FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 2 OF 7

RIVERSIDE COUNTY, CALIFORNIA

AND INCORPORATED AREAS

COMMUNITY NAME	NUMBER	COMMUNITY NAME	NUMBER
BANNING, CITY OF	060246	LAKE ELSINORE, CITY OF	060636
BEAUMONT, CITY OF	060247	MENIFEE, CITY OF	060176
BLYTHE, CITY OF	060248	MORENO VALLEY, CITY OF	065074
CALIMESA, CITY OF	060740	MURRIETA, CITY OF	060751
CANYON LAKE, CITY OF	060753	NORCO, CITY OF	060256
CATHEDRAL CITY, CITY OF	060704	PALM DESERT, CITY OF	060629
COACHELLA, CITY OF	060249	PALM SPRINGS, CITY OF	060257
CORONA, CITY OF	060250	PERRIS, CITY OF	060258
DESERT HOT SPRINGS, CITY OF	060251	RANCHO MIRAGE, CITY OF	060259
EASTVALE, CITY OF	060155	RIVERSIDE, CITY OF	060260
HEMET, CITY OF	060253	RIVERSIDE COUNTY, UNINCORPORATED AREAS	060245
INDIAN WELLS, CITY OF	060254	SAN JACINTO, CITY OF	065056
INDIO, CITY OF	060255	TEMECULA, CITY OF	060742
JURUPA VALLEY, CITY OF	060286	WILDOMAR, CITY OF	060221
LA QUINTA, CITY OF	060709		

TRIBAL NATION**	TRIBAL NATION**	TRIBAL NATION**
AGUA CALIENTE BAND OF CAHUILLA INDIANS OF THE AGUA CALIENTE INDIANS	RAMONA BAND OF CAHUILLA	TWENTY-NINE PALMS BAND OF MISSION INDIANS
AUGUSTINE BAND OF CAHUILLA INDIANS	SANTA ROSA BAND OF CAHUILLA INDIANS	CAHUILLA BAND OF INDIANS
MORONGO BAND OF MISSION INDIANS	SOBOBA BAND OF LUISENO INDIANS	COLORADO RIVER INDIAN TRIBES
PECHANGA BAND OF LUISENO MISSION INDIANS	CABAZON BAND OF MISSION INDIANS	TORRES MARTINEZ DESERT CAHUILLA INDIANS

**Federally Recognized Tribal Nations

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Table 7: Non-Levee Flood Protection Measures

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
1001 Ranch Drain	Culvert	1-percent-annual-chance flood discharge contained in structure	1001 Ranch Drain	1-percent-annual-chance flood contained in culvert
1001 Ranch Drain	Concrete Weir	Weir	1001 Ranch Drain	*
1001 Ranch Drain	Culvert	Culvert	1001 Ranch Drain	*
1001 Ranch Drain	Culvert	1-percent-annual-chance flood discharge contained in structure	1001 Ranch Drain	*
1001 Ranch Drain	Dam	Dam	1001 Ranch Drain	*
1001 Ranch Drain West Tributary	Control Weir	Weir	1001 Ranch Drain West Tributary	*
Arlington Channel	Arlington Channel	*	From confluence with Oak Street Channel to 250 feet upstream of D Street	72-inch reinforced-concretepipe
Arlington Channel	Arlington Channel	Channel	*	Fully improved 1-percent-annual-chance designchannel
Arlington Channel	Arlington Channel	Channel	*	Fully improved 1-percent-annual-chance design channel
Arlington Channel	Arlington Channel	*	From confluence with Temescal Wash to corporate limits	1-percent-annual-chance capacity reinforced-concrete rectangular channel
Bautista Creek	Bautista Creek	Concrete Lined Channel	*	Capacity equal to or greater than the 1-percent-annual-chance flood
Bautista Creek	Bautista Creek	Stable, Graded Channel	*	Designed to contain the 1-percent-annual-chance or greater flood

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Bautista Wash Basin	Fairview Channel	Concrete Diversion Channel	Above Fairview Avenue	Collects runoff from the watershed above Fairview Avenue and deposits it within the levees of Bautista Creek
Bear Creek	Bear Creek Channel	Channel	Upper Bear Creek	The 2.5 mile long Bear Creek Channel is a soil cement lined, trapezoidal channel with a 40-foot constant bottom width and 2:1 side slopes except for the last 400 ft, which has a 70-foot constant bottom width and 1.5:1 side slopes. The upper 2.0 mile channel reach has a steep gradient of about 0.028, starting from the spillway of the Upper Bear Creek detention basin. The lower 0.5 mile reach is on a mild gradient of 0.0015, and contains a drop structure upstream of the outlet into the Oleander Reservoir. Channel bank heights were selected to contain the 1-percent-annual-chance flood within the channel. The four side drain inlets along the west bank of the 2.5 mile channel control the introduction of runoff from the surrounding drainage areas into the channel and store debris carried by a major storm event.
Bear Creek	Oleander Reservoir	Reservoir	*	Collects storm runoff from the Bear Creek system and the drainage areas north and west of the reservoir and discharge it to the Coachella Valley Storm Channel via the La Quinta Evacuation Channel. During a 1-percent- annual-chance storm, the water level in the reservoir will rise to about elevation 44 feet NGVD.

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Bear Creek	Upper Bear Creek Detention Basin	Detention Basin	*	Has a storage capacity of 752 acre-feet for temporary detention of storm runoff and debris. The basin is approximately 700 feet wide and 1,350 feet long, with its bottom set at about elevation 320 feet NGVD. Basin side slopes vary from 2.5:1 in soil to 1.5:1 along the existing rock surface. Flows from Bear Creek will enter the basin via a 5:1 sloped inlet protected by one-quarter to one-ton riprap. Attenuated by temporary basin storage, outflows from the basin will enter the Bear Creek Channel via a rectangular concrete spillway in the basin embankment.
Blind Canyon Channel	Blind Canyon Channel	Channel	At the northern corporate limits	Dirt-graded, trapezoidal-shaped channel, which is 100 feet wide and 8 feet deep, and has 1-percent-annual-chance capacity below ground level.
Blind Canyon Channel	Blind Canyon Channel	Concrete Drop	At 16th Street	Concrete drop structure regulates large flood flows.
Bly Channel	Bly Channel	Concrete Lined Channel	*	Capacity equal to or greater than the 1-percent-annual-chance flood
Calismesa Channel	Calismesa Channel	Concrete Lined Channel	*	Capacity equal to or greater than the 1-percent-annual-chance flood
Carrizo Canyon/ Dead Indian Canyon	Carrizo/Dead Indian Debris Basin	Debris Basin	West of HWY- 74 and south end of Palm Desert	Provide 1-percent-annual-chance protection from Carrizo and Dead Indian Canyons
Cat Canyon Creek	Cat Canyon Debris Basin	Debris Basin	In the vicinity of Palm Desert	Provide 1-percent-annual-chance protection from Cat Canyon.

