness Questionnaire

1. Flood Hazard Preparedness

FLOOD PREPAREDNESS QUESTIONNAIRE

Los Angeles County is seeking input from community members regarding flood hazard preparedness. The responses provided to this questionnaire will assist Los Angeles County to update its 2020 Floodplain Management Plan (FMP). The FMP is updated every five years to ensure unincorporated communities receive adequate resources and services in the event of a flood hazard.

This brief survey will take no longer than 15 minutes to complete. Thank you for your contribution to this important process.

Please Note: Responses to questions that are *"italicized"* are highly encouraged.

1. *Do you live or own a business in a known floodplain or an area that has been subject to flooding?*

- Yes
- No
- Not Sure

Please describe any experiences you have had with flooding at your current residence:

Figure 3-4. Sample Page from Survey Distributed to the Public

ARE YOU PREPARED FOR A FLOOD?


Please take a survey to help LA County reduce flood risks!

Los Angeles County has begun to update the 2020 Floodplain Management Plan (FMP) for the unincorporated areas of LA County. Collecting survey data on your experiences with flooding and your perception of flood risks is a vital component of the FMP update process. By participating in this survey you will help improve the management of floodplains and reduce potential flood risk to communities and properties!

The survey includes questions regarding:

- Perception of flood risks in LA County.
- Experience with flooding in your home and in your community.
- Dissemination of flood risk and disaster-related information.

Scan the QR code for the survey:



Or visit:
surveymonkey.com/r/LAC_FloodRisk

For more information: Call the LA County Flood Zone Hotline at (626) 458-4321

Thank you for participating!






Figure 3-5. Post Card Mailing Advertising the Survey

Another open house was scheduled for March 12, 2020, but it was cancelled due to the COVID-19 pandemic. Instead, Los Angeles County had a narrated presentation posted on the FMP website. The presentation encouraged viewers to provide input to Public Works.

Open House Meeting Notification

Multiple means were used to provide broad public notice of the open house public meetings:

- Notice of all public meetings was posted on the floodplain management plan website.
- Flyers were developed and distributed throughout the communities (see Figure 3-6).
- Social media (Facebook, Twitter, Nextdoor) posts were also made.

Postcards were mailed to properties located in floodplains near the meeting locations (see Figure 3-7). Over the course of the planning process, 2,472 postcards were distributed.

Los Angeles County Floodplain Management Plan Open House

Los Angeles County is updating its Floodplain Management Plan. Officials from LA County, Malibu Lake Community Emergency Response Team and Malibu Lake Fire Safe Council will discuss flood and emergency preparedness. LA County will provide **FREE** one-on-one consultations specialized for your property.

Date and Time
Monday, October 7, 2019
5:30 p.m. - 8 p.m.

Location
Malibu Lake Mountain Club House
29033 Lake Vista Dr. Agoura, CA 91301







Figure 3-6. Flyer Announcing Phase 1 Open Hose for the Floodplain Management Plan

Los Angeles County Floodplain Management Plan Update Open House

Los Angeles County is hosting an open house to discuss the draft comprehensive Floodplain Management Plan. The draft Plan addresses the following:

- Identifies flood-related hazards
- Explains potential effects to structures and residents
- Explores possible preventative measures
- Specifies how flood awareness outreach will be conducted

Join #LACounty for a chance to review and comment on the draft Plan from March 9 to March 31, 2020. The draft Plan will be available at:

pw.lacounty.gov/wmd/NFIP/FMP2020/DraftFMP





Wednesday, March 11, 2020 | 6 p.m. – 8 p.m. | Lancaster Public Library
601 W. Lancaster Blvd. Lancaster, CA 93534

Figure 3-7. Postcard Announcing Phase 2 Open House for the Floodplain Management Plan

Open House Meeting Format

The public meeting (open house) format allowed attendees to examine maps and handouts and have direct conversations with project staff. Reasons for planning and information generated for the risk assessment were shared with attendees via a PowerPoint presentation. Computer mapping workstations loaded with output from the Hazus modeling allowed attendees to see information on their property, including exposure and damage estimates for flood hazard events (see Figure 3-8). Participating property owners were provided printouts of this information for their properties. This tool was effective in illustrating flood risk to the public. Planning team members were present to answer questions. All open house attendees were asked to complete a survey, and each was given an opportunity to provide written comments to the Steering Committee. Example meeting activities are shown in Figure 3-9 and Figure 3-10.

3.2.3 Public Involvement Results

Survey Results

The City of Los Angeles was facilitating an update to its Comprehensive Flood Hazard Management Plan concurrent with the County's floodplain management plan update, and the City and County were active stakeholder participants in each other's efforts. Both planning efforts used surveys, and the two surveys were similar in the questions asked.

The number of survey responses for both planning efforts was considered to be insufficient for analysis: the County received 76 responses and the City received 174. The City and County decided to combine their survey results to provide an enhanced view of the public's perception of the flood risk. This was a reasonable choice, given the similarities in flooding issues in the two jurisdictions. Residents of the County work and recreate in the City as residents of the City work and recreate in the County. Key results are as follows:

- Nearly half of respondents said their home or business is not located in a floodplain or area subject to flooding; 24 percent said it is; 27 percent said they are not sure.
- Nearly two-thirds of respondents said they do not have flood insurance; just over 20 percent said they do; 9 percent said they are not sure.
- The main reasons given by those without flood insurance for not having it are that they do not need it because their property has never flooded (28 percent), that they do not need it because their property is on high ground (25 percent) or that they did not know about it (17 percent).
- Two-thirds of respondents said that the presence of a flood hazard at their current home was not disclosed to them by a real estate agent, seller, or landlord. More than half said such disclosure would have influenced their decision to buy or rent a home.
- The following flood hazards were identified as greatest issues of concern based on a scale of 1 (not concerned) to 5 (extremely concerned):
 - Stormwater flooding/urban flooding/drainage issues (weighted score of 2.86)
 - Climate change impacts (weighted score of 2.81)
 - Post-fire mud/debris flow (weighted score of 2.62)
 - Infrastructure failure (pipes, tanks) (weighted score of 2.49)
 - Mud-flow hazards (weighted score of 2.49)
 - Coastal Flooding (weighted score of 2.14)
 - Groundwater flooding (weighted score of 2.14)
- Slightly more than half of respondents said they are at least adequately prepared for a flood event; 29 percent indicated feeling not at all prepared.

Hazard Report

APN [REDACTED]
Address [REDACTED]
Zip Code 90221
100-yr Flood Percent Building Damage
100-yr Flood Building Loss
100-yr Flood Percent Contents Damage
100-yr Flood Contents Loss
100-yr Flood Depth (ft)
500-yr Flood Percent Building Damage 7.29
500-yr Flood Building Loss \$299,343.04
500-yr Flood Percent Contents Damage 24.40
500-yr Flood Contents Loss \$1,001,801.53
500-yr Flood Depth (ft) 2.76
10-yr Flood Percent Building Damage
10-yr Flood Building Loss
10-yr Flood Percent Contents Damage
10-yr Flood Contents Loss
10-yr Flood Depth (ft)
50-yr Flood Percent Building Damage
50-yr Flood Building Loss
50-yr Flood Percent Contents Damage
50-yr Flood Contents Loss
50-yr Flood Depth (ft)
County Floodway Percent Building Damage
County Floodway Building Loss
County Floodway Percent Contents Damage
County Floodway Contents Loss
County Floodway Flood Depth (ft)
Tsunami Inundation Area N

For Informational Purposes Only

Figure 3-8. Example Printout from Hazus Workstation



Figure 3-9. Hazus Workstation, Malibou Lake Mountain Club Meeting, October 7, 2019



Figure 3-10. Attendees Look at Flood Hazard Maps During the Malibou Lake Public Meeting

- About 45 percent of residents neither agree nor disagree that flood hazard and risk information is easy to find; remaining respondents are evenly split between those who somewhat or strongly agree and those who somewhat or strongly disagree.
- Respondents rated the following as the most effective means for providing general flood hazard and disaster information:
 - Internet (62 percent)
 - TV news (48 percent)
 - Public awareness campaign, e.g., flood awareness week (37 percent)
 - Social media, such as Twitter or Facebook (34 percent).
 - Radio news (30 percent)
 - Newspapers (26 percent)
 - Public meetings (20 percent)
- Respondents’ top preferred methods for receiving emergency notifications are as follows:
 - Text message (73 percent)
 - Cell phones (49 percent)
 - Email (39 percent)

The following results were from questions that were asked only on the County’s survey:

- 74 percent of respondents agree or strongly agree that local, state and federal government should provide programs promoting resident action to reduce exposure to flood risks.
- Respondents ranked government-sponsored flood damage reduction projects in the following order of preference:
 - Retrofitting infrastructure (improving culverts, bridges, and local drainage)
 - Capital projects (dams, levees, flood walls, and drainage improvements)
 - Providing better flood risk information to the public
 - Assisting vulnerable property owners with securing mitigation funding
 - Mitigating future flood impacts caused by climate change
 - Strengthening codes and regulations to higher regulatory standards
 - Acquiring vulnerable properties and maintaining them as open space

- 86 percent of respondents support the preservation of natural land containing a flood hazard, although 29 percent of them support it only for properties other than their own.

Open House Public Meeting Attendance

Table 3-2 summarizes participation in the public meetings that were held during the outreach effort.


Table 3-2. Summary of Public Meetings

Date	Location	Number of Attendees	Number of Surveys or Comments Received
October 7, 2019	Malibou Lake Mountain Club	32	5
March 11, 2020	Lancaster Library	3	3
Total		35	8

3.3 REPETITIVE LOSS AREA SPECIFIC OUTREACH

During the development of the draft of this report, the Los Angeles County Public Works sent a letter to residents in each repetitive loss area informing them that their properties are in identified repetitive loss areas, requesting that they provide information about how flooding affects their properties, and informing them that the RLAA was being conducted and that they would be informed when the draft is ready for review. A copy of the template for this letter is shown in Figure 3-11.

Upon the completion of a draft of this report, Los Angeles County Public Works disseminated the letter to residents in each repetitive loss area informing them of this report, where and how they would be able to review it, and where and how they might submit comments regarding it. The communication document is shown in Figure 3-12.



COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

900 SOUTH PESTRELLA AVENUE
ALHAMBRA, CALIFORNIA 91801-1131
Telephone: (626) 458-3100
<http://dpw.lacounty.gov>

MARK PESTRELLA, Director

ADDRESS ALL CORRESPONDENCE TO:
ALHAMBRA, CALIFORNIA 91801-1460

SWE-7

IF NEWLY PLEASE
REFER TO FILE

May 28, 2020

<<Property Owner>>
<<MAILING ADDRESS>>
<<MAILING CITY>>

Dear <<Property Owner>>:

LOS ANGELES COUNTY REPETITIVE LOSS AREA ANALYSIS
PROPERTY LOCATION: << SITE ADDRESS >>, <<SITE CITY>>

Your property at the above listed location has been identified to be in an area considered to be potentially vulnerable to repetitive flooding. In an effort to help reduce the risk of flood damage to properties, Los Angeles County Public Works (Public Works) is updating its Repetitive Loss Area Analysis that outlines the location of these areas, the likely sources of flooding, and possible mitigation measures to reduce the risk from flood events. The current Repetitive Loss Area Analysis was adopted in September 2016 and can be found at: <https://dpw.lacounty.gov/WMD/NFIP/FMP/draftFMP.aspx>.

You may recall that you received a postcard from Public Works in late 2019 asking for your participation in a flood risk preparedness survey. This resident participation allowed Public Works to learn more about the flood hazards in the community and helped Public Works identify suitable actions for improving its comprehensive Floodplain Management Program.

Repetitive loss areas have been delineated based on a list of Repetitive Loss Properties maintained by the Federal Emergency Management Agency. A Repetitive Loss Property is any insurable building, which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program within any rolling 10-year period, since 1978.

<<Property Owner>>
May 28, 2020
Page 2

If you would like to share any information about the flood hazards you may have experienced at your property or have any suggestions, please provide them by June 15, 2020, to:

Los Angeles County Public Works
Stormwater Engineering Division
Attention: Mr. Larry Tran
900 South Fremont Avenue
Alhambra, CA 91803

You may also e-mail your suggestions to Mr. Tran at ltran@pw.lacounty.gov.

The draft Repetitive Loss Area Analysis is expected to be ready at the beginning of July 2020. Public Works will be sending a letter to offer you the opportunity to review and comment on the draft document before it is finalized.

Please note that specific property addresses and owner names will not be included in the report and flood insurance claims have been aggregated. This has been done for privacy reasons.

We look forward to receiving your input.

If you have any questions, please contact Ms. Patricia Wood at (626) 458-6131 or pwwood@pw.lacounty.gov or Mr. Tran at (626) 458-4337 or ltran@pw.lacounty.gov.

Very truly yours,

MARK PESTRELLA
Director of Public Works

For [Signature]
STERLING KLIPPEL
Acting, Assistant Deputy Director
Stormwater Engineering Division

L.T:sg
P:\wof\Flood Analysis\NFIP\Floodplain Management Plan Update\2020 FMP\LAOutreach\RLAA Final Notification Letter ena_L1.docx

Figure 3-11. Repetitive Loss Area Target Mailing #1

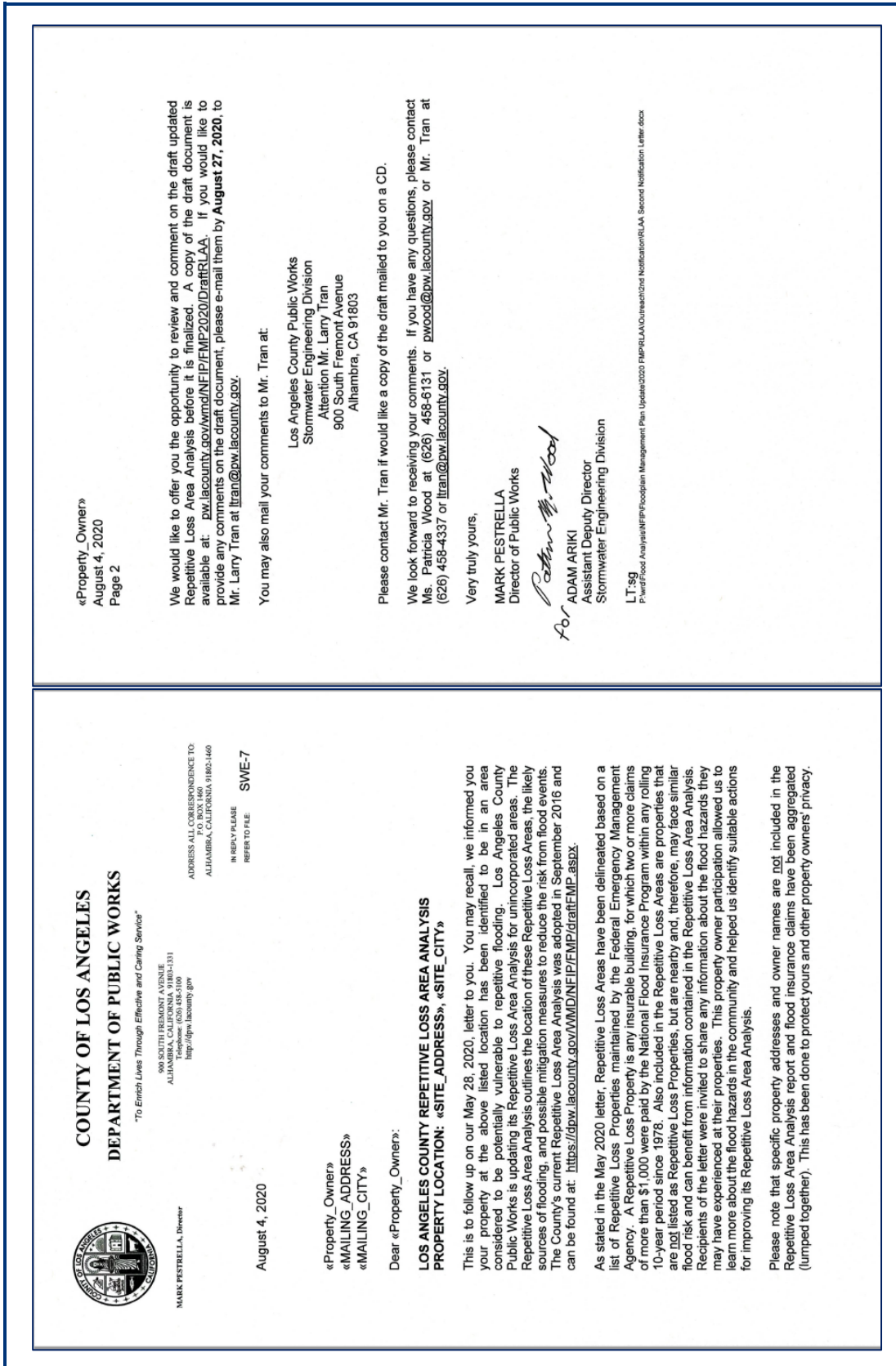


Figure 3-12. Repetitive Loss Area Target Mailing #2

4. RELEVANT PROGRAMS AND REGULATIONS

This chapter provides a comprehensive review of existing laws, ordinances and plans at the federal, state and local level that can support or impact action items identified in this RLAA. Federal, state, and local agencies share and coordinate responsibilities for flood protection in Los Angeles County. The two main federal agencies are the U.S. Army Corps of Engineers, which implements federal flood protection policies, and FEMA. The California Department of Water Resources (DWR) is responsible for managing the state’s waterways. Los Angeles Public Works and the Los Angeles County Flood Control District work to reduce flood risk in Los Angeles County. Development of the RLAA included a review and incorporation, if appropriate, of existing plans, studies, reports, and technical information as part of the planning process. Pertinent federal, state and local laws are described below.

4.1 FEDERAL AND STATE

Federal and state regulations and programs that need to be considered in floodplain management are constantly evolving. For this plan, a review was performed to determine which regulations and programs are currently most relevant to local comprehensive floodplain management. The findings are summarized in Table 4-1 and Table 4-2. Short descriptions of each program are provided in Appendix B.

4.2 LOCAL

4.2.1 General Plan

The Los Angeles County 2035 General Plan, adopted in October 2015, is the latest update to the County of Los Angeles general plan. It provides a policy framework for how and where the unincorporated County will grow through 2035. It accommodates new housing and jobs within the unincorporated areas in anticipation of population growth in the County and the broader region. The General Plan includes the following elements (Los Angeles County Department of Regional Planning, 2015b):

- Land Use Element
- Mobility Element
- Air Quality Element
- Conservation and Natural Resources Element
- Parks and Recreation Element
- Noise Element
- Safety Element
- Public Services and Facilities Element
- Economic Development Element
- Housing Element.

General Plan elements that are particularly applicable to implementation of the floodplain management plan are the Conservation and Natural Resources Element, which guides the long-term conservation of natural resources and preservation of available open space areas, and the Safety Element, which reduces the potential risk of death, injuries, and economic damage resulting from natural and human-caused hazards. By inclusion of these elements, the Los Angeles County General Plan is in compliance with the First Validating Act of 2019.

Table 4-1. Summary of Relevant Federal Agencies, Programs and Regulations

Agency, Program or Regulation	Local Relevance and Response
National Flood Insurance Program	The NFIP provides property owners insurance against potential losses from flooding. Los Angeles County participates in the NFIP on behalf of the unincorporated areas and has adopted regulations that meet the NFIP requirements. The County entered the NFIP in 1980, and the first Los Angeles County FIRMs were issued December 2, 1980. The index date for the currently effective FIRMs is December 21, 2018. Los Angeles County is in good standing with the NFIP as monitored by FEMA Region IX and the California Department of Water Resources. Table 4-7 (at the end of this chapter) summarizes local NFIP capabilities.
Community Rating System	Los Angeles County has participated in the CRS program since 1990. The County has a Class 7 rating (out of 10), so residents who live in a 1 percent annual chance (100-year) floodplain in unincorporated areas of the County can receive up to a 15 percent discount on flood insurance; outside the 1 percent annual chance floodplain they receive a 5 percent discount. This equates to a savings of \$78 to \$254 per policy, for a total countywide premium savings of \$214,926 (Insurance Services Office, 2019). To maintain or improve its rating, the County goes through recertification and re-verification every five years. This plan is developed to help the County maintain or enhance its CRS classification.
Disaster Mitigation Act of 2000	Los Angeles County, in conjunction with emergency services partners, has prepared a local All-Hazards Mitigation Plan that sets strategies for coping with the natural and man-made hazards. The scope of this plan is for the unincorporated County areas only. The plan correlates information from County departments with known and projected hazards that face Southern California. It was formally adopted by the Los Angeles County Board of Supervisors for use in the development of specific cost-effective hazard mitigation proposals. The plan complies with requirements of FEMA and the Governor’s Office of Emergency Services and was approved by both agencies in 2014. It has a 5-year performance period through 2019. The County is currently updating this All-Hazard Mitigation Plan; it is anticipated to be approved in 2020.
2012 Biggert-Waters Flood Insurance Reform Act; 2014 Homeowner Flood Insurance Affordability Act	The Biggert-Waters Flood Insurance Reform Act of 2012 required flood insurance premiums to reflect real flood risk, leading to increased premiums for homeowners. The Homeowner Flood Insurance Affordability Act for 2014 delayed the increases in premiums.
Endangered Species Act	In some parts of the United States, court rulings have found that floodplain management measures can conflict with goals of the Endangered Species Act. Those rulings have required FEMA and local governments to consult with federal wildlife agencies (Section 7 of the ESA) as they work to develop certain floodplain management programs, plans and projects. No such rulings currently affect the Los Angeles area, but floodplain managers should be aware of any potential activities that could fall under the ESA.
Clean Water Act	The Clean Water Act provides regulatory and non-regulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff in order to support propagation of wildlife and recreation in and on the water.
National Incident Management System	Los Angeles County adopted the <i>County of Los Angeles Operational Area Emergency Response Plan</i> in March 2012. The Governor’s Office of Emergency Services approved it on August 31, 2011, as fully compliant with the National Incident Management System (NIMS).
Americans with Disabilities Act	The Americans with Disabilities Act intersects with disaster preparedness programs in regard to transportation, social services, temporary housing, and rebuilding. Persons with disabilities may require additional assistance in evacuation and transit (e.g., vehicles with wheelchair lifts or paratransit buses). Evacuation and other response plans should address the unique needs of residents. Local governments may implement a special-needs registry to identify the home addresses, contact information, and needs of residents who require more assistance for emergency management purposes.
Public Law 84-99, Flood Control and Coastal Emergencies (33 U.S.C. 701n) (69 Stat. 186)	This law gives the U.S. Army Corps of Engineers the legal authority to conduct emergency preparation, response, and recovery activities and to supplement local efforts in the repair of flood damage reduction projects that are damaged by floods. It authorizes the Corps’ Chief of Engineers to undertake activities including disaster preparedness, advance measures, emergency operations (flood response and post-flood response), rehabilitation of flood control works threatened or destroyed by flood, protection or repair of federally authorized shore protective works threatened or damaged by coastal storm, and provisions of emergency water in the event of drought or contaminated source.

Table 4-2. Summary of Relevant State Agencies, Programs and Regulations

Agency, Program or Regulation	Local Relevance and Response
California General Planning Law	The <i>Los Angeles County 2035 General Plan</i> provides a policy framework for how and where the unincorporated County will grow through 2035, while recognizing the County's diversity of cultures, abundant natural resources, and status as an international economic center. The <i>Los Angeles County 2035 General Plan</i> accommodates new housing and jobs in unincorporated areas in anticipation of population growth in the County and the region.
California Environmental Quality Act	This RLAA does not require CEQA environmental review. It constitutes a feasibility and planning study for possible future actions, which the County has not approved, adopted or funded, and therefore is exempt from CEQA under Section 15262 of the CEQA Guidelines. However, future mitigation actions implemented as recommended by this plan may be subject to CEQA review.
AB 162: Flood Planning, Chapter 369, Statutes of 2007	Compliance with this law constitutes inclusion of certain General Plan elements. Los Angeles County's compliance with Chapter 369, Statutes of 2007 is described in Appendix B.
AB 2140: General Plans—Safety Element	This bill enables state and federal disaster assistance and mitigation funding to communities with compliant hazard mitigation plans.
AB 747: General Plans—Safety Element	The safety elements of cities' and counties' general plans must address evacuation routes and include any new information on flood and fire hazards and climate adaptation and resiliency strategies.
AB 2800: Climate Change—Infrastructure Planning	This act requires State agencies to take into account the impacts of climate change when developing State infrastructure.
SB 92 and New Standards for Submitting Dam Inundation Maps	This bill (SB 92, part of the 2017-18 budget package) makes significant legislative changes related to dam safety. It requires owners of dams under the regulatory jurisdiction of the California Department of Water Resources' Division of Safety of Dams to prepare inundation maps and emergency action plans and provides for fees and enforcement.
SB 379: Land Use, General Plan, Safety Element	Los Angeles County's compliance with SB 379 is described in Appendix B.
California State Building Codes	Los Angeles County has adopted the State's Building Codes by reference, except where the County has made amendments or revisions to apply higher standards. The permitting process in Los Angeles County ensures compliance with the State's Building Codes.
Standardized Emergency Management System	Los Angeles County has adopted an emergency response plan that is fully NIMS compliant (the <i>County of Los Angeles Operational Area Emergency Response Plan</i> , March 2012). The Governor's Office of Emergency Services approved it as NIMS compliant on August 31, 2011.
California State Hazard Mitigation Plan	The 2014 County of Los Angeles All Hazards Mitigation Plan was determined to be consistent with the State Plan by the Governor's Office of Emergency Services during its review and approval of the plan in 2013. The County is currently updating this All-Hazard Mitigation Plan and it is anticipated to be approved in 2020.
Governor's Executive Order S-13-08	This order includes guidance on planning for sea level rise in designated coastal and floodplain areas for new projects. Climate impact information developed under this executive order is used in the climate change evaluation of the <i>2020 Los Angeles County Comprehensive Floodplain Management Plan</i> .
California Civil Code 1102	The flood hazard disclosure requirements established under this code apply to all real estate transactions in Los Angeles County.
Local Flood Protection Planning Act	This State statute provides guidance on what a flood mitigation plan should include.
California Water Code Division 5, Part 2, Chapter 4, Article 4	This code provides floodplain regulations for public agencies within a floodplain or the planning area of a floodplain management plan.
California Coastal Management Program	This program requires coastal communities to prepare coastal plans and requires that new development minimize risks to life and property in areas of high geologic, flood, and fire hazard.

Conservation and Natural Resources Element

Watershed Management

The Conservation and Natural Resources Element of the General Plan addresses watershed management, noting that it is an effective and comprehensive way to address water resource challenges. Watershed management integrates habitat enrichment and recreation availability with water supply, flood protection, and clean runoff (Los Angeles County, 2015).

Because a watershed encompasses many jurisdictions, water supply, water quality, flood protection and natural resource issues are best managed at a regional or multiple-agency level. The County works within its jurisdiction to improve the health of rivers, streams and lesser tributaries to enhance overall water resources, runoff quality and wildlife habitat. However, watershed integration requires the County to also participate with other stakeholders to manage the function and health of watersheds. Collaboration with local stakeholders and jurisdictions and with educational and professional institutions is needed to develop and implement watershed plans to protect and augment local water supplies, maintain flood protection standards, provide assistance in the event of flooding, encourage recreational opportunities, conserve habitats of native species, and improve the quality of water that flows to rivers, lakes, and the ocean.

Significant Ecological Areas and Coastal Resource Areas

The Conservation and Natural Resources Element of the General Plan establishes the Significant Ecological Area (SEA) designation for land in unincorporated areas that contains irreplaceable biological resources (SEAs also have been identified in cities, but they function differently from those in unincorporated areas). Coastal Resource Areas (CRAs) are located within the coastal zone and include biological resources equal in significance to SEAs. The General Plan identifies 21 SEAs and 9 CRAs. Two CRAs are linked to SEAs that are not entirely within CRAs (the Santa Monica Mountains Coastal Zone and Palos Verde Coastline) (Los Angeles County, 2015):

Significant Ecological Areas

- | | |
|--|---------------------------------------|
| ➤ Cruzan Mesa Vernal Pools | ➤ San Andreas |
| ➤ East San Gabriel Valley | ➤ San Dimas Canyon / San Antonio Wash |
| ➤ Griffith Park | ➤ San Gabriel Canyon |
| ➤ Harbor Lake Regional Park | ➤ Santa Clara River |
| ➤ Joshua Tree Woodlands | ➤ Santa Felicia |
| ➤ Madrona Marsh Preserve | ➤ Santa Monica Mountains |
| ➤ Palos Verdes Peninsula and Coastline | ➤ Santa Susana Mountains / Simi Hills |
| ➤ Puente Hills | ➤ Tujunga Valley / Hansen Dam |
| ➤ Rio Hondo College Wildlife Sanctuary | ➤ Valley Oaks Savannah |
| | ➤ Verdugo Mountains |

Coastal Resource Areas

- El Segundo Dunes
- Malibu Coastline
- Palos Verdes Coastline (ocean and shoreline portions)
- Point Dume
- Santa Catalina Island
- Coastal Zone of the Santa Monica Mountains
- Terminal Island (Pier 400)

The objective of the SEA program is to conserve genetic and physical diversity by designating biological resource areas that are capable of sustaining themselves into the future. However, SEAs are not wilderness preserves. Much of the land in SEAs is privately held, used for public recreation, or abuts developed areas. The SEA program must therefore balance the overall objective of resource preservation against other critical public needs. The General Plan goals and policies are intended to ensure that privately held lands within the SEAs retain the right of reasonable use, while avoiding activities and developments that are incompatible with the long-term survival of the SEAs (Los Angeles County, 2015).

Safety Element

Flooding is among the natural hazards addressed in the Safety Element of the General Plan. The element presents goals and policies for uses in flood hazard zones, as well as tsunami hazard areas and potential dam failure inundation areas. The Safety Element of the County’s General Plan is currently being updated and will be in compliance with the provisions of California’s SB 379.

4.2.2 Community Plans

The Los Angeles County General Plan (2015) serves as the foundation for community-based plans, such as area plans, community plans, and coastal land use plans. Area plans focus on land use and policy issues that are specific to the planning area. Community plans cover smaller geographic areas within the planning area and address neighborhood and/or community-level policy issues. Coastal land use plans are components of local coastal programs; they regulate land use and establish policies to guide development in the coastal zone.

The following is a list of adopted community-based plans in unincorporated Los Angeles County:

- Altadena Community Plan
- Antelope Valley Area Plan
- East Los Angeles 3rd Street Plan
- East Los Angeles Community Plan
- Florence-Firestone Community Plan
- Hacienda Heights Community Plan
- Marina del Rey Land Use Plan
- Pepperdine Long Range Development Plan
- Rowland Heights Community Plan
- Santa Catalina Island Local Coastal Land Use Plan
- Santa Clarita Valley Area Plan
- Santa Monica Mountains North Area Plan
- Twin Lakes Community Plan
- Walnut Park Neighborhood Plan
- West Athens-Westmont Community Plan.

4.2.3 Watershed Management Program

Municipalities and community stakeholders throughout Los Angeles County developed a total of 31 collaborative Watershed Management Programs and Enhanced Watershed Management Programs for the County’s six watersheds—Dominguez Channel, Los Angeles River, Los Cerritos Channel, San Gabriel River, Santa Monica Bay and Upper Santa Clara River. Each Watershed Management Group meets regularly to implement its plan.

Each plan identifies programs and projects to improve water quality, promote water conservation, enhance recreational opportunities, manage flood risk, improve aesthetics, and support public education. Each includes water quality priorities, watershed control measures, the scheduling of projects, and monitoring, assessment and adaptive management for projects. The plans rely heavily on three approaches:

- **Regional Multi-Benefit Projects**—Regional multi-benefit projects retain, divert or treat stormwater and non-stormwater from subwatershed areas, while also providing water conservation, flood, recreation, habitat and other benefits.
- **Green Street Projects**—Green street projects improve streets, sidewalks or other paved areas using permeable materials and drought-tolerant plants to capture, clean or infiltrate rainwater. Green infrastructure projects help to clean surface water bodies, recharge groundwater, beautify neighborhoods, and cool communities by increasing the amount of vegetation.
- **Low Impact Development**—Low impact development consists of site design approaches and best management practices that address runoff and pollution at the source. These practices can effectively remove nutrients, bacteria, and metals while reducing the volume and intensity of stormwater flows.

4.2.4 Greater Los Angeles County Region Integrated Regional Water Management Plan

The 2017 Integrated Regional Water Management (IRWM) Plan Update defines the direction for collaborative planning to achieve sustainable management of water resources in the Greater Los Angeles County Region. The update meets the California Department of Water Resources' 2016 updated IRWM guideline requirements. The Plan identifies solutions to achieve the following objectives over the 25-year planning horizon:

- Reduce the region's reliance on imported water
- Comply with water quality regulations by improving the quality of urban runoff, stormwater and wastewater
- Protect, restore and enhance natural processes and habitats
- Increase watershed-friendly recreational space for all communities
- Reduce flood risk in flood-prone areas by increasing protection or decreasing needs using integrated flood management approaches
- Adapt to and mitigate against climate change vulnerabilities.

4.2.5 Los Angeles County Flood Control District

The Los Angeles County Flood Control Act was adopted by the State Legislature in 1915 after a regional flood took a heavy toll on lives and property. The act established the Los Angeles County Flood Control District and empowers it to provide flood protection, water conservation, recreation and aesthetic enhancement within its boundaries (authority to address recreation and aesthetics was added via subsequent amendments). The County of Los Angeles Board of Supervisors is the ex-officio governing body for the Los Angeles County Flood Control District. In 1984, the Flood Control District entered into an operational agreement transferring its administration, planning, and operational activities to Los Angeles County Public Works.

Within the Greater Los Angeles County area, the Flood Control District and the U.S. Army Corps of Engineers share responsibilities for managing flood risk. The Flood Control District is the primary agency able to address large regional drainage needs within its boundaries. It uses available funds to operate and maintain flood control facilities and systems that cross various cities. In years of heavy rainfall, the flood control system has largely prevented serious flooding that affected the Los Angeles area many years ago.

