

FLOOD INSURANCE STUDY

VOLUME 1 OF 4



LOS ANGELES COUNTY, CALIFORNIA AND INCORPORATED AREAS

Community Name	Community Number	Community Name	Community Number	Community Name	Community Number	Community Name	Community Number
LOS ANGELES COUNTY, UNINCORPORATED AREAS	065043	DIAMOND BAR, CITY OF	060741	LAWNDALE, CITY OF*	060134	SAN DIMAS, CITY OF	060154
AGOURA HILLS, CITY OF	065072	DOWNEY, CITY OF	060645	LOMITA, CITY OF*	060135	SAN FERNANDO, CITY OF*	060628
ALHAMBRA, CITY OF*	060095	DUARTE, CITY OF	065026	LONG BEACH, CITY OF	060136	SAN GABRIEL, CITY OF*	065055
ARCADIA, CITY OF	065014	EL MONTE, CITY OF*	060658	LOS ANGELES, CITY OF	060137	SAN MARINO, CITY OF*	065057
ARTESIA, CITY OF*	060097	EL SEGUNDO, CITY OF	060118	LYNWOOD, CITY OF	060635	SANTA CLARITA, CITY OF	060729
AVALON, CITY OF	060098	GARDENA, CITY OF	060119	MALIBU, CITY OF	060745	SANTA FE SPRINGS, CITY OF	060158
AZUSA, CITY OF	065015	GLENDALE, CITY OF	065030	MANHATTAN BEACH, CITY OF	060138	SANTA MONICA, CITY OF	060159
BALDWIN PARK, CITY OF*	060100	GLENDORA, CITY OF	065031	MAYWOOD, CITY OF*	060651	SIERRA MADRE, CITY OF	065059
BELL GARDENS, CITY OF	060656	HAWAIIAN GARDENS, CITY OF*	065032	MONROVIA, CITY OF	065046	SIGNAL HILL, CITY OF*	060161
BELL, CITY OF*	060101	HAWTHORNE, CITY OF*	060123	MONTEBELLO, CITY OF	060141	SOUTH EL MONTE, CITY OF*	060162
BELLFLOWER, CITY OF	060102	HERMOSA BEACH, CITY OF	060124	MONTEREY PARK, CITY OF*	065047	SOUTH GATE, CITY OF	060163
BEVERLY HILLS, CITY OF*	060655	HIDDEN HILLS, CITY OF	060125	NORWALK, CITY OF	060652	SOUTH PASADENA, CITY OF*	065061
BRADBURY, CITY OF	065017	HUNTINGTON PARK, CITY OF*	060126	PALMDALE, CITY OF	060144	TEMPLE CITY, CITY OF	060653
BURBANK, CITY OF	065018	INDUSTRY, CITY OF	065035	PALOS VERDES ESTATES, CITY OF	060145	TORRANCE, CITY OF	060165
CALABASAS, CITY OF	060749	INGLEWOOD, CITY OF*	065036	PARAMOUNT, CITY OF	065049	VERNON, CITY OF*	060166
CARSON, CITY OF	060107	IRWINDALE, CITY OF*	060129	PASADENA, CITY OF	065050	WALNUT, CITY OF	065069
CERRITOS, CITY OF	060108	LA CANADA FLINTRIDGE, CITY OF	060669	PICO RIVERA, CITY OF	060148	WEST COVINA, CITY OF	060666
CLAREMONT, CITY OF	060109	LA HABRA HEIGHTS, CITY OF	060701	POMONA, CITY OF	060149	WEST HOLLYWOOD, CITY OF	060720
COMMERCE, CITY OF	060110	LA MIRADA, CITY OF	060131	RANCHO PALOS VERDES, CITY OF	060464	WESTLAKE VILLAGE, CITY OF	060744
COMPTON, CITY OF	060111	LA PUENTE, CITY OF*	065039	REDONDO BEACH, CITY OF	060150	WHITTIER, CITY OF	060169
COVINA, CITY OF	065024	LA VERNE, CITY OF	060133	ROLLING HILLS ESTATES, CITY OF*	065054		
CUDAHY, CITY OF	060657	LAKEWOOD, CITY OF	060130	ROLLING HILLS, CITY OF	060151		
CULVER CITY, CITY OF	060114	LANCASTER, CITY OF	060672	ROSEMEAD, CITY OF	060153		

*Non-floodprone community

REVISED
January 6, 2016

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
06037CV001B



**NOTICE TO
FLOOD INSURANCE STUDY USERS**

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Countywide FIS Effective Date: September 26, 2008

Revised Countywide FIS Date: January 6, 2016

TABLE OF CONTENTS

VOLUME 1—January 6, 2016

	<u>Page</u>
1.0 INTRODUCTION	1
1.1 Purpose of Study.....	1
1.2 Authority and Acknowledgments	2
1.3 Coordination.....	5
2.0 AREA STUDIED	20
2.1 Scope of Study.....	20
2.2 Community Description.....	43
2.3 Principal Flood Problems	76
2.4 Flood Protection Measures.....	94
3.0 ENGINEERING METHODS.....	106
3.1 Hydrologic Analyses.....	106
3.1.1 Methods for Flooding Sources with New or Revised Analyses in Current Study.....	106
3.1.2 Methods for Flooding Sources Incorporated from Previous Studies	145
3.2 Hydraulic Analyses.....	163
3.2.1 Methods for Flooding Sources with New or Revised Analyses in Current Study.....	167
3.2.2 Methods for Flooding Sources Incorporated from Previous Studies	168
3.3 Vertical Datum	204
4.0 FLOODPLAIN MANAGEMENT APPLICATIONS.....	206
4.1 Floodplain Boundaries	207
4.2 Floodways	207
5.0 INSURANCE APPLICATIONS.....	212
6.0 FLOOD INSURANCE RATE MAP.....	220
7.0 OTHER STUDIES.....	229
8.0 LOCATION OF DATA	232
9.0 BIBLIOGRAPHY AND REFERENCES	232
10.0 REVISION DESCRIPTIONS.....	245
10.1 Revision (Revised January 6, 2016)	245

TABLE OF CONTENTS (CONTINUED)

Figure 1. Floodway Schematic..... 211

TABLES

VOLUME 1

Table 1: Contacted Agencies 6
Table 2: Initial and Final CCO Meetings..... 17
Table 3: Flooding Sources Studied by Detailed Methods..... 33
Table 4: Flooding Sources Studied by Approximate Methods 34
Table 5: Letters of Map Change 38

VOLUME 2

Table 6: Summary of Peak Discharges 107
Table 7: Summary of Breakout Discharges 140
Table 8: Summary of Elevations..... 142
Table 9: Summary of Inflow Volumes 163
Table 10: Summary of Roughness Coefficients..... 165
Table 11: Summary of Elevations for Wave Runup and Wave Setup..... 193
Table 12: List of Levees Requiring Flood Hazard Revisions 201
Table 13: List of Certified and Accredited Levees 203
Table 14: Stream Conversion Factors..... 204
Table 15: Floodway Data..... 214
Table 16: Community Map History 221

TABLE OF CONTENTS (CONTINUED)

EXHIBITS

VOLUME 3

Exhibit 1 – Flood Profiles

Amargosa Creek	01P-03P
Anaverde Creek	04P-06P
Avalon Canyon	07P-10P
Big Rock Wash	11P-12P
Cheseboro Creek	13P-15P
Cold Creek	16P-21P
Dark Canyon	22P-23P
Dry Canyon	24P-33P
Escondido Canyon	34P-39P
Flow Along Empire Avenue	40P
Flowline No. 1	41P
Garapito Creek	42P-44P
Hacienda Creek	45P
Kagel Canyon	46P-57P
Lake Street Overflow	58P
La Mirada Creek	59P-62P
Las Flores Canyon	63P-66P
Las Virgenes Creek	67P-76P
INTENTIONALLY LEFT OUT	77P
Liberty Canyon	78P-79P
Lindero Canyon above confluence with Medea Creek	80P-81P
Lindero Canyon above Lake Lindero	82P-87P
Lindero Canyon spillway at Lindero	88P
Little Rock Wash - Profile A	89P-92P
Little Rock Wash - Profile B	93P
Little Rock Wash - Profile C	94P
Lobo Canyon	95P-98P
Lockheed Drain Channel	99P- 102P

TABLE OF CONTENTS (Continued)

VOLUME 4

Exhibit 1 – Flood Profiles (continued)

Lopez Canyon Channel	103P-104P
Los Angeles River left overbank path 2	105P-108P
Los Angeles River right overbank path 1	109P-111P
Los Angeles River right overbank path 2	112P
Malibu Creek	113P-115P
Medea Creek	116P- 127P
Medea Creek (above Ventura Freeway)	128P-129P
Mill Creek	130P-134P
North Overflow (A)	135P
North Overflow (B)	136P
Old Topanga Canyon	137P-142P
Overflow Area of Lockheed Drain Channel	143P
Overflow Area of Lockheed Storm Drain	144P
Palo Comando Creek	145P-150P
Ramirez Canyon	151P-156P
Rio Hondo left overbank path 3	157P
Rio Hondo left overbank path 5	158P-159P
Rio Hondo left overbank path 6	160P
Rustic Canyon	161P-164P
Sand Canyon Creek	165P
Santa Maria Canyon	166P
Stokes Canyon	167P-170P
Topanga Canyon	171P-195P
Trancas Creek	196P
Triunfo Creek	197P-200P
Unnamed Canyon (Serra Retreat Area)	201P-202P
Upper Los Angeles River left overbank	203P
Weldon Canyon	204P-205P
Zuma Canyon	206P-213P
Unnamed Stream Main Reach	214P-219P
Unnamed Stream Tributary 1	220P-221P
Unnamed Stream Tributary 2	222P-224P

Exhibit 2 – Flood Insurance Rate Map Index (Published Separately)
Flood Insurance Rate Maps (Published Separately)

FLOOD INSURANCE STUDY
LOS ANGELES COUNTY, CALIFORNIA, AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and updates information on the existence and severity of flood hazards in the geographic area of Los Angeles County, included the Cities of Agoura Hills, Alhambra, Arcadia, Artesia, Avalon, Azusa, Baldwin Park, Bell Gardens, Bell, Bellflower, Beverly Hills, Bradbury, Burbank, Calabasas, Carson, Cerritos, Claremont, Commerce, Compton, Covina, Cudahy, Culver City, Diamond Bar, Downey, Duarte, El Monte, El Segundo, Gardena, Glendale, Glendora, Hawaiian Gardens, Hawthorne, Hermosa Beach, Hidden Hills, Huntington Park, Industry, Inglewood, Irwindale, La Canada Flintridge, La Habra Heights, La Mirada, La Puente, La Verne, Lakewood, Lancaster, Lawndale, Lomita, Long Beach, Los Angeles, Lynwood, Malibu, Manhattan Beach, Maywood, Monrovia, Montebello, Monterey Park, Norwalk, Palmdale, Palos Verdes Estates, Paramount, Pasadena, Pico Rivera, Pomona, Rancho Palos Verdes, Redondo Beach, Rolling Hills Estates, Rolling Hills, Rosemead, San Dimas, San Fernando, San Gabriel, San Marino, Santa Clarita, Santa Fe Springs, Santa Monica, Sierra Madre, Signal Hill, South El Monte, South Gate, South Pasadena, Temple City, Torrance, Vernon, Walnut, West Covina, West Hollywood, Westlake Village, Whittier and the unincorporated areas of Los Angeles County (referred to collectively herein as Los Angeles County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Please note that the Cities of Alhambra, Artesia, Baldwin Park, Bell, Beverly Hills, El Monte, Hawaiian Gardens, Hawthorne, Huntington Park, Inglewood, Irwindale, La Puente, Lawndale, Lomita, Maywood, Monterey Park, Rolling Hills Estates, San Fernando, San Gabriel, San Marino, Signal Hill, South El Monte, South Pasadena, and Vernon are non-floodprone. This study has developed flood hazard data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence, and the State (or other jurisdictional agency) will be able to explain them.

The Digital Flood Insurance Rate Map (DFIRM) and FIS Report for this countywide study have been produced in digital format. Flood hazard information was converted to meet the Federal Emergency Management Agency (FEMA) DFIRM database specifications and Geographic Information and is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community.

1.2 Authority and Acknowledgments

The sources of authority for this FIS report are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

For this revision of the countywide FIS, BakerAECOM, LLC, for the U.S. Federal Emergency Management Agency (FEMA), will be incorporating a new detailed study of Las Virgenes Creek. This study will also incorporate the Palos Verdes Estates study provided by Henningson Durham and Richardson (HDR) Inc., along Unnamed Stream Main Reach and Tributaries 1 and 2.

Vector base map information for this revision was provided in digital format for FIRM panels 1264, 1526, 1527, 1916, 1917, 1918 and 1919. Information on roads was provided by TIGER/Line Files, U.S. Department of Commerce, U.S. Census Bureau, Geography Division. Orthophoto base map data was acquired from the U.S. Department of Agriculture. Users of this FIRM should be aware that minor adjustments may have been made to specific base map features.

The coordinate system used for the production of this FIRM is Universal Transverse Mercator (UTM) Zone11 North, North American Datum of 1983 (NAD 83), and GRS 1980 spheroid. Corner coordinates shown on the FIRM are in latitude and longitude referenced to NAD 83. Differences in datum and spheroid used in the production of FIRMs for adjacent counties may result in slight positional differences in map features and at the county boundaries. These differences do not affect the accuracy of information shown on the FIRM.

The initial countywide FIS was prepared to include the unincorporated areas of, and incorporated areas, within Los Angeles County in a countywide format. In September 2008, HDR Engineering, Inc. completed a countywide DFIRM and FIS for the County of Los Angeles. HDR Engineering, Inc. was hired as an IDIQ study contractor for FEMA Region IX under contract number EMF-2003-CO-0045, Task Order 15. The DFIRM process included digitizing floodplain boundaries from the effective paper FIRMs and fitting them to a digital base map, thus converting the existing manually produced FIRMs to digitally produced FIRMs. Individual community effective FIS reports were also combined into one report for the entire county.

Information on the authority and acknowledgements of each jurisdiction included in the original countywide FIS, as compiled from their previously printed FIS reports, is shown below.

Hydraulic analyses for unincorporated areas of the County were performed by the Los Angeles County Flood Control District (LACFCD), for FEMA, under Contract No. H-3940. The hydraulic analyses were completed in December 1979. In unincorporated coastal areas, the hydrologic analyses for this study were performed by Dames & Moore, for FEMA, under Contract No. C-0970. This work was completed in 1984.

The hydrologic and hydraulic analyses for the City of Agoura Hills were performed by the LACFCD, as reported in the FIS for Los Angeles County, California (Federal Emergency Management Agency, 1980). Hydrologic and hydraulic analyses for the August 3, 1998, restudy were performed, for FEMA, by Ensign & Buckley, under

Contract No. EMW-93-C-41 51.

Hydraulic analyses for the City of Avalon were performed by the LACFCD, for FEMA, under Contract No. H-3940. The hydraulic analyses were completed in 1977. In coastal areas of the City of Avalon, the hydrologic and hydraulic analyses were performed by Tetra Tech, Inc., for FEMA, under Contract No. H-4543. This study was completed in June 1981.

Hydraulic analyses for the Cities of Bellflower, Carson, Compton, Downey, Gardena, Lakewood, Lynwood, Paramount, Pico Rivera, and South Gate and for the restudy for Los Angeles County were prepared by Schaaf & Wheeler, Consulting Civil Engineers, the study contractor, for FEMA, under Contract No. EMW-86-C-2248. The work for this study was completed on May 15, 1991.

Hydrologic data used in the study of the Cities of Bellflower, Carson, Compton, Downey, Gardena, Lakewood, Lynwood, Paramount, Pico Rivera, and South Gate and in the restudy for Los Angeles County, were provided by the U.S. Army Corps of Engineers (USACE), from the "Los Angeles County Drainage Area - Draft Feasibility Report" (LACDA); Appendix A - Hydrology, updated February 1990. As-built plans for the channel and bridges were obtained from the USACE and the California Department of Transportation (CALTRANS).

Hydrologic and hydraulic analyses for the study of the City of Burbank were performed by the LACFCD, for the Federal Insurance Administration (FIA), under Contract No. H-3940. This work, which was completed in July 1978, covered all significant flooding sources affecting the City of Burbank.

The hydrologic and hydraulic analyses for the January 20, 1999, restudy were performed for FEMA, by Ensign & Buckley, under Contract No. EMQ-90-C-9 133.

Hydrologic and hydraulic analyses for the City of Calabasas were performed by BakerAECOM, for FEMA, under Contract No. HSFEHQ-09-D-0368, Task Order HSFE09-10-J-002, and covered Las Virgenes Creek.

Hydrologic and hydraulic analyses for the study of the City of Culver City were performed by the LACFCD, for the FIA, under Contract No. H3940. This work, which was completed in June 1978, covered all significant flooding sources affecting the City of Culver City.

Hydrologic and hydraulic analysis for Hidden Hills for the Long Valley Storm Drain is based on plans and specifications for the Long Valley Road Storm Drain improvements dated March 27, 1991, and the Project Concept Report for Long Valley Drain dated September 1986. Based on the submitted information, the FIRM was revised to incorporate the effects to construction of Long Valley Drain and Jed Smith Drain storm water improvement projects. Based on this information, the Zone D designations from Long Valley Road near its intersection with Twin Oaks Road to the upstream corporate limits of the City and from Jed Smith Road have been removed. Also, the Zone A area just south of Long Valley Road to just south of Twin Oaks Road has been changed to Zone X shaded as a result of the information submitted for the Long Valley Storm Drain

improvement project.

Hydrologic and hydraulic analyses for the study of the City of La Mirada were performed by the LACFCD, for the FIA, under Contract No. H3940. This work, which was completed in January 1979, covered all significant flooding sources affecting the City of La Mirada.

Hydrologic and hydraulic analyses for the study of the City of Lancaster were performed by the LACFCD, for the FIA, under Contract No. H3940. This work, which was completed in March 1979, covered all significant flooding sources affecting the City of Lancaster.

Hydrologic and hydraulic analyses for the original study of the City of Long Beach were performed by the LACFCD and Tetra Tech, Inc., for FEMA, under Contract Nos. H-3940 and H-4543. This work was completed in June 1981.

Hydraulic analysis for the restudy of the City of Long Beach was prepared by Schaaf & Wheeler, Consulting Civil Engineers, the study contractor, for FEMA, under Contract No. EMW-86-C-2248. The work for this study was completed on May 15, 1991. Hydrologic data used in this study were provided by the USACE in the LACDA Appendix A - Hydrology, updated February 1990. As built plans for the channel and bridges were obtained from the USACE and CALTRANS.

Hydrologic and hydraulic analyses for the study of the City of Los Angeles were performed by the LACFCD, for FEMA, under Contract No. H-3940. This study was completed in August 1979. In coastal areas, the hydrologic analyses for this study were performed by Dames & Moore, for FEMA, under Contract No. C-0970. This work was completed in 1984.

The hydraulic analysis for the revised study for the City of Los Angeles was prepared by Schaaf & Wheeler, for FEMA, under contract No. EMW-86-C-2248. The work for this study was completed on May 15, 1991. Hydrologic data used in this study were provided by the USACE in the LACDA Appendix A - Hydrology, updated February 1990. As-built plans for the channel and bridges were obtained from the USACE and CALTRANS. The hydraulic and hydrologic analyses for part two of this restudy were performed, for FEMA, by Ensign & Buckley, under Contract No. EMW-90-C-9 133.

Hydrologic and hydraulic analyses for the original study of the City of Montebello were performed by the LACFCD, for the FIA, under Contract No. H-3940. This work was completed in September 1978.

Hydraulic analysis for the revised study of the City of Montebello was prepared by Schaaf & Wheeler, Consulting Civil Engineers, the study contractor, for FEMA, under Contract No. EMW-86-C-2248. The work for this study was completed on May 15, 1991. Hydrologic data used in this study were provided by the USACE in the LACDA Appendix A - Hydrology, updated February 1990. As- built plans for the channel and bridges were obtained from the USACE and CALTRANS.

Hydrologic and hydraulic analyses for the original study of the City of Palmdale were performed by the LACFCD, FEMA, under Contract No. H-3940. The study was revised

by Rick Engineering Company (REC) under Contract No. EMW-84-1639. This study was completed in May 1979, and revised in November 1985. The study was revised again on March 30, 1998, by Ensign & Buckley, for FEMA, under Contract No. EMW-90-C-3 133.

Hydrologic and hydraulic analyses for the study of the City of Palos Verdes Estates were performed by HDR, Inc for FEMA, under Contract No. EMF-2003-CO-0045, Task Order 15. The analyses covered three Unnamed stream reaches (Unnamed Stream Main Reach, Unnamed Stream Tributary 1, and Unnamed Stream Tributary 2).

Hydrologic and hydraulic analyses for the study of the City of Redondo Beach were performed by Tetra Tech, Inc. and the LACFCD, for FEMA, under Contract Nos. H-4543 and H-3940. This work, which was completed in June 1981, covered all significant flooding sources affecting the City of Redondo Beach.

Hydrologic and hydraulic analyses used to prepare the study of the City of Santa Clarita were performed by the LACFCD, for the FEMA, under Contract No. H-3940. This work was completed in 1984.

Hydrologic and hydraulic analyses for the study of the City of Santa Fe Springs were performed by the LACFCD, for the FIA, under Contract No. H-3940. This work, which was completed in October 1978, covered all significant flooding sources affecting the City of Santa Fe Springs.

Hydrologic and hydraulic analyses for the study of the City of Torrance were performed by the LACFCD, for the FIA, under Contract No. H3940. This work, which was completed in August 1978, covered all significant flooding sources affecting the City of Torrance.

Hydraulic analyses for the study of the City of West Hollywood were performed by the LACFCD, for the FEMA, as part of the FIS for Los Angeles County, California, under Contract No. H-3940. Because the City of West Hollywood was incorporated out of the County of Los Angeles on November 29, 1984, this FIS was prepared by compiling all existing technical and scientific data originally prepared for the FIS for Los Angeles County, California, Unincorporated Areas, dated December 2, 1980, and revised November 15, 1985. The Los Angeles County FIS was completed December 2, 1980, and revised November 15, 1985.

Hydrologic and hydraulic analyses for the study of the City of Whittier were performed by the LACFCD, for the FIA, under Contract No. H3940. This work, which was completed in August 1978, covered all significant flooding sources affecting the City of Whittier.

1.3 Coordination

An initial Consultation Coordination Officer (CCO) meeting is held with representatives of the communities, FEMA, and the study contractors to explain the nature and purpose of the FIS and to identify the streams to be studied by detailed methods. A final CCO is held with representatives of the communities, FEMA, and the study contractors to review

the results of the study.

For this revision of the countywide FIS, the initial CCO meeting was held on March 10, 2011, and attended by representatives of FEMA Region IX, City of Calabasas, LA County Flood Control District (LAFCD), and BakerAECOM, LLC. An initial CCO meeting for the study of the City of Palos Verdes Estates, was held on July 28, 2009, to discuss the scope of the revision.

The final CCO meeting was held on August 5, 2014, to review the results of this FIS. Those who attended this meeting included representatives of City of Calabasas, City of Palos Verdes Estates, Los Angeles County Department of Public Works, BakerAECOM and FEMA Region IX. All questions and issues raised at that meeting have been addressed in this study.

The following agencies (Table 1) were contacted in an attempt to explore all possible sources of data. Information describing hydrological conditions, drainage patterns, historical storm systems, tides, and waves as well as information on the topography, roads, beach profiles, shelf bathymetry flood protection structures (sea walls, breakwaters), and the demography of communities of Los Angeles County was sought from:

Table 1: Contacted Agencies

California Coastal Commission	Los Angeles County Office of Emergency Services	Scripps Institute of Oceanography
California Department of Transportation	Los Angeles County Regional Planning Department	Security Pacific Bank
California State Department of Boating and Waterways	Los Angeles Public Library	Small Business Administration
California State Office of Emergency Services	National Climate Center	South Coast Regional Coastal Commission
CH2M Hill, Inc.	National Oceanic and Atmospheric Administration	U.S. Army Corps of Engineers, Coastal Engineering Research Center
City of Calabasas	National Oceanic and Atmospheric Administration, Eastern Pacific Hurricane Center	U.S. Army Corps of Engineers, Los Angeles District
City of Santa Monica		
Department of Defense	National Oceanic and Atmospheric Administration, Tide Prediction Branch	U.S. Army Corps of Engineers, Waterways Experiment Station
Fleet Numerical Weather Center Facilities	National Weather Service, Los Angeles	U.S. Department of Defense, Fleet Numerical Weather Center

Los Angeles County Flood
Control District

The State Coordinator was involved in these study efforts through the Oakland Regional office of FEMA.

For previous studies in the unincorporated areas of Los Angeles County, an initial coordination meeting attended by representatives of the County, FEMA, the California Department of Water Resources (DWR), and the study contractor was held in February 1976. The purpose of the meeting was to discuss the nature and scope of the study and to determine the areas to be studied by detailed and approximate methods.

During the course of the study, representatives of the County were contacted to gather the latest relevant information. Flood elevations and flood boundaries were reviewed with appropriate county officials.

The U.S. Soil Conservation Service; the USACE; the U.S. Geological Survey (USGS), Water Resources Division; the California DWR and Department of Transportation (CALTRANS); and the Southern Pacific (now Union Pacific) Transportation Company were contacted and provided information used in this report.

The preliminary results of the Los Angeles County study for unincorporated areas were reviewed at four intermediate coordination meetings. The Antelope Valley meeting was held on January 22, 1979; the Santa Clarita Valley meeting on July 10, 1979; and the Malibu meetings on March 3 and 4, 1980. Representatives of FEMA, the study contractor, the Office of the County Engineer, and interested citizens, attended all meetings.

The results of this study were reviewed at a final coordination meeting held on May 7, 1980. Attending the meeting were representatives of FEMA, the study contractor, the Office of the County Engineer, and the county. No problems were raised at the meeting.

On January 26, 1984, Dames & Moore was instructed by FEMA to proceed with an existing data study for the City of Agoura Hills, using the detailed study data from the Los Angeles County FIS.

In preparing the Los Angeles County FIS, the California DWR, the USGS, and the USACE were contacted for information and data. In addition, the U.S. Soil Conservation Service and the Southern Pacific Transportation Company were also contacted.

In preparing this existing data study, the City of Agoura Hills was contacted for information regarding cultural features and existing conditions in the community.

The final CCO meeting for this study was held on December 20, 1984, and was attended by representatives of FEMA, the study contractor, and the City of Agoura Hills. No problems were raised at this meeting.

The initial CCO meeting for the August 3, 1998, revision was held on October 12, 1995, and attended by representatives of the City of Agoura Hills and the study contractor.

Available data were discussed, and a field reconnaissance was performed jointly with the City of Agoura Hills. The scope of methods of study were proposed to, and agreed upon, by FEMA and the City of Agoura Hills.

An initial CCO meeting for the study of the City of Avalon, attended by representatives of the City, FEMA, the California DWR, and the LACFCD, was held in February 1976. The purpose of the meeting was to discuss the nature and scope of the study and to determine the areas which would be studied by detailed and approximate methods.

During the course of the work done by the LACFCD on the City of Avalon, flood elevations and flood boundaries were reviewed with appropriate community officials.