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Channel H	Channel H	Channel	Hemet, Full length	Fully improved, 1-percent-annual-chance design channel. Improvements extend from the outfall of the channel into Lake Elsinore, when the lake elevation is 1,265 feet, upstream toward the corporate limits. From 840 feet downstream of Riverside Drive to 790 feet downstream of Riverside Drive, is a riprap trapezoidal channel that is capable of containing up to a 1-percent-annual-chance flow. A concrete trapezoidal channel with a 1-percent-annual-chance flood capacity is located from 790 feet downstream of Riverside Drive to the corporate At the upstream face of Grand Ave, a 2.8-foot headwall provides sufficient headwater to generate 1-percent-annual-chance flood capacity in the 6-foot by 4-foot concrete box culvert that runs beneath Grand Ave. After passing through this box culvert, the flow continues toward Lake Elsinore and is contained by the concrete trapezoidal channel.
Cherry Avenue Channel	Cherry Avenue Channel	Channel	From 8th Street to 200 feet to the north	8-foot wide by 5-foot deep earthen channel
Cherry Avenue Channel	Cherry Avenue Channel	Channel	From Interstate Highway 10 to 6th Street	8-foot bottom width, 16-foot top width, 4-foot deep concrete trapezoidal channel
Cherry Avenue Channel	Cherry Avenue Channel	Culvert	Under Interstate Highway 10	Double 6-feet wide by 3-feet high reinforced concrete box culvert
Cherry Valley Creek	Cherry Valley Creek	Concrete Lined Channel	*	Capacity equal to or greater than the 1-percent-annual-chance flood
Cherry Valley Creek	Cherry Valley Creek	Improved Channel	*	Designed to contain 10-percent-annual-chance or greater floods whose capacities are inadequate for containing the 1-percent-annual-chance flood
Colorado River	Colorado River	Dam	Various locations	Eliminated the major flood hazards along the Colorado River Valley

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Corral Canyon	Dike No. 2	Dike	In the vicinity of La Quinta	Certified dike
Country Club Creek	Country Club Creek	Natural Watercourse with Minor Stabilization Improvement	*	*
Country Club Creek	Country Club Creek	Channel	*	1-percent-annual-chance flood discharge contained in structure
Country Club Creek Tributary	Country Club Creek Tributary	Natural Watercourse with Minor Stabilization Improvement	*	*
Day Creek	Day Creek	Channel	*	1-percent-annual-chance flood discharge contained in structure
Day Creek	Day Creek	Improved Channel	*	Designed to contain 10- percent annual chance or greater floods whose capacities are inadequate for containing the 1-percent-annual-chance flood
Day Creek Line J	Day Creek Line J Culvert	Culvert	*	1-percent-annual-chance flood discharge contained in structure
Dead Indian Canyon	Dead Indian Debris Basin	Debris Basin	In the vicinity of Palm Desert	Provide 1-percent-annual-chance protection from floods on Cat, Dead Indian, and Carrizo Canyons.
Deep Canyon	Deep Canyon Storm Water Channel	Channel	Through the developed portion of the city	Improvements provide adequate control of the 1- percent-annual-chance flood through this segment of the channel.
Desert Hot Springs Channel	Desert Hot Springs Channel	Channel	12th to 8th Streets	A reinforced-concrete channel
Desert Hot Springs Channel	Desert Hot Springs Channel	Concrete Box	Under Palm Drive	A double 10-foot by 5-foot reinforced-concrete box
Desert Hot Springs Channel	Desert Hot Springs Channel	Pipe	At the Verbera Drive Crossing	48-inch reinforced-concrete pipe
Devil Canyon	Dike No. 4	Dike	In the vicinity of La Quinta	Certified dike
Devil Canyon	Guadalupe Dike	Dike	In the vicinity of La Quinta	Dike

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Dunes View Road	Magnesia Spring Canyon Flood Control Project	Channel	Dunes View Road	The 1-percent-annual-chance flood is contained within the channels, levees and streets of the Magnesia Spring Canyon Flood Control Project
East and West Wide Canyon Watersheds	West Wide Canyon Dam	Dam	Northeast of Desert Hot Springs in the Little San Bernardino Mountains	Built in 1968. Is of sufficient duration that flood hazards from the 33 square miles upstream are effectively eliminated. The hydrologic calculations do not include any runoff contribution from the drainage area controlled by this dam.
East Gilman Home Channel	East Gilman Home Channel	Channel	George Street to 1,000 feet upstream of Gilman Street	5-foot deep Works Progress Administration rubble trapezoidal channel with 3-foot bottom width and 7-foot top width.
East Gilman Home Channel	Gilman Home Channel-Stage I Improvements	Channel	*	Constructed by Flood Control District. Has 1-percent-annual-chance capacity, does not fully eliminate flooding
East La Quinta Channel	Avenida Bermudas Detention Basin	Detention Basin	La Quinta	Handles runoff, retains debris from the drainage area in the foothills to the south and from presently developed area to the southwest of the basin. Runoff to the basin will be conveyed by the East La Quinta Channel to a riprap- protected inlet at the upper end of the basin. The basin outlets into a riprap lined channel at the north end.
East La Quinta Channel	Calle Tecate Detention Basin	Detention Basin	Downstream of the Upper Training Dike	Has a storage capacity of 200 acre-feet for temporary detention of storm runoff and debris.
East La Quinta Channel	East La Quinta Channel	Channel	From the toe of the foothills, from the outlet of the spillway at Calle Tecate Detention Basin to Avenida Bermudas Detention Basin.	Trapezoidal with 2.5:1 side slopes and full riprap lining which follows the existing natural drainage channel.
East La Quinta Channel	Stormwater Conduit	Stormwater Conduit	*	60-inch diameter buried RCP conduet designed to convey flows from the East La Quinta system to the La Quinta Channel.