The Flood Control District boundaries encompass more than 2,700 square miles, six major watersheds, 86 incorporated cities, and the unincorporated County areas. Its municipal flood protection and water conservation system is one of the largest in the world. It includes 14 major dams and reservoirs, 491 miles of open channels, 27 spreading grounds, 175 debris basins, operates 61 pump stations, 3,411 miles of underground storm drains, and an estimated 82,800 catch basins. Planning efforts to rehabilitate flood control facilities also consider other potential beneficial uses of those facilities, such as environmental restoration, enhancement of water quality, and recreation.

4.2.6 Antelope Valley Comprehensive Plan and Amendments

Los Angeles County prepared and adopted the Antelope Valley Areawide General Plan in 1986, a comprehensive plan for the unincorporated County area of Antelope Valley. The Plan was updated in June 2015, renamed the Antelope Valley Area Plan. The Antelope Valley differs from other parts of the County because it lacks an ocean drainage outlet. It also lacks defined natural channels below the foothills, as well as an adequate flood control system, resulting in unpredictable and varying flood risk across the valley floor. The Plan explores flood control and water conservation measures to reduce the negative effects of regional private development and to better address local flood hazard needs. It seeks to provide a cohesive approach to drainage, stormwater management,

and flood risk mitigation. The Plan evaluates the fee structures available to finance drainage solutions (Los Angeles County Public Works, 1987). Two amendments to the original plan update costs and drainage fees to continue implementing recommended improvements (Los Angeles County Public Works, 1991 and 2006). The most recent update to the plan in 2015 provided for zone changes, including residential, agricultural, commercial, industrial, special purpose, C-RU (rural commercial) and MXD-RU (rural mixed use) zones.

4.2.7 Antelope Valley Integrated Regional Water Management Plan and Salt and Nutrient Management Plan

The Antelope Valley Integrated Regional Water Management (IRWM) group developed a water resource management plan in 2007. The 2007 plan was updated in 2013 to reflect new state integrated planning requirements, include more detailed and updated content, and solicit future project funding opportunities. The 2013 Antelope Valley IRWM Plan explores key issues, including uncertain and variable water supply, water demand exceeding supply, water quality and flood management, environmental resources, water management and land use, and climate change. It identifies and prioritizes a series of projects to address key concerns in the region, particularly those related to water supply (Antelope Valley Integrated Regional Water Management Group, 2013).

The Antelope Valley Salt and Nutrient Management Plan of 2014 was developed to manage salts, nutrients, and other elements from various sources to ensure that water quality objectives of the State Water Resource Control Board's Recycled Water Policy are met and safeguarded. The State Water Resources Control Board requires a Salt and Nutrient Management Plan for any community to qualify for recycled water projects through the Lahontan Regional Water Quality Control Board.

4.2.8 Upper Santa Clara River Watershed Integrated Regional Water Management Plan

The Upper Santa Clara River Watershed Integrated Regional Water Management group updated its IRWM plan in 2018 to meet the 2016 IRWM Guidelines under Proposition 1 (the Water Quality, Supply, and Infrastructure Improvement Act of 2014). The 2018 Upper Santa Clara River Watershed IRWM Plan examines current and future water-related needs, identifies regional objectives for water-related resource management, develops strategies to address identified needs, and evaluates projects to meet the regional objectives. It integrates planning and implementation and facilitates regional cooperation, with the goals of reducing water demand, improving operational efficiency, increasing water supply, improving water quality, and promoting resource stewardship over the long term (Los Angeles County, 2019).

4.2.9 Sediment Management Strategic Plan

The Los Angeles County Flood Control District developed a Sediment Management Strategic Plan in response to challenges in managing sediment. These challenges included wildfires occurring in 2007 and 2009 that led to an increased inflow of sediment and debris and increased pressure on the capacity of sediment placement sites. This plan provides an overview of sediment management issues and evaluates various projects. The plan, designed to be effective from 2012 to 2032, is guided by the following objectives (Los Angeles County Public Works, 2019):

- Maintaining flood risk management and water conservation
- Recognizing opportunities for increased environmental stewardship
- Reducing social impacts related to sediment management
- Identifying ways to use sediment as a resource
- Ensuring that the Flood Control District is fiscally responsible in its decision-making.

4.2.10 Local Coastal Programs

Los Angeles County local coastal programs (LCPs) comply with the 1976 California Coastal Act, which requires coastal cities and counties to establish coastal resource conservation and development programs. The LCPs consist of planning and regulatory measures to manage development in coastal zones. Each LCP includes a land use plan and implementation program. LCPs must consider unique factors of the coastal community and regional and state concerns. There are five coastal areas within the unincorporated Los Angeles County jurisdiction: the Santa Monica Mountains, Marina Del Rey, Santa Catalina Island, San Clemente Island and Ballona Wetlands Area A. Of these five areas, three have certified LCPs: Marina del Rey, Santa Catalina Island, and the Santa Monica Mountains. Certified LCPs are not required for San Clemente Island or Ballona Wetlands Area A.

4.2.11 Los Angeles County Low Impact Development Ordinance

In November 2012, the Los Angeles Regional Water Quality Control Board adopted a Municipal Separate Storm Sewer System (MS4) Permit to regulate stormwater and non-stormwater discharges in the Los Angeles region. The permit included low impact development (LID) requirements for certain projects to reduce the discharge of stormwater and associated pollutants into receiving water bodies and to control hydromodification. In November 2013, Los Angeles County amended its LID Ordinance in response to the 2012 MS4 Permit. The LID Ordinance applies to certain new development and re-development projects and is intended to accomplish the following:

- Lessen adverse impacts of stormwater and urban runoff from development on natural drainage systems, receiving waters and other water bodies
- Minimize pollutant loadings from impervious surfaces by requiring certain projects to incorporate appropriate best management practices and other LID strategies
- Require hydromodification to minimize erosion and other hydrologic impacts on natural drainage systems

In 2014 Los Angeles County created the *Low Impact Development Standards Manual* to comply with requirements of the National Pollutant Discharge Elimination System MS4 Permit for discharges within the coastal watersheds of Los Angeles County. The manual provides guidance in new development as well as redevelopments within unincorporated areas of Los Angeles County. Its intent is to improve water quality and mitigate potential water quality impacts from stormwater and non-stormwater discharges.

4.2.12 Los Angeles County Operational Area Emergency Response Plan

The Los Angeles County Operational Area Emergency Response Plan provides details for coordinated response to large-scale emergency situations in the County, whether natural, man-made, or technological. It focuses on potentially catastrophic disasters that require more than normal response measures. It reviews capabilities in prevention, protection, response, recovery, and mitigation. It describes continuity of government plans and provides annexes for specific situations, including tsunamis, oil spills, and terrorism (Los Angeles County, 2012).

4.2.13 Topanga Creek Watershed Management Plan

The Topanga Creek Watershed covers 18 square miles, has the greatest diversity of native plants and animals of all watersheds in the Santa Monica Mountains, and is the third largest drainage to Santa Monica Bay. In 2002, the Topanga Creek Watershed Committee updated its 1996 Topanga Creek Watershed Management Study with new preventive planning strategies and best management practices. These projects and practices were developed to maintain and enhance the watershed's current physical, chemical, biological, economic, and social characteristics, including its diversity in land use (i.e., residential, business development, infrastructure, wilderness recreation, and biological habitat). The plan also seeks to protect life and property from vulnerability to natural hazards such as stormwater runoff, floods, earthquakes, and wildfires (Topanga Creek Watershed Committee, 2002).

4.2.14 Rio Hondo Watershed Management Plan

The 2018 Rio Hondo Watershed Management Plan provides goals and strategies to all affected municipalities and conservation organizations as a way to improve water quality, health, habitat and recreational opportunities for the Rio Hondo watershed. The Rio Hondo watershed is a sub-watershed of the Los Angeles River watershed and is linked to the San Gabriel River watershed as a result of both natural hydrologic processes and human intervention. The watershed contains both rural and urban areas, with the San Gabriel Mountains and Angeles National Forest defining the upper reaches and the more urban and developed San Gabriel Valley below the foothills. The watershed encompasses 22 cities and six unincorporated communities in Los Angeles County (San Gabriel Valley Council of Governments, 2018).

4.2.15 Gateway Watershed Management Program

The Gateway Watershed Management Authority is a coalition of 25 cities and government entities that manage regional water planning needs for the Gateway Cities region. The Gateway Watershed Management Authority developed an integrated regional water management plan in 2013. Although the plan primarily focuses on needs for cities in this region, it includes a few unincorporated County areas. Recommendations developed for this plan include coordinating regional water management efforts, continued maintenance of projects and grant opportunities, addressing MS4 permit watershed monitoring and reporting, and developing a funding and finance plan to implement projects (Gateway Management Authority, 2013).

4.2.16 Los Angeles River Master Plan and Corridor Highlights

The Los Angeles River is 51 miles long, and its watershed covers 834 square miles. It extends from the Santa Monica Mountains to the Simi Hills in the east and from the Santa Susana Mountains to the San Gabriel Mountains in the west. The Los Angeles River flows eastward from its headwaters in the mountains to the northern corner of Griffith Park, where the channel turns southward through the Glendale Narrows before it flows across the coastal plain and into San Pedro Bay near Long Beach. The river is a valuable resource for the County, as well as a major source of flooding.

The County developed the Los Angeles River Master Plan in 1996 to seek ways to utilize the natural assets of the Los Angeles basin for economic, recreational, and environmental benefits while maintaining the waterway as a flood protection resource. The plan highlights water conservation as a major concern, noting that 30 to 40 percent of the County's water supply comes from local sources. It also recommends multi-use and multi-benefit projects, which not only strengthen flood control measures but also educate residents, create environmental habitats, or increase recreational opportunities (Los Angeles County Public Works, 1996).

In 2005, the County released the Master Plan and Corridor Highlights document, which provides information about Master Plan projects implemented since the Master Plan's adoption and those planned for future construction. Many of the projects are structural but highlights also include natural resource preservation and education and outreach projects. Where sufficient data was available, the report documents specific benefits as well as implementation and location information (Los Angeles County Public Works, 2019). Los Angeles County is currently updating the 1996 Los Angeles River Master Plan.

4.2.17 Los Angeles County Annual Hydrologic Reports

Los Angeles County releases an annual report containing hydrologic data relevant to the County; the most recent report covers 2017 through 2018. The report is organized into eight major sections providing background and statistics on the following areas (Los Angeles County Public Works, 2018):

- **Los Angeles County**—County’s topography, geology, and land use
- **Runoff**—Mean daily and peak annual runoff flow rates for active stream gaging stations
- **Flood Control District**—Flood events summaries
- **Reservoirs**—Summary of annual inflow, outflow, and storage data for County dams and reservoirs
- **Precipitation**—Daily and annual rainfall data from County rain gage stations
- **Erosion control**—Debris basin design data, production summary, and production history
- **Evaporation**—Data for the County’s active evaporation stations
- **Water conservation**—Groundwater recharge facility data and historical well data

These reports are a resource for County personnel evaluating water management.

4.2.18 Los Angeles County Drainage Area

In 1915, the State Legislature created the Los Angeles County Flood Control District to control floods and conserve water. Early bond issues financed construction of 14 dams in the San Gabriel Mountains as well as flood channel modifications. District funding financed construction of debris basins to trap sediment. The federal Emergency Relief Appropriations Act of 1935 financed the construction of Eaton Wash Dam. The federal Flood Control Act of 1936 made the Army Corps of Engineers a participant in Los Angeles County’s flood protection program. Subsequent federal Flood Control Acts provided additional funding for flood control facilities. The Army Corps’ Los Angeles River, San Gabriel River and Ballona Creek projects constructed five flood storage reservoirs or basins, 24 debris basins, 95 miles of main channels, 191 miles of tributary channels and two jetties. This regional flood control system is described in the Los Angeles County Drainage Area (LACDA) study. It includes the Los Angeles River, San Gabriel River, Rio Hondo Channel and Ballona Creek. Flood control facilities in the LACDA system fall into four general categories: debris basins, flood control reservoirs, improved tributary channels, and improved main channels. In total, the system has over 100 miles of main stem channel, over 370 miles of tributary channels, over 200 debris basins, 15 flood control and stormwater capture dams, and five flood control dams.

4.2.19 Trash Best Management Practices

The 2004 *Technical Report of Trash Best Management Practices* identifies necessary measures to meet trash total maximum daily load goals for the Los Angeles River and Ballona Creek. Recommendations include trash and runoff source-control best management practices as the top preference. Also recommended are structural projects for high-trash generation areas, such as drain system retrofits, channel-cleaning contracts, and replacement of impervious surfaces (Los Angeles County Public Works, 2004). Keeping flood control facilities, including catch basins, free from trash and debris helps prevent localized street flooding.

4.2.20 Los Angeles County Response to the Americans with Disabilities Act

The *Los Angeles County Operational Area Emergency Response Plan Access and Functional Needs Annex* defines “individuals with disabilities and access and functional needs” as populations whose members may have additional needs before, during and after an incident in functional areas including but not limited to the following:

- Maintaining independence
- Communication
- Transportation
- Supervision
- Medical care.

These populations may include any of the following:

- Individuals with mobility and transportation impairments
- Individuals with vision, hearing and dual sensory impairment
- Individuals with health, behavioral and mental health needs
- Individuals with intellectual and developmental disabilities
- Individuals who live in institutionalized settings
- Seniors and children
- Culturally diverse populations
- Individuals with limited English proficiency or non-English speakers
- Individuals with socio-economic barriers, including the homeless population.

Reasonable Accommodations Ordinance

The ordinance, which was adopted by the Board of Supervisors on November 28, 2011, creates an administrative procedure for persons with disabilities to request reasonable accommodation from land use and zoning standards or procedures, when those standards or procedures are a barrier to equal housing access, pursuant to state and federal Fair Housing laws. The ordinance applies to all the unincorporated areas of Los Angeles County.

Plan Action Implementation

The Americans with Disabilities Act protocol will be applied when implementing any actions in this plan that could impact individuals with disabilities and access and functional needs. This will involve measures such as review by the Los Angeles County Inclusive Emergency Management Advisory Committee or whatever protocol has been established by the County at the time of project implementation.

4.3 CAPABILITY ASSESSMENT

The planning team performed an inventory and analysis of existing authorities and capabilities called a “capability assessment.” A capability assessment creates an inventory of an agency’s mission, programs and policies, and evaluates its capacity to carry them out.

Table 4-3 summarizes the legal and regulatory capability of Los Angeles County. This table describes the legal authorities available to the county and/or enabling legislation at the state level affecting planning and land management tools that can support floodplain management action items. Each of these capabilities represents an ongoing program that supports Los Angeles County’s commitment to floodplain resilience. Any gap in capability identified in this table should be considered as an action by the County in the action plan component of this plan. The table identifies the following information for each program:

- **Local Authority:** Does the County have the authority to implement the identified capability through policy or formal adoption?
- **State or Federal Prohibitions:** Are there any regulations that may impact the implementation of an identified capability that are enforced or administered by another agency (e.g., a state agency or special purpose district)?
- **Other Regulatory Authority:** Are there any regulations that may impact the implementation of a capability that are enforced or administered by another agency (e.g., a state agency or special purpose district)? This can also be referred to as delegated authority.
- **State Mandated**—Do state laws or other requirements enable or require the listed item to be implemented at the local level?

Table 4-3. Los Angeles County Legal and Regulatory Capability

	Local Authority	State or Federal Prohibitions	Other Regulatory Authority	State Mandated
Codes, Ordinances & Requirements				
Building Code	Yes	No	No	Yes
<i>Comment:</i>	County of Los Angeles County Code, Title 26 – Building Code			
Zoning Code	Yes	No	No	Yes
<i>Comment:</i>	County of Los Angeles County Code, Title 22 – Planning and Zoning			
Subdivisions	Yes	No	No	No
<i>Comment:</i>	County of Los Angeles County Code, Title 21 – Subdivision Code. The California State Subdivision Map Act sets out how long a map approval can be valid, and the County cannot grant time longer than that.			
Post-Disaster Recovery	Yes	No	No	No
<i>Comment:</i>	County of Los Angeles County Code, Title 2 – Administration, Division 3 – Departments and Other Administrative Bodies, Chapter 2.68 – Emergency Services, Part 6 – Director of Recovery Operations			
Flood Damage Prevention Ordinance	Yes	No	No	No
<i>Comment:</i>	County of Los Angeles County Code: Title 26, Chapter 1, Section 110 – Prohibited Uses of Building Sites Title 11, Division 3, Chapter 11.60 – Floodways and Water Surface Elevations Title 21, Chapter 21.44.320 – Land subject to flood hazard, inundation, or geological hazard Title 21, Chapter 21.44.330 – Flood-hazard area, floodway or natural watercourse designation Title 20, Division 5, Chapter 20.94 – Channels Title 22, Division 1, Chapter 22.52, Part 5 – Flood Control			
Low-Impact Development Standards	Yes	No	No	Yes
<i>Comment:</i>	County of Los Angeles County Code, Title 12 – Environmental Protection, Chapter 12.84 Low Impact Development Standards			
Real Estate Disclosure	Yes	No	No	Yes
<i>Comment:</i>	State of California Natural Hazards Disclosure Act, effective June 1, 1998 (California Civil Code Section 1103.2)			
Growth Management	No	No	Yes	Yes
<i>Comment:</i>	County of Los Angeles County Code, Title 22 – Planning and Zoning, Chapter 22.46 – Specific Plans. Specific Plans are available for Santa Catalina Island, Marina Del Rey, Universal Studios, and East Los Angeles Third Street.			
Site Plan Review	Yes	No	No	No
<i>Comment:</i>	County of Los Angeles County Code, Title 26 – Building Code, Chapter 1 – Administration, Inspections.			
Special Purpose (flood management, critical areas)	—	—	—	—
<i>Comment:</i>	County of Los Angeles County Code, Title 11 – Health and Safety, Division 2 – General Hazards, Chapter 11.52 – Water Hazards. County of Los Angeles County Code, Title 11 – Health and Safety, Division 3 – Miscellaneous Regulations, Chapter 11.60 – Floodways and Water Surface Elevations. County of Los Angeles County Code, Title 12 – Environmental Protection, Chapter 12.80 – Stormwater and Runoff Pollution Control County of Los Angeles County Code, Title 12 – Environmental Protection, Chapter 12.20 – Depositing Petroleum Products on Beaches or into Pacific Ocean County of Los Angeles County Code, Title 20 – Utilities, Division 5 – Flood Control District Property and Facilities County of Los Angeles County Code, Title 31 – County Green Building Standards Code County of Los Angeles County Code, Flood Control District Code, Chapter 21 – Stormwater and Runoff Pollution Control			

	Local Authority	State or Federal Prohibitions	Other Regulatory Authority	State Mandated
Planning Documents				
General Plan	Yes	No	No	Yes
<i>Comment:</i>	The <i>Los Angeles County 2035 General Plan</i> , adopted by the Los Angeles County Board of Supervisors on October 6, 2015, provides a policy framework for how and where the unincorporated County will grow through 2035. Comprising 2,650 square miles, unincorporated Los Angeles County is home to over one million people. The General Plan accommodates new housing and jobs within the unincorporated areas in anticipation of population growth in the County and the region.			
Capital Improvement Plan	Yes	No	No	No
<i>Comment:</i>	Los Angeles County Public Works develops and implements capital projects, and manages projects implemented by consultants. The 2035 General Plan Implementation Program identifies a goal project of Public Works and the Department of Regional Planning jointly securing funding and setting priorities to prepare capital improvement plans for the County's 11 planning areas. Some current community plans have capital improvements listed, but level of detail varies based on community and plan age.			
Economic Development Plan	Yes	No	No	No
<i>Comment:</i>	Los Angeles County Strategic Plan for Economic Development, 2016 2035 General Plan, Chapter 14 – Economic Development Element. Available online			
Floodplain or Basin Plan	Yes	No	No	No
<i>Comment:</i>	Los Angeles County Comprehensive Floodplain Management Plan, 2015. Available online.			
Stormwater Plan	Yes	No	Yes	Yes
<i>Comment:</i>	Low Impact Development Standards Manual, February 2014			
Watershed Management Plan	Yes	No	Yes	No
<i>Comment:</i>	Enhanced Watershed Management Programs in progress and to be submitted for approval to the Los Angeles Regional Water Quality Control Board by June 28, 2015. These plans will include the County's five watersheds: Ballona Creek, Dominguez Channel, Marina Del Rey, Santa Monica Bay, and Upper Los Angeles River. All available online. Other unincorporated community watershed management plans: Topanga Creek, Upper Santa Clara River, Rio Hondo and Gateway Cities Region			
Habitat Conservation Plan	Yes	No	Yes	No
<i>Comment:</i>	2035 General Plan, Chapter 9 – Conservation and Natural Resources Element, Significant Ecological Areas. Available online. The General Plan has policies related to habitat and resource conservation, but the Conservation and Natural Resources Element is not the equivalent of a habitat conservation plan. Other regulatory authority lies with the California Department of Fish & Wildlife or the U.S. Fish & Wildlife Service, depending upon the species.			
Shoreline Management Plan	Yes	No	No	Yes
<i>Comment:</i>	Los Angeles County Stormwater Monitoring Reports, Section 1.1.1.4 – Shoreline Monitoring (released annually and with most recent report of 2014-2015) Local Coastal Programs (LCP) <ul style="list-style-type: none"> • Santa Monica Mountains LCP, adopted on August 26, 2014, and certified on October 10, 2014 • Marina Del Rey LCP, adopted in 1996, and amended and certified in 2012 • Santa Catalina Island LCP, adopted on March 15, 1983, and certified on November 17, 1983 All available online			
Emergency Response Plan	Yes	No	No	Yes
<i>Comment:</i>	Los Angeles County Operational Area Emergency Response Plan (ERP), 2012. Available online			
Post-Disaster Recovery Plan	Yes	No	No	No
<i>Comment:</i>	Recovery Annex to the ERP ERP, Section 2.7: Recovery Considerations also reviews County Recovery Procedures			
Sediment Management Plan	Yes	No	No	No
<i>Comment:</i>	Sediment Management Strategic Plan, 2012-2032. Available online			

	Local Authority	State or Federal Prohibitions	Other Regulatory Authority	State Mandated
Continuity of Operations Plan	Yes	No	No	Yes
<i>Comment:</i>	All Los Angeles County departments and/or divisions must develop, exercise, and maintain plans for business continuity functions and processing resources. Each department and/or division must develop a plan for its business operations that can sufficiently support the service requirements of other operations and functions involved in the incident. Plans must address the full range of resources including data processing, data communications links, personnel, personal computers, terminals, workspace, voice communication, and documents. Additionally, Chapter 3 of the ERP includes Continuity of Government information.			
Water Resource Management Plan	Yes	No	Yes	Yes
<i>Comment:</i>	Greater Los Angeles County Region Integrated Regional Water Management Plan, 2013, Antelope Valley Integrated Regional Water Management Plan, 2013, Upper Santa Clara River Watershed Integrated Regional Water Management Plan, 2014			
Best Management Practices	—	—	—	—
<i>Comment:</i>	Technical Report of Trash Best Management Practices, 2004 These best management practices were identified and evaluated to provide effective alternatives to meet the goals of the trash total maximum daily load for Los Angeles River and Ballona Creek.			

Table 4-4 summarizes fiscal capability of Los Angeles County. This table identifies what financial resources (other than grants) are available to the county to support the implementation of repetitive loss area action items.

Table 4-4. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding (Flood Control District)	Yes
Authority to Levy Taxes for Specific Purposes	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
State Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes

Table 4-5 summarizes community based classification programs that rate facets of a community’s floodplain management capability. The Community Rating System is described in Section 1.1. The Building Code Effectiveness Grading Schedule assesses the building codes in effect in a community and how the community enforces them, with emphasis on mitigation of losses from natural hazards. The National Oceanic and Atmospheric Administration administers the StormReady and TsunamiReady programs. StormReady helps arm communities with communication and safety skills needed to save lives and property before, during and after an event. It helps community leaders and emergency managers strengthen local safety programs.

Table 4-5. Community Classifications

	Participating?	Classification	Date Classified
Community Rating System	Yes	7	11/5/2015
Building Code Effectiveness Grading Schedule	Yes	2/2	2015
StormReady	No	N/A	N/A
TsunamiReady	No	N/A	N/A

Table 4-6 summarizes the administrative and technical capability of Los Angeles County. This table inventories the staff/personnel resources available to Los Angeles County to help with floodplain management and the implementation of specific actions.

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Los Angeles County Public Works (Public Works) Land Development Division; Los Angeles County Department of Regional Planning
Engineers or professionals trained in building or infrastructure construction practices	Yes	Public Works Geotechnical and Materials Engineering Division; Public Works Building and Safety Division
Planners or engineers with an understanding of flooding hazards	Yes	Public Works Geotechnical and Materials Engineering Division; Public Works Stormwater Engineering Division and associated subdivisions
Staff with training in benefit/cost analysis	Yes	Public Works multiple divisions, including the Stormwater Planning Division
Floodplain manager	Yes	Public Works Stormwater Engineering Division
Surveyors	Yes	Public Works Survey/Mapping and Property Management (Land Records) Division
Personnel skilled or trained in GIS applications	Yes	Public Works Survey/Mapping and Property Management (Land Records) Division; Public Works Stormwater Engineering Division; and Public Works GIS Managers
Scientists familiar with flooding hazards in local area	Yes	Public Works Stormwater Engineering Division and associated subdivisions
Emergency manager	Yes	Public Works Disaster Services Group; Los Angeles County Office of Emergency Management
Grant writers	Yes	Public Works Stormwater Planning Division, Stormwater Engineering Division, and Transportation Planning and Programs Division; Los Angeles County Office of Emergency Management

Table 4-7 summarizes the County's participation in national flood-related programs.

Table 4-7. National Flood Insurance Program Compliance

What department is responsible for floodplain management in your community?	Los Angeles County Public Works Stormwater Engineering Division
Who is your community's floodplain administrator?	Los Angeles County Public Works Stormwater Engineering Division
Do you have any certified floodplain managers on staff in your community?	No
What is the date of adoption of your flood damage prevention ordinance?	County of Los Angeles County Code: <ul style="list-style-type: none"> • Title 26, Chapter 1, Section 110 – Prohibited Uses of Building Sites, last amended by ordinance 2013-0048 § 2, effective 2013 • Title 11, Division 3, Chapter 11.60 – Floodways and Water Surface Elevations, last amended by ordinance 2016-0062 § 2, effective 2016 • Title 21, Chapter 21.44.320 – Land subject to flood hazard, inundation, or geological hazard, last amended by ordinance 11665 § 38, effective 1978 • Title 21, Chapter 21.44.330 – Flood-hazard area, floodway or natural watercourse designation, last amended by ordinance 11665 § 39, effective 1978 • Title 20, Division 5, Chapter 20.94 – Channels, last amended by ordinance 86-0032 § 1, effective 1986; Title 22, Division 1, Chapter 22.52, Part 5 – Flood Control, last amended by ordinance 1494 Ch. 7 Art. 5 § 705.1, effective 1927
When was the most recent Community Assistance Visit or Community Assistance Contact?	Last Community Assistance Visit: December 19, 2019 Community Assistance Visit Report: Pending Community Assistance Visit Closed: Pending Issues: None
To the best of your knowledge, does your community have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No issues that would render Los Angeles County out of full compliance with the provisions of the NFIP were identified during the last Community Assistance Visit.
Do your flood hazard maps adequately address the flood risk within your community?	Flood hazard mapping has been identified as an issue that needs to be addressed by this planning process. See Section 6.14 lists mapping issues, which are addressed by Mitigation Action #33 (Chapter 11).
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Los Angeles County Public Works Stormwater Engineering Division staff actively participate in programs of the Floodplain Management Association as well as other trainings offered by the State and FEMA where feasible. County staff welcomes opportunities for training on floodplain management programs and principles.
Does your community participate in the CRS? If so, is your community seeking to improve its CRS Classification? If not, is your community interested in joining the CRS program?	Los Angeles County has participated in the CRS since 10/1/1991 and is currently rated a CRS Class 7

5. MITIGATED REPETITIVE LOSS PROPERTIES

5.1 REPETITIVE LOSS LIST CORRECTION

As part of their application and cycle verification obligations, CRS-participating communities must review their lists of repetitive-loss properties for accuracy, for correct addresses, to determine whether the properties are actually in the community's corporate limits, and to determine whether the insured buildings have been removed, retrofitted or otherwise protected from the cause of the repetitive flooding. The result of this review is recorded on a Repetitive Loss Update Worksheet (AW-501; see Figure 5-1).

A community with repetitive losses must sign the Repetitive Loss List Community Certification, CC-RL, certifying that each address has been checked. If there are updates, the submittal must include corrected Repetitive Loss Update Worksheets (AW-501) with any required supporting documentation. The community must note the following situations in which the form should be updated:

1. The property is not located in the community's jurisdiction. The property may be outside the community's corporate limits, it may be in another city, or it may have been annexed by another community. If it can be determined in which community the property belongs, the property will be reassigned to the correct community. If a property is not in the community, it will not be reassigned unless the community in which the property does belong can be definitely identified.
2. There was an error in the repetitive loss data base, such as a duplicate listing or an incorrect address.
3. The property has subsequently been protected from the types of events that caused the losses. Buildings that have been acquired, relocated, retrofitted, or otherwise protected from the types of frequent floods that caused the past damage are not counted in determining the community's CRS requirements.
4. The property is protected from damage by the base flood shown on the current Flood Insurance Rate Map (FIRM). For example, the community may demonstrate that the building is elevated or flood-proofed above the base flood elevation but was flooded by a higher level. If the property is outside the Special Flood Hazard Area, the community may show that all of the repetitive losses were caused by events with recurrence intervals of over 100 years (e.g., two 200-year storms).

For corrections made under situations 3 or 4 above, all future AW-501s issued for the community will be segregated into two categories; mitigated and unmitigated.

5.2 MITIGATED REPETITIVE LOSS PROPERTIES

Los Angeles County is using the ISO repetitive loss list and AW-501s dated September 2018 as the basis for this Repetitive Loss Area Analysis. This is the last officially sanctioned CRS repetitive loss data set issued to Los Angeles County. According to the AW-501s issued, Los Angeles County has 54 repetitive loss properties, of which four are officially recognized as "mitigated," as shown in Table 5-1. No area analysis has been conducted for these mitigated properties. The County is seeking mitigated status approval for an additional eight properties, and another three have been destroyed by wildfires; these properties are all included in the area analyses provided in this RLAA.

OMB Control Number: 1650-0022
 Expiration: xxxx, xxxx

Federal Emergency Management Agency National Flood Insurance Program NFIP REPETITIVE LOSS UPDATE WORKSHEET (AW-501) THE INFORMATION ON THIS FORM IS BASED ON CLAIMS ON OR BEFORE: 01/31/2011 REPETITIVE LOSS NUMBER: 0987654 Internal use only <input checked="" type="checkbox"/> A <input type="checkbox"/> N/A <input type="checkbox"/> FRR			
NFIP Community Name: BALDWIN COUNTY		CID#: 015000	
Local Property Identifier: 56-09-29-999-000			
Current Property Address		Previous Property Address/Community ID#	
12345 MEMORY LANE FAIRHOPE, AL 36532-5963		
Last Claimant:		Last Claimant:	
Insured: Yes	Name Insured:		ELMER FLOOD
Date of Losses: 20040916 19980927		Total Number of Losses for Property: 2	
REQUESTED UPDATES MARK ALL UPDATES BELOW THAT APPLY (IMPORTANT - SEE INSTRUCTIONS)			
1. <input type="checkbox"/> INFORMATION PROVIDED NOT SUFFICIENT TO IDENTIFY PROPERTY. Choose this update if all attempts to locate the property fail. Please describe the steps you took to locate the property in the comments section below.			
2. <input type="checkbox"/> COSMETIC CHANGES REQUIRED TO THE ADDRESS: Update the address shown above and/or add our local alternative property identifier such as a Tax Assessor #.			
3. <input type="checkbox"/> PROPERTY NOT IN OUR COMMUNITY OR JURISDICTION: Choose this update if you have positively determined that the property shown is not located in your community. Please provide the correct NFIP community name and if known the NFIP community ID Number. If available, please attach a map showing the property location. ASSIGN TO NFIP COMMUNITY NAME: _____ NFIP COMMUNITY ID#: _____			
4. <input checked="" type="checkbox"/> FLOOD PROTECTION PROVIDED. Choose this update only if some type of structural intervention has occurred to the building, property or the source of flooding that protects the building from future events similar to those that occurred in the past. The update must be supported by documentation such as an Elevation Certificate and the Mitigation action and funding below must be provided. (Mitigation Action 1.) (Source of Primary Mitigation Funding 3.) (Secondary Source of Funding 3.)			
CC-RL-2 (AW-501-1)		[continued on next page]	

Figure 5-1. Example AW-501

Table 5-1. Mitigated Repetitive Loss Properties

Repetitive Loss Number	Date Corrected
#0014896	April 25, 1995
#0017933	May 10, 1995
#0028337	June 11, 1996
#0049465	May 10, 1995

6. MITIGATION ALTERNATIVES CONSIDERED

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

Many types of flood hazard mitigation exist, and there is not one mitigation measure that fits every case or even most cases. Successful mitigation often requires multiple strategies. The CRS Coordinator's Manual breaks the primary types of mitigation down as follows (FEMA, 2017):

- **Preventive** activities keep flood problems from getting worse. The use and development of flood-prone areas is limited through planning, land acquisition, or regulation. They are usually administered by building, zoning, planning, and/or code enforcement offices.
- **Property protection** activities are usually undertaken by property owners on a building-by- building or parcel basis.
- **Natural resource protection** activities preserve or restore natural areas or the natural functions of floodplain and watershed areas. They are implemented by a variety of agencies, primarily parks, recreation, or conservation agencies or organizations.
- **Emergency services** are measures taken during an emergency to minimize its impact. These measures are usually the responsibility of city or county emergency management staff and the owners or operators of major or critical facilities.
- **Structural projects** keep floodwaters away from an area with a levee, reservoir, or other flood control measure. They are usually designed by engineers and managed or maintained by public works staff.
- **Public information** activities advise property owners, potential property owners, and visitors about hazards and ways to protect people and property from them, as well as the natural and beneficial functions of local floodplains. They are usually implemented by a public information office.

