



CITY OF LOS ANGELES



Floodplain Management Plan

FOR REPETITIVE LOSS PROPERTIES

**PART III
FMP for RLP**

**Adopted
2010**

CITY OF LOS ANGELES

FLOODPLAIN MANAGEMENT PLAN
FOR
REPETITIVE LOSS PROPERTIES

Prepared by
Bureau of Engineering
Department of Public Work
City of Los Angeles

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(Not for Public Release)

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INTRODUCTION

1.1 Objectives

The objective of this Floodplain Management Plan (FMP) for Repetitive Loss Properties (RLP) is to provide specific potential mitigation measures and activities to best address the community's flood problems and needs associated with repetitive loss properties. A repetitive loss property is one for which two or more claims of \$1,000 or more have been paid by the National Flood Insurance Program (NFIP) within any given ten-year period since 1978.

Repetitive Loss Properties (RLP) is most susceptible to flood damages; therefore, they have been the focus of flood hazard mitigation. Unlike a citywide program, the floodplain management plan for repetitive loss properties involves highly diversified property profiles, drainage issues, and property owner's interest. It also requires public involvement processes unique to each RLP area. This FMP for RLPs intends to serve as a living document for future reference to the flooding problems and mitigation potentials, also as implementation guidelines for all mitigation activities. The ultimate goal of this report is to protect flood-prone residences, reduce flood hazards, and eliminate future flood insurance claims.

Specifically, this report provides the FMP for one hundred forty-six (146) RLPs in the City of Los Angeles as shown in Figures 1.1. Table 1.1 provides a list of the 146 RLPs and a summary of the flood insurance claims filed for each property. The plan was developed following the general requirements of the National Floodplain Insurance Program (NFIP) and specific procedures outlined in the Community Rating System (CRS) Coordinator's Manual (2007). Implementation of this plan will result in fewer flood losses and improved protection of natural and beneficial floodplain functions. This plan will assist the community and repetitive loss property owners in understanding flood hazards, identifying problems, and deriving cost-effective and integral solutions for flood protection, stormwater management, and environmental protection.

The RLPs have been identified and grouped by watershed areas and flood hazards. The two watersheds that contain RLPs are the Ballona Creek and Los Angeles River. Flood hazards are described by non-hillside and hillside areas. The four groups of RLPs are Ballona Creek Non-Hillside, Ballona Creek Hillside, Los Angeles River Non-Hillside and Los Angeles River Hillside.

1.2 Previous Repetitive Loss Property Plan

Since October 1990, the City of Los Angeles (Community No. 060137) has been a voluntary participant in the CRS established by Federal Emergency Management Agency (FEMA) under NFIP. This program provides a discount on flood insurance premiums for property owners who reside in the Community that participates in the NFIP. For those properties located within the designated Special Flood Hazard Areas (SFHA) defined by the Flood Insurance Rate Maps (FIRMs) receives higher discount than those outside the SFHA.

In October 2001, the City adopted the "Floodplain Management Plan." The plan was credited by FEMA for CRS Activity No. 510. To continue program participation and maintain CRS level, the City is required to prepare an annual update of activities in the Floodplain Management Plan that mitigate flood hazards and reduce the number of risks to properties with multiple flood damage claims. The City's current Floodplain Management Plan for Repetitive Loss Properties was published in October 2001, and it will be replaced by this 2009 Floodplain Management Plan (FMP) for the RLP. This FMP for RLP will follow the similar format of the 2001 FMP but with updated information.

2009 Floodplain Management Plan for
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FIGURE 1.1 WATERSHED BOUNDARIES WITH RLP LOCATION MAP

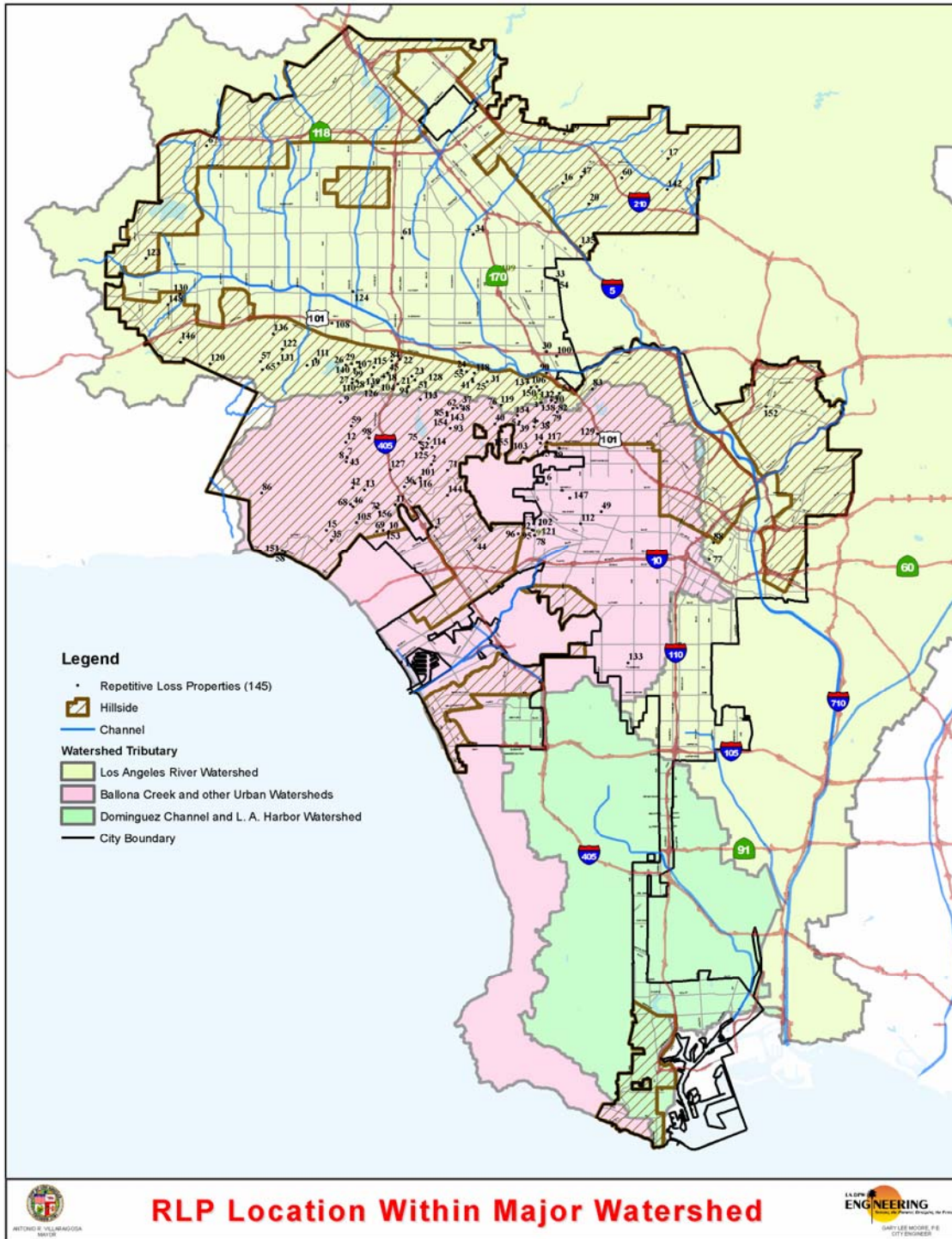


Table 1.1 Repetitive Loss Properties					
City Ref #	Community	FEMA RLP #	Claim History (Month/Year)	Flood Zone*	Total Claim Paid as of 6/2008 (in dollars)
Ballona Creek Non-Hillside Communities					
1	Los Angeles	35091	1/83, 2/80	X	6,931.86
6	Los Angeles	39738	3/83, 2/80	X	4,050.00
10	Los Angeles	34711	2/93, 3/83, 1/83, 2/80	Shaded X	52,806.90
44	Los Angeles	34379	3/81, 2/80	X	10,784.56
49	Los Angeles	39001	3/83, 1/83	X	5,727.48
69	Los Angeles	58038	2/93, 3/83	X	17,965.88
78	Los Angeles	56938	2/93, 2/92	Shaded X	39,430.72
89	Los Angeles	17937	2/86, 3/78	X	15,220.26
92	Los Angeles	7232	2/93, 2/92	Shaded X	56,504.71
95	Los Angeles	12819	2/93, 3/92	Shaded X	4,891.98
96	Los Angeles	12817	2/93, 2/92	X	3,835.59
97	Los Angeles	12816	2/93, 2/92	Shaded X	8,910.08
102	Los Angeles	417	2/93, 2/93	Shaded X	33,500.85
112	Los Angeles	77246	2/98, 3/95, 2/80	X	30,542.76
121	Los Angeles	111789	2/01, 2/98	X	38,189.96
133	Los Angeles	137203	1/05, 1/98	AO	5,245.17
141	Marina Del Rey	137802	2/05, 2/98	Shaded X	9,397.96
144	Los Angeles	138217	2/05, 1/05	X	3,008.40
147	Los Angeles	138325	1/05, 2/98	X	9,862.73
153	Los Angeles	139702	2/05, 3/98	X	33,508.92

Table 1.1 Repetitive Loss Properties					
City Ref #	Community	FEMA RLP #	Claim History (Month/Year)	Flood Zone*	Total Claim Paid as of 6/2008 (in dollars)
Ballona Creek Hillside Communities					
2	Los Angeles	40261	1/83, 2/80	AO	6,556.44
4	Los Angeles	41841	3/83, 2/80	Shaded X	2,623.60
5	Los Angeles	28454	2/80, 2/78	X	13,243.78
7	Los Angeles	39933	2/80, 1/79	X	23,427.62
8	Los Angeles	28390	2/80, 1/79	X	14,721.80
9	Los Angeles	39055	1/05, 3/83, 2/80, 3/79	X	38,187.63
11	Los Angeles	28413	1/83, 3/80	AH	3,468.72
12	Los Angeles	40145	2/80, 1/79	X	3,832.48
13	Los Angeles	38943	1/83, 2/80	X	9,226.04
14	Los Angeles	45672	3/83, 4/80	X	27,269.64
15	Pacific Palisades	46649	1/83, 2/80	X	4,929.47
35	Pacific Palisades	40572	2/80, 1/79	X	56,480.18
36	Los Angeles	34521	3/83, 2/80	X	2,387.10
37	Beverly Hills	33983	1/83, 2/80, 3/78	X	18,703.16
38	Los Angeles	878	1/95, 2/93, 1/93, 2/92	Shaded X	41,377.33
39	Los Angeles	58021	2/98, 2/91, 2/80	X	23,828.26
40	Beverly Hills	41643	1/95, 2/93, 2/80	X	49,141.26
42	Los Angeles	42283	3/83, 2/80	X	3,793.50
43	Los Angeles	40571	3/83, 2/80, 3/79	X	12,455.67
46	Los Angeles	37246	3/83, 2/80	X	25,315.26
48	Beverly Hills	39174	3/83, 2/79	X	15,310.25
52	Los Angeles	28307	3/79, 2/78, 1/78	X	6,184.50
53	Los Angeles	28400	2/80, 2/78	X	2,407.18
58	Pacific Palisades	46812	3/83, 1/83, 2/80	X	277,991.39
59	Los Angeles	46600	3/83, 2/80	X	98,400.00
62	Beverly Hills	57891	2/93, 11/85	X	63,482.46
68	Los Angeles	58040	4/98, 2/92, 2/80	X	13,434.89
70	Los Angeles	58034	1/83, 2/80	X	11,843.80
71	Los Angeles	58033	3/98, 2/93, 3/83	X	32,266.65

Table 1.1 Repetitive Loss Properties					
City Ref #	Community	FEMA RLP #	Claim History (Month/Year)	Flood Zone*	Total Claim Paid as of 6/2008 (in dollars)
Ballona Creek Hillside Communities (continue)					
72	Los Angeles	58032	3/95, 2/93, 1/83	X	16,565.77
75	Los Angeles	72245	3/98, 1/95, 1/93	AO	35,286.22
76	Beverly Hills	72134	1/95, 1/93	X	10,480.10
79	Los Angeles	51293	2/86, 1/83	X	12,709.18
82	Los Angeles	13694	2/93, 2/92, 2/78	X	7,445.24
85	Beverly Hills	14893	2/80, 3/78	Shaded X	8,687.00
86	Pacific Palisades	14895	3/83, 2/80, 3/78	X	22,874.05
93	Beverly Hills	6605	1/95, 1/93, 2/92	X	17,151.06
98	Los Angeles	1157	2/93, 12/92	X	12,994.71
101	Los Angeles	84045	2/96, 1/95	X	15,355.75
103	Los Angeles	76800	3/95, 2/93	X	7,203.78
105	Los Angeles	84552	3/95, 2/93	X	106,109.53
113	Los Angeles	95748	2/98, 1/93	AO	18,994.27
114	Los Angeles	94805	2/98, 1/95	X	20,883.44
116	Los Angeles	94922	3/98, 2/98	X	13,494.69
117	Los Angeles	94073	2/98, 12/92	X	6,267.38
119	Beverly Hills	111643	1/01, 3/98	X	64,119.41
125	Los Angeles	122550	3/03, 12/02, 2/00	AO	59,949.58
127	Los Angeles	122949	2/03, 2/00	X	14,886.93
129	Los Angeles	136151	12/04, 2/98	X	23,808.32
134	Los Angeles	137531	1/05, 2/98	X	11,396.60
143	Beverly Hills	138199	2/05, 12/04	Shaded X	28,488.68
145	Los Angeles	138264	1/05, 1/98	X	26,489.93
151	Pacific Palisade	139491	2/05, 2/00	X	108,728.71
154	Beverly Hills	144843	1/05, 3/98	Shaded X	28,038.63
155	Beverly Hills	174323	1/08, 2/98	X	17,466.78
156	Los Angeles	174594	1/08, 2/01	X	7,947.03

Table 1.1 Repetitive Loss Properties					
City Ref #	Community	FEMA RLP #	Claim History (Month/Year)	Flood Zone*	Total Claim Paid as of 6/2008 (in dollars)
Los Angeles River Non-Hillside Communities					
22	Sherman Oaks	35738	3/83, 2/80	X	15,986.64
30	North Hollywood	39188	3/83, 1/83, 2/80	X	87,712.37
33	Burbank	40092	1/83, 2/80, 1/80	AE	29,015.00
34	Los Angeles	47162	2/95,2/93,2/92,10/87,3/83	X	98,965.97
54	Burbank	34203	2/80, 1/80, 3/78	AE	16,069.44
61	Van Nuys	49539	2/92, 3/83	X	87,616.23
77	Los Angeles	70874	11/97, 12/94, 3/94	X	23,589.62
88	Los Angeles	17939	2/80, 1/78, 1/78, 1/78	X	49,445.22
90	North Hollywood	11060	2/93, 2/92	X	5,937.82
100	North Hollywood	34954	1/80, 2/80	X	4,619.74
108	Encino	92317	2/98, 2/98	X	7,655.31
109	North Hollywood	36963	3/83, 3/79	X	11,792.26
124	Van Nuys	121962	12/02, 2/98	X	5,022.24
130	Woodland Hills	136852	12/04, 2/98	X	10,807.49
148	Woodland Hills	138450	1/05, 2/98	X	11,112.61
152	Los Angeles	139586	1/05, 2/98	X	3,075.11