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
East La Quinta Channel	Upper Training Dike	Dike	Upstream of Calle Tecate Detention Basin	Diverts stormwater flows from the Calle Tecate Detention Basin.
East Magnesia Storm Channel	Magnesia Spring Canyon Flood Control Project	Channel	*	Trapezoidal channel with grouted riprap side slopes.
East Rancho Mirage Storm Channel	Magnesia Spring Canyon Flood Control Project	Channel	*	The 1-percent-annual-chance flood is contained within the channels, levees and streets of the Magnesia Spring Canyon Flood Control Project
Edgemont A	Edgemont A	Natural Watercourse with Minor Stabilization Improvement	*	*
Edgemont B North Fork	Edgemont B North Fork	Concrete-lined Channel	*	Designed to contain the 10-percent-annual-chance or greater flood which have capacities inadequate for containing the 1-percent-annual-chance flood.
Edgemont Storm Channel B East Fork	Edgemont Storm Channel B East Fork	Channel	Moreno Valley	Improved channel designed to contain the 10-percent annual chance flood but not the 1-percent-annual-chance flood.
Edgemont Storm Channel B North Fork	Edgemont Storm Channel B North Fork	Channel	Moreno Valley	Has sections that are concrete-lined channels designed to contain the 10- percent, but not the 1-percent-annual-chance flood.
Edgemont Story Channel A	Edgemont Story Channel A	Channel	Moreno Valley	Natural watercourse with minor stability improvements.
El Cerrito Channel	El Cerrito Channel	Concrete Lined Channel	*	Capacity equal to or greater than 1-percent-annual-chance flood.
El Cerrito Channel	El Cerrito Channel	Improved Channel	*	Designed to contain 10-percent-annual-chance or greater floods whose capacities are inadequate for containing the 1-percent-annual-chance flood.
Gage Canal	Gage Canal	Canal	Gage Canal	*
Garden Air Golf Course	Garden Air Golf Course	Natural Watercourse with Minor Stabilization Improvement	*	*

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Gilman Home Channel	Gilman Home Channel	Channel	1,000 to 400 feet downstream of Wilson Street	5-foot deep concrete trapezoidal channel with a 5- foot bottom width and 20-foot top width
Gilman Home Channel	Gilman Home Channel	Channel	George Street to 1,000 feet downstream of Wilson Street	7-foot wide by 6-foot high concrete rectangular channel
Gilman Home Channel	Gilman Home Channel	Channel	Interstate Highway 10 to George Street	5-foot deep trapezoidal channel with a 3-foot bottom width and a 7-foot top width
Gilman Home Channel	Gilman Home Channel	Channel	Westward Avenue to Interstate Highway 10	1-percent-annual-chance design channel
Hemet Storm Channel	*	Primary Drainage System	Includes Hemet Storm Channel and the downstream reaches of Acacia Street Drain, Whittier Channel, and Stetson Avenue Channel	1-percent-annual-chance capacity primary system channels collect runoff generated in the Hemet watershed between Florida and Stetson Avenues, with Hemet Storm Channel acting as the main conveyance structure that transmits flow collected in the other channels to Salt Creek.
Highland Springs Channel	Highland Springs Channel	Channel	*	Constructed by Flood Control District. A 1-percent-annual-chance design improvement, but suffers from a lack of inlet capacity to the subterranean box culvert below Wilson Street.
Highlands Springs Channel	Highlands Springs Channel	Channel	From 8th to 12th Streets	5.5-foot deep concrete trapezoidal channel with a 5-foot bottom width and a 21.5-foot top width
Highlands Springs Channel	Highlands Springs Channel	Channel	From Fifth Street to Eighth Street (Wilson Street)	6-foot high, 6-foot wide, reinforced-concrete box
Indian Canyon Channel	Indian Canyon Channel	Channel	From Wilson Street to 400 feet north of Indian School Lane	5-foot deep Works Progress Administration rubble channel with a 3-foot bottom width and 7-foot top width
Kalmia Street Tributary	Kalmia Street Tributary	Improved Channel	*	Designed to contain 10- percent annual chance or greater floods whose capacities are inadequate for containing the 1-percent-annual-chance flood

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Kitching Drain	Kitching Drain	Drain	Moreno Valley	Improved channel designed to contain the 10-percent-annual-chance flood but not the 1-percent-annual-chance flood
La Quinta Evacuation Channel	La Quinta Evacuation Channel	Channel	La Quinta	Extends from the outlet of Aleander Reservoir at Eisenhow Drive to the Coachella Valley Stormwater Channel near Jefferson Street. A mixture of trapezoidal channels, broad channels through golf courses, levees, low water crossing and bridges. It is 3.5 miles long with a relatively flat gradient of under 1 foot per mile.
Lakeland Village Channel	Lakeland Village Channel	Improved Channel	*	Designed to contain 10-percent-annual-chance or greater floods whose capacities will not contain the 1-percent-annual-chance flood
Leach Canyon Channel	Leach Canyon Channel	Channel	Hemet, Full length	Fully improved, 1-percent-annual-chance design channel. Improvements extend from outfall of the channel into Lake Elsinore, when lake elevation is 1,265 feet, upstream toward corporate limits. From 840 feet downstream of Riverside Drive to 790 feet. From 1,300 feet downstream of Riverside Drive to 1,350 feet upstream of Riverside Drive.
Lime Street Channel	Lime Street Channel	Channel	Hemet, Full length	Fully improved, 1-percent-annual-chance design channel. Improvements extend from outfall of the channel into Lake Elsinore, when the lake elevation is 1,265 feet, upstream toward the corporate limits. From 1,190 feet to 1,110 feet downstream of Grande Avenue, is a riprap trapezoidal channel capable of containing a 1-percent- annual-chance flow. From 1,110 feet to 40 feet downstream of Grande Avenue, there is a concrete trapezoidal channel that is capable of channeling a 1-percent-annual-chance flood. From 40 feet downstream of Grand Ave to 40 feet upstream of Grand Avenue, there is an 8-feet wide, 3.66-foot high concrete box culvert.