6.1 PREVENTIVE

Los Angeles County regulates residential and commercial development through its building code, planning and zoning requirements, stormwater management regulations and floodplain management ordinances. Any project in an unincorporated area located in a floodplain outside state or federally owned lands, regardless of the project's size, requires a permit from Los Angeles County, unless the project can be characterized as routine maintenance.

6.2 PROPERTY PROTECTION

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

- FEMA 259, Engineering Principles and Practices of Retrofitting Floodprone Residential Structures
- FEMA 312, Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding
- FEMA 551, Selecting Appropriate Mitigation Measures for Floodprone Structures
- FEMA 348, Protecting Building Utilities from Flood Damage
- FEMA 511, Reducing Damage from Localized Flooding
- FEMA 102, Floodproofing Non-Residential Structures
- FEMA 84, Answers to Questions about the NFIP
- FEMA 54, Elevated Residential Structures Book
- FEMA 268, Protecting Floodplain Resources: A Guidebook for Communities
- FEMA 347, Above the Flood: Elevating Your Floodprone House
- FEMA 85, Protecting Manufactured Homes from Floods and Other Hazards

The manuals listed above are available for review at FEMA's website. For a complete guide to retrofitting homes for flood protection, see FEMA P-312, *Homeowner's Guide to Retrofitting 3rd Edition* (FEMA 2014). The primary methods of property protection in Los Angeles County are:

- Demolition/relocation.
- Elevation (structure or damage-prone components such as furnace or AC unit)
- Dry flood-proof (so water cannot get in).
- Wet flood-proof portions of the building (so water will not cause damage).
- Direct drainage away from the building.
- Drainage maintenance.
- Sewer Improvements.

6.2.1 Acquisition

One of the most effective approaches to preventing further flood damage to a building is acquisition and relocation or clearing of the structure. The property would then serve as open space or recreation area. Property owners retain the right to select this as a mitigation method. They may sell their property to a government agency or an agency dedicated to the preservation and management of local open space. The property owner can also relocate the building to another property. Alternatively, the building can be moved to another area of the same property, if that area is outside the flood hazard. The property owner can also take advantage of federal funding for such mitigation.

For the Los Angeles County RLAA, it has been determined that acquisition would not be a cost-effective alternative for structures with probable flood depths of 2 feet or less. "Cost-effective" means that the benefits of the action would equal or exceed the costs to implement the action. For this RLAA, a benefit is considered to be an avoided loss. The high value of property in Los Angeles County makes it unlikely that acquisition projects can be cost-effective.

6.2.2 Home Elevation

Sometimes dry or wet flood-proofing are not enough and greater measures must be taken. For example, if the floodwaters are too high for dry flood-proofing and the inhabited area is too low for wet flood-proofing, it may be necessary to raise the structure. Whenever the floor of a home is below the 1 percent annual chance (100-year) flood elevation, physically elevating the structure is often recommended as it is one of the most effective means to prevent flood damage. Financial assistance may be available for floodproofing. Los Angeles County requires all substantially improved residential buildings to have their lowest floor elevated 1 foot above the 100-year elevation. No basements are allowed in the flood hazard.

6.2.3 Dry Flood-Proofing

Dry flood-proofing consists of completely sealing around the exterior of the building so that water cannot enter the building (see Figure 6-1). Dry flood-proofing is not a good option for areas where floodwater is deep or flows quickly. The hydrostatic pressure and/or hydrodynamic force can structurally damage the building by causing the walls to collapse or causing the entire structure to float. However, in areas that have minimal velocity and low depth, dry flood-proofing can be a good option.

Source: FEMA P-312, June 30, 2014

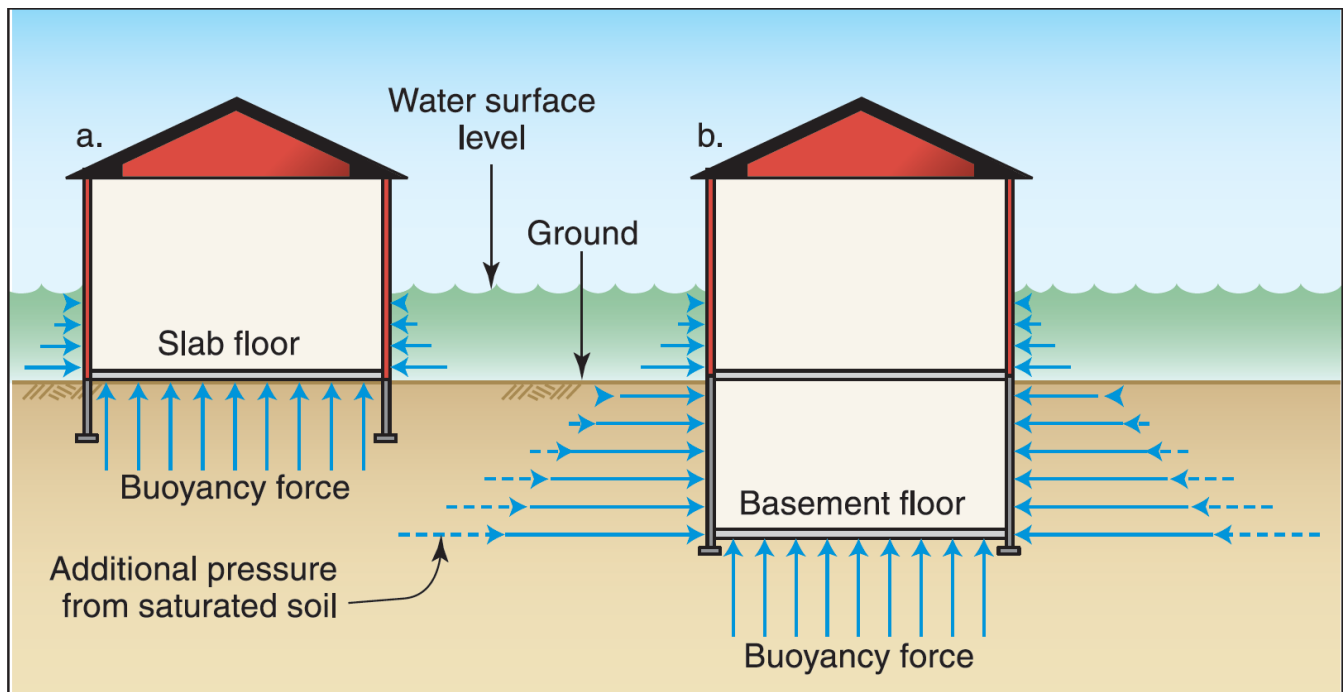


Figure 6-1. Dry Flood-Proofing Example

Many flood hazards can be mitigated with various forms of dry flood-proofing. Properties that do not have adequate protection of their low opening (window or basement door) can effectively raise the low opening height with a window well or a flood gate. The ultimate height of the low opening depends on several factors, such as: the level of flood protection desired, the appearance, and cost. The flood protection elevation could be set 1-foot higher than the existing low opening elevation, or it could be set to match the elevation of the lowest opening into a home that cannot be raised. This might be the elevation of the threshold of a door, for example.

The NFIP only allows dry flood-proofing for residential retrofits that are not classified as a substantial improvement. A substantial improvement is any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the “start of construction” of the improvement.

6.2.4 Wet Flood-Proofing

Wet flood-proofing consists of modifying uninhabited portions of a home, such as a crawlspace, garage, or unfinished basement with flood-damage resistant materials, to allow floodwaters to enter the structure without causing damage (see Figure 6-2). Wet flood-proofing requires portions of the building to be cleared of valuable items and mechanical utilities.

Source: FEMA P-312, June 30, 2014

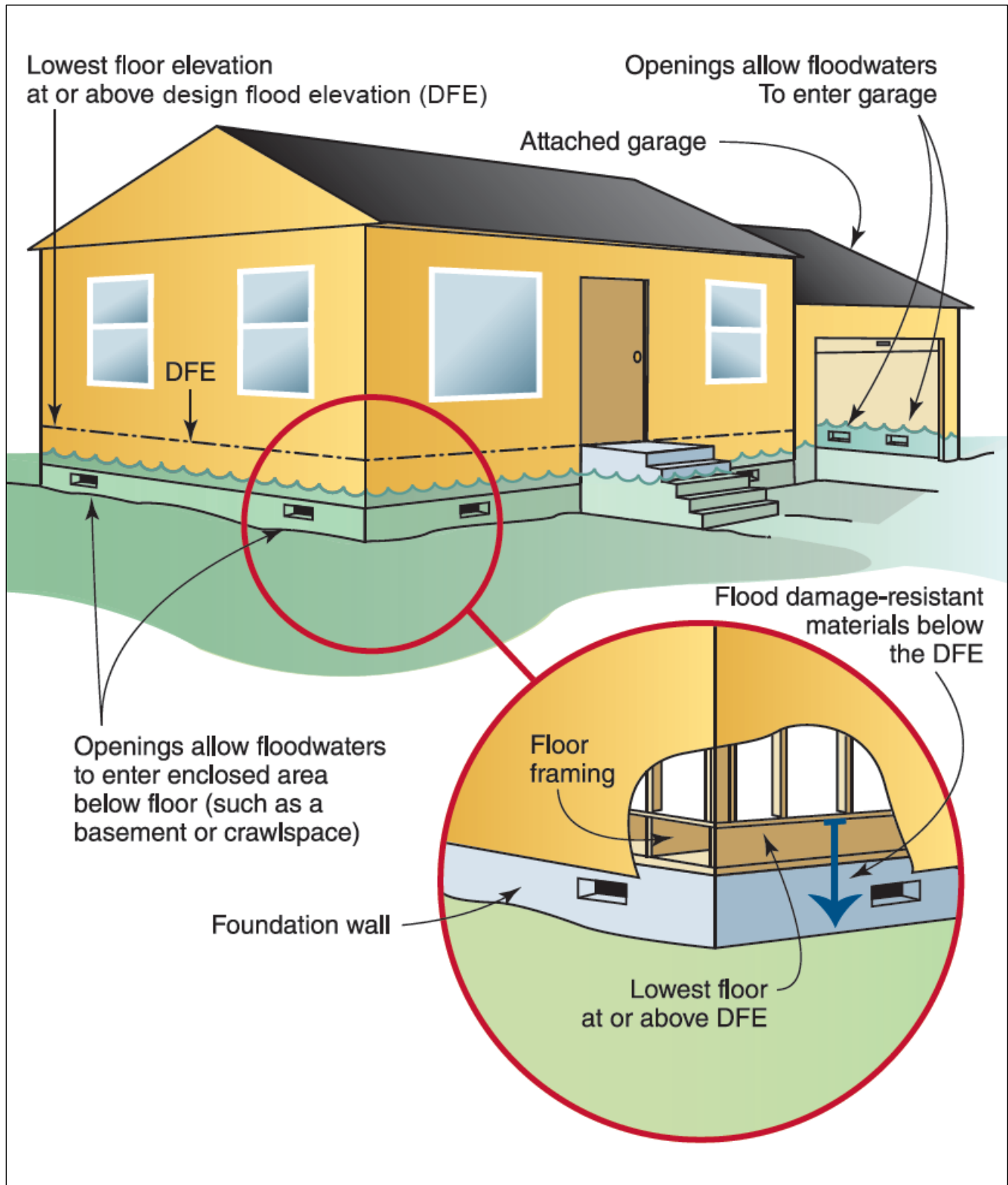


Figure 6-2. Wet Flood-Proofing Example

A key component of wet flood-proofing is providing openings large enough for the water to flow through the structure such that the elevation of the water in the structure is equal to the elevation of the water outside of the structure. This equilibrium of floodwater prevents hydrostatic pressure from damaging structural walls. The NFIP requires the bottoms of the openings to be no more than 1 foot above the lowest adjacent grade, whether that lowest adjacent grade is outside the structure or in the crawlspace.

6.2.5 Direct Drainage Away from the Building

In some cases, there are things that the property owner can do on-site such as directing shallow floodwater away from a flood-prone structure. Shallow flooding can often be kept away from a structure if some simple improvements are made to the yard. Sometimes structures are built at the bottom of a hill or in a natural drainage way or storage area, so that water naturally flows toward them.

One solution is to regrade the yard. If water flows toward the building; a new swale or wall can direct the flow to the street or a drainage way. Filling and grading next to the building can also direct shallow flooding away. Although water may remain in the yard temporarily, it is kept away from the structure. When these types of drainage modifications are made, care must be taken not to adversely affect the drainage patterns of adjacent properties. Over time, the swales along the lot lines or in the back yard may get filled in as property owners build fences, garages, sheds, swimming pools, and other obstructions up to the lot line. These drainage problems can be fixed by removing the obstructions and restoring the swales so they will carry water away from the building.

6.2.6 Drainage Maintenance

Dumping into the drainage system is a Los Angeles County Code violation. Debris can accumulate and restrict the flow of stormwater, increasing the potential of localized flooding. To report flood problems or illegal dumping to the drainage system, call (888) CLEAN LA (253-2652).

6.2.7 Sewer Improvements

Heavy rains can saturate the soil and infiltrate the sanitary sewer system through leaky joints or cracks in the pipes. The inflow of stormwater floods the sanitary sewer system causing water to back-up into the home through lower level plumbing fixtures. This occurrence can be prevented by installing a sewer backflow preventer (see Figure 6-3). A backflow preventer will allow the sanitary sewer water to flow freely from the home to the sewer, but restrict the reverse flow. Backflow preventers do require maintenance and can fail if debris in the sewer prevents the valve seating properly. An overhead sewer system pumps wastewater from basement level plumbing fixtures up to an elevation near the ground level, where it can drain by gravity into the sewer service line. This higher sewer makes it unlikely that water will back-up into the building.

6.2.8 Temporary Barriers

Several types of temporary barriers are available to address typical flooding problems. They work to direct drainage away from structures with the same principles as permanent barriers such as floodwalls or levees, but can be removed, stored, and reused in subsequent flood events.

6.3 NATURAL RESOURCE PROTECTION

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

Source: FEMA P-312, June 30, 2014

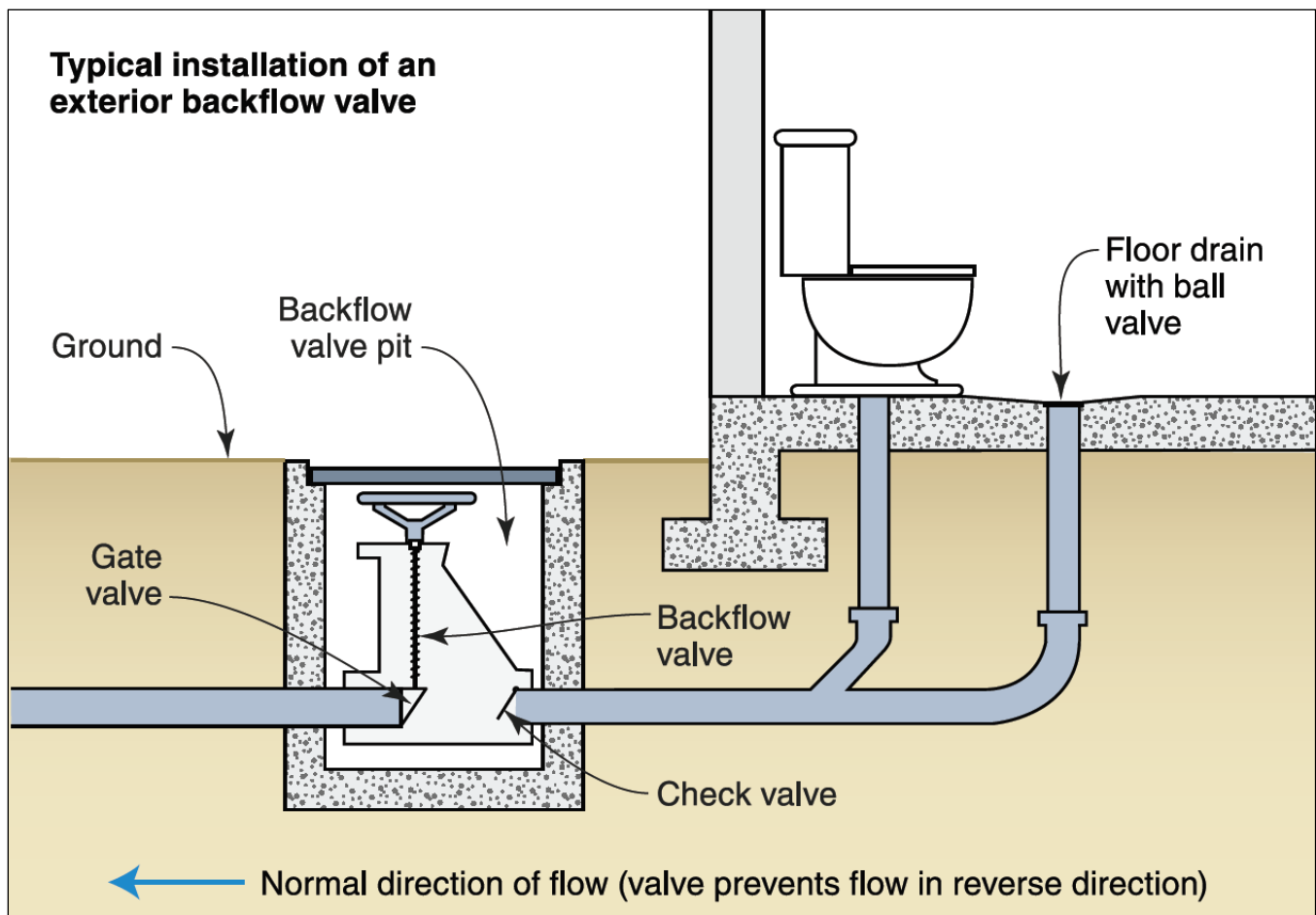


Figure 6-3. Sewer Backflow Valve Installation Example

6.4 EMERGENCY SERVICES

Advance identification of an impending storm is only the first part of an effective Flood Warning and Response Plan. To truly realize the benefit of an early flood warning system, the warning must be disseminated quickly to floodplain occupants, repetitive loss areas and critical facilities. Appropriate response activities must then be implemented, such as: road closures, directing evacuations, sandbagging, and moving building contents above flood levels. Finally, a community should take measures to protect public health and safety and facilitate recovery. These measures may include cleaning up debris and garbage, clearing streets, and ensuring that citizens have shelter, food, and safe drinking water.

6.5 STRUCTURAL PROJECTS

Structural projects keep floodwaters away from an area with a levee, reservoir, or other flood control measure. They are usually designed by engineers and managed or maintained by public works staff. Los Angeles County Public Works develops and implements capital projects. The 2035 General Plan Implementation Program identifies a goal project of the Los Angeles County Department of Regional Planning and Los Angeles County Public Works jointly securing funding and setting priorities to prepare capital improvement plans for the County’s 11 planning areas.

6.6 PUBLIC INFORMATION

One of the most important, and often overlooked, aspects of mitigation is public awareness. Awareness starts with recognition of the flood risk. FIRM panels, which designate areas of a community according to various levels of flood risk, can be viewed at www.FEMA.gov. Also, real estate transactions require disclosure of known flood hazards. The next level of awareness is related to flood hazard mitigation measures. Often homeowners can greatly reduce their risks with mitigation efforts if they are aware of the risks.. For that reason, as part of this analysis, every resident in the repetitive loss area has been contacted and informed of the opportunity to review this Report. In addition, Los Angeles County Public Works sends out an annual outreach letter to every resident in each repetitive loss area.

Los Angeles County has defined a program for public information as part of its *2020 Comprehensive Floodplain Management Plan*. This program for public information includes a strategy for providing important information about property protection to property owners in the repetitive loss areas identified under this RLAA.

Los Angeles County Repetitive Loss Area Analysis

PART 2—ANALYSIS OF INDIVIDUAL REPETITIVE LOSS AREAS

7. AGUA DULCE REPETITIVE LOSS AREA

7.1 PROBLEM STATEMENT

Figure 7-1 shows the Agua Dulce Repetitive Loss Area. Flood zones are mapped on the FEMA FIRM. This repetitive loss area is in the San Gabriel Mountains, east of Santa Clarita. The targeted repetitive loss property for this area is located within the floodplain of Mint Canyon. The property is in Zone A, which has significant risk from a 1 percent annual chance (100-year) flood. The culvert under Sierra Highway approximately 250 feet upstream from the repetitive loss property is subject to becoming obstructed by debris from upstream. When runoff exceeds the capacity of the culvert, street flooding occurs and the subject property is subject to inundation. In addition, the property owner reported that the upstream neighbor improperly altered the natural creek and encroached on the floodplain and caused flow breakout from the channel. Mint Canyon borders the repetitive loss property, eroding and flooding its backyard. The property owner placed log retaining walls around the street-side property entrance. The County built a berm on top of the channel bank near the culvert under the Sierra Highway in an effort to contain the water inside the channel.

7.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 7-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 7-1. Repetitive Loss Properties in Agua Dulce Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0091339	37	3/95, 2/98	\$4,321.16	No

Identified Flood Cause: Property is located in the floodplain. Repetitive flooding possibly caused by street flooding when storm flows exceed the capacity of an upstream culvert. No reported losses since 1998.

7.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

There are three properties with a total of 20 insurable buildings included in this repetitive loss area. Table 7-2 provides general information for the properties, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 7-2. All Properties in Agua Dulce Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
AD-1	6	Crawlspace	D7B	Enlarge culvert Drainage system maintenance Acquisition Elevation Public education
AD-2	12	Crawlspace	D7	Enlarge culvert Drainage system maintenance Acquisition Elevation Public education
AD-3	2	Crawlspace	D55C	Enlarge culvert Drainage system maintenance Acquisition Elevation Public education
Total	20			

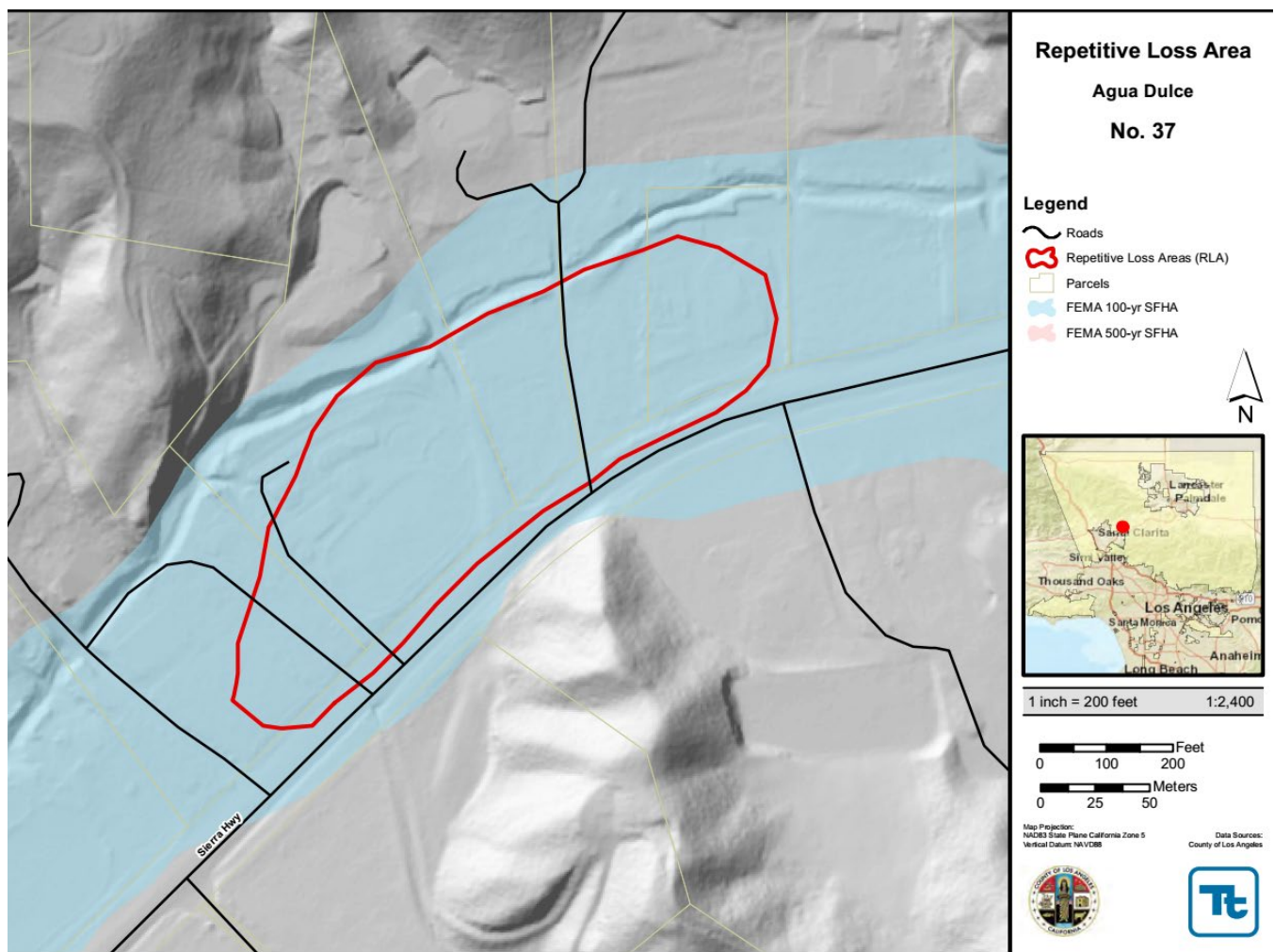


Figure 7-1. Agua Dulce Repetitive Loss Area

8. ALTADENA A REPETITIVE LOSS AREA

8.1 PROBLEM STATEMENT

The Altadena A Repetitive Loss Area is located in the San Gabriel Mountains, east of Burbank near Altadena. There is a single-property repetitive loss area on Alzada Drive. No map of this repetitive loss area is provided, due to privacy concerns. The area is located at the bottom of a hill and is possibly impacted by storm runoff from surrounding hills. There is a 2-foot-wide and 1-foot-deep dry earthen ditch running west of but outside of the property. The property is on higher ground than the bank elevations of the ditch. Repetitive flood history for this area can be associated with post-wildfire conditions.

8.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 8-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 8-1. Repetitive Loss Properties in Altadena A Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0056933	35	2/91, 2/92	\$2,725	No

Identified Flood Cause: Hillside drainage problem.

8.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

There is one property included in this repetitive loss area, with a total of two insurable buildings. Table 8-2 provides general information for the property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 8-2. All Properties in Altadena A Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
ALT-A1	2	Crawlspace	No Information	Drainage improvement Elevation Public education
Total	2			

9. ALTADENA B REPETITIVE LOSS AREA

9.1 PROBLEM STATEMENT

The Altadena B Repetitive Loss Area is in the San Gabriel Mountains, east of Burbank near Altadena. There is a single-property repetitive loss area on Hollyslope Road. No map of this repetitive loss area is provided, due to privacy concerns. The target repetitive loss property for this area is adjacent to a private, unmapped channel within a private residential community. Repetitive flood history for this area can be associated with post-wildfire conditions.

9.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 9-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 9-1. Repetitive Loss Properties in Altadena B Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0091348	36	3/95, 2/98	\$4,321	Yes ^a

Identified Flood Cause: Property is located near the privately constructed channel within the private hillside residential community. According to property owner who resides in the community, the channel has a concrete bottom but is not engineered. After a brush fire in 1993, hillside storm runoff in the channel destroyed a private studio in the floodplain and eroded the bank protections, which were restored and improved later. In a separate incident, the basement was flooded due to a backyard drainage deficiency, which was improved with a 6-inch berm.

- a. An AW-501 has been submitted for this property, but correction was not yet approved as of this RLAA. Area will be removed from RLAA once correction is processed by FEMA.

9.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

There is only one property included in this repetitive loss area. It has three insurable buildings. Table 9-2 provides general information for the property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 9-2. All Properties in Altadena B Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
ALT-B1	3	Crawlspace	D7A	Private channel maintenance Establish post-fire protocols Public education
Total	3			

10. CALABASAS A REPETITIVE LOSS AREA

10.1 PROBLEM STATEMENT

The Calabasas A Repetitive Loss Area is in the Santa Monica Mountains in the southwestern portion of Los Angeles County. There is a single-property repetitive loss area on Las Virgenes Canyon Road. No map of this repetitive loss area is provided, due to privacy concerns. This area is a camping ground on privately owned land, located at the bottom of a hillside area. The steep hill at the west corner, the highest point of the property, is prone to mudflow from the hill whenever it rains. The flow then runs along the private road across the camping ground between the camp housing facilities to the natural creek at the east property boundary. The owner placed sandbags in some locations to temporarily protect the housing facilities near the bottom of the hill. The owner reported that the sandbags were strategically placed to protect the housing facilities, and if the pattern of hillside runoff changes, as it did in 1996 after the brush fire, the property would again be at the risk. The subject property is not located in or near a FEMA-mapped floodplain.

10.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 10-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 10-1. Repetitive Loss Properties in Calabasas A Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0072498	26	2/92, 1/95, 1/95, 2/98	\$6,436	No

Identified Flood Cause: Mudflow from the hillside at the east end of the property and along the private road within the property.

10.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

There is only one property included in this repetitive loss area. It has 12 insurable buildings. Table 10-2 provides general information for the property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 10-2. All Properties in Calabasas A Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
CA-A1	12	Slab	D55A	Drainage improvement Drainage system maintenance Public education
Total	12			

11. CALABASAS B REPETITIVE LOSS AREA

11.1 PROBLEM STATEMENT

Figure 11-1 shows the Calabasas B Repetitive Loss Area. This area is in the Santa Monica Mountains in the southwestern portion of Los Angeles County. The flooding appears to be associated with urban drainage issues associated with runoff from streets as well as grading issues from property to property. The repetitive-loss property for this area is located at the low point of the street and flows entering the front yard can be trapped and cause damage to the house, including foundation cracks.

11.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 11-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 11-1. Repetitive Loss Properties in Calabasas B Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0136718	41	2/98, 12/04	\$4,105	No

Identified Flood Cause: The subject property is adjacent to a higher neighboring property and receives runoff that can seep into the house. A former problem is that runoff from the roof enters planters in front of the house. The owner has installed pipes and drains in the planters to evacuate the water from the planters. Street level is higher than the subject property, potentially creating a condition where runoff could enter from the street. However, the owner indicated that an existing storm drain adequately captures flows from the street.

11.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

Eighteen properties with 33 insurable buildings have been identified in this repetitive loss area. Table 11-2 provides general information for each property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 11-2. All Properties in Calabasas B Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
CA-B1	2	Crawlspace	D11A	Construct a berm to prevent off-site flows from entering the property. Provide grading and drainage to avoid water impoundment near the structure. Convert planter to pavement near the problem area. Continue to inspect the foundation for cracks and repair.
CA-B2	2	Crawlspace	D8C	Drainage system maintenance Public education
CA-B3	1	Crawlspace	No Info	Drainage system maintenance Public education
CA-B4	1	Crawlspace	D9B	Drainage system maintenance Public education
CA-B5	1	Crawlspace	D9C	Drainage system maintenance Public education
CA-B6	3	Crawlspace	D10D	Drainage system maintenance Public education
CA-B7	3	Crawlspace	D75D	Drainage system maintenance Public education
CA-B8	2	Crawlspace	D85C	Drainage system maintenance Public education
CA-B9	2	Crawlspace	D11D	Drainage system maintenance Public education
CA-B10	2	Crawlspace	D11A	Drainage system maintenance Public education
CA-B11	3	Crawlspace	D8C	Drainage system maintenance Public education
CA-B12	2	Crawlspace	D11D	Drainage system maintenance Public education
CA-B13	1	Crawlspace	D10C	Drainage system maintenance Public education
CA-B14	1	Crawlspace	D105A	Drainage system maintenance Public education
CA-B15	2	Crawlspace	D11A	Drainage system maintenance Public education
CA-B16	1	Crawlspace	D10B	Drainage system maintenance Public education
CA-B17	2	Crawlspace	D11A	Drainage system maintenance Public education
CA-B18	2	Crawlspace	D9B	Drainage system maintenance Public education
Total	33			

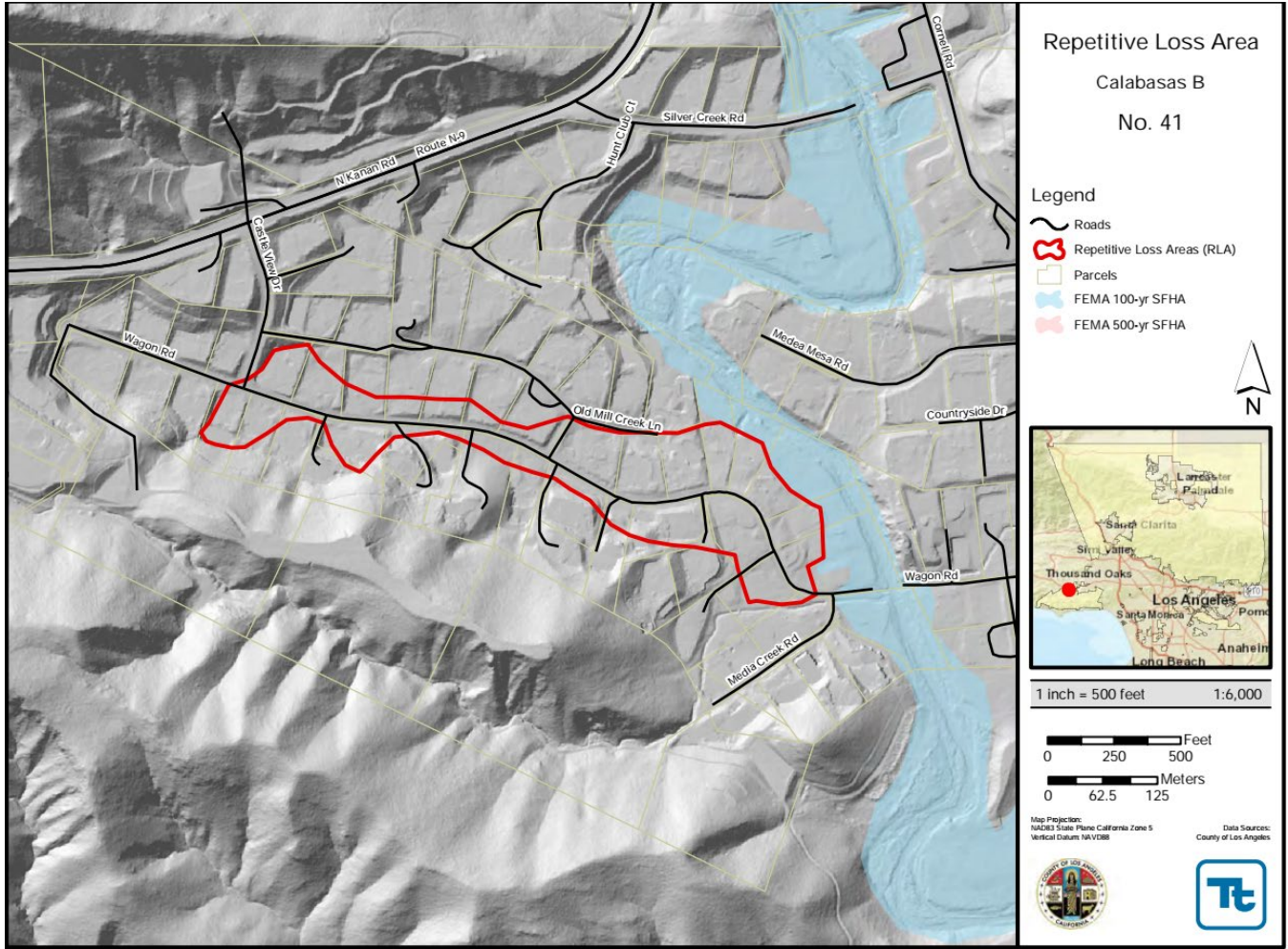


Figure 11-1. Calabasas B Repetitive Loss Area

12. COLD CREEK A REPETITIVE LOSS AREA

12.1 PROBLEM STATEMENT

Figure 12-1 shows the Cold Creek A Repetitive Loss Area. This area is in the Santa Monica Mountains in the southwestern portion of Los Angeles County. The single repetitive loss property is not within a FEMA-mapped floodplain, but the delineated repetitive loss area does parallel an approximate Zone A area mapped along Cold Creek. There is significant topographic relief in this area. The cause of repetitive flooding in the area is associated with the blockage or obstruction of contributory drainages to Cold Creek off the hillside areas. Drainage ways and flow paths can become blocked by debris (downed trees and shrubs, leaves, sediment, and trash) collected by overland flows. When the drainages are blocked, stormwater flows overland to the streets, where there are few if any drainage conveyances. The properties in the Cold Creek A Repetitive Loss Area are topographically subject to flooding when these situations occur due to their locations below roadways.