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Table 1.1 Repetitive Loss Properties					
City Ref #	Community	FEMA RLP #	Claim History (Month/Year)	Flood Zone*	Total Claim Paid as of 6/2008 (in dollars)
Los Angeles River Hillside Communities					
3	Los Angeles	45890	3/83, 2/80	X	5,685.50
16	Los Angeles	40388	2/83, 3/79	Shaded X	8,546.03
17	Los Angeles	28336	2/80, 2/78	X	14,621.22
18	Los Angeles	28306	2/80, 2/78	X	74,200.00
19	Encino	47284	3/83, 1/86	X	11,384.27
20	Sun Valley	49416	3/83, 1/81	X	3,802.20
21	Sherman Oaks	14891	3/83, 2/80	X	4,828.08
23	Sherman Oaks	14897	3/83, 2/80, 3/78	X	30,909.74
24	Sherman Oaks	14894	1/95, 1/93, 1/80, 3/79, 3/78	X	19,936.55
25	Sherman Oaks	51775	2/93, 3/83, 4/82	X	24,959.27
26	Encino	14911	3/83, 2/80	X	8,776.30
27	Encino	36864	1/83, 11/82, 1/80	X	13,091.34
28	Encino	35004	1/05, 2/01, 3/83, 2/80	X	31,070.10
29	Encino	46546	3/83, 2/80	X	34,097.36
31	Studio City	14899	2/80, 1/78	X	67,773.98
32	Studio City	17936	2/80, 3/78	X	15,343.61
41	Sherman Oaks	41904	3/83, 2/80	X	25,416.46
45	Los Angeles	35040	2/80, 3/79	X	61,419.06
47	Sunland	37406	1/81, 2/80	X	43,162.85
51	Sherman Oaks	39782	2/93, 3/83	X	11,537.79
55	Sherman Oaks	47423	1/93, 2/92, 3/83, 1/83	X	8,312.35
57	Tarzana	47221	2/86, 11/82, 12/80	X	11,642.05
60	Sunland	48057	2/98, 2/92, 3/83	X	9,701.30
65	Tarzana	58017	2/98, 1/95, 2/92, 11/82	X	42,898.21
67	Chatsworth	57931	3/83, 3/80	X	6,614.78
83	Los Angeles	13679	3/92, 2/92	X	3,072.16
84	Encino	14906	2/80, 3/78	X	67,389.46
94	Sherman Oaks	2988	1/93, 2/92	X	17,849.33
99	Encino	28471	3/83, 2/80	X	10,527.91
104	Sherman Oaks	71419	1/05, 2/04, 2/01, 1/95, 2/92	X	69,581.10

Table 1.1 Repetitive Loss Properties					
City Ref #	Community	FEMA RLP #	Claim History (Month/Year)	Flood Zone*	Total Claim Paid as of 6/2008 (in dollars)
Los Angeles River Hillside Communities (continue)					
106	Studio City	94323	3/98, 2/98	X	19,216.40
107	Encino	95202	2/98, 2/92	X	9,442.46
110	Encino	93876	2/98, 1/95	X	2,843.71
111	Encino	95776	12/97, 1/95	X	8,421.73
115	Encino	73630	2/98, 3/95, 1/95	X	12,243.80
118	Studio City	108392	3/00, 3/98	X	14,082.66
120	Woodland Hills	111736	12/04, 2/01, 2/98	X	107,548.82
122	Tarzana	116479	1/01, 2/98	X	31,459.12
123	Canoga Park	113344	4/01, 2/98	X	44,428.75
126	Encino	122853	2/03, 3/01	X	60,800.33
128	Van Nuys	135368	10/04, 2/98	X	19,615.43
131	Tarzana	136862	1/05, 2/98	X	13,802.94
132	Los Angeles	136863	1/05, 2/98	X	20,741.73
135	Burbank	137532	1/05, 2/98	X	45,085.76
136	Tarzana	137533	2/05, 1/05	X	28,591.82
137	Studio City	137534	2/05, 1/01,	X	31,214.98
138	Los Angeles	137692	1/05, 1/95	X	110,854.74
139	Encino	137797	1/05, 2/98	X	5,804.17
140	Encino	137798	2/05, 1/05, 2/98	X	10,115.83
142	Tujunga	138175	2/05, 1/05	X	27,768.53
146	Woodland Hills	138318	1/05, 2/98	X	52,725.60
149	Lake View Terrace	138780	1/05, 2/98	X	10,894.03
150	Studio City	138958	10/04, 2/98	X	26,784.54
Addresses are deleted for privacy protection; this information is available from the City of Los Angeles, Bureau of Engineering.					
*Flood Zone 'AE' is the Special Hazard Area inundated by the 1% annual chance flood with base flood elevation determined.					
*Flood Zone 'AH' is the Special Hazard Area inundated by the 1% annual chance flood (usually areas of ponding) where flooding depths are between 1 and 3 feet.					
*Flood Zone 'AO' is the Special Hazard Area inundated by the 1% annual chance flood (usually sheet flow on sloping terrain) where flooding depths are between 1 and 3 feet.					
*Flood Zones 'Shaded X' is a designation for the area between the Special Hazard Areas and the limits of the 0.2% annual chance floodplain.					
*Flood Zone 'X' is a designation for the area determined to be outside the 0.2% annual chance floodplain.					

1.3 Review of NFIP and CRS Community Participation

The National Flood Insurance Program (NFIP) provides federally supported flood insurance in communities that regulate development in their floodplains. The Community Rating System (CRS) was implemented in 1990 as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. The CRS reduces flood insurance premiums for those communities that do more than implement the minimum regulatory requirements.

The CRS encourages comprehensive planning to address the community's flooding problems and provides credit for preparing, adopting, implementing, evaluating, and updating a comprehensive FMP. The CRS does not specify what activities the FMP must recommend, but rather the process used to prepare the FMP.

Depending on the credit points received during CRS certification, a community can fall into one of ten classes: Class 1 requires the most credit points and gives the largest premium reduction, while Class 10 receives no premium reduction. The City's current CRS classification is 7. For Class 7, the credit points earned range from 1,500 to 1,999, and the premium reduction is 15 percent for special flood hazard areas (SFHA) and 5 percent for Non-SFHA. Preparation of the FMP will help the community to retain or improve the CRS classification and receive greater insurance premium reductions.

Community application for the CRS is voluntary. Communities applying for a CRS classification will be given credit points that reflect the impact of their activities on reducing flood losses, improving insurance rating, and promoting the awareness of flood insurance. Floodplain management planning is a principal activity of the City's compliance with the CRS. The CRS encourages programs and projects that preserve or restore the natural state of floodplains and protect these functions. The CRS also encourages communities to coordinate their flood-loss-reduction programs with Habitat Conservation Plans and other public and private activities that preserve and protect natural and beneficial floodplain functions. CRS credit criteria, scoring, and documentation requirements are described in the CRS Coordinator's Manual.

1.4 Overview of the FMP Procedure and Process

The FMP for the RLPs located within the city of Los Angeles, was prepared according to the process described in Activity 510 (Floodplain Management Planning) in the CRS Coordinator's Manual(2007 edition). The FMP planning process involves review, research, investigation, discussion, interview, and consensus building. It includes receiving input from all parties involved and collaborating with existing and future regional programs that relate to flood hazard mitigation, such as land use plans, capital improvement plans, neighborhood redevelopment plans, floodplain ordinances, and environmental preservation/enhancement plans. The FMP for RLPs intends to address the site-specific problems and identify possible solutions under the authority of individual homeowners and/or their homeowner associations.

CRS credit is provided for preparing, adopting, implementing, evaluating, and updating a comprehensive floodplain management plan. Credit is not based on the activities the FMP recommends, but rather on the process that is used to prepare the FMP. To ensure compliance with the CRS program for flood reduction and to achieve the flood insurance premium credits, the subject FMP was prepared following the ten-step planning process described in Section 511, Credit Points of the CRS Coordinator's Manual. The maximum credit points for a full FMP (community-wide and FMP for RLPs) are listed below for reference and the implied proportion for the planning efforts was used to guide the development of the FMP for the RLPs within the City of Los Angeles. Note that the FMP for RLPs alone will receive only 25% of the maximum credits shown below.

CRS Planning Steps	Maximum Points
Phase I – Planning process	
1. Organize to prepare the plan	10
2. Involve the public	85
3. Coordinate with other agencies	25
Phase II – Risk Assessment	
4. Assess the hazard	20
5. Assess the problem	35
Phase III – Mitigation strategy	
6. Set goals	2
7. Review possible activities	30
8. Draft an action plan	70
Phase IV – Planning maintenance	
9. Adopt the plan	2
10. Implement, evaluate, revise	15
Total	294

1.5 FMP Planning Committee

The development, modification, and revision of the FMP are accomplished through the direction and oversight of an FMP Planning Committee. EMA places a high priority on the establishment of a committee that consists of residents, businesses, and property owners that are most affected by flood hazards. The City has maximized the involvement of the public throughout the FMP preparing process and formed an FMP Planning Committee that consists of a large and widely distributed public representation from those areas believed to be at high risk for flood hazards.

In conjunction with the citywide FMP Planning Committee selection, the City conducted a public outreach program to residents in areas having a high risk related to flood hazards and who were thus most likely to participate on the FMP Planning Committee.

In order to determine who would be a part of the Planning Committee, the City reviewed the Planning Committee members from the last update which took place in 2001, along with stakeholders actively involved in floodplain management and stormwater endeavors throughout the City, agencies who would be involved in the implementation of the Plan's programs, and other persons who have a stakeholder interest in floodplain management within the City. The Bureau of Engineering staff, with the assistance of consultant, also referred to the City's Department of Neighborhood Empowerment (DONE) database of residents actively involved in community issues and to residents in high-risk areas for flooding. High-risk areas were identified as those in

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FEMA designated 100-year floodplains, areas with historical complaints of flooding and drainage problems, Repetitive Loss Properties and adjacent properties, hillside and sloped areas, and areas near the coast.

From this list, Planning Committee membership was developed based on the representation of a variety of flood problem areas across the City (with a focus on high-hazard zones), a reflection of the City’s diverse population, the presence of a cross-section of stakeholder interests, and a demonstrated individual interest in floodplain management and associated issues, dedication to their community, and commitment to fully participate FMP.

The ideal FMP Planning Committee representation would include a citizen member from each of the 15 City Council Districts and also representation from Repetitive Loss Properties and other high-risk areas (e.g., hillside, coastal, etc.). The final citizen FMP Planning Committee consists of 22 citizen (public) members, representing homeowner/neighborhood associations, local businesses, real estate agents, engineers, developers, planners, politicians, and concerned citizens. 10 of them have voting right in the Committee.

In addition to the 22 citizen members, the FMP Planning committee has 39 City agency members representing involved City departments, however only 9 were voting members. The City’s FMP Planning Committee voting members include the following departments: Planning, Emergency Management, Building and Safety, Fire, Harbor, Water and Power, Public Works/Sanitation, Public Works/Engineering, and City Administrative Office.

Table 1.2 lists the entire FMP Planning Committee membership, including citizen and City agency participants. This FMP Planning Committee was formed to address the citywide floodplain management plan as well as to review the repetitive loss property issues.

Table 1.2 City of Los Angeles 2009 FMP Committee (*Represent Voting Members)

Citizen Voting Members	Representing
*Ed Demesa/Carvel Bass	US Army Corps of Engineer
*Clint Simmons	West Adams NC
*Iovanka Todt	Floodplain Management Association
*Lisa Sarkin/Chair	Studio City NC
*George De La O/Rick Sun/Michael Chen	LACDPW
*Mike Greespan	North Hills CCC
*Pat Rome	Wilmington NC
*Roy Forbes	900 Mullen Block
*Stewart Fliege/Vice Chair	Brentwood HOA
*Frank Wada	Lincoln Heights NC
Citizen Advisory Members	Representing
Dan McManus	President Sunland-Tujunga NC
Dr. Clyde Williams	LA32NC Sierra Club Water
Elena Popp	President Lincoln Heights NC

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Jose Aguilar	Private Resident
Jose Gutierrez	Interested Citizen
Marcia Hobbs	Interested Citizen
Mel Wilson	Southland Regional Assoc. of Realtors, Bd. of Dir.
Nancy Steele	LASGRWC
Randall Davis	Dominguez Channel Watershed Council
Ruben Chavez	Private Resident
Tom Horn	Real Estate Agent
Tracey Chavira	Central City Association

City Staff	Representing
*Claire Bowin	DCP
*Colin Kumabe	B & S
*Danilo Abalos	POLA
*Eric Baumgardner	EMD
*Jeffrey Elder	LAFD
*Martin Adams	DWP
*Shahram Kharaghani	BOS/WPD
*Susan Shu	BOE
*Thomas Grant	CAO
Alice Gong	BOS/WPD
Chuck Richmond	DRP
Cindy Kovacs	BOS/HRDD
Coleen Briggs	LAPD
Cora Jackson-Fossett	PAO
Dana Prevost	DBS
David Paschal	GSD
Deborah Kahen	DCP
Doug Mensman	CD 4
Dustin Shiau	Ofc. of the Mayor
Fares Botros	BSS
Jack Wise	LAFD
Jill Sourial	CD 1

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Keith Garcia	EMD
Larry Hsu	BOE
Mark Mackowski	DWP
Melinda Bartlett	EAD
Miguel Franco	CD 6
Neeraj Bhatnagar	Ofc. of the Mayor
Norman Mundy	BOE
Paul Backstrom	CD 5
Paul Habib	CD 14
Romano Galassi	BOE
Stacy Gerlich	LAFD
Sterling Kippel	LADPW
Thom Brennan	LAPD
Thu Quach	BSS
Tim Weng	DBS
Tom Cotter	BPW
Yalin Tam	BSS

BACKGROUND

2.1 Watershed and Drainage

The City of Los Angeles is the largest city in Los Angeles County. The City occupies the central portion of the Los Angeles Basin, surrounded by the San Gabriel, Santa Susana, and Verdugo Mountains on the north; incorporated cities on the east; the Pacific Ocean on the south and southwest; and unincorporated portions of Los Angeles County and the City of Malibu on the west. The City enjoys a pleasant Mediterranean climate, with sunny, warm, dry summers and semi-moist, mild winters. Rainfall averages approximately 15 inches per year, nearly all between November and April. Precipitation during the summer months is infrequent, and rainless periods of several months are common.

The City terrain can be classified as 75 percent alluvial plain and 25 percent rugged canyons and hills. The City's storm drainage system is integrated with the Los Angeles County's drainage system. The comprehensive flood control system known as the Los Angeles County Drainage Area Project (LACDA) includes the Los Angeles River, San Gabriel River, Rio Hondo Channel, Dominguez Channel and Ballona Creek. The City complements the LACDA drainage system with a comprehensive storm drain system to prevent local flooding.

The San Fernando Valley portion of the City is drained by the Los Angeles River through a system of north-to-south channels. The West Los Angeles area is tributary to Ballona Creek and other channels that discharge into Santa Monica Bay. The central portion of the City is tributary to Compton Creek and the Los Angeles River, which flows south beyond the City limits and discharges into San Pedro Bay. The Harbor Gateway area is tributary to Dominguez Channel and Harbor Lake, which also discharge into San Pedro Bay.