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Lincoln Avenue Drain	Lincoln Avenue Drain	*	From 250 feet upstream of D Street to Eighth Street	51-inch reinforced-concrete pipe
Lincoln Avenue Drain	Lincoln Avenue Drain	Pipe	From Eighth Street to 1,000 feet upstream of Citron Avenue	48-inch reinforced-concrete pipe
Line "J" Channel	Line "J" Channel	Channel	City of Perris, from Perris Valley Storm Drain to Perris Boulevard	5-foot deep concrete trapezoidal channel with a 10-foot bottom width and 2:1 sideslope that is capable of channeling a 1-percent-annual-chance flood and allows only shallow flooding during the 0.2-percent-annual-chance frequency storm.
Little Morongo Wash	Little Morongo Wash	Natural Watercourse with Minor Stabilization Improvement	*	*
Little San Gorgonio Creek	Little San Gorgonio Creek	Improved Channel	*	Designed to contain 10-percent-annual-chance or greater floods whose capacities are inadequate for containing the 1-percent-annual-chance flood
Mabey Canyon	Mabey Canyon	Channel	From the spillway downstream for approximately 1,500 feet	Fully improved channel with 1- to 0.2-percent-annual-chance flood control
Mabey Canyon	Mabey Canyon	Debris Basin	*	1-percent-annual-chance flood control
Mabey Canyon	Mabey Canyon	Structural Wall	Along the segment of channel improvement adjacent to Border Avenue	4-foot-high structural wall provides control and defines the eastern edge of Border Avenue as the limit of the special flood hazard in the reach of Mangular Channel.
Main Street Channel	Main Street Channel	Channel	*	Fully improved 1-percent-annual-chance design channel
Main Street Channel	Main Street Channel	Channel and Debris Basin	From confluence with Temescal Wash to upstream limit	1-percent-annual-chance capacity reinforced-concrete channel and debris basin

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Mangular Channel	Mangular Channel	Channel	From the confluence with Oak Street Channel to Ontario Avenue	Fully improved 1-percent-annual-chance design channel
Mangular Channel	Mangular Channel	Channel	From confluence with Oak Street Channel to Ontario Avenue	1-percent-annual-chance design reinforced-concrete channel
Mangular Channel	Mangular Channel	Channel and Debris Basin	From 4,000 feet upstream of Ontario Avenue to corporate limits	1- to 0.2-percent-annual-chance design channel and 1,000-year control debris basin
Meridian Street Channel	Meridian Street Channel	Channel	San Jacinto, from the San Jacinto River to Burkley	Constructed to divert runoff from Bautista Wash to the San Jacinto River.
Metz Road Basin	Metz Road Basin	Basin	City of Perris	0.2-percent-annual-chance flood storage capacity. The outlets are designed to create no flooding problems as they discharge downstream toward the San Jacinto River.
Metz Road Storm Drain	Metz Road Storm Drain	Drain	City of Perris, from Perris Valley Storm Drain to Perris Boulevard	4-foot deep concrete trapezoidal channel with a 4- foot bottom width and a 1:1/2:1 sideslope.
Metz Road Storm Drain	Metz Road Storm Drain	Drain	City of Perris, from Wilson Avenue to Perris Boulevard	3-foot deep concrete trapezoidal channel, with a 3- foot bottom width and sideslopes of 1:1 and 2:1.
Middle Canyon	Dike No. 4	Dike	In the vicinity of La Quinta	Certified dike
Middle Canyon	Guadalupe Dike	Dike	In the vicinity of La Quinta	Dike
Mission Creek	Mission Creek	Channel	*	A 250-foot wide, graded, trapezoidal channel. The flowline is between 3 and 4 feet below grade and sand dikes of 5 to 6 feet high.
Mission Creek	Mission Creek	Graded, Trapezoidal Channel	In the vicinity of Desert Hog Springs	250 feet wide with the flowline between 3 and 4 feet below grade and sand dikes of 5 to 6 feet high. Does not contain the 1-percent-annual-chance flood.
Mission Creek	Mission Creek	Stable, Graded Channel	*	Designed to contain the 1-percent-annual-chance or greater flood

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Montgomery Creek Channel	Montgomery Creek Channel	Channel	Down to Ramsey Street	Constructed by Flood Control District. A 1-percent annual chance design channel which eliminates the special flood hazards along this watercourse down to Ramsey Street.
Montgomery Creek Channel	Montgomery Creek Channel	Channel	From Nicolet to Wilson Streets	5.5-foot deep concrete trapezoidal channel with a 3-foot bottom width and a 19.5-foot top width
Montgomery Creek Channel	Montgomery Creek Channel	Channel	From Ramsey to Nicolet Streets	6-foot high, 10-foot wide reinforced-concrete rectangular channel
Montgomery Creek Channel	Montgomery Creek Channel	Channel	From Wilson Street to Sunset Avenue	5-foot deep concrete trapezoidal channel with a 3- foot bottom width and an 18-foot top width
Montgomery Creek Channel	Montgomery Creek Channel	Culvert	Under Interstate Highway 10 and Ramsey Street	6-foot high, 10-foot wide reinforced-concrete box culvert
Murrieta Creek	Murrieta Creek	Improved Channel	*	Designed to contain 10-percent-annual-chance or greater floods whose capacities are inadequate for containing the 1-percent-annual-chance flood
Murrieta Hot Springs	Murrieta Hot Springs	Concrete Lined Channel	*	Capacity equal to or greater than the 1-percent-annual-chance flood
Murrieta Hot Springs	Murrieta Hot Springs	Natural Watercourse with Minor Stabilization Improvement	*	*
Noble Creek	Noble Creek	Concrete Lined Channel	*	Capacity equal to or greater than the 1-percent-annual-chance flood
Noble Creek	Noble Creek	Improved Channel	*	Designed to contain 10- percent annual chance or greater floods whose capacities are inadequate for containing the 1-percent-annual-chance flood

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
North Cathedral Channel	North Cathedral Channel	Channel	Just above the confluence with West Cathedral Channel to 2,040 feet upstream	A trapezoidal concrete-lined channel 6 to 7 feet in depth. The channel was constructed for the Flood Control District and is designed to contain a 1-percent-annual-chance flow of 2,300 cubic feet per second (cfs).
North Norco Channel	North Norco Channel	Channel	From Country Club Lane to River Street	Graded trapezoidal channel
North Norco Channel	North Norco Channel	Channel	From Country Club Lane to River Street	Graded trapezoidal channel
North Norco Channel	North Norco Channel	Channel	From Hamner Avenue to Sixth Street	Graded trapezoidal channel
North Norco Channel	North Norco Channel	Channel	From Hamner Avenue to Sixth Street	Graded trapezoidal channel
North Norco Channel	North Norco Channel	Channel	From Parkridge Avenue to Hamner Avenue	1-percent-annual-chance design channel
North Norco Channel	North Norco Channel	Channel	From Parkridge Avenue to Hamner Avenue	1-percent-annual-chance design channel
North Norco Channel	North Norco Channel	Channel	From Valley View Avenue to 700 feet upstream	Fully improved, 1-percent-annual-chance design, trapezoidal channel
North Norco Channel	North Norco Channel	Channel	From Country Club Drive to River Road	Graded trapezoidal channel
North Norco Channel	North Norco Channel	Ditch	From River Road to Parkridge Avenue	Natural ditch
North Norco Channel	North Norco Channel	Channel	North Norco Channel	1-percent-annual-chance flood discharge contained in structure
North Norco Channel, Tributary A	North Norco Channel, Tributary A	Channel	*	Fully improved, 1-percent-annual-chance design watercourse; but, due to the current lack of inlet capacity, shallow flooding occurs, resulting in depths of less than 1.0 foot and a moderate flood hazard to areas adjacent to the watercourse.