On December 14, 1976, the preliminary results of the work were reviewed at an intermediate CCO meeting. Representatives of the LACFCD, FEMA, the California DWR, and the offices of the City Engineer, Manager, and Planning attended the meeting.

The final CCO meeting for the City of Avalon was held on November 9, 1977. Representatives of the City, FEMA, and the study contractor attended the meeting. No major problems with the study were found at the meeting.

For information pertinent to coastal areas within the City of Avalon, used to revise and update the study, numerous agencies were contacted in an attempt to explore all possible sources of data. Information describing hydrological conditions, drainage patterns, historical storm systems, tides, and waves as well as information on the topography, roads, benchmarks, beach profiles, shelf bathymetry flood protection structures (seawalls, breakwaters), and the demography of coastal areas was sought.

The initial CCO meeting for the Cities of Bellflower, Carson, Compton, Downey, Gardena, Lakewood, Lynwood, Paramount, Pico Rivera, and South Gate, was held on January 28, 1986, and attended by representatives of the Cities of Downey, Long Beach, Lynwood, Vernon, Bellflower, Paramount, Los Angeles County and the LACFCD, the USACE, FEMA, and the study contractor.

On April 4, 1991, an interim coordination meeting was held with representatives from FEMA and community officials from the Cities of Pico Rivera, Bellflower, South Gate, Lynwood, Seal Beach, Torrance, Bell Gardens, Signal Hill, Los Angeles, Downey, Long Beach, Compton, Paramount, Lakewood, Carson, Cerritos, Gardena, and Los Angeles County, and representatives of the California DWR, the USACE, the LACFCD, State Senator David Roberti's office, and the study contractor. Preliminary results of the study were presented.

The USACE provided as-built plans of the channel and bridge characteristics along with peak discharge and original design information. They also provided hydrologic and hydraulic information for the study area, from the LACDA Appendix A - Hydrology, updated February 1990, and Hydraulic Appendix dated July 1989. Coordination with the USACE concerning certification of levees, breakout locations and progress of work was on-going during this study. The CALTRANS was helpful in providing information regarding bridge and highway geometric data. Vertical control data to establish the Elevation Reference Marks (ERM) were obtained from the USGS, the United States

Coast and Geodetic Survey, and the Cities of Long Beach, Paramount, and Compton.

The results of the study of the Cities of Bellflower, Carson, Compton, Downey, Gardena, Lakewood, Lynwood, Paramount, Pico Rivera, South Gate and Los Angeles County were reviewed at the final CCO meeting held on October 30, 1991, and attended by representatives of FEMA, the study contractor, and communities affected by the Los Angeles River and Rio Hondo restudy. All problems raised at that meeting have been addressed in this study.

A final CCO meeting for the restudy of the Los Angeles River and Rio Hondo affecting the City of Los Angeles was held on December 3, 1997. This meeting was attended by representatives of the City of Los Angeles and FEMA. All problems raised at this meeting have been addressed in the restudy.

An initial CCO meeting for the City of Burbank, attended by representatives of the community, the FIA, the California DWR, and the study contractor, was held in February 1976. The purpose of the meeting was to discuss the nature and scope of the study and to determine the areas to be studied by detailed and approximate methods.

A request for information relevant to the study was made to various governmental and local agencies, including the U.S. Soil Conservation Service; the USACE; the USGS, Water Resources Division; and the California DWR.

Drainage deficiency reports and historical flooding information on file at the LACFCD were reviewed.

During the course of the work done by the study contractor, flood elevations and flood boundaries were reviewed with appropriate community officials.

On May 18, 1978, the preliminary results of this study were reviewed at an intermediate coordination meeting. Representatives of the study contractor, the FIA, and the office of the City Engineer attended the meeting.

The results of the study of the City of Burbank were reviewed at a final CCO meeting held on November 2, 1979. Attending the meeting were representatives of the FIA, the study contractor, and the City. No problems were raised at the meeting.

Results of the January 20, 1999, revision for the City of Burbank were reviewed at a final CCO meeting held on October 15, 1997, and attended by representatives of FEMA and the City of Burbank. All problems raised at this meeting have been addressed in the restudy.

An initial CCO meeting, attended by representatives of the City of Calabasas, LAFCD, FEMA Region IX, and BakerAECOM, was held on March 10, 2011. The purpose of the meeting was to discuss the nature and scope of the study and to determine the areas to be studied by detailed methods.

An initial CCO meeting, attended by representatives of the City of Culver City, the FIA, the California DWR, and the LACFCD (the study contractor), was held in February 1976. The purpose of the meeting was to discuss the nature and scope of the study and to

determine the areas to be studied by detailed and approximate methods.

The U.S. Soil Conservation Service; the USACE; the USGS, Water Resources Division; and, the California DWR were contacted and provided information used in the study of the City of Culver City.

On May 16, 1978, the preliminary results of the study of the City of Culver City were reviewed at an intermediate CCO meeting. Representatives of the FIA, the study contractor, and the office of the City Engineer attended the meeting.

The results of the study of the City of Culver City were reviewed at a final CCO meeting held on January 11, 1979. Attending the meeting were representatives of the FIA, the study contractor, and the City. No problems were raised at the meeting.

An initial CCO meeting was held for the City of La Mirada, attended by the City Engineer and representatives of the FIA, the California DWR, and the LLACFCD, in February 1976.

The U.S. Soil Conservation Service, the USACE, the USGS, Water Resources Division, and the California DWR were contacted for information relevant to the study. During the study, representatives from the Office of the City Engineer were contacted on several occasions to gather the latest possible relevant information. During the course of the work done by the study contractor, flood information was reviewed with Toups Corporation and VTN Corporation.

Flood elevations and flood boundaries were reviewed with the City Engineer and the Planning Director at a meeting held in the Office of the City Engineer on September 11, 1978. Zoning information supplied by the Planning Director was used to refine the limits of flooding along La Mirada Creek upstream of La Mirada Boulevard.

On October 3, 1978, the preliminary results of the study of the City of La Mirada were reviewed at an intermediate coordination meeting. The meeting was attended by the city planning director and representatives of the study contractor, and the FIA.

The results of this study were reviewed at a final CCO meeting held on May 21, 1979. Attending the meeting were representatives of the FIA, the study contractor, the LACFCD, and the City. No problems were raised at the meeting.

An initial CCO meeting for the original study of the City of Long Beach, attended by the City Engineer, FEMA, the California DWR, and the LACFCD (the study contractor), was held in February 1976.

A request for information relevant to the study was made to various governmental and local agencies, including the U.S. Soil Conservation Service; the USACE; the USGS, Water Resources Division; the California DWR; the California Coastal Commission; the CALTRANS; the State Department of Boating and Waterways; the State Office of Emergency Services; the National Oceanic and Atmospheric Administration (NOAA); the National Weather Service, Los Angeles; the Fleet Numerical Weather Center; Department of Defense; the Los Angeles County Engineers Facilities; the County Office of Emergency Services; the County Regional Planning Department; CH2M Hill, Inc.; Scripps Institute of Oceanography; the South Coast Regional Coastal Commission; the

City Engineer's Office, and the Long Beach Harbor Department.

On October 25, 1978, the preliminary results of this study were reviewed at an intermediate coordination meeting. Representatives of the study contractor, FEMA, and the City Engineer's Office attended the meeting. No objections were made at this time and the study was acceptable to the community.

The final CCO meeting on the original study of the City of Long Beach was held on October 27, 1982, and was attended by representatives of FEMA, the study contractor, and the City. All problems raised at the meeting were resolved.

The initial CCO meeting for the revised study of the City of Long Beach was held on January 28, 1986, and attended by representatives of the Cities of Downey, Long Beach, Lynwood, Vernon, Bellflower, Paramount, and the LACFCD, the USACE, FEMA, and the study contractor.

On April 4, 1991, an interim CCO meeting was held with representatives from FEMA and community officials from the Cities of Pico Rivera, Bellflower, South Gate, Lynwood, Seal Beach, Torrance, Bell Gardens, Signal Hill, Los Angeles, Downey, Long Beach, Compton, Paramount, Lakewood, Carson, Cerritos, Gardena, and Los Angeles County, and representatives of the California DWR, the USACE, Los Angeles District, State Senator David Roberti's office, and the study contractor. Preliminary results of the study were presented.

The results of the re-study of the City of Long Beach were reviewed at the final CCO meeting held on October 30, 1991, and attended by representatives of FEMA, the study contractor, and communities affected by the Los Angeles River and Rio Hondo restudy. All problems raised at that meeting have been addressed in this study.

An initial CCO meeting on the City of Los Angeles, attended by representatives of FEMA, the California DWR, and the study contractor, was held in February 1976.

Agencies providing information used in this study included: the U.S. Soil Conservation Service; the USACE; the USGS, Water Resources Division; and the California DWR.

During the study, the study contractor reviewed drainage deficiencies and historic flooding information, on file at the LACFCD.

In a series of meetings held on November 7 and 9, 1978, the study contractor met with San Fernando Valley Councilpersons to review the flood elevations and flood, plain boundaries affecting their districts.

On November 28, 1978, FEMA and the study contractor, which was attended by representatives of the Mayor's Office, the City Council, the Board of Public Works, the City Planning Department, the Department of Building and Safety, and the City Engineer's Office, conducted a FIS session. A FEMA representative gave a briefing on the current and future status of the city in the National Flood Insurance Program (NFIP). A study contractor representative provided the City Engineer with a preview of the preliminary results of the study.

On November 1 and 9, 1978, and June 5, 1979, the study contractor displayed and

explained the flood elevations and floodplain boundaries to the staff of the City Engineer's Offices representing the Harbor, San Fernando Valley, West Los Angeles, and Central Los Angeles Districts.

On July 10, 1979, representatives of FEMA and the study contractor conducted another study session for the City Councilpersons representing the West and Central Los Angeles Districts in order to explain the city's participation in the NFIP, and to review the 1-percent-annual-chance flooding affecting their districts.

The preliminary results of the City of Los Angeles study were reviewed at three intermediate CCO meetings. The San Fernando Valley meeting was held on December 18, 1978; the Harbor District meeting was held on January 30, 1979; and a joint meeting for both the Central and West Los Angeles Districts was held on July 11, 1979. Representatives of FEMA, the study contractor, and the City Engineer's Office, as well as concerned citizens, attended all meetings.

The results of this study were reviewed at a final CCO meeting held on May 7, 1980, and attended by representatives of FEMA, the study contractor, and the City. No problems were raised at the meeting.

On April 19, 1984, the LACFCD submitted information indicating a reduction in flood hazards as a result of Bond Issue Storm Drain Project No. 5204 on Jefferson Boulevard. This information was used to revise FIRM Panels 0072, 0073, 0079, and 0080 for the City of Los Angeles.

An initial CCO meeting for the original study of the City of Montebello, attended by city officials, the FIA, the State Department of Water Resources, and the study contractor, was held in February 1976. The purpose of the meeting was to discuss the nature and scope of the study and to determine the areas to be studied by detailed and approximate methods.

The U.S. Soil Conservation Service; the USACE; the USGS, Water Resources Division; and the California DWR were contacted for information relevant to the study.

While conducting the study, representatives of the City Engineer's office were contacted on several occasions to gather the latest possible relevant information. During the course of the work done by the study contractor, flood elevations and flood boundaries were reviewed with the City Engineer at a meeting held in the City Engineer's office on May 15, 1978.

On August 15, 1978, the preliminary results of this study were reviewed at an intermediate CCO meeting. Representatives of the study contractor, the FIA, and the offices of the City Engineer and City Planning Department attended the meeting.

The results of this original study of the City of Montebello were reviewed at the final community coordination meeting held on January 24, 1979. Attending the meeting were representatives of the FIA, the study contractor, and the City. No problems were raised at this meeting which would affect the technical results of this study.

The initial CCO meeting for the revised study of the City of Montebello was held on January 28, 1986 and attended by representatives of the Cities of Downey, Long Beach,

Lynwood, Vernon, Bellflower, Paramount, and the LACFCD, the USACE, FEMA, and the study contractor.

On April 4, 1991, an interim CCO meeting was held with representatives from FEMA and community officials from the Cities of Pico Rivera, Bellflower, South Gate, Lynwood, Seal Beach, Torrance, Bell Gardens, Signal Hill, Los Angeles, Downey, Long Beach, Compton, Paramount, Lakewood, Carson, Cerritos, Gardena, and Los Angeles County, and representatives of the California DWR, the USACE, Los Angeles District, State Senator David Roberti's office, and the study contractor. Preliminary results of the study were presented.

The USACE provided as-built plans of the channel and bridge characteristics along with peak discharge and original design information. They also provided hydrologic and hydraulic information for the study area in the LACDA Appendix A - Hydrology, updated February 1990 and Hydraulic Appendix dated July 1989. Coordination with the USACE concerning the certification of the levees, the breakout locations and progress of work was ongoing during this study. The CALTRANS was helpful in providing information regarding bridge and highway geometric data. Vertical control data to establish the Elevation Reference Marks (ERM) were obtained from the USGS, the United States Coast and Geodetic Survey, and the Cities of Long Beach, Paramount, and Compton.

The results of the study were reviewed at the final CCO meeting for the City of Montebello, held on October 30, 1991, and attended by representatives of FEMA, the study contractor, and communities affected by the Los Angeles River and Rio Hondo restudy. All problems raised at that meeting have been addressed in this study.

An initial CCO meeting for the original study of the City of Palmdale, was held in February 1976, and was attended by city officials, representatives of the FIA, the California DWR, and the LACFCD.

During the course of study, representatives of the City Engineering Office were contacted on several occasions to gather information. The U.S. Soil Conservation Service; the USACE; the USGS, Water Resources Division; the California DWR and CALTRANS; and the Southern Pacific Railroad were also contacted and provided information used in this study.

During the course of the study, flood depths were reviewed with appropriate community officials.

On January 22, 1979, the preliminary results of the original study were reviewed at an intermediate CCO meeting attended by representatives of the FIA, the LACFCD, and the offices of the City Manager and the City Engineer. No problems resulting in changes to the study were encountered at the meeting.

City officials, representatives of FEMA, the California DWR, and REC, attended an initial CCO meeting for the revised study, held in April 1984.

A notice explaining the purpose of the revised study was published in the Antelope Valley Press on October 11, 1984. This notice served as an invitation to interested parties

to bring any relevant facts and technical data to the attention of FEMA.

A final CCO meeting for the study of the City of Palmdale was held on January 8, 1986, and attended by representatives of the City of Palmdale, FEMA, and REC. The revised study was found to be acceptable to the City of Palmdale.

On August 23, 1990, an initial CCO meeting for the March 30, 1998, revision for the City of Palmdale was held with representatives of FEMA, the California DWR, the Los Angeles County Department of Public Works, the City of Palmdale, and the study contractor. The stream to be studied and limits of study were identified at the meeting. Available mapping, previous studies, and other data were also identified at the meeting.

During the conduct of the restudy, additional meetings were held among representatives of the California DWR, the City of Palmdale, and the study contractor.

The results of this revision were reviewed at a final CCO meeting held on April 24, 1997, and attended by representatives of FEMA and the City of Palmdale. All problems raised at this meeting have been addressed in this restudy.

An initial CCO meeting for the study of the City of Palos Verdes Estates, was held on July 28, 2009, to discuss the scope of the revision.

An initial CCO meeting for the study of the City of Redondo Beach, attended by representatives of the City Engineering Office, FEMA, the California DWR, and the LACFCD (the study contractor), was held in February 1976. The purpose of the meeting was to discuss the nature and scope of the study and to determine the areas to be studied by detailed and approximate methods.

Representatives of the study contractor reviewed flood elevations and flood boundaries with representatives from the Office of the City Engineer at a meeting held on February 21, 1978. The final CCO meeting was held on October 27, 1982, and attended by representatives of the EMA, the study contractor, and the city. No problems were raised at this meeting.

An initial CCO meeting for the City of Santa Fe Springs, attended by representatives of the FIA, the California DWR, and the study contractor, was held in February 1976.

Initial contact was made with the city's Director of Public Works on July 6, 1977, to discuss the scope of the study, flooding problems, and study procedures. On several occasions, officials of the city's engineering department were contacted to gather the latest relevant information.

Representatives of the study contractor reviewed flood elevations and flood boundaries with the City Engineer at a meeting held in the City Engineer's office on April 25, 1978.

On August 16, 1978, the preliminary results of this study were reviewed at an intermediate coordination meeting. The meeting was attended by representatives of the study contractor, the FIA, and the offices of the City Engineer and Public Works Department.

The results of the study of the City of Santa Fe Springs were reviewed at a final CCO

meeting held on February 28, 1979. Attending the meeting were representatives of the FIA, the study contractor, and the City. No problems were raised at the meeting.

An initial CCO meeting for the City of Torrance, attended by city officials, and representatives of the FIA, the California DWR, and the study contractor, was held in February 1976. The purpose of the meeting was to discuss the nature and scope of the study and to determine the areas to be studied by detailed and approximate methods.

During the course of the study, representatives of the City Engineer's office were contacted on several occasions to gather the latest possible relevant information.

The U.S. Soil Conservation Service; the USACE; the USGS, Water Resources Division; and the California DWR were contacted for information relevant to the study.

During the course of the work done by the study contractor, flood elevations and flood boundaries were reviewed with appropriate community officials.

On May 16, 1978, the preliminary results of this study were reviewed at an intermediate coordination meeting. The meeting was attended by representatives of the study contractor, the FIA, and the office of the City Engineer.

A final CCO meeting was held on January 11, 1979, attended by city officials and representatives of the FIA, and the study contractor. All corrections resulting from the meeting have been incorporated into the study.

An initial CCO meeting for the study of the City of Whittier, attended by city officials, the FIA, the California DWR, and the study contractor was held in February 1976. The purpose of the meeting was to discuss the nature and scope of the study and to determine the areas to be studied by detailed and approximate methods.

While conducting the study, representatives of the community were contacted on several occasions to gather the latest information.

Drainage deficiencies and historical flooding information on file at the LACFCD were reviewed in the course of the study.

A request for information relevant to the study was made to various governmental and local agencies, including the U.S. Soil Conservation Service; the USACE; the USGS, Water Resources Division; and the California DWR. These agencies did not have any data relevant to the study. However, Toups Corporation in the City of Santa Ana, California, supplied hydrologic data and 1-percentannual-chance flooding limits for La Mirada Creek in the adjoining City of La Habra.

During the course of the work done by the study contractor, flood elevations and flood boundaries were reviewed with appropriate community officials.

On May 18, 1978, the preliminary results of this study were reviewed at an intermediate coordination meeting. The meeting was attended by representatives of the study contractor, the Federal Insurance boundaries were reviewed Administration, and the office of the City Engineer.

The results of this study were reviewed at a final CCO meeting held on November 1, 1979. Attending the meeting were representatives of the FIA, the study contractor, the LACFCD, and the City. No problems were raised at the meeting.

An initial CCO meeting for the study of the City of Lancaster, attended by city officials and representatives of the FIA, the California DWR, and the study contractor, was held in February 1976.

During the course of the study, representatives of the City Engineer's office were contacted on several occasions to gather the latest possible relevant information.

The U.S. Soil Conservation Service; the USACE; the USGS, Water Resources Division; the California DWR and CALTRANS; and the Southern Pacific Transportation Company were contacted to provide information used in this study.

During the course of the study, flood elevations and flood boundaries were reviewed with appropriate community officials.

On January 22, 1979, the preliminary results of this study were reviewed at an intermediate CCO meeting attended by representatives of the FIA, the study contractor, and the offices of the City Engineer and Planning Department. No problems resulting in changes to the study were encountered at the meeting.

The final community CCO meeting was held in Palmdale, California, on January 13, 1981, and was attended by representatives of the FIA, the study contractor, and the City. All problems and questions raised at that meeting have been resolved in this study.

On October 11, 1988, an initial CCO meeting for the City of Santa Clarita was held. On November 17, 1988, a final CCO meeting was held, at which the results of the study were reviewed. Representatives of FEMA, the City, and the community attended this meeting.

Coordination for the original study of what became the City of West Hollywood began as a study of Los Angeles County's unincorporated areas. The study began with a CCO meeting held in February 1976, attended by the County, FEMA, the California DWR and the study contractor.

The U.S. Soil Conservation Service; the USACE; the USGS, Water Resources Division; the California DWR and CALTRANS; and the Southern Pacific Transportation Company were contacted and provided information used in the Los Angeles County FIS.

The results of the Los Angeles County FIS were reviewed at a final CCO meeting held on May 7, 1980. Attending the meeting were representatives of FEMA, the study contractor, the Office of the County Engineer, and the County. No problems were raised at the meeting.

In February 1986, FEMA initiated the processing of a separate FIS for the City of West Hollywood. On July 3, 1986, the results of this study were reviewed and accepted at a final coordination meeting attended by representatives of the community and FEMA.

The dates of the initial and final CCO meetings held for Los Angeles County and the incorporated areas and communities within its boundaries are shown in Table 2, "Initial

and Final CCO Meetings.”

Table 2: Initial and Final CCO Meetings

Community Name	Initial CCO Date	Final CCO Date
Los Angeles County and Incorporated Areas	May 9-12, 2005	November 15-16, 2005
Los Angeles County (Unincorporated Areas)	February 1976	August 5, 2014
Agoura Hills, City of	January 26, 1984 October 12, 1995	December 20, 1984
Alhambra, City Of	N/A	N/A
Arcadia, City Of	N/A	N/A
Artesia, City Of	N/A	N/A
Avalon, City Of	February 1976	November 9, 1977
Azusa, City Of	N/A	N/A
Baldwin Park, City Of	N/A	N/A
Bell Gardens, City Of	N/A	N/A
Bell, City Of	N/A	N/A
Bellflower, City Of	January 28, 1986	October 30, 1991
Beverly Hills, City Of	N/A	N/A
Bradbury, City Of	N/A	N/A
Burbank, City Of	February 1976	November 2, 1979 October 15, 1997
Calabasas, City Of	March 10, 2011	August 5, 2014
Carson, City Of	January 28, 1986	October 30, 1991
Cerritos, City Of	N/A	N/A
Claremont, City Of	N/A	N/A
Commerce, City Of	N/A	N/A
Compton, City Of	January 28, 1986	October 30, 1991
Covina, City Of	N/A	N/A
Cudahy, City Of	N/A	N/A
Culver City, City Of	February 1976	January 11, 1979
Diamond Bar, City Of	N/A	N/A
Downey, City Of	January 28, 1986	October 30, 1991
Duarte, City Of	N/A	N/A
El Monte, City Of	N/A	N/A
El Segundo, City Of	N/A	N/A

Community Name	Initial CCO Date	Final CCO Date
Gardena, City Of	January 28, 1986	October 30, 1991
Glendale, City Of	N/A	N/A
Glendora, City Of	N/A	N/A
Hawaiian Gardens, City Of	N/A	N/A
Hawthorne, City Of	N/A	N/A
Hermosa Beach, City Of	N/A	N/A
Hidden Hills, City Of	N/A	N/A
Huntington Park, City Of	N/A	N/A
Industry, City Of	N/A	N/A
Inglewood, City Of	N/A	N/A
Irwindale, City Of	N/A	N/A
La Canada Flintridge, City Of	N/A	N/A
La Habra Heights, City Of	N/A	N/A
La Mirada, City Of	February 1976	May 21, 1979
La Puente, City Of	N/A	N/A
La Verne, City Of	N/A	N/A
Lakewood, City Of	January 28, 1986	October 30, 1991
Lancaster, City Of	February 1976	January 13, 1981
Lawndale, City Of	N/A	N/A
Lomita, City Of	N/A	N/A
Long Beach, City Of	February 1976 January 28, 1986	October 27, 1982 October 30, 1991
Los Angeles, City Of	February 1976	May 7, 1980 December 3, 1997
Lynwood, City Of	January 28, 1986	October 30, 1991
Malibu, City Of	N/A	N/A
Manhattan Beach, City Of	N/A	N/A
Maywood, City Of	N/A	N/A
Monrovia, City Of	N/A	N/A
Montebello, City Of	February 1976 January 28, 1986	January 24, 1979 October 30, 1991
Monterey Park, City Of	N/A	N/A
Norwalk, City Of	N/A	N/A
Palmdale, City Of	February 1976 August 23, 1990	January 8, 1986 April 24, 1997
Palos Verdes Estates, City Of	July 28, 2009	August 5, 2014

Community Name	Initial CCO Date	Final CCO Date
Paramount, City Of	January 28, 1986	October 30, 1991
Pasadena, City Of	N/A	N/A
Pico Rivera, City Of	January 28, 1986	October 30, 1991
Pomona, City Of	N/A	N/A
Rancho Palos Verdes, City Of	N/A	N/A
Redondo Beach, City Of	February 1976	October 27, 1982
Rolling Hills Estates, City Of	N/A	N/A
Rolling Hills, City Of	N/A	N/A
Rosemead, City Of	N/A	N/A
San Dimas, City Of	N/A	N/A
San Fernando, City Of	N/A	N/A
San Gabriel, City Of	N/A	N/A
San Marino, City Of	N/A	N/A
Santa Clarita, City Of	October 11, 1988	November 17, 1988
Santa Fe Springs, City Of	February 1976	February 28, 1979
Santa Monica, City Of	N/A	N/A
Sierra Madre, City Of	N/A	N/A
Signal Hill, City Of	N/A	N/A
South El Monte, City Of	N/A	N/A
South Gate, City Of	January 28, 1986	October 30, 1991
South Pasadena, City Of	N/A	N/A
Temple City, City Of	N/A	N/A
Torrance, City Of	February 1976	January 11, 1979
Vernon, City Of	N/A	N/A
Walnut, City Of	N/A	N/A
West Covina, City Of	N/A	N/A
West Hollywood, City Of	February 1976 February 1986	May 7, 1980 July 3, 1986
Westlake Village, City Of	N/A	N/A
Whittier, City Of	February 1976	November 1, 1979

N/A – Not applicable

In September 2008, HDR Engineering, Inc. completed a countywide DFIRM and FIS for the County of Los Angeles. HDR Engineering, Inc. was hired as an IDIQ study contractor for FEMA Region IX under contract number EMF-2003-CO-0045, Task Order 15. The DFIRM process included digitizing floodplain boundaries from the effective

paper FIRMs and fitting them to a digital base map, thus converting the existing manually produced FIRMs to digitally produced FIRMs, referred to as DFIRMs. Individual community effective FIS reports were also combined into one report for the entire county.

On May 9-12, 2005, the initial CCO meeting for the Los Angeles countywide DFIRM and FIS were held. Attending the meeting were representatives of FEMA Region IX, HDR Engineering, Inc. the study contractor, RMC, Los Angeles County, cities of Arcadia, Bell, Burbank, Carson, Downey, La Canada Flintridge, La Mirada, La Verne, Lakewood, Lancaster, Long Beach, Los Angeles, Lynwood, Malibu, Palos Verdes Estates, Redondo Beach, San Dimas, Santa Fe Springs, and West Covina.

On November 15-16, 2005, the final CCO meeting for the Los Angeles countywide DFIRM and FIS were held. Attending the meeting were representatives of FEMA Region IX, HDR Engineering, Inc. the study contractor, Los Angeles County, cities of Agoura Hills, Arcadia, Burbank, Diamond Bar, Gardena, Glendale, Glendora, Irwindale, La Canada Flintridge, La Mirada, Lancaster, Long Beach, Los Angeles, Lynwood, Malibu, Monrovia, Pico Rivera, San Dimas, San Fernando, Santa Clarita, West Covina, and West Hollywood.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS report covers the geographic area of Los Angeles County, California, including the incorporated communities listed in Section 1.1. The scope and methods of this study were selected with priority given to all known flood hazards and areas of projected development.