The most visible drainage features of the City of Los Angeles area are the open flood control channels. There are about 220 miles of these channels, which include the Los Angeles River, Dominguez Channel, and Ballona Creek. They serve to collect runoff from most of the City's storm drains and smaller open channels, and transport the water out to either Santa Monica Bay or San Pedro Bay. In most cases, these channels have been built along the natural stream courses of the area.

With the cooperation of the City, County, and U.S. Army Corps of Engineers (COE), Los Angeles has an extensive drainage system. The City drainage system consists of streets (including gutters), about 1,900 miles of storm drains beneath streets, about 70,000 catch basins, several large spreading grounds, and pumping facilities.

2.2 Population and Land Use Cover

The entire City of Los Angeles is about 484 square miles, of which there are about 215 square miles of hills and mountains and 22 square miles of parklands. The Los Angeles River Basin communities (Hillside and Non-Hillside) cover an approximate area of 289 square miles. The area of the Ballona Creek Basin communities (Hillside and Non-Hillside) was estimated to be 105 square miles. These areas are predominately urbanized with large areas of residential, commercial, and industrial development. Development ranges from the densely populated central city to the quiet, secluded areas of the Santa Monica Mountains.

The population of Los Angeles City increased almost 300% between 1940 and 2008. According to the 2007 Federal Census of Population and Housing, the entire City of Los Angeles has an estimated population of 4 million. Based on the Population Statistics by the City, approximately, 1.3 million people live in the Ballona Creek Basin communities, while 2.1 million people reside in the Los Angeles River Basin communities.

HAZARD ASSESSMENTS

3.1 Sources of Flooding

The major causes of flooding in the City are short-duration, high-intensity storms. In the highly developed areas, local runoff volumes have increased as the soil surfaces become covered by impervious materials. Peak runoff rates have also increased due to improved hydraulic efficiency of streets and improved storm drains and flood control channels. Flooding sources for the RLPs within the communities are mostly the local runoff generated within the property boundaries or adjacent open spaces. A few properties are subject to deficient storm drains and street flooding. There are two RLPs located within the Special Flood Hazard Area Zone AE, one RLP located in Special Flood Hazard Area Zone AH, and five RLPs located within Special Flood hazard Area Zone AO. (See Table 1.1)

3.2 Flooding History

The first few storm drains in the City were installed in the latter half of the 19th century. In 1915, the Los Angeles County Flood Control District was formed. Between the 1940s and the 2008s, the Los Angeles area experienced phenomenal growth, which necessitated the construction of many drainage facilities to alleviate the potential of property damage and loss of life during floods. Due to consolidation of County programs in 1985, the Los Angeles County Flood Control District is now a part of the Los Angeles County Department of Public Works (LACDPW). The LACDPW provides for the operation, maintenance and construction of flood control facilities throughout Los Angeles County.

There have been at least nine major floods in the Los Angeles area since 1861. The most catastrophic flood occurred in March 1938, in which 113 people died, and flood damage was estimated at \$40 million (equivalent to over \$1.3 billion in 2008). Another recent flood in 1980 caused overbank channel flows in the lower Los Angeles River that deposited debris on the top of levees, which was previously thought to have more than a 100-year protection.

During a series of storms in February 1992, rainfall rates of up to 2 inches per hour were reported from thunderstorms in the area. Daily rainfall totals ranged from 4 to 7 inches with some isolated readings of 10 to 12 inches over a 24-hour period. Continuous moderate to heavy rain events persisted throughout a one-week period with flash flood watches in effect during portions of each day.

There has been a history of flooding in the Los Angeles area. Table 1.1 shows the flooding events that have caused damages (with insurance claims filed) to each repetitive loss property since 1978. The majority of the RLPs suffered flooding damages twice in these periods.

The flood events occurred in most rainy season except in the following years which are relatively dry; 1983-85, 1986/87, 1988-90, 1996/97 1998/99, 2001/02, 2005-07, 2008/09.

Flood frequency analysis was conducted using the United States Geological Survey (U.S.G.S) gaging station data. A U.S.G.S. gaging station at Arroyo Seco near Pasadena (Station No. 11098000) has been in operation from 1914 up to now. Since this gaging station is the only nearby station in the project vicinity that has long-term and recent flood measurements, the annual peak data of this station were used to identify the return periods of the past flood events shown in Table 1.1. The Log Pearson Type III method was applied to the flood frequency analysis shown in Appendix A.

Table 3.1 is a summary of the flood frequency for the peak discharge of each rainy season and the number of properties that claimed flood damages.

Table 3.1 Summary of the Flood Frequency

Raining Season	Recurring Year	No of Flood Insurance Claimed
1913/14	30	*
1914/15	2	*
1915/16	10	*
1916/17	3	*
1917/18	2	*
1918/19	1	*
1919/20	2	*
1920/21	2	*
1921/22	8	*
1922/23	2	*
1923/24	1	*
1924/25	1	*
1925/26	4	*
1926/27	4	*
1927/28	2	*
1928/29	1	*
1929/30	1	*
1930/31	1	*
1931/32	2	*
1932/33	1	*
1933/34	3	*
1934/35	7	*
1935/36	3	*
1936/37	2	*
1937/38	100	*
1938/39	2	*
1939/40	2	*
1940/41	4	*
1941/42	1	*
1942/43	25	*
1943/44	6	*
1944/45	4	*
1945/46	3	*
1946/47	2	*

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Raining Season	Recurring Year	No of Flood Insurance Claimed
1947/48	1	*
1948/49	1	*
1949/50	1	*
1950/51	1	*
1951/52	3	*
1952/53	1	*
1953/54	2	*
1954/55	1	*
1955/56	3	*
1956/57	1	*
1957/58	3	*
1958/59	2	*
1959/60	1	*
1960/61	3	*
1961/62	5	*
1962/63	2	*
1963/64	1	*
1964/65	1	*
1965/66	11	*
1966/67	5	*
1967/68	6	*
1968/69	50	*
1969/70	2	*
1970/71	4	*
1971/72	1	*
1972/73	14	*
1973/74	2	*
1974/75	2	*
1975/76	2	*
1976/77	1	*
1977/78	19	20
1978/79	1	11
1979/80	9	59
1980/81	2	4
1981/82	2	1

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Raining Season	Recurring Year	No of Flood Insurance Claimed
1982/83	7	58
1983/84	1	0
1984/85	1	0
1985/86	1	5
1986/87	1	0
1987/88	2	1
1988/89	1	0
1989/90	1	0
1990/91	3	1
1991/92	5	20
1992/93	5	33
1993/94	1	1
1994/95	6	20
1995/96	2	1
1996/97	2	0
1997/98	16	49
1998/99	1	0
1999/00	2	4
2000/01	2	10
2001/02	1	0
2002/03	2	4
2003/04	3	1
2004/05	12	36
2005/06	4	0
2006/07	1	0
2007/08	3	2

* Denote Year prior to NFIP

Some of RLPs filed multiple claims within the same rainy season. (See Table 1.1)

Noted that, the number of claims generally correspond to the magnitude of the flood.

3.3 Recent Problems

A field visit was conducted by the City of Los Angeles engineering staff for each RLP site during the period of February through June 2009(see Appendix B). Based on these recent site visits, interviews with the property owners/residents and/or the questionnaire survey (Refer to Appendix 4 of the Part II of the FMP), as well as various inputs from previous investigations performed by the City of Los Angeles Bureau of Engineering, Bureau of Sanitation, and/or the Department of Building and Safety from 1994 through 2006, previous flooding problems have been resolved for the following 64 RLPs:

1. Ballona Creek Non-hillside community: Twelve (12) properties (RLP Nos. 1, 6, 44, 78, 89, 92, 95, 96, 97, 102, 133, 141)
2. Ballona Creek Hillside community: Twenty-four (24) properties (RLP Nos. 2, 7, 8, 12, 13, 14, 15, 35, 36, 37, 39, 58, 75, 76, 86, 101, 105, 114, 117, 125, 129, 145, 151, 155)
3. LA River Non-hillside community: Eight (8) properties (RLP Nos. 22, 30, 34, 61, 88, 90, 100, 130)
4. LA River Hillside community: Twenty (20) properties (RLP Nos. 16, 17, 18, 19, 21, 26, 31, 41, 47, 60, 65, 106, 107, 110, 123, 131, 132, 136, 137, 140)

20 out of 64 of the RLPs identified above were listed under “Inactive” RLPs based on the FEMA’s record as of June 2008. The City were able to submit necessary documentation to FEMA on behalf of those home owners, and FEMA agreed with the City’s findings to place those RLPs on the “Inactive” list. The City will continue to work with home owners for the remaining RLPs, and collect necessary documentation to justify the City’s findings for FEMA review and approval. It’s also evident that many of these RLPs had no claim for 10 to nearly 30 years which correspond to the heavy storm events span between 97/98 and 04/05.

Many of the new RLPs were the result of the heavy rain in 04/05. Although recent years have been relatively dry, the remaining RLP properties should still be cautious about the potential damages due to future storms.

PROBLEM IDENTIFICATION

4.1 FEMA 100-Year Floodplain

Nearly 15 square miles of the City of Los Angeles lie within the FEMA-designated, 100-year Special Flood Hazard Areas (SFHAs), of which 12 square miles may be developed without significant encroachment to the floodways.

Most of the RLPs are located outside of the FEMA 100-year Special Flood Hazard Zone (i.e. areas inundated by a 1% annual chance flood). Based on analysis for this report, 5 of the 146 RLPs are located within the FEMA Special Flood Hazard Zone AO (RLP Nos. 2, 75, 113, 125 and 133 in Table 1.1). There was one located within the FEMA Special Flood Hazard Zone AH (RLP No. 11 in Table 1.1). Two (2) located in Zone AE (RLP Nos. 33, 54 in Table 1.1). Thirteen (13) are in Zone Shaded X, and 124 are in Zone X, (see Table 1.1). According to the Flood Insurance Study (FIS), published by FEMA, the Flood Insurance Zone AO is the Special Hazard Area inundated by the 1% annual chance flood (usually sheet flow on sloping terrain) where flooding depths are between 1 and 3 feet. The Flood Insurance Zone 'AH' is the Special Hazard Area inundated by the 1% annual chance flood (usually areas of ponding) where flooding depths are between 1 and 3 feet. The Flood Insurance Zone AE is the Special Hazard area with base flood elevation determined. The Flood Insurance Zone Shaded X is the area inundated by a 0.2% annual chance flood, with the 1% annual chance flood depth less than one foot, with drainage area less than one square mile, or protected by levee from the 1% annual chance flood. The Flood Insurance Zone X is a designation for the area determined to be outside the 0.2% annual chance floodplain.

4.2 Field Investigation

A field visit was conducted by the City of Los Angeles engineering staff for each RLP site except one during the period of February through June 2009. The one RLP that was not visited is due to insufficient information to locate the property. The field visit was an important part of the analysis because it verified the findings of the previous investigations performed by the City of Los Angeles Bureau of Engineering, Bureau of Sanitation, and/or the Department of Building and Safety. The field visit also identified any new specific flood problems associated with each RLP if present, and the improvements implemented to mitigate the known drainage problems.

Some of the sites on the list were labeled 'inactive', but the field visit and subsequent engineering analysis were still conducted for those sites in order to evaluate the adequacy of the drainage improvements implemented either by the City of Los Angeles or the property owners.

Specifically, the following issues were investigated during the field visits: location of each property, contributing drainage area, grading and drainage pattern, problems contributing to previous damages, physical conditions of the structures, and surrounding environments. Appendix B shows field photographs, topographic features, adjacent creeks/channels, and key findings of the field investigation. Residents were interviewed if available during the visits, and the interview results were incorporated to update and supplement the information obtained from field observation.

4.3 Causes of Flood Damages

Causes of flood damages to RLPs in all communities were analyzed based on field investigation, data review, interviews with homeowners, and hydrologic/hydraulic calculations. More specific descriptions for each RLP are summarized in Table 4.1. Table 4.1 also includes the properties that do not show further flood hazard based on the recent site visits, interviews with the property owners/residents and/or the questionnaire survey, as well as various inputs from previous investigations performed by the City of Los Angeles Bureau of

Engineering, Bureau of Sanitation, and/or the Department of Building and Safety obtained from 1994 through 2006.

Although flooding problems may be specific to each RLP, these can be classified into four types listed below.

- a. Hillside Drainage Problem: 76 Properties (RLP Nos. 2, 3, 4, 5, 7, 8, 9, 12, 14, 15, 20, 21, 23, 25, 26, 27, 28, 31, 32, 35, 37, 38, 39, 40, 43, 46, 48, 51, 52, 53, 55, 57, 59, 60, 65, 68, 70, 71, 75, 76, 79, 82, 83, 84, 85, 93, 94, 98, 99, 103, 105, 111, 113, 118, 119, 120, 122, 123, 125, 127, 128, 129, 131, 132, 134, 135, 136, 138, 139, 140, 142, 143, 145, 146, 154, and 156): These properties are located at the bottom of a steep hill, which can be impacted by hillside runoff. Flooding occurs due to deficiency of private on-site drainage system to carry the hillside runoff that enters the property. Mudslide hazards from slope failure are also common problems.
- b. Street Drainage Problem: 27 Properties (RLP Nos. 1, 11, 16, 17, 18, 22, 24, 34, 36, 61, 77, 78, 88, 92, 95, 96, 97, 100, 102, 106, 107, 112, 117, 137, 141, 148, and 151): The properties are located lower than the street level, and/or the driveway is sloped towards the house and garage. Street runoff can enter the private property, particularly if the property is located at the street sump area (lowest point of the nearby streets), where street flow can pond. Storm drain problems may include undersized or broken storm drain and debris-clogged catch basins.
- c. Onsite Drainage Problem: 27 Properties (RLP Nos. 6, 10, 13, 19, 29, 42, 44, 45, 49, 67, 108, 109, 114, 115, 116, 121, 124, 126, 130, 133, 144, 147, 149, 150, 152, 153, and 155): The on-site private drain inlets can be deficient or plugged with debris in the yard, causing water to pond within the property and not drain to the street. RLP No. 116 was damaged by roof leaks.
- d. Others: 15 Properties: (RLP Nos. 30, 33, 41, 47, 54, 58, 62, 69, 72, 86, 89, 90, 101, 104, and 110): These properties have site-specific problems that need special and individual attention such as: A sump inlet, which was connected to the storm drain, was installed in the side yard just outside of the subject property and was clogged by debris and branches (RLP No. 62). The house was damaged by coastal flooding and storm drain failure (RLP No. 58). A new retaining wall constructed by neighbor removed the existing v-ditch and has no backfill or new v-ditch to drain the water (RLP No. 72). Storm drain broke during 'El Nino', which has since been fixed (RLP No. 101). New owners have remodeled the house and are not aware of any old flood-related problems of the previous owners (RLP Nos. 86).

Table 4.1 details the flood causes for each RLP. Table 4.2 summarizes the flood causes for RLP within different communities.