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
North Norco Channel, Tributary A	North Norco Channel, Tributary A	Channel	Entire length upstream of Hamner Avenue	Graded trapezoidal channel
North Norco Channel, Tributary A	North Norco Channel, Tributary A	Channel	From 600 feet upstream of Corona Avenue to 900 feet upstream of Temescal Avenue	Fully improved 1-percent-annual-chance design trapezoidal channel
North Norco Channel, Tributary A	North Norco Channel, Tributary A	Channel	From 600 feet upstream of Corona Avenue to 900 feet upstream of Temescal Avenue	Fully improved 1-percent-annual-chance design trapezoidal channel
North Norco Channel, Tributary A	North Norco Channel, Tributary A	Channel	From confluence with South Norco Channel to between Corona and Temescal Avenues	Graded trapezoidal channel
North Norco Channel, Tributary A	North Norco Channel, Tributary A	Channel	From Valley View Avenue to 700 feet upstream	Fully improved, 1-percent-annual-chance design, trapezoidal channel
North Norco Channel, Tributary A	North Norco Channel, Tributary A	Culvert	From 700 feet upstream of Valley View Avenue to 600 feet upstream of Corona Avenue	Reinforced concrete box culvert
North Norco Channel, Tributary A	North Norco Channel, Tributary A	Culvert	From 700 feet upstream of Valley View Avenue to 600 feet upstream of Corona Avenue	Reinforced concrete box culvert
North Norco Channel, Tributary A	North Norco Channel, Tributary A	Pipe	From 900 feet upstream of Temescal Avenue to intersection of Hillside Avenue and Vaughn Street	66-inch diameter reinforced concrete pipe

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Oak Street Channel	Oak Street Channel	1-percent-annual-chance flood discharge contained in structure	Oak Street Channel	*
Oak Street Channel	Oak Street Channel	Channel	From 400 feet upstream of confluence with Mangular Channel to Ontario Avenue	Post and wire revetted channel (approximately 100- percent-annual-chance capacity)
Oak Street Channel	Oak Street Channel	Channel	From 500 feet upstream of Ontario Avenue to Chase Drive	Post and wire revetted channel (approximately 100- percent-annual-chance capacity)
Oak Street Channel	Oak Street Channel	Channel	From Atchison, Topeka & Santa Fe Railway to 400 feet upstream of confluence with Mangular Channel	Concrete channel (approximately 100-percent-annual-chance capacity)
Oak Street Channel	Oak Street Channel	Channel	From Ontario Avenue to 500 feet upstream	Concrete channel (approximately 100-percent-annual-chance capacity)
Oak Street Channel	Oak Street Channel	Channel	Oak Street Channel	1-percent-annual-chance flood discharge contained in structure
Ocotillo Drive	Magnesia Spring Canyon Flood Control Project	Channel	Ocotillo Road	The 1-percent-annual-chance flood is contained within the channels, levees and streets of the Magnesia Spring Canyon Flood Control Project
Ortega Channel	Ortega Channel	Channel	Full length	Fully improved, 1-percent-annual-chance design channel. Improvements extend from the outfall of the channel into Lake Elsinore, when the lake elevation is 1,265 feet, upstream toward the corporate limits. From 1,140 feet to 1,040 feet downstream of Grand Avenue, is a riprap trapezoidal channel that is capable of channeling a 1- percent-annual-chance flood. From 1,040 feet to 40 feet downstream of Grand Avenue, there is a concrete trapezoidal channel capable of containing a 1-percent-annual-chance flow.

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Palm Valley Stormwater Channel	Palm Valley Stormwater Channel	Channel	In the vicinity of Palm Desert	Provide 1-percent-annual-chance protection from floods on Cat, Dead Indian, and Carrizo Canyons.
Park Hill Drain	Park Hill Detention Basin	Detention Basin	Downstream of Devonshire Avenue	Reduces peak discharges on Park Hill Drain
Park Hill Drain	Park Hill Drain	Downstream of Devonshire Avenue	*	Reduces peak discharges on Park Hill Drain downstream of Devonshire Avenue
Perris Lateral A	Perris Lateral A	Improved Channel	*	Designed to contain 10-percent-annual-chance or greater floods whose capacities are inadequate for containing 1-percent-annual-chance flood
Perris Lateral B	Perris Lateral B	Improved Channel	*	Designed to contain 10-percent-annual-chance or greater floods whose capacities are inadequate for containing the 1-percent-annual-chance flood
Perris Valley Storm Drain	Perris Valley Storm Drain	Improved Channel	*	Designed to contain 10-percent-annual-chance or greater floods whose capacities are inadequate for containing the 1-percent-Annual-chance flood.
Perris Valley Drain	Perris Valley Drain	Drain	Moreno Valley	Improved channel designed to contain the 10-percent- annual-chance flood but not the 1-percent-annual-chance flood.
Perris Valley Storm Drain	Perris Valley Storm Drain	Drain	City of Perris, from 1,300 feet upstream of Rider Street to Martin Street	6-foot deep graded trapezoidal channel.
Perris Valley Storm Drain	Perris Valley Storm Drain	Drain	City of Perris, from the confluence with San Jacinto River to 1,300 feet upstream of Rider Street	5-foot deep graded trapezoidal channel. The channel has a 50-foot bottom width with a 4:1 sideslope.
Pigeon Pass Channel	Pigeon Pass Channel	Concrete Lined Channel	*	Designed to contain 10-percent-annual-chance
Pyrite Channel	Pyrite Channel	Concrete Lined Channel	*	Capacity equal to or greater than the 1-percent-annual-chance flood