12.2 IDENTIFIED REPETITIVE LOSS PROPERTIES

Table 12-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 12-1. Repetitive Loss Properties in Cold Creek A Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
#0071255	27	02/92, 01/93	\$23,983	No

Identified Flood Cause: Is located on high ground and flooded by excessive storm runoff from surrounding hills. It was also determined from the FEMA FIRM in Figure 12-1 that the property was not in the floodplain of Cold Canyon, adjacent to the property. No flooding activity since 1992.

12.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

Two properties with two insurable buildings have been identified in this repetitive loss area. Table 12-2 provides general information for each property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 12-2. All Properties in Cold Creek A Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
CO-A1	1	Crawlspace	D5A	Public education Local drainage improvements Drainage maintenance
CO-A2	1	Slab	D9C	Public education Local drainage improvements Drainage maintenance
Total	2			

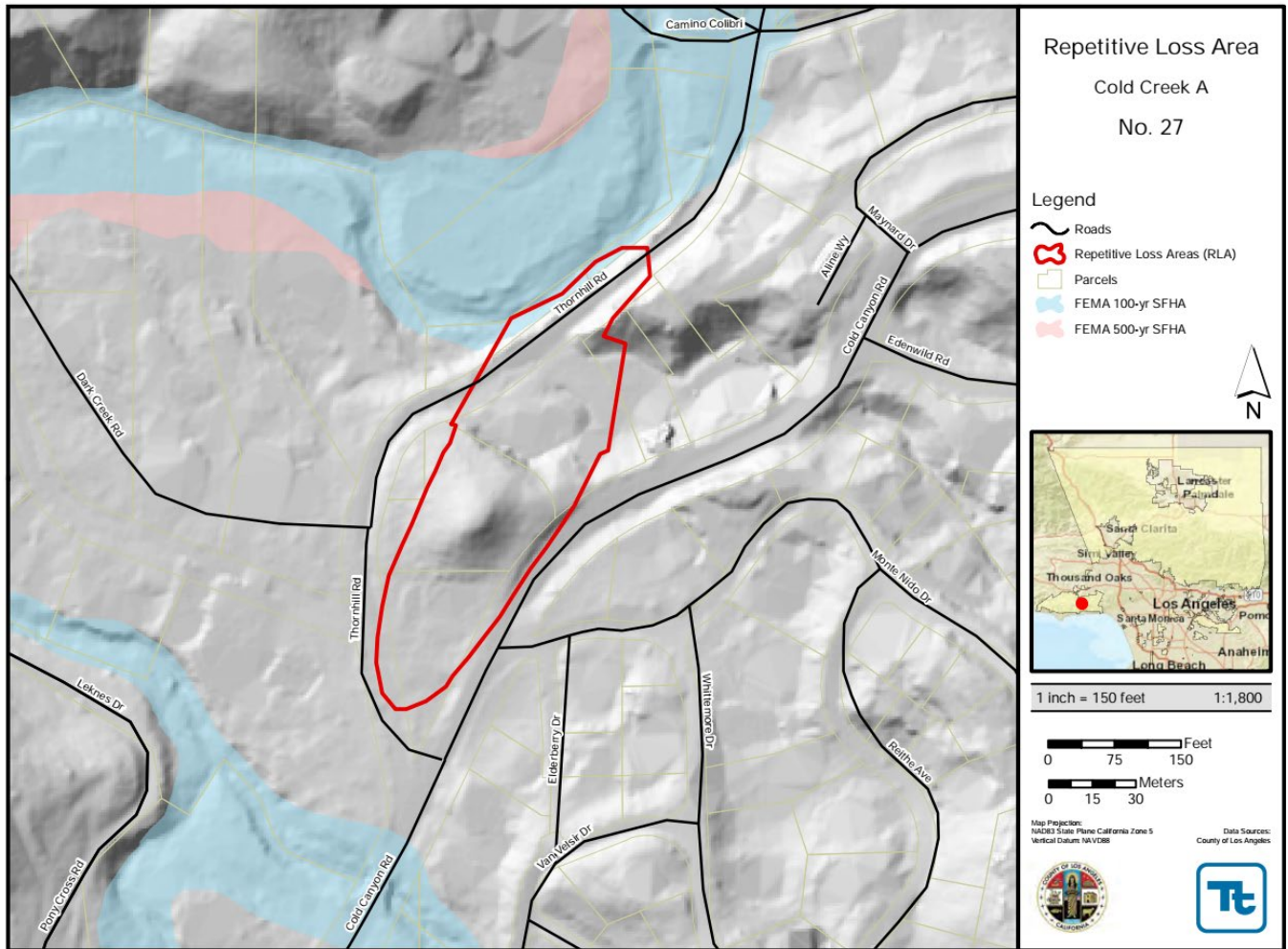


Figure 12-1. Cold Creek A Repetitive Loss Area

13. COLD CREEK B REPETITIVE LOSS AREA

13.1 PROBLEM STATEMENT

Figure 13-1 shows the Cold Creek B Repetitive Loss Area. This area is in the Santa Monica Mountains in the southwestern portion of Los Angeles County. The single repetitive loss property is not within a FEMA-mapped floodplain, but the delineated repetitive loss area does parallel an approximate Zone A area mapped along Cold Creek. There is significant topographic relief in this area. The cause of repetitive flooding in the area is associated with the blockage or obstruction of contributory drainages to Cold Creek off the hillside areas. Drainage ways and flow paths can become blocked by debris (downed trees and shrubs, leaves, sediment, and trash) collected by overland flows. When the drainages are blocked, stormwater flows overland to the streets, where there are few if any drainage conveyances. The properties in the Cold Creek B Repetitive Loss Area are topographically subject to flooding when these situations occur due to their locations below roadways.

13.2 IDENTIFIED REPETITIVE LOSS PROPERTIES

Table 13-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 13-1. Repetitive Loss Properties in Cold Creek B Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
#0148768	45	12/04, 2/05	\$8,062	No

Identified Flood Cause: Property is lower than the adjacent street, where flows concentrate during a rainstorm. The property is adjacent to Cold Creek (Zone X (shaded) in FIRM); however, the owner reported that no issues were caused by creek flows. The owner reported that he has provided sufficient catch basins to handle the flows. Without proper diversion and control of runoff from the streets, future flood damage may occur.

13.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

Seven properties with nine insurable buildings have been identified in this repetitive loss area. Table 13-2 provides general information for each property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 13-2. All Properties in Cold Creek B Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
CO-B1	2	Slab	D75C	Public education Local drainage improvements Drainage maintenance
CO-B2	1	Slab	D7C	Public education Local drainage improvements Drainage maintenance
CO-B3	1	Slab	D75B	Public education Local drainage improvements Drainage maintenance
CO-B4	1	Slab	D45A	Public education Local drainage improvements Drainage maintenance
CO-B5	1	Slab	D55B	Public education Local drainage improvements Drainage maintenance
CO-B6	2	Slab	No Information	Public education Local drainage improvements Drainage maintenance
CO-B7	1	Crawlspace	D4B	Public education Local drainage improvements Drainage maintenance
Total	9			

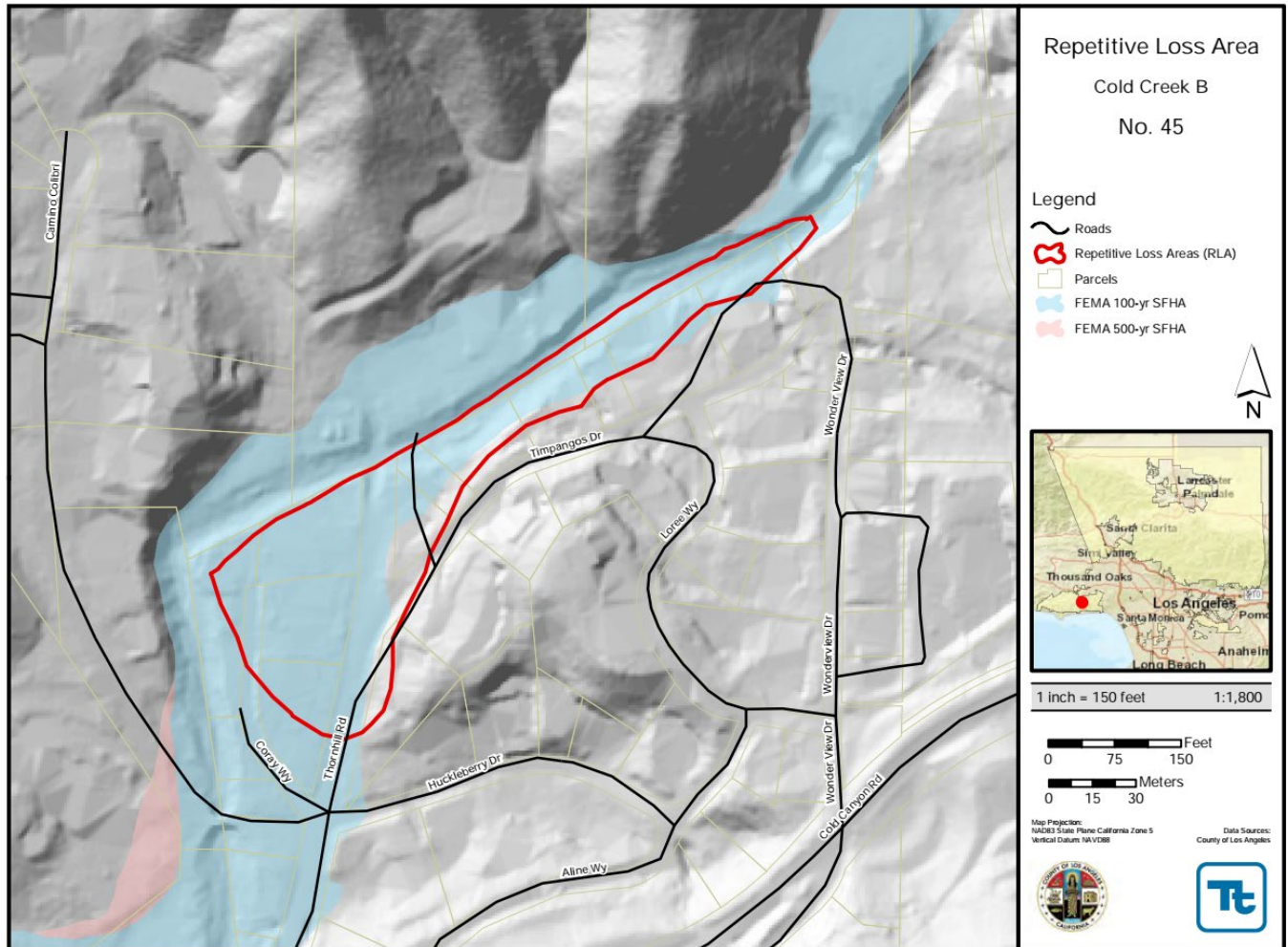


Figure 13-1. Cold Creek B Repetitive Loss Area

14. DEL SUR REPETITIVE LOSS AREA

14.1 PROBLEM STATEMENT

Figure 14-1 shows the Del Sur Repetitive Loss Area. This area is in the northwestern part of Los Angeles County. Flood zones are mapped on FEMA FIRMs. This repetitive-loss area is within a FEMA-designated 100-year floodplain, and the dates of loss for the claims on the property coincide with federally declared flood disasters. No other loss history suggests any flooding of this area other than from the riverine overbank flooding reflected in the FEMA FIRMs. The properties identified for this area analysis were selected due to their proximity to the stream.

14.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 14-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 14-1. Repetitive Loss Properties in Del Sur Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
#0138781	55	1/05, 2/05	\$14,034	No

Identified Flood Cause: This property is within a FEMA designated 100-year floodplain and the dates of loss for the two claims coincide with significant flood events in LA county that received federal disaster declarations (DR-1577 and DR-1585). The cause of flooding for this area is commensurate with the flood risk reflected on the FEMA FIRM for this area.

14.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

Two properties with 10 insurable buildings have been identified in this repetitive loss area. Table 14-2 provides general information for the properties, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 14-2. All Properties in Del Sur Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
DS1	3	Crawlspace	D8B	Elevation Public education Local drainage improvements Drainage maintenance
DS2	7	Crawlspace	D75B	Elevation Public education Local drainage improvements Drainage maintenance
Total	10			

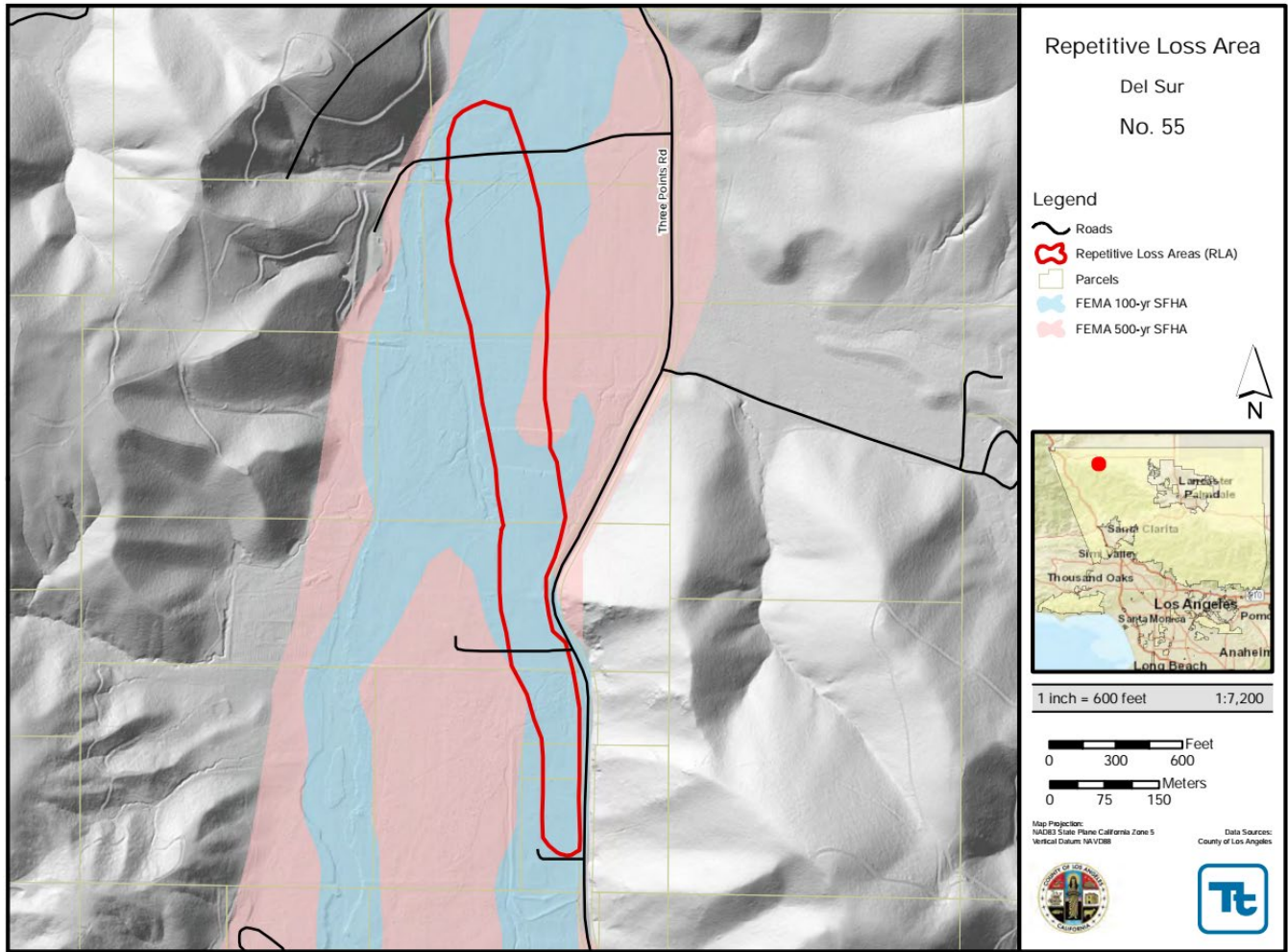


Figure 14-1. Del Sur Repetitive Loss Area

15. LOWER TOPANGA CANYON REPETITIVE LOSS AREA

15.1 PROBLEM STATEMENT

The Lower Topanga Canyon Repetitive Loss Area is shown in Figure 15-1. This area is in the Topanga Canyon area of Los Angeles County, about 26 miles northwest of downtown Los Angeles. All of the areas along the lower reach of the Topanga Canyon channel (sometimes referred to as the Rodeo Grounds area) were frequently inundated by Topanga Canyon flood flows. These properties are within the lower reach of Topanga Canyon, with ground elevation similar to the channel invert (i.e. lowest elevation of the channel). This information was derived from analysis of the topographic data as described in Chapter 2. Rodeo Grounds Road is higher than the invert; however, the berm is not sufficient to confine the floodwater and the Rodeo Grounds low-lying areas have been subject to severe flood damage. Previous insurance claims were filed by residents who leased the properties.

15.2 IDENTIFIED REPETITIVE LOSS PROPERTIES

Table 15-1 lists the FEMA-designated repetitive loss properties within this repetitive loss area.

Table 15-1. Repetitive Loss Properties in Lower Topanga Canyon Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0014900	19	3/78, 2/80	\$9,374	Yes ^a
<i>Identified Flood Cause:</i> Property in the channel and in Flood Zone AE of Lower Topanga Canyon				
0017941	20	1/78, 2/80, 1/83	\$11,180	Yes ^a
<i>Identified Flood Cause:</i> Property in the channel and in Flood Zone AE of Lower Topanga Canyon				
0017942	21	1/78, 1/80, 2/80, 1/83, 2/92, 1/95	\$7,744	Yes ^a
<i>Identified Flood Cause:</i> Property in the channel and in Flood Zone AE of Lower Topanga Canyon				
0028440	22	1/78, 3/78	\$8,806	Yes ^a
<i>Identified Flood Cause:</i> Property in the channel and in Flood Zone AE of Lower Topanga Canyon				
0017940	23	1/78, 3/78, 2/80	\$3,999	Yes ^a
<i>Identified Flood Cause:</i> Property in the channel and in Flood Zone AE of Lower Topanga Canyon				

- a. The secondary analysis for this area determined that there are no longer structures on any of the properties. The County will need to submit new AW-501s for this area.

15.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

The identified five repetitive loss properties are the only properties in this repetitive loss area. The secondary analysis for this area determined that there are no longer structures on any of the properties. The County will need to submit new AW-501s for this area. Until these corrections can be made, this area will remain in this RLAA, however no additional properties are identified.

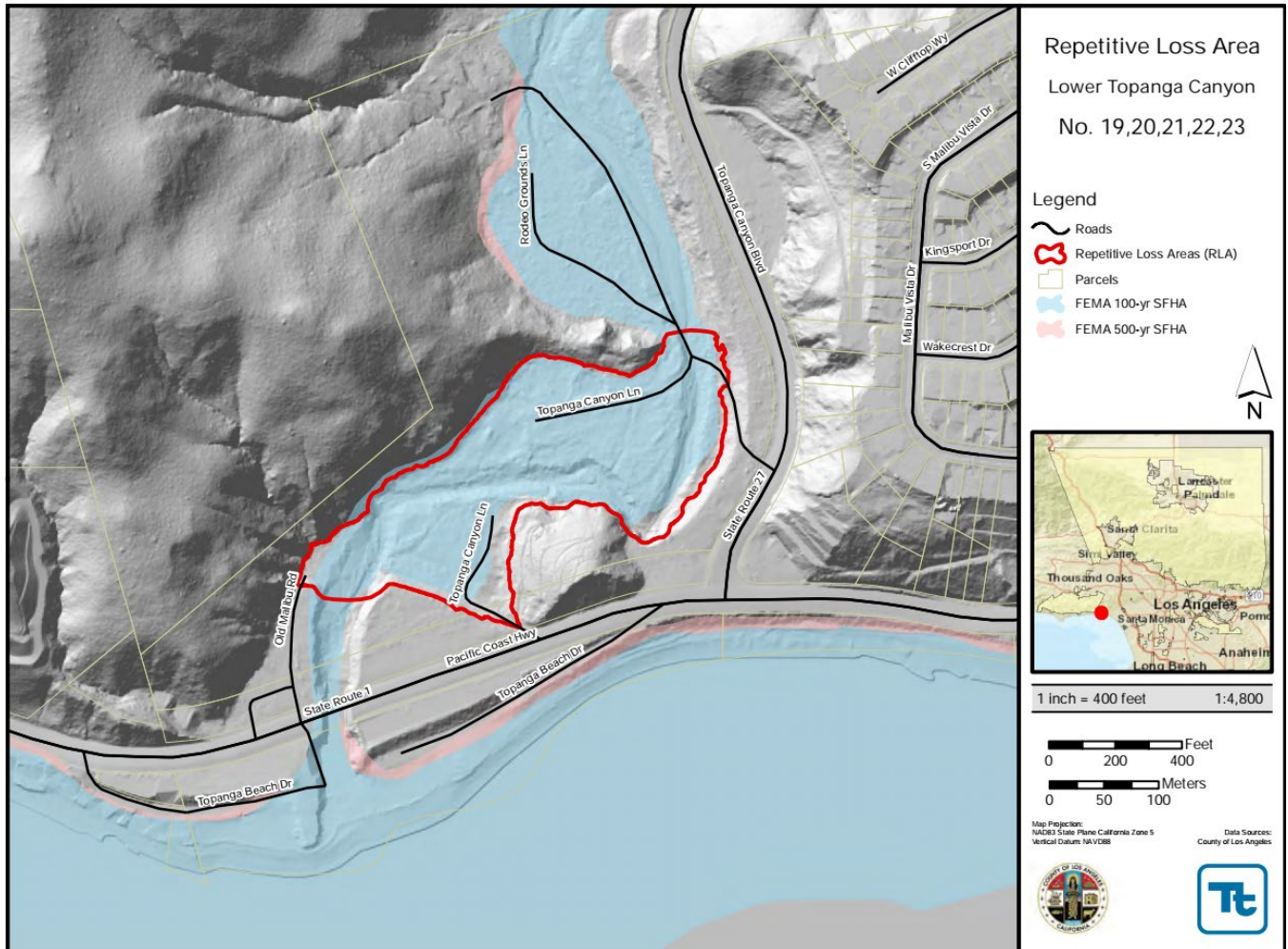


Figure 15-1. Lower Topanga Canyon Repetitive Loss Area

16. MALIBOU LAKE REPETITIVE LOSS AREA

16.1 PROBLEM STATEMENT

Figure 16-1 shows the Malibou Lake repetitive loss area. This area includes 19 repetitive loss properties, one of which has been mitigated, one of which was destroyed, and 17 of which are unmitigated. Malibou Lake is a privately owned and operated reservoir in the southwest area of Los Angeles County near the Ventura County/Los Angeles County line. The contributing watershed starts in Ventura Hidden Valley in Ventura County, approximately 10 miles northwest of Malibou Lake. Stormwater runoff enters the ungated Lake Sherwood and flows through Potrero Valley Creek, Westlake Lake, and Triunfo Canyon Creek before emptying into Malibou Lake. Westlake Lake is 4.7 miles northwest of Malibou Lake and is in both Ventura and Los Angeles Counties. Malibou Lake also receives runoff from Medea Creek, a major tributary north of the lake. The total drainage area at the spillway of Malibou Lake is 64 square miles.

The lake has a surface area of approximately 20 acres at spillway elevation. The contributory watershed covers portions of Ventura County and Los Angeles County and crosses the boundaries of three city: Thousand Oaks, Agoura Hills, and Westlake Village.

Most of the repetitive loss properties in this area are damaged by rising water of Malibou Lake during flood events. Malibou Lake lies at the confluence of Triunfo Canyon and Medea Creek. The terrain in the area around the lake is steep and rocky, causing rainwater to concentrate at the lake quickly. In addition, the watershed is highly urbanized, so its runoff is significant. The storage below the spillway is ineffective for peak flow attenuation during normal times since the water elevation is maintained at the spillway elevation at all times. During flood events, the lake is partially filled with sediments, reducing its recreational functions.

16.2 IDENTIFIED REPETITIVE LOSS PROPERTIES

Table 16-1 lists the FEMA-designated repetitive loss properties within this repetitive loss area.

16.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

Fifty-five properties with 57 insurable buildings have been identified in this repetitive loss area. Table 16-2 provides general information for each property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 16-1. Repetitive Loss Properties in Malibou Lake Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0001165	46	2/98, 1/01, 3/01, 2/03, 2/04, 1/05, 2/05, 1/08, 1/10	\$11,674	No
0012820	46	2/92; 2/93; 1/95; 2/98; 3/01; 12/04; 1/05; 2/17	\$38,993	No
0028444	46	3/78; 2/80; 1/83; 3/83; 2/92; 1/95; 2/98	\$13,414	No

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0028487	46	3/78; 2/80	\$9,398	No
0035727	46	2/80; 1/83; 3/83; 2/92; 1/95; 2/98	\$25,272	No
0039962	46	2/80; 2/92; 3/95; 2/98	\$2,859	No
0040087	46	2/80; 3/83; 2/92	\$20,926	No
0046576	46	2/80; 3/83; 2/92; 2/93; 1/95; 3/95; 2/98;	\$6,716	No
0047197	46	2/80; 3/83; 2/92	\$5,538	No
0049496	46	3/83; 2/92; 1/95; 2/98	\$9,792	No
0052974	46	2/80; 1/83; 2/92; 1/95; 3/95; 2/98; 1/05; 2/17	\$14,207	No
0057971	46	3/83; 2/92; 1/95	\$9,150	Destroyed
0071413	46	2/92; 1/95; 3/95	\$16,264	Yes ^a
0071417	46	1/83; 2/92; 1/95; 2/98; 2/01; 1/05	\$2,649	No
0072406	46	2/93; 1/95	\$4,391	No
0073653	46	1/92; 1/95	\$65,231	No
0091232	46	2/98; 1/05	\$14,607	No
0093872	46	2/80; 1/95; 2/98	\$4,288	No
0137792	46	3/01; 1/05	\$1,557	No

a. An AW-501 has been submitted for this property, but correction was not yet approved as of this RLAA. Area will be removed from RLAA once correction is processed by FEMA.

Table 16-2. All Properties in Malibou Lake Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
ML1	1	Crawlspace	D75B	Abandon lowest floor or convert to parking and storage Elevate lowest floor to above base flood elevation Acquisition Public education
ML2	1	Slab	D75B	Abandon lowest floor or convert to parking and storage Elevate lowest floor to above base flood elevation Acquisition Public education
ML3	1	Slab	D75B	Elevation Flood-proofing Floodwall Public education
ML4	1	Slab	D75B	All structures removed
ML5	1	slab	D75B	Elevation Acquisition Flood-proofing Public education
ML6	1	Slab	D75B	Elevation, Floodwall Flood-proofing Public education

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
ML7	1	Slab	D75B	Abandon lowest floor or convert to parking and storage Elevate lowest floor to above base flood elevation Acquisition Flood-proofing Public education
ML8	1	Slab	D75B	Abandon lowest floor or convert to parking and storage Elevate lowest floor to above base flood elevation Acquisition Flood-proofing Public education
ML9	1	Slab	D75B	Abandon lowest floor or convert to parking and storage Elevate lowest floor to above base flood elevation Acquisition Flood-proofing Public education
ML10	1	Slab	D75B	Abandon lowest floor or convert to parking and storage Elevate lowest floor to above base flood elevation Acquisition Public education
ML11	1	Slab	D75B	Public Education
ML12	1	Slab	D75B	Abandon lowest floor or convert to parking and storage Elevate lowest floor to above base flood elevation Acquisition Public education
ML13	1	Slab	D75B	Abandon lowest floor or convert to parking and storage Elevate lowest floor to above base flood elevation Acquisition Public education
ML14	1	Slab	D75B	Abandon lowest floor or convert to parking and storage Elevate lowest floor to above base flood elevation Acquisition Public education
ML15	1	Slab	D75B	Elevation Acquisition Public education
ML16	1	Slab	D75B	Confine upstream inflow Upsize the pipe opening Improve storm drain Add a truss-rack at the inlet Public education
ML17	1	Slab	D75B	Elevation Acquisition Public education
ML18	1	Slab	D75B	Install perimeter diversion ditches, walls, and berms to prevent street runoff entering the property Raise and pave planting areas with ditches to drain, Build a cutoff wall to keep storm runoff from street flows away from the structure. Provide a ditch crossing the driveway to divert flows away from the structure Build cutoff wall to prevent seepage Public education

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
ML19	1	Slab	D75B	Abandon lowest floor or convert to parking and storage Elevate lowest floor to above base flood elevation Acquisition Public education
ML20	1	Slab	D75B	Maintain drainage flow away from property Public education
ML21	1	Slab	D75B	Maintain drainage flow away from property Public education
ML22	1	Slab	D75B	Flood-proofing of the garage Public education
ML23	1	Slab	D75B	Flood-proofing Public education
ML24	1	Slab	D75B	Flood-proofing Public education
ML25	1	Slab	D75B	Flood-proofing Public education
ML26	1	Slab	D75B	Public education for whole property Flood-proofing for the boat house For the main house: Flood-proofing Abandon lowest floor Elevation Acquisition
ML27	1	Slab	D75B	Flood-proofing Public education
ML28	1	Slab	D75B	Flood-proofing Public Education
ML29	1	Slab	D75B	Flood-proofing Public Education
ML30	1	Crawlspace	D75B	Flood-proofing Public Education
ML31	1	Crawlspace	D75B	Abandon lowest floor or convert to parking and storage Elevate lowest floor to above base flood elevation Flood-proofing Floodwall Public education
ML32	1	Slab	D75B	Elevation, acquisition Flood-proofing Public education
ML33	1	Slab	D75B	Flood-proofing Floodwall Public education
ML34	1	Slab	D75B	Floodwall Flood-proofing Public Education
ML35	1	Slab	D6B	Temporary barriers to protect doors, divert water around home, decrease water coming in from street/driveway Public education

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
ML36	1	Slab	D75B	Mitigation measures for main structure: Acquisition Flood-proofing Floodwall Public education
ML37	1	Slab	D75B	Flood-proof basement garage Floodwall Public education
ML38	2	Slab	D75B	Abandon lowest floor or convert to parking and storage Elevate lowest floor to above base flood elevation Acquisition Flood-proofing Public Education
ML39	1	Slab	D75B	Abandon lowest floor or convert to parking and storage Elevate lowest floor to above base flood elevation Acquisition Flood-proofing Public education
ML40	1	Crawlspace	D6A	Elevation Acquisition Floodwall Public Education
ML41	1	Slab	D75B	Elevation Acquisition Floodwall Public Education
ML42	1	Slab	D75B	Elevation Acquisition Floodwall Public education
ML43	1	Slab	D75B	Flood-proof basement garage Floodwall Public education
ML44	1	Crawlspace	D75B	Flood-proofing, Temporary barriers (sandbags and such other items) Public education
ML45	1	Slab	D75B	Public Education
ML46	1	Slab/Crawlspace	D75B	Public Education
ML47	1	Slab	D75B	Flood-proofing Public education
ML48	1	Slab	D75B	Elevation Acquisition Floodwall Flood-proofing Public education
ML49	1	Crawlspace	D75B	Floodwall Flood-proofing Public Education

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
ML50	1	Crawlspace	e	Flood-proofing Public education
ML51	2	Crawlspace	D75B	Abandon lowest floor or convert to parking and storage Elevate lowest floor to above base flood elevation Acquisition Flood-proofing Public education
ML52	1	Crawlspace	D75B	Public education
ML53	1	Crawlspace	D75B	Public education
ML54	1	Slab	D75B	Public education
ML55	1	Crawlspace	D75B	Elevation Acquisition Floodwall Flood-proofing Public education
Total	57			

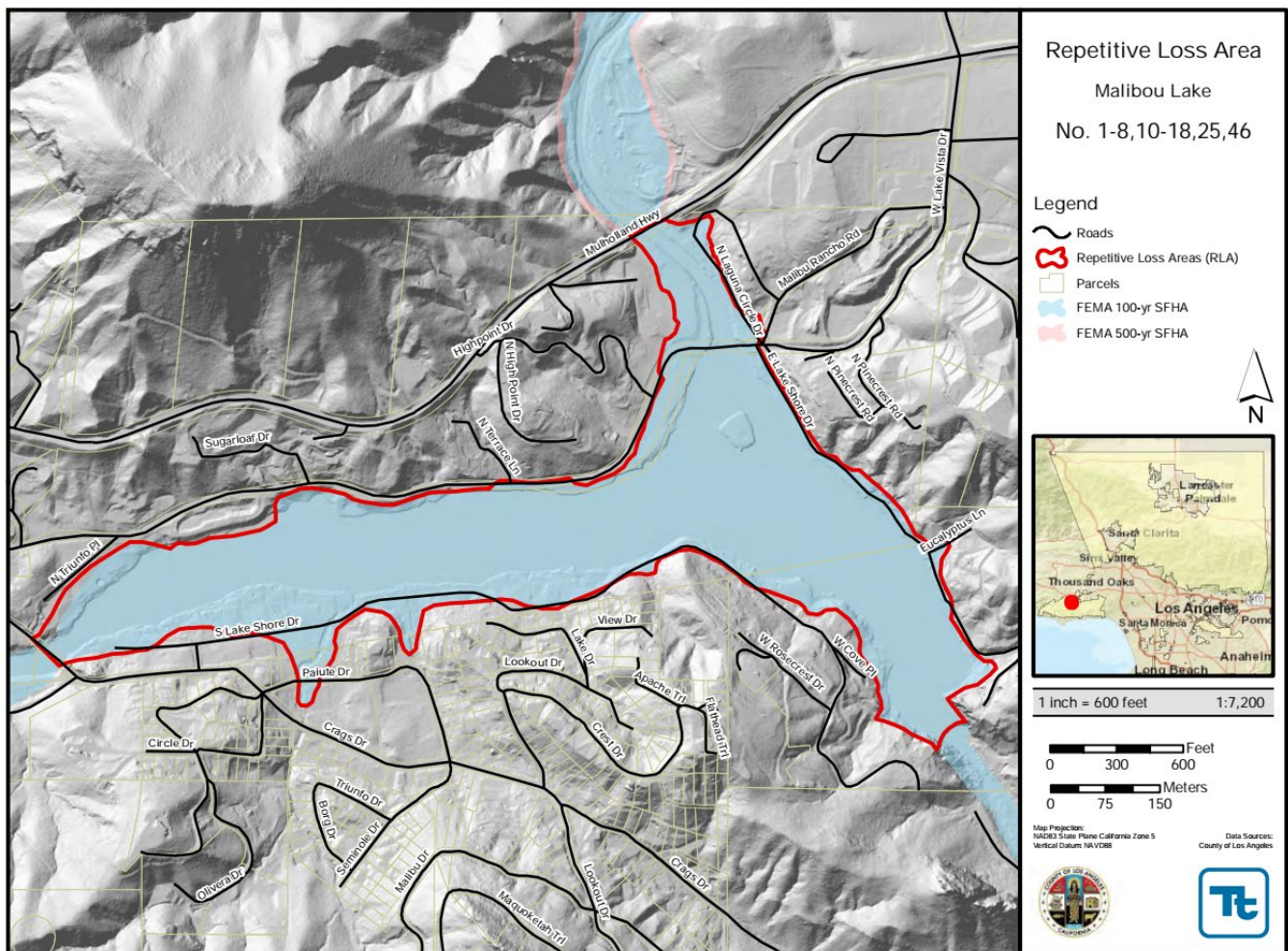


Figure 16-1. Malibou Lake Repetitive Loss Area

17. MALIBU REPETITIVE LOSS AREA

17.1 PROBLEM STATEMENT

Figure 17-1 shows the Malibu Repetitive Loss Area. This area is in the Santa Monica Mountains in the southwestern portion of Los Angeles County. There is one repetitive loss property in this area. The property is located at the lowest point of the street. The first floor of the house was built lower than the street level, and street runoff can enter the house through the driveway. An owner of this property built a 6-inch berm in front of the driveway to divert the water. This, however, may not have relieved the flood problem associated with major floods. The other properties in this area have similar circumstances, with the first floor of the house built below the street within a similar elevation contour. There is no mapped FEMA flood zone within this area.