For this revision of the countywide FIS, BakerAECOM, LLC, for FEMA, incorporated new detailed study on Las Virgenes Creek, affecting the City of Calabasas. This revision also incorporated new detailed study, provided by HDR Inc., affecting the City of Palos Verdes Estates.

Streams that have been studied using detailed methods in this FIS are presented in Table 3, "Flooding Sources Studied by Detailed Methods."

Los Angeles County

For the countywide mapping, the unincorporated areas of the County were generally divided into four primary sub-areas: those of the Antelope Valley, Santa Clarita Valley, the Malibu area, and the Los Angeles basin. Unincorporated territory in the Los Angeles basin consists primarily of "islands" partially or completely surrounded by incorporated cities or National Forest boundaries. The largest portion of unincorporated territory in the Los Angeles basin is currently located in the Hacienda Heights-Diamond Bar area in the southeastern portion of the County. Areas within National Forest lands were not studied in detail because of low development potential. Edwards Air Force Base was not included in this study.

Flooding sources that affect developed areas or areas with high potential for development were studied by detailed methods. A detailed analysis of the Pacific Ocean was performed for the entire coastline of Los Angeles County. Portions of the County to be studied by detailed methods were selected after considering the level of existing and proposed development. Areas with little or no potential for future development were studied by approximate methods or excluded from the study.

There are watersheds of less than 1 square mile within the County that have historically caused flooding. In order to complete an adequate detailed study, it was necessary to evaluate drainage areas of less than 1 square mile.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon, by FEMA and Los Angeles County.

City of Agoura Hills

This FIS for the City of Agoura Hills was revised on September 26, 2008 to incorporate the incorporated areas of the City of Agoura Hills, Los Angeles County, California. Flooding caused by Lindero Canyon was studied in detail from its confluence with Medea Creek upstream to the southern edge of Agoura Road and from Mainmast Drive upstream through the City of Agoura Hills. Medea Creek was studied in detail from a point approximately 400 feet downstream of Sideway Road, upstream to a point approximately 1,150 feet above Canwood Street. Cheseboro Creek was studied in detail from the southern edge of Driver Avenue to a point approximately 1,450 feet upstream of Driver Avenue. Palo Comado Creek was studied in detail from a point approximately 400 feet downstream of Balkins Drive to a point approximately 5,500 feet upstream.

Medea Creek was studied by approximate methods from a point approximately 1,150 feet upstream of Canwood Street to the corporate limits.

The FIS for the City of Agoura Hills was revised on December 18, 1986, to add approximate Zone A flooding along Liberty Canyon. Depths of flooding were determined using Manning's equation. The 1-percent-annual-chance flood discharge was obtained from the 1980 FIS for Los Angeles County (Federal Emergency Management Agency, 1980).

The FIS for the City of Agoura Hills was also revised on August 3, 1998, to incorporate detailed flood-hazard information along Medea Creek from approximately 1,040 feet downstream of Kanan road to approximately 385 feet upstream of Fountainwood Street.

Along Medea Creek, the Los Angeles County Department of Public Works constructed approximately 2,000 linear feet of reinforced-concrete-lined channel approximately 500 feet downstream of Kanan Road to approximately 200 feet downstream of Thousand Oaks Boulevard to approximately 700 feet upstream of Thousand Oaks Boulevard. The channel has a side-slope lining with an earthen-channel invert. In addition, channel modifications have been completed from 1,600 feet upstream of Thousand Oaks Boulevard to Ventura County line. These modifications include channel excavation,

installation of riprap slope protection, and construction of riprap grade stabilization structures.

City of Alhambra

The City of Alhambra is identified as a non-flood prone community.

City of Arcadia

The City of Arcadia is identified as a non-flood prone community.

City of Artesia

The City of Artesia is identified as a non-flood prone community.

City of Avalon

Coastal areas from the western corporate limits to approximately 0.3 mile from the eastern corporate limits were studied by detailed methods that considered tidal flooding and wave run-up. Avalon Canyon was also studied by detailed methods.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through 1986.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the City of Avalon.

Cities of Bellflower, Carson, Compton, Downey, Gardena, Lakewood, Los Angeles, Lynwood, Paramount, Pico Rivera, South Gate and Los Angeles County

The primary flood threat to the communities listed above is caused by the Los Angeles River. This Countywide FIS encompasses the Los Angeles River from the Arroyo Seco confluence to the Pacific Ocean and the Rio Hondo from Whittier Narrows Dam to the confluence with the Los Angeles River in Los Angeles County, California. The study effort divided the River into four reaches. The upper reach begins at the confluence of the Arroyo Seco River and ends downstream of Interstate 10. The middle reach starts downstream of Interstate 10 and ends at the confluence of the Rio Hondo River. The lower reach extends from the confluence of the Rio Hondo to the Pacific Ocean. The Rio Hondo reach begins at the Whittier Narrows Dam and ends at Interstate 105, the Century Freeway. Flooding from the San Gabriel River is not in the scope of this study. Discharge from Arroyo Seco enters the Los Angeles River at its confluence.

The Los Angeles River concrete channel was built by the USACE in cooperation with LACFCD in 1958. The middle reach was certified in September 1987 as having adequate design capacity to carry the 100 year discharge in accordance with FEMA guidelines. The upper and lower reach and the Rio Hondo were not certified. These areas were studied using detailed methods. Overflow maps were provided by the USACE for the middle reach. Breakout locations and magnitudes on both the Los Angeles River and the Rio Hondo, as well as Compton Creek, were also provided by the USACE in the LACDA

report. The scope and methods of study were agreed to by FEMA, USACE, and LACFCD.

City of Azusa

Results of the mapping study were not previously summarized in an effective FIS report for the City of Azusa; therefore, no scope of study is provided.

City of Baldwin Park

Results of the mapping study were not previously summarized in an effective FIS report for the City of Baldwin Park; therefore, no scope of study is provided.

City of Bell Gardens

Results of the mapping study were not previously summarized in an effective FIS report for the City of Bell Gardens; therefore, no scope of study is provided.

City of Bell

The City of Bell is identified as a non-flood prone community.

City of Beverly Hills

Results of the mapping study were not previously summarized in an effective FIS report for the City of Beverly Hills; therefore, no scope of study is provided.

City of Bradbury

The City of Bradbury is identified as a non-flood prone community.

City of Burbank

The Los Angeles River Flood Control Channel and the Burbank Western Flood Control Channel were studied by detailed methods. All shallow flooding sources that affect the community were studied in detail. Lockheed Storm Drain was studied by approximate methods.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to and agreed upon by the FIA and the City of Burbank.

The January 20, 1999, revision incorporated detailed flood hazard information along the Lockheed Drain Channel in the City of Burbank. The study limits extend from the confluence with the Burbank Western Flood Control Channel to approximately 1,300 feet downstream of Vineland Avenue. The length of the reach studied is approximately 2.9 miles. Flood hazard information along Lake Street, North Overflow, and Empire Avenue was also incorporated in this restudy.

City of Calabasas

The December 16, 2015, revision incorporated a detailed study along Las Virgenes

Creek, from just upstream of Highway 101 to the confluence with Stokes Canyon.

City of Cerritos

Results of the mapping study were not previously summarized in an effective FIS report for the City of Cerritos; therefore, no scope of study is provided.

City of Claremont

Revised effective FIRMs were issued July 2, 2004, and have been included into the countywide FIRM. Results of the mapping study were not previously summarized in an effective FIS report for the City of Claremont; therefore, no detailed information is provided.

City of Commerce

Results of the mapping study were not previously summarized in an effective FIS report for the City of Commerce; therefore, no scope of study is provided.

City of Covina

Results of the mapping study were not previously summarized in an effective FIS report for the City of Covina; therefore, no scope of study is provided.

City of Cudahy

Results of the mapping study were not previously summarized in an effective FIS report for the City of Cudahy; therefore, no scope of study is provided.

City of Culver City

Ballona Creek Channel, Sawtelle-Westwood Storm Drain Channel, Benedict Canyon Channel, Centinela Creek Channel, and the shallow flooding areas in the vicinity of the intersection of Adams and Washington Boulevards and along the western border of Hannum Avenue, in the northeast section of the Fox Hills Mall were studied in detail. An oil field in the eastern portion of the city was studied by approximate methods due to a lack of potential for development.

Those areas studied by detailed methods were chosen with consideration given to all proposed construction and forecasted development through 1983.

City of Diamond Bar

Results of the mapping study were not previously summarized in an effective FIS report for the City of Diamond Bar; therefore, no scope of study is provided.

City of Duarte

The City of Duarte is identified as a non-flood prone community.

City of El Monte

The City of El Monte is identified as a non-flood prone community.

City of El Segundo

Results of the mapping study were not previously summarized in an effective FIS report for the City of El Segundo; therefore, no scope of study is provided.

City of Glendale

Results of the mapping study were not previously summarized in an effective FIS report for the City of Glendale; therefore, no scope of study is provided.

City of Glendora

Results of the mapping study were not previously summarized in an effective FIS report for the City of Glendora; therefore, no scope of study is provided.

City of Hawaiian Gardens

Results of the mapping study were not previously summarized in an effective FIS report for the City of Hawaiian Gardens; therefore, no scope of study is provided.

City of Hawthorne

The City of Hawthorne is identified as a non-flood prone community.

City of Hermosa Beach

Results of the mapping study were not previously summarized in an effective FIS report for the City of Hermosa Beach; therefore, no scope of study is provided.

City of Hidden Hills

Revised effective FIRMs were issued January 19, 2006, and have been included in the countywide FIRM. Results of the mapping study were not previously summarized in an effective FIS report for the City of Hidden Hills; therefore, no detailed information is provided.

City of Huntington Park

The City of Huntington Park is identified as a non-flood prone community.

City of Industry

Results of the mapping study were not previously summarized in an effective FIS report for the City of Industry; therefore, no scope of study is provided.

City of Inglewood

Results of the mapping study were not previously summarized in an effective FIS report for the City of Inglewood; therefore, no scope of study is provided.

City of Irwindale

Results of the mapping study were not previously summarized in an effective FIS report for the City of Irwindale; therefore, no scope of study is provided.

City of La Canada Flintridge

The City of La Canada Flintridge is identified as a non-flood prone community.

City of La Habra Heights

Results of the mapping study were not previously summarized in an effective FIS report for the City of La Habra Heights; therefore, no scope of study is provided.

City of La Mirada

Flooding caused by the overflow of La Mirada Creek and ponding areas throughout the community was studied in detail.

Those areas studied by detailed methods were chosen with consideration given to all proposed construction and forecasted development through 1984.

City of La Puente

Results of the mapping study were not previously summarized in an effective FIS report for the City of La Puente; therefore, no scope of study is provided.

City of La Verne

Results of the mapping study were not previously summarized in an effective FIS report for the City of La Verne; therefore, no scope of study is provided.

City of Lancaster

Streams selected for detailed study affecting the City of Lancaster were Amargosa Creek, Amargosa Creek Tributary, and Portal Ridge Wash.

Portions of Lancaster that were studied by detailed methods were those areas shown as having a potential for development in the preliminary North Los Angeles County General Plan.

Those areas studied by detailed methods were chosen with consideration given to all proposed construction and forecasted development through 1984.

City of Lawndale

The City of Lawndale is identified as a non-flood prone community.

City of Lomita

The City of Lomita is identified as a non-flood prone community.

City of Long Beach

This FIS covers the incorporated areas of the City of Long Beach, including those affected by potential overflow of the Los Angeles River (as discussed, and as studied under the City of Bellflower, et al., above).

In addition, as discovered in the original study, some watersheds within the city which have historically caused flooding in developed low-lying areas are less than 1 square mile in area. To complete a detailed study of the community, it was necessary to evaluate these watersheds.

Low-lying areas between the San Gabriel River and the San Gabriel River Freeway were studied by approximate methods.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the study contractor.

City of Los Angeles

This FIS covers the incorporated areas of the City of Los Angeles, as studied for the Los Angeles River from the Arroyo Seco confluence to the Pacific Ocean and the Rio Hondo from Whittier Narrows Dam to the confluence with the Los Angeles River in Los Angeles County, California (as discussed under the City of Bellflower, above).

The study area was also broken into four primary subareas: the San Fernando Valley, Harbor, Central, and West Districts. This was possible because of the hydrologic independence of each watershed and necessary because of the geographical expanse of the city. Portions of the Central District tributary to Ballona Creek were studied within the West Los Angeles District.

Flooding sources studied by detailed methods include: Weldon Canyon, Kagel Canyon, Rustic Canyon, Pacomia Wash, Little Tujunga Wash, and Big Tujunga Wash, as well as areas affected by surface runoff and shallow flooding throughout the city. There are several rock quarries, public parks, and golf courses in the city that will be flooded during a 1-percent-chance flood. These areas were studied by approximate methods due to the lack of potential for development.

As mentioned earlier, a detailed analysis of coastal areas affected by the Pacific Ocean was performed along the entire coastline of the City of Los Angeles, including Los Angeles Harbor.

There are watersheds of less than 1 square mile within the city that have historically caused flooding in developed low-lying areas. Therefore, to complete a detailed study of the community, it was necessary to evaluate drainage areas of less than 1 square mile.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through 1989.

Approximate analyses were used to study those areas having a low development potential

or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the City of Los Angeles.

The City of Los Angeles FIS was revised on May 4, 1999. This restudy was done in two parts. Part one incorporates detailed flood-hazard information from the Los Angeles River and Rio Hondo affecting the City of Los Angeles. Part two incorporates detailed flood hazard information along Overflow Area of Lockheed Drain Channel from Vanowen Street to approximately 380 feet northwest of Vanowen Street.

City of Malibu

Results of the mapping study were not previously summarized in an effective FIS report for the City of Malibu; therefore, no scope of study is provided.

City of Manhattan Beach

Results of the mapping study were not previously summarized in an effective FIS report for the City of Manhattan Beach; therefore, no scope of study is provided.

City of Maywood

The City of Maywood is identified as a non-flood prone community.

City of Monrovia

The City of Monrovia is identified as a non-flood prone community.

City of Montebello

All flooding sources that affect the community, including the flooding area at the intersection of Garfield Avenue and Beverly Boulevard, the ponding area at the intersection of Mines Avenue and Taylor Avenue, and Whittier Narrows Flood Control Basin were studied in detail for the original study. The rock quarry in the southwest portion of the city and the pond in Montebello Municipal Golf Course were studied by approximate methods due to a lack of potential for development.

Watersheds of less than 1 square mile within the city have historically caused flooding in developed low-lying areas. Therefore, to complete a detailed study of the community, it was necessary to evaluate drainage areas of less than 1 square mile.

Those areas studied by detailed methods for the original study were chosen with consideration given to all proposed construction and forecasted development through 1983.

The revised study of the City of Montebello included the results of the study of the Los Angeles River from the Arroyo Seco confluence to the Pacific Ocean and the Rio Hondo from Whittier Narrows Dam to the confluence with the Los Angeles River, as discussed under the City of Bellflower, et al., above.

The areas studied by detailed methods for the revised study were selected with priority given to all known flood hazards and areas of projected development or proposed

construction through 1991.

City of Monterey Park

Results of the mapping study were not previously summarized in an effective FIS report for the City of Manhattan Beach; therefore, no scope of study is provided.

City of Norwalk

Results of the mapping study were not previously summarized in an effective FIS report for the City of Norwalk; therefore, no scope of study is provided.

City of Palmdale

Portions of Palmdale that were studied by detailed methods are those areas shown as having a potential for development in the preliminary North Los Angeles County General Plan, which includes much of central and western Palmdale. The city is situated on an alluvial fan at the northern base of the San Gabriel Mountain foothills. Flood flows discharge from the foothills onto the alluvial fan, where there are relatively few permanent streams, causing the flows to spread out over much of the city. Included in the detailed analysis are areas flooded by Amargosa Creek, Amargosa Creek Tributary, Anaverde Creek, Big Rock Wash and Little Rock Wash. Also studied in detail was flooding from segments of Anaverde Creek Tributary, located south of the city, which affects the southwestern portion of the city.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through November 1990.

Areas studied by approximate methods include an area in the western part of the city affected by alluvial fan flooding from Ritter Ridge in the San Gabriel Mountains and a small segment of Anaverde Creek in western Palmdale. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the City of Palmdale.

The March 30, 1998, restudy consisted of the analysis of approximately 2 miles of Anaverde Creek, from the Antelope Valley Freeway (California State Highway 14) to the California Aqueduct.

For approximately 4,000 feet at the upstream end of the study, Anaverde Creek has been channelized and consists of an unlined trapezoidal section. This work was performed as part of the construction of the California Aqueduct. A short floodway structure has been constructed under the California State Highway 14 undercrossing bridge for Rayburn Road at the downstream limit of this study. This structure was constructed as part of the Route 14 project, and serves to channelize the flow under the freeway.

City of Palos Verdes Estates

Revised effective FIRMs were issued July 2, 2004, and have been included into the initial

countywide FIRM.

The December 16, 2015, revision incorporated detailed study along the Unnamed Stream Main Reach and Tributaries 1 and 2.

City of Pasadena

The City of Pasadena is identified as a non-flood prone community.

City of Pomona

Results of the mapping study were not previously summarized in an effective FIS report for the City of Pomona; therefore, no scope of study is provided.

City of Rancho Palos Verdes

Results of the mapping study were not previously summarized in an effective FIS report for the City of Rancho Palos Verdes; therefore, no scope of study is provided.

City of Redondo Beach

The small watersheds within the city and coastal areas along Santa Monica Bay fronted by King Harbor comprising the city were studied in detail. Redondo State Beach was not included in this study.

City of Rolling Hills Estates

Results of the mapping study were not previously summarized in an effective FIS report for the City of Rolling Hills Estates; therefore, no scope of study is provided.

City of Rolling Hills

The City of Rolling Hills is identified as a non-flood prone community.

City of Rosemead

Results of the mapping study were not previously summarized in an effective FIS report for the City of Rosemead; therefore, no scope of study is provided.

City of San Dimas

Results of the mapping study were not previously summarized in an effective FIS report for the City of San Dimas; therefore, no scope of study is provided.

City of San Fernando

Results of the mapping study were not previously summarized in an effective FIS report for the City of San Fernando; therefore, no scope of study is provided.

City of San Gabriel

The City of San Gabriel is identified as a non-flood prone community.

City of San Marino

The City of San Marino is identified as a non-flood prone community.

City of Santa Clarita

The following stream reaches were studied by detailed methods in the City of Santa Clarita:

- Santa Clara River, from western corporate limits at U.S. Highway 5 to eastern corporate limits;
- South Fork Santa Clara River, from confluence with Santa Clara River to U.S. Highway 5;
- Placerita Creek, from confluence with Newhall Creek to State Highway 14;
- Mint Canyon, from confluence with Santa Clara River to 7,250 feet upstream of Scherzinger Road;
- Sand Canyon, from confluence with Santa Clara River to approximately 6,400 feet upstream of Sulters Street;
- Newhall Creek, from confluence with South Fork Santa Clara River to State Highway 14;
- Oak Springs Canyon, from confluence with Santa Clara River to Union Pacific (former Southern Pacific) Railroad;
- Iron Canyon, from confluence with Sand Canyon to approximately 3,000 feet upstream of Devell Road extended.

The areas studied by detailed methods were selected with priority given to known flood hazard areas and areas of projected development or proposed construction.

Several unnamed tributaries were studied by approximate methods.

City of Santa Fe Springs

The San Gabriel River, Milan Creek, Coyote Creek - North Fork, and Coyote Creek were studied in detail. Flooding from all unnamed streams in the community and from ponded areas was also studied in detail. There are watersheds of less than 1 square mile within the city which have historically caused flooding in developed low-lying areas. Therefore, to complete a detailed study of the community, it was necessary to evaluate drainage areas of less than 1 square mile.

City of Santa Monica

Results of the mapping study were not previously summarized in an effective FIS report for the City of Santa Monica; therefore, no scope of study is provided.

City of Sierra Madre

The City of Sierra Madre is identified as a non-flood prone community.

City of Signal Hill

Results of the mapping study were not previously summarized in an effective FIS report for the City of Signal Hill; therefore, no scope of study is provided.

City of South El Monte

Results of the mapping study were not previously summarized in an effective FIS report for the City of South El Monte; therefore, no scope of study is provided.

City of South Pasadena

The City of South Pasadena is identified as a non-flood prone community.

City of Temple City

The City of Temple City is identified as a non-flood prone community.

City of Torrance

All flooding sources that affect the City of Torrance were studied in detail, except for a gravel pit in the southern portion of the city and coastal flooding from the Pacific Ocean, which were studied by approximate methods.

There are watersheds of less than 1 square mile within the city that have historically caused flooding in developed low-lying areas. Therefore, to complete a detailed study of the community, it was necessary to evaluate drainage areas of less than 1 square mile.

Those areas studied by detailed methods were chosen with consideration given to all proposed construction and forecasted development through 1983.

City of Vernon

The City of Vernon is identified as a non-flood prone community.

City of Walnut

Results of the mapping study were not previously summarized in an effective FIS report for the City of Walnut; therefore, no scope of study is provided.

City of West Covina

Revised effective FIRMs were issued December 2, 2004, and have been included into the countywide FIRM.

City of West Hollywood

Shallow flooding methods were used to study flooding sources in the vicinity of Rosewood Avenue and Huntley Drive and also in the vicinity of Santa Monica Boulevard and Genesee Avenue. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed

construction through 1989.

City of Westlake Village

Results of the mapping study were not previously summarized in an effective FIS report for the City of Westlake Village; therefore, no scope of study is provided.

City of Whittier

Areas affected by flooding along Turnbull Canyon, Savage Creek, and at Whittier Narrows Flood Control Basin were studied by detailed methods. Watersheds of less than 1 square mile within the city have caused flooding in developed and low-lying areas. Therefore, in order to complete a detailed study of the community, it was necessary to evaluate drainage areas of less than 1 square mile.

A landfill at a city dump east of Canyon Crest Drive, the Friendly Hills Country Club golf course, and La Mirada Creek were studied by approximate methods.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to and agreed upon by the FIA and the City of Whittier.

All or portions of the flooding sources listed in Table 3, "Flooding Sources Studied by Detailed Methods," were studied by detailed methods. Limits of detailed study are indicated on the Flood Profiles (Exhibit 1) and on the FIRM.

Table 3: Flooding Sources Studied by Detailed Methods

Acton Creek	Los Angeles River right overbank path 1
Agua Dulce Canyon Creek	Los Angeles River right overbank path 2
Amargosa Creek	Los Angeles River right overbank path 3
Anaverde Creek	Malibu Creek
Avalon Canyon	Medea Creek
Big Rock Wash	Medea Creek (above Ventura Freeway)
Bouquet Canyon Creek	Mill Creek
Cheseboro Creek	Newall Creek
Cold Creek	North Overflow
Dark Canyon	Old Topanga Canyon
Dry Canyon	Overflow Area of Lockheed Drain Channel
Escondido Canyon Creek	Overflow Area of Lockheed Storm Drain
Flow Along Empire Avenue	Palo Comando Creek
Flowline No. 1	Ramirez Canyon
Garapito Creek	Rio Hondo River left overbank path 3
Hacienda Creek	Rio Hondo River left overbank path 5
Haskell Canyon Creek	Rio Hondo River left overbank path 6
Kagel Canyon	Rustic Canyon
La Mirada Creek	Santa Maria Canyon
Lake Street Overflow	San Francisquito Canyon Creek

Las Flores Canyon	San Canyon Creek
Las Virgenes Creek *	Santa Clara River
Liberty Canyon	Stokes Canyon
Lindero Canyon above confluence with Medea Creek	Topanga Canyon
Lindero Canyon above Lake Lindero	Trancas Creek
Little Rock Wash - Profile A	Triunfo Creek
Little Rock Wash - Profile B	Unnamed Canyon (Serra Retreat Area)
Little Rock Wash - Profile C	Unnamed Stream Main Reach*
Lobo Canyon	Unnamed Stream Tributary 1*
Lockheed Drain Channel	Unnamed Stream Tributary 2*
Lopez Canyon Channel	Upper Los Angeles River left overbank
Los Angeles River left overbank path 2	Weldon Canyon
	Zuma Canyon

*Flooding source with new or revised analysis in this revision

All or portions of the flooding sources listed in Table 4, "Flooding Sources Studied by Approximate Methods," were studied by approximate methods. Approximate analyses were used to study only those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and Los Angeles County.