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Ramsey Street Drain	Ramsey Street Drain	Channel	From 300 feet northwest of the intersection of Ramsey and Alola Streets to 200 feet downstream of San Gorgonio Avenue	5-foot deep Works Progress Administration rubble channel with a 3-foot bottom width and a 7-foot top width
Ramsey Street Drain	Ramsey Street Drain	Channel	From Interstate Highway 10 to Ramsey Street	6-foot deep concrete trapezoidal channel with a 3- foot bottom width and a 27-foot top width
Ramsey Street Drain	Ramsey Street Drain	Channel	From the upstream face of San Gorgonio Avenue crossing to Wilson Street	5-foot deep Work Progress Administration rubble channel with a 3-foot bottom width and a 7-foot top width
Ramsey Street Drain	Ramsey Street Drain	Culvert	Under Interstate Highway 10	4-foot high, 8-foot wide reinforced-concrete box culvert
Ramsey Street Drain	Ramsey Street Drain	Pipe	From 200 feet downstream of San Gorgonio Avenue to the upstream face of San Gorgonio Avenue	60-inch reinforced-concrete pipe
Ramsey Street Drain	Ramsey Street Drain	Reinforced-concrete box	From Ramsey Street to 300 feet northwest of the intersection of Ramsey and Alola Streets	4-foot high reinforced- concrete box that is 5.5 feet wide
Reche Canyon	Reche Canyon	Improved Channel	*	Designed to contain 10-percent-annual-chance or greater floods whose capacities are inadequate for containing the 1-percent-annual-chance flood
Riverside Canal	Riverside Canal	Canal	Riverside Canal	*
Romoland Wash	Romoland Wash	Concrete-lined Channel	*	Designed to contain the 10-percent-annual-chance or greater flood which have capacities inadequate for containing the 1-percent-annual-chance flood

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Salt Creek	Salt Creek	Improved Channel	*	Designed to contain 10-percent-annual-chance or greater floods whose capacities are inadequate for containing the 1-percent-annual-chance flood
Salt Creek	Salt Creek	Stable, Graded Channel	*	Designed to contain the 1-percent-annual-chance or greater flood
San Gorgonio River	Sidney Street Channel	Channel	80 feet north of an extension of centerline of Pendleton Road to the intersection of Repplier Road and Sidney Street	2-foot deep concrete trapezoidal channel with a 3-foot bottom width and a 9- foot top width
San Gorgonio River	Sidney Street Channel	Channel	From Wilson Street to 300 feet south of an extension of the centerline of Pendleton Road	2-foot deep concrete trapezoidal channel with a 3-foot bottom width and a 9- foot top width
San Gorgonio River	Sidney Street Channel	Concrete box	30 feet south to 80 feet north of an extension of the centerline of Pendleton Road	3-foot deep concrete trapezoidal box with a 2.5- foot bottom width and a 4-foot top width
San Gorgonio River	Sidney Street Channel	Pipe	From the intersection of Repplier Road and Sidney Street to 880 feet north at the mouth of the canyon	280 lineal feet of 3.6-inch reinforced-concrete pipe, 432 lineal feet of 42-inch reinforced-concrete pipe, and 160 lineal feet of 48-inch reinforced-concrete pipe, in that order
San Jacinto Drain	San Jacinto Drain	Drain	San Jacinto, between Seventh and State Streets	*
San Jacinto Lateral	San Jacinto Lateral	Pipe	Between U.S. Highway 395 and D Street	24-inch diameter reinforced-concrete pipe
San Jacinto Lateral	San Jacinto Lateral	Pipe	From D Street to Third Street Basin	18-inch diameter reinforced-concrete pipe.
San Sevaine Channel	San Sevaine Channel	Channel	San Sevaine Channel	1-percent-annual-chance flood discharge contained in structure

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Santa Ana River	Prado Dam	Dam	Prado Dam	*
Santa Ana River	Slope Protection	Retaining Wall	Santa Ana River	*
Santa Ana River	Santa Ana River	Improved Channel	*	Designed to contain 10-percent-annual-chance or greater floods whose capacities are inadequate for containing the 1-percent-annual-chance flood
Sidney Street Channel	Sidney Street Channel	Channel	*	Constructed by Flood Control District. Flood protection facility which performed well in minimizing flood damages during the 1969 storms.
Smith Creek	Smith Creek	Concrete Slope Protection	Upstream from the banning Sewage Disposal Plant	1,500 lineal feet of concrete slope protection along the north bank
Smith Creek	Smith Creek Bank Protection	Bank Protection	*	Constructed by Flood Control District
South Norco Channel	*	Pipe	From 900 feet upstream of Temescal Avenue to intersection of Hillside Avenue and Vaughn Street	66-inch diameter reinforced concrete pipe
South Norco Channel	South Norco Channel	Culvert	Hamner Avenue	12-foot wide by 6-ft high reinforced-concrete box
South Norco Channel	South Norco Channel	Culvert	I-15	12-foot wide by 7-ft high reinforced-concrete box beneath I-15. Concrete-lined open channel downstream of I-15 to upstream of Corona Avenue
South Norco Channel	South Norco Channel	Concrete Lined Channel	I-15 to Corona Avenue	Concrete lined channel
South Norco Channel, Tributary A	South Norco Channel, Tributary A	Storm-drain System	From confluence with South Norco Channel to 500 feet upstream of Hamner Avenue	Designed to contain the 1-percent-annual-chance flood
South Norco Channel, Tributary A	South Norco Channel, Tributary A	Channel	South Norco Channel, Tributary A	1-percent-annual-chance flood discharge contained in structure

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
South Norco Channel, Tributary A	South Norco Channel, Tributary A	Detention Basin	500 feet upstream of Hamner Avenue	Reduces peak discharges on South Norco Channel, Tributary A
South Norco Channel, Tributary B	South Norco Channel, Tributary B	Concrete Lined Channel	From confluence with South Norco Channel to between Corona and Temescal Avenues	Concrete lined channel
Spring Brook Wash	State Route 60 Culvert	Culvert	Spring Brook Wash	*
Sun City Channel A-A	Sun City Channel A-A	Stable, Graded Channel	*	Designed to contain the 1-percent-annual-chance or greater flood
Sun City Channel C-C	Sun City Channel C-C	Concrete Lined Channel	*	Capacity equal to or greater than the 1-percent-annual-chance flood
Sun City Channel H-H	Sun City Channel H-H	Concrete Lined Channel	*	Capacity equal to or greater than the 1-percent-annual-chance flood
Sun City Channel X-X	Sun City Channel X-X	Concrete Lined Channel	*	Capacity equal to or greater than the 1-percent-annual-chance flood
Sun City Southeast Tributary	Sun City Southeast Tributary	Concrete Lined Channel	*	Capacity equal to or greater than the 1-percent-annual-chance flood
Sun City Southeast Tributary	Sun City Southeast Tributary	Stable, Graded Channel	*	Designed to contain the 1-percent-annual-chance or greater flood
Sunnymead Storm Channel	Sunnymead Storm Channel	Channel	Moreno Valley	Some portions are concrete-lined with capacity greater than the 1-percent-annual- chance flood, while other portions can carry the 10- percent-annual-chance flood but not the 1-percent-annual-chance flood.
Sunnymead Storm Channel	Sunnymead Storm Channel	Concrete-lined Channel	*	Designed to contain the 10-percent-annual-chance or greater flood which have capacities inadequate for containing the 1-percent-annual-chance flood
Sunnyslope Channel	Sunnyslope Channel	Concrete Lined Channel	*	Capacity equal to or greater than the 1-percent-annual-chance flood