Table 4.1 Flooding Causes for Each RLP

Table 4.1* Flooding Causes								
City Ref #	Hillside drainage	Street drainage	On-site drainage	Other	Causes	Flood Zone	Problem	No Problem**
Ballona Creek Non-Hillside Communities								
1		X			Garage lower than street, installed grating, no more problem	X		X
6			X		Drainage system improved in 1989 - no more problem	X		X
10			X		Water into underground garage	Shaded X	X	
44			X		New apartment building, no more problem	X		X
49			X		Onsite drainage problem	X	X	
69				X	Debris in drainage channel caused overflow	X	X	
78		X			Clogged catch basin causing water ponding, Hollyhills SD installed by LACDPW,	Shaded X		X
89				X	Owner(1969) said no flood problem for more than 30 years	X		X
92		X			Street drainage not adequate, Hollyhills SD installed by LACDPW	Shaded X		X
95		X			Street flooding, Hollyhills SD installed by LACDPW	Shaded X		X
96		X			Plugged catch basin, routinely maintained by City, no more problem	X		X
97		X			Street flooding, Hollyhills SD installed by LACDPW	Shaded X		X
102		X			Street flooding, Hollyhills SD installed by LACDPW	Shaded X		X
112		X			Storm drainage not adequate	X	X	
121			X		Onsite backyard drainage problem	X	X	
133			X		Onsite backyard drainage problem, install new floor and grading no more problem	AO		X
141		X			Flat street, street water enter the garage, installed berm, grating and sump pump at garage, no more problem	Shaded X		X
144			X		Onsite backyard drainage problem	X	X	
147			X		Onsite backyard drainage problem	X	X	
153			X		Onsite backyard drainage problem	X	X	

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Table 4.1* - Flooding Causes								
City Ref #	Hillside drainage	Street drainage	On-site drainage	Other	Causes	Flood Zone	Problem	No Problem**
Ballona Creek Hillside Communities								
2	X				Hillside backyard drainage, drainage system installed, no more problem	AO		X
4	X				Hillside backyard drainage	Shaded X	X	
5	X				Backyard mudslide	X	X	
7	X				Debris revetments installed, reduce mudslide/flooding, no more problem	X		X
8	X				Debris revetments installed, reduce mudslide/flooding, no more problem	X		X
9	X				Hillside backyard drainage problem	X	X	
11		X			FEMA Zone AH; street sump, catch basin clogged	AH	X	
12	X				Debris revetments installed, reduce mudslide/flooding, no more problem	X		X
13			X		On-site drainage problem, remodeled & add drainage and wall, no more problem	X		X
14	X				Mudslide after fire, installed fence & wall, no more problem	X		X
15	X				Drainage system installed, owner (4/97) not aware of old problems,	X		X
35	X				Hillside backyard drainage, drainage system installed, no more problem	X		X
36		X			Property lower than street - City reconstructed the street, no more problem	X		X
37	X				Hillside backyard problem, drainage system installed - no more problem	X		X
38	X				Slope failure and mudslide	Shaded X	X	
39	X				Hillside backyard problem, installed wall and drainage system - no more problem	X		X
40	X				Hillside backyard drainage	X	X	
42			X		Frontyard grading drainage	X	X	
43	X				Hillside backyard drainage	X	X	
46	X				Hillside backyard drainage	X	X	
48	X				Hillside backyard drainage	X	X	
52	X				Hillside backyard drainage	X	X	
53	X				Hillside backyard drainage	X	X	
58				X	Broken pipe repaired - no more problem	X		X
59	X				Hillside backyard drainage	X	X	

Table 4.1* - Flooding Causes

City Ref #	Hillside drainage	Street drainage	On-site drainage	Other	Causes	Flood Zone	Problem	
							Problem	No Problem**
Ballona Creek Hillside Communities (continue)								
62				X	Sump inlet outside the property clogged by debris	X	X	
68	X				Hillside backyard drainage	X	X	
70	X				V-ditch behind the house not sufficient	X	X	
71	X				Hillside backyard drainage	X	X	
72				X	No backfill or V-ditch behind the neighbor's new retaining wall	X	X	
75	X				FEMA Zone AO; Remodel, add french drain - no more problem	AO		X
76	X				Hillside backyard drainage, new house under construction, no more problem	X		X
79	X				Hillside backyard drainage	X	X	
82	X				Hillside backyard drainage	X	X	
85	X				FEMA Zone B - Hillside backyard drainage	Shaded X	X	
86				X	Current owner is not aware of any flooding problem	X		X
93	X				Hillside backyard drainage problem	X	X	
98	X				Hillside backyard drainage problem	X	X	
101				X	Broken City storm drain has been fixed, no more problem	X		X
103	X				Hillside backyard drainage problem	X	X	
105	X				Hillside backyard problem, installed fence, drainage system & planted the slope, no more problem	X		X
113	X				FEMA Zone AO; Ditch across the front yard	AO	X	
114			X		Yard drainage improved - no more problem	X		X
116			X		Yard drainage to the garage, roof leak	X	X	
117		X			Water flow to garage - drainage system installed, no more problem	X		X
119	X				Hillside backyard drainage problem	X	X	
125	X				Hillside backyard drainage problem, new house under construction, no problem expected	AO		X
127	X				Hillside backyard drainage problem	X	X	
129	X				Hillside backyard drainage problem, installed retaining wall and yard drain, no more problem	X		X
134	X				Hillside backyard drainage problem	X	X	

Table 4.1* - Flooding Causes								
City Ref #	Hillside drainage	Street drainage	On-site drainage	Other	Causes	Flood Zone	Problem	No Problem**
Ballona Creek Hillside Communities (continue)								
143	X				Hillside backyard drainage problem	Shaded X	X	
145	X				mudslide from neighbor, neighbor built retaining wall, no more problem	X		X
151		X			Garage lower than street, installed grating and berm, no more problem	X		X
154	X				Hillside backyard drainage problem	Shaded X	X	
155			X		House lower than street grade, installed sump pump, no more problem	X		X
156	X				Hillside backyard drainage problem	X	X	

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Table 4.1* - Flooding Causes								
City Ref #	Hillside drainage	Street drainage	On-site drainage	Other	Causes	Flood Zone	Problem	No Problem**
Los Angeles River Non Hillside Communities								
22		X			Street flow to underground parking, Added floodwall - no more problem	X		X
30				X	Owner (since 1979) has no knowledge of flooding	X		X
33				X	FEMA Zone AE; storm drain/channel problem	AE	X	
34		X			Street sump, property lower than street, new storm drain built, no more problem	X		X
54				X	FEMA Zone AE; storm drain/channel problem	AE	X	
61		X			Debris in catch basin, catch basin cleaned, no more problem	X		X
77		X			Street sump; water ponding in front of property	X	X	
88		X			New storm drain was built, no more problem	X		X
90				X	New apartment complex with underground garage, grating and sump pump, no more problem	X		X
100		X			Dam release water, owner installed floodgate, no more problem	X		X
108			X		Frontyard drainage, house lower than street	X	X	
109			X		On site drainage problem	X	X	
124			X		Onsite backyard drainage problem	X	X	
130			X		Onsite backyard drainage problem, drainage system installed, no more problem	X		X
148		X			Flat street, street water enter the front yard	X	X	
152			X		Onsite backyard drainage problem	X	X	

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Repetitive Loss Properties

Table 4.1* - Flooding Causes

City Ref #	Hillside drainage	Street drainage	On-site drainage	Other	Causes	Flood Zone	Problem	No Problem**
Los Angeles River Hillside Communities								
3	X				Hillside problem, trash in retaining wall gutter	X	X	
16		X			Storm drain improved, berm at driveway, no more problem	Shaded X		X
17		X			Street sump, driveway lower than street, remodel driveway, no more problem	X		X
18		X			Street sump, property lower than street, enlarged catch basin, no more problem	X		X
19			X		Clogged area drains, installed new drain, no more problem	X		X
20	X				Lack of debris basin, adjacent to watercourse	X	X	
21	X				Hillside backyard drainage problem, added V-ditch - no more problem	X		X
23	X				Slope failure and mudslide	X	X	
24		X			Street runoff flow toward property	X	X	
25	X				Hillside backyard drainage problem	X	X	
26	X				Hillside backyard problem, installed yard drain - no more problem	X		X
27	X				Slope failure and mudslide	X	X	
28	X				Hillside backyard drainage problem	X	X	
29			X		Onsite drainage, property lower than street	X	X	
31	X				Mudslide before - added retaining wall, no more problem	X		X
32	X				Possible slope failure and mudslide	X	X	
41				X	New house constructed, no more problem	X		X
45			X		Onsite drainage problem	X	X	
47				X	Channel drainage problem, Channel remodeled, no more problem	X		X
51	X				Hillside Onsite drainage problem	X	X	
55	X				Hillside backyard drainage problem	X	X	
57	X				Onsite hillside drainage problem	X	X	
60	X				Hillside backyard drainage, installed new retaining wall and drainage system, no more problem	X		X
65	X				Onsite hillside drainage problem, add v-ditch drain to street, no more problem	X		X
67			X		Onsite backyard drainage problem	X	X	
83	X				Onsite hillside drainage problem	X	X	
84	X				Onsite hillside drainage problem, inlet plugged	X	X	
94	X				Onsite hillside drainage problem	X	X	

2009 Floodplain Management Plan for
Repetitive Loss Properties

Table 4.1* - Flooding Causes

City Ref #	Hillside drainage	Street drainage	On-site drainage	Other	Causes	Flood Zone	Problem	No Problem**
Los Angeles River Hillside Communities (continue)								
99	X				Hillside backyard drainage problem	X	X	
104				X	Backyard flooding seepage through floor	X	X	
106		X			House lower than street, Installed berm & french drain - no more problem	X		X
107		X			Broken storm drain repaired, no more problem	X		X
110				X	Broken drainage pipe repaired, no more problem	X		X
111	X				Hillside backyard drainage problem	X	X	
115			X		Frontyard drainage problem	X	X	
118	X				Hillside backyard drainage problem	X	X	
120	X				Hillside backyard drainage problem	X	X	
122	X				Hillside backyard drainage problem	X	X	
123	X				Hillside backyard drainage problem, installed drainage ditch on slope, no more problem	X		X
126			X		Onsite backyard drainage problem	X	X	
128	X				Hillside backyard drainage problem	X	X	
131	X				Hillside backyard drainage problem, Installed inlets/french drain in the yard & drain to the street, no more problem	X		X
132	X				Hillside backyard drainage problem, yard drainage system installed, no more problem	X		X
135	X				Hillside backyard drainage problem	X	X	
136	X				Hillside backyard drainage problem, installed retaining wall and drainage pipe, no more problem	X		X
137		X			Driveway lower than street, installed grating at garage, no more problem	X		X
138	X				Hillside backyard drainage problem	X	X	
139	X				Hillside backyard drainage problem	X	X	
140	X				Hillside backyard drainage problem, install drainage system and new grading, no more problem	X		X
142	X				Hillside backyard drainage problem	X	X	
146	X				Hillside backyard drainage problem	X	X	
149			X		Onsite backyard drainage problem	X	X	
150			X		Onsite backyard drainage problem	X	X	
<p>*Addresses are deleted for privacy protection; this information is available from the City of Los Angeles, Bureau of Engineering</p> <p>*Properties may be still subjected to channel flooding if they are located within FEMA's SFHA Zone A, AO or AE.</p>								

Table 4.2 Summary of Flooding Causes

Community	Total No.	Type of Problem							
		Hillside Drainage		Street Drainage		Onsite Drainage		Other	
		Problem exist	No Problem	Problem exist	No Problem	Problem exist	No Problem	Problem exist	No Problem
Ballona Creek Non-hillside	20	0	0	1	8	6	3	1	1
Ballona Creek Hillside	56	27	15	1	3	2	3	2	3
Los Angeles Non-hillside	16	0	0	2	5	4	1	2	2
Los Angeles Hillside	53	24	10	1	6	7	1	1	3
Total	145	51	25	5	22	19	8	6	9

4.4 Hydrology Related to Flood Damaged Properties

The discharge rates affecting the RLPs in all areas were estimated by applying the Rational Method as described in the Hydrology Manual of the Los Angeles County Department of Public Works. The methodology primarily depends on three factors: total drainage area, runoff coefficient of the area, and rainfall intensity. The runoff coefficient and rainfall intensity were determined from the Hydrology Manual, drainage map, and data gathered from field visits. The drainage area was delineated on the drainage map of the City of Los Angeles, and depends on topographic features of the area and the existing storm drain facilities. (See Appendix A)

Determination of the drainage area also depends on the flooding sources that affect each site. The contributing drainage areas were estimated using maps shown in Appendix A. The estimates of 100-year discharge rates to all the sites are summarized in Table 4.3. Properties were divided into two categories, Category A and Category B, depending on the flooding sources. A total of 119 RLPs were identified under Category A, and a total of 26 RLPs under Category B. For properties in Category A where flooding was caused by local runoff, the drainage areas, including on-site and hillside areas were determined, based on the topographic map and property tract map. For the properties in Category B where flooding was caused by street runoff, the drainage areas were determined by delineating the contributing areas of the street or storm drains near the property. When there is no storm drain system in the area or the flood event is beyond storm drain system designed capacity, the capacity of the existing drainage structure was modeled using normal depth calculation to determine the excessive runoff to the street. Note that the properties in Category A were identified in Table 4.1 as having hillside drainage or slope failure problems, deficient on-site drainage

systems, or site-specific problems that are not related to street drainage conditions. The properties in Category B were identified to have storm runoff problems beyond existing drainage systems capacity.