17.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 17-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 17-1. Repetitive Loss Properties in Malibu Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0070079	28	2/92, 1/95, 3/98, 3/00	\$5,524	Destroyed

Identified Flood Cause: House is located at the low point of the street.

17.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

Seven properties with 10 insurable buildings have been identified in this repetitive loss area. Table 17-2 provides general information for each property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 17-2. All Properties in Malibu Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
MAL1	2	Slab	No Information	Diversion Berm Street grading Public education
MAL2	1	Slab	No Information	Diversion Berm Street grading Public education
MAL3	2	Slab	No Information	Diversion Berm Street grading Public education
MAL4	1	Crawlspace	No Information	Diversion Berm Street grading Public education
MAL5	1	Crawlspace	D10A	Diversion Berm Street grading Public education
MAL6	1	Slab	D85A	Diversion Berm Street grading Public education
MAL7	2	Basement	D10D	Diversion Berm Street grading Public education
Total	10			

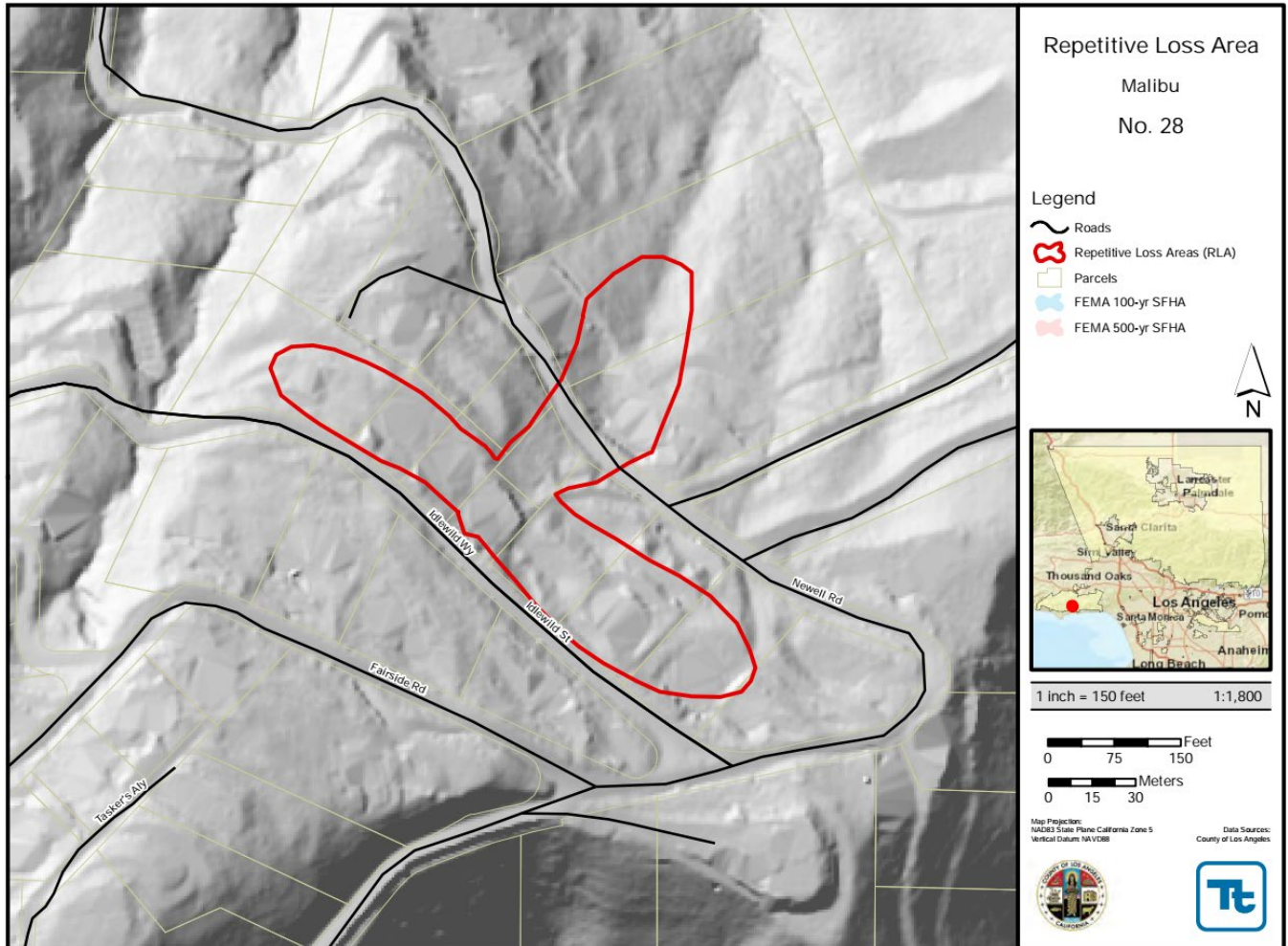


Figure 17-1. Malibu Repetitive Loss Area

18. QUARTZ HILL A REPETITIVE LOSS AREA

18.1 PROBLEM STATEMENT

The Quartz Hill A Repetitive Loss Area is located in the Quartz Hill region of Los Angeles County. Quartz Hill, a 390-square-mile, high desert community, is located in the westernmost part of the Mojave Desert north of the San Gabriel Mountains and west of Lancaster and Palmdale. Flood studies of the Quartz Hill area show that the identified repetitive-loss property is located within a FEMA Zone X, an area of minimal flooding. The repetitive flooding of this area is due to the overflow runoff from a detention basin, which has now been relocated southeast of the identified repetitive-loss property. This property is also possibly subject to sheet-flow along the Antelope Valley Drainage Corridor No. 9, (identified in the *Antelope Valley Comprehensive Plan of Flood Control and Water Conservation*; Los Angeles County, 1991). According to the repetitive-loss property owner, the property was flooded when the retention basin, located a couple of blocks to the south, could not hold the stormwater, and the gate was forced to open. The overland runoff entered his property across empty lots, causing flooding at the property. The basin has been replaced by a golf course and relocated one half mile to the northwest, further downstream from the property, which eliminated further flooding problems. This is substantiated by the fact that there has been no subsequent flood damage to the property since the relocation of the retention basin. This is considered to be an isolated event, and no other properties were determined to be impacted. The County has submitted an AW-501 for this property. This property will be shown as “mitigated,” and the area will be removed from obligation for annual repetitive loss mailing under the County’s CRS program.

18.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 18-1 lists the FEMA-designated repetitive loss property within this repetitive loss area; which is being listed as “mitigated.” No other properties are identified for this area.

Table 18-1. Repetitive Loss Properties in Quartz Hill A Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0057385	38	1/92, 2/92, 12/92	\$15,228	Yes ^a

Identified Flood Cause: Overflow from detention basin, which has been relocated. Property no longer subject to repetitive flooding.

- a. An AW-501 has been submitted for this property, but correction was not yet approved as of this RLAA. Area will be removed from RLAA once correction is processed by FEMA.

18.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

There is only one property included in this repetitive loss area. It has three insurable buildings. Table 18-2 provides general information for the property. The property is listed as mitigated, so no new mitigation measures are recommended.

Table 18-2. All Properties in Quartz Hill A Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
QH-A1	3	Slab	D6C	N/A
Total	3			

19. QUARTZ HILL B REPETITIVE LOSS AREA

19.1 PROBLEM STATEMENT

Figure 19-1 shows the Quartz Hill B Repetitive Loss Area. This area is located in the Quartz Hill region of Los Angeles County. Quartz Hill, a 390-square-mile, high desert community, is located in the westernmost part of the Mojave Desert north of the San Gabriel Mountains and west of Lancaster and Palmdale.

None of the properties in this area are located within a FEMA-identified special flood hazard area. The flooding source for this repetitive-loss area is street runoff that breaks out from Antelope Valley Drainage Corridor No. 7 (identified in the *Antelope Valley Comprehensive Plan of Flood Control and Water Conservation*; Los Angeles County, 1991) along 50th and 52nd Streets. The other properties in this area are at ground elevations similar to that of the identified repetitive loss property and have lowest floors with similar elevations as well.

19.2 IDENTIFIED REPETITIVE LOSS PROPERTIES

Table 19-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 19-1. Repetitive Loss Properties in Quartz Hill B Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0091087	39	2/92, 12/97	\$2,783	No

Identified Flood Cause: Property is located in Antelope Drainage Corridor. Sheet flow from Antelope Valley Drainage Corridor No. 7 flooded the property, displacing retaining walls. The property currently has a private earthen ditch and small berms along it to route the water through the property boundaries.

19.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

Twelve properties with 26 insurable buildings have been identified in this repetitive loss area. Table 19-2 provides general information for each property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 19-2. All Properties in Quartz Hill B Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
QH-B1	2	Crawlspace	D5C	Improve private ditch Construct an area-wide storm drain and flood retention system Public education
QH-B2	1	Crawlspace	D65C	Construct an area-wide storm drain and flood retention system Public education
QH-B3	1	Crawlspace	D55B	Construct an area-wide storm drain and flood retention system Public education
QH-B4	4	Crawlspace	D6B	Construct an area-wide storm drain and flood retention system Public education
QH-B5	1	Crawlspace	D75D	Construct an area-wide storm drain and flood retention system Public education
QH-B6	3	Crawlspace	D65D	Construct an area-wide storm drain and flood retention system Public education
QH-B7	5	Crawlspace	D55C	Construct an area-wide storm drain and flood retention system Public education
QH-B8	2	Crawlspace	D8D	Construct an area-wide storm drain and flood retention system Public education
QH-B9	3	Crawlspace	D45C	Construct an area-wide storm drain and flood retention system Public education
QH-B10	2	Crawlspace	D75A	Construct an area-wide storm drain and flood retention system Public education
QH-B11	1	Slab	D65D	Construct an area-wide storm drain and flood retention system Public education
QH-B12	1	Crawlspace	D55C	Construct an area-wide storm drain and flood retention system Public education
Total	26			

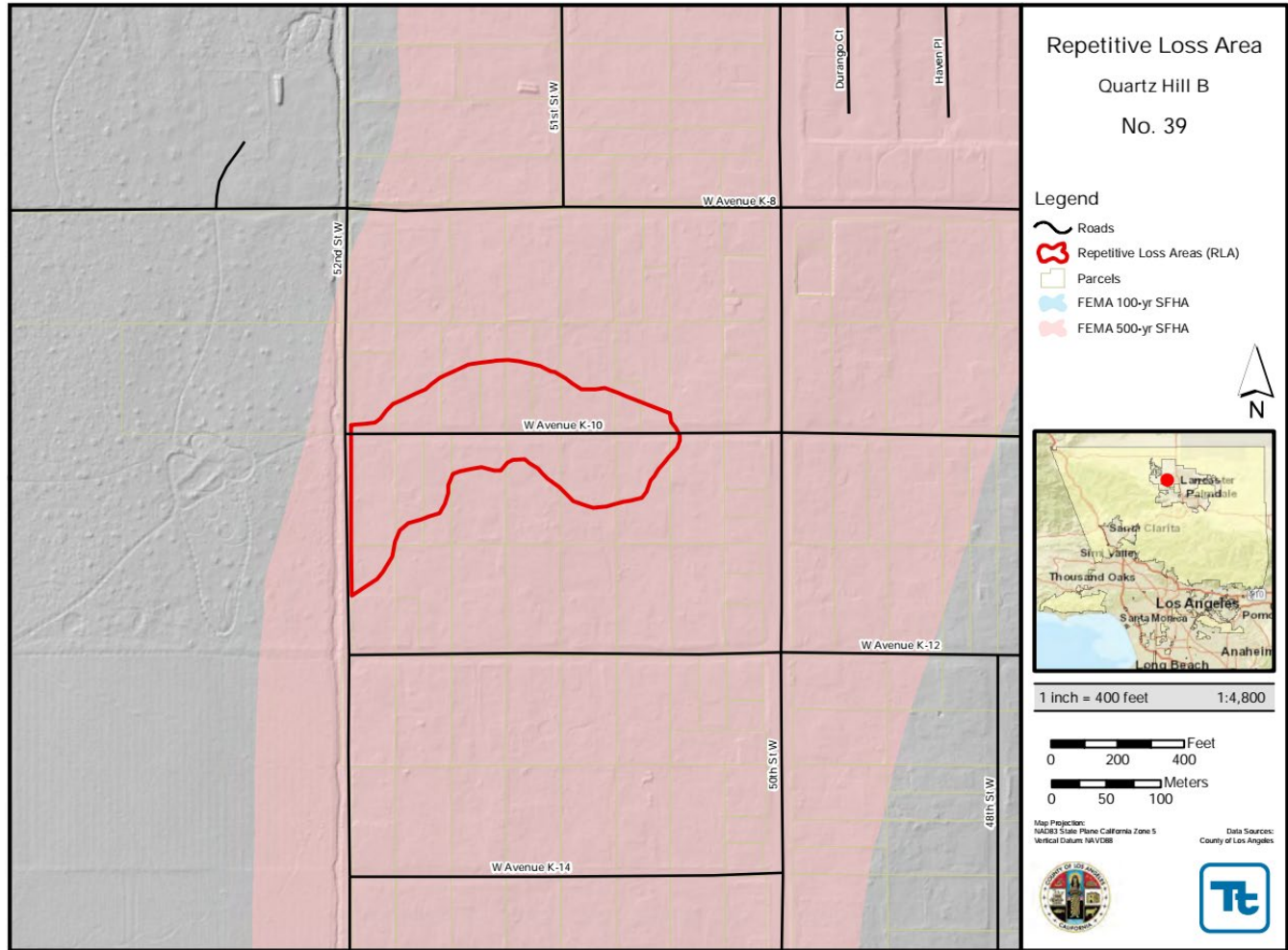


Figure 19-1. Quartz Hill B Repetitive Loss Area

20. QUARTZ HILL C REPETITIVE LOSS AREA

20.1 PROBLEM STATEMENT

Figure 20-1 shows the Quartz Hill C Repetitive Loss Area. This area is located in the Quartz Hill region of Los Angeles County. Quartz Hill, a 390-square-mile, high desert community, is located in the westernmost part of the Mojave Desert north of the San Gabriel Mountains and west of Lancaster and Palmdale.

None of the properties in this area are located within a FEMA-identified special flood hazard area. The repetitive-loss area is within an alluvial fan in Antelope Valley Drainage Corridor No. 7 (identified in the *Antelope Valley Comprehensive Plan of Flood Control and Water Conservation*; Los Angeles County, 1991) which contributes flows to the property via surrounding streets. This property is located at the low point of the street where flows can concentrate and enter the property. The other properties identified within this area have a topographic relationship with the identified repetitive loss property.

20.2 IDENTIFIED REPETITIVE LOSS PROPERTIES

Table 20-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 20-1. Repetitive Loss Properties in Quartz Hill C Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0131222	40	2/04, 10/04, 12/04, 1/05, 2/05	\$6,186	No

Identified Flood Cause: The subject property is located within Flood Hazard Zone X (shaded) and is located in Antelope Drainage Corridor 7. The property is subject to significant flooding. The corridor flows may be conveyed to this property through streets and low lying areas and trapped at the property (which is lower than the streets). The first floor is also lower than the streets and has been damaged frequently by historical floods. The owner has constructed berms at the entry gate and prepared a pump pit. Without a comprehensive and reliable berm and on-site pump system, this property may continue to experience flood damage and submit future claims. In addition, the interior household flows are being discharged to the side yard, but should be disposed via a sanitary sewer or County-approved drywell.

20.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

Twelve properties with 26 insurable buildings have been identified in this repetitive loss area. Table 20-2 provides general information for each property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 20-2. All Properties in Quartz Hill C Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
QH-C1	2	Crawlspace	D35B	Stabilize the entry with rock or concrete blocks under the dirt. Install a permanent automatic control pump so that it activates if water reaches a predetermined level of 1 or 2 inches. Complete and raise the 1' high side wall Install a dry well with dimensions of 2' or 3' diameter, 10' or 15' depth to receive discharge. Connect the washer and bath flow to the dry well.
QH-C2	2	Crawlspace	D5A	Construct an area-wide storm drain and flood retention system Public education
QH-C3	3	Crawlspace	D6D	Construct an area-wide storm drain and flood retention system Public education
QH-C4	3	Crawlspace	D7B	Construct an area-wide storm drain and flood retention system Public education
QH-C5	2	Crawlspace	D4B	Construct an area-wide storm drain and flood retention system Public education
QH-C6	3	Crawlspace	D65D	Construct an area-wide storm drain and flood retention system Public education
QH-C7	3	Crawlspace	D6C	Construct an area-wide storm drain and flood retention system Public education
QH-C8	2	Crawlspace	D75D	Construct an area-wide storm drain and flood retention system Public education
QH-C9	1	Crawlspace	D5B	Construct an area-wide storm drain and flood retention system Public education
QH-C10	2	Crawlspace	C5C	Construct an area-wide storm drain and flood retention system Public education
QH-C11	1	Crawlspace	D65D	Construct an area-wide storm drain and flood retention system Public education
QH-C12	2	Crawlspace	D8A	Construct an area-wide storm drain and flood retention system Public education
Total	26			

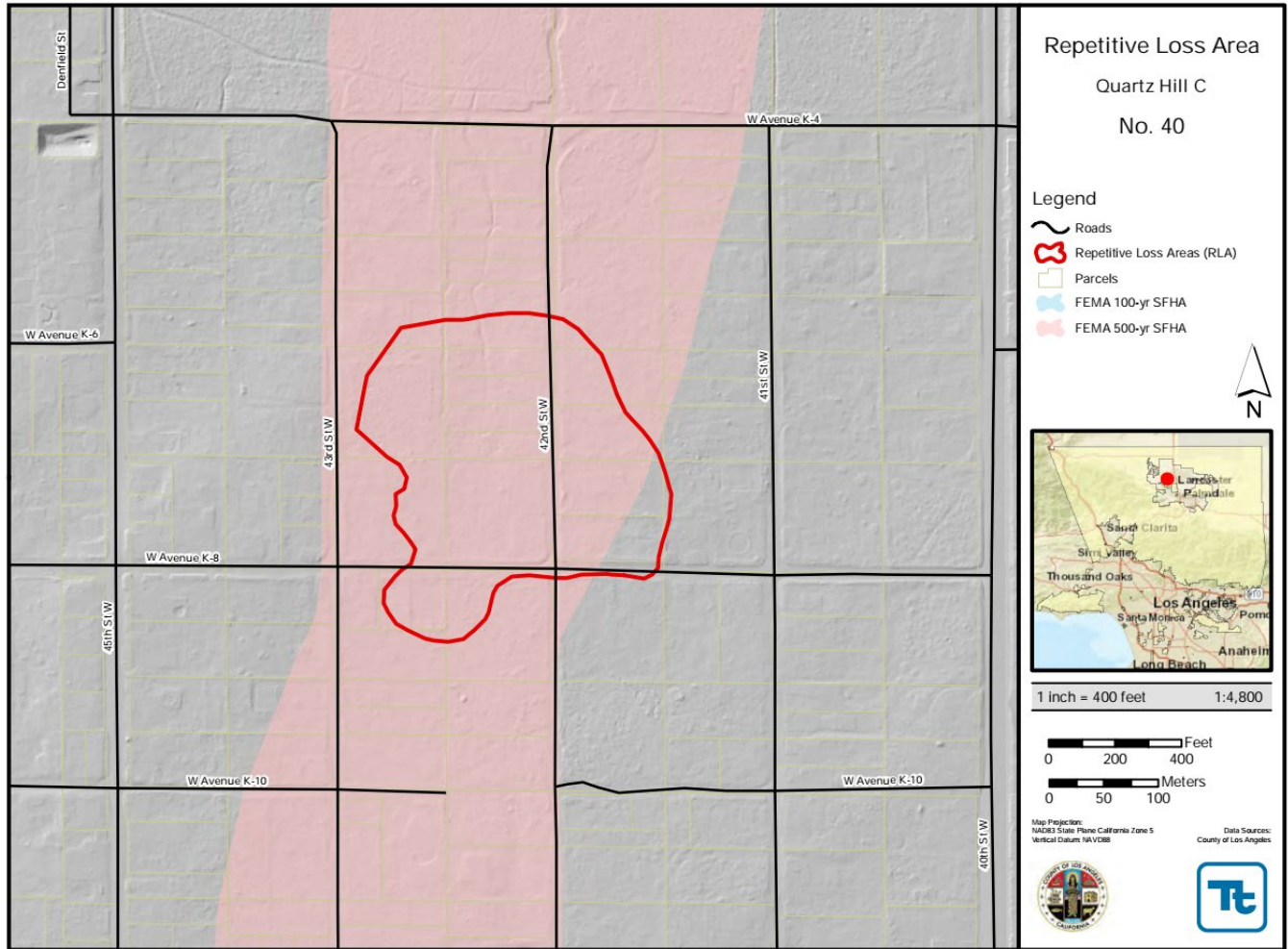


Figure 20-1. Quartz Hill C Repetitive Loss Area

21. ROOSEVELT REPETITIVE LOSS AREA

21.1 PROBLEM STATEMENT

Figure 21-1 shows the Roosevelt Repetitive Loss Area. Flood zones are mapped on FEMA FIRMs. This area is within the floodplain of Little Red Rock Wash in Lancaster. Lancaster is approximately 70 miles north of the downtown Los Angeles in Southern California’s Antelope Valley. It is separated from the Los Angeles Basin by the San Gabriel Mountain Range to the south and from Bakersfield and the San Joaquin Valley by the Tehachapi Mountain Range to the north. Lancaster’s elevation is 2,500 feet above sea level on a high, flat valley surrounded by mountain ranges. The subject property lies below adjacent grade and receives runoff from the higher adjacent grade during rain events.

21.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 21-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 21-1. Repetitive Loss Properties in Roosevelt Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0137354	42	1/05, 2/05	\$17,148	No

Identified Flood Cause: Property is located in FEMA Flood Hazard Zone A and in the floodplain of Little Red Rock Wash. The existing lot is lower than the adjacent grade and may receive runoff from adjacent properties during rain events.

21.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

Three properties with seven insurable buildings have been identified in this repetitive loss area. Table 21-2 provides general information for each property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 21-2. All Properties in Roosevelt Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
RO01	4	Slab	D65C	Establish drainage flow paths around structure Elevation Drainage system maintenance Public education
RO02	2	Crawlspace	DX	Establish drainage flow paths around structure Elevation Drainage system maintenance Public education
RO03	1	Crawlspace	D6A	Establish drainage flow paths around structure Elevation Drainage system maintenance Public education
Total	7			

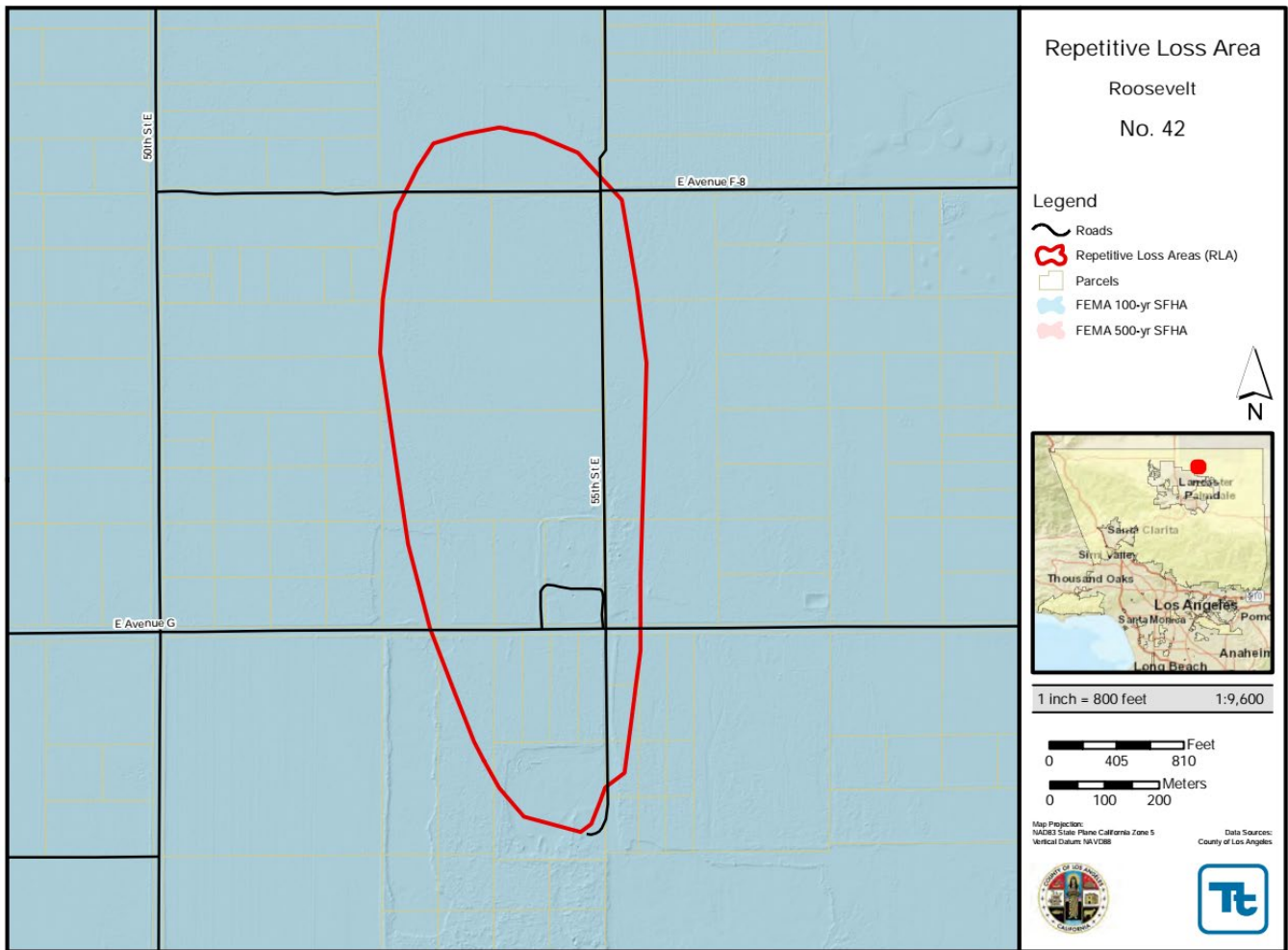


Figure 21-1. Roosevelt Repetitive Loss Area

22. ROWLAND HEIGHTS REPETITIVE LOSS AREA

22.1 PROBLEM STATEMENT

The Rowland Heights Repetitive Loss Area is in Rowland Heights—about 9 square miles of unincorporated Los Angeles County near where Los Angeles County, Orange County and San Bernardino County meet. The elevation is 540 feet above sea level. It is loosely bounded by the Puente Hills to the south and San Jose Hills to the north-northeast. There is a single-property repetitive loss area on Robert Road. No map is provided due to privacy concerns. The area is approximately 10 miles north of Anaheim and 34 miles east-southeast of Los Angeles. Flood studies of the Rowland Heights area show that this repetitive-loss area is located within FEMA Flood Hazard Zone X, an area of minimal flooding. The repetitive-loss area is a single dwelling within a hillside development generally situated high above the floodplain. The possible flooding source is storm and irrigation runoff from the adjoining neighboring property to the east, which is much higher than the subject property. The property may receive significant excess runoff from the elevated neighboring property, especially during large storms. There is also a possibility of slope erosion due to the high and steep nature of the slope. The flooding problem seems to have been partially fixed with a small toe wall. However, a more comprehensive wall and drain system will be required to prevent future claims. This repetitive flooding problem is considered to be localized and isolated to the identified repetitive loss property. The fact that no subsequent claims have been filed in the last 10 years suggests that the problem has been rectified.

22.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 22-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 22-1. Repetitive Loss Properties in Rowland Heights Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0138651	44	3/01, 2/05	\$9,734	No

Identified Flood Cause: The property is significantly lower in elevation than the neighboring property. Without insurance records to confirm, it seems that flows from the neighboring property to the side yard can be sufficient to cause damage. Additionally, the slope may be eroded and contribute debris. Street flows may tend to collect in front of the property before moving down the steep street. The finished floor elevation, however, seems to be high enough to prevent damage by street flow.

22.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

One property with one insurable building has been identified in this repetitive loss area. Table 22-2 provides general information for the property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 22-2. All Properties in Rowland Heights Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
ROW1	1	Slab	D75B	Extend existing side wall and provide ditch to convey flows from the slope Construct terraced wall to avoid slope failure (Construction will require neighbor's consent) Public education
Total	1			

23. TOPANGA CANYON A REPETITIVE LOSS AREA

23.1 PROBLEM STATEMENT

The Topanga Canyon A Repetitive Loss Area is near Garapito Creek, approximately 550 feet upstream of its confluence with Topanga Canyon. Topanga Canyon is located in the Santa Monica Mountains in southwest Los Angeles County. There is a single-property repetitive loss area near Garapito Creek, upstream of its confluence with Topanga Canyon. No map of this repetitive loss area is provided, due to privacy concerns. The studies of Garapito Creek show Flood Hazard Zones A and AE, high-risk flood zones near this repetitive-loss area. The property is on the bank of Garapito Creek and is being accessed by a private bridge from the street. The ground elevation of the house seems to be lower than the street, and the front door and wall were built on the bank slope. The problem is associated with limited creek capacity and backwater effect caused by the small bridge. The property, however, is subject to much greater risk due to high flood discharges estimated for the 1 percent annual chance (100-year) flood and the Los Angeles County capital flood (flooding produced by a 50-year frequency storm falling on a saturated watershed). The elevation for the lowest point of the house is about 920 feet, while the FEMA FIRM shows that the 100-year water surface elevation of Garapito Creek at the location is approximately 926 feet. The creek is moderately vegetated, which may also contribute to the high water.