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Taylor Avenue Drain	Taylor Avenue Drain	Channel	From Cota Street to intersection of Harrison and Sheridan Avenues From intersection of Harrison and Sheridan Avenues to Grand Boulevard	Reinforced-concrete channel
Taylor Avenue Drain	Taylor Avenue Drain	Concrete Box	From intersection of Harrison and Sheridan Avenues to Grand Boulevard	7.0-foot by 8.5-foot reinforced-concrete box
Taylor Avenue Drain	Taylor Avenue Drain	Pipe	From Grand Boulevard to Chicago Street	Reinforced-concrete pipes ranging from 30 to 75 inches
Temescal Wash	Temescal Wash	Channel	Between Cota Street and the Atchison, Topeka & Santa Fe Railway crossing just downstream of Riverside Freeway	Contains the 1-percent- annual-chance flood discharge
Temescal Wash	Temescal Wash	Channel	From Lincoln Avenue to Atchison, Topeka & Santa Fe Railway	1-percent-annual-chance capacity graded trapezoidal channel
Temescal Wash	Temescal Wash	Channel	Temescal Wash	*
Tequesquite Arroyo	Tequesquite Arroyo	Channel	Tequesquite Arroyo	1-percent-annual-chance flood discharge contained in structure
Third Street Basin	Third Street Basin	Basin	City of Perris	0.2-percent-annual-chance flood storage capacity. The outlets are designed to create no flooding problems as they discharge downstream toward the San Jacinto River
Toro Canyon	Dike No. 4	Dike	In the vicinity of La Quinta	Certified dike
Toro Canyon	Guadalupe Dike	Dike	In the vicinity of La Quinta	Dike
Tri-Palm Estates Channel	Tri-Palm Estates Channel	Stable, Graded Channel	*	Designed to contain the 1-percent-annual-chance or greater flood
Tri-Palm Estates Middle Tributary	Tri-Palm Estates Middle Tributary	Stable, Graded Channel	*	Designed to contain the 1-percent-annual-chance or greater flood

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Tri-Palm Estates East Tributary	Tri-Palm Estates East Tributary	Stable, Graded Channel	*	Designed to contain the 1-percent-annual-chance or greater flood
University Wash	University Wash	Channel	University Wash	1-percent-annual-chance flood discharge contained in structure
University Wash	University Wash	Culvert	University Wash	1-percent-annual-chance flood discharge contained in structure
Wardlow Wash	1-percent-annual-chance flood contained in structure	1-percent-annual-chance flood contained in structure	Wardlow Wash	*
Wardlow Wash	Palisades Drive Culvert	Culvert	Wardlow Wash	1-percent-annual-chance flood discharge contained in structure
West Magnesia Storm Channel	Magnesia Spring Canyon Flood Control Project	Concrete Lined Channel	From the West Magnesia Springs Debris Basin to the Whitewater River	Concrete-lined rectangular channel with a width of 20 feet, and depth varying from 8 to 10 feet.
West Magnesia Storm Channel	Magnesia Spring Canyon Flood Control Project	Debris Basin	*	Approximate base area of 15 acres. When the detained flood and debris level exceed the basin spillway, the excess flood spills over to the West Magnesia Storm Channel.
West Norco Channel	West Norco Channel	Pipe	From 500 feet above confluence with North Norco Channel upstream to corporate limits	72-inch reinforced-concrete pipe
West Norco Channel	1-percent-annual-chance flood contained in culvert	Culvert	West Norco Channel	*
West Norco Channel	West Norco Channel	Culvert	West Norco Channel	1-percent-annual-chance flood discharge contained in structure
West Pershing Channel	West Pershing Channel	Channel	Empties into the natural streambed below Wilson Street	Constructed by Flood Control District. A 1-percent-annual-chance design channel throughout its improved segment. Flood protection facility which performed well in minimizing flood damages during 1969.

*Data not available

Table 7: Non-Levee Flood Protection Measures *(continued)*

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
West Pershing Channel	West Pershing Channel	Channel	From Wilson Street to 400 feet north of the corporate limits	5-foot deep concrete trapezoidal channel with a 5- foot bottom width and a 20-foot top width.
West Pershing Channel	West Pershing Channel	Culvert	Under Wilson Street	5-foot high and 600-foot wide reinforced-concrete box culvert
West Pershing Creek	West Pershing Creek	Concrete Lined Channel	*	Capacity equal to or greater than the 1-percent-annual-chance flood
West San Sevaine Creek	West San Sevaine Creek	Improved Channel	*	Designed to contain 10-percent-annual-chance or greater floods whose capacities are inadequate for containing the 1-percent-annual-chance flood
White House Canyon	White House Canyon	Natural Watercourse with Minor Stabilization Improvement	*	*
Whitewater River	Coachella Valley Stormwater Channel	Channel	From Happy Point to the Salton Sea	Man-made flowpath with reinforced banks with adjacent developments only up to Avenue 54 in the City of Coachella.
Whitewater River Channel	Whitewater River Channel	Channel	In the vicinity of Rancho Mirage	Manmade channel generally following the path of the Whitewater River. Its gradient, as it passes through Rancho Mirage, averages 23 ft/mile, and its average cross section in the reach has a 220-foot bottom width, is 25 ft deep, and has 4:1 sideslopes. Unlined channel excavated from natural material, except for a 2,100-foot length of riprap bank protection on the northeast bank extending from 1,500 feet downstream of Frank Sinatra Drive southeasterly and 2,900-foot length of riprap on the southwest bank, downstream from Frank Sinatra Drive
Whitewater River Storm Channel	Whitewater River Storm Channel	Channel	Palm Springs to Point Happy near Washington Street Bridge	Improved portion following the natural flowpath of the Whitewater River. Concrete-lined or grass-lined with few exceptions.

*Data not available

4.4 Levees

For purposes of the NFIP, FEMA only recognizes levee systems that meet, and continue to meet, minimum design, operation, and maintenance standards that are consistent with comprehensive floodplain management criteria. The Code of Federal Regulations, Title 44, Section 65.10 (44 CFR 65.10) describes the information needed for FEMA to determine if a levee system reduces the risk from the 1-percent-annual-chance flood. This information must be supplied to FEMA by the community or other party when a flood risk study or restudy is conducted, when FIRMs are revised, or upon FEMA request. FEMA reviews the information for the purpose of establishing the appropriate FIRM flood zone.