Table 4.3 100-Year Storm Event Discharge Rate

Table 4.3 100-Year Discharges						
City Ref #	Community	Drainage Area (sq.ft)	Intensity I(in/hr)	C	100-yr Q (cfs)	Category
Ballona Creek Non-Hillside Communities						
1	Los Angeles	280,000	4.55	0.91	27.92	A
6	Los Angeles	510,400	5.58	0.92	63.46	A
10	Los Angeles	341,056	4.55	0.91	34.01	A
44	Los Angeles	128,800	4.55	0.91	12.85	A
49	Los Angeles	18,000	4.55	0.91	1.8	A
69	Los Angeles	1,262,456	4.55	0.91	126.6	A
78	Los Angeles	16,800	4.55	0.91	1.68	B
89	Los Angeles	330,266	4.55	0.91	32.94	A
92	Los Angeles	51,600	4.55	0.91	5.15	B
95	Los Angeles	78,000	4.55	0.91	7.78	B
96	Los Angeles	130,000	4.55	0.91	12.96	B
97	Los Angeles	16,720	4.55	0.91	1.67	B
102	Los Angeles	237,600	4.55	0.91	23.7	B
112	Los Angeles	400,000	4.55	0.91	39.89	B
121	Los Angeles	6,882	3.88	0.92	0.55	A
133	Los Angeles	4,156	3.48	0.95	0.3	A
141	Marina Del Rey	18,289	3.75	0.52	0.09	B
144	Los Angeles	7,536	4.55	0.97	0.71	A
147	Los Angeles	6,098	3.88	0.92	0.49	A
153	Los Angeles	5,140	4.55	0.97	0.48	A

Table 4.3 100-Year Discharges						
City Ref #	Community	Drainage Area (sq.ft)	I (in/hr)	C	100-yr Q (cfs)	Category
Ballona Creek Hillside Communities						
2	Los Angeles	46,460	5.58	0.92	5.78	A
4	Los Angeles	7,500	5.58	0.92	0.93	A
5	Los Angeles	8,233	5.58	0.92	1.02	A
7	Los Angeles	23,000	5.58	0.92	2.86	A
8	Los Angeles	21,170	5.58	0.92	2.63	A
9	Los Angeles	42,000	6.54	0.93	6.21	A
11	Los Angeles	388,626	4.55	0.91	38.97	B
12	Los Angeles	108,900	6.54	0.93	16.09	A
13	Los Angeles	10,846	5.58	0.92	1.35	A
14	Los Angeles	15,350	5.58	0.92	1.91	A
15	Pacific Palisades	95,396	5.58	0.92	11.86	A
35	Pacific Palisades	26,136	4.55	0.91	2.61	A
36	Los Angeles	60,133	5.58	0.92	7.48	B
37	Beverly Hills	14,505	5.58	0.92	1.8	A
38	Los Angeles	18,295	5.58	0.92	2.27	A
39	Los Angeles	2,500	5.58	0.92	0.31	A
40	Beverly Hills	43,240	5.58	0.92	5.38	A
42	Los Angeles	257,600	5.58	0.92	32.03	A
43	Los Angeles	40,000	5.58	0.92	4.97	A
46	Los Angeles	66,211	5.58	0.92	8.23	A
48	Beverly Hills	48,800	5.58	0.92	6.07	A
52	Los Angeles	21,780	5.58	0.92	2.71	A
53	Los Angeles	18,584	5.58	0.92	2.31	A
58	Pacific Palisades	29,000	4.55	0.91	2.89	A
59	Los Angeles	424,000	6.54	0.93	62.66	A
62	Beverly Hills	608,000	5.58	0.92	75.59	A
68	Los Angeles	51,400	5.58	0.92	6.39	A
70	Los Angeles	16,800	5.58	0.92	2.09	A
71	Los Angeles	39,200	5.58	0.92	4.87	A

Table 4.3 100-Year Discharges						
City Ref #	Community	Drainage Area (sq.ft)	I (in/hr)	C	100-yr Q (cfs)	Category
Ballona Creek Hillside Communities (continue)						
72	Los Angeles	14,550	4.55	0.91	1.45	A
75	Los Angeles	39,500	5.58	0.92	4.91	A
76	Beverly Hills	55,000	5.58	0.92	6.84	A
79	Los Angeles	12,650	5.58	0.92	1.57	A
82	Los Angeles	15,000	5.58	0.92	1.86	A
85	Beverly Hills	49,600	5.58	0.92	6.17	A
86	Pacific Palisades	6,100	5.58	0.92	0.76	A
93	Beverly Hills	9,500	5.58	0.92	1.18	A
98	Los Angeles	2,750	6.54	0.93	0.41	A
101	Los Angeles	35,284	5.58	0.92	4.39	A
103	Los Angeles	17,100	5.58	0.92	2.13	A
105	Los Angeles	18,000	4.55	0.91	1.8	A
113	Los Angeles	175,550	6.54	0.93	55.45	A
114	Los Angeles	2,570	5.58	0.92	0.32	A
116	Los Angeles	31,800	5.58	0.92	3.95	A
117	Los Angeles	58,800	5.58	0.92	7.31	B
119	Beverly Hills	16,688	4.55	0.77	1.43	A
125	Los Angeles	26,136	4.95	0.65	2.26	A
127	Los Angeles	500,940	5.22	0.66	51.63	A
129	Los Angeles	6,177	4.02	0.91	0.51	A
134	Los Angeles	14,397	4.42	0.89	1.3	A
143	Beverly Hills	28,606	4.82	0.83	2.66	A
145	Los Angeles	7,928	4.15	0.95	0.68	A
151	Pacific Palisade	35,689	4.55	0.79	1.1	B
154	Beverly Hills	27,007	4.95	0.83	2.76	A
155	Beverly Hills	7,449	4.55	0.89	0.69	A
156	Los Angeles	7,884	4.82	0.97	0.79	A

Table 4.3 100-Year Discharges						
City Ref #	Community	Drainage Area (sq.ft)	I (in/hr)	C	100-yr Q (cfs)	Category
Los Angeles River Non-Hillside Communities						
22	Sherman Oaks	173,600	4.55	0.91	17.31	B
30	North Hollywood	77,101	5.58	0.92	9.59	A
33	Burbank	7,890,351	4.55	0.91	791.25	A
34	Los Angeles	480,000	5.58	0.92	59.68	B
54	Burbank	7,890,351	4.55	0.91	791.25	A
61	Van Nuys	700,800	4.55	0.91	69.89	B
77	Los Angeles	270,400	4.55	0.91	26.97	B
88	Los Angeles	104,000	4.55	0.91	10.37	B
90	North Hollywood	392,000	5.58	0.92	48.74	A
100	North Hollywood	158,000	5.58	0.92	19.64	B
108	Encino	27,600	4.55	0.91	2.75	A
109	North Hollywood	19,200	4.55	0.91	1.91	A
124	Van Nuys	7,170	5.09	0.7	0.65	A
130	Woodland Hills	16,392	4.69	0.94	1.59	A
148	Woodland Hills	370,888	4.82	0.94	2.79	B
152	Los Angeles	4,500	4.55	0.97	0.42	A

Table 4.3 100-Year Discharges						
City Ref #	Community	Drainage Area (sq.ft)	I (in/hr)	C	100-yr Q (cfs)	Category
Los Angeles River Hillside Communities						
3	Los Angeles	14,990	5.58	0.92	1.86	A
16	Los Angeles	44,900	5.58	0.92	5.58	B
17	Los Angeles	58,800	5.58	0.92	7.31	B
18	Los Angeles	147,200	5.58	0.92	18.3	B
19	Encino	20,200	5.58	0.92	2.51	A
20	Sun Valley	12,800	5.58	0.92	1.59	A
21	Sherman Oaks	29,000	6.54	0.93	4.29	A
23	Sherman Oaks	15,750	5.58	0.92	1.96	A
24	Sherman Oaks	101,600	4.55	0.91	10.13	B
25	Sherman Oaks	50,744	5.58	0.92	6.31	A
26	Encino	16,320	5.58	0.92	2.03	A
27	Encino	19,000	5.58	0.92	2.36	A
28	Encino	16,000	5.58	0.92	1.99	A
29	Encino	407,293	5.58	0.92	50.64	A
31	Studio City	9,000	5.58	0.92	1.12	A
32	Studio City	16,160	5.58	0.92	2.01	A
41	Sherman Oaks	44,000	5.58	0.92	5.47	A
45	Los Angeles	63,600	5.58	0.92	7.91	A
47	Sunland	95,200	5.58	0.92	11.84	A
51	Sherman Oaks	153,000	5.58	0.92	19.02	A
55	Sherman Oaks	380,000	4.55	0.91	37.9	A
57	Tarzana	22,625	5.58	0.92	2.81	A
60	Sunland	6,060	5.58	0.92	0.75	A
65	Tarzana	18,300	5.58	0.92	2.28	A
67	Chatsworth	20,300	5.58	0.92	2.52	A
83	Los Angeles	16,553	5.58	0.92	2.06	A
84	Encino	35,000	4.55	0.91	3.49	A
94	Sherman Oaks	13,070	5.58	0.92	1.63	A
99	Encino	16,300	5.58	0.92	2.03	A

Table 4.3 100-Year Discharges						
City Ref #	Community	Drainage Area (sq.ft)	I (in/hr)	C	100-yr Q (cfs)	Category
Los Angeles River Hillside Communities (continue)						
104	Sherman Oaks	10,629	5.58	0.92	1.32	A
106	Studio City	272,800	5.58	0.92	33.92	B
107	Encino	17,950	5.58	0.92	2.23	B
110	Encino	3,030	5.58	0.92	0.38	A
111	Encino	16,640	5.58	0.92	2.07	A
115	Encino	47,916	5.58	0.92	5.96	A
118	Studio City	25,400	4.82	0.78	2.33	A
120	Woodland Hills	7,667	5.22	0.81	0.78	A
122	Tarzana	37,457	5.62	0.81	4.11	A
123	Canoga Park	11,217	4.28	0.78	0.91	A
126	Encino	18,896	5.76	0.81	2.12	A
128	Van Nuys	17,468	5.09	0.79	1.71	A
131	Tarzana	17,999	5.62	0.81	1.97	A
132	Los Angeles	28,249	4.15	0.88	2.4	A
135	Burbank	14,497	4.82	0.97	1.44	A
136	Tarzana	27,077	5.49	0.98	3.07	A
137	Studio City	102,027	4.55	0.91	1.06	B
138	Los Angeles	11,587	4.28	0.89	1.01	A
139	Encino	16,348	5.76	0.81	1.84	A
140	Encino	19,049	5.62	0.81	2.09	A
142	Tujunga	32,757	6.02	0.81	3.85	A
146	Woodland Hills	8,817	4.95	0.8	0.84	A
149	Lake View Terrace	13,957	4.28	0.91	1.23	A
150	Studio City	19,136	4.55	0.91	1.8	A

4.5 High Risk Properties

As reported in the City's 2001 FMP for Repetitive Loss Properties, roughly 48,000 structures (or about 2.6%) of total structures within the City lie within the 100-year floodplain. Based on the 2008 DFIRM, five RLP properties are in FEMA Flood Zone "AO", two RLP properties are in FEMA zone "AE", and one property of the 146 RLPs is within FEMA Flood Zones "AH" (see Section 4.1).

In addition to RLPs, there are other residential properties that may have been affected by the historical flooding or are subject to future flooding damages. Although these properties did not file claims more than twice within any given 10-year period since 1978 as the RLPs did, they will be included as the "high risk properties" to be monitored by the City of Los Angeles for future flood damage reduction (see Section 10).

"High risk properties" near the current RLPs were determined by identifying drainage and erosion problems similar to the RLPs shown in Table 4.1. Total of 19 RLP were identified to have high risk properties nearby and were determined to be affected by the same flooding condition. These RLPs are 7, 8, 9, 17, 23, 24, 31, 34, 43, 59, 67, 69, 77, 92, 96, 106, 109, 112, and 151. The rest of the RLPs have site-specific sources of problems, and no other "high risk property" has been identified near those RLPs, based on the current information available. Figure 4.1 Shows the Map of High Risk Property. Detail plans for the High Risk Properties are included in Appendix C. Table 4.4 summarizes the numbers of "high risk properties"

FIGURE 4.1 MAP OF HIGH RISK PROPERTIES

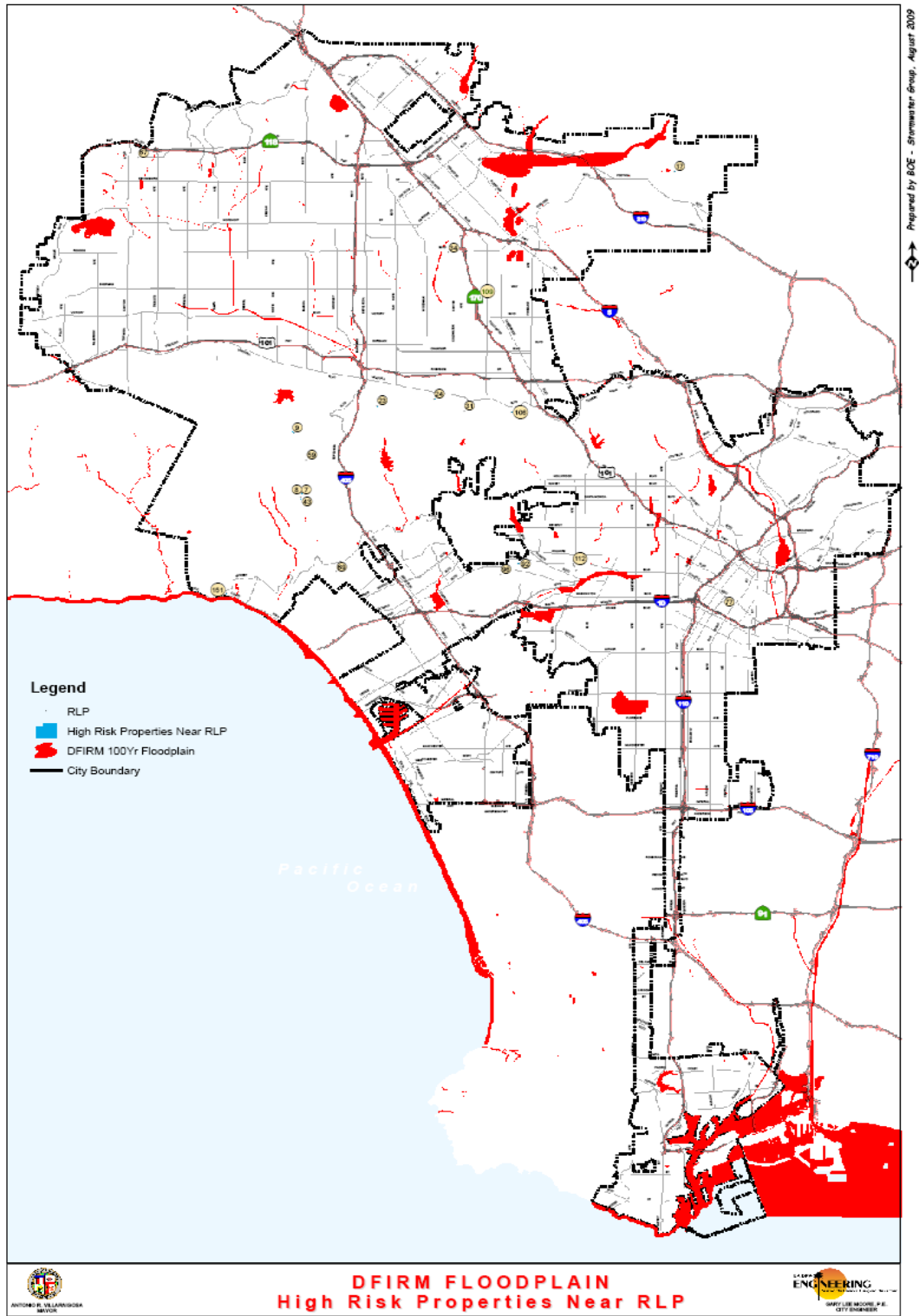


Table 4.4 Numbers of "High Risk Properties" -

RLP ID	Localized source of problem		Number of other property possibly affected by same problem	Description of Problem
	Yes	No		
Ballona Creek Hillside				
7	x		5**	Hillside backyard drainage/mudslide
8	x			
9	x		5	Hillside backyard drainage problem
43	x		7	Hillside backyard drainage/mudslide
59	x		1	Hillside backyard drainage/mudslide
151		x	2	Garage lower than street
Ballona Creek Non-Hillside				
69	x		1	L A County Flood Channel not adequate
92		x	4	Stormwater runoff
96		x	2	Plugged catch basin
112		x	4	Stormwater runoff
Los Angeles River Hillside				
17		x	3	Street sump, driveway lower than street
23	x		5	Slope failure and mudslide
24		x	2	Street runoff flow toward property
31	x		1	Mudslide
67	x		3	Onsite backyard drainage problem
106		x	2	House lower than street,
Los Angeles River Non-Hillside				
34		x	1	Street sump, property lower than street
77		x	4	Street sump; water ponding in front of property
109	x		3	On-site drainage problem
* Addresses are not shown for privacy protection; this information is available from the City of Los Angeles Bureau of Engineering for owner reference.				
** RLP Nos. 7 and 8 are located right next to each other.				