23.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 23-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 23-1. Repetitive Loss Properties in Repetitive Topanga Canyon A Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0028394	30	3/78, 2/80, 3/83, 2/92, 1/93	\$9,247	No

Identified Flood Cause: The subject property is on the channel bank and partially in Garapito Creek. The problem is associated with limited creek capacity and a backwater effect caused by the small bridge

23.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

There is one property included in this repetitive loss area. It has one insurable building. Table 23-2 provides general information for the property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 23-2. All Properties in Topanga Canyon A Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
TOP-A1	1	Slab	D45C	Acquisition Elevation Convert flood-prone living space and replace with new story Public education
Total	1			

24. TOPANGA CANYON B REPETITIVE LOSS AREA

24.1 PROBLEM STATEMENT

Figure 24-1 shows the Topanga Canyon B Repetitive Loss Area. This area is in the vicinity of Topanga Canyon, approximately 600 feet upstream of the Old Topanga Canyon confluence, within the Santa Monica Mountains in southwestern Los Angeles County. This repetitive-loss area is subject to flooding from Topanga Canyon, which is commensurate with the flood risk reflected on the FIRM.

24.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 24-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 24-1. Repetitive Loss Properties in Topanga Canyon B Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0012818	34	1/80, 2/80, 3/91, 2/92, 1/95	\$7,872	No

Identified Flood Cause: Property in the channel and FEMA Flood Zone AE of Topanga Canyon. The elevation for the lowest point of the house is about 770 feet and is higher than the channel invert of Topanga Canyon (765 feet) by only 5 feet. Based on the FEMA FIRM, the water surface elevation of the area is 772 feet, which could cause flooding of the house.

24.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

Two properties with five insurable buildings have been identified in this repetitive loss area. Table 24-2 provides general information for each property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 24-2. All Properties in Topanga Canyon B Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
TOP-B1	1	Slab	D75B	Acquisition Elevation Convert flood-prone living space and replace with new story Public education
TOP-B2	4	Crawlspace	D45B	Acquisition Elevation Convert flood-prone living space and replace with new story Public education
Total	5			

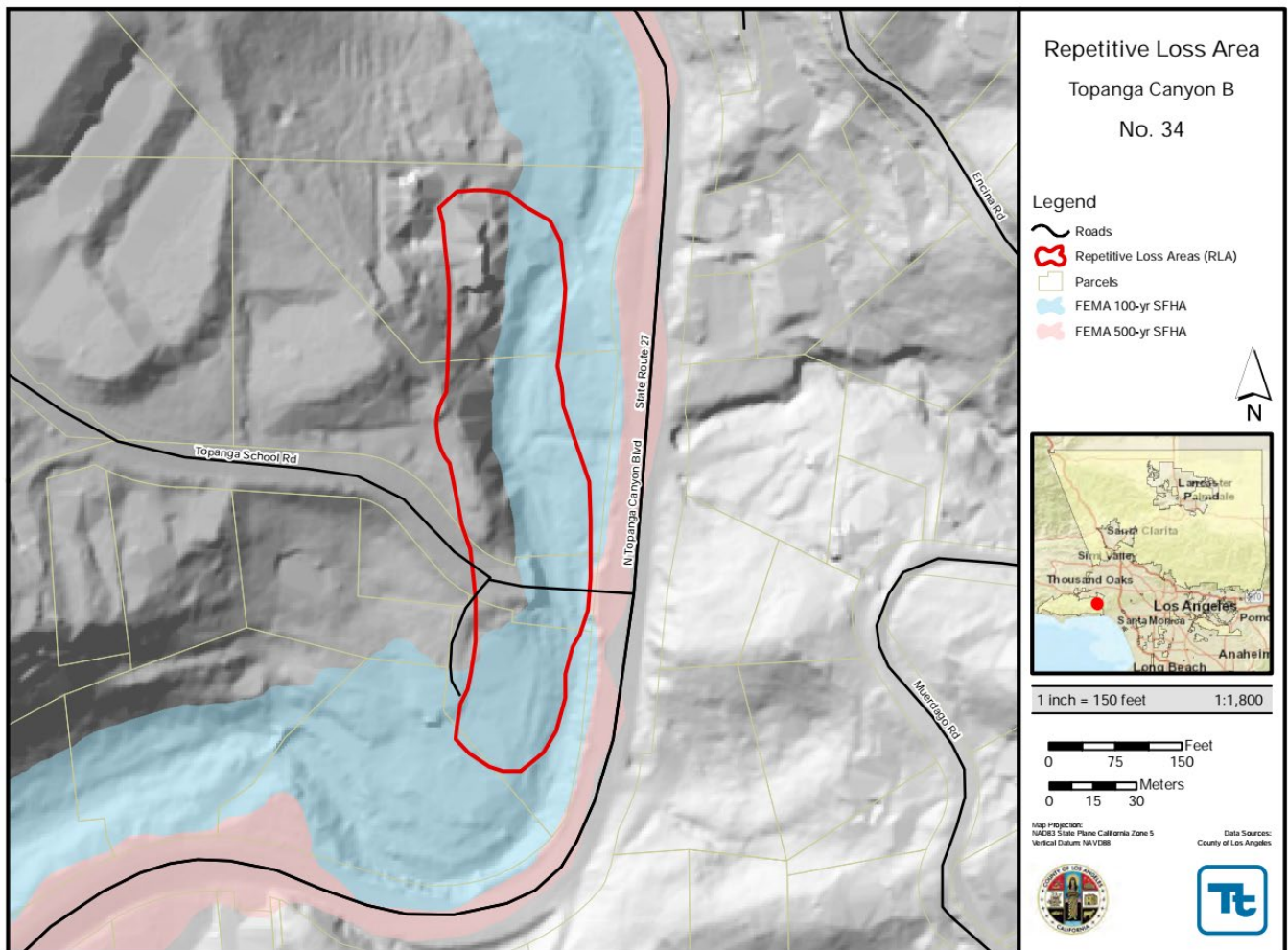


Figure 24-1. Topanga Canyon B Repetitive Loss Area

25. TOPANGA CANYON C REPETITIVE LOSS AREA

25.1 PROBLEM STATEMENT

The Topanga Canyon C Repetitive Loss Area is in the vicinity of Calabasas in southwestern Los Angeles County. The identified repetitive-loss property is newer construction and is located on a knoll of an area with a lot of topographic relief. Flooding at this property appears to be associated with drainage from a surrounding hillside. The repetitive flooding problem is considered to be isolated to the identified repetitive loss property. The fact that no claims have been filed in the last 10 years suggests that the problem has been rectified.

25.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 25-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 25-1. Repetitive Loss Properties in Topanga Canyon C Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0111971	48	2/98, 3/01	\$11,698	No

Identified Flood Cause: Localized flooding associated with hillside drainage.

25.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

There is only one property included in this repetitive loss area. It has one insurable building. Table 25-2 provides general information for the property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 25-2. All Properties in Topanga Canyon C Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
TOP-C1	1	Crawlspace	No Information	Establish drainage flow paths around structure Drainage system maintenance Floodwall Public education
Total	1			

26. TOPANGA CANYON D REPETITIVE LOSS AREA

26.1 PROBLEM STATEMENT

Figure 26-1 shows the Topanga Canyon D Repetitive Loss Area. This area is in Topanga within the Santa Monica Mountains in southwestern Los Angeles County. The identified repetitive loss property for this area is not located in a FEMA-mapped flood zone and the source of repetitive flood risk appears to be localized. The dates of loss correspond to storm events that occurred in early 2005. The property is located in a cul-de-sac. There is a gradient slope in this vicinity with properties above the identified repetitive-loss property as well as below it. The cause of flooding is most likely drainage flows from the uphill neighbor. The other property within this area is at ground elevation similar to that of the identified repetitive loss property and has its lowest floor with similar elevation as well.

26.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 26-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 26-1. Repetitive Loss Properties in Topanga Canyon D Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0137970	49	1/05, 2/05	\$10,822	No
<i>Identified Flood Cause:</i> Localized drainage issue associated with interior drainage from private property				

26.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

Two properties with two insurable buildings have been identified in this repetitive loss area. Table 26-2 provides general information for each property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 26-2. All Properties in Topanga Canyon D Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
TOP-D1	1	Slab	D10B	Create/maintain flow paths to public storm drains Drainage system maintenance Public education
TOP-D2	1	Slab	D95B	Create/maintain flow paths to public storm drains Drainage system maintenance Public education
Total	2			

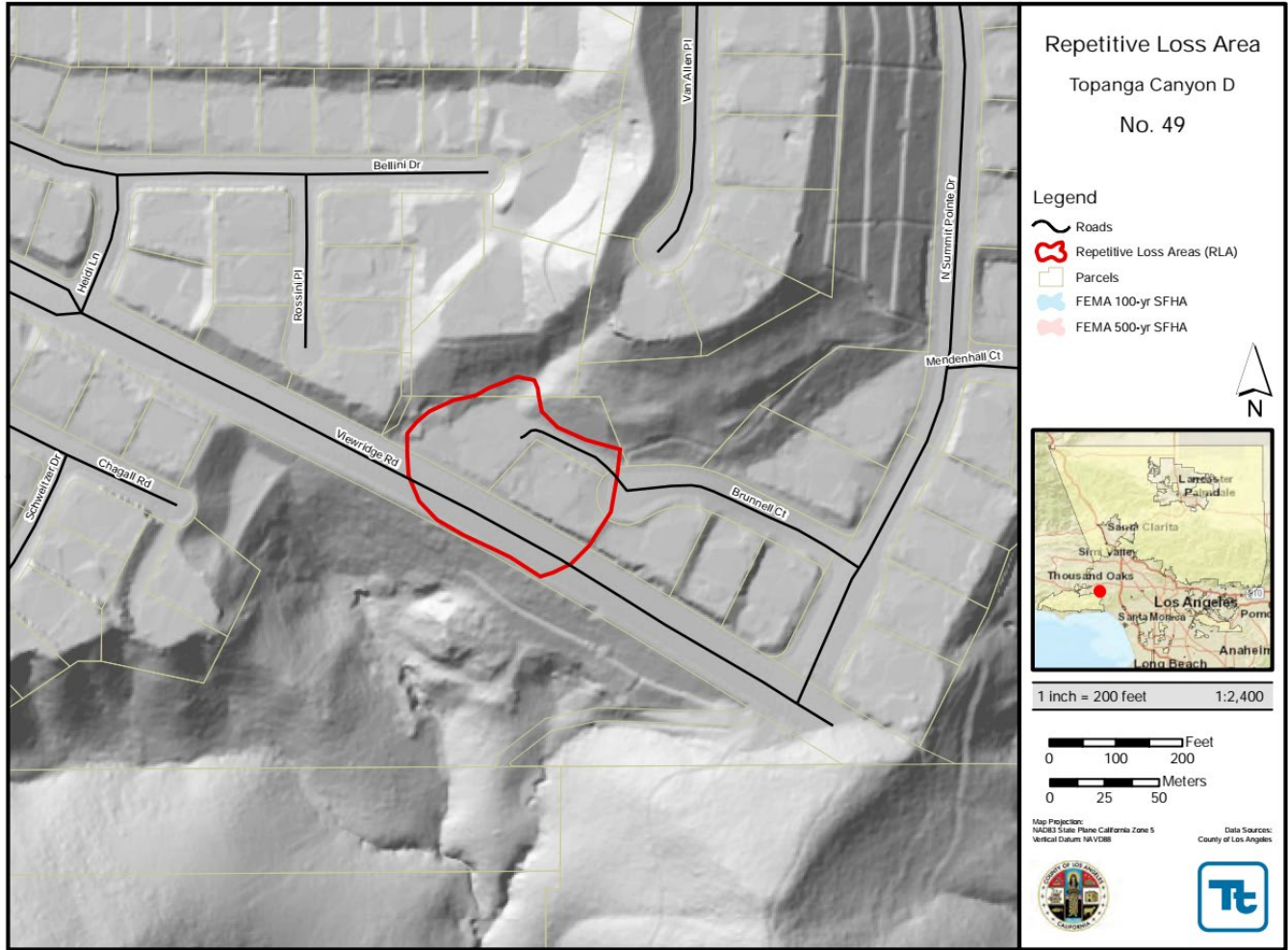


Figure 26-1. Topanga Canyon D Repetitive Loss Area

27. TOPANGA CANYON E REPETITIVE LOSS AREA

27.1 PROBLEM STATEMENT

Figure 27-1 shows the Topanga Canyon E Repetitive Loss Area. This area is in the Santa Monica Mountains, in the southwestern area of Los Angeles County and the southeastern area of Ventura County. The identified repetitive loss property for this area is in the vicinity of Calabasas. The property backs up to steep terrain of the Santa Monica Mountains. The two events in 1995 and 2005 were 5-year and 13-year flood events, respectively, based on historical data. A 5-year flood event is a projected flood event that has a 20 percent chance of occurring in a given year; a 13-year flood event is a projected flood with a 7.7 percent chance of occurring in a given year. Based on topography, the flooding problem appears to be associated with runoff from the surrounding hillside. This problem could be exacerbated by wildfire events within the region.

27.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 27-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 27-1. Repetitive Loss Properties in Topanga Canyon E Repetitive Loss Area				
FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0138321	50	3/95, 1/05	\$28,727	No

Identified Flood Cause: Hillside drainage.

27.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

Four properties with five insurable buildings have been identified in this repetitive loss area. Table 27-2 provides general information for the properties, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 27-2. All Properties in Topanga Canyon E Repetitive Loss Area				
Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
TOP-E1	2	Crawlspace	D75D	Establish/maintain flow paths around structure to improved drainage system Hillside retaining wall Public education
TOP-E2	1	Slab	D75C	Establish/maintain flow paths around structure to improved drainage system Hillside retaining wall Public education
TOP-E3	1	Crawlspace	D2B	Establish/maintain flow paths around structure to improved drainage system Hillside retaining wall Public education

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
TOP-E4	1	Slab	D75D	Establish/maintain flow paths around structure to improved drainage system Hillside retaining wall Public education
Total	5			

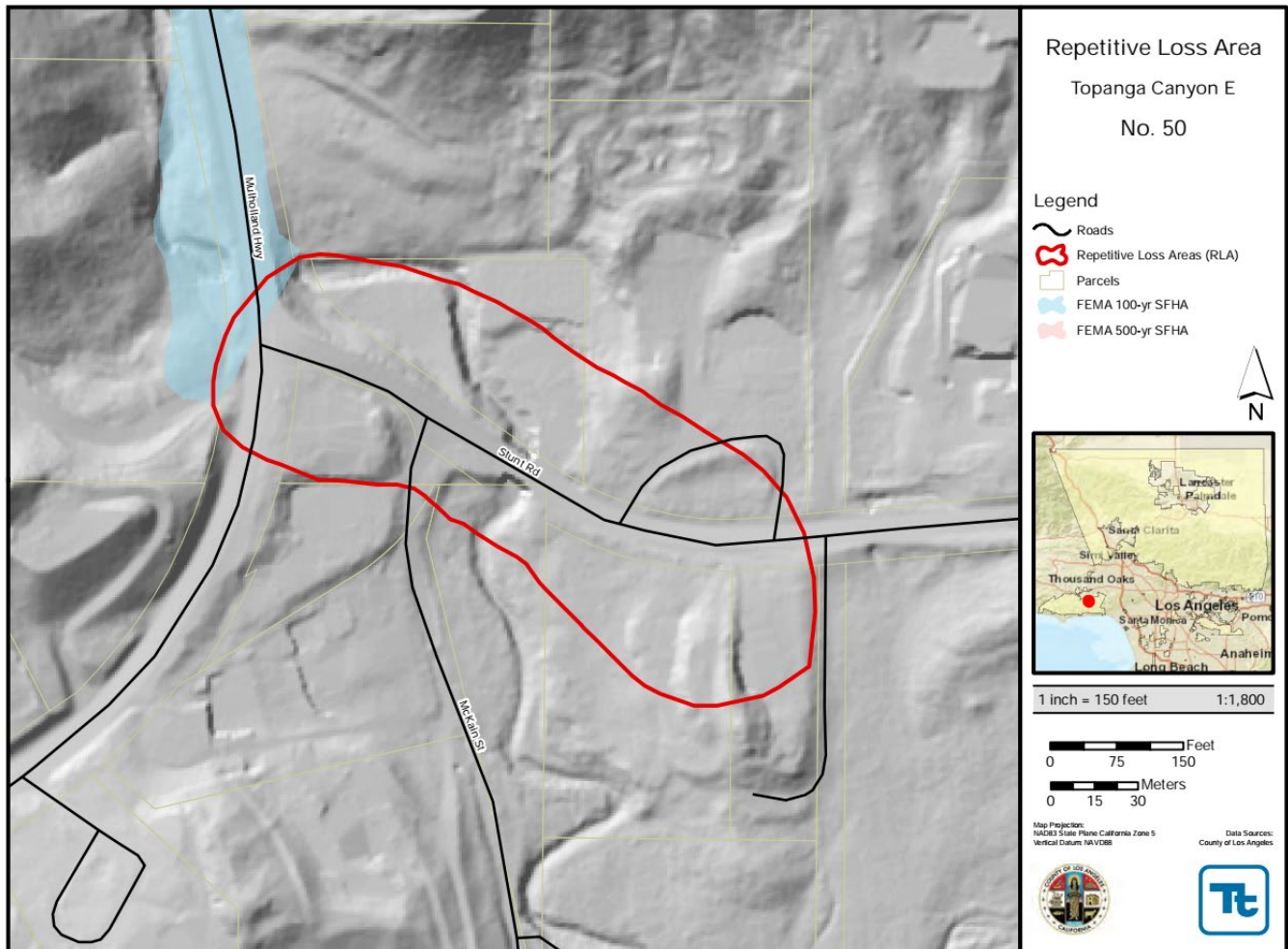


Figure 27-1. Topanga Canyon E Repetitive Loss Area

28. TRIUNFO CANYON A REPETITIVE LOSS AREA

28.1 PROBLEM STATEMENT

The Triunfo Canyon A Repetitive Loss Area is in the Santa Monica Mountains in the southwestern portion of Los Angeles County. There is a single-property repetitive loss area on Lobo Canyon Road. No map of this repetitive loss area is provided, due to privacy concerns. This is an offsite drainage problem isolated to the single property. The property is located in the floodplain and FEMA Flood Hazard Zone AE. In the past, small private bridges and culverts in the creek running behind the house clogged with debris, causing water to overflow and run along Lobo Canyon Road in front of the subject property.

28.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 28-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 28-1. Repetitive Loss Properties in Triunfo Canyon A Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0095737	24	1/95, 2/98	\$23,454	No

Identified Flood Cause: Property is in FEMA Flood Zone AE of Lobo Canyon (behind the house). Past clogging of small private bridges and culverts in the creek caused water to overflow onto the street and flood the property. No losses reported since 1998. The structure's windows are boarded up and it is assumed to be vacant.

28.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

There is one property included in this repetitive loss area. It has two insurable buildings. Table 28-2 provides general information for the property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 28-2. All Properties in Triunfo Canyon A Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
TRI-A1	2	Slab	No Information	Acquisition Elevation Berm Floodwall Public education
Total	2			

29. TRIUNFO CANYON B REPETITIVE LOSS AREA

29.1 PROBLEM STATEMENT

The Triunfo Canyon B Repetitive Loss Area is in the Santa Monica Mountains in the southwestern portion of Los Angeles County. There is a single-property repetitive loss area on Hidden Highland Road. No map of this repetitive loss area is provided, due to privacy concerns. The repetitive loss property is at the base of a hillside and receives runoff from the adjacent hills. Based on topography, the property is subject to runoff from the hillside behind the property.

29.2 IDENTIFIED REPETITIVE LOSS PROPERTY

Table 29-1 lists the FEMA-designated repetitive loss property within this repetitive loss area.

Table 29-1. Repetitive Loss Properties in Triunfo Canyon B Repetitive Loss Area

FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
0137793	43	2/98, 1/05	\$13,473	No

Identified Flood Cause: Based on topography, the property is subject to runoff from the hillside behind the property.

29.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

There is one property included in this repetitive loss area. The property currently has two insurable buildings, which were constructed to current flood damage prevention requirements. Table 29-2 provides general information for the property, but no mitigation measures are identified for the new structures.

Table 29-2. All Properties in Triunfo Canyon B Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
TRI-B1	2	Slab	No Information	N/A
Total	2			

30. UPPER TOPANGA CANYON REPETITIVE LOSS AREA

30.1 PROBLEM STATEMENT

Figure 30-1 shows the Upper Topanga Canyon Repetitive Loss Area. This repetitive-loss area is in the Topanga Canyon area in the Santa Monica Mountains in southwest Los Angeles County, 26 miles northwest of downtown Los Angeles. All properties in the repetitive loss area are in or immediately adjacent to the FEMA-mapped 1 percent annual chance (100-year) floodplain for Topanga Canyon. Topanga Canyon’s contributing watershed is the second largest watershed in the Santa Monica Mountains. Sources of flooding in the Topanga Canyon area consist of storm runoff in Topanga Creek and associated storm drainage facilities. Based on historical information and FEMA’s Flood Insurance Study, flooding occurs from 5-year or greater flood events. A 5-year flood event is a projected flood event that has a 20 percent chance of occurring each year. Because most of the repetitive loss properties are located within the low-lying floodplain areas immediately adjacent to the low-flow channels, it is expected that without mitigation, these properties will continue to be subject to future floods.

30.2 IDENTIFIED REPETITIVE LOSS PROPERTIES

Table 30-1 lists the FEMA-designated repetitive loss properties within this repetitive loss area.

Table 30-1. Repetitive Loss Properties in Upper Topanga Canyon Repetitive Loss Area				
FEMA RL #	RL Map #	Flood Dates of Previous Claims	Average Claim Paid	Mitigated?
#0074656	29	1/95, 3/95	\$6,972	No
<i>Identified Flood Cause:</i> Property on the bank next to Old Topanga Canyon. Crawlspace foundation with finished floor below 100-year water surface elevation. Damage caused by 5-year return interval flood event in 1995. No reported damage since.				
#0074334	31	2/92, 1/95	\$11,451	No
<i>Identified Flood Cause:</i> Property on the bank next to Old Topanga Canyon. Crawlspace foundation with finished floor below 100-year water surface elevation. Damage caused by 5-year return interval flood event in 1995. No reported damage since.				
#0074553	32	1/95, 3/95	\$10,276	No
<i>Identified Flood Cause:</i> In 1983 & 1993, the water from the natural creek tributary east of the house overtopped Old Topanga Canyon Road and poured into the house. The owner reported no more problems with the tributary flooding. The property is still subject to flooding from Old Topanga Canyon channel (Zone AE). The property is in Zone AE, which has significant risk from a 1 percent annual chance (100-year) flood. The tributary flow may continue to overtop the street if the culvert inlet becomes obstructed by debris from the upstream reach.				
#0076269	33	1/95, 3/95	\$29,354	No
<i>Identified Flood Cause:</i> Property No. 33 was not mapped by FEMA, but was confirmed by field investigation to be subject to a high risk from Red Rock Canyon flooding. The property is on the opposite bank from Red Rock Road and is accessed by a pedestrian bridge crossing the creek. The creek is very shallow, without the capacity to carry the estimated 810 cubic feet per second of the 1 percent annual chance (100-year) flood discharge, and the bridge has a very low clearance, which can cause further flow blockage and higher backwater.				
#0074498	47	1/95, 3/95	\$9,692	No
<i>Identified Flood Cause:</i> Crawlspace foundation with finished floor below 100-year water surface elevation. Damage caused by 5-year return interval flood event in 1995. No reported damage since.				

30.3 PROPERTIES INCLUDED IN REPETITIVE LOSS AREA

Fifty-six properties with 91 insurable buildings have been identified in this repetitive loss area. Table 30-2 provides general information for each property, along with mitigation measures that could be employed to address repetitive flood losses. For private properties, the decision on whether to implement the identified mitigation measures resides with the private property owner. These measures are recommended due to the flood risks, but owners are not obligated to implement them.

Table 30-2. All Properties in Upper Topanga Canyon Repetitive Loss Area

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
UTC1	1	Crawlspace	D65B	Elevation Acquisition Flood-proofing Public education
UTC2	1	Slab	D45A	Elevation Acquisition Flood-proofing Public education
UTC3	2	Slab	D3A	Elevation Acquisition Flood-proofing Public education
UTC4	1	Slab	D75A	Elevation Acquisition Flood-proofing Public education
UTC5	2	Slab	No Info	Elevation Acquisition Flood-proofing Public education
UTC6	1	Slab	D75D	Elevation Acquisition Flood-proofing Public education
UTC7	1	Crawlspace	D65B	Elevation Acquisition Flood-proofing Public education
UTC8	2	Crawlspace	D7C	Elevation Acquisition Flood-proofing Public education
UTC9	2	Crawlspace	D65C	Elevation Acquisition Flood-proofing Public education
UTC10	2	Crawlspace	No Info	Elevation Acquisition Flood-proofing Public education

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
UTC11	1	Crawlspace	D45A	Elevation Acquisition Flood-proofing Public education
UTC12	1	Crawlspace	D7B	Elevation Acquisition Flood-proofing Public education
UTC13	1	Slab	D6B	Elevation Acquisition Flood-proofing Public education
UTC14	2	Crawlspace	D55C	Elevation Acquisition Flood-proofing Public education
UTC15	1	Crawlspace	D45C	Elevation Acquisition Flood-proofing Public education
UTC16	3	Crawlspace	D45A	Elevation Acquisition Flood-proofing Public education
UTC17	1	Crawlspace	D6A	Elevation Acquisition Flood-proofing Public education
UTC18	2	Crawlspace	D7B	Elevation Acquisition Flood-proofing Public education
UTC19	2	Crawlspace	D6B	Elevation Acquisition Flood-proofing Public education
UTC20	1	Slab	D5B	Elevation Acquisition Flood-proofing Public education
UTC21	1	Crawlspace	D75B	Elevation Acquisition Flood-proofing Public education
UTC22	1	Crawlspace	D65	Elevation Acquisition Flood-proofing Public education

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
UTC23	1	Crawlspace	D6C	Elevation Acquisition Flood-proofing Public education
UTC24	1	Crawlspace	D55C	Elevation Acquisition Flood-proofing Public education
UTC25	2	Crawlspace	CX	Elevation Acquisition Flood-proofing Public education
UTC26	1	Crawlspace	CX	Elevation Acquisition Flood-proofing Public education
UTC27	1	Crawlspace	D6A	Elevation Acquisition Flood-proofing Public education
UTC28	1	Slab	D4C	Elevation Acquisition Flood-proofing Public education
UTC29	2	Slab	D45B	Elevation Acquisition Flood-proofing Public education
UTC30	3	Crawlspace	DX	Elevation Acquisition Flood-proofing Public education
UTC31	2	Crawlspace	D55B	Elevation Acquisition Flood-proofing Public education
UTC32	2	Slab	D65C	Elevation Acquisition Flood-proofing Public education
UTC33	2	Crawlspace	D7D	Elevation Acquisition Flood-proofing Public education
UTC34	3	Crawlspace	D5B	Elevation Acquisition Flood-proofing Public education

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
UTC35	1	Crawlspace	D6D	Elevation Acquisition Flood-proofing Public education
UTC36	2	Crawlspace	D55A	Elevation Acquisition Flood-proofing Public education
UTC37	1	Slab	D8C	Elevation Acquisition Flood-proofing Public education
UTC38	1	Slab	D7B	Elevation Acquisition Flood-proofing Public education
UTC39	2	Crawlspace	D65C	Elevation Acquisition Flood-proofing Public education
UTC40	2	Crawlspace	D65A	Elevation Acquisition Flood-proofing Public education
UTC41	3	Crawlspace	D8A	Elevation Acquisition Flood-proofing Public education
UTC42	1	Slab	D7B	Elevation Acquisition Flood-proofing Public education
UTC43	2	Crawlspace	D7A	Elevation Acquisition Flood-proofing Public education
UTC44	1	Crawlspace	D6A	Elevation Acquisition Flood-proofing Public education
UTC45	2	Crawlspace	D7B	Elevation Acquisition Flood-proofing Public education
UTC46	1	Slab	D7B	Elevation Acquisition Flood-proofing Public education

Property ID	Number of Insurable Buildings	Building Description		Probable Mitigation Measures
		Foundation	Condition	
UTC47	3	Slab	No Information	Elevation Acquisition Flood-proofing Public education
UTC48	1	Crawlspace	D7B	Elevation Acquisition Flood-proofing Public education
UTC49	1	Slab	D7A	Elevation Acquisition Flood-proofing Public education
UTC50	2	Slab	D75B	Elevation Acquisition Flood-proofing Public education
UTC51	3	Crawlspace	No Information	Elevation Acquisition Flood-proofing Public education
UTC52	3	Slab	D65B	Elevation Acquisition Flood-proofing Public education
UTC53	1	Crawlspace	D5B	Elevation Acquisition Flood-proofing Public education
UTC54	2	Slab	D95B	Elevation Acquisition Flood-proofing Public education
UTC55	2	Crawlspace	D5B	Elevation Acquisition Flood-proofing Public education
UTC56	1	No Information	D55B	Elevation Acquisition Flood-proofing Public education
Total	91			

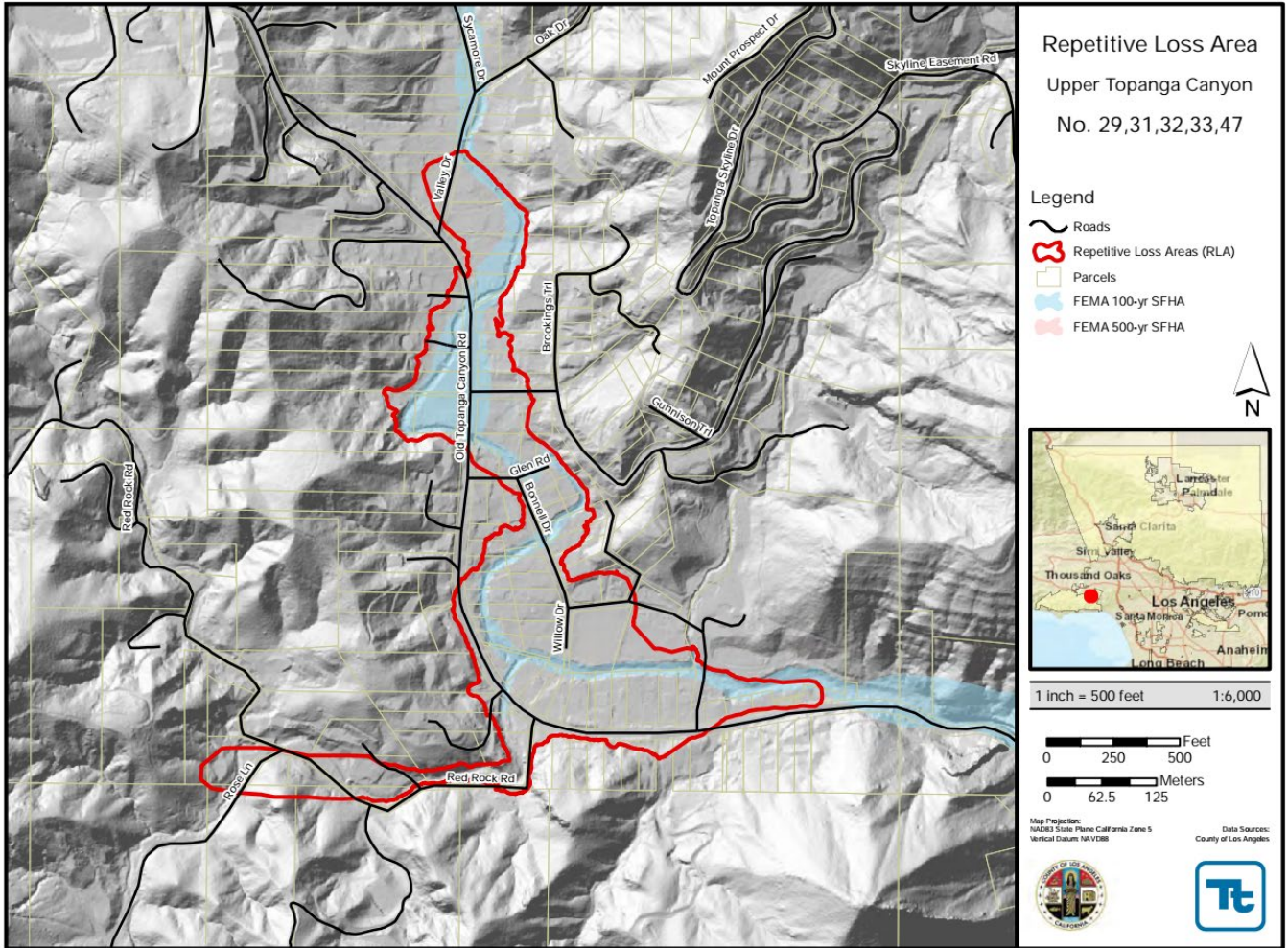


Figure 30-1. Upper Topanga Canyon Repetitive Loss Area

Los Angeles County Repetitive Loss Area Analysis

PART 3—REPETITIVE LOSS AREA ACTION PLAN

31. REPETITIVE LOSS AREA ACTION PLAN

31.1 MITIGATION ACTIONS

This Los Angeles County Repetitive Loss Area Analysis was created in conjunction with the development of the *2020 Los Angeles County Comprehensive Floodplain Management Plan*. The floodplain management plan identified and prioritized an action plan that will have direct relevance to this RLAA. This action plan has been adapted to apply to the RLAA and is shown in Table 31-1. The following information is presented for each action plan item:

- Action item **number** and **description**
- **Lead agency** responsible for implementing the action item
- **Support agencies** expected to participate in the implementation
- Agencies or programs that may be able to provide **funding** to implement the action item
- An estimated **cost** range (see Section 31.2 for definition of high, medium and low cost ratings)
- A statement of **timing** for implementing the action item:
 - Ongoing—This action already occurs and will continue
 - Short term—This action would be implemented within five years
 - Long term— This action would be implemented after five years
- A list of the **repetitive loss areas that would be affected** by the action item
- Indication of whether the action item was **included in the previous RLAA** and, if so, its number in that previous document.