Table 4: Flooding Sources Studied by Approximate Methods

ABC River	Abrams Canyon Creek	Acton Canyon	Adams Canyon Creek
Agua Amarge Canyon	Agua Dulce Canyon Creek	Alamitos Bay	Alder Gulch
Aliso Canyon Creek	Aliso Creek	Alpine Canyon Creek	Amargosa Creek Tributary
Antimony Canyon	Arrastre Canyon Creek	Arroyo Pescadero	Arroyo San Miguel
Arroyo Sequit	Avalon Bay	Back Channel	Baldwin Grade Canyon Creek
Baldwin Hills Reservoir	Ballona Creek	Bar Creek	Bare Mountain Canyon Creek
Bartholomaus Canyon Creek	Bear Canyon Creek	Bear Gulch	Beartrap Canyon Creek
Bee Canyon	Bee Canyon Creek	Big Dalton Wash	Big Rock Creek
Big Rock Wash Profile Base Line	Big Tujunga Canyon Creek	Big Tujunga Wash	Bitter Canyon Creek
Blartrad Canyon Creek	Bleich Canyon Creek	Bluff Cove	Bobcat Canyon Creek
Bootleggers Canyon Creek	Boulder Canyon Creek	Bouquet Canyon Creek	Bouquet Reservoir
Bouton Creek	Bouton Lake	Brea Canyon Creek	Broad Canyon Creek
Browns Creek Control Channel	Bull Creek	Burbank Canyon	Burbank Western Flood
Burns Canyon Creek	Burnside Canyon Creek	California Aqueduct	Canada De Los Alamos
Canyon Creek	Carbon Canyon Creek	Carlos Canyon Creek	Carr Canyon Creek
Cassara Canyon Creek	Castaic Creek	Castaic Lagoon	Castaic Lake

Table 4: Flooding Sources Studied by Approximate Methods (continued)

Cedar Canyon Creek Channel	Cedar Creek	Centinela Creek	Centinela Creek
Cerritos Channel	Channel No. 1	Channel No. 2	Channel No. 3
Charles Oak Creek	Charlie Canyon Creek	Chatsworth Reservoir	Cherry Canyon Creek
Clark Gulch Creek	Clear Springs	Cloudbrook Creek	Cloudburst Canyon
Cold Canyon Creek Creek	Cold Springs Canyon	Colorado Lagoon	Compton Creek
Compton Creek Channel Creek	Consolidated Channel	Coral Canyon Creek	Cow Springs Canyon
Coyote Canyon Creek	Coyote Creek	Craig Spring	Cruthers Creek
Dagger Flat Canyon Creek	Dark Canyon West Branch	Deadhorse Canyon Creek	Deer Canyon Creek
Delaware River	Descanso Bay	Devil Canyon Creek	Devils Gulch
Dewitt Canyon Creek	Dix Canyon Creek	Dominguez Channel	Dorothy Canyon Creek
Dorr Canyon Creek	Dowd Canyon	Dowd Canyon Creek	Drinkwater Canyon Creek
Dry Canyon Creek	Dry Canyon Flood Control Channel	Dry Canyon Reservoir	East Basin
East Canyon Creek	East Compton Creek	Echo Park Lake	El Toro Canyon Creek
Elizabeth Canyon	Elizabeth Lake Creek	Elizabeth Lake Canyon	Eller Slough
Elsmere Canyon Creek	Encinal Canyon Creek	Encinal Creek Channel	Entrance Channel
Evil Canyon Creek	Fairmont Reservoir	Fall Canyon Creek	Fall Creek
Falls Gulch	Fenner Canyon Creek	Fish Canyon Creek	Fish Creek
Fish Fork	Fish Harbor	Flume Canyon Creek	Forsythe Canyon Creek
Franklin Canyon Reservoir	Fryer Canyon Creek	Gail Canyon	Garden Gulch
Gary Creek	Gates Canyon Creek	Gavin Canyon Creek	Gookins Dry Lake
Gooseberry Canyon Creek	Gordon Canyon Creek	Gorman Creek	Government Canyon
Graham Canyon Creek	Grande Canyon Creek Creek	Grandview Canyon Creek	Grasshopper Canyon
Halsey Canyon Creek	Happy Valley Creek	Harbor Lake	Haskell Canyon
Haskell Channel	Hasley Canyon Creek	Hauser Canyon Creek	Heryford Canyon Creek
Hiat Canyon Creek	Hidden Lake Creek	Hideaway Canyon	Hog Canyon Creek
Holcomb Canyon Creek	Holiday Lake	Hollywood Reservoir	Holmes Creek
Hondo Canyon Creek	Horse Camp Canyon Creek	Hosler Canyon Creek	Hudson River
Hughes Canyon Creek	Hughes Lake	Hunt Canyon Creek	Hutak Canyon Creek
Indian Bill Canyon Creek	Indian Canyon Creek	Inner Harbor	Iron Canyon
Iron Canyon	Iron Fork	Islip Canyon Creek	Jesus Canyon Creek
John Bird Canyon Creek	Jones Canyon Creek	Kashmere Canyon	Kentucky Springs Canyon Creek
Kimbrough Canyon Creek	Kings Canyon Creek	Kitter Canyon Creek	La Canada Creek
La Canada Verde Creek	Lachusa Canyon Creek	Lake Lindero	Lake Palmdale
Latigo Canyon Creek	Laurel Canyon Creek	Leaming Canyon Creek	Lechler Canyon Creek
Lemontaine Creek	Liebre Gulch	Limekiln Canyon	Limekiln Creek
Lindero Canyon	Lindero Creek Canyon Creek	Little Las Flores	Little Red Rock Wash

Table 4: Flooding Sources Studied by Approximate Methods (continued)

Little Rock Creek	Little Rock Reservoir	Little Rock Wash	Little Tujunga Wash
Lockheed Storm Drain	Long Beach Channel	Loop Canyon Creek	Los Alisos Canyon Creek
Los Angeles County Flood Control Channel	Los Angeles County Storm Drain	Los Angeles Harbor	Los Angeles River
Los Angeles River Flood Control Channel	Los Cerritos Channel	Los Flores Canyon	Los Llajas Canyon Creek
Lost Canyon Creek	Lucky Canyon Creek	Lunada Bay	Lynx Gulch
Lyon Canyon Creek	Maher Canyon Creek	Main Channel	Malaga Canyon
Malaga Cove	Malibu Lake	Malibu Reservoir	Maple Canyon Creek
Marek Canyon Creek	Marie Canyon Creek	Marina Del Ray	Marine Stadium
Matay Canyon Creek	Mattox Canyon Creek	May Canyon Channel	May Canyon Creek
McClure Canyon Creek	McCorkle Canyon Creek	McCoy Canyon Creek	Medea Creek (above Mulholland Highway)
Michael Creek	Middle Fork Mill Creek	Middle Harbor	Milan Creek
Miller Canyon Creek	Milton B. Arthur Lakes	Mine Gulch	Mint Canyon
Mint Canyon Spring	Montaria Lake	Monte Cristo Creek	Montebello Municipal Golf Course Pond
Morris Reservoir	Munz Canyon Creek	Muscal Creek	Mystic Canyon Creek
Nellus Canyon Creek	Newhall Creek	Noel Canyon Creek	North Fork Mill Creek
North Long Canyon Creek	OA Canyon Creek	Oak Springs Canyon	Oakdale Canyon
Oakgrove Canyon Creek	Old Topanga Canyon	Oro Fino Canyon	Orr Spring Canyon Creek
Osito Canyon Creek	Oso Canyon Creek	Overflow Area of	Pacific Ocean Lockheed Drain
Pacific Terrace Harbor	Pacoima Canyon Creek	Pacoima Wash	Pallett Creek
Palmdale Ditch Basin	Palmer Trout Lake	Palomas Canyon Creek	Pan Pacific Detention
Paradise Cove	Pena Canyon Creek	Pico Canyon	Pico Canyon Creek
Piedra Gorda Canyon Creek	Pine Canyon Creek	Pine Creek	Piru Creek
Placerita Creek Creek	Plum Canyon Creek	Poison Oak Canyon	Pole Canyon Creek
Portal Ridge Wash	Posey Canyon Creek	Potrero Canyon Creek	Potrero Valley Creek
Praire Fork	Pratt Canyon Creek	Price Canyon Creek	Puddingstone Reservoir
Puerco Canyon Creek Creek	Punchbowl Canyon	Puzzle Canyon Creek	Pyramid Lake
Quail Lake	Quigley Canyon Creek	Qwerty River	Railroad Canyon
Rattlesnake Canyon Creek	Reed Canyon Channel	Rice Canyon Creek	Richardson Canyon Creek
Rio Hondo Channel	Ritter Canyon Creek	Rivera Canyon Creek	Roberts Canyon Creek
Robinson Canyon Creek	Rock Creek	Rockbound Canyon Creek	Rogers Creek
Romero Canyon Creek	Ross Gulch	Rowley Channel	Ruby Canyon Creek
Rustic Canyon Channel	Salt Canyon Creek	San Antonio Creek	San Antonio Reservoir
San Antonio Wash Channel	San Dimas Wash	San Francisquito Canyon Creek	San Gabriel Reservoir
San Gabriel River	San Jose Creek	San Martinez Chiquito Canyon	San Martinez Grande Canyon Creek
San Nicholas Canyon Creek	San Pedro Bay	Sand Canyon	Sand Canyon Creek
Santa Clara River	Santa Felicia Canyon Creek	Santa Margarita Canyon Creek	Santa Monica Bay

Table 4: Flooding Sources Studied by Approximate Methods (continued)

Santa Susana Creek	Santa Susana Pass Wash	Santa Susana Pass Reservoir	Santa Ynez Canyon
Santiago Canyon Creek	Savage Creek	Saw Canyon Creek	Sawmill Canyon Creek
Sawtelle-Westwood Channel	Sawtelle-Westwood Storm Drain Channel	Schoolhouse Canyon Creek	Scychull River
Shake Canyon Creek	Sharps Canyon Creek	Sierra Canyon Creek	Silver Lake Reservoir
Sleeper Canyon Creek	Sloan Canyon Creek	Snowslide Canyon	Solano Canyon
Soldier Creek	Soledad Canyon	Solstice Canyon Creek	Sombrero Canyon Creek
Sonome Canyon Creek	Sorensen Avenue Drain	South Fork	South Fork Santa Clara River
South Portal Canyon Creek	South Tule Canyon Creek	Spade Canyon	Spencer Canyon Creek
Spring Canyon Creek	Steep Hill Canyon	Steep Hill Canyon	Steine Canyon Creek
Stone Canyon Reservoir	Sullivan Canyon	Sulphur Canyon Creek	Sunshine Canyon
Swimming Lagoon	Sycamore Canyon Creek	Tacobi Creek	Tapia Canyon
Taylor Creek	Tentrock Canyon Creek	Texas Canyon Creek	Thompson Creek
Tonner Canyon	Towsley Canyon Creek	Trent River	Trough Canyon Creek
Tuna Canyon Creek	Turnbull Canyon	Tweedy Lake	Una Lake
Upper Franklin Canyon Reservoir	Upper Stone Canyon Reservoir	Vasquez Canyon	Via Coronel
Villa Canyon Creek	Vincent Gulch	Vine Creek	Violin Canyon Creek
Walnut Canyon Creek	Walnut Creek	Water Canyon Creek	Wayside Canyon Creek
Webb Canyon	Weldon Canyon	West Basin	West Branch
West Branch California Aqueduct Angeles	West Channel	West Fork	West Fork Fox Creek
West Fork Liebre Gulch	Whitewater Canyon Creek	Whitney Canyon Creek	Whittier Narrows
Whittier Narrows Flood Control Basin	Wickham Canyon Creek	Wilbur Creek	Wilbur Wash
Wilbur Wash East	Wildwood Canyon	Wiley Canyon Creek	Willow Springs Canyon Creek
Wilson Canyon	Wilson Canyon Drain	Winter Canyon Creek	Woodley Creek
Worsham Creek	XX River	Ybarra Canyon Creek	Young Canyon Creek

This FIS also incorporates the determinations of letters issued by FEMA resulting in map changes (Letter of Map Revision [LOMR], Letter of Map Revision - based on Fill [LOMR-F], and Letter of Map Amendment [LOMA]), as shown in Table 5, "Letters of Map Change."

Table 5: Letters of Map Change

Communities Affected	Flooding Source(s)	Date Issued	Type	Case Number
City of Agoura Hills	Mariposa Place Apartments	02/22/2007	LOMR	07-09-0403P
City of Azusa	San Gabriel River – 600’ upstream to 3,900’ upstream of confluence with Roberts Canyon Creek – and Roberts Canyon Creek from the confluence to 2,200’ upstream	04/17/2002	102-D	02-09-330P
City of Burbank	Burbank Empire Center North Overflow	5/19/2004	LOMR	02-09-944P
City of Burbank	Burbank Empire Center North Overflow	5/19/2004	LOMR	02-09-944P
City of Burbank	Lockheed Channel/Burbank Costco	5/20/2004	LOMR	02-09-874P
City of Burbank	Lockheed Channel/Burbank Costco	5/20/2004	LOMR	02-09-874P
City of Calabasas	Las Virgenes Creek from Thousand Oaks Boulevard to County Boundary	7/30/1987	102A	--
City of Calabasas	Las Virgenes Creek	9/2/1999	LOMR	99-09-334P
City of Gardena City of Los Angeles	Los Angeles County Drainage Area Project (LACDA) along Compton Creek and Los Angeles River from Ocean Blvd to Long Beach Blvd. – Los Angeles River Left Overbank Path 1	2/25/2000	LOMR	00-09-1 77P
City of Lancaster	Amargosa Creek - Avenue M to Avenue K and Amargosa Creek Tributary – from Southern Pacific Railroad to Valleyline Drive	05/20/2005	LOMR	04-09-0375P
City of Los Angeles	Topham Street Tampa Ave To Melvin Ave	12/15/1988	LOMR	89-09-14P
City of Los Angeles	Catch Basins and Storm Drain Systems along Topham Street between Tampa and Melvin Avenues	12/22/1988	LOMR	--

Table 5: Letters of Map Change (continued)

Communities Affected	Flooding Source(s)	Date Issued	Type	Case Number
City of Los Angeles	Gravel Pit bounded by Union Pacific Railroad, Laurel Canyon Boulevard, Saticoy Avenue, and Hollywood Freeway	2/18/1994	102	94-09-192P
City of Los Angeles	Adams Boulevard Drain, Units 1-3	3/30/1995	LOMR	94-09-909P
City of Los Angeles	Adams Boulevard Drainage Area	5/15/1996	LOMR	96-09-681P
City of Los Angeles	Ventura-Canoga Drain	8/20/1996	LOMR	96-09-970P
City of Los Angeles	Ventura-Canoga Drain	8/20/1996	LOMR	96-09-857P
City of Los Angeles City of West Hollywood	Hollyhills Drain, Units 1-5	3/12/1999	LOMR	99-09-419P
City of Los Angeles	Unnamed Flooding Source - - Airport Boulevard Storm Drain -- Howard Hughes Development Center	11/9/2001	LOMR	01-09-557P
City of Los Angeles	Rustic Canyon 700 feet upstream of Sunset Boulevard to 2,000 feet upstream of Sunset Boulevard	6/17/2004	LOMR	04-09-0102P
City of Montebello	Storm Drains along Garfield Avenue at Wilcox Avenue and Beverly Boulevard	4/21/1998	LOMR	98-09-445P
City of Palmdale	Amargosa Creek from Avenue O to the Antelope Valley Freeway	04/29/2005	LOMR	04-09-0306P
City of Palmdale	Amargosa Creek Tributary – from Railroad to Valleyline Drive	05/20/2005	LOMR	04-09-0375P
City of Palmdale	Amargosa Creek	9/22/2006	LOMR	06-09-BD 11P
City of Palmdale	Ritter Ranch Anaverde Creek – North Branch Tract 51508	03/30/2007	LOMR	07-09-0755P
City of Redondo Beach City of Torrance	Doris Coast Drain	12/15/1997	LOMR	98-09-097P

Table 5: Letters of Map Change (continued)

Communities Affected	Flooding Source(s)	Date Issued	Type	Case Number
City of Santa Clarita	Santa Clara River – South Fork from Lyons Avenue to South of Wiley Canyon Road	3/21/1990	LOMR	--
City of Santa Clarita	Santa Clara River from 6,500 feet downstream of 1.500 downstream of the Los Angeles Aqueduct	3/3/2005	LOMR	04-09-1681P
City of Santa Clarita	River Park Soil Cement Bank Protection	05/29/2007	LOMR	07-09-1041P
Los Angeles County	Levee within Tract 31198 from Antelope Valley Freeway to 1,500 feet downstream of Antelope Valley Road	12/22/1986	102	--
Los Angeles County	Las Virgenes Creek from Thousand Oaks Boulevard to County Boundary	7/30/1987	LOMR	--
Los Angeles County	Oakdale Canyon	8/9/1988	102	--
Los Angeles County	Tributary to Santa Clara River – Acton Area	1/23/1992	102A	92-09-018P
Los Angeles County	Dry Canyon Creek 5,900 feet upstream of Francisquito Road	3/2/1992	LOMR	92-09-007P
Los Angeles County	Channel Improvements along Oakdale Canyon and along Unnamed Wash north of Placerita Creek	10/05/1993	102A	93-09-501P
Los Angeles County	Santa Clarita Family Recreation Center	5/23/1994	LOMR	94-09-049P
Los Angeles County City of Los Angeles City of West Hollywood	Pan Pacific Flood Control System Area	6/3/1994	102A	94-09-540P
Los Angeles County	Violin Canyon Creek from confluence with Castaic Creek to 2,600 feet Upstream of Lake Hughes Road	9/12/1994	102	94-09-680P
Los Angeles County	Medea Creek (above Mulholland Highway)	11/18/1994	102	94-09-552P

Table 5: Letters of Map Change (continued)

Communities Affected	Flooding Source(s)	Date Issued	Type	Case Number
Los Angeles County	Castaic Creek from Interstate 5 to 2,700 feet downstream of Interstate 5	3/1/1995	102	94-09-716P
Los Angeles County	Harbor Area	9/13/1995	LOMR	95-09-405P
Los Angeles County	Santa Clara River 500 feet downstream of McBean Parkway to 1,800 feet upstream of confluence with South Fork Santa Clara River and along the South Fork Santa Clara River from confluence with Santa Clara River to 1,200 upstream of confluence	10/25/1995	102	95-09-398P
Los Angeles County	Basin at Villa Canyon Road and Route 5	1/3/1997	102	97-09-070P
Los Angeles County	Bouquet Canyon Creek, Dry Canyon And Santa Clara River	8/18/1997	102	97-09-783P
Los Angeles County	San Francisquito Canyon Creek	2/19/1998	LOMR	98-09-285P
Los Angeles County	Hasley Canyon Creek	9/18/1998	LOMR	98-09-1022P
Los Angeles County City of Compton	Los Angeles County Drainage Area Project (LACDA) along Compton Creek and Los Angeles River from Ocean Blvd to Long Beach Blvd. – Los Angeles River Left Overbank Path 1	2/25/2000	LOMR	00-09-1 77P
Los Angeles County	Hacienda Heights; Private Drain Nos. 746, 1446, & 1560 & Road Dept. Drain No. 024	3/9/2001	102	00-09-294P
Los Angeles County	Hillcrest Park, Private Drains 2157, 2279, 2316, & 2467	5/1/2001	102	01-09-190P
Los Angeles County	Private Drain No. 2275, Tract No. 48150	5/23/2001	102	01-09-127P
Los Angeles County	San Francisquito Canyon Creek	6/7/2001	102	01-09-49 1P

Table 5: Letters of Map Change (continued)

Communities Affected	Flooding Source(s)	Date Issued	Type	Case Number
Los Angeles County	Haskel Canyon, Tract 47657, P.D. No. 2469	8/22/2001	102	01-09-459P
Los Angeles County City of Bellflower City of Carson City of Compton City of Downey City of Lakewood City of Long Beach City of Lynwood City of Montebello City of Paramount City of Pico Rivera City of South Gate	Los Angeles County Drainage Area Project (LACDA) along Compton Creek and Los Angeles River from Ocean Blvd to Long Beach Blvd	1/11/2002	LOMR	02-09-034P
Los Angeles County	Santa Clara River at confluences with San Martinez Chiquito Canyon and San Martinez Grande	10/24/2002	102	County01-09-559P
Los Angeles County	Pico Canyon Creek at confluence with Dewitt Canyon Creek	1/15/2003	102	03-09-0065P
Los Angeles County	Santa Clara River - Tract 45023 upstream of Antelope Valley Freeway	4/21/2003	LOMR	02-09-404P
Los Angeles County City of Santa Clarita	San Francisquito Canyon Creek from 500 feet downstream of Decoro Drive to 1,800 feet upstream of Copper Hill Drive, Tract 44831-A	4/30/2003	102	03-09-0041P
Los Angeles County City of Santa Clarita	Soilcement Bank Protection At East Creek	4/30/2003	LOMR	03-09-0694X
Los Angeles County	Hasley Canyon Creek	9/26/2003	102	03-09-031 1P
Los Angeles County City of Palmdale	Amargosa Dam	3/10/2005	LOMR	04-09-1388P
Los Angeles County	Oak Creek Mixed Use Development Tentative Tract 53752, Medea Creek From Canwood Street up 1,700 feet upstream	6/30/2005	LOMR	04-09-1 686P

Table 5: Letters of Map Change (continued)

Communities Affected	Flooding Source(s)	Date Issued	Type	Case Number
Los Angeles County	San Francisquito Canyon Creek – Tract No. 51644	10/31/2005	LOMR	05-09-A120P
Los Angeles County	Triunfo Creek – upstream of Hidden Park Bridge	11/14/2005	LOMR	05-09-0892P
Los Angeles County	Pico Canyon Creek upstream of Stevenson Ranch Parkway	11/14/2005	LOMR	05-09-1 072P
Los Angeles County	Plum Canyon Creek – 3,000’ upstream to 6,780’ upstream of Bouquet Creek	02/28/2006	LOMR	06-09-B003P
Los Angeles County	San Francisquito Canyon Creek	10/16/2006	LOMR	06-09-BE 13P
Los Angeles County	River Ranch	12/18/2006	LOMR	06-09-B867P
Los Angeles County	Valencia Commerce Center	12/22/2006	LOMR	06-09-B837P
Los Angeles County City of Palmdale	Amargosa Creek Soils Cement Improvements and Arch Culverts @ 10 th Street West	02/09/2007	LOMR	07-09-0322P
Los Angeles County	Plum Creek Canyon	10/31/2007	LOMR	07-09-1877P

--Data Unknown

2.2 Community Description

Los Angeles County is located in southwestern California and is bounded on the east by San Bernardino County, on the south by Orange County and the Pacific Ocean, on the west by the Pacific Ocean and Ventura County, and on the north by Kern County.

The communities comprising the incorporated portions of Los Angeles County encompass the vast majority of developable land within the County. The total land area of the County is approximately 4,061 square miles. The total unincorporated area of the County is approximately 3,000 square miles.

The primary areas where significant development has occurred and is continuing are the canyon floors of the Antelope Valley, the Santa Clarita Valley, and the Malibu area. In addition, there are many relatively small “islands” in the Los Angeles basin area which are partially or completely surrounded by incorporated cities. Many of these islands are fully developed or undergoing rapid development. The balance of the county area is located within the rugged mountains of the Angeles National Forest or undeveloped agricultural lands. The population of the County has risen from approximately 1,005,900 in 1977, when many original FIS studies were prepared, to approximately 9,818,610 by 2010 (U.S. Census data, 2010), an increase of over 1,000 percent. Along with this

phenomenal boom in population has been an accompanying in-filling of much of the remaining developable land in the County.

Land use in Los Angeles County is highly diversified. Development ranges from densely populated areas in the Los Angeles basin, to lower density semi-rural development in the Santa Clarita Valley, Antelope Valley, and Malibu area, to some almost uninhabited mountainous areas of the Angeles National Forest. The terrain within the County can be classified in broad terms as being 30 percent alluvial plain and 70 percent rugged mountains and hills. Elevations range from sea level to nearly 10,000 feet at some locations in the San Gabriel Mountains.

The incorporated areas of Los Angeles County drain to the ocean largely through a system of human-modified channels and storm drains. Much of the incorporated area is protected by a vast network of flood control channels, debris basins, and flood control reservoirs. In the unincorporated areas of the County, with the exception of a few improved channels, the Malibu area is drained by natural watercourses which discharge directly to the Pacific Ocean. The Santa Clarita Valley is drained by the largely-natural channel of the Santa Clara River and its tributaries, which discharges into Ventura County and thence, to the ocean. Some improved channels have been constructed in the Santa Clarita Valley. Flows in the Antelope Valley are northerly from the mountains across the broad alluvial plain, through a network of largely unimproved channels. During minor storms, much of the flow percolates into the ground. In major storms, flows reach the lake at the northern county limits, where flood flows pond until evaporated. With the exception of a small portion of Amargosa Creek, there are no flood control improvements in the Antelope Valley.

Throughout most of the County, nearly all precipitation occurs during December through March. Precipitation during the summer is infrequent, except in the desert areas, where intense, short-duration thunderstorms can occur. Major storms consist of one or more frontal systems, and occasionally last four days or longer. Average annual rainfall ranges from 13.8 inches at the ocean, to 28.2 inches in the San Gabriel Mountains, to 7.9 inches in the Antelope Valley. In highly developed areas, runoff volumes have increased as the soil surface has become covered by impervious materials, natural ponding areas have been eliminated, and flood control facilities have been constructed.

City of Agoura Hills

The City of Agoura Hills is located in southwest Los Angeles County, in southwestern California, in a relatively flat basin between the Santa Monica Mountains and cluster of hills separating it from Simi Valley. The City of Los Angeles is located approximately 6 miles to the east.

The City of Agoura Hills is bordered by unincorporated areas of Los Angeles County to the east, south, and west, and unincorporated areas of Ventura County to the north.

According to the U.S. Bureau of the Census, the population of the City of Agoura Hills in 2010 was 20,330.

The Agoura Hills area is bisected by a number of drainage courses including Las Virgenes Canyon, Liberty Canyon, Lindero Canyon, and Triunfo Canyon. The most prominent physical feature in the city is Ladyface Mountain, which at an elevation of 2,036 feet is visible from nearly all points in the Agoura Hills area. A prominent ridge line runs along Ladyface Mountain for approximately 2 miles. Much of the terrain in the Santa Monica Mountains is rugged and steep. Elevations in the study area range from 600 feet to approximately 2,000 feet. The canyon bottoms are generally flat, with relatively abrupt transitions to canyon sides sloping at 25 percent to 35 percent from the bottom.

The soils in the Malibu/Santa Monica Mountains Plan area are highly susceptible to erosion. Slope stability hazards not only cause erosion, but erosion leads to problems of run-off and siltation. The top soils are termed expansive in nature.

Land development within the city ranges from low-density rural in Old Agoura to a higher density and urban development in the newer sections of the city.

There are several types of vegetation within the Agoura Hills area consisting of chaparral, coastal sage scrub, bigleaf maple, western sycamore, and coast live oak. Grassland, characterized by herbs and native grasses, is also found in the area.

Most precipitation occurs during December through March. Precipitation during the summer is infrequent. The average rainfall is 17 inches a year.

City of Alhambra

Results of the mapping study were not previously summarized in an effective FIS report for the City of Alhambra; therefore, no community description is provided.

City of Arcadia

Results of the mapping study were not previously summarized in an effective FIS report for the City of Arcadia; therefore, no community description is provided.

City of Artesia

Results of the mapping study were not previously summarized in an effective FIS report for the City of Artesia; therefore, no community description is provided.

City of Avalon

The City of Avalon is located on Santa Catalina Island, approximately 26 miles south of Los Angeles Harbor. The City is approximately 1.2 square miles in size. It is situated on the coast, and is surrounded by steep headwaters that are primarily unincorporated areas of Los Angeles County. Development is primarily residential, with scattered hotels and commercial areas.

The population of Avalon was 2,022 in 1980, and approximately 3,000 in 2004. This represents an approximate 200 percent increase from the 1970 population of 1,520.

The terrain in Avalon can be classified in broad terms as being 15 percent alluvial plain, 5 percent moderately sloping canyons, and 80 percent mountains. Relief of the terrain ranges from sea level to an elevation of approximately 900 feet.

Nearly all precipitation occurs during December through March. Precipitation during the summer is infrequent, and rainless periods of several months are common. Precipitation in the area occurs primarily as winter orographic rainfall associated with extra-tropical cyclones of North Pacific origin. Major storms consist of one or more frontal systems and occasionally last four days or longer.

In mountain areas, the steep canyon slopes and stream channel gradients are conducive to rapid concentration of storm runoff quantities. The watersheds tributary to the City are composed of rough, broken, and stony land not suitable for agricultural production. The soils are classified as having moderately low infiltration rates and, therefore, moderately high runoff rates.

The principal vegetative cover of the upper mountain areas consists of various species of brush and shrubs known as chaparral. Grasses are the principal natural vegetation on the undeveloped portions of the alluvial plains.

A large portion of the developed area of the City of Avalon is situated on a broad alluvial plain at the mouth of Avalon Canyon. The tributary watershed is approximately 3 square miles in size. A small drainage ditch, which originates high up in Avalon Canyon, meanders down to the developed area of the city.

City of Azusa

Results of the mapping study were not previously summarized in an effective FIS report for the City of Azusa; therefore, no community description is provided.

City of Baldwin Park

Results of the mapping study were not previously summarized in an effective FIS report for the City of Baldwin Park; therefore, no community description is provided.

City of Bell Gardens

Results of the mapping study were not previously summarized in an effective FIS report for the City of Bell Gardens; therefore, no community description is provided.

City of Bell

Results of the mapping study were not previously summarized in an effective FIS report for the City of Bell; therefore, no community description is provided.

City of Bellflower

The City of Bellflower is located in southeastern Los Angeles County approximately 10 miles from downtown Los Angeles. Bellflower is bordered by the Cities of Downey on

the north, Paramount and Long Beach on the west, Lakewood on the south, and Cerritos and Norwalk on the east.