4.6 Insurance Claims and Disaster Assistance Applications

The flood insurance claim history has been presented and summarized in Table 1.1. Each RLP owner has filed insurance claims to FEMA at least twice since 1978.

4.7 Flood Warning and Emergency Management

The City does not have flood-warning devices at this time. The emergency management program is under the jurisdiction of Emergency Management Department (EMD). Refer to Emergency Plans and annexes prepared by EMD

4.8 Critical Facilities

There are no critical facilities in the subject RLP area.

4.9 Development (land use) and Growth Trends

The population of Los Angeles County increased almost 300% between 1940 and 2008. By creating impermeable surfaces, this has increased stormwater runoff discharged to the City's drainage systems. The increased discharges have caused negative impact to the capacities of many flood control and storm drain systems.

The locations of the repetitive loss properties within the City do not generally correspond to the identified Special Flood Hazard Area (SFHAs). The repetitive loss property locations are contained within major urban developments located in hillside or mountainous areas; no new major developments are anticipated in the future that may significantly alter the flooding problems identified in this FMP.

4.10 Future Development / Redevelopment Plans

The Floodplain Management Ordinance, Ordinance No. 154405, was adopted on September 16, 1980, and amended on July 26, 1988 and June 17, 1998, respectively by Ordinance 163913, 172081. Floodplain Management Ordinance contains the development constraints for SFHAs. The ordinance prohibits new public and private development in areas where flood-related hazards would seriously endanger human life, health, and property.

The ordinance imposes site investigations and requires adequate grading and drainage of mudflow areas to ensure reasonable safety. These regulations are considered to be minimum requirements, and additional measures will be taken as necessary based on sound engineering principles to assure full compliance with the intent and purpose of the ordinance.

The Floodplain Hazard Management Ordinance is the key component of the City's participation in the NFIP. The City Engineer is designated as Flood Hazard Mitigation Coordinator for the City, has primary responsibility for implementing and managing the activities required in the NFIP. In addition, FEMA continually modifies and updates NFIP requirements for local agencies with the long-range goal of public safety and reduced flood damage.

4.11 Community and Economic Impact Assessment

The economic impacts on the RLPs include sediment/trash removal after floods, non-usable living spaces, and health problems caused by contaminated floodwater. The overall community economic impacts are considered insignificant.

5 ENVIRONMENTAL SETTING

Per the City of Los Angeles CEQA Guidelines, the environmental issues include the following:

- Aesthetics
- Agriculture resources
- Air quality
- Biological resources
- Cultural resources
- Geology and soils
- Hazards and hazardous materials
- Hydrology and water quality
- Land use and planning
- Mineral resources
- Noise
- Population and housing
- Public services
- Recreation
- Transportation/traffic
- Utilities and service systems
- Mandatory findings of significance

According to the Los Angeles City CEQA Guidelines, each environmental issue listed above is subdivided into numerous sub-issues. The CEQA Guidelines are presented in Appendix D of this report. The project repairs are typically small projects that are confined to existing structures or will occur in previously disturbed sites. Therefore, no significant impacts are expected of possible improvements within the RLPs, assuming minor changes to the physical condition of the property. However, temporary construction impacts must be minimized and mitigated. Although improvements to individual RLPs may be exempted, construction permit issuance should ensure compliance with all environmental requirements. The area-wide storm drain/retention system, which may be implemented as a public activity, will require an additional environmental impact evaluation to ensure CEQA compliance.

6 PUBLIC INVOLVEMENT

6.1 Public Involvement Process and Procedure

The public involvement process and procedure for this FMP include informing and involving the public by interviewing RLP owners at the sites, mailing questionnaire to all homeowners in the area, and conducting frequent public meetings. There were two series of public-involved meetings conducted by the City and consultant. The first series of meetings were FMP Planning Committee meetings, participated in primarily by the FMP Planning committee members (see Section 1.5) to cover the required topics as outlined in the CRS manual. The second series of meeting included “early involvement” public meetings, conducted from February to June 2009, to which all interested public and RLP owners were invited (see Section 6.4).

The meeting summaries and copies of the meeting attendance list, as well as copies of the questionnaires, are included in Part II of the FMP.

6.2 Questionnaires

The City identified approximately 56,000 addresses in areas suspected of flooding risks due to the following factors: multiple historical drainage complaints, historical flood claims, proposed capital improvement projects, Special Flood Hazard Areas(SFHA), Repetitive Loss Properties(RLP) and adjacent properties, hillside areas (where slope is greater than or equal to 6%), and proximity (within 500 feet) to the coast. Individual “outreach letters” and questionnaires were mailed to these residents for invitation to the public meetings mentioned above.

The outreach letters were a continuation of the City’s efforts to provide information to those residents whose homes suffered flood damages in the past. The letters provided information regarding the FMP process and flood mitigation such as property protection measures, including retrofitting; clearing the on-site drainage devices; and emergency measures. The availability of flood insurance and engineering information for each RLP was publicized.

Additionally, the City sent questionnaires to the RLPs. The City received responses to those questionnaires from the RLPs. Most responses indicated that the City should be responsible for solving the repetitive flooding problem because the City issued building permits for the homes.

6.3 Public Meeting Invitation

A series of thirty (30) “early involvement” public meetings were scheduled to involve the interested public in the plan development process. Public meeting invitations were sent to all neighborhood councils and community leaders in the City of Los Angeles. The meeting date is coordinated with each neighborhood council regular meetings to encourage and maximize participations.

6.4 Meeting Attendance

A total of thirty public meetings have been conducted with residents in the repetitive loss areas. These meetings were intended to allow the homeowners to voice their concerns and the residents to volunteer to participate in the City's floodplain management planning. The meetings were attended by both RLP owners and other interested and/or concerned homeowners in the vicinity of the repetitive loss areas. The time and location for those 30 meetings and meeting notes taken at each meeting are included in Part II of the FMP.

FMP Planning Committee Meetings were held a total of six times and attended by most of the FMP Planning Committee members (see Section 1.5). For each meeting, 22 citizen committee members and 39 departmental committee members were invited. Meeting notices, agendas, attendance and meeting minutes are included in the Part II of the FMP.

6.5 Public Input and Comments

Most residents found that the flooding problems have been resolved or improved. Some expressed concerns about street maintenance and drainage improvements. Refer to Part II of FMP – Involving the Public for details of the Public Outreach

7 AGENCY COORDINATION

The City is in close contact with the Los Angeles County Department of Public Work and U.S. Army Corps of Engineers. They were invited to attend the Planning Committee meetings. A series of meetings were held with interested homeowners and neighborhood councils. The meeting dates, locations and notes are included in Part II of the FMP.

8 GOAL SETTING

8.1 Floodplain Management Goal Definition

Goals were established to define the floodplain management plan and to address the flooding concerns of the community residents. The overall goal for the FMP is to create a safe environment for individual owners or lessees by reducing flood hazards without significant environmental impacts. Specifically, the following goals were defined for the development of this FMP for RLPs:

- Understand the flood hazard and past mitigation activities.
- Conduct site inspection and data research to identify drainage problems.
- Identify the environmental settings at problem sites and public concern.
- Formulate non-structural and structural alternatives.
- Evaluate feasibility of each alternative.
- Evaluate impacts and mitigation requirements by the project.
- Outreach property owners to promote flood awareness and assist in hazard mitigation measures.

8.2 Compatibility with Other Community FMP Goals

This FMP for the RLPs is in concurrence with the goals and objectives set forth in the city wide FMP. These goals include:

- a. Minimize flood hazards and protect water quality by employing watershed-based approaches that balance environmental, economic, and engineering considerations.
- b. Find effective and efficient approaches to reduce storm water runoff and protect water quality.

9 REVIEW OF POSSIBLE MITIGATION ACTIVITIES

9.1 Floodplain Management Objective Overview

Development of the citywide FMP is intended to serve all properties within the City through its goals, objectives, policies, and implementation programs. Repetitive Loss Properties, however, require a specific set of objectives, policies, and programs to address the problems unique to these individual parcels or areas. RLPs manifest a unique divide between public and private hazard mitigation. Recurrent damages to these properties carry public concern and cost; yet the damage forces and solutions are of a private nature and financial responsibility. Thus, the FMP for RLPs is of a dual character, which requires both public agencies and private RLP owners' attention. The FMP must first identify the problems associated with each RLP, assess solutions that can be provided by RLP owners and public agencies, and at the same time, communicate with RLP owners the critical information and awareness to encourage the voluntary participation in private solutions. The following discussion centers on the private programs, measures, and activities to address the problems and needs associated with RLPs.

In keeping with the goals of the FMP to ensure that all possible mitigation measures are explored, the review of possible mitigation activities starts with the six activity categories presented in Section 511-a.7 of the CRS Coordinators Manual (2007). These activity categories are (1) preventive, (2) property protection, (3) natural resource protection, (4) emergency services, (5) structural projects, and (6) public information.

The following sections detail the application of these six activity categories to the affected RLPs by identifying basic responsible party with a division between essentially public versus private activities. Note that the division between private versus public activities is for easy reference only. Implementation responsibility may be shared by both parties as shown in Section 10.1. Property protection activities are discussed under "Private Activities" since most protection measures will be implemented within the private property rights-of-way. Major structural improvements such as elevating the entire house or public storm drain improvement may be costly and may be qualified for governmental funding assistance. Under these circumstances, property protection measures may be jointly participated by private owners, the City, and other entities involved in funding approval and reimbursement. Conversely, natural resources protection activities are primarily through the watershed management efforts of the public agencies and are listed under "Public Activities". However, the private owners are encouraged to apply environmentally friendly materials and to provide environmental protection during design and construction of property protection measures.

9.2 Public Activities

Of the six activity categories identified under the CRS Coordinators Manual, five are essentially governmental in nature. These five are preventive, natural resource protection, emergency services, structural projects, and public information. Implementation of any activity contained in these categories is dependent upon the priorities and funding availability of the responsible governing agencies.

9.2.1 Preventive Activities

The list below identifies possible preventive activities that could reduce potential flood damage for RLPs and "high risk properties" and, in many instances, to non-RLP properties.

- 1.a Maintain the City's Emergency Operations Master Plan and Procedures.

- 1.b. Maintain regular contact with surrounding cities, the Los Angeles County Department of Public Works, State and Federal agencies regarding flood hazard mitigation, and the National Flood Insurance Program.
- 1.c. Participate in organizations such as the Association of State Floodplain Managers and the National Association of Flood and Stormwater Management Agencies to network with other agencies and remain current in the field of floodplain management.
- 1.d. Conduct an annual National Flood Insurance Program seminar for City agencies responsible for applying and enforcing floodplain management regulations.
- 1.e. Update operational procedures and training materials for staff that apply and enforce floodplain management regulations and provide annual training.
- 1.f. Conduct a stormwater facilities condition assessment program to identify the physical and hydraulic condition of the system and to support infrastructure management needs.
- 1.g. Develop and maintain a citywide list of priority maintenance-related flood problem sites.
- 1.h. Conduct maintenance activities at priority maintenance-related flood problem sites prior to the wet season.
- 1.i. Post “No Dumping” signs at points of entry to the stormwater system.
- 1.j. Revise the Map of Hillside Areas to more accurately reflect areas subject to hillside regulations based on current data and technology.
- 1.k. Develop a map of known landslide and mudflow areas.
- 1.l. Research and continue to improve Municipal Code regulations regarding soil stability and erosion abatement.
- 1.m. Refine the use of the Plan Check and Inspection System (PCIS) to track high-risk properties and ensure that drainage is adequately addressed through the plan check process.
- 1.n. Incorporate floodplain management information into the Zoning Information and Map Access System (ZIMAS).
- 1.o. The Flood Hazard Mitigation Coordinator shall flag repetitive loss properties in the PCIS database for review and approval of building permit applications.
- 1.p. Investigate RLPs and annually notify RLP owners regarding local flood hazards and proper protection activities, provide technical advice regarding flood protection and flood preparedness, and distribute a revised RLP questionnaire to new RLPs.
- 1.q. Identify and maintain a list of high-risk properties that could be acquired for conversion into open space.
- 1.r. Establish standards and/or incentives for the use of structural and non-structural techniques that mitigate flood-hazards and manage stormwater pollution.

9.2.2 Natural Resource Protection Activities

The guidance of the CRS Coordinators Manual typically places these activities at a scale that benefit a broad range of people or are at an ecosystem level, which is beyond the scope of an individual RLP. Ecosystem restoration activities typically reduce stormwater volume through infiltration and decrease flood peak discharge through increased ground cover density and resistance. However, these large-scale restoration

activities are not expected for this FMP due to the physical characteristics of the watershed. Limited mitigation measures are available to the RLP through the use of bioengineering solutions within the RLP right-of-way. The implementation and financing of these activities is normally the property owner's responsibility. Potential natural resource protection activities identified are as follows.

- 2.a Continue to require environmental review in the development process to provide for the protection of natural resources.
- 2.b Encourage the application of biological resource measures for the control of stormwater and erosion to the best of their applicable limits with regards to other safety factors such as fire control.
- 2.c Establish standards and/or incentives for the use of structural and non-structural techniques that mitigate flood and erosion hazards and manage stormwater pollution.
- 2.d Ensure awareness of RLP owners on environmental sensitivities specific to their area.
- 2.e Establish standards and procedures for mitigation of temporary construction impacts.

9.2.3 Emergency Services Activities

Emergency services activities are taken during a flood to minimize its impacts. These measures are normally the responsibility of city or county emergency management staff. Under some special circumstances, private entities can undertake emergency services activities. A highly organized and committed private entity, like a homeowners association, may be capable of providing limited emergency services activities.

- 3.a Identify flood-warning systems for properties situated where such systems can be beneficially employed.
- 3.b Maintain the City's Emergency Operations Master Plan and Procedures.
- 3.c Make sand and sand bags 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.

9.2.4 Structural Activities

Section 511 of the CRS Coordinators Manual employs this category for large-scale projects providing protection to groups, rather than the more individually based category of Property Protection Activities. Large-scale projects are, by their nature, public facilities and are thus designed and maintained by public works staff. In the examination of RLPs, a limited number of large-scale projects are potentially suited for controlling the hazards of RLPs. These potential structural activities are as follows.

- 4.a Storm drain improvements.
- 4.b Channel modifications.
- 4.c Street drainage modifications.
- 4.d Construction of levees or floodwalls.
- 4.e Construction of flood detention or debris basins

9.2.5 Public Information Activities

Information transfers to RLP owners, potential property owners, and visitors about the hazards and ways to protect people and property from the hazards are effective activities that can lead to the mitigation of the hazards. The following public information activities have been identified for RLPs.

- 5.a Identify possible sources of funding including Cost of Compliance funds and mitigation grant funds among others and provide this information to RLP owners.
- 5.b Continue to investigate RLPs as they are identified by FEMA, annually notify RLP owners regarding local flood hazards and proper protection activities, provide technical advice regarding flood protection and flood preparedness, and distribute a revised RLP questionnaire to new RLPs.
- 5.c Develop and distribute flood protection information and materials to property owners and developers in high-risk areas.
- 5.d Develop and distribute a map of known landslide and mudflow areas.
- 5.e Revise the Map of Hillside Areas to more accurately reflect areas subject to hillside regulations based on current data and technology.
- 5.f Provide public education about maintaining the stormwater system free of debris.
- 5.g Maintain the City web page to provide emergency preparedness information to the general public and media.
- 5.h Distribute information regarding flood prevention and flood insurance at emergency operations and emergency preparedness events.
- 5.i Continue implementing the City's Annual Emergency Preparedness Fair.