Table 31-1. Action Plan—Flood Mitigation Initiatives

Action, Responsible Agencies and Potential Funding ^a	Estimated Project Cost	Timeline	Affected Repetitive-Loss Area	In Previous Plan? Action #
<p>1—Promote awareness of flood hazards to residents in flood hazard areas. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division) <i>Support Agencies:</i> Regional Planning Department, Public Works (Building and Safety Division, Community Government Relations Group, Disaster Services Group) <i>Funding Source:</i> FEMA; Cal EMA; Public Works; County Regional Planning Department</p>	Low	Ongoing	All	Yes-1
<p>2—Develop and distribute flood protection information and materials to property owners, renters, and developers in high-risk areas. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division) <i>Support Agencies:</i> Public Works (Community Government Relations Group, Building and Safety Division, Land Development Division) <i>Funding Source:</i> Public Works</p>	Low	Ongoing	All	Yes-2
<p>3—Maintain a list of critical facilities located in FEMA-designated flood zones, provide flood protection information to operators of these critical facilities, and encourage the implementation of flood protection measures. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division) <i>Support Agencies:</i> Los Angeles County Chief Executive Office/ Office of Emergency Management (CEO OEM), Public Works (Disaster Services Group) <i>Funding Source:</i> Public Works; CEO OEM</p>	Low	Ongoing	Agua Dulce, Calabasas B, Cold Creek A, Cold Creek B, Del Sur, Lower Topanga Canyon, Malibou Lake, Quartz Hill A, Quartz Hill B, Quartz Hill C, Roosevelt, Topanga Canyon A, Topanga Canyon B, Triunfo Canyon A, Upper Topanga Canyon	Yes-3
<p>4—Investigate repetitive loss properties identified by FEMA and update the list of repetitive loss properties and high-risk properties. Conduct the following flood control activities for these properties:</p> <ul style="list-style-type: none"> • Annually notify owners regarding local flood hazards and proper protection activities • Provide technical advice regarding flood protection and flood preparedness • Distribute a revised questionnaire to new repetitive loss properties. <p><i>Lead Agency:</i> Public Works (Stormwater Engineering Division) <i>Support Agencies:</i> Public Works (Building and Safety Division) <i>Funding Source:</i> Public Works</p>	Low	Ongoing	All	Yes-4
<p>5—Make sandbags available to flood risk property owners during the wet season, provide notifications of the availability of these materials, and track the distribution of the materials. <i>Lead Agency:</i> Fire Department, Public Works (Administrative Services Division, Stormwater Engineering Division) <i>Support Agencies:</i> Public Works (Community Government Relations Group) <i>Funding Source:</i> FEMA; Cal EMA; Fire Department; Public Works</p>	Low	Ongoing	All	Yes-5

Action, Responsible Agencies and Potential Funding ^a	Estimated Project Cost	Timeline	Affected Repetitive-Loss Area	In Previous Plan? Action #
<p>6—Provide public education about maintaining the stormwater system free of debris. <i>Lead Agency:</i> Public Works (Stormwater Quality Division) <i>Support Agencies:</i> Public Works (Community Government Relations Group, Stormwater Engineering Division, Stormwater Maintenance Division, Stormwater Planning Division, Road Maintenance Division) <i>Funding Source:</i> Public Works</p>	Low	Ongoing	All	Yes-6
<p>7—Continue to maintain/ enhance the County’s classification under the Community Rating System to address increased flood insurance costs and promote safety and preparedness. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division) <i>Support Agencies:</i> Regional Planning Department, Public Works (Stormwater Maintenance Division, Stormwater Planning Division, Transportation Planning and Programs Division, Community Government Relations Group) <i>Funding Source:</i> Public Works</p>	Low	Ongoing	All	Yes-7
<p>8—Implement the Program for Public Information protocol identified in the FMP and include appropriate messaging for compliance with the Americans with Disabilities Act. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division, Community Government Relations Group) <i>Funding Source:</i> FEMA; Cal EMA; Public Works</p>	Low	Ongoing	All	Yes-8
<p>9—Provide emergency preparedness and flood protection information to the general public. <i>Lead Agency:</i> CEO OEM <i>Support Agencies:</i> Public Works (Stormwater Engineering Division, Stormwater Planning Division, Community Government Relations Group) <i>Funding Source:</i> FEMA; Cal EMA; CEO OEM; Public Works; USC Sea Grant</p>	Low	Ongoing	All	Yes-9
<p>10—Distribute information regarding flood prevention and flood insurance at emergency operations and emergency preparedness events. <i>Lead Agency:</i> CEO OEM, Public Works (Disaster Services Group) <i>Support Agencies:</i> Public Works (Stormwater Engineering Division, Stormwater Planning Division, Community Government Relations Group) <i>Funding Source:</i> FEMA; Cal EMA; CEO OEM; Public Works</p>	Low	Ongoing	All	Yes-10
<p>11—Develop and maintain a list of priority maintenance-related problem sites. <i>Lead Agency:</i> Public Works (Stormwater Maintenance Division) <i>Support Agencies:</i> Public Works (Stormwater Engineering Division, Stormwater Planning Division, Road Maintenance Division) <i>Funding Source:</i> Public Works</p>	Low	Ongoing	Agua Dulce, Altadena B, Calabasas A, Calabasas B, Cold Creek A, Cold Creek B, Del Sur, Roosevelt, Topanga Canyon C, Topanga Canyon D	Yes-11
<p>12—Conduct routine maintenance of flood control facilities and additional maintenance as needed at priority maintenance-related flood issue sites. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division, Road Maintenance Division) <i>Funding Source:</i> Public Works</p>	Low	Ongoing	All	Yes-12

Action, Responsible Agencies and Potential Funding ^a	Estimated Project Cost	Timeline	Affected Repetitive-Loss Area	In Previous Plan? Action #
<p>13—Conduct a stormwater facilities condition assessment to identify the physical and hydraulic condition of the system and to support infrastructure management. <i>Lead Agency:</i> Public Works (Stormwater Maintenance Division) <i>Support Agencies:</i> Public Works (Stormwater Planning Division, Stormwater Engineering Division) <i>Funding Source:</i> Public Works</p>	Low	Ongoing	All	Yes-13
<p>14—Evaluate storm drain, open channel, and flood retention basin facilities for future improvements. <i>Lead Agency:</i> Public Works (Stormwater Planning Division) <i>Support Agencies:</i> Public Works (Design Division, Stormwater Maintenance Division, Stormwater Engineering Division, Stormwater Quality Division), Stakeholders <i>Funding Source:</i> Public Works</p>	Low	Ongoing	All	Yes-14
<p>15—Pursue appropriate flood hazard mitigation grant funding. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division, Stormwater Planning Division) <i>Support Agencies:</i> Public Works (Transportation Planning and Programs Division, Disaster Services Group, Stormwater Planning Division), CEO OEM <i>Funding Source:</i> Public Works; CEO OEM</p>	Low	Ongoing	All	Yes-15
<p>16—Consider the conversion of high-risk properties into open space. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division) <i>Support Agencies:</i> Public Works (Stormwater Quality Division) Regional Planning Department, Parks and Recreation <i>Funding Source:</i> FEMA; U.S. EPA; Cal EMA; Cal EPA; Public Works; County Regional Planning Department; County Parks and Recreation</p>	High	Ongoing	All	Yes-16
<p>17—Refine the plan check system to track properties in the flood zone and address drainage. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division) <i>Support Agencies:</i> Public Works (Building and Safety Division, Land Development Division) <i>Funding Source:</i> Public Works</p>	Low	Ongoing	Agua Dulce, Calabasas B, Cold Creek A, Cold Creek B, Del Sur, Lower Topanga Canyon, Malibu Lake, Quartz Hill A, Quartz Hill B, Quartz Hill C, Roosevelt, Topanga Canyon A, Topanga Canyon B, Triunfo Canyon A, Upper Topanga Canyon	Yes-17
<p>18—Flag repetitive loss properties in the plan, and check database for review and approval of building permit applications. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division) <i>Support Agencies:</i> Public Works (Building and Safety Division) <i>Funding Source:</i> Public Works</p>	Low	Ongoing	All	Yes-18

Action, Responsible Agencies and Potential Funding ^a	Estimated Project Cost	Timeline	Affected Repetitive-Loss Area	In Previous Plan? Action #
<p>19—Maintain a database system for tracking all reviewed and approved elevation certificates prior to the closure of a building permit. Lead Agency: Public Works (Stormwater Engineering Division) Support Agencies: Public Works (Building and Safety Division, Chief Information Office) Funding Source: Public Works</p>	Low	Ongoing	Agua Dulce, Calabasas B, Cold Creek A, Cold Creek B, Del Sur, Lower Topanga Canyon, Malibou Lake, Quartz Hill A, Quartz Hill B, Quartz Hill C, Roosevelt, Topanga Canyon A, Topanga Canyon B, Triunfo Canyon A, Upper Topanga Canyon	Yes-19
<p>20—Evaluate opportunities for incorporating watershed ecosystem restoration into projects. Lead Agency: Public Works (Stormwater Planning Division) Support Agencies: Regional Planning Department, Public Works (Stormwater Engineering Division), Stakeholders Funding Source: FEMA, U.S. EPA; Cal EMA; Cal EPA; Public Works; County Regional Planning Department</p>	Low	Ongoing	All	Yes-20
<p>21—Where feasible, cost-effective and supported both publicly and politically, restore the natural and beneficial functions of floodplains. Lead Agency: Public Works (Stormwater Planning Division, Stormwater Quality Division) Support Agencies: Public Works (Transportation Planning and Programs Division, Stormwater Engineering Division) Funding Source: FEMA; U.S. EPA; Cal EMA; Cal EPA; Public Works</p>	High/Medium	Long term	Agua Dulce, Calabasas B, Cold Creek A, Cold Creek B, Del Sur, Lower Topanga Canyon, Malibou Lake, Quartz Hill A, Quartz Hill B, Quartz Hill C, Roosevelt, Topanga Canyon A, Topanga Canyon B, Triunfo Canyon A, Upper Topanga Canyon	Yes-21
<p>22—Encourage the application of biological resource measures for the control of stormwater and erosion to the best of their applicable limits. Lead Agency: Fire Department, Public Works (Building and Safety Division, Design Division, Land Development Division) Support Agencies: Regional Planning Department, Public Works (Environmental Programs Division, Stormwater Quality Division, Stormwater Planning Division, Stormwater Engineering Division, Project Management Division) Funding Source: FEMA; U.S. EPA; Cal EMA; Cal EPA; County Fire Department; Public Works</p>	Low	Ongoing	All	Yes-22
<p>23—Maintain the Operational Area Emergency Response Plan. Lead Agency: CEO OEM Support Agencies: Public Works (Disaster Services Group, Stormwater Engineering Division) Funding Source: FEMA; Cal EMA; Public Works; CEO OEM</p>	Low	Ongoing	All	Yes-23
<p>24—Maintain standards for the use of structural and non-structural techniques that mitigate flood hazards and manage stormwater pollution. Lead Agency: Public Works (Building and Safety Division, Design Division, Land Development Division) Support Agencies: Public Works (Stormwater Engineering Division, Stormwater Quality Division, Stormwater Planning Division) Funding Source: Public Works</p>	Low	Ongoing	All	Yes-24

Action, Responsible Agencies and Potential Funding ^a	Estimated Project Cost	Timeline	Affected Repetitive-Loss Area	In Previous Plan? Action #
<p>25—Continue to require environmental review in the development process to provide for the creation or protection of natural resources that can mitigate the impacts of development. <i>Lead Agency:</i> Regional Planning Department <i>Support Agencies:</i> Public Works (Stormwater Engineering Division, Transportation Planning and Programs Division, Land Development Division) <i>Funding Source:</i> Public Works; County Regional Planning Department</p>	Low	Ongoing	All	Yes-25
<p>26—Where appropriate, support retrofitting, purchase, or relocation of structures in hazard-prone (high risk) areas to prevent future structure damage. Give priority to properties with exposure to repetitive losses. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division) <i>Support Agencies:</i> Regional Planning Department, Parks and Recreation, Public Works (Building and Safety Division, Transportation Planning and Programs Division) <i>Funding Source:</i> FEMA Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant Program, and Flood Mitigation Act; U.S. HUD; Cal EMA; Public Works; CEO OEM; County Regional Planning Department; County Parks and Recreation</p>	Low	Ongoing	All	Yes-26
<p>27—Use risk-based information from the <i>Los Angeles County Comprehensive Floodplain Management Plan</i> and the <i>Los Angeles County Hazard Mitigation Plan</i> to update the Safety Element of the County’s General Plan. <i>Lead Agency:</i> Regional Planning Department <i>Support Agencies:</i> Public Works (Stormwater Engineering Division) <i>Funding Source:</i> County Regional Planning Department; Public Works</p>	Low	Short term	All	Yes-27
<p>28—Continue to maintain good standing under the National Flood Insurance Program by implementing programs that meet or exceed the minimum NFIP requirements. Such programs include enforcing an adopted flood damage prevention ordinance, participating in floodplain mapping updates, and providing public assistance and information on floodplain requirements and impacts. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division) <i>Support Agencies:</i> Public Works (Building and Safety Division, Land Development Division, Stormwater Maintenance Division), Regional Planning Department <i>Funding Source:</i> Public Works</p>	Low	Ongoing	All	Yes-28
<p>29—Consider the best available data and science to determine probable impacts on all forms of flooding from global climate change when making program enhancements or updates to the County’s floodplain management program. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division) <i>Funding Source:</i> FEMA; U.S. EPA; Cal EMA; Cal EPA; Public Works; USC Sea Grant</p>	Low	Long term	All	Yes-29

Action, Responsible Agencies and Potential Funding ^a	Estimated Project Cost	Timeline	Affected Repetitive-Loss Area	In Previous Plan? Action #
<p>30—Identify flood-warning systems for properties where such systems can be beneficially employed. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division) <i>Support Agencies:</i> CEO OEM, Sheriff’s Department, Public Works (Stormwater Maintenance Division, Disaster Services Group) <i>Funding Source:</i> FEMA Hazard Mitigation Grant Program , Pre-Disaster Mitigation Grant Program, and Flood Mitigation Act; Cal EMA; Public Works; CEO OEM</p>	Low	Ongoing	All	Yes-30
<p>31—Consider the development of a comprehensive flood warning and response plan for the unincorporated County that would become a functional annex to the Operational Area Emergency Response Plan and meet the Community Rating System Activity 610 requirements. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division) <i>Support Agencies:</i> CEO OEM, Public Works (Disaster Services Group) <i>Funding Source:</i> FEMA; Cal EMA; Public Works; CEO OEM</p>	Medium/Low	Long term	All	Yes-31
<p>32—Continue to enforce the County’s development regulations to prevent increases of the flood hazard on adjacent properties. <i>Lead Agency:</i> Public Works (Building and Safety Division, Land Development Division) <i>Support Agencies:</i> Public Works (Stormwater Engineering Division) <i>Funding Source:</i> Public Works</p>	Low	Ongoing	All	Yes-32
<p>33—Conduct an evaluation of FEMA-designated flood zones and revise/ update them to reflect current conditions. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division) <i>Funding Source:</i> FEMA; Cal EMA; Public Works</p>	Medium/Low	Ongoing	Agua Dulce, Calabasas B, Cold Creek A, Cold Creek B, Del Sur, Lower Topanga Canyon, Malibou Lake, Quartz Hill A, Quartz Hill B, Quartz Hill C, Roosevelt, Topanga Canyon A, Topanga Canyon B, Triunfo Canyon A, Upper Topanga Canyon	Yes-33
<p>34—Continue to maintain and update the Hazus model constructed to support the development of the FMP, in order to make flood risk information available to property owners. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division) <i>Funding Source:</i> FEMA; Cal EMA; Public Works</p>	Low	Ongoing	All	Yes-34
<p>35—Continue County coordination with other agencies and stakeholders on issues of flood control. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division, Stormwater Planning Division) <i>Funding Source:</i> Public Works</p>	Low	Ongoing	All	Yes-35
<p>36—Continue to identify and assess drainage needs. <i>Lead Agency:</i> Public Works (Stormwater Engineering Division, Stormwater Planning Division) <i>Support Agencies:</i> Public Works (Stormwater Maintenance Division) <i>Funding Source:</i> Public Works</p>	Medium/Low	Ongoing	All	No

Action, Responsible Agencies and Potential Funding ^a	Estimated Project Cost	Timeline	Affected Repetitive-Loss Area	In Previous Plan? Action #
<p>37—Once FEMA establishes its Building Resilient Infrastructure and Communities (BRIC) program, consider updating this plan accordingly to meet the BRIC program guidelines.</p> <p>Lead Agency: Public Works (Stormwater Engineering Division)</p> <p>Support Agencies: Public Works (Disaster Services Group, Stormwater Planning Division, Stormwater Maintenance Division)</p> <p>Funding Source: Public Works; FEMA</p>	Low	Long Term	All	No

31.2 BENEFIT/COST ANALYSIS

The action plan is prioritized according to a benefit/cost analysis of the proposed projects (CRS Step 8). The benefits of proposed projects were weighed against estimated costs as part of the project prioritization process. The benefit/cost analysis was not of the detailed variety required by FEMA for project grant eligibility under various grant programs. A less formal approach was used because some projects may not be implemented for some time, and associated costs and benefits could change dramatically in that time. Therefore, a review of the apparent benefits versus the apparent cost of each project was performed. Parameters were established for assigning subjective ratings (high, medium, and low) to the costs and benefits of these projects.

Cost ratings were defined as follows:

- **High**—Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases). Costs are estimated to be greater than \$5 million.
- **Medium**—The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years. Costs are estimated to be between \$500,000 and \$5 million.
- **Low**—The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program. Costs are estimated to be less than \$500,000.

Benefit ratings were defined as follows:

- **High**—Project will provide an immediate reduction of risk exposure for life and property.
- **Medium**—Project will have a long-term impact on the reduction of risk exposure for life and property, or project will provide an immediate reduction in the risk exposure for property.
- **Low**—Long-term benefits of the project are difficult to quantify in the short term.

Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-beneficial and are prioritized accordingly.

For many of the strategies identified in this action plan, Los Angeles County may seek financial assistance under the Hazard Mitigation Grant Program or Hazard Mitigation Assistance programs, both of which require detailed benefit/cost analyses. These analyses will be performed on projects at the time of application using the FEMA benefit-cost model. For projects not seeking financial assistance from grant programs that require detailed analysis, Los Angeles County reserves the right to define “benefits” according to parameters that meet floodplain management goals and objectives.

31.3 ACTION PLAN PRIORITIZATION

Table 31-2 lists the priority of each action item assigned by the planning team, using the same parameters used in selecting the action items. A qualitative benefit-cost review was performed for each action item. The priorities are defined as follows:

- **High Priority**—A project that meets multiple objectives, has benefits that exceed cost, has funding secured or is an ongoing project and meets eligibility requirements for a grant program. High priority projects can be completed in the short term (1 to 5 years). The key factors for high priority projects are that they have funding secured and can be completed in the short term.
- **Medium Priority**—A project that meets goals and objectives, that has benefits that exceed costs, and for which funding has not been secured but that is grant eligible. Project can be completed in the short term, once funding is secured. Medium priority projects will become high priority projects once funding is secured. The key factors for medium priority projects are that they are eligible for funding, but do not yet have funding secured, and they can be completed within the short term.
- **Low Priority**—A project that will mitigate the risk of the flood hazard, that has benefits that do not exceed the costs or are difficult to quantify, for which funding has not been secured, that is not eligible for FEMA grant funding, and for which the time line for completion is long term (1 to 10 years). Low priority projects may be eligible for grant funding from other programs. Low priority projects are “blue-sky” projects. How they will be financed is unknown, and they can be completed over a long term.

Table 31-2. Prioritization of Mitigation Actions

# of FMP Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant Eligible?	Can Project be Funded Under Existing Programs/ Budgets?	Priority (High, Medium, Low)
1—Promote awareness of flood hazards to residents in flood hazard areas.						
3	Medium	Low	Yes	Yes	Yes	High
2—Develop and distribute flood protection information and materials to property owners, renters, and developers in high-risk areas.						
2	Medium	Low	Yes	No	Yes	High
3— Maintain a list of critical facilities located in FEMA-designated flood zones, provide flood protection information to operators of these critical facilities, and encourage the implementation of flood protection measures.						
2	High	Low	Yes	No	Maybe	High
4—Investigate repetitive loss properties identified by FEMA and update the list of repetitive loss properties and high-risk properties. Conduct the following flood control activities for these properties:						
<ul style="list-style-type: none"> • Annually notify owners regarding local flood hazards and proper protection activities • Provide technical advice regarding flood protection and flood preparedness • Distribute a revised questionnaire to new repetitive loss properties. 						
4	High	Low	Yes	No	Yes	High
5—Make sandbags available to flood risk property owners during the wet season, provide notifications of the availability of these materials, and track the distribution of the materials.						
3	High	Low	Yes	Yes	Yes	High
6—Provide public education about maintaining the stormwater system free of debris.						
3	Medium	Low	Yes	No	Yes	High
7—Continue to maintain/enhance the County’s classification under the Community Rating System to address increased flood insurance costs and promote safety and preparedness.						
6	Medium	Low	Yes	No	Yes	High
8—Implement the Program for Public Information protocol identified in the FMP and include appropriate messaging for compliance with the Americans with Disabilities Act.						
3	Medium	Low	Yes	Yes	Maybe	High

# of FMP Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant Eligible?	Can Project be Funded Under Existing Programs/ Budgets?	Priority (High, Medium, Low)
9—Provide emergency preparedness and flood protection information to the general public.						
3	Medium	Low	Yes	Yes	Yes	High
10—Distribute information regarding flood prevention and flood insurance at emergency operations and emergency preparedness events.						
3	Medium	Low	Yes	No	Yes	High
11—Develop and maintain a list of priority maintenance-related problem sites.						
2	Low	Low	Yes	No	Yes	High
12—Conduct routine maintenance of flood control facilities and additional maintenance as needed at priority maintenance-related flood problem sites.						
2	Medium	Low	Yes	No	Yes	High
13—Conduct a stormwater facilities condition assessment to identify the physical and hydraulic condition of the system and to support infrastructure management.						
3	Low	Low	Yes	No	Yes	High
14—Evaluate storm drain, open channel, and flood retention basin facilities for future improvements.						
2	Medium	Low	Yes	No	Yes	High
15—Pursue appropriate flood hazard mitigation grant funding.						
3	Low	Low	Yes	No	Yes	High
16—Consider the conversion of high-risk properties into open space.						
3	High	High	Yes	Yes	No	Medium
17—Refine the plan check system to track properties in the flood zone and address drainage.						
4	Medium	Low	Yes	No	Maybe	Medium
18—Flag repetitive loss properties in the plan, and check database for review and approval of building permit applications.						
3	Medium	Low	Yes	No	Yes	High
19—Maintain a database system for tracking all reviewed and approved elevation certificates prior to the closure of a building permit.						
3	Medium	Low	Yes	No	Maybe	High
20—Evaluate opportunities for incorporating watershed ecosystem restoration into projects.						
3	Low	Low	Yes	Yes	Yes	High
21—Where feasible, cost-effective and supported both publicly and politically, restore the natural and beneficial functions of floodplains.						
5	Medium	High/ Medium	No	Yes	No	Medium
22—Encourage the application of biological resource measures for the control of stormwater and erosion to the best of their applicable limits.						
3	Medium	Low	Yes	Yes	Yes	High
23—Maintain the Operational Area Emergency Response Plan.						
3	Medium	Low	Yes	Yes	Yes	High
24—Maintain standards for the use of structural and non-structural techniques that mitigate flood hazards and manage stormwater pollution.						
4	Medium	Low	Yes	No	Yes	High
25—Continue to require environmental review in the development process to provide for the creation or protection of natural resources that can mitigate the impacts of development.						
2	Medium	Low	Yes	No	Yes	High
26—Where appropriate, support retrofitting, purchase, or relocation of structures in hazard-prone (high risk) areas to prevent future structure damage. Give priority to properties with exposure to repetitive losses.						
3	High	Low	Yes	Yes	Yes	High
27—Use risk-based information from the <i>Los Angeles County Comprehensive Floodplain Management Plan</i> and the <i>Los Angeles County Hazard Mitigation Plan</i> to update the Safety Element of the County's General Plan.						
3	Low	Low	Yes	No	Yes	High

# of FMP Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant Eligible?	Can Project be Funded Under Existing Programs/ Budgets?	Priority (High, Medium, Low)
28—Continue to maintain good standing under the National Flood Insurance Program by implementing programs that meet or exceed the minimum NFIP requirements. Such programs include enforcing an adopted flood damage prevention ordinance, participating in floodplain mapping updates, and providing public assistance and information on floodplain requirements and impacts.						
6	Medium	Low	Yes	No	Yes	High
29—Consider the best available data and science to determine probable impacts on all forms of flooding from global climate change when making program enhancements or updates to the County’s floodplain management program.						
4	Medium	Low	Yes	Yes	Maybe	High
30—Identify flood-warning systems for properties where such systems can be beneficially employed.						
3	Medium	Low	Yes	Yes	Maybe	Medium
31—Consider the development of a comprehensive flood warning and response plan for the unincorporated County that would become a functional annex to the Operational Area Emergency Response Plan and meet the Community Rating System Activity 610 requirements.						
2	Medium	Medium/ Low	Yes	Yes	Maybe	High
32—Continue to enforce the County’s development regulations to prevent increases of the flood hazard on adjacent properties.						
3	Medium	Low	Yes	No	Yes	High
33—Conduct an evaluation of FEMA-designated flood zones and revise/update them to reflect current conditions.						
3	Low	Medium/ Low	No	Yes	Maybe	Medium
34—Continue to maintain and update the Hazus model constructed to support the development of the FMP, in order to make flood risk information available to property owners.						
2	Medium	Low	Yes	Yes	Maybe	High
35—Continue County coordination with other agencies and stakeholders on issues of flood control.						
3	Low	Low	Yes	No	Yes	Medium
36—Continue to identify and assess drainage needs.						
3	Medium	Medium/Low	Yes	Yes	Yes	High
37—Once FEMA establishes its Building Resilient Infrastructure and Communities (BRIC) program, consider updating this plan accordingly to meet the BRIC program guidelines.						
2	Medium	Medium	Yes	Yes	No	Medium

31.4 ANNUAL EVALUATION REPORT

Los Angeles County will prepare an annual evaluation report for its area analyses. The report will include a review of each action item, including a description of what was implemented or not implemented, and recommended changes to the actions items as appropriate. The report will be made available to the media and the public and will be submitted with the annual CRS recertification.

32. PLAN ADOPTION

This chapter documents formal adoption of the *2020 Los Angeles County Repetitive Loss Area Analysis* by the Los Angeles County Board of Supervisors (CRS Step 9). Los Angeles County formally adopted the plan on June 15, 2021. A copy of the resolution is provided on the following pages.



COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

MARK PESTRELLA, Director

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Telephone: (626) 458-5100
<http://dpw.lacounty.gov>

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

June 15, 2021

APPROVED

BY DELEGATED AUTHORITY

IN REPLY PLEASE
REFER TO FILE:

CHIEF EXECUTIVE OFFICE
COUNTY OF LOS ANGELES

June 15, 2021

FESIA A. DAVENPORT
CHIEF EXECUTIVE OFFICER

The Honorable Board of Supervisors
County of Los Angeles
383 Kenneth Hahn Hall of Administration
500 West Temple Street
Los Angeles, California 90012

Dear Supervisors:

**WATER RESOURCES CORE SERVICE AREA
ADOPTION OF UPDATES TO
THE COMPREHENSIVE FLOODPLAIN MANAGEMENT PLAN,
PROGRAM FOR PUBLIC INFORMATION, AND THE REPETITIVE LOSS AREA
ANALYSIS IN CONNECTION WITH THE COUNTY'S PARTICIPATION IN THE
NATIONAL FLOOD INSURANCE PROGRAM COMMUNITY RATING SYSTEM
(ALL SUPERVISORIAL DISTRICTS)
(3 VOTES)**

SUBJECT

Public Works is seeking the Board to adopt updates to the Los Angeles County Comprehensive Floodplain Management Plan and its Program for Public Information, and the Los Angeles County Repetitive Loss Area Analysis to enable the County of Los Angeles to retain its eligibility in the National Flood Insurance Program's Community Rating System.

IT IS RECOMMENDED THAT THE BOARD:

1. Find that the recommended actions are not a project under the California Environmental Quality Act and exempt from the California Environmental Quality Act for the reasons stated in this letter and in the record.
2. Approve and adopt the update to the Los Angeles County Comprehensive Floodplain Management Plan and its Program for Public Information dated March 2021.
3. Approve and adopt the update to the Los Angeles County Repetitive Loss Area Analysis dated March 2021.

4. Delegate authority to the Director of Public Works or his designee to annually certify to the Federal Emergency Management Agency, on behalf of the County of Los Angeles, the County's implementation of its Community Rating System activities, and submit to the Federal Emergency Management Agency annual progress reports on the updated Comprehensive Floodplain Management Plan, its Program for Public Information, and the Repetitive Loss Area Analysis.

PURPOSE/JUSTIFICATION OF RECOMMENDED ACTION

Approval of the recommended actions will find that they are not subject to and exempt from the California Environmental Quality Act (CEQA) as described more specifically below. The actions will approve and adopt updates of the County's Comprehensive Floodplain Management Plan, its Program for Public Information, and the County's Repetitive Loss Area Analysis. These documents provide an overall strategy of programs, projects, and measures to reduce the adverse impacts of flooding on the community of unincorporated County of Los Angeles; a risk assessment for all properties in the community subject to flood hazard and mitigation initiatives that may be implemented; and a program for flood risk outreach. The actions will also authorize the Director of Public Works to perform annual progress reporting on the implementation of these plans and annual certification of the County's Community Rating System (CRS) activities.

The County of Los Angeles has been a participant in the National Flood Insurance Program (NFIP) since 1980 and the NFIP's CRS Program since 1990. The NFIP and the CRS Programs are administered by the Federal Emergency Management Agency (FEMA). Participation in the NFIP enables the County to obtain federal assistance and makes flood insurance available for property owners and renters in the County's unincorporated areas. Participation in the CRS Program, which requires the County to exceed the NFIP's minimum requirements, allows property owners in the County's unincorporated areas to qualify for discounted flood insurance premiums. The County currently has a CRS Class 7 rating, resulting in up to a 15 percent reduction in flood insurance premiums for property owners in the unincorporated areas.

As part of its CRS activities to achieve a Class 7 rating, the County developed a Comprehensive Floodplain Management Plan, which includes a Program for Public Information. The County also prepared a Repetitive Loss Area Analysis that identifies and analyzes properties that have suffered recurring flood damage (repetitive loss properties). The Board adopted the Floodplain Management Plan and the Repetitive Loss Area Analysis in September 2016.

To retain its CRS Class 7 rating, the County is required, every 5 years, to update and re-adopt the Floodplain Management Plan, its Program for Public Information, and the Repetitive Loss Area Analysis. The updated documents were developed following the prescribed steps in the NFIP's 2017 CRS Coordinator's Manual. The updated documents can be viewed at: <https://dpw.lacounty.gov/wmd/NFIP/FMP2020>. FEMA has reviewed these updated documents and determined that they meet the NFIP's requirements, subject to their adoption by the Board.

In addition, the County is also required to annually certify to FEMA its implementation of its CRS activities and prepare and submit to FEMA annual progress reports on the Floodplain Management Plan, its Program for Public Information, and the Repetitive Loss Area Analysis.

The annual certification will be available at Public Works.

Implementation of Strategic Plan Goals

These recommendations support the County Strategic Plan: Strategy III.3, Pursue Operational Effectiveness, Fiscal Responsibility, and Accountability. The recommended actions will help achieve this goal by identifying mitigation measures that can be implemented by the County, property owners, and organizations to improve the community's flood emergency preparedness.

FISCAL IMPACT/FINANCING

There will be no impact to the County's General Fund.

Funding for CRS activities is included in the Flood Fund Fiscal Year 2020-21 Budget. The adoption of the updated plans and analysis will have no binding funding obligation on the County or the Los Angeles County Flood Control District.

FACTS AND PROVISIONS/LEGAL REQUIREMENTS

The Comprehensive Floodplain Management Plan, which includes a Program for Public Information, is an overall strategy of programs, projects, and measures to reduce the adverse impacts of flooding on the community of unincorporated County of Los Angeles. It includes a risk assessment for all properties subject to flood hazard, mitigation initiatives that may be implemented, and a program for flood risk outreach to the public.

The Repetitive Loss Area Analysis addresses over 50 repetitive loss properties in the unincorporated areas plus almost 200 adjacent properties that may be subjected to the same flood hazards. These properties have been divided into 24 repetitive loss areas. The Board adopted the previous Comprehensive Floodplain Management Plan, which contained the program of public information, and the previous Repetitive Loss Area Analysis in September 2016.

ENVIRONMENTAL DOCUMENTATION

The approval and adoption of the updates of the County's Comprehensive Floodplain Management Plan, its Program for Public Information, and the County's Repetitive Loss Area Analysis are exempt from CEQA pursuant to Section 15262 of the CEQA Guidelines and Section 21102 of the California Public Resources Code. These actions are activities relating to planning and feasibility studies for possible future actions, which the Board has not adopted, approved, or funded.

By approving these updates, the County of Los Angeles does not commit to or otherwise endorse, authorize, or approve any specific project. Any future recommendations on any proposed development remain subject to the Board's sole discretion to approve, deny, or modify a proposed project and to consider factors that would accompany CEQA review. Authorization of any future project activities would occur only following compliance with CEQA, and the County department undertaking a future project will return to the Board for consideration of appropriate environmental documentation.

Upon the Board's approval of the recommended actions, Public Works will file a Notice of Exemption with the County Clerk in accordance with Section 21152 of the California Public Resources Code.

The delegation of authority to the Director or his designee to annually certify to FEMA, on behalf of the County of Los Angeles, the County's implementation of its CRS activities, and submit to FEMA annual progress reports on the updated Comprehensive Floodplain Management Plan; its program of public information; and the Repetitive Loss Area Analysis; are not subject to CEQA because they are activities that are excluded from the definition of a project by Section 21065 of the Public Resources Code and Section 15378(b) of the CEQA Guidelines. The delegation of authority is an organizational or administrative activity of government, which will not result in direct or indirect physical changes to the environment.

The Honorable Board of Supervisors
June 15, 2021
Page 5

IMPACT ON CURRENT SERVICES (OR PROJECTS)

There will be no adverse impact on any other current services and/or projects as a result of this action. If the plans are not adopted, the County's participation in the CRS Program could be terminated.