Levee systems that are determined to reduce the hazard from the 1-percent-annual-chance flood are accredited by FEMA. FEMA can also grant provisional accreditation to a levee system that was previously accredited on an effective FIRM and for which FEMA is awaiting data and/or documentation to demonstrate compliance with 44 CFR 65.10. These levee systems are referred to as Provisionally Accredited Levees, or PALs. Provisional accreditation provides communities and levee owners with a specified timeframe to obtain the necessary data to confirm the levee system's accreditation status. Accredited levee systems and PALs are shown on the FIRM using the symbology shown in Figure 3. If the required information for a PAL is not submitted within the required timeframe, or if information indicates that a levee system no longer meets 44 CFR 65.10, FEMA will consider the levee system as non-accredited and issue an effective FIRM showing the levee-impacted area as a SFHA or Zone D.

FEMA coordinates its programs with USACE, who may inspect, maintain, and repair levee systems. The USACE has authority under Public Law 84-99 to supplement local efforts to repair flood control projects that are damaged by floods. Like FEMA, the USACE provides a program to allow public sponsors or operators to address levee system maintenance deficiencies. Failure to doso within the required timeframe results in the levee system being placed in an inactive status in the USACE Rehabilitation and Inspection Program. Levee systems in an inactive status are ineligible for rehabilitation assistance under Public Law 84-99.

FEMA coordinated with the USACE, the local communities, and other organizations to compile a list of levee systems that exist within Riverside County. Table 8, "Levee Systems," lists all accredited levee systems, PALs, and non-accredited levee systems shown on the FIRM for this FIS Report. Other categories of levees may also be included in the table. The Levee ID shown in this table may not match numbers based on other identification systems that were listed in previous FIS Reports. Levee systems identified in the table are displayed on the FIRM with notes to users to indicate their flood hazard mapping status.

Please note that the information presented in Table 8 is subject to change at any time. For that reason, the latest information regarding the levee systems presented in the table may be obtained by accessing the National Levee Database. For additional information, contact the levee owner/sponsor or the local community shown in Table 30.

Table 8: Levees

Community	Flooding Source	Levee Location	Levee Owner	USACE Levee	Levee ID	Covered Under PL84-99 Program?	FIRM Panel(s)
Cathedral City, City of	East Cathedral Channel	Left Bank	RCFCWCD	No	1911031026	*	06065C1588G, 06065C1589G
Cathedral City, City of	East Cathedral Channel	Right Bank	RCFCWCD	No	1911031025	*	06065C1589G
Cathedral City, City of	West Cathedral Channel	Left Bank	RCFCWCD	No	1911031002	*	06065C1586G, 06065C1588G
Cathedral City, City of	West Cathedral Channel	Right Bank	RCFCWCD	No	1911031003	*	06065C1586G, 06065C1588G
Cathedral City, City of	Whitewater River	Left Bank	RCFCWCD - CVWD	No	1911031005	*	06065C1587G, 06065C1589G, 06065C1595G
Cathedral City, City of	Whitewater River; Spring Brook Wash	Left Bank	RCFCWCD - CVWD	No	1911031006	*	06065C1576G, 06065C1578G, 06065C1586G
Corona, City of	Oak Street Channel	Left Bank	RCFCWCD	No	3805030009	U	06065C0689H
Corona, City of	Oak Street Channel	Right Bank	RCFCWCD	No	3805030009	U	06065C0689H
Corona, City of	Oak Street Channel	Right Bank	RCFCWCD	No	3805030009	U	06065C0689H
Corona, City of	Temescal Wash	Right Bank	RCFCWCD	No	1905031001	U	06065C0689H
Hemet, City of	San Jacinto River	Left Bank, Right Bank	RCFCWCD	Yes	1911031024	*	06065C1490H, 06065C1495H
Indian Wells, City of	Channel A; Zone AO Flooding	Left Bank, Right Bank	CVWD	No	1911031044	*	06065C2220H, 06065C2236G
Indian Wells, City of	Haystack Channel; Zone AO Flooding	Left Bank	CVWD	No	1911031042	*	06065C2228H
Indio, City of	Coachella Valley Stormwater Channel	Left Bank	CVWD	No	1911031041	*	06065C2232G, 06065C2234G, 06065C2251H, 06065C2252H, 06065C2254H, 06065C2260H, 06065C2270H, 06065C2910J, 06065C2930J

*Data not available

Table 8: Levees *(continued)*

Community	Flooding Source	Levee Location	Levee Owner	USACE Levee	Levee ID	Covered Under PL84-99 Program?	FIRM Panel(s)
Indio, City of	Coachella Valley Stormwater Channel	Right Bank	CVWD	No	1911031040	*	06065C2232G, 06065C2234G, 06065C2251H, 06065C2252H, 06065C2254H, 06065C2260H, 06065C2270H, 06065C2910J, 06065C2930J
La Quinta, City of	Coachella Valley Stormwater Channel	Left Bank	CVWD	No		*	06065C2270H, 06065C2910J, 06065C2925J, 06065C2930J, 06065C2940J, 06065C2950J,
Jurupa Valley, City of; Riverside, City of	Santa Ana River	Right Bank	USACE	Yes	3805010038	U	06065C0045H, 06065C0710H
Jurupa Valley, City of; Riverside, City of; Riverside County, Unincorporated Areas	Santa Ana River	Left Bank	USACE	Yes	3805010050	U	06065C0045H, 06065C0063H, 06065C0710H
La Quinta, City of	Bear Creek	Right Bank	CVWD	No	1911031045	*	06065C2237H, 06065C2239H, 06065C2243H
Murrieta, City of	Murrieta Creek	Right Bank	RCFCWCD	No	1911031011	*	06065C2715G, 06065C2720G
Palm Desert, City of	Palm Valley Stormwater Channel	Right Bank	CVWD	No	1911031030	*	06065C2207H
Palm Desert, City of	Palm Valley Stormwater Channel	Right Bank	CVWD	No	1911031031	*	06065C2207H, 06065C2209H
Palm Desert, City of	Palm Valley Stormwater Channel	Right Bank	CVWD	No	1911031032	*	06065C2208H, 06065C2209H, 06065C2220H
Palm Springs, City of	Chino Canyon Levee	Right Bank	RCFCWCD	No	1911031049	*	06065C1552H
Palm Springs, City of	Palm Canyon