9.3 Private Property Protection Activities

Property protection activities for RLPs are generally in the nature of small-scale measures undertaken by property owners on a structure-by-structure or parcel basis. As these measures are usually carried out by the property owners, implementation and financing of these measures are normally at the discretion of the property owners. Such measures include the following:

- 6.a Construct or modify retaining walls with proper drainage and trash capacity.
- 6.b Construct berms to divert water flows.
- 6.c Install debris fences or traps.
- 6.d Install yard inlets to drain water flows to the street.
- 6.e Construct on-site detention basins.
- 6.f Improve headwalls for water conveyance.
- 6.g Floodproof retaining walls.
- 6.h Floodproof entrances.
- 6.i Add sump pump to drainage systems and drain to nearest storm drain.
- 6.j Construct terrace drain and plant slope to reduce erosion.

*2009 Floodplain Management Plan for
Repetitive Loss Properties*

- 6.k Plant slopes to reduce erosion and water flows.
- 6.l Improve on-site grading and add french drain.
- 6.m Convert flood-prone living space and replace with new story.
- 6.n Lift entire house including floor slab and build a new foundation to elevate the house.
- 6.o Waterproof lower level.
- 6.p Extend the walls of the house upward and raise the lowest floor.

10 ACTION PLAN

Section 9 concluded with the identification of alternatives that have the potential to mitigate the flood hazards experienced by the RLPs. In this section, where the goal is to identify actions to be taken by RLPs, the alternatives were examined for their technical appropriateness, affordability, ability to be implemented, and their regulatory compliance by local, state, and federal regulations at the RLP level.

10.1 Final Alternative Activity Plans

The set of alternatives carried forward from Section 9 can be divided into two actions: (1) activities requiring action at the “public” level; i.e., they require a governmental action and (2) actions that can be pursued by the individual property owner. Table 10.1 makes these divisions with the possible exceptions being noted. As noted earlier, the main focus of the FMP for RLPs is in the identification of hazard mitigation activities that the property owner can undertake. Given this focus, the activity categories that are basically governmental are left to the appropriate governmental entities to be implemented under the citywide FMP, with the noted exceptions of Table 10.1 being applied to RLPs where applicable.

Table 10.1 Six Mitigation Activity Categories and Basic Responsible Party	
Category	Basic Responsible Party
1. Preventive Activities	Public
2. Natural Resource Protection Activities	Public (primary) and Private (secondary)
3. Emergency Services Activities	Public
4. Structural Activities	Public
5. Public Information Activities	Public
6. Property Protection Activities	Private (primary) and Public (funding assistance)

10.2 Selection Factors for RLPs

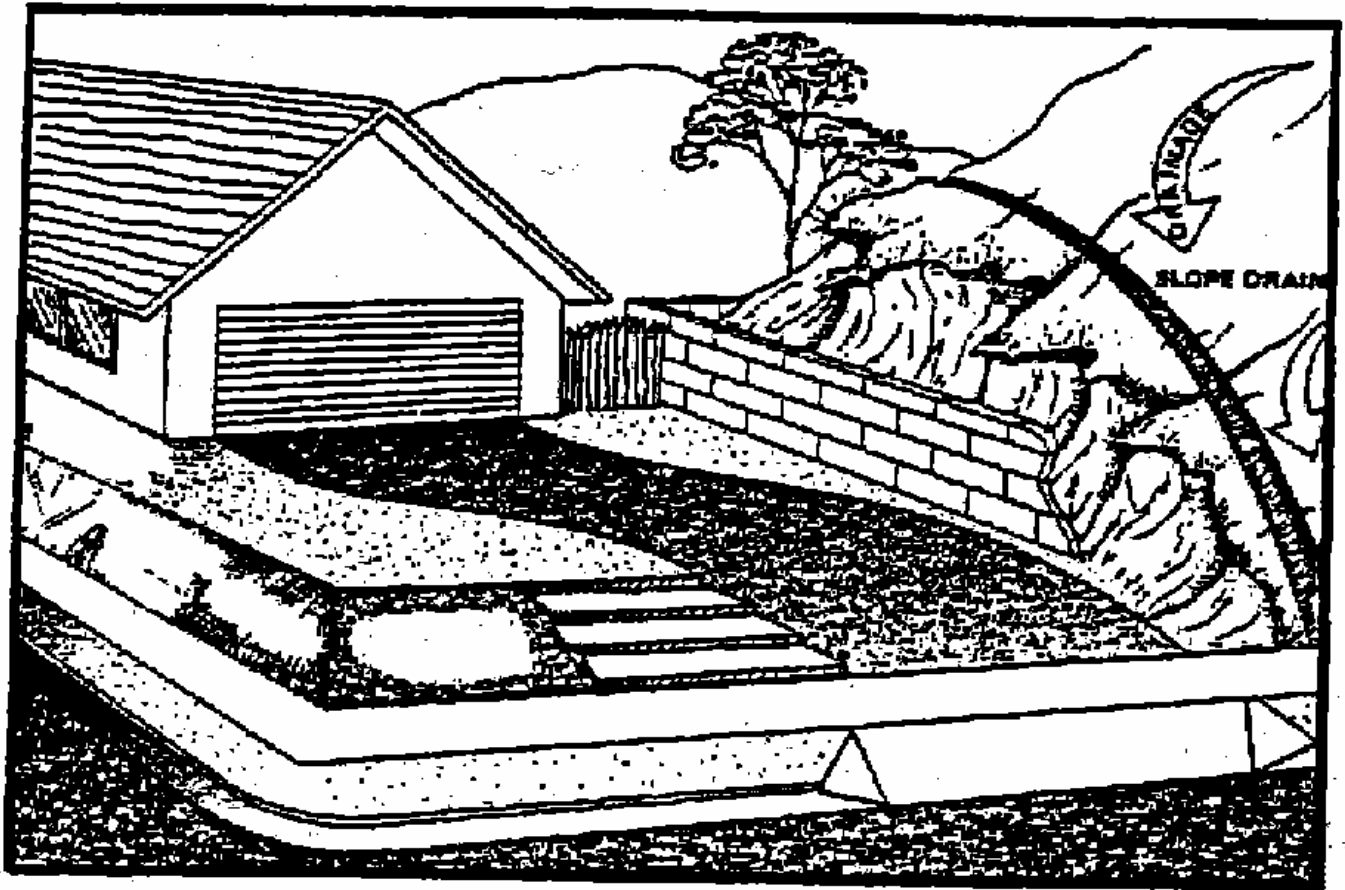
The selection factors to be carried out by the RLP owners are focused on alternatives that are economically, environmentally, and engineering feasible for the RLP owner. Specifically, this selection factor directs the focus of activities to those actions that can be carried out by the individual property owner.

10.3 RLP Action Plan for Property Protection Activities

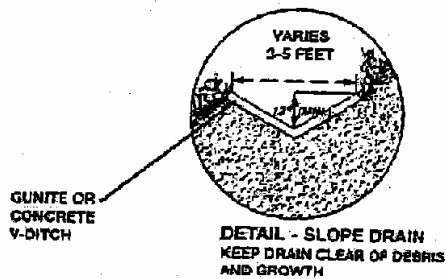
The initial survey of the RLPs indicated that 146 properties meet the criteria of an RLP. Further field examination of these properties indicated that 64 properties in all had implemented hazard mitigation plans to remove the threat. The remaining RLPs have potential solutions based on preliminary hydrologic and hydraulic analysis and engineering evaluation as shown in Table 10.2 and 10.3. Depictions of the primary solutions are shown in Figure 10.1 to 10.3.

As shown in Tables 10.2 and 10.3, four properties (RLP Nos.) may require governmental participation in action for funding assistance.

FIGURE 10.1 RETAINING WALL AND DRAINAGE LAYOUT



A RETAINING WALL AT THE BOTTOM OF SLOPE TO PREVENT SLOPE FAILURE



A Small ditch close to the upper edge of the property to drain into a natural water course or onto street pavement or to a well-vegetated area

FIGURE 10.2 BERM AND SUMP LAYOUT

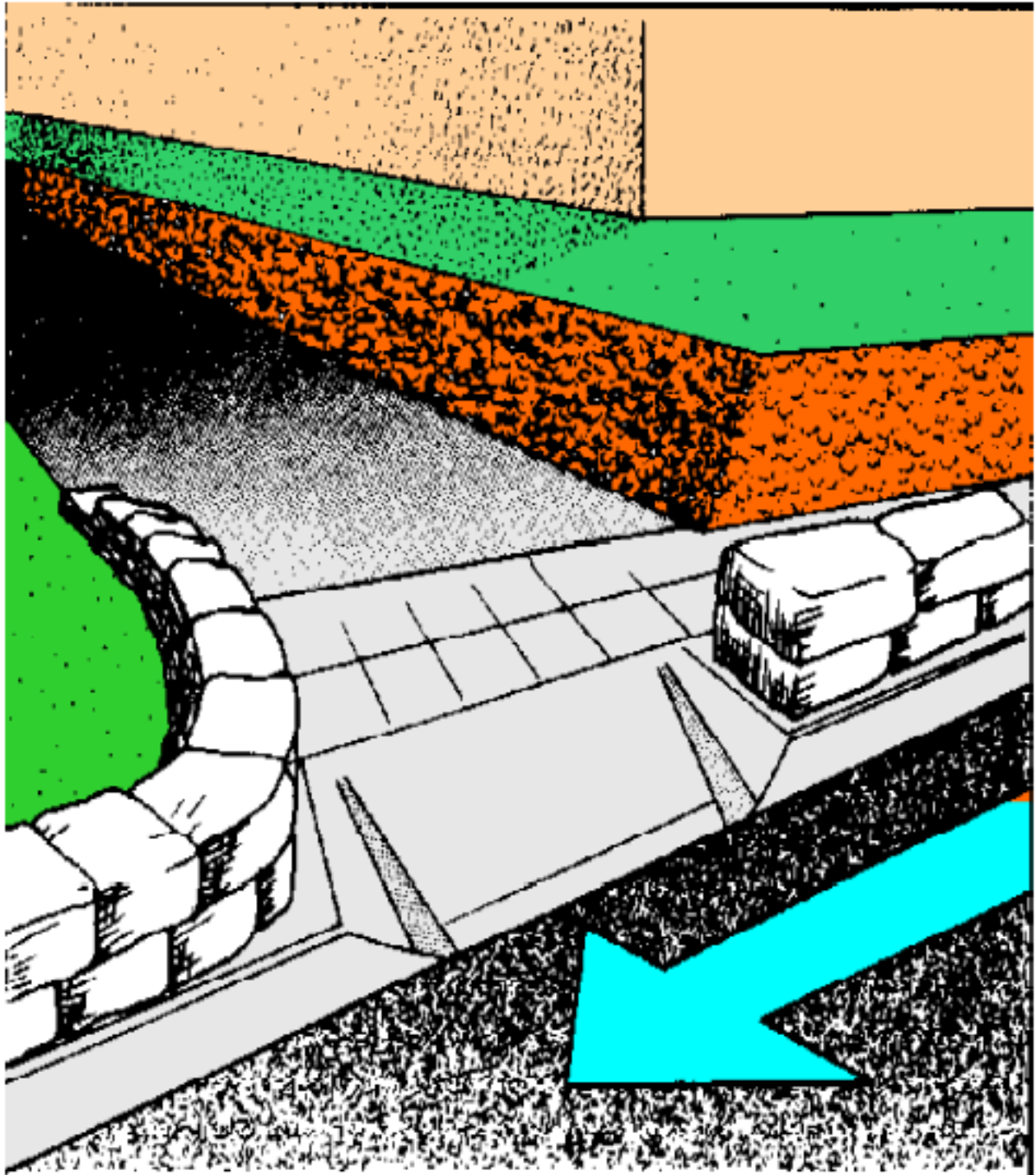
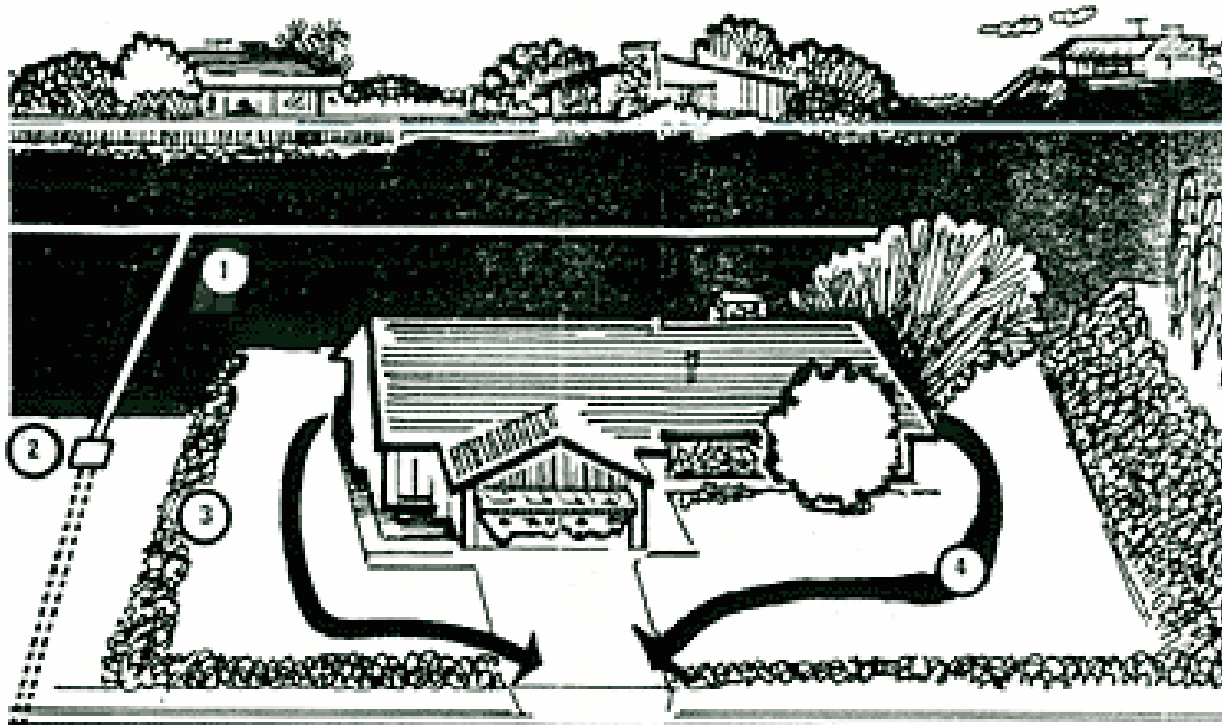


FIGURE 10.3 INLET/FRENCH DRAIN AND DRAINAGE LAYOUT



1

Paved Terrace Drains may extend over several lots, but it is each owner's responsibility to maintain that portion which is on his property. Keep drainage devices clean.

2

Catch Basins should be kept free of silt and debris. Make periodic checks to be sure the grate and outlet pipes are not clogged.

3

Earth Berms prevent water from flowing over slopes. It is important that these berms be maintained.

4

Side Swales direct water around the house. Keep flow line (arrows) at least 24 inches from the building wall.