The population of Bellflower was 53,441 in 1980, and approximately 72,878 in 2000, an increase of 36 percent. Bellflower covers an area of 6.1 square miles and is served by State Highway 91 (Artesia Freeway) and State Highway 19. The San Gabriel River flows north to south along the eastern corporate limits of the City.

The Los Angeles River, which is the primary flood threat to the City of Bellflower, originates at the west end of the San Fernando Valley in the northwestern-most corner of the County. The river channel extends through the heart of Los Angeles County by flowing east to Glendale where it turns and flows south to the Pacific Ocean. The Los Angeles River is part of a network of dams, reservoirs, debris collection basins, and spreading grounds built by the LACFCD and USACE to minimize flooding in the County. The portion of the river that affects the City of Bellflower begins at the Arroyo Seco and ends at the mouth of the river at the Pacific Ocean. The floodplain starts in the northeast part of the City of Los Angeles at the Arroyo Seco confluence, passes through the Cities of Los Angeles, Bell, Bell Gardens, South Gate, Lynwood, Lakewood, Paramount, Compton, Bellflower, Carson, Gardena and Long Beach, to its terminus at the Pacific Ocean.

The Rio Hondo originates from the eastern part of Los Angeles County at Whittier Narrows Dam east of the Montebello Hills. The River flows southwest through the Cities of Montebello, Pico Rivera, Bell Gardens, Downey and South Gate to its confluence with the Los Angeles River just north of the Imperial Highway.

The metropolitan areas adjacent to the Los Angeles River and the Rio Hondo are densely populated with residential, commercial, and industrial development. Surface runoff has increased as a consequence of impervious development.

The topography of the coastal plain on which the City of Bellflower resides is gradually sloped from the foothills of the San Gabriel Mountains upstream of the City, to the Pacific Ocean with a few exceptions of rising hills and depressed areas. Ground elevations range from 10,000 feet in the San Gabriel Mountains, to 330 feet near the Arroyo Seco confluence, to mean sea level at the mouth of the Los Angeles River.

Underlying soils are considered alluvial, and vary from coarse sand and gravel, to silty clay and gravel or clay. The land is generally well drained, with relatively few perched water or artesian areas. Large deposits of petroleum are present along the coast. Extensive pumping for oil has caused subsidence in the lower reach.

The climate is considered subtropical. The precipitation regime contributing to the Bellflower area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extra-tropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may influence flood events through the occurrence of rapid melting associated with warm weather following a major storm. Major storms consist of one or more frontal systems which may last up to four or more days each. The fall of precipitation is greatly

intensified due to the San Gabriel Mountains which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet), the average daily minimum in January is 34.3°F with an average daily maximum of 80.2°F in July.

City of Beverly Hills

Results of the mapping study were not previously summarized in an effective FIS report for the City of Beverly Hills; therefore, no community description is provided.

City of Bradbury

Results of the mapping study were not previously summarized in an effective FIS report for the City of Bradbury; therefore, no community description is provided.

City of Burbank

The City of Burbank is an urbanized community situated at the southerly foothills of the Verdugo Mountains at the east end of the San Fernando Valley and the central portion of the Los Angeles County basin. It is located approximately 11 miles northeast of the downtown area of the City of Los Angeles. Burbank is bordered on the east by the City of Glendale, on the north by the Verdugo Mountains, and on the west and south by the City of Los Angeles.

The City is approximately 17.1 square miles in size. The population of the City was approximately 83,300 in 1977, and approximately 100,316 in 2000, an increase of 20 percent.

The majority of development in the floodplain is residential, while small portions are either commercial or undergoing re-development.

The topography of the coastal plain on which the City of Burbank resides is gradually sloped from the foothills of the San Gabriel Mountains upstream of the City, to the Pacific Ocean, with a few exceptions of rising hills and depressed areas. Ground elevations range from 10,000 feet in the San Gabriel Mountains, to 330 feet near the Arroyo Seco confluence, to mean sea level at the mouth of the Los Angeles River.

The terrain within the corporate limits of the City of Burbank can be classified in broad terms as being 80 percent alluvial plain and 20 percent moderately sloping canyons and mountains. Elevation ranges from 500 feet at the southern portion of the city to approximately 2,600 feet at the Verdugo Mountains to the northeast. The mountain area is characterized by very steep and rugged terrain with very little residential development. The foothill area is characterized by steep (greater than 10 percent slope) ground surface and street gradients. Residential development in the lower foothills has occurred on sites created by varying degrees of cut and fill that have produced a terraced effect. The

alluvial fan area, lying between the foothill and valley floor areas, is characterized by moderate (3 to 10 percent slope) ground surface and street gradients, whereas, the valley floor area consists of flatter slopes (less than 3 percent). The majority of development in these two areas is residential, while a significant portion is commercial.

The Los Angeles River, which is the primary flood threat to the City of Burbank, originates at the west end of the San Fernando Valley in the northwestern-most corner of the County. The river channel extends through the heart of Los Angeles County by flowing east to Glendale where it turns and flows south to the Pacific Ocean. The Los Angeles River is part of a network of dams, reservoirs, debris collection basins, and spreading grounds built by the LACFCD and USACE to minimize flooding in the County.

The climate is considered subtropical. The precipitation regime contributing to the Burbank area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extratropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may influence flood events through the occurrence of rapid melting associated with warm weather following a major storm. Major storms consist of one or more frontal systems which may last up to four or more days each. The fall of precipitation is greatly intensified due to the San Gabriel Mountains, which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San

Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F with an average daily maximum of 80.2°F in July.

Soils within the city are generally of the clay type. Vegetation consists primarily of private gardens and urban landscape. The less developed portions of the city, especially the upper foothills and mountain slopes, are characterized by vegetation of the chaparral type, an ecological community occurring widely in southern California and comprised of shrubby plants especially adapted to dry summers and moist winters.

In highly developed areas of the city, local runoff volumes have increased as the soil surface has become covered by impervious materials. Peak runoff rates for valley areas have also increased due to elimination of natural ponding areas and improved hydraulic efficiency of water conveyance systems, such as streets and storm drain systems. Surface runoff traverses the city in a southeasterly direction, draining into the Los Angeles River, located to the south of the community.

City of Calabasas

The City of Calabasas is located in northwestern Los Angeles County and is located in the northwest Santa Monica Mountains between Woodland Hills, Agoura Hills, West Hills, Hidden Hills and Malibu, California. The population of Calabasas was 20,033 in

2000, and 23,058 in 2010, and increase of 15 percent. Calabasas has an area of approximately 13 square miles. Primary land uses include residential, commercial, and open/green space.

City of Carson

The City of Carson is located in southern Los Angeles County. It is bordered by the City of Los Angeles to the east, south, and west. It is bordered by the City of Compton to the north and the City of Long Beach to the east. The population of the City of Carson was approximately 81,221 in 1980, and approximately 89,730 in 2000, an increase of 10 percent.

Carson has an area of approximately 19.8 square miles. Primary land uses include residential, commercial, and light industrial.

The highest point in Carson is 195 feet above sea level located between Victoria and 190th Street on Wilmington Avenue. The lowest point on land has an elevation of 5 feet below sea level and is located in Del Amo Park. The lowest point is in the center of the Dominguez Channel located at the southeastern corner of the city with an elevation of 14.71 feet below sea level.

The Los Angeles River, which is the primary flood threat to the City of Carson, originates at the west end of the San Fernando Valley in the northwestern-most corner of the county. The river channel extends through the heart of Los Angeles County by flowing east to Glendale where it turns and flows south to the Pacific Ocean. The Los Angeles River is part of a network of dams, reservoirs, debris collection basins, and spreading grounds built by the LACFCD and USACE to minimize flooding in the county. The portion of the river that affects the City of Carson begins at the Arroyo Seco and ends at the mouth of the river at the Pacific Ocean. The floodplain starts in the northeast part of the City of Los Angeles at the Arroyo Seco confluence, passes through the Cities of Los Angeles, Bell, Bell Gardens, South Gate, Lynwood, Lakewood, Paramount, Compton, Bellflower, Carson, Gardena and Long Beach, to its terminus at the Pacific Ocean.

The topography of the coastal plain on which the City of Carson resides is gradually sloped from the foothills of the San Gabriel Mountains upstream of the City, to the Pacific Ocean with a few exceptions of rising hills and depressed areas. Ground elevations range from 10,000 feet in the San Gabriel Mountains, to 330 feet near the Arroyo Seco confluence, to mean sea level at the mouth of the Los Angeles River.

Underlying soils are considered alluvial, and vary from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the Carson area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extra-tropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may

influence flood events through the occurrence of rapid melting associated with warm weather following a major storm. Major storms consist of one or more frontal systems which may last up to four or more days each. The fall of precipitation is greatly intensified due to the San Gabriel Mountains, which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F with an average daily maximum of 80.2°F in July.

City of Cerritos

Results of the mapping study were not previously summarized in an effective FIS report for the City of Cerritos; therefore, no community description is provided.

City of Claremont

Results of the mapping study were not previously summarized in an effective FIS report for the City of Claremont; therefore, no community description is provided.

City of Commerce

Results of the mapping study were not previously summarized in an effective FIS report for the City of Commerce; therefore, no community description is provided.

City of Compton

The City of Compton is located in southern Los Angeles County approximately 10 miles south of downtown Los Angeles City. The population of Compton was approximately 78,547 in 1970 and 93,393 in 2000, an increase of approximately 19 percent.

The Los Angeles River, which is the primary flood threat to the City of Compton, originates at the west end of the San Fernando Valley in the northwestern-most corner of the county. The river channel extends through the heart of Los Angeles County by flowing east to Glendale where it turns and flows south to the Pacific Ocean. The Los Angeles River is part of a network of dams, reservoirs, debris collection basins, and spreading grounds built by the LACFCD and USACE to minimize flooding in the county. The portion of the river that affects the City of Compton begins at the Arroyo Seco and ends at the mouth of the river at the Pacific Ocean. The floodplain starts in the northeast part of the City of Los Angeles at the Arroyo Seco confluence, passes through the Cities of Los Angeles, Bell, Bell Gardens, South Gate, Lynwood, Lakewood, Paramount, Compton, Bellflower, Carson, Gardena and Long Beach, to its terminus at the Pacific Ocean.

The metropolitan areas adjacent to the Los Angeles River containing the City of Compton are densely populated with residential, commercial, and industrial development. Surface runoff has increased as a consequence of impervious development.

The topography of the coastal plain on which the City of Compton resides is gradually sloped from the foothills of the San Gabriel Mountains upstream of the city, to the Pacific Ocean with a few exceptions of rising hills and depressed areas. Ground elevations range from 10,000 feet in the San Gabriel Mountains, to 330 feet near the Arroyo Seco confluence, to mean sea level at the mouth of the Los Angeles River.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the Compton area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extra-tropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may influence flood events through the occurrence of rapid melting associated with warm weather following a major storm. Major storms consist of one or more frontal systems, which may last up to four or more days each. The fall of precipitation is greatly intensified due to the San Gabriel Mountains which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F above zero with an average daily maximum of 80.2°F in July.

City of Covina

Results of the mapping study were not previously summarized in an effective FIS report for the City of Covina; therefore, no community description is provided.

City of Cudahy

Results of the mapping study were not previously summarized in an effective FIS report for the City of Cudahy; therefore, no community description is provided.

City of Culver City

Culver City is an urbanized community situated at the westerly base of the Baldwin Hills, in the western portion of the Los Angeles County basin. The City is approximately 4.9 square miles in size. The city had a population in 1977 of approximately 38,600, and approximately 38,816 in 2000, almost no increase in 30 years. It is located approximately 11 miles west of the downtown area of the City of Los Angeles and is bordered by the City of Los Angeles and unincorporated County territory.

The terrain within Culver City's corporate limits can be classified, in broad terms, as being 90 percent alluvial plain and 10 percent moderately sloping canyons and hills. Elevations range from 20 feet at the western portion of the city to approximately 400 feet at the Baldwin Hills to the east.

Nearly all precipitation occurs during the months of December through March. Precipitation during the summer months is infrequent, and rainless periods of several months are common. Precipitation in the area occurs primarily in the form of winter orographic rainfall associated with extratropical cyclones of North Pacific origin. Major storms consist of one or more frontal systems and occasionally last 4 days or longer.

In the highly developed areas, local runoff volumes have increased as the soil surface has become covered by impervious materials.

Peak runoff rates for valley areas have also increased due to elimination of natural ponding areas and improved hydraulic efficiency of water carriers, such as streets and storm drain systems.

City of Diamond Bar

Results of the mapping study were not previously summarized in an effective FIS report for the City of Diamond Bar; therefore, no community description is provided.

City of Downey

The City of Downey, incorporated December 17, 1956, is located 12 miles southeast of Los Angeles in Los Angeles County. The population of Downey was approximately 88,573 in 1970, and approximately 107,323 in 2000, an increase of 21 percent.

Downey is serviced by the Santa Ana Freeway (Interstate 5), Long Beach Freeway (Interstate 710), and the San Gabriel Freeway (Interstate 605). Downey is approximately 8 miles from Long Beach Airport, and 17 miles from Los Angeles International Airport.

The Rio Hondo, which is the primary flood threat to the City of Downey, originates at Whittier Narrows Dam, a flood control facility that controls runoff originating in the northeastern portion of the County. The Rio Hondo channel joins the Los Angeles River downstream of the City of Downey. Rio Hondo flows southwest through the Cities of Montebello, Pico Rivera, Bell Gardens, Downey and South Gate to its confluence with the Los Angeles River just north of the Imperial Highway. The Los Angeles River and Rio Hondo are part of a network of dams, reservoirs, debris collection basins, and spreading grounds built by the LACFCD and USACE to minimize flooding in the county.

The metropolitan areas adjacent to the Los Angeles River and the Rio Hondo are densely populated with residential, commercial, and industrial development. Surface runoff has increased as a consequence of impervious development.

The metropolitan areas adjacent to the Rio Hondo containing the City of Downey are densely populated with residential, commercial, and industrial development. Surface runoff has increased as a consequence of impervious development.

The topography of the coastal plain on which the City of Downey resides is gradually sloped from the foothills of the San Gabriel Mountains upstream of the City, to the

Pacific Ocean with a few exceptions of rising hills and depressed areas. Ground elevations range from 10,000 feet in the San Gabriel Mountains, to 330 feet near the Arroyo Seco confluence, to mean sea level at the mouth of the Los Angeles River.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the Downey area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extratropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may influence flood events through the occurrence of rapid melting associated with warm weather following a major storm. Major storms consist of one or more frontal systems, which may last up to four or more days each. The fall of precipitation is greatly intensified due to the San Gabriel Mountains, which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F with an average daily maximum of 80.2°F in July.

City of Duarte

Results of the mapping study were not previously summarized in an effective FIS report for the City of Duarte; therefore, no community description is provided.

City of El Monte

Results of the mapping study were not previously summarized in an effective FIS report for the City of El Monte; therefore, no community description is provided.

City of El Segundo

Results of the mapping study were not previously summarized in an effective FIS report for the City of El Segundo; therefore, no community description is provided.

City of Gardena

The City of Gardena is located in southwestern Los Angeles County, 12 miles south of the City of Los Angeles. It is bordered by the City of Hawthorne to the west and north, the City of Torrance to the west and south, and the City of Los Angeles to the east and south.

Gardena was incorporated in 1930, and was once known as the world's strawberry capital. The population of Gardena was approximately 45,165 in 1980, and

approximately 57,746 in 2000, an increase of 28 percent. The primary employment markets for Gardena are manufacturing, professional and retail sales.

Gardena covers an area of 5.7 square miles and is serviced by the San Diego Freeway (Interstate 405), the Harbor Freeway (Interstate 110) and the Artesia Freeway (State Highway 91).

The Los Angeles River, which is the primary flood threat to the City of Gardena, originates at the west end of the San Fernando Valley in the northwestern-most corner of the county. The river channel extends through the heart of Los Angeles County by flowing east to Glendale where it turns and flows south to the Pacific Ocean. The Los Angeles River is part of a network of dams, reservoirs, debris collection basins, and spreading grounds built by the LACFCD and USACE to minimize flooding in the county. The portion of the river that affects the City of Gardena begins at the Arroyo Seco and ends at the mouth of the river at the Pacific Ocean. The floodplain starts in the northeast part of the City of Los Angeles at the Arroyo Seco confluence, passes through the Cities of Los Angeles, Bell, Bell Gardens, South Gate, Lynwood, Lakewood, Paramount, Compton, Bellflower, Carson, Gardena and Long Beach, to its terminus at the Pacific Ocean.

The metropolitan areas adjacent to the Los Angeles River containing the City of Gardena are densely populated with residential, commercial, and industrial development. Surface runoff has increased as a consequence of impervious development.

The topography of the coastal plain on which the City of Gardena resides is gradually sloped from the foothills of the San Gabriel Mountains upstream of the City, to the Pacific Ocean with a few exceptions of rising hills and depressed areas. Ground elevations range from 10,000 feet in the San Gabriel Mountains, to 330 feet near the Arroyo Seco confluence, to mean sea level at the mouth of the Los Angeles River.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the Gardena area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extratropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may influence flood events through the occurrence of rapid melting associated with warm weather following a major storm. Major storms consist of one or more frontal systems which may last up to four or more days each. The fall of precipitation is greatly intensified due to the San Gabriel Mountains which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580

feet) the average daily minimum in January is 34.3°F with an average daily maximum of 80.2°F in July.

City of Glendale

Results of the mapping study were not previously summarized in an effective FIS report for the City of Glendale; therefore, no community description is provided.

City of Glendora

Results of the mapping study were not previously summarized in an effective FIS report for the City of Glendora; therefore, no community description is provided.

City of Hawaiian Gardens

Results of the mapping study were not previously summarized in an effective FIS report for the City of Hawaiian Gardens; therefore, no community description is provided.

City of Hawthorne

Results of the mapping study were not previously summarized in an effective FIS report for the City of Hawthorne; therefore, no community description is provided.

City of Hermosa Beach

Results of the mapping study were not previously summarized in an effective FIS report for the City of Hermosa Beach; therefore, no community description is provided.

City of Hidden Hills

Results of the mapping study were not previously summarized in an effective FIS report for the City of Hidden Hills; therefore, no community description is provided.

City of Huntington Park

Results of the mapping study were not previously summarized in an effective FIS report for the City of Huntington Park; therefore, no community description is provided.

City of Industry

Results of the mapping study were not previously summarized in an effective FIS report for the City of Industry; therefore, no community description is provided.

City of Inglewood

Results of the mapping study were not previously summarized in an effective FIS report for the City of Inglewood; therefore, no community description is provided.

City of Irwindale

Results of the mapping study were not previously summarized in an effective FIS report for the City of Irwindale; therefore, no community description is provided.

City of La Canada Flintridge

Results of the mapping study were not previously summarized in an effective FIS report for the City of La Canada Flintridge; therefore, no community description is provided.

City of La Habra Heights

Results of the mapping study were not previously summarized in an effective FIS report for the City of La Habra Heights; therefore, no community description is provided.

City of La Mirada

The City of La Mirada is an urban community situated south of the Puente Hills, in the eastern portion of the Los Angeles County basin. The city is approximately 6 square miles in size. The city had a 1977 population of approximately 40,500, and approximately 46,783 in 2000, an increase of 16 percent. It is located approximately 20 miles southeast of downtown Los Angeles and is bordered by the Cities of Cerritos to the south and west, Santa Fe Springs to the west, La Habra to the north and east, Fullerton to the east, and Buena Park to the south. It is also bordered by unincorporated areas of Los Angeles County to the north and east and Orange County to the south and west.

The terrain within the La Mirada corporate limits can be classified in broad terms as 90 percent alluvial plain and 10 percent moderately sloping canyons and hills. Elevations range from approximately 200 feet in the northern portion of the city to 60 feet at the southern corporate limits.

Nearly all precipitation occurs during the months of December through March. Precipitation during the summer months is infrequent, with rainless periods of several months being common. Precipitation in the area occurs primarily in the form of winter orographic rainfall associated with extratropical cyclones of North Pacific origin. Major storms consist of one or more frontal systems and occasionally last four days or longer.

In the highly developed areas, local runoff volumes have increased because the soil surface has become covered by impervious materials, such as pavement areas and rooftops. Peak runoff rates for coastal plain areas have also increased due to the elimination of natural ponding areas and improved hydraulic efficiency of water carriers, such as streets and storm drain systems.

City of La Puente

Results of the mapping study were not previously summarized in an effective FIS report for the City of La Puente; therefore, no community description is provided.

City of La Verne

Results of the mapping study were not previously summarized in an effective FIS report for the City of La Verne; therefore, no community description is provided.

City of Lakewood

The City of Lakewood, incorporated April 16, 1954, is located 20 miles southeast of the City of Los Angeles in Los Angeles County. Lakewood is bordered by the Cities of Bellflower on the north, Long Beach to the west and south, Cerritos on the east and Bellflower on the north. The San Gabriel River flows north to south along the eastern corporate limits.

The population of Lakewood was approximately 82,973 in 1970, and 79,345 in 2000, a decrease of 4 percent. Lakewood is serviced by Interstate Highways 5, 405, 605, and 710 and State Highways 19 and 91. Long Beach Airport is approximately 2 miles and Los Angeles International Airport is approximately 20 miles from Lakewood.

The Los Angeles River, which is the primary flood threat to the City of Lakewood, originates at the west end of the San Fernando Valley in the northwestern-most corner of the county. The river channel extends through the heart of Los Angeles County by flowing east to Glendale where it turns and flows south to the Pacific Ocean. The Los Angeles River is part of a network of dams, reservoirs, debris collection basins, and spreading grounds built by the LACFCD and USACE to minimize flooding in the county. The portion of the river that affects the City of Lakewood begins at the Arroyo Seco and ends at the mouth of the river at the Pacific Ocean. The floodplain starts in the northeast part of the City of Los Angeles at the Arroyo Seco confluence, passes through the Cities of Los Angeles, Bell, Bell Gardens, South Gate, Lynwood, Lakewood, Paramount, Compton, Bellflower, Carson, Gardena and Long Beach, to its terminus at the Pacific Ocean.

The metropolitan areas adjacent to the Los Angeles River containing the City of Lakewood are densely populated with residential, commercial, and industrial development. Surface runoff has increased as a consequence of impervious development.

The topography of the coastal plain on which the City of Lakewood resides is gradually sloped from the foothills of the San Gabriel Mountains upstream of the City, to the Pacific Ocean with a few exceptions of rising hills and depressed areas. Ground elevations range from 10,000 feet in the San Gabriel Mountains, to 330 feet near the Arroyo Seco confluence, to mean sea level at the mouth of the Los Angeles River.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the Lakewood area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extratropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may influence flood events through the occurrence of rapid melting associated with warm

weather following a major storm. Major storms consist of one or more frontal systems which may last up to four or more days each. The fall of precipitation is greatly intensified due to the San Gabriel Mountains which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F with an average daily maximum of 80.2°F in July.

City of Lancaster

Lancaster is an urbanized community situated in the Antelope Valley of northeastern Los Angeles County, in southern California. The city had a population of approximately 44,600 in 1977, and 118,718 in 2000, an increase of 266 percent. It is located approximately 56 miles north of the downtown area of the City of Los Angeles, and it is bordered by the City of Palmdale to the south and unincorporated county land to the west, north, and east.

The terrain within Lancaster's corporate limits can be classified, in broad terms, as being 100 percent alluvial plain.

The Antelope Valley is located on the leeward side of the San Gabriel Mountains, so orographic rainfall is generally sparse and occurs only during the winter months. Some snow falls at the higher elevations. Intense, short-duration summer thunderstorms are not uncommon and have created flooding in downstream areas.

The primary flood threat to the City of Lancaster is created by runoff originating in the Amargosa Creek and Portal Ridge Wash watersheds.

The average annual rainfall in Lancaster is approximately 6 inches. In the mountain watersheds to the south, the annual rainfall averages over 19 inches. On occasion, rainfall is of such intensity or duration that flows continue down major stream courses to the dry lakes north of the city where it ponds and eventually evaporates.

City of Lawndale

Results of the mapping study were not previously summarized in an effective FIS report for the City of Lawndale; therefore, no community description is provided.

City of Lomita

Results of the mapping study were not previously summarized in an effective FIS report for the City of Lomita; therefore, no community description is provided.

City of Long Beach

The City of Long Beach is located on the coast, in the southern region of the Los Angeles County basin. The City is approximately 50 square miles in size. The City had a population in 1980 of approximately 361,334, and approximately 461,522 in 2000, an increase of 28 percent.

Long Beach is located approximately 24 miles south of the downtown area of the City of Los Angeles. The city is bordered by the Cities of Paramount, Bellflower, Lakewood, Seal Beach, Signal Hill, Los Angeles, and Carson; unincorporated areas of Los Angeles County; and the Pacific Ocean.

The development in the flood-prone areas of Long Beach is commercial, industrial, and residential.

The terrain within the Long Beach corporate limits can be classified in broad terms as being 100 percent coastal plain. Elevation ranges from 60 feet in the northern portion of the city to sea level along the coast.

In the highly developed areas, local runoff volumes have increased as the soil surface has become covered by impervious materials. Peak runoff rates for coastal plain areas have also increased due to elimination of natural ponding areas and improved hydraulic efficiency of water carriers, such as streets and storm drain systems.

The Los Angeles River, which is the primary flood threat to the City of Long Beach, originates at the west end of the San Fernando Valley in the northwestern-most corner of the county. The river channel extends through the heart of Los Angeles County by flowing east to Glendale where it turns and flows south to the Pacific Ocean. The Los Angeles River is part of a network of dams, reservoirs, debris collection basins, and spreading grounds built by the LACFCD and USACE to minimize flooding in the county. The portion of the river that affects the City of Long Beach begins at the Arroyo Seco and ends at the mouth of the river at the Pacific Ocean. The floodplain starts in the northeast part of the City of Los Angeles at the Arroyo Seco confluence, passes through the Cities of Los Angeles, Bell, Bell Gardens, South Gate, Lynwood, Lakewood, Paramount, Compton, Bellflower, Carson, Gardena and Long Beach, to its terminus at the Pacific Ocean.

The metropolitan areas adjacent to the Los Angeles River containing the City of Long Beach are densely populated with residential, commercial, and industrial development. Surface runoff has increased as a consequence of impervious development.

The topography of the coastal plain on which the City of Long Beach resides is gradually sloped from the foothills of the San Gabriel Mountains upstream of the city, to the Pacific Ocean with a few exceptions of rising hills and depressed areas. Ground elevations range from 10,000 feet in the San Gabriel Mountains, to 330 feet near the Arroyo Seco confluence, to mean sea level at the mouth of the Los Angeles River. Two prominent hill formations are located in the lower reach of the floodplain. They include the Dominguez Hills on the west side of the Los Angeles River approximately 4 miles north of the coast and Signal Hill in the City of Long Beach. The Dominguez Hills reach an elevation of

200 feet and Signal Hill reaches 110 feet. Industrial areas just north of the Long Beach Harbor experience depressed elevations of -8.0 feet below sea level.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas. Deposits of petroleum are present along the coast. Extensive pumping for oil has caused subsidence in the lower reach. ERM's along the coast and in the City of Long Beach are updated on a regular basis.

The climate is considered subtropical. The precipitation regime contributing to the Long Beach area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extra-tropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may influence flood events through the occurrence of rapid melting associated with warm weather following a major storm. Major storms consist of one or more frontal systems which may last up to four or more days each. The fall of precipitation is greatly intensified due to the San Gabriel Mountains, which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F with an average daily maximum of 80.2°F in July.