CONCLUSION

Please return an adopted copy of this letter to Public Works, Stormwater Engineering Division.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Mark Pestrella". The signature is written in a cursive, flowing style.

MARK PESTRELLA, PE
Director of Public Works

MP:AA:pw

c: Chief Executive Office (Chia-Ann Yen)
County Counsel (Mark Yanai)
Executive Office

REFERENCES

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- FEMA 551 *Selecting Appropriate Mitigation Measures for Floodprone Structures* (FEMA-551) <https://www.wbdg.org/ffc/dhs/criteria/fema551>
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Los Angeles County Repetitive Loss Area Analysis

Appendix A. Generic Depth-Damage Relationships for Residential Structures

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Economic Guidance Memorandum (EGM) 04-01, Generic Depth-Damage Relationships for Residential Structures with Basements.

1. Purpose. The purpose of this memorandum is to release, and provide guidance for the use of, generic depth-damage curves for use in U.S. Army Corps of Engineers flood damage reduction studies.

2. Background. Proper planning and evaluation of flood damage reduction projects require knowledge of actual damage caused to various types of properties. The primary purpose of the Flood Damage Data Collection Program is to meet that requirement by providing Corps district offices with standardized relationships for estimating flood damage and other costs of flooding, based on actual losses from flood events. Under this program, data have been collected from major flooding that occurred in various parts of the United States from 1996 through 2001. Damage data collected are based on comprehensive accounting of losses from flood victims' records. The generic functions developed and provided in this EGM represent a substantive improvement over other generalized depth-damage functions such as the Flood Insurance Administration (FIA) Rate Reviews.

3. Results. Generic damage functions are attached for one-story homes with basement, two or more story homes with basement, and split-level homes with basement. Generic damage functions for similar structures without basements were published in 2000 and are included as enclosure 1 for ready reference.

a. Regression analysis was used to create the damage functions. While several independent variables, such as flood duration and flood warning lead-time, were examined in building the models, the models that were most efficient in explaining the percent damage to structure and contents were quadratic and cubic forms with depth as the only independent variable.

b. Content damage was modeled with the dependent variable being content damage as a percentage of structure value. This differs from the previous technique of first developing content valuations and then content damage relationships as a function of content valuations. The generic content damage models are statistically significant and their use eliminates the need to establish content-to-structure ratios through surveys.

c. While the data collected include information on all aspects of National Economic Development (NED) losses, only results and recommendations related to the structure and content damages for homes with basements are included in this EGM.

Direct costs for cleanup expenses, unpaid hours for cleanup and repair, emergency damage prevention actions, and other flood-related costs are not included in these damage functions. Information on other residential flood costs, beyond those included in these damage functions will found the summary report, discussed in paragraph 5. These costs should be developed using site-specific historical information.

4. Application. The following paragraphs provide information on the application of the generic curves within the HEC-FDA damage calculation program.

a. The economic section of HEC-FDA divides the quantification of flood damages into a direct method and an indirect method. The direct method allows the user to directly enter a stage-damage relationship for any structure. This approach is commonly used for large or unique properties such as industrial or public buildings. The indirect method quantifies the stage-damage relationship for a group of structures that have significant commonality. Typically damage to residential structures is calculated using the indirect method. The procedures described in the following paragraphs apply only when using the indirect method to determine the stage-damage relationship.

b. The traditional approach to quantifying damage to contents by the indirect method relies on three pieces of information: 1) structure value; 2) content-to-structure value ratio; and 3) the content depth-damage relationship. The content-to-structure value ratio and content depth-damage relationship are unique to the structure occupancy type to which a structure is assigned. The content depth-damage relationship provides the estimate of content flood damage as a percentage of content value. Thus, to calculate a content stage-damage function for an individual structure, the structure value for an individual structure is first multiplied by the content-to-structure value ratio to provide an estimate of the content value. This content value is then multiplied by each percent damage value of the content depth-damage relationship.

c. The new content depth-damage functions provided herein are different from those used by the Corps in the past in one important aspect. The new functions calculate content damage as a percent of structure value rather than content value. Using these functions within HEC-FDA requires care in specifying a content-to-structure value ratio. To understand the requirements for using the new content depth-damage functions requires a basic understanding of how HEC-FDA calculates content damage.

(1). To calculate damages by the indirect method, each structure must be assigned to a structure occupancy type. For each structure occupancy type a content-to-structure value ratio and content depth-damage relationship are defined. These data for calculating content damage within HEC-FDA is entered on the “Study Structure Occupancy Type” screen. As long as a content value is not entered for a structure in the Structure Inventory Data, HEC-FDA calculates the content stage-damage by first calculating content using the structure value multiplied by the content-to-structure value ratio.

In some instances, however, analysts develop unique estimates of content values for a structure, which are entered for the individual structure on the Structure Inventory Data screen. For each structure that has a content value entered, calculating a content value by using the content-to-structure value ratio is ignored and the user entered content value is used to calculate content damage.

(2). The new content depth-damage functions do not require this intermediate step of calculating content values. Therefore, the content-to-structure value ratio for each structure occupancy type using the new content depth-damage relationships must be set to one hundred percent (100). This forces the content depth-damage function to be multiplied by the structure value as required. Also, the “Error Associated with Content/Structure Value” on the “Study Structure Occupancy Type” screen should be left blank. This implies that the error in content-to-structure value ratio is part of the new content depth-damage relationship.

(3). Because entering a content value on the Structure Inventory Data window overrides the content-to-structure value ratio, the new content depth-damage relationships should not be used for structures that have separately entered content values.

(4). Questions concerning the use of the generic curves within the HEC-FDA model can be addressed to Dr. David Moser, Institute of Water Resources (IWR), (703) 428-8066.

5. Report. A report summarizing the data collection effort and analyses performed to derive these curves will shortly be available on the IWR website. More information may be obtained by contacting the program’s principal investigator, Stuart Davis, (703) 428-7086.

6. Waiver to Policy. These curves are developed for nation-wide applicability in flood damage reduction studies. When using these curves, the requirement to develop site-specific depth-damage curves contained in ER 1105-2-100, E-19q.(2) is waived. Additionally, the requirement to develop content valuations and content-to-structure ratios based on site-specific or comparable floodplain information, ER 1005-2-100, E-19q.(1)(a), is also waived. Note these waivers currently apply only to single-family homes with and without basements for which generic curves have been published, and not other categories of flood inundation damages for which no generic curves exist. Feasibility reports must state the generic curves are being used in the flood damage analysis for residential structures with and/or without basements. Use of these curves is optional and analysts should always endeavor to use the best available information to accurately quantify the damages and benefits in inundation reduction studies.

CECW-PG

SUBJECT: Economic Guidance Memorandum (EGM) 04-01, Generic Depth-Damage Relationships

7. Point of Contact. Administrators of the Flood Damage Data Collection Program continue to collect and analyze flood-related damages to both residential and commercial properties. The HQUSACE program monitor is Lillian Almodovar, (202) 761-4233, who can address any questions concerning the program.

FOR THE COMMANDER:

Encl

/s/
WILLIAM R. DAWSON, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works

CECW-PG

SUBJECT: Economic Guidance Memorandum (EGM) 04-01, Generic Depth-Damage Relationships

DISTRIBUTION:

North Atlantic Division, ATTN: CENAD-ET-P

South Atlantic Division, ATTN: CESAD-ET-P

Great Lakes/Ohio River Division: ATTN: CELRD-E-P

Northwestern Division, ATTN: CENWD-PNP-ET-P

Pacific Ocean Division, ATTN: CEPOD-ET-E

South Pacific Division, ATTN: CESPDP-ET-P

Southwestern Division, ATTN: CESWD-ET-P

Mississippi Valley Division: ATTN: CEMVD-PM

**DAMAGE FUNCTIONS
FOR SINGLE FAMILY RESIDENTIAL
STRUCTURES WITH BASEMENTS**

Structure Depth-Damage

Table 1 Structure One Story, With Basement		
Depth	Mean of Damage	Standard Deviation of Damage
-8	0%	0
-7	0.7%	1.34
-6	0.8%	1.06
-5	2.4%	0.94
-4	5.2%	0.91
-3	9.0%	0.88
-2	13.8%	0.85
-1	19.4%	0.83
0	25.5%	0.85
1	32.0%	0.96
2	38.7%	1.14
3	45.5%	1.37
4	52.2%	1.63
5	58.6%	1.89
6	64.5%	2.14
7	69.8%	2.35
8	74.2%	2.52
9	77.7%	2.66
10	80.1%	2.77
11	81.1%	2.88
12	81.1%	2.88
13	81.1%	2.88
14	81.1%	2.88
15	81.1%	2.88
16	81.1%	2.88

**Table 2
Structure
Two or More Stories, With Basement**

Depth	Mean of Damage	Standard Deviation of Damage
-8	1.7%	2.70
-7	1.7%	2.70
-6	1.9%	2.11
-5	2.9%	1.80
-4	4.7%	1.66
-3	7.2%	1.56
-2	10.2%	1.47
-1	13.9%	1.37
0	17.9%	1.32
1	22.3%	1.35
2	27.0%	1.50
3	31.9%	1.75
4	36.9%	2.04
5	41.9%	2.34
6	46.9%	2.63
7	51.8%	2.89
8	56.4%	3.13
9	60.8%	3.38
10	64.8%	3.71
11	68.4%	4.22
12	71.4%	5.02
13	73.7%	6.19
14	75.4%	7.79
15	76.4%	9.84
16	76.4%	12.36

Table 3
Structure
Split Level, With Basement

Depth	Mean of Damage	Standard Deviation of Damage
-8		
-7		
-6	2.5%	1.8%
-5	3.1%	1.6%
-4	4.7%	1.5%
-3	7.2%	1.6%
-2	10.4%	1.6%
-1	14.2%	1.6%
0	18.5%	1.6%
1	23.2%	1.7%
2	28.2%	1.9%
3	33.4%	2.1%
4	38.6%	2.4%
5	43.8%	2.6%
6	48.8%	2.9%
7	53.5%	3.2%
8	57.8%	3.4%
9	61.6%	3.6%
10	64.8%	3.9%
11	67.2%	4.2%
12	68.8%	4.8%
13	69.3%	5.7%
14	69.3%	5.7%
15	69.3%	5.7%
16	69.3%	5.7%

Content Depth-Damage

Table 4
Content
One Story, With Basement

Depth	Mean of Damage	Standard Deviation of Damage
-8	0.1%	1.60
-7	0.8%	1.16
-6	2.1%	0.92
-5	3.7%	0.81
-4	5.7%	0.78
-3	8.0%	0.76
-2	10.5%	0.74
-1	13.2%	0.72
0	16.0%	0.74
1	18.9%	0.83
2	21.8%	0.98
3	24.7%	1.17
4	27.4%	1.39
5	30.0%	1.60
6	32.4%	1.81
7	34.5%	1.99
8	36.3%	2.13
9	37.7%	2.25
10	38.6%	2.35
11	39.1%	2.45
12	39.1%	2.45
13	39.1%	2.45
14	39.1%	2.45
15	39.1%	2.45
16	39.1%	2.45

Table 5
Content
Two or More Stories-With Basement

Depth	Mean of Damage	Standard Deviation of Damage
-8	0%	0
-7	1.0%	2.27
-6	2.3%	1.76
-5	3.7%	1.49
-4	5.2%	1.37
-3	6.8%	1.29
-2	8.4%	1.21
-1	10.1%	1.13
0	11.9%	1.09
1	13.8%	1.11
2	15.7%	1.23
3	17.7%	1.43
4	19.8%	1.67
5	22.0%	1.92
6	24.3%	2.15
7	26.7%	2.36
8	29.1%	2.56
9	31.7%	2.76
10	34.4%	3.04
11	37.2%	3.46
12	40.0%	4.12
13	43.0%	5.08
14	46.1%	6.39
15	49.3%	8.08
16	52.6%	10.15

Table 6
Content
Split-Level-With Basement

Depth	Mean of Damage	Standard Deviation of Damage
-8	0.6%	2.09
-7	0.7%	1.49
-6	1.4%	1.14
-5	2.4%	1.01
-4	3.8%	1.00
-3	5.4%	1.02
-2	7.3%	1.03
-1	9.4%	1.04
0	11.6%	1.06
1	13.8%	1.12
2	16.1%	1.23
3	18.2%	1.38
4	20.2%	1.57
5	22.1%	1.76
6	23.6%	1.95
7	24.9%	2.13
8	25.8%	2.28
9	26.3%	2.44
10	26.3%	2.44
11	26.3%	2.44
12	26.3%	2.44
13	26.3%	2.44
14	26.3%	2.44
15	26.3%	2.44
16	26.3%	2.44

**ENCLOSURE
DAMAGE FUNCTIONS
FOR SINGLE FAMILY RESIDENTIAL**

STRUCTURES WITHOUT BASEMENTS

Structure One Story, No Basement		
Depth	Mean of Damage	Standard Deviation of Damage
-2	0%	0%
-1	2.5%	2.7%
0	13.4%	2.0%
1	23.3%	1.6%
2	32.1%	1.6%
3	40.1%	1.8%
4	47.1%	1.9%
5	53.2%	2.0%
6	58.6%	2.1%
7	63.2%	2.2%
8	67.2%	2.3%
9	70.5%	2.4%
10	73.2%	2.7%
11	75.4%	3.0%
12	77.2%	3.3%
13	78.5%	3.7%
14	79.5%	4.1%
15	80.2%	4.5%
16	80.7%	4.9%

Structure		
Two or More Stories-No Basement		
Depth	Mean of Damage	Standard Deviation of Damage
-2	0%	0%
-1	3.0%	4.1%
0	9.3%	3.4%
1	15.2%	3.0%
2	20.9%	2.8%
3	26.3%	2.9%
4	31.4%	3.2%
5	36.2%	3.4%
6	40.7%	3.7%
7	44.9%	3.9%
8	48.8%	4.0%
9	52.4%	4.1%
10	55.7%	4.2%
11	58.7%	4.2%
12	61.4%	4.2%
13	63.8%	4.2%
14	65.9%	4.3%
15	67.7%	4.6%
16	69.2%	5.0%

Structure Split-Level-No Basement		
Depth	Mean of Damage	Standard Deviation of Damage
-2	0%	0%
-1	6.4%	2.9%
0	7.2%	2.1%
1	9.4%	1.9%
2	12.9%	1.9%
3	17.4%	2.0%
4	22.8%	2.2%
5	28.9%	2.4%
6	35.5%	2.7%
7	42.3%	3.2%
8	49.2%	3.8%
9	56.1%	4.5%
10	62.6%	5.3%
11	68.6%	6.0%
12	73.9%	6.7%
13	78.4%	7.4%
14	81.7%	7.9%
15	83.8%	8.3%
16	84.4%	8.7%

Content One Story, No Basement		
Depth	Mean of Damage	Standard Deviation of Damage
-2	0%	0%
-1	2.4%	2.1%
0	8.1%	1.5%
1	13.3%	1.2%
2	17.9%	1.2%
3	22.0%	1.4%
4	25.7%	1.5%
5	28.8%	1.6%
6	31.5%	1.6%
7	33.8%	1.7%
8	35.7%	1.8%
9	37.2%	1.9%
10	38.4%	2.1%
11	39.2%	2.3%
12	39.7%	2.6%
13	40.0%	2.9%
14	40.0%	3.2%
15	40.0%	3.5%
16	40.0%	3.8%

Content		
Two or More Stories-No Basement		
Depth	Mean of Damage	Standard Deviation of Damage
-2	0%	0%
-1	1.0%	3.5%
0	5.0%	2.9%
1	8.7%	2.6%
2	12.2%	2.5%
3	15.5%	2.5%
4	18.5%	2.7%
5	21.3%	3.0%
6	23.9%	3.2%
7	26.3%	3.3%
8	28.4%	3.4%
9	30.3%	3.5%
10	32.0%	3.5%
11	33.4%	3.5%
12	34.7%	3.5%
13	35.6%	3.5%
14	36.4%	3.6%
15	36.9%	3.8%
16	37.2%	4.2%

Content Split-Level-No Basement		
Depth	Mean of Damage	Standard Deviation of Damage
-2	0%	0%
-1	2.2%	2.2%
0	2.9%	1.5%
1	4.7%	1.2%
2	7.5%	1.3%
3	11.1%	1.4%
4	15.3%	1.5%
5	20.1%	1.6%
6	25.2%	1.8%
7	30.5%	2.1%
8	35.7%	2.5%
9	40.9%	3.0%
10	45.8%	3.5%
11	50.2%	4.1%
12	54.1%	4.6%
13	57.2%	5.0%
14	59.4%	5.4%
15	60.5%	5.7%
16	60.5%	6.0%

Los Angeles County Repetitive Loss Area Analysis

Appendix B. Federal and State Agencies, Programs and Regulations

B. FEDERAL AND STATE AGENCIES, PROGRAMS AND REGULATIONS

Existing laws, ordinances, plans and programs at the federal and state level can support or impact flood hazard mitigation actions identified in this plan. The following federal and state programs have been identified as programs that may interface with the actions identified in this plan. Each program enhances capabilities to implement recommended actions or has a nexus with a recommended action in this plan.

FEDERAL

National Flood Insurance Program

The NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in participating communities that enact floodplain regulations. For most participating communities, FEMA has prepared a detailed Flood Insurance Study. The study presents water surface elevations for floods of various magnitudes, including the 1 percent annual chance (100-year) flood (or base flood) and the 500-year flood. Base flood elevations and the boundaries of the 100- and 500-year floodplains are shown on Flood Insurance Rate Maps (FIRMs), which are the principle tool for identifying the extent and location of the flood hazard. FIRMs are the most detailed and consistent data source available, and for many communities they represent the minimum area of oversight under their floodplain management program.

Participants in the NFIP must, at a minimum, regulate development in floodplain areas in accordance with NFIP criteria. Before issuing a permit to build in a flood-prone area, participating jurisdictions must, at a minimum, ensure that the project meets the following criteria (44 CFR Part 60, Section 60.3):

- Be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy,
- Be constructed with materials resistant to flood damage
- Be constructed by methods and practices that minimize flood damage
- Be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

Additional criteria apply depending on the availability of information about the flood hazard.

Community Rating System

The CRS is a voluntary program within the NFIP that encourages floodplain management activities that exceed the minimum NFIP requirements. Flood insurance premiums are discounted to reflect the reduced flood risk resulting from community actions to meet the CRS goals of reducing flood losses, facilitating accurate insurance rating and promoting awareness of flood insurance.

For participating communities, flood insurance premium rates are discounted in increments of 5 percent. For example, a Class 9 community would receive a 5 percent premium discount, a Class 8 community would receive a 10 percent premium discount, and so on, until reaching a 45 percent premium discount for a Class 1 community. (Class 10 communities are those that do not participate in the CRS; they receive no discount.) The CRS classes for local communities are based on 18 creditable activities in the following categories:

- Public information
- Mapping and regulations
- Flood damage reduction
- Flood preparedness.

CRS activities can help to save lives and reduce property damage. Communities participating in the CRS represent a significant portion of the nation's flood risk; over 66 percent of the NFIP's policy base is located in these communities. Communities receiving premium discounts through the CRS range from small to large and represent a broad mixture of flood risks, including both coastal and riverine flood risks.

Disaster Mitigation Act of 2000

The federal Disaster Mitigation Act (DMA) of 2000 (Public Law 106-390) provides the legal basis for FEMA mitigation planning requirements for state, local and Indian tribal governments as a condition of mitigation grant assistance. The DMA replaced previous federal mitigation planning provisions with new requirements that emphasize the need for planning entities to coordinate mitigation planning and implementation efforts. The DMA established a new requirement for local mitigation plans and authorized up to 7 percent of Hazard Mitigation Grant Program funds to be available for development of state, local, and Indian tribal mitigation plans.

Biggert-Waters Flood Insurance Reform Act of 2012 and Homeowner Flood Insurance Affordability Act of 2014

The Biggert-Waters Flood Insurance Reform Act of 2012 authorized and funded a national mapping program. It also authorized insurance premium rate increases to ensure the fiscal soundness of the NFIP by transitioning the program from subsidized rates, also known as artificially low rates, to offer full actuarial rates reflective of risk.

The Homeowner Flood Insurance Affordability Act of 2014 repealed parts of Biggert-Waters, restoring grandfathering, putting limits on certain rate increases and updating the approach to ensuring the fiscal soundness of the fund by applying an annual surcharge to all policyholders.

Endangered Species Act

The federal Endangered Species Act (ESA) was enacted in 1973 to conserve species facing depletion or extinction and the ecosystems that support them. The act sets forth a process for determining which species are threatened and endangered and requires the conservation of the critical habitat in which those species live. The ESA provides broad protection for species of fish, wildlife and plants that are listed as threatened or endangered. Provisions are made for listing species, as well as for recovery plans and the designation of critical habitat for listed species. The ESA outlines procedures for federal agencies to follow when taking actions that may jeopardize listed species and contains exceptions and exemptions. It is the enabling legislation for the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Criminal and civil penalties are provided for violations of the ESA and the Convention.

In some parts of the country, including the Pacific Northwest and the Sacramento-San Joaquin Delta area, court rulings have found that floodplain management measures can be in conflict with the goals of the endangered

species act. Those rulings have required FEMA and local governments to engage in a consultation process with federal wildlife agencies (Section 7 of the ESA) as they work to develop certain floodplain management programs, plans and projects.

Clean Water Act

The federal Clean Water Act (CWA) employs regulatory and non-regulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nation’s surface waters so that they can support “the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water.”

Evolution of CWA programs over the last decade has included a shift from a program-by-program, source-by-source, pollutant-by-pollutant approach to more holistic watershed-based strategies. Under the watershed approach, equal emphasis is placed on protecting healthy waters and restoring impaired ones. A full array of issues are addressed, not just those subject to CWA regulatory authority. Involvement of stakeholder groups in the development and implementation of strategies for achieving and maintaining water quality and other environmental goals is a hallmark of this approach.

National Incident Management System

The National Incident Management System (NIMS) is a systematic approach for government, nongovernmental organizations, and the private sector to work together to manage incidents involving floods and other hazards. The NIMS provides a flexible but standardized set of incident management practices. Incidents typically begin and end locally, and they are managed at the lowest possible geographical, organizational, and jurisdictional level. In other instances, success depends on the involvement of multiple jurisdictions, levels of government, functional agencies, and emergency-responder disciplines. These instances necessitate coordination across this spectrum of organizations. Communities using NIMS follow a comprehensive national approach that improves the effectiveness of emergency management and response personnel across the full spectrum of potential hazards (including natural hazards, terrorist activities, and other human-caused disasters) regardless of size or complexity.

Americans with Disabilities Act

The Americans with Disabilities Act (ADA) seeks to prevent discrimination against people with disabilities in employment, transportation, public accommodation, communications, and government activities. The most recent amendments became effective in January 2009 (Public Law 110-325). Title II of the ADA deals with compliance with the Act in emergency management and disaster-related programs, services, and activities. It applies to state and local governments as well as third parties, including religious entities and private nonprofit organizations.

The ADA has implications for sheltering requirements and public notifications. During an emergency alert, officials must use a combination of warning methods to ensure that all residents have any necessary information. Those with hearing impairments may not hear radio, television, sirens, or other audible alerts, while those with visual impairments may not see flashing lights or visual alerts. Two stand-alone technical documents have been issued for shelter operators to meet the needs of people with disabilities. These documents address physical accessibility as well as medical needs and service animals.

The ADA also intersects with disaster preparedness programs in regards to transportation, social services, temporary housing, and rebuilding. Persons with disabilities may require additional assistance in evacuation and transit (e.g., vehicles with wheelchair lifts or paratransit buses). Evacuation and other response plans should address the unique needs of residents. Local governments may be interested in implementing a special-needs

registry to identify the home addresses, contact information, and needs for residents who may require more assistance.

Public Law 8499, Flood Control and Coastal Emergencies

Federal law that gives the U.S. Army Corps of Engineers the legal authority to conduct emergency preparation, response, and recovery activities and to supplement local efforts in the repair of flood damage reduction projects that have been damaged by floods. Under Public Law 8499, the Corps' Chief of Engineers is authorized to undertake activities including disaster preparedness, advance measures to prevent or reduce damage when there is an imminent threat of unusual flooding, emergency operations (flood response and post-flood response), rehabilitation of flood control works threatened or destroyed by flood, protection or repair of federally authorized shore protective works threatened or damaged by coastal storm, and provision of emergency water in the event of drought or contaminated source.

STATE

California General Planning Law

California state law requires that every county and city prepare and adopt a comprehensive long-range plan to serve as a guide for community development. The general plan expresses the community's goals, visions, and policies relative to future land uses, both public and private. The general plan is mandated and prescribed by state law (Cal. Gov. Code §65300 et seq.), and forms the basis for most local government land use decision-making. The plan must consist of an integrated and internally consistent set of goals, policies, and implementation measures. In addition, the plan must focus on issues of the greatest concern to the community and be written in a clear and concise manner. County actions, such as those relating to land use allocations, annexations, zoning, subdivision and design review, redevelopment, and capital improvements, must be consistent with the plan.

California Environmental Quality Act

The California Environmental Quality Act (CEQA) was passed in 1970, shortly after the federal government passed the National Environmental Policy Act, to institute a statewide policy of environmental protection. CEQA requires state and local agencies in California to follow a protocol of analysis and public disclosure of the potential environmental impacts of development projects. CEQA makes environmental protection a mandatory part of every California state and local agency's decision making process.

CEQA establishes a statewide environmental policy and mandates actions all state and local agencies must take to advance the policy. For any project under CEQA's jurisdiction with potentially significant environmental impacts, agencies must identify mitigation measures and alternatives by preparing an environmental impact report and may approve only projects with no feasible mitigation measures or environmentally superior alternatives.

Porter-Cologne Act

The Porter-Cologne Water Quality Control Act expanded the enforcement authority of the State Water Resources Control Board and the nine Regional Water Quality Control Boards, including the Los Angeles Regional Water Quality Control Board. The act provided for the California Environmental Protection Agency to create the local boards and better protect water rights and water quality. The act uses National Pollutant Discharge Elimination System permits for point source discharges and waste discharge to keep people from degrading the water quality of the state. The policy states:

- The quality of all waters of the state shall be protected

- All activities and factors affecting the quality of water will be regulated in order to attain the highest water quality within reason.
- The state must be prepared to exercise its fullest power and jurisdiction in order to protect the quality of water in the state from degradation.

AB 162: Flood Planning, Chapter 369, Statutes of 2007

This California State Assembly Bill passed in 2007 requires cities and counties to address flood-related matters in the land use, conservation, and safety and housing elements of their general plans. The land use element must identify and annually review the areas covered by the general plan that are subject to flooding as identified in floodplain mapping by either FEMA or the California Department of Water Resources. The conservation element of the general plan must identify rivers, creeks, streams, flood corridors, riparian habitat, and land that may accommodate floodwater for the purposes of groundwater recharge and stormwater management. The safety element must identify information regarding flood hazards including (California Legislature, 2015):

- Flood hazard zones
- Maps published by FEMA, California Department of Water Resources, the U.S. Army Corps of Engineers, the Central Valley Flood Protection Board, the Governor's Office of Emergency Services, etc.
- Historical data on flooding
- Existing and planned development in flood hazard zones.

The general plan must establish goals, policies and objectives to protect from unreasonable flooding risks including:

- Avoiding or minimizing the risks of flooding new development
- Evaluating whether new development should be located in flood hazard zones
- Identifying construction methods to minimize damage.

AB 162 establishes goals, policies and objectives to protect from unreasonable flooding risks. It establishes procedures for the determination of available land suitable for urban development, which may exclude lands where FEMA or California Department of Water Resources has determined that the flood management infrastructure is not adequate to avoid the risk of flooding.

AB 2140: General Plans—Safety Element

This bill provides that the state may allow for more than 75 percent of public assistance funding under the California Disaster Assistance Act only if the local agency is in a jurisdiction that has adopted a local hazard mitigation plan as part of the safety element of its general plan. The local hazard mitigation plan needs to include elements specified in this legislation. In addition, this bill requires the California Office of Emergency Services to give preference for federal mitigation funding to cities and counties that have adopted local hazard mitigation plans. The intent of the bill is to encourage cities and counties to create and adopt hazard mitigation plans.

AB 747: General Plans—Safety Element

This bill requires California communities with general plans to address evacuation routes in the safety element of the general plan. Information on the evacuation routes and their capacity, safety and viability under a range of emergency scenarios must be provided. For communities that have not adopted a local hazard mitigation plan, the safety element must be updated with this information by January 1, 2022. For those with a local hazard mitigation plan, the requirement applies upon the next revision of the hazard mitigation plan on or after January 1, 2022. Communities that have adopted a local hazard mitigation plan, emergency operations plan, or other document that

fulfills the goals and objectives of this law may comply with this requirement by summarizing and incorporating by reference the other plan or document in the safety element.

In subsequent revisions to the safety element, communities also will be required to identify new information relating to flood and fire hazards and climate adaptation and resiliency strategies applicable to the city or county that was not available during the previous revision of the safety element. These subsequent updates must occur upon each revision of the general plan housing element or local hazard mitigation plan and not less than once every eight years.

AB 2800: Climate Change—Infrastructure Planning

This California State Assembly bill passed in 2016 and until July 1, 2020, requires state agencies to take into account the current and future impacts of climate change when planning, designing, building, operating, maintaining, and investing in state infrastructure. The bill, by July 1, 2017, and until July 1, 2020, requires an agency to establish a Climate-Safe Infrastructure Working Group to examine how to integrate scientific data concerning projected climate change impacts into state infrastructure engineering.

SB 92 and New Standards for Submitting Dam Inundation Maps

On June 27, 2017, significant legislative changes related to dam safety were adopted by California through the passing of Senate Bill 92 (SB 92, part of the 2017-18 budget package). The bill requires the following changes which will affect dam owners:

- Inundation Maps
- Emergency Action Plans
- Fees and Enforcement

SB 379: Land Use, General Plan, Safety Element

This California Senate Bill establishes provisions that require the safety element in local general plans to be reviewed and updated to address climate adaptation and resiliency strategies. The safety element must include a vulnerability assessment, adaptation goals, policies and objectives, and implementation measures. A safety element update to comply with the law is due at the time of a jurisdiction's first local hazard mitigation plan adoption after January 1, 2017, or if no such FEMA plan has been adopted, by January 1, 2022. The bill also references specific sources of useful climate information to consult, such as Cal-Adapt.

California State Building Code

California Code of Regulations Title 24, also known as the California Building Standards Code, is a compilation of building standards from three sources:

- Building standards that have been adopted by state agencies without change from building standards contained in national model codes
- Building standards that have been adopted and adapted from the national model code standards to meet California conditions
- Building standards authorized by the California legislature that constitute extensive additions not covered by the model codes adopted to address particular California concerns.

The state Building Standards Commission is authorized by California Building Standards Law (Health and Safety Code Sections 18901 through 18949.6) to administer the processes related to the adoption, approval, publication, and implementation of California's building codes. These building codes serve as the basis for the design and

construction of buildings in California. The national model code standards adopted into Title 24 apply to all occupancies in California except for modifications adopted by state agencies and local governing bodies. Since 1989, the Building Standards Commission has published new editions of Title 24 every three years.

Standardized Emergency Management System

California Code of Regulations Title 19 establishes the Standardized Emergency Management System to standardize the response to emergencies involving multiple jurisdictions. The Standardized Emergency Management System is intended to be flexible and adaptable to the needs of all emergency responders in California. It requires emergency response agencies to use basic principles and components of emergency management. Local governments must use the system in order to be eligible for state funding of response-related personnel costs under California Code of Regulations Title 19 (Sections 2920, 2925 and 2930). Individual agencies' roles and responsibilities contained in existing laws or the state emergency plan are not superseded by these regulations.

California State Hazard Mitigation Plan

Under the DMA, California must adopt a federally approved state multi-hazard mitigation plan in order to be eligible for certain disaster assistance and mitigation funding. The intent of the California State Hazard Mitigation Plan is to reduce or prevent injury and damage from hazards in the state through the following:

- Documenting statewide hazard mitigation planning in California
- Describing strategies and priorities for future mitigation activities
- Facilitating the integration of local and tribal hazard mitigation planning activities into statewide efforts
- Meeting state and federal statutory and regulatory requirements.

The plan is an annex to the State Emergency Plan, and it identifies past and present mitigation activities, current policies and programs, and mitigation strategies for the future. It also establishes hazard mitigation goals and objectives. The plan will be reviewed and updated annually to reflect changing conditions and new information, especially information on local planning activities.

Local hazard mitigation plans developed in response to the Disaster Mitigation Act in the State of California are to be consistent with the provisions of the approved State Hazard Mitigation Plan.

Governor's Executive Order S-13-08

Governor's Executive Order S-13-08 enhances the state's management of climate impacts from sea level rise, increased temperatures, shifting precipitation and extreme weather events. There are four key actions in the executive order:

- Initiate California's first statewide climate change adaptation strategy to assess expected climate change impacts, identify where California is most vulnerable, and recommend adaptation policies by early 2009. This effort will improve coordination within state government so that better planning can more effectively address climate impacts on human health, the environment, the state's water supply and the economy.
- Request that the National Academy of Science establish an expert panel to report on sea level rise impacts in California, to inform state planning and development efforts.
- Issue interim guidance to state agencies for how to plan for sea level rise in designated coastal and floodplain areas for new projects.
- Initiate a report on critical infrastructure projects vulnerable to sea level rise.

California Civil Code 1102

Article 1102 of the California Civil Code establishes requirements for disclosure of information as part of real estate transactions. It applies to any transfer of real property or residential stock cooperative with one to four dwelling units, by sale, exchange, installment land sale contract, lease with an option to purchase, other option to purchase, or ground lease coupled with improvements. The code imposes disclosure duties on the seller, the seller's agent, or both. Provisions of this code require disclosure of information regarding the proximity of the subject property to areas of natural hazards, including flood, wildfire and earthquake.

Local Flood Protection Planning Act

This statute provides guidance on what a flood mitigation plan should include.

Water Code Division 5, Part 2, Chapter 4, Article 4

This code provides flood plain regulations established for public agencies within flood plain or a flood plain management plan.

California Coastal Management Program

This program requires coastal communities to prepare coastal plans and requires that new development minimize risks to life and property in areas of high geologic, flood, and fire hazard.