Table 10.2 Property Protection Alternatives

City Ref #	Community	Problem	No Problem	Solutions	Alternate Solution
Ballona Creek Non-Hillside Communities					
1	Los Angeles		X		
6	Los Angeles		X		
10	Los Angeles	X		Construct berm to divert water (6.b)	Add sump pump, drain to street or nearest storm drain (6.i)
44	Los Angeles		X		
49	Los Angeles	X		Install inlets in the yard & drain to the street (6.d)	Add sump pump, drain to street or nearest storm drain (6.i)
69	Los Angeles	X		Install debris fences or trap (6.c)	Improve channel capacity (4.b)
78	Los Angeles		X		
89	Los Angeles		X		
92	Los Angeles		X		
95	Los Angeles		X		
96	Los Angeles		X		
97	Los Angeles		X		
102	Los Angeles		X		
112	Los Angeles	X		Enlarge catch basin drainage capacity (4.c)	Improve storm drain (4.a)
121	Los Angeles	X		Install inlets/french drain in the yard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)
133	Los Angeles		X		
141	Marina Del Rey		X		
144	Los Angeles	X		Install inlets/french drain in the yard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)
147	Los Angeles	X		Install inlets/french drain in the yard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)
153	Los Angeles	X		Install inlets/french drain in the yard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)

Table 10.2 Property Protection Alternatives

City Ref #	Community	Problem	No Problem	Solutions	Alternate Solution
Ballona Creek Hillside Communities					
2	Los Angeles		X		
4	Los Angeles	X		Install inlets in the yard & drain to the street (6.d)	Add sump pump, drain to street or nearest storm drain (6.i)
5	Los Angeles	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
7	Los Angeles		X		
8	Los Angeles		X		
9	Los Angeles	X		Add sump pump, drain to street or nearest storm drain (6.i)	Raise wall, add V-ditch and trash rack (6.a)
11	Los Angeles	X		Const berm at high point of driveway (6.b) add sump pump (6.i)	Improve storm drain (4a)
12	Los Angeles		X		
13	Los Angeles		X		
14	Los Angeles		X		
15	Pacific Palisades		X		
35	Pacific Palisades		X		
36	Los Angeles		X		
37	Beverly Hills		X		
38	Los Angeles	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
39	Los Angeles		X		
40	Beverly Hills	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
42	Los Angeles	X		Install inlets in the yard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)
43	Los Angeles	X		Raise wall, add V-ditch and trash rack, drain to street (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
46	Los Angeles	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
48	Beverly Hills	X		Install inlets in the yard & drain to the street (6.d)	Add sump pump, drain to street or nearest storm drain (6.i)

Table 10.2 Property Protection Alternatives

City Ref #	Community	Problem	No Problem	Solutions	Alternate Solution
Ballona Creek Hillside Communities (continue)					
52	Los Angeles	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
53	Los Angeles	X		Raise wall, add V-ditch and trash rack, drain to street (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
58	Pacific Palisades		X		
59	Los Angeles	X		Raise wall, add V-ditch and trash rack, drain to street (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
62	Beverly Hills	X		Const. berm at high point of driveway (6.b)	Improve storm drain (4.a)
68	Los Angeles	X		Raise wall, add V-ditch and trash rack, drain to street (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
70	Los Angeles	X		Extend the V-ditch behind the house to the street (6.a)	Add sump pump, drain to street or nearest storm drain (6.i)
71	Los Angeles	X		Install inlets in the yard & drain to the street (6.d)	Add sump pump, drain to street or nearest storm drain (6.i)
72	Los Angeles	X		Improve V-ditch behind the neighbor's new retaining wall (6.a)	Backfill retaining wall and add V-ditch (6.a)
75	Los Angeles		X		
76	Beverly Hills		X		
79	Los Angeles	X		Raise wall, add V-ditch and trash rack, drain to street (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
82	Los Angeles	X		Install inlets in the backyard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)
85	Beverly Hills	X		Raise wall, add V-ditch and trash rack, drain to street (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
86	Pacific Palisades		X		
93	Beverly Hills	X		Raise the retaining wall, add V-ditch, and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
98	Los Angeles	X		Install inlets in the backyard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)
101	Los Angeles		X		
103	Los Angeles	X		Add V-ditch, trash rack, drain to the street (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
105	Los Angeles		X		
113	Los Angeles	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)

Table 10.2 Property Protection Alternatives

City Ref #	Community	Problem	No Problem	Solutions	Alternate Solution
Ballona Creek Hillside Communities (continue)					
114	Los Angeles		X		Improve on-site grading and add french-drain (6.l)
116	Los Angeles	X		Const. berm, enlarge inlets in driveway (6.b)	Add sump pump, drain to street or nearest storm drain (6.i)
117	Los Angeles		X		
119	Beverly Hills	X		Install inlets/french drain in the yard & drain to the street (6.d)	Const. terrace drain & plant slope to reduce erosion (6.j)
125	Los Angeles		X		
127	Los Angeles	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
129	Los Angeles		X		
134	Los Angeles	X		Install inlets/french drain in the yard & drain to the street (6.d)	Const. terrace drain & plant slope to reduce erosion (6.j)
143	Beverly Hills	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
145	Los Angeles		X		
151	Pacific Palisade		X		
154	Beverly Hills	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
155	Beverly Hills		X		
156	Los Angeles	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)

Table 10.2 Property Protection Alternatives

City Ref #	Community	Problem	No Problem	Solutions	Alternate Solution
Los Angeles River Non-Hillside Communities					
22	Sherman Oaks		X		
30	North Hollywood		X		
33	Burbank	X		Lower SD inlet and backflow valve at outlet SD (4.a) and improve channel (4.b)	Improve Lockheed Channel (4.b)
34	Los Angeles		X		
54	Burbank	X		Lower SD inlet and backflow valve at outlet SD (4.a) and improve channel (4.b)	Improve Lockheed Channel (4.b)
61	Van Nuys		X		
77	Los Angeles	X		Enlarge inlet with trash rack (4.a)	Improve storm drain (4.a)
88	Los Angeles		X		
90	North Hollywood		X		
100	North Hollywood		X		
108	Encino	X		Install inlets in the backyard & drain to the street (6.d)	
109	North Hollywood	X		Install inlets/french drain in the yard & drain to the street (6.d)	Add sump pump, drain to street or nearest storm drain (6.i)
124	Van Nuys	X		Install inlets/french drain in the yard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)
130	Woodland Hills		X		
148	Woodland Hills	X		Install berm at driveway (6.b)	Add sump pump, drain to street or nearest storm drain (6.i)
152	Los Angeles	X		Install inlets/french drain in the yard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)

Table 10.2 Property Protection Alternatives

City Ref #	Community	Problem	No Problem	Solutions	Alternate Solution
Los Angeles River Hillside Communities					
3	Los Angeles	X		Raise wall, add V-ditch and trash rack (6.a)	Clean debris, install fence upstream ditch to trap trash (6.c)
16	Los Angeles		X		
17	Los Angeles		X		
18	Los Angeles		X		
19	Encino		X		
20	Sun Valley	X		Const. berm to divert water away from the property (6.b) & const. debris basin (4.e)	Improve channel (4.b)
21	Sherman Oaks		X		
23	Sherman Oaks	X		Raise the retaining wall, increase size of V-ditch (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
24	Sherman Oaks	X		Const. berm at high point of driveway (6.b)	Improve street drainage (4.c)
25	Sherman Oaks	X		Install inlets in the backyard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)
26	Encino		X		
27	Encino	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain and plant slope to reduce erosion (6.j)
28	Encino	X		Install inlets in the backyard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)
29	Encino	X		Const. berm at high point of driveway (6.b)	Add sump pump, drain to street or nearest storm drain (6.i)
31	Studio City		X		
32	Studio City	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
41	Sherman Oaks		X		
45	Los Angeles	X		Install inlets in the backyard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)

Table 10.2 Property Protection Alternatives

City Ref #	Community	Problem	No Problem	Solutions	Alternate Solution
Los Angeles River Hillside Communities (continue)					
47	Sunland		X		
51	Sherman Oaks	X		Raise wall, enlarge V-ditch and add trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
55	Sherman Oaks	X		Raise wall, add V-ditch and trash rack, drain to street (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
57	Tarzana	X		Install inlets in the yard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)
60	Sunland		X		
65	Tarzana		X		
67	Chatsworth	X		Floodproof wall in the backyard (6.g)	Const. terrace drain & plant slope to reduce erosion (6.j)
83	Los Angeles	X		Raise the retaining wall, add V-ditch, and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
84	Encino	X		Raise the retaining wall, add V-ditch, and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
94	Sherman Oaks	X		Install inlets in the backyard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)
99	Encino	X		Install inlets in the backyard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)
104	Sherman Oaks	X		Install inlets/french drain in the yard & drain to the street (6.d)	Add sump pump, drain to street or nearest storm drain (6.i)
106	Studio City		X		
107	Encino		X		
110	Encino		X		
111	Encino	X		Install inlets in the backyard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.l)
115	Encino	X		Install inlets/french drain in the yard & drain to the street (6.d)	Add sump pump, drain to street or nearest storm drain (6.i)
118	Studio City	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
120	Woodland Hills	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
122	Tarzana	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
123	Canoga Park		X		

Table 10.2 Property Protection Alternatives

City Ref #	Community	Problem	No Problem	Solutions	Alternate Solution
Los Angeles River Hillside Communities (continue)					
126	Encino	X		Install inlets/french drain in the yard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.1)
128	Van Nuys	X		Install inlets/french drain in the yard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.1)
131	Tarzana		X		
132	Los Angeles		X		
135	Burbank	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
136	Tarzana		X		
137	Studio City		X		
138	Los Angeles	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
139	Encino	X		Install inlets/french drain in the yard & drain to the street (6.d)	Const. terrace drain & plant slope to reduce erosion (6.j)
140	Encino		X		
142	Tujunga	X		Raise wall, add V-ditch and trash rack (6.a)	Const. terrace drain & plant slope to reduce erosion (6.j)
146	Woodland Hills	X		Install inlets/french drain in the yard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.1)
149	Lake View Terrace	X		Install inlets/french drain in the yard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.1)
150	Studio City	X		Install inlets/french drain in the yard & drain to the street (6.d)	Improve on-site grading and add french-drain (6.1)

Table 10.3 Recommended Solutions for RLPs

Mitigation Activities	Recommended Solution	RLPs	Total
4.a	Improve storm drain	33,54,77	3
4.c	Improve street drainage capacity	112	1
6.a	Construct or modify retaining wall with proper drainage and trash capacity	3,5,23,27,32,38,40,43,46,51,52,53,55,59,68,70,72,79,83,84,85,93,103,113,118,120,122,127,135,138,142,143,154,156	34
6.b	Construct berms to divert water flows	10,11,20,24,29,62,116,148	8
6.c	Install debris fence	69	1
6.d	Install yard inlets to drain water flows to the street	4,25,28,42,45,48,49,57,71,82,94,98,99,104,108,109,111,115,119,121,1124,126,128,134,139,144,146,147,149,150,152,153	32
6.g	Floodproof retaining walls	67	1
6.i	Add sump pump and drain to storm drain	9	1

Environmental Considerations

No significant impacts are expected of possible improvements within the RLPs, assuming minor changes to the physical condition of the property. However, temporary construction impacts must be minimized and mitigated. Although improvements to individual RLPs may be exempted, the permitting process and construction oversight should ensure compliance with all applicable environmental regulations. The storm drain/retention system, which may be implemented as a public activity, will require an additional environmental impact evaluation to ensure California Environmental Quality Act (CEQA) compliance. Appendix D is the City's CEQA Initial Study Checklist.

10.4 RLP Action Plan Related to Public Activities

Table 10.4 displays the Action Plan and the activities that are recommended to be implemented in order to meet the Goals, Objectives, and Policies outlined in Chapter 9. The primary responsible agencies and schedule describe each activity are listed in Table 10.4.

Table 10.4 Action Plan of the FMP for RLPs

		Emergency Management	Public Works	Building & Safety	City Planning	Fire		
Activity		Responsible Department					Schedule	Notes
1	Maintain the City’s Emergency Operations Master Plan and Procedures	X					On Going	
2	Conduct a stormwater facilities condition assessment program to identify the physical and hydraulic condition of the system and to support infrastructure management needs		X				TBD	
3	Develop and maintain a citywide list of priority maintenance-related flood problem sites		X				On Going	
4	Conduct annual maintenance at priority maintenance-related flood problem sites prior to the wet season		X				On Going	
5	Revise the Map of Hillside Areas to more accurately reflect areas subject to hillside regulations based on current data and technology		X	X	X		TBD	
6	Develop a map of known landslide and mudflow areas		X	X	X		On-Going	
7	Research and continue to improve Municipal Code regulations regarding soil stability and erosion abatement		X	X	X		TBD	
8	Refine the use of the Plan Check and Inspection System (PCIS) to track high-risk properties and ensure that drainage is adequately addressed through the plan check process		X	X	X		TBD	
9	The Flood Hazard Mitigation Coordinator shall flag repetitive Loss Properties in the PCIS database for review and approval of building permit applications		X	X			On Going	

Table 10.4 Action Plan of the FMP for RLPs

		Emergency Management	Public Works	Building & Safety	City Planning	Fire		
Activity		Responsible Department					Schedule	Notes
10	Investigate RLPs and annually notify RLP owners regarding local flood hazards and proper protection activities, provide technical advice regarding flood protection and flood preparedness, and distribute a revised RLP questionnaire to new RLPs		X				On Going	
11	Identify and maintain a list of high-risk properties that could be acquired for conversion into open space		X				TBD	
12	Establish standards and/or incentives for the use of structural and non-structural techniques that mitigate flood-hazards and manage stormwater pollution		X				On Going	
13	Continue to require environmental review in the development process to provide for the protection of natural resources		X		X		On Going	
14	Encourage the application of biological resource measures for the control stormwater and erosion to the best of their applicable limits with regards to other safety factors such as fire control	X	X	X	X	X	On Going	
15	Establish standards and/or incentives for the use of structural and non-structural techniques that mitigate flood-hazards and manage stormwater pollution		X				On Going	
16	Make sand and sand bags 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		X			X	On Going	
17	Storm drain improvements		X				TBD	
18	Channel modifications		X				TBD	

Table 10.4 Action Plan of the FMP for RLPs

		Emergency Management	Public Works	Building & Safety	City Planning	Fire		
Activity		Responsible Department					Schedule	Notes
19	Street drainage modifications		X				TBD	
20	Identify possible sources of funding including Cost of Compliance funds and mitigation grant funds among others, and provide this information to RLP owners	X	X				On Going	
21	Continue to investigate RLPs, as they are identified by FEMA, annually notify RLP owners regarding local flood hazards and proper protection activities, provide technical advice regarding flood protection and flood preparedness, and distribute a revised RLP questionnaire to new RLPs		X				On Going	
22	Develop and distribute flood protection information and materials to property owners and developers in high-risk area	X	X	X		X	On-Going	
23	Develop and distribute a map of known landslide and mudflow areas	X	X	X	X	X	TBD	
24	Provide public education about maintaining the stormwater system free of debris		X				On Going	
25	Distribute information regarding flood prevention and flood insurance at emergency operations and emergency preparedness events	X					On Going	
26	Continue implementing the City's Annual Emergency Preparedness Fair	X					On-Going	