City of Los Angeles

The City of Los Angeles is the largest city in Los Angeles County. It is located in the southwestern portion of Los Angeles County. The City of Los Angeles occupies the central portion of the Los Angeles basin, surrounded by the San Gabriel, Santa Susana, and Verdugo Mountains on the north; incorporated cities within the coastal plain on the east; the Pacific Ocean on the south and southwest; and unincorporated areas of Los Angeles County and Malibu on the west. The Malibu area is within the western portion of the Santa Monica Mountains, which also extends to the east within the downtown area of the city.

The city encompasses an area of approximately 464 square miles. The city had a population in 1977 of approximately 2,762,000, and 3,694,820 in 2000, an increase of 34 percent. The City of Los Angeles is bordered by the Cities of Burbank, Glendale, Pasadena, South Pasadena, Alhambra, Monterey Park, Commerce, Vernon, Huntington Park, Carson, Long Beach, Rancho Palos Verdes, Lomita, Torrance, Gardena, Inglewood, Culver City, and Santa Monica, and by unincorporated areas of Los Angeles County.

Land use in the City of Los Angeles is diverse, with large areas of residential, commercial, and industrial development. Development varies from the densely populated central city to the quiet, secluded areas of the Santa Monica Mountains. The full development of the flat lands of the Los Angeles basin, the great demand for new residential units, and the tremendous increase in real estate values in the past years have

resulted in extensive hillside development in the San Gabriel, Verdugo, and Santa Monica Mountains.

The terrain within the Los Angeles corporate limits can be classified in broad terms as being 75 percent alluvial plain and 25 percent rugged canyons and hills. Elevations range from 5,074 feet at Sister Elsie Peak in the San Gabriel Mountains to nearly mean sea level in the southwestern part of the city.

The Los Angeles River, which is the primary flood threat to the City of Los Angeles, originates at the west end of the San Fernando Valley in the northwestern-most corner of the County. The river channel extends through the heart of Los Angeles County by flowing east to Glendale where it turns and flows south to the Pacific Ocean. The Los Angeles River is part of a network of dams, reservoirs, debris collection basins, and spreading grounds built by the LACFCD and USACE to minimize flooding in the county. The portion of the river that affects the City of Los Angeles begins at the Arroyo Seco and ends at the mouth of the river at the Pacific Ocean. The floodplain starts in the northeast part of the City of Los Angeles at the Arroyo Seco confluence, passes through the Cities of Los Angeles, Bell, Bell Gardens, South Gate, Lynwood, Lakewood, Paramount, Compton, Bellflower, Carson, Gardena and Long Beach, to its terminus at the Pacific Ocean.

The remaining major drainage networks within the City are those of the Ballona Creek and Dominguez Channel systems. The West Los Angeles area is tributary to Ballona Creek and other channels that discharge into the Pacific Ocean on the west side of the County. The Central District is tributary to Compton Creek and the Los Angeles River, which flows southerly beyond the city limits and discharges into the ocean. The Harbor District is tributary to Dominguez Channel and Harbor Lake, which drain adjacent to the Los Angeles River mouth.

The topography of the coastal plain on which much of the City of Los Angeles resides is gradually sloped from the foothills of the San Gabriel Mountains upstream of the city, to the Pacific Ocean with a few exceptions of rising hills and depressed areas. Ground elevations range from 10,000 feet in the San Gabriel Mountains, to 330 feet near the Arroyo Seco confluence, to mean sea level at the mouth of the Los Angeles River. The city contains numerous steep, developed hillside residential areas.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the Los Angeles area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extra-tropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may influence flood events through the occurrence of rapid melting associated with warm weather following a major storm. Major storms consist of one or more frontal systems, which may last up to four or more days each. The fall of precipitation is greatly intensified due to the San Gabriel Mountains, which lie in the path of storms moving

from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F with an average daily maximum of 80.2°F in July.

City of Lynwood

The City of Lynwood is a residential community, with scattered areas of commercial and industrial development, situated in the central basin area of Los Angeles County. The city is approximately 5.0 square miles in size. The City of Lynwood had a population in 1980 of approximately 48,548, and approximately 69,845 in 2000, an increase of 44 percent. It is located approximately 11 miles southeast of the downtown area of the City of Los Angeles and is bordered by the Cities of South Gate, Paramount, Compton, and Los Angeles and incorporated county territory.

The Los Angeles River, which is the primary flood threat to the City of Lynwood, originates at the west end of the San Fernando Valley in the northwestern-most corner of the County. The river channel extends through the heart of Los Angeles County by flowing east to Glendale where it turns and flows south to the Pacific Ocean. The Los Angeles River is part of a network of dams, reservoirs, debris collection basins, and spreading grounds built by the LACFCD and USACE to minimize flooding in the County. The portion of the river that affects the City of Lynwood begins at the Arroyo Seco and ends at the mouth of the river at the Pacific Ocean. The floodplain starts in the northeast part of the City of Los Angeles at the Arroyo Seco confluence, passes through the Cities of Los Angeles, Bell, Bell Gardens, South Gate, Lynwood, Lakewood, Paramount, Compton, Bellflower, Carson, Gardena and Long Beach, to its terminus at the Pacific Ocean.

The metropolitan areas adjacent to the Los Angeles River containing the City of Lynwood are densely populated with residential, commercial, and industrial development. Surface runoff has increased as a consequence of impervious development.

The topography of the coastal plain on which the City of Lynwood resides is gradually sloped from the foothills of the San Gabriel Mountains upstream of the City, to the Pacific Ocean with a few exceptions of rising hills and depressed areas. Ground elevations range from 10,000 feet in the San Gabriel Mountains, to 330 feet near the Arroyo Seco confluence, to mean sea level at the mouth of the Los Angeles River. The terrain within the Lynwood corporate limits can be classified in broad terms as being 100 percent coastal plain. Elevations range from 95 feet at the northerly corporate limits of the city to 71 feet along the southerly corporate limits.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the Lynwood area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extra-tropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may influence flood events through the occurrence of rapid melting associated with

warm weather following a major storm. Major storms consist of one or more frontal systems which may last up to four or more days each. The fall of precipitation is greatly intensified due to the San Gabriel Mountains which lie in the path of storms moving from the west or southwest. Steep canyons and

gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F above zero with an average daily maximum of 80.2°F in July.

City of Malibu

Results of the mapping study were not previously summarized in effective FIS report for the City of Malibu; therefore, no community description is provided.

City of Manhattan Beach

Results of the mapping study were not previously summarized in effective FIS report for the City of Manhattan Beach; therefore, no community description is provided.

City of Maywood

Results of the mapping study were not previously summarized in effective FIS report for the City of Maywood; therefore, no community description is provided.

City of Monrovia

Results of the mapping study were not previously summarized in effective FIS report for the City of Monrovia; therefore, no community description is provided.

City of Montebello

The City of Montebello is an urbanized community situated in the east-central portion of the Los Angeles County basin. It is located approximately 8 miles east of the downtown area of the City of Los Angeles and is bordered by the Cities of Commerce, Monterey Park, Pico Rivera, and Rosemead, and unincorporated territory of Los Angeles County. The city is approximately 8.2 square miles in size. The City had a population of approximately 52,929 in 1980, and approximately 62,150 in 2000, an increase of 17 percent.

The Rio Hondo, which is the primary flood threat to the City of Montebello, originates at Whittier Narrows Dam, a flood control facility that controls runoff originating in the northeastern portion of the County. The Rio Hondo channel joins the Los Angeles River downstream of the City of Montebello. Rio Hondo flows southwest through the Cities of Montebello, Pico Rivera, Bell Gardens, Downey and South Gate to its confluence with the Los Angeles River just north of the Imperial Highway. The Los Angeles River and Rio Hondo are part of a network of dams, reservoirs, debris collection basins, and spreading grounds built by the LACFCD and USACE to minimize flooding in the County.

The metropolitan areas adjacent to the Los Angeles River and the Rio Hondo are densely populated with residential, commercial, and industrial development. Surface runoff has increased as a consequence of impervious development.

The metropolitan areas adjacent to the Rio Hondo containing the City of Montebello are densely populated with residential, commercial, and industrial development. Surface runoff has increased as a consequence of impervious development.

The topography of the coastal plain on which the City of Montebello resides is gradually sloped from the foothills of the San Gabriel Mountains upstream of the City, to the Pacific Ocean with a few exceptions of rising hills and depressed areas. Ground elevations range from 10,000 feet in the San Gabriel

Mountains, to 330 feet near the Arroyo Seco confluence, to mean sea level at the mouth of the Los Angeles River. The terrain within Montebello's corporate limits can be classified, in broad terms, as being 90 percent alluvial plain and 10 percent moderately sloping hills. Elevations range from 160 feet in the southern portion of the city to approximately 500 feet in the Montebello Hills to the northeast.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the Montebello area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extra-tropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may influence flood events through the occurrence of rapid melting associated with warm weather following a major storm. Major storms consist of one or more frontal systems which may last up to four or more days each. The fall of precipitation is greatly intensified due to the San Gabriel Mountains which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F above zero with an average daily maximum of 80.2°F in July.

City of Monterey Park

Results of the mapping study were not previously summarized in effective FIS report for the City of Monterey Park; therefore, no community description is provided.

City of Norwalk

Results of the mapping study were not previously summarized in effective FIS report for the City of Norwalk; therefore, no community description is provided.

City of Palmdale

The City of Palmdale is a growing urban community situated in the Antelope Valley area of northeastern Los Angeles County. It is located approximately 48 miles north of downtown Los Angeles and is bordered by the City of Lancaster and unincorporated areas of Los Angeles County. The population of the City of Palmdale was approximately 20,024 in 1977, and approximately 116,670 in 2000, an increase of 583 percent.

Floodplain development east of the Antelope Valley Freeway is generally commercial and industrial development west of the freeway is primarily residential. Between 10th Street East and 50th Street East, there is a mix of residential and commercial development. Palmdale International Airport is proposed in the northeastern section of the city. Floodplain development along Little Rock Wash is largely agricultural and rural/urban development, with one dwelling unit per 1.0 to 2.5 acres. The proposed land use for this area is generally neighborhood commercial.

The community is located in the Amargosa, Anaverde, Little Rock, and Big Rock Wash watersheds. Major streams, such as Amargosa Creek, Anaverde Creek, Amargosa Creek Tributary, Little Rock Wash, and Big Rock Wash, originate in the San Gabriel Mountains and flow northerly and northeasterly through Palmdale. Anaverde Creek Tributary also originates in the San Gabriel Mountains and flows northerly toward Palmdale. Elevations range from 2900 feet at the foothills of the San Gabriel Mountains in the south and west, to approximately 2450 feet in the northern portion of the city. The terrain within Palmdale corporate limits can be classified as being 95 percent alluvial fan and 5 percent moderately sloping canyons and hills.

Antelope Valley is located on the leeward side of the San Gabriel Mountains, therefore, orographic rainfall is generally sparse and occurs only during the winter. Some snow falls at the higher elevations. The average annual rainfall in Palmdale is approximately 6 inches. In the mountain watersheds to the south, the annual rainfall averages over 19 inches. On occasion, rainfall is of such intensity or duration that flows continue down major stream courses to the dry lakes in the northern portion of the city where water ponds and eventually evaporates.

Soils in the vicinity of Palmdale consist of sandy alluvial deposits ranging from very coarse deposits near the base of the San Gabriel Mountains to finer deposits extending to the northeast.

City of Palos Verdes Estates

The City of Palos Verdes Estates is coastal community located on the Palos Verdes peninsula in Los Angeles County. The population of Palos Verdes Estates was 13,340 in 2000, and 13,438 in 2010, and increase of less than 1 percent. Palos Verdes Estates has an area of approximately 5 square miles. Primary land uses include residential, commercial, and open/green space

City of Paramount

The City of Paramount is located in southern Los Angeles County approximately 12 miles southeast of downtown Los Angeles City. The population of the City of Paramount was approximately 36,407 in 1980, and 55,266 in 2000, and increase of 52 percent.

The Los Angeles River, which is the primary flood threat to the City of Paramount, originates at the west end of the San Fernando Valley in the northwestern-most corner of the County. The river channel extends through the heart of Los Angeles County by flowing east to Glendale where it turns and flows south to the Pacific Ocean. The Los Angeles River is part of a network of dams, reservoirs, debris collection basins, and spreading grounds built by the LACFCD and USACE to minimize flooding in the County. The portion of the river that affects the City of Paramount begins at the Arroyo Seco and ends at the mouth of the river at the Pacific Ocean. The floodplain starts in the northeast part of the City of Los Angeles at the Arroyo Seco confluence, passes through the Cities of Los Angeles, Bell, Bell Gardens, South Gate, Lynwood, Lakewood, Paramount, Compton, Bellflower, Carson, Gardena and Long Beach, to its terminus at the Pacific Ocean.

The metropolitan areas adjacent to the Los Angeles River containing the City of Paramount are densely populated with residential, commercial, and industrial development. Surface runoff has increased as a consequence of impervious development.

The topography of the coastal plain on which the City of Paramount resides is gradually sloped from the foothills of the San Gabriel Mountains upstream of the City, to the Pacific Ocean with a few exceptions of rising hills and depressed areas. Ground elevations range from 10,000 feet in the San Gabriel Mountains, to 330 feet near the Arroyo Seco confluence, to mean sea level at the mouth of the Los Angeles River. The terrain within the Paramount corporate limits can be classified in broad terms as being 100 percent coastal plain. Elevations range from 95 feet at the northerly corporate limits of the city to 71 feet along the southerly corporate limits.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the Paramount area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extra-tropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may influence flood events through the occurrence of rapid melting associated with warm weather following a major storm. Major storms consist of one or more frontal systems

which may last up to four or more days each. The fall of precipitation is greatly intensified due to the San Gabriel Mountains which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F above zero with an average daily maximum of 80.2°F in July.

City of Pasadena

Results of the mapping study were not previously summarized in effective FIS report for the City of Pasadena; therefore, no community description is provided.

City of Pico Rivera

The City of Pico Rivera is located in southern Los Angeles County approximately 10 miles east of downtown Los Angeles City. The population of Pico Rivera was approximately 58,459 in 1980, and 63,428 in 2000, an increase of 8 percent.

The Rio Hondo, which is the primary flood threat to the City of Pico Rivera, originates at Whittier Narrows Dam, a flood control facility that controls runoff originating in the northeastern portion of the County. The Rio Hondo channel joins the Los Angeles River downstream of the City of Pico Rivera. Rio Hondo flows southwest through the Cities of Montebello, Pico Rivera, Bell Gardens, Downey and South Gate to its confluence with the Los Angeles River just north of the Imperial Highway. The Los Angeles River and Rio Hondo are part of a network of dams, reservoirs, debris collection basins, and spreading grounds built by the LACFCD and USACE to minimize flooding in the County.

The metropolitan areas adjacent to the Rio Hondo containing the City of Pico Rivera are densely populated with residential, commercial, and industrial development. Surface runoff has increased as a consequence of impervious development.

The topography of the coastal plain on which the City of Pico Rivera resides is gradually sloped from the foothills of the San Gabriel Mountains upstream of the City, to the Pacific Ocean with a few exceptions of rising hills and depressed areas. Ground elevations range from 10,000 feet in the San Gabriel Mountains, to 330 feet near the Arroyo Seco confluence, to mean sea level at the mouth of the Los Angeles River. The terrain within Pico Rivera's corporate limits can be classified, in broad terms, as being 90 percent alluvial plain and 10 percent moderately sloping hills. Elevations range from 160 feet in the southern portion of the city to approximately 500 feet in the Montebello Hills to the northeast.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the Pico Rivera area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extra-tropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may influence flood events through the occurrence of rapid melting associated with warm weather following a major storm. Major storms consist of one or more frontal systems which may last up to four or more days each. The fall of precipitation is greatly intensified due to the San Gabriel Mountains which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F above zero with an average daily maximum of 80.2°F in July.

City of Pomona

Results of the mapping study were not previously summarized in effective FIS report for the City of Pomona; therefore, no community description is provided.

City of Rancho Palos Verdes

Results of the mapping study were not previously summarized in effective FIS report for the City of Rancho Palos Verdes; therefore, no community description is provided.

City of Redondo Beach

The City of Redondo Beach is located on the central coastline along the western County boundary bordering the Pacific Ocean on Santa Monica Bay. It is located approximately 23 miles southwest of the downtown area of the City of Los Angeles and is bordered by the Cities of Hermosa Beach and Manhattan Beach to the northwest, Hawthorne to the north, Lawndale and Torrance to the east, Palos Verdes Estates to the south, and the Pacific Ocean to the west.

The population of the City of Redondo Beach was approximately 63,100 in 1979, and 63,261 in 2000, a negligible increase.

The coastline of Los Angeles County is approximately 74 miles in length, extending from Sequit Point to the San Gabriel River just south of the Los Angeles/Long Beach Harbor. The shoreline is diverse and varied, consisting of sandy beaches, eroding cliffs, and rock outcroppings. It includes two prominent headlands, Point Dume and Palos Verdes Peninsula, and two bays, Santa Monica Bay and San Pedro Bay. Redondo Beach is on the northeastern portion of Palos Verdes Peninsula off Santa Monica Bay.

The shoreline is characterized by a sandy beach backed by cliffs in its northern portion and by extensive urban development behind the beaches along the southern portion of Santa Monica Bay. The coastline of Palos Verdes Peninsula is rocky, with pocket

beaches of sand and cobble typical of Redondo Beach. The southern stretch along San Pedro Bay is the highly developed Los Angeles/Long Beach Harbor area.

The City of Redondo Beach is densely populated with residential, commercial, and light industrial development. Surface runoff has increased as a consequence of impervious development.

The topography of the coastal plain on which the City of Redondo Beach resides is gradually sloped from inland communities and hills to the east, to the Pacific Ocean with a few exceptions of rising coastal dune ridges and depressed areas.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the Redondo Beach area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extra-tropical cyclones during the months between December and March. Major storms consist of one or more frontal systems which may last up to four or more days each. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains north east of the city. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83 .3°F.

City of Rolling Hills Estates

Results of the mapping study were not previously summarized in effective FIS report for the City of Rolling Hills Estates; therefore, no community description is provided.

City of Rolling Hills

Results of the mapping study were not previously summarized in effective FIS report for the City of Rolling Hills; therefore, no community description is provided.

City of Rosemead

Results of the mapping study were not previously summarized in effective FIS report for the City of Rosemead; therefore, no community description is provided.

City of San Dimas

Results of the mapping study were not previously summarized in effective FIS report for the City of San Dimas; therefore, no community description is provided.

City of San Fernando

Results of the mapping study were not previously summarized in effective FIS report for the City of San Fernando; therefore, no community description is provided.

City of San Gabriel

Results of the mapping study were not previously summarized in effective FIS report for the City of San Gabriel; therefore, no community description is provided.

City of San Marino

Results of the mapping study were not previously summarized in effective FIS report for the City of San Marino; therefore, no community description is provided.

City of Santa Clarita

The City of Santa Clarita is located in west-central Los Angeles County, in southwestern California. Santa Clarita is just north of U.S. Route 5 and State Route 14 on the canyon floor of the Santa Clarita Valley.

Santa Clarita is considered a low-density, semi-rural development, with medium-density development rapidly occurring in alluvial fan and canyon areas. The Santa Clarita Valley is drained by the Santa Clara River and its tributaries, which discharge into Ventura County, eventually reaching the Pacific Ocean. Some improved channels have been constructed in the Santa Clarita Valley.

The topography of the broad floodplain in which much of the City resides is gradually sloped from the foothills upstream of the City, to the Pacific Ocean with major mountainous landforms on either side. Ground elevations range from over 5,000 feet in the mountains, to mean sea level at the Pacific Ocean west of the city.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the Santa Clarita area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extra-tropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may influence flood events through the occurrence of rapid melting associated with warm weather following a major storm. Major storms consist of one or more frontal systems which may last up to four or more days each. The fall of precipitation is greatly intensified due to the mountains which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F above zero with an average daily maximum of 80.2°F in July.

City of Santa Fe Springs

The City of Santa Fe Springs is located in southeast Los Angeles County, in southern California.

The City is approximately 8.8 square miles in size, had a population of approximately 15,500 in 1977, and approximately 17,438 in 2002, an increase of 13 percent. It is located approximately 14 miles east of downtown Los Angeles and is bordered by the Cities of Norwalk, Cerritos, La Mirada, Downey, and Whittier and unincorporated areas of Los Angeles County.

The City of Santa Fe Springs is a diverse community with large areas of residential, commercial, industrial, and oil well development. The community is situated in the eastern portion of the Los Angeles County basin.

There is no development within the floodplain in the City of Santa Fe Springs. The San Gabriel River follows the western corporate limits. Its headwaters are located deep in the San Gabriel Mountains, and it flows approximately 31 miles through several residential communities, finally discharging into the Pacific Ocean south of the City.

The terrain within Santa Fe Springs can be broadly classified as a gently sloping plain. Elevations range from 155 feet in the north-central portion of the city to approximately 80 feet at the southern corporate limits.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the Santa Fe Springs area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extra-tropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may influence flood events through the occurrence of rapid melting associated with warm weather following a major storm. Major storms consist of one or more frontal systems which may last up to four or more days each. The fall of precipitation is greatly intensified due to the mountains which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F above zero with an average daily maximum of 80.2°F in July.

City of Santa Monica

Results of the mapping study were not previously summarized in effective FIS report for the City of Santa Monica; therefore, no community description is provided.

City of Sierra Madre

Results of the mapping study were not previously summarized in effective FIS report for the City of Sierra Madre; therefore, no community description is provided.

City of Signal Hill

Results of the mapping study were not previously summarized in effective FIS report for the City of Signal Hill; therefore, no community description is provided.

City of South El Monte

Results of the mapping study were not previously summarized in effective FIS report for the City of South El Monte; therefore, no community description is provided.

City of South Gate

The City of South Gate is located in southern Los Angeles County approximately 6 miles south of downtown Los Angeles City. The population of South Gate was approximately 66,784 in 1980, and 96,375 in 2000, an increase of 44 percent.

The Los Angeles River, which is the primary flood threat to the City of South Gate, originates at the west end of the San Fernando Valley in the northwestern-most corner of the County. The river channel extends through the heart of Los Angeles County by flowing east to Glendale where it turns and flows south to the Pacific Ocean. The Los Angeles River is part of a network of dams, reservoirs, debris collection basins, and spreading grounds built by the LACFCD and USACE to minimize flooding in the County. The portion of the river that affects the City of South Gate begins at the Arroyo Seco and ends at the mouth of the river at the Pacific Ocean. The floodplain starts in the northeast part of the City of Los Angeles at the Arroyo Seco confluence, passes through the Cities of Los Angeles, Bell, Bell Gardens, South Gate, Lynwood, Lakewood, Paramount, Compton, Bellflower, Carson, Gardena and Long Beach, to its terminus at the Pacific Ocean.

The metropolitan areas adjacent to the Los Angeles River containing the City of South Gate are densely populated with residential, commercial, and industrial development. Surface runoff has increased as a consequence of impervious development.

The topography of the coastal plain on which the City of South Gate resides is gradually sloped from the foothills of the San Gabriel Mountains upstream of the City, to the Pacific Ocean with a few exceptions of rising hills and depressed areas. Ground elevations range from 10,000 feet in the San Gabriel Mountains, to 330 feet near the Arroyo Seco confluence, to mean sea level at the mouth of the Los Angeles River. The terrain within the South Gate corporate limits can be classified in broad terms as being 100 percent coastal plain. Elevations range from 95 feet at the northerly corporate limits of the city to 71 feet along the southerly corporate limits.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the South Gate area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extra-tropical cyclones during the months between December and March. Snow fall, common at elevations of 5,000 feet or more, may influence flood events through the occurrence of rapid melting associated with warm weather following a major storm. Major storms consist of one or more frontal systems which may last up to four or more days each. The fall of precipitation is greatly intensified due to the San Gabriel Mountains which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F above zero with an average daily maximum of 80.2°F in July.

City of South Pasadena

Results of the mapping study were not previously summarized in effective FIS report for the City of South Pasadena; therefore, no community description is provided.

City of Temple City

Results of the mapping study were not previously summarized in effective FIS report for the City of Temple City; therefore, no community description is provided.

City of Torrance

The City of Torrance is an urbanized community situated in southwestern Los Angeles County. The city is approximately 20.5 square miles in size. The City had a population of approximately 135,000 in 1977, and approximately 137,946 in 2000, an increase of 2 percent. It is located approximately 19 miles southwest of the downtown area of the City of Los Angeles and is bordered by the Cities of Gardena, Lawndale, Lomita, Los Angeles, Palos Verdes Estates, Redondo Beach, and Rolling Hills Estates, and unincorporated areas of Los Angeles County.

The terrain within the corporate limits of Torrance can be classified, in broad terms, as being 100 percent coastal plain. Elevations range from 300 feet at the southern portion of the city to sea level along the coast.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the Torrance area and its surrounding watershed is primarily determined by the course of rainfall associated with extra-tropical cyclones during the months between December and March. Major storms consist of one or more frontal systems which may last up to four or more days each. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F.

City of Vernon

Results of the mapping study were not previously summarized in effective FIS report for the City of Vernon; therefore, no community description is provided.

City of Walnut

Results of the mapping study were not previously summarized in effective FIS report for the City of Walnut; therefore, no community description is provided.

City of West Covina

Results of the mapping study were not previously summarized in effective FIS report for the City of West Covina; therefore, no community description is provided.

City of West Hollywood

West Hollywood is one of Los Angeles County's older, more established communities. The city was newly incorporated November 29, 1984. It is the 84th, city to be incorporated in Los Angeles County. According to the December 1985 issue of City News, the population of West Hollywood was approximately 37,000, but was recorded as 35,716 in the 2000 Census. The City of West Hollywood, located in Los Angeles County California, is bordered to the south by the City of Beverly Hills and to the east by the City of Hollywood.

Over 51 percent of the land area in West Hollywood is developed as single and multiple family dwellings. Commercial and industrial area accounts for approximately 187 of the 2 square miles of land area within the city.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the West Hollywood area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extra-tropical cyclones during the months between December and March. Major storms consist of one or more frontal systems which may last up to four or more days each. The fall of precipitation is greatly intensified due to the San Gabriel Mountains which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual

rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F above zero with an average daily maximum of 80.2°F in July.

City of Westlake Village

Results of the mapping study were not previously summarized in effective FIS report for the City of Westlake Village; therefore, no community description is provided.

City of Whittier

Whittier is an urban community at the southern base of the Puente Hills, in the southeastern corner of Los Angeles County. It is approximately 15 miles east of the downtown area of the City of Los Angeles and is bordered by the cities of La Habra and Santa Fe Springs, and unincorporated areas of Los Angeles and Orange Counties. The city is approximately 12.1 square miles in area. The City had a population of approximately 70,300 in 1977, and approximately 83,680 in 2000, an increase of 19 percent. Development in the flood plain is mostly residential with some commercial development along Painter Avenue.

Elevations range from 140 feet in the southwest portion of the city to approximately 800 feet at the Puente Hills to the northeast. The terrain within the city can be classified in broad terms as being 90 percent alluvial land and 10 percent moderately sloping canyons and hills.

Underlying soils are considered alluvial, and varies from coarse sand and gravel to silty clay and gravel or clay. The land is generally well-drained, with relatively few perched water or artesian areas.

The climate is considered subtropical. The precipitation regime contributing to the Whittier area and its surrounding watershed is primarily determined by the course of orographic rainfall associated with extra-tropical cyclones during the months between December and March. Major storms consist of one or more frontal systems which may last up to four or more days each. The fall of precipitation is greatly intensified due to the San Gabriel Mountains which lie in the path of storms moving from the west or southwest. Steep canyons and gradients in the mountains contribute to rapid concentrations of storm runoff, which may or may not reach the city. The average annual rainfall ranges from 13.8 inches at the ocean to 28.2 inches in the San Gabriel Mountains. Average daily minimum temperature for January is 46.6°F, while the average daily maximum temperature for July is 83.3°F. In the San Gabriel Mountains (elevation 5,580 feet) the average daily minimum in January is 34.3°F above zero with an average daily maximum of 80.2°F in July.

2.3 Principal Flood Problems

Los Angeles County

Los Angeles County has a long history of destructive flooding. The County suffered the effects of flooding episodes in 1811, 1815, 1825, 1832, 1861-62, 1867, 1876, 1884, 1888-91 (each year), 1914, 1921, and 1927. Similar and better-documented floods have occurred in January 1934, March 1938, February 1941, January 1943, January 1952, January 1956, January and February 1969, March 1978, January 1979, March 1980, March 1983, January 1992, and January 1994. Many flood control facilities were constructed after the heavy loss of life and property damage incurred in the January 1934 flood event. These facilities have eliminated much of the damage which could have resulted in their absence. However, the floods of January and February 1969 and February and March 1978 demonstrated that Los Angeles County will always be susceptible to flood disaster. Of particular concern are mudflows which frequently occur in the foothill areas during intense rainfall, usually following wildfires in the upstream watershed. This hazard has not been addressed in this study but has been identified and addressed in numerous ways by the County, such as the construction of over one hundred debris basins at the mouths of mountainous canyons, to retain the high volume of sediment and debris that flood flows may carry during large floods. Debris basins have been demonstrated to be the only effective means of keeping downstream channel free of debris blockage, and the subsequent overtopping that would result during large flood events.

As an example of the continued threat from floods, during the 1969 storms, considerable damage occurred in the eastern portion of Los Angeles County, particularly in the foothill areas of the San Gabriel Mountains. Water and mud destroyed or damaged many residences and other buildings near the Cities of Glendora and Azusa, despite the presence of a large network of local flood control channels, storm drains, and debris basins.

In unincorporated areas of the County, much of the damage occurred downstream of brush fires which occurred during the summer of 1968. In the Malibu area, damage was experienced along Malibu Creek and Topanga Canyon where flows damaged homes, swept away bridges, and washed out roads. Approximately 500 people were left homeless or isolated. In the Santa Clarita Valley, most damage was caused by erosion and sedimentation of natural watercourses.

In the Antelope Valley, at least one home was completely destroyed. Railroads, public utilities, and agricultural interests also sustained considerable damage.

Although much of the damage, which occurred during the 1978 storms, was in the City of Los Angeles, unincorporated areas also sustained severe damage. In the La Crescenta area, a debris basin overflowed inundating several homes with mud and water. In addition, localized flooding damaged other homes in the area. Virtually all of the Flood Control District debris basins in this area were filled to capacity. In the Hidden Springs area, mud and water flowing down Mill Creek took 10 lives and destroyed numerous structures.

In the Los Angeles basin area, an extensive flood control system has eliminated much of the flood hazard experienced in years past. However, in the less densely populated areas of Malibu, Santa Clarita Valley, and Antelope Valley, relatively few flood control

facilities have been constructed. These areas remain subject to flood hazard during major storms.

Mud flow mapping was incorporated into the DFIRM for the unincorporated areas of Los Angeles County.

City of Agoura Hills

The Los Angeles County Flood Control District indicates a history of flooding in the area from major storms in January 1934, March 1938, February 1941, January 1952, and January 1956 (Los Angeles County Flood Control District, Flood Overflow Maps, Updated Periodically).

Many flood control facilities have been constructed since these storms occurred. These facilities would have eliminated much of the damage which resulted from these storms. However, the more recent storms of January and February 1969 and February and March 1978 have demonstrated that Los Angeles County is still susceptible to flood disaster. Of particular concern are mudflows which frequently occur in the foothills during intense rainfall, usually following brush fires in the upstream watershed.

Damage from the 1969 storms was considerable in the Malibu area. Much of the damage occurred downstream of brush fire areas occurring in the summer of 1968. The Malibu area experienced damage to homes, bridges, and roads. Virtually all of the Flood Control District debris basins were filled to capacity. However, relatively few flood control facilities have been constructed in the area.

City of Alhambra

The City of Alhambra is identified as a non-flood prone community.

City of Arcadia

The City of Arcadia is identified as a non-flood prone community.

Mud flow mapping was incorporated into the DFIRM for the City of Arcadia. City of Artesia

The City of Artesia is identified as a non-flood prone community. City of Avalon

A small drainage ditch that channels runoff through the City exists along the eastern side of the headwaters canyon at an elevation somewhat higher than that of adjacent developed areas. The channel has capacity for approximately 15 percent of the 1-percent chance flood event. Excess flows break out as sheet flow and spread across the city, creating a wide flood plain that may inundate approximately 75 percent of all the structures located on the canyon floor. Research of local newspaper accounts and interviews with residents reveal that the capacity of the channel has been exceeded during numerous past floods, and that shops and homes in the floodplain have experienced inundation damage.

Coastal areas of the City may be exposed to waves generated by winter and summer storms originating in the Pacific Ocean. The occurrence of such a storm event in combination with high astronomical tides and strong winds can cause a significant wave run-up allowing waves to reach higher than normal elevations along the coastline. When this occurs, shoreline erosion and coastal flooding frequently results in damage to inadequately protected structures and facilities located along low-lying portions of the shoreline.

On March 27, 1964, 10-foot waves, set in motion by a violent Alaskan earthquake, damaged the unsheltered coast of Santa Catalina Island. No damage was reported on the sheltered side of the island where Avalon Bay and the isthmus anchorage are located. However, there have been occasions when large, wind-driven waves have threatened structures fronting Avalon Bay.

Mud flow mapping was incorporated into the DFIRM for this city.

City of Azusa

Results of the mapping study were not previously summarized in the effective FIS report for the City of Azusa; therefore, no flood protection measures are provided.

Mud flow mapping was incorporated into the DFIRM for the City of Azusa.

City of Baldwin Park

Results of the mapping study were not previously summarized in the effective FIS report for the City of Baldwin Park; therefore, no flood protection measures are provided.

City of Bell Gardens

Results of the mapping study were not previously summarized in the effective FIS report for the City of Bell Gardens; therefore, no flood protection measures are provided.

City of Bell

The City of Bell is identified as a non-flood prone community.

The Cities of Bellflower, Carson, Compton, Downey, Gardena, Lakewood, Long Beach, Los Angeles, Lynwood, Montebello, Paramount, Pico Rivera, Santa Fe Springs, South Gate, and Whittier have a history of flooding roughly parallel to that of the larger Los Angeles River watershed. Prior to the construction of the extensive storm drain and flood control channel system protecting numerous communities within the County, these cities suffered the continual damage wrought by overflow of the Los Angeles River and/or its tributaries. Following completion of this system, and due to the lack of a very large flood event during the intervening period, the major cause of flood damage within these cities has been flooding by overflow of local drainage systems and smaller tributaries to the Los Angeles River system.

Localized flooding occurred to a large extent during the floods of January and February 1969, February and March 1978, and February 1980, March 1983, January 1992, and January 1994. This flooding was due to the occurrence of localized high-intensity rainfall events, which overwhelmed the ability of local storm drains and flood control channels to drain off the excess runoff.

Flood control facilities constructed after the large events of the 1930's eliminated much of the damage which could have resulted in their absence; however, the level of protection offered by these facilities may have diminished during this period of rapid development of the Los Angeles basin, demonstrated by the almost break-out of the Los Angeles River in 1980, during an event that was recorded as considerably smaller than that of the expected design level of protection. Construction of the Los Angeles County Drainage Area Project (LACDA) has brought to level of protection offered by the system up to a level of greater than a 1-percent annual chance event.

These cities remain susceptible to flood damage from other sources. Of particular concern are mudflows which frequently occur in the foothill areas during intense rainfall, usually following wildfires in the upstream watershed.

Prior to completion of the Corps of Engineers' Los Angeles County Drainage Area study and Los Angeles River and Rio Hondo flood control channel modifications, the upper and lower reach of the Los Angeles River Channel were not capable of adequately conveying a 1-percent annual chance flood event. Overbank areas were susceptible to flooding caused by overtopping and potential failure of levee structures. Completion of this project, and its subsequent pursuit of Map Revision and USACE certification of the level of protection offered by the project, has resulted in these cities' removal from the regulatory 1-percent annual chance floodplain. Breakout is still possible during events larger than the current design of the system is capable of conveying.

In addition to land-based storms, the coastline of the cities of Long Beach and Los Angeles are also susceptible to storm-associated flooding. The southern California coastline is exposed to waves generated by winter and summer storms originating in the Pacific Ocean. It is not uncommon for these storms to cause 15-foot breakers. The occurrence of such a storm event in combination with high astronomical tides and strong winds can cause a significant wave runup and allow storm waves to attack higher than normal elevations along the coastline. When this occurs, shoreline erosion and coastal flooding frequently results in damage to inadequately protected structures and facilities located along low-lying portions of the shoreline.

Brief descriptions of several significant storms follow, which provide information to which coastal flood hazards and the projected flood depths can be compared.

September 16, 1910

Heavy seas and high ground swells undermined homes in the Long Beach area. Efforts were made to check the destruction of the waves by building temporary bulkheads along the waterfront at its most exposed points, but until the tide began to recede late in the evening, little effective good was done. The ocean eroded

into the sidewalks which stretch from the Long Beach Bath House to Seaside Park at high tide on the afternoon of the 16th. Within a short period of time, over a mile of the bulkhead and sidewalk were destroyed.

September 1934

A recurrence of destructive waves, similar to those of August 21, 1934, broke along the coast centering northward in the Long Beach area. Damage was reported at Malibu, where portions of the Roosevelt Highway were flooded due to waters backed up at a storm drain project under construction. In addition, the Pine Avenue Pier in Long Beach was destroyed. No damage was reported at either San Pedro or Santa Monica. Structures along the pike were endangered and temporary devices of protection were installed.

September 24-25, 1939

A tropical cyclone lashed the entire southern California coastline on Sunday, September 24th and Monday, September 25th. The storm brought approximately a 20°F drop in temperature throughout southern California and winds reached 65 miles per hour. The gales and rain claimed lives, wreaked havoc with power and phone lines, temporarily destroyed the main railroad systems, closed highways, and flooded homes. Eight large homes along the waterfront at Sunset Beach were swept away. In Long Beach, plate glass windows were smashed by fierce winds. Some Pacific Electric track was washed out at Hermosa Beach. Disruption of phone service was heaviest in the Bellflower, Hynes-Clearwater, and Artesia areas. Homes along the shore from Malibu to Huntington Beach were heavily damaged by pounding seas and high winds. Many small boats were washed ashore, and several were wrecked when the high waves dashed them upon breakwaters or rocky shores. At least 10 yachts and barges were sunk or wrecked upon breakwaters or sands. At Santa Monica, the 227-foot fishing barge Minne A was washed ashore. Five deaths in the surf were reported; two at Los Angeles, two at Long Beach, and one at Newport Beach. At Burbank, one woman was drowned and others injured when a boat overturned.

December 25, 26, and 27, 1940

Twenty- and thirty-foot waves undermined residences and portions of the Strand at Redondo Beach. Two houses collapsed and five blocks of ocean-front walk were destroyed. In addition, 25-foot breakers undermined a house and store 50 feet landward of the normal high tide mark. At Belmont Peninsula, Long Beach, 70 homes were threatened with being cut off from the mainland by intense wave action.

May 22, 1960

Resurgent seismic-triggered ocean waves stemming from Chilean earthquakes smashed dock facilities and hundreds of small craft. Damage was estimated at upwards of \$1 million. Hardest hit was the Los Angeles-Long Beach Harbor

complex, where a series of tidal currents surged back and forth through narrow Cerritos Channel wreaking havoc among the yacht anchorages. Some 300 yachts and small boats were torn from their slips and estimates indicated that from 15 to 30 boats were sunk. The closing of the Terminal Island bridges and suspension of ferry service caused monumental traffic jams in the Los Angeles/Long Beach area. The peak surge was estimated at between 8 and 9 feet.

Winter 1977-1978

A combination of high astronomical tides, strong onshore winds, and high storm waves resulted in significant coastal flooding along the coastline of Los Angeles County. High tides and waves were responsible for an estimated \$1 to 1.8 million in private property losses to homes located along beaches in Malibu; \$80,000 worth of damage to the Santa Monica Pier; \$150,000 worth of damage to the Long Beach Harbor; and \$140,000 worth of damage to a bicycle path in 81 Segundo. Other losses resulting from wave damages occurred at Leo Carillo State Beach, Redondo Beach, Avalon, and other areas along the county shoreline.

Oil pumping in past years has caused subsidence along the ocean front areas of Long Beach. Settlements of up to 30 feet have occurred in some areas of the Long Beach Harbor subjecting many locations along the coast to damage from direct wave action. Much of Naples Island and Belmont Shores in southeastern Long Beach, lie at elevations less than the maximum recorded tide. Interior drainage is handled by means of flap-gated outlets in the seawall.

Mud flow mapping was incorporated into the DFIRM for the Cities of Los Angeles, Montebello, and Whittier.

City of Beverly Hills

Results of the mapping study were not previously summarized in the effective FIS report for the City of Beverly Hills; therefore, no flood protection measures are provided.

City of Bradbury

The City of Bradbury is identified as a non-flood prone community.

Mud flow mapping was incorporated into the DFIRM for the City of Bradbury.

City of Burbank

Stormflows entering the City of Burbank are generated from relatively small watersheds on the southwesterly side of the Verdugo Mountains. Flooding is caused by surface runoff associated with high-intensity orographic rainfalls of several hours duration. Once the ground is saturated, subsequent rainfall, augmented by canyon flood flows and coupled with inadequate local drainage facilities, produces shallow flooding and ponding to a depth of approximately 3 feet.

Los Angeles County Flood Control District flood overflow delineations on U.S. Geological Survey maps indicate a history of flooded streets and streams in Burbank; however, minimal damage has occurred due to the construction of up-graded drainage facilities and flood protection structures.

Mud flow mapping was incorporated into the DFIRM for this city.

During a February 1992 storm, localized flooding was observed in the following locations in the City of Burbank:

1. In the area west of the Lockheed Drain and Burbank Western Flood Control Channels, east of Victory Boulevard, north of the southern branch of the Southern Pacific Railroad (SPRR), and south of Burbank Boulevard. Channel overflows flowed down Lake Street and ponded north of the SPPR tracks prior to returning to the Burbank Western Flood Control Channel.
2. Lockheed Drain overtopped upstream of an existing railroad spur bridge and flowed south down Griffith Park Drive to Burbank Boulevard. The overflow then flowed east along Burbank Boulevard until joining the flood flows described above.
3. Overflow through the existing railroad trestle weir located upstream of Clybourn Street.
4. No other significant flooding problems have been documented. The Los Angeles County Flood Control District (LACFCD) has prepared a deficiency analyses study (Los Angeles County Flood Control District, August 1982) that identifies several other potential flood-hazard areas.

City of Calabasas

Results of the mapping study were not previously summarized in the effective FIS report for the City of Calabasas; therefore, no flood protection measures are provided.

City of Cerritos

Results of the mapping study were not previously summarized in the effective FIS report for the City of Cerritos; therefore, no flood protection measures are provided.

City of Claremont

Results of the mapping study were not previously summarized in the effective FIS report for the City of Claremont; therefore, no flood protection measures are provided.

Mud flow mapping was incorporated into the DFIRM for the City of Claremont. City of Commerce

Results of the mapping study were not previously summarized in the effective FIS report for the City of Commerce; therefore, no flood protection measures are provided.

City of Covina

Results of the mapping study were not previously summarized in the effective FIS report for the City of Covina; therefore, no flood protection measures are provided.

Mud flow mapping was incorporated into the DFIRM for the City of Covina.

City of Cudahy

Results of the mapping study were not previously summarized in the effective FIS report for the City of Cudahy; therefore, no flood protection measures are provided.

City of Culver City

The City of Culver City has an extensive history of floods and flooding. Sources of flooding include the Ballona Creek channel and associated tributaries, as well as drainage channels originating in the Baldwin Hills and surrounding cities.

The Los Angeles County Flood Control District's flood overflow maps indicate a history of flooded streets and low-lying areas along the streams of Culver City that resulted from major storms discussed above.

City of Diamond Bar

Results of the mapping study were not previously summarized in the effective FIS report for the City of Diamond Bar; therefore, no flood protection measures are provided.

City of Duarte

The City of Duarte is identified as a non-flood prone community.

Mud flow mapping was incorporated into the DFIRM for the City of Duarte.

City of El Monte

The City of El Monte is identified as a non-flood prone community.

City of El Segundo

Results of the mapping study were not previously summarized in the effective FIS report for the City of El Segundo; therefore, no flood protection measures are provided.

City of Glendale

Results of the mapping study were not previously summarized in the effective FIS report for the City of Glendale; therefore, no flood protection measures are provided. Mud flow mapping was incorporated into the DFIRM for the City of Glendale.

City of Glendora

Results of the mapping study were not previously summarized in the effective FIS report for the City of Glendora; therefore, no flood protection measures are provided. Mud flow mapping was incorporated into the DFIRM for the City of Glendora.

City of Hawaiian Gardens

Results of the mapping study were not previously summarized in the effective FIS report for the City of Hawaiian Gardens; therefore, no flood protection measures are provided.

City of Hawthorne

The City of Hawthorne is identified as a non-flood prone community.

City of Hermosa Beach

Results of the mapping study were not previously summarized in the effective FIS report for the City of Hermosa Beach; therefore, no flood protection measures are provided.

City of Hidden Hills

Results of the mapping study were not previously summarized in the effective FIS report for the City of Hidden Hills; therefore, no flood protection measures are provided.

City of Huntington Park

The City of Huntington Park is identified as a non-flood prone community

City of Industry

Results of the mapping study were not previously summarized in the effective FIS report for the City of Industry; therefore, no flood protection measures are provided. Mud flow mapping was incorporated into the DFIRM for the City of Industry.

City of Inglewood

Results of the mapping study were not previously summarized in the effective FIS report for the City of Inglewood; therefore, no flood protection measures are provided.

City of Irwindale

Results of the mapping study were not previously summarized in the effective FIS report for the City of Irwindale; therefore, no flood protection measures are provided.

City of La Canada Flintridge

The City of La Canada Flintridge is identified as a non-flood prone community. Mud flow mapping was incorporated into the DFIRM for the City of La Canada Flintridge.

City of La Habra Heights

Results of the mapping study were not previously summarized in the effective FIS report for the City of La Habra Heights; therefore, no flood protection measures are provided. Mud flow mapping was incorporated into the DFIRM for the City of La Habra Heights.

City of La Mirada

Los Angeles County Flood Control District flood overflow maps indicate a history of flooded streets and natural watercourses in La Mirada. This flooding resulted from major storms of March 1938, January 1956, January and February 1969, February 1978, March 1980, February 1983, and January 1994. La Mirada Creek is an unimproved watercourse which flows southwest through the City. Between Santa Gertrudes Avenue and Stamy Road, the channel runs into La Mirada Creek Park. The park has been designed as a greenbelt flood plain management area and the 1-Percent Annual Chance discharge is contained within city-owned park property. Downstream of Stamy Road, the flood flows follow the natural watercourse alignment of La Mirada Creek. Between Stamy Road and Imperial Highway, the existing development is rural-residential and the flood plain is occupied by horse corrals and small barns. The water ponds upstream of Imperial Highway inundate approximately 3 acres of undeveloped property. Between Imperial Highway and La Mirada Boulevard, the flows continue through a miniature golf course and a residential development. The residential structures are located on high ground substantially above the flood plain. Downstream of La Mirada Boulevard, the watercourse traverses an open field which is part of Biola College. An existing flood control channel, downstream of the field, collects floodwaters, which are ultimately conveyed to North Fork Coyote Creek.

Watersheds of less than one square mile within the City have historically caused flooding in developed low-lying areas. These areas are located in the vicinity of the intersection of Valeda Drive and De Alcala Drive, between Goldendale Drive and Telegraph Road, the eastern end of Capella Street, the intersection of San Feliciano Drive and Figueras Road, the intersection of Crosswood Road and Pemberton Drive, the intersection of Borda Drive and San Ardo Drive, and north of the Atchison, Topeka, and Santa Fe Railway near Castellon Road.

City of La Puente

Results of the mapping study were not previously summarized in the effective FIS report for the City of La Puente; therefore, no flood protection measures are provided.

City of La Verne

Results of the mapping study were not previously summarized in the effective FIS report for the City of La Verne; therefore, no flood protection measures are provided. Mud flow mapping was incorporated into the DFIRM for the City of La Verne.

City of Lancaster

Lancaster is situated on the alluvial floodplain of the Antelope Valley. Consequently, the type of flooding experienced in the city is typical of that experienced by communities developed on alluvial fans. Flood flows discharge from the mountainous canyons onto

the desert floor, where, due to the lack of well-incised streambeds, it spreads out in uncontrolled patterns.

Flood discharges have overflowed in normally dry streambeds, resulting in heavy damage as floodwaters pass through developed areas. During the period of comparatively recent record, floods of major proportions have occurred. The office of the County Engineer has identified the areas in which moderate to severe flooding was observed during the heavy storms of 1938, 1965, 1969, 1978, 1980, 1983, 1994 on flood overflow maps. Flooding from Little Rock Creek was experienced in the eastern portion of the city. During these floods, widespread damage to orchards, irrigation systems, buildings, and roads occurred.

City of Lawndale

The City of Lawndale is identified as a non-flood prone community.

City of Lomita

The City of Lomita is identified as a non-flood prone community.

City of Malibu

Results of the mapping study were not previously summarized in the effective FIS report for the City of Malibu; therefore, no flood protection measures are provided.

City of Manhattan Beach

Results of the mapping study were not previously summarized in the effective FIS report for the City of Manhattan Beach; therefore, no flood protection measures are provided.

City of Maywood

The City of Maywood is identified as a non-flood prone community.

City of Monrovia

The City of Monrovia is identified as a non-flood prone community. Mud flow mapping was incorporated into the DFIRM for the City of Monrovia.

City of Monterey Park

Results of the mapping study were not previously summarized in the effective FIS report for the City of Monterey Park; therefore, no flood protection measures are provided.

City of Norwalk

Results of the mapping study were not previously summarized in the effective FIS report for the City of Norwalk; therefore, no flood protection measures are provided.

City of Palmdale

The type of flooding in the city is typical of that experienced by communities developed on alluvial fans. Flood flows discharge from the mountainous canyons onto the desert floor, where, due to the lack of well incised streambeds, water spreads out in uncontrolled patterns. Intense, short-duration summer thunderstorms are not uncommon and have created flooding in downstream areas.

The principal flood problems for both the Little Rock and Big Rock Washes can be attributed to three factors: the very flat topography, the absence of well-defined natural channels, and the lack of a developed flood control system. In the steeper upstream reaches of both washes, water is confined mostly to the main channel. Flooding problems occur when the flows reach the valley floor where the channels flatten out. This allows the flows to spread out over great distances inundating the surrounding areas.

In some instances, flooding from different sources converges in specific drainage areas of the city. In the east-central part of the city, flooding studied by approximate methods originates in the north, east of Amargosa Creek, and converges with flooding studied by detailed methods that originate in the foothills to the south.

Flood discharges have overflowed normally dry streambeds, resulting in heavy damage as floodwaters travel through developed areas. During the period of comparatively recent record, floods of major proportions have occurred. The office of the County Engineer has identified the areas in which moderate to severe flooding was observed during heavy storms in 1938, 1965, and 1969 on flood overflow maps. During these floods, widespread damage to orchards, irrigation systems, buildings, and roads occurred.

Thunderstorms have caused localized damage in various portions of the valley, particularly along the foothills of the San Gabriel Mountains to the south and southwest of the city.

Mud flow mapping was incorporated into the DFIRM for the City of Palmdale.

City of Palos Verdes Estates

Results of the mapping study were not previously summarized in the effective FIS report for the City of Palos Verdes Estates; therefore, no flood protection measures are provided.

City of Pasadena

The City of Pasadena is identified as a non-flood prone community. Mud flow mapping was incorporated into the DFIRM for the City of Pasadena.

City of Pomona

Results of the mapping study were not previously summarized in the effective FIS report for the City of Pomona; therefore, no flood protection measures are provided.

Mud flow mapping was incorporated into the DFIRM for the City of Pomona.

City of Rancho Palos Verdes

Results of the mapping study were not previously summarized in the effective FIS report for the City of Rancho Palos Verdes; therefore, no flood protection measures are provided.

Mud flow mapping was incorporated into the DFIRM for the City of Rancho Palos Verdes.

City of Redondo Beach

The watersheds of Redondo Beach are relatively small with storm flows either draining directly into the ocean or accumulating in numerous small sumps. The Los Angeles County Flood Control District flood overflow maps indicate a history of flooded streets and sumps in the community which resulted from the major storms of 1938, 1965, 1969, 1978, 1980, 1983, and 1994.

Flooding caused by the 1-percent annual chance flood is limited to street rights of way, areas of shallow flooding less than one foot deep, and ponding areas. Shallow flooding occurs along Avenue I between South Elena and Esplanade Avenues; along Julia Avenue between Camino Real and South Juanita Avenue; between Del Amo, Diamond, Garnsey, and Vincent Streets; between Vincent Street, South Irena Avenue, Spencer Street, and El Rondo; between Anita Street, North Prospect Avenue, Agate Street, and Harkness Lane; along Carnegie Lane between Blossom and Green Lanes; between Aviation Way and Artesia and Aviation Boulevards; between Gibson Avenue, Deland Boulevard, Dow Avenue, and Manhattan Beach Boulevard; at the intersection of the Atchinson, Topeka, and Santa Fe Railway and Inglewood Avenue; and along Compton Boulevard between Freeman and Aviation Boulevards.

The southern California coastline is exposed to waves generated by winter and summer storms originating in the Pacific Ocean. It is not uncommon for these storms to cause 15-foot breakers. The occurrence of such a storm event in combination with high astronomical tides and strong winds can cause a significant wave runup and allow storm waves to attack higher than normal elevations along the coastline. When this occurs, shoreline erosion and coastal flooding frequently result in damage to inadequately protected structures and facilities located along low-lying portions of the county shoreline.

Brief descriptions of several significant storms provide historic information to which coastal flood hazards and the projected flood depths can be compared.

September 16, 1910

On September 16, 1910, a heavy sea and high ground swells undermined homes in the Long Beach area. The ocean began to erode the sidewalks which stretch from the Long Beach Bath House to Seaside Park at high tide that afternoon and, in a short period of time, over a mile of the bulkhead and sidewalk were destroyed. Efforts were made to check the destruction of the waves by building temporary bulkheads along the waterfront at the most

exposed points; however, these measures proved ineffective until the tide began to recede late in the evening.

December 7-12, 1934

Another recurrence of waves was reported from December 7th through December 12th. Two large openings were made through the rock-mound breakwater at Santa Monica, indicating that the force of the waves was sufficient to displace very heavy granite rocks.

August 21, 1934

On August 21, 1934, waves of a reported height exceeding 30 feet broke with tremendous force along the coast from Laguna to Malibu. At Venice, the seaward end of the pier was destroyed by the heavy seas. The pier at the entrance to the Playa del Rey Lagoon was weakened by the loss of piling. At Hermosa Beach, considerable sand in front of Long Beach was washed away. Basements of seaside cottages along 100 miles of beach were filled with sand, some to a depth of 5 feet. An unusually heavy sea surged over the Santa Monica breakwater carrying some of the rocks away and doing some damage to the pier by destroying a few of the piles. Breakers 15 feet high were reported at Santa Monica.

September 1934

A recurrence of destructive waves, similar to those of August 1934, broke along the coast centering northward in the Long Beach area. Damage was reported at Malibu where portions of the Roosevelt Highway were flooded due to waters backed up at a storm drain project under construction. In addition, the Pine Avenue Pier in Long Beach was destroyed. Structures along the pike were endangered and temporary protection devices were installed. No damage was reported at either San Pedro or Santa Monica.

September 24, 1939

On September 24th and 25th, a tropical cyclone occurred along the entire southern California coastline. The storm resulted in a 20 degree drop in temperatures throughout Southern California. The gales and rain caused death, disrupted power lines, temporarily destroyed main railroad systems, closed highways, and flooded homes.

The winds, reaching a velocity of 65 miles per hour, caused considerable damage. Eight large homes along the waterfront at Sunset Beach were destroyed. In Long Beach, plate-glass windows were shattered by the fierce winds. Some Pacific Electric trackage was destroyed at Hermosa Beach. Phone and power lines were down at Sunset Beach. Disruption of phone service was heaviest at Bellflower, Hynes-Clearwater, and the Artesia area. Homes along the shore from Malibu to Huntington Beach were damaged heavily by

pounding seas and the high wind. In addition, the storm caused the grounding of all airplanes at airports in the Los Angeles area.

The Hamilton, a large storm basin, overflowed its banks and flooded houses and stores. Families in the surrounding district were evacuated from their homes. Schools were closed because of flooded streets. As the stormwaters rushed seaward from the uplands, homes in the residential districts of the lowlands and beach cities were flooded.

Many small boats were washed ashore and several were wrecked when the high waves dashed them upon breakwaters or rocky shores. Early estimates indicated that at least ten yachts and barges sank or were wrecked upon breakwaters and sands. At Santa Monica, the 227-foot fishing barge Minne A was washed ashore.

Five deaths were reported. Two died at Los Angeles Harbor, two at Long Beach, and one at Newport Beach. At Burbank, one woman drowned and others were injured when a boat overturned.

Catalina Island reported a 50 mile per hour wind at Diamond Point.

December 25, 26, and 27, 1940

Twenty- and thirty-foot waves undermined residences and portions of the Strand at Redondo Beach. Two houses collapsed and five blocks of ocean-front walk were destroyed. In addition, 25-foot high breakers undermined a house and store 50 feet landward of the normal high-tide mark.

At Belmont Peninsula, Long Beach, 70 homes were threatened to be cut off from the mainland by intense wave action.

May 22, 1960

Resurgent seismic-triggered ocean waves stemming from Chilean earthquakes destroyed dock facilities and hundreds of small craft. Damage was estimated at upwards of one million dollars. Hardest hit was the Los Angeles-Long Beach Harbor complex, where a series of tidal currents surged back and forth through narrow Cerritos Channel, wreaking havoc among the yacht anchorages. Some 300 yachts and small boats were torn from their slips, and early estimates indicated that from 15 to 30 had been sunk.

Monumental traffic jams occurred in the Los Angeles/Long Beach Harbor area coincident with suspension of ferry service and closing of the Terminal Island bridges. The surge was estimated at 8 and 9 feet high at times.

March 27, 1964

Ten-foot waves, set in motion by a violent Alaskan earthquake, damaged the unsheltered coast of Santa Catalina Island. No damage was reported on the sheltered side of the island where Avalon Bay and the isthmus anchorage are located.

At Marina del Rey, the rise was measured at 52 inches in the harbor and 5 feet at the entrance during low tide.

Winter 1977-1978

A combination of high astronomical tides, strong onshore winds, and high storm waves resulted in significant coastal flooding along the coastline of Los Angeles County. High tides and waves were responsible for 1 to 1.8 million dollars in private property losses to homes located along beaches in Malibu; \$80,000 in damages to the Santa Monica Pier; \$150,000 in damages to the Long Beach Harbor; and \$140,000 in damages to a bicycle path in El Segundo. Other smaller losses resulting from wave damages occurred at Leo Carillo State Beach, Redondo Beach, Avalon, and other areas along the county shoreline.

City of Rolling Hills Estates

Results of the mapping study were not previously summarized in the effective FIS report for the City of Rolling Hills Estates; therefore, no flood protection measures are provided.

City of Rolling Hills

The City of Rolling Hills is identified as a non-flood prone community.

Mud flow mapping was incorporated into the DFIRM for the City of Rolling Hills.

City of Rosemead

Results of the mapping study were not previously summarized in the effective FIS report for the City of Rosemead; therefore, no flood protection measures are provided.

City of San Dimas

Results of the mapping study were not previously summarized in the effective FIS report for the City of San Dimas; therefore, no flood protection measures are provided. Mud flow mapping was incorporated into the DFIRM for the City of San Dimas.

City of San Fernando

Results of the mapping study were not previously summarized in the effective FIS report for the City of San Fernando; therefore, no flood protection measures are provided.

City of San Gabriel

The City of San Gabriel is identified as a non-flood prone community.

City of San Marino

The City of San Marino is identified as a non-flood prone community.

City of Santa Clarita

Los Angeles County Flood Control District flood-overflow maps indicate a history of flooding in this area from major storms during 1934, 1938, 1941, 1943, 1952, 1956, separate storm events in January and February 1969, February and March 1978, and 1980, 1983, 1992, and 1994. These events demonstrate that the City of Santa Clarita is susceptible to flood damage. Of particular concern are mudflows that frequently occur in the foothill areas during intense rainfall, usually following brush fires in the upstream watershed. This hazard has not been addressed in this study.

During the 1969 storms in the Santa Clarita Valley, much damage was caused by erosion and sedimentation of the natural watercourses. The most significant damage to private property was the destruction of a zoological compound located in the Santa Clara River floodplain.

City of Santa Monica

Results of the mapping study were not previously summarized in the effective FIS report for the City of Santa Monica; therefore, no flood protection measures are provided.

City of Sierra Madre

The City of Sierra Madre is identified as a non-flood prone community.

Mud flow mapping was incorporated into the DFIRM for the City of Sierra Madre.

City of Signal Hill

Results of the mapping study were not previously summarized in the effective FIS report for the City of Signal Hill; therefore, no flood protection measures are provided.

City of South El Monte

The City of South El Monte is identified as a non-flood prone community.

City of South Pasadena

The City of South Pasadena is identified as a non-flood prone community.

City of Temple City

The City of Temple City is identified as a non-flood prone community.

City of Torrance

The LACFCD flood overflow map at a scale of 1: 24, 000 (Los Angeles County Flood Control District, 1993) indicate a history of flood streets, sumps, and general flooding among Dominguez Channel in Torrance, which resulted from the major storms of March 1938, February 1941, January 1952, January 1956, and January 1969. The flooding problems were related to the inadequacy of local drainage facilities.

The city is also exposed to potential coastal high hazard caused by storm surge and wave runup from the Pacific Ocean.

City of Vernon

The City of Vernon is identified as a non-flood prone community.

City of Walnut

Results of the mapping study were not previously summarized in the effective FIS report for the City of Walnut; therefore, no flood protection measures are provided. Mud flow mapping was incorporated into the DFIRM for the City of Walnut.

City of West Covina

Results of the mapping study were not previously summarized in the effective FIS report for the City of West Covina; therefore, no flood protection measures are provided.

City of West Hollywood

The major causes of flooding in West Hollywood are short-duration, high intensity storms. Los Angeles County Flood Control District flood overflow maps indicate a history of flooding from the major storms of January 1934, March 1938, February 1941, January 1943, January 1952, and January 1956. A more recent storm, January 1969, was the worst storm recorded for the Los Angeles Basin.

City of Westlake Village

Results of the mapping study were not previously summarized in the effective FIS report for the City of Westlake Village; therefore, no flood protection measures are provided.

2.4 Flood Protection Measures

Los Angeles County

A complex drainage system has been constructed to alleviate flooding in Los Angeles County. The major components of the Los Angeles County flood control system are the Los Angeles River, the San Gabriel River, Rio Hondo, Ballona Creek, and Dominguez Channel. In addition, numerous other storm drains, channels and debris basins have been constructed by the USACE, local agencies, and private developers. Responsibility for maintaining the majority of this system, which serves the incorporated cities as well as

unincorporated county territory, lies with the Los Angeles County Flood Control District. Generally, the larger drainage systems mentioned above are designed to contain a 1-percent annual chance flood event.

The major drainage systems in the western and northern portions of the county are largely unimproved, although developed areas generally contain drainage systems providing a level of protection less than that of a 1-percent annual chance event. Development in these areas, which includes the Malibu area, and the Santa Clarita and Antelope Valleys, is less dense than that of the Los Angeles basin, but is rapidly reaching the point of complete build-out in some areas.

Although a number of drainage systems have been constructed to protect areas of development, environmental concerns, and a desire to retain “natural” channels that retain environmental functions, recharge capability, and water quality improvement qualities make extensive flood control channel development unlikely. Therefore, it appears that most areas of the County will have to be protected from flood hazard by exercising sensible flood plain management. Current floodplain management measures include the reviewing of new developments before permits are issued and the undertaking of additional studies designed to supplement this Flood Insurance Study.

City of Agoura Hills

The major drainage systems in the western portion of the county are largely unimproved. Development in these areas, which includes the Malibu area, is far more sparse than in the Los Angeles basin. Although a few drainage systems have been constructed to protect portions of the existing development, lack of funding and environmental concerns make extensive flood control work unlikely. Therefore, for the foreseeable future, it appears that most future development will have to be protected from flood hazard by exercising sensible floodplain management. Current floodplain management measures include the reviewing of new developments before permits are issued.

City of Alhambra

The City of Alhambra is identified as a non-flood prone community.

City of Arcadia

The City of Arcadia is identified as a non-flood prone community.

City of Artesia

The City of Artesia is identified as a non-flood prone community.

City of Avalon

Currently, there are no flood protection devices or measures that protect the City from damaging floods, other than the presence of small drainage ditches and natural channels.

City of Azusa

Results of the mapping study were not previously summarized in the effective FIS report for the City of Azusa; therefore, no flood protection measures are provided.

City of Baldwin Park

Results of the mapping study were not previously summarized in the effective FIS report for the City of Baldwin Park; therefore, no flood protection measures are provided.

City of Bell Gardens

Results of the mapping study were not previously summarized in the effective FIS report for the City of Baldwin Park; therefore, no flood protection measures are provided.

City of Bell

The City of Bell is identified as a non-flood prone community.

The Los Angeles County Flood Control District, in conjunction with the Corps of Engineers, have built a series of dams, reservoirs, debris basins, and channel and storm drain systems, to minimize flooding in the Los Angeles River basin and its tributaries. Responsibility for maintaining most of the system lies with the LACFCD.

The Los Angeles River is the major flood control system affecting these cities. The current flood control channel was designed to convey flood waters safely through the County to its outlet on the Pacific Ocean at Long Beach. The current channel was modified in the 1990's to carry an event larger than a 1-percent chance flood.

Components of the system protecting these cities includes the Hansen and Sepulveda Flood Control Dams, 15 major channels within the City of Los Angeles, including the Los Angeles River, Pacoima Wash, Tujunga Wash, Sawtelle-Westwood Flood Control System, and Ballona Creek systems. Additionally, the Los Angeles County Flood Control District has constructed 111 debris basins, additional major flood control channels in the San Fernando Valley, the Ballona Creek system, which collects flood flows from West Los Angeles and discharges into the Pacific Ocean, and the Laguna Dominquez Flood Control System, which drains the southern portion of these cities and a portion of the Harbor area into San Pedro Bay. Moreover, the City of Los Angeles operates and maintains approximately 1,100 miles of open channels and underground drains. The Los Angeles County Flood Control District has constructed and is responsible for the operation and maintenance of approximately 1,000 miles of storm-drain bond issue projects within the city. The City of Los Angeles and the Los Angeles County Flood Control District operate and maintain 13 pumping plants in the Harbor, San Fernando Valley, and West Los Angeles areas to alleviate inundation of low-lying areas during storms.

In addition, the City of Long Beach has constructed seawalls and levees around the piers in Long Beach Harbor to keep the seawater out of the areas where subsidence has occurred.

The extension of the Detached Federal Breakwater by the USACE to its present terminus opposite the mouth of San Gabriel River in 1946 has eliminated progressive beach erosion. Concrete bulkheads were constructed on Naples Islands by a Works Progress Administration project in the 1930s. In 1967, the City of Long Beach added a reinforced concrete cap approximately 18 inches high to these walls, raising the top to an elevation of 9.0 feet. The city has also constructed several pump plants in the vicinity of Naples Island and Long Beach Harbor.

The only major nonstructural flood protection measure is the Public Warning System for severe weather conditions and tsunamis, operated by the National Oceanic and Atmospheric Administration through its National Weather Service, in cooperation with various State, county, and local officials. This system can provide some measure of flood protection by alerting coastal residents to take necessary precautions in the event of a tsunami or major storm.

The City of Santa Fe Springs is currently protected by the San Gabriel River, Coyote Creek channel (both located outside the corporate limits), and the Coyote Creek - North Fork. The Los Angeles County Flood Control District has constructed several local storm drain projects providing relief to flood-prone areas. Milan Creek upstream of Marquardt Avenue (outside the corporate limits) is permanently improved. However, downstream of Marquardt Avenue, the channel remains unimproved.

The City of Whittier is currently protected by a series of small drainage channels and storm drain systems, as well as the larger system of La Mirada Creek, where it passes through the southeast corner of Whittier. The Los Angeles County Flood Control District has constructed several local storm-drain projects, providing relief to flood-prone areas by controlling the 1-percent annual chance flood event. The USACE has constructed levees along the San Gabriel River, west and north of Whittier. These levees control the 1-percent annual chance flood event downstream of Whittier Narrows Flood Control Basin.

City of Beverly Hills

Results of the mapping study were not previously summarized in the effective FIS report for the City of Beverly Hills; therefore, no flood protection measures are provided.

City of Bradbury

The City of Bradbury is identified as a non-flood prone community.

City of Burbank

The City of Burbank is protected by the Los Angeles River and the Burbank Western Flood Control Channel. The Los Angeles River and Burbank Western Flood Control Channels are currently capable of conveying the 1-percent annual chance flood event. In addition, the Los Angeles County Flood Control District has constructed several debris basins, major channels, and numerous local storm drain projects, including the Lockheed Storm Drain, to provide relief to flood-prone areas. Most channels and storm drains built within the city are capable of controlling discharges associated with the 1-percent annual

chance event; however, several areas do not have this level of protection and shallow flooding is, therefore, not uncommon.

Burbank has also adopted flood plain management regulations incorporating building and safety standards as well as ordinances controlling construction in the floodplain.

The Lockheed Drain Channel is a constructed storm-drain channel. Upstream of Clybourn Avenue the channel is an excavated earthen section with a levee on the north side of the channel. Downstream of Clybourn Avenue the channel is either in a closed conduit (reinforced-concrete pipe or reinforced- concrete box section) or is a rectangular reinforced concrete open channel section. Bridge crossings of the rectangular section consist of a reinforced concrete slab over the rectangular channel section.

Immediately upstream of Clybourn Avenue, a multiple-pipe spillway structure has been constructed to convey excess discharge under the SPRR. This structure replaces an open-channel trestle-type structure and is intended to spill excess flows to the area south of the Lockheed Drain Channel, thereby preventing overtopping of the levee located along the north side of the drain and the railroad embankment on the south side of the drain. As part of this restudy, the railroad embankment on the south side of the Lockheed Drain Channel was evaluated as if it were a levee. However, in this restudy it was determined that as a result of replacing the former open-channel facility with the current multiple-pipe structure, the south-side embankment will not have the minimum 3 feet of freeboard during a 1-percent annual chance flood event as outlined in Section 65.10 of FEMA publication "National Flood Insurance Program and Related Regulations" (Federal Emergency Management Agency, October 1, 1994). As part of this restudy, the levee system along the north bank of the Lockheed Drain Channel and the embankment along the south bank were analyzed as providing protection during a 1-percent annual chance flood event and as failing during a 1-percent annual chance flood event. The guidelines found in Section 65.10 of "National Flood Insurance Program and Related Regulations" were applied where it was assumed that the levee or railroad embankment may not exist due to the lack of requisite freeboard or structural and soil data that would confirm the adequacy of the existing levee or railroad embankment. Analyses were performed alternatively assuming the facilities to be in place.

Analyses were also performed for the following facilities, as above, based on the guidelines found in Section 65.10 of "National Flood Insurance Program and Related Regulations":

1. The SPRR embankments, from just upstream of Naomi Street to Buena Vista Street and from Lincoln Street to Parish Place, did not meet the minimum freeboard requirements.
2. The existing masonry walls around the City of Burbank electrical substation at Lincoln Street.
3. The subdivision masonry wall located between the City of Burbank substation at Lincoln Street and Parish Place.

The base (1-percent annual chance) flood elevations (BFEs) shown on the FIRM and Flood Profiles for the Lockheed Drain Channel represent the results of the analyses performed with the above facilities being in place during a 1-percent annual chance flood event. The Zone X areas delineated along the south overbank in the vicinity of Frederick Street and Parish Place represent the results of the analyses that were performed assuming that the above facilities were not in place during a 1-percent annual chance flood event.

City of Calabasas

Results of the mapping study were not previously summarized in the effective FIS report for the City of Calabasas; therefore, no flood protection measures are provided.

City of Cerritos

Results of the mapping study were not previously summarized in the effective FIS report for the City of Cerritos; therefore, no flood protection measures are provided.

City of Claremont

Results of the mapping study were not previously summarized in the effective FIS report for the City of Claremont; therefore, no flood protection measures are provided.

City of Commerce

Results of the mapping study were not previously summarized in the effective FIS report for the City of Commerce; therefore, no flood protection measures are provided.

City of Covina

Results of the mapping study were not previously summarized in the effective FIS report for the City of Covina; therefore, no flood protection measures are provided.

City of Cudahy

Results of the mapping study were not previously summarized in the effective FIS report for the City of Cudahy; therefore, no flood protection measures are provided.

City of Culver City

The City of Culver City is protected by the Ballona Creek Channel, Centinela Creek Channel, SawtelleWestwood Storm Drain Channel, and Benedict Canyon Channel, in addition to numerous local storm drain projects providing relief to flood-prone areas. Benedict Canyon is below ground for its entire study length.

City of Diamond Bar

Results of the mapping study were not previously summarized in the effective FIS report for the City of Diamond Bar; therefore, no flood protection measures are provided.

City of Duarte

The City of Duarte is identified as a non-flood prone community.

City of El Monte

The City of El Monte is identified as a non-flood prone community.

City of El Segundo

Results of the mapping study were not previously summarized in the effective FIS report for the City of El Segundo; therefore, no flood protection measures are provided.

City of Glendale

Results of the mapping study were not previously summarized in the effective FIS report for the City of Glendale; therefore, no flood protection measures are provided.

City of Glendora

Results of the mapping study were not previously summarized in the effective FIS report for the City of Glendora; therefore, no flood protection measures are provided.

City of Hawaiian Gardens

Results of the mapping study were not previously summarized in the effective FIS report for the City of Hawaiian Gardens; therefore, no flood protection measures are provided.

City of Hawthorne

The City of Hawthorne is identified as a non-flood prone community.

City of Hermosa Beach

Results of the mapping study were not previously summarized in the effective FIS report for the City of Hermosa Beach; therefore, no flood protection measures are provided.

City of Hidden Hills

Results of the mapping study were not previously summarized in the effective FIS report for the City of Hidden Hills; therefore, no flood protection measures are provided.

City of Huntington Park

The City of Huntington Park is identified as a non-flood prone community. City of Industry

Results of the mapping study were not previously summarized in the effective FIS report for the City of Industry; therefore, no flood protection measures are provided.

City of Inglewood

Results of the mapping study were not previously summarized in the effective FIS report for the City of Inglewood; therefore, no flood protection measures are provided.

City of Irwindale

Results of the mapping study were not previously summarized in the effective FIS report for the City of Irwindale; therefore, no flood protection measures are provided.

City of La Canada Flintridge

The City of La Canada Flintridge is identified as a non-flood prone community.

City of La Habra Heights

Results of the mapping study were not previously summarized in the effective FIS report for the City of La Habra Heights; therefore, no flood protection measures are provided.

City of La Mirada

The City of La Mirada is protected from flood flows by the Los Angeles River system, and the flood control facility of Coyote Creek, which generally follows the eastern corporate limits. Also, the Los Angeles County Flood Control District has constructed several local storm drains providing relief to flood-prone areas.

City of Puente

Results of the mapping study were not previously summarized in the effective FIS report for the City of Puente; therefore, no flood protection measures are provided.

City of La Verne

Results of the mapping study were not previously summarized in the effective FIS report for the City of La Verne; therefore, no flood protection measures are provided.

City of Lancaster

Flooding conditions within the City of Lancaster have been improved with the installation of flood control structures by various agencies and property owners. Major public and private improvements, such as the Antelope Valley Freeway (State, Routes 14 and 138), the Union (former Southern) Pacific Railroad, and the California Aqueduct, have incorporated provisions for the passage of flood flows. During construction of the Antelope Valley Freeway, an interceptor drain was constructed for Amargosa Creek. The drain starts at Avenue K and continues northward along the east side of the freeway through the city. The drain will contain a 1-percent annual chance flood.

City of Lawndale

The City of Lawndale is identified as a non-flood prone community.

City of Lomita

The City of Lomita is identified as a non-flood prone community.

City of Malibu

Results of the mapping study were not previously summarized in the effective FIS report for the City of Malibu; therefore, no flood protection measures are provided.

City of Manhattan Beach

Results of the mapping study were not previously summarized in the effective FIS report for the City of Manhattan Beach; therefore, no flood protection measures are provided.

City of Maywood

The City of Maywood is identified as a non-flood prone community.

City of Monrovia

The City of Monrovia is identified as a non-flood prone community.

City of Monterey Park

Results of the mapping study were not previously summarized in the effective FIS report for the City of Monterey Park; therefore, no flood protection measures are provided.

City of Norwalk

Results of the mapping study were not previously summarized in the effective FIS report for the City of Norwalk; therefore, no flood protection measures are provided.

City of Palmdale

Flooding conditions within the City of Palmdale have been improved with the installation of smaller flood control systems by various agencies and property owners. Major public and private improvements, such as the Antelope Valley Freeway (State Route 14), the Union (former Southern) Pacific Railroad, and the California Aqueduct (located south of Palmdale), have provided for the passage of flood flows.

City of Palos Verdes Estates

Results of the mapping study were not previously summarized in the effective FIS report for the City of Palos Verdes Estates; therefore, no flood protection measures are provided.

City of Pasadena

The City of Pasadena is identified as a non-flood prone community.

City of Pomona

Results of the mapping study were not previously summarized in the effective FIS report for the City of Pomona; therefore, no flood protection measures are provided.

City of Rancho Palos Verdes

Results of the mapping study were not previously summarized in the effective FIS report for the City of Rancho Palos Verdes; therefore, no flood protection measures are provided.

City of Redondo Beach

The City of Redondo Beach is protected by a system of drainage channels and storm drain systems.

Major structural modifications have been made along the 74 miles of coastline in Los Angeles County. Over 50 miles of seawalls and revetments have been constructed to halt erosion and to absorb the impact of wave forces. In addition, 41 groins, 9 breakwaters, and 6 jetties have been constructed to serve a number of purposes, including flood protection.

The only major countywide nonstructural flood protection measure is the Public Warning System for severe weather conditions and tsunamis, operated by the National Oceanic and Atmospheric Administration through its National Weather Service, in cooperation with various State, county, and local officials.

This system can provide some measure of flood protection by alerting the coastal residents to take necessary precautions in the event of a tsunami or major storm.

In addition, the City of Redondo Beach as well as other coastal communities in the County are participating in either the emergency or regular phase of the National Flood Insurance Program.

City of Rolling Hills Estates

Results of the mapping study were not previously summarized in the effective FIS report for the City of Rolling Hills Estates; therefore, no flood protection measures are provided.

City of Rolling Hills

The City of Rolling Hills is identified as a non-flood prone community.

City of Rosemead

Results of the mapping study were not previously summarized in the effective FIS report for the City of Rosemead; therefore, no flood protection measures are provided.

City of San Dimas

Results of the mapping study were not previously summarized in the effective FIS report for the City of San Dimas; therefore, no flood protection measures are provided.

City of San Fernando

Results of the mapping study were not previously summarized in the effective FIS report for the City of San Fernando; therefore, no flood protection measures are provided.

City of San Gabriel

The City of San Gabriel is identified as a non-flood prone community. City of San Marino

The City of San Marino is identified as a non-flood prone community. City of Santa Clarita

The major drainage systems in and around the City of Santa Clarita are currently undergoing major change. Numerous developments within the City are protected by facilities constructed to convey the 1- percent chance flood event. No comprehensive flood control system as yet exists. Environmental concerns and funding limitations make the construction of a large concrete flood control channel system unlikely. Therefore, sound floodplain management may remain a primary means of limiting flood hazards to new development. Current floodplain management measures include reviewing new development before permits are issued and performing additional studies designed to supplement this Flood Insurance Study.

City of Santa Monica

Results of the mapping study were not previously summarized in the effective FIS report for the City of Santa Monica; therefore, no flood protection measures are provided.

City of Sierra Madre

The City of Sierra Madre is identified as a non-flood prone community.

City of Signal Hill

Results of the mapping study were not previously summarized in the effective FIS report for the City of Signal Hill; therefore, no flood protection measures are provided.

City of South El Monte

The City of South El Monte is identified as a non-flood prone community.

City of South Pasadena

The City of Pasadena is identified as a non-flood prone community.

City of Temple City

The City of Temple City is identified as a non-flood prone community.

City of Torrance

The City of Torrance is currently protected by a series of small drainage channels and storm drain systems. The Dominguez Channel and several local storm drain projects, provide relief to flood-prone areas.

City of Vernon

The City of Vernon is identified as a non-flood prone community.

City of Walnut

Results of the mapping study were not previously summarized in the effective FIS report for the City of Walnut; therefore, no flood protection measures are provided.

City of West Covina

Results of the mapping study were not previously summarized in the effective FIS report for the City of West Covina; therefore, no flood protection measures are provided.

City of West Hollywood

The City of West Hollywood is currently protected by a series of small drainage channels and storm drain systems. Plans are underway to upgrade the flood protection measures exercised in West Hollywood. The Los Angeles County Flood Control District maintains the majority of the drainage system.

City of Westlake Village

Results of the mapping study were not previously summarized in the effective FIS report for the City of Westlake Village; therefore, no flood protection measures are provided.

[End Section 2.0 Area Studied,

Section 3.0 Engineering Methods begins in Volume 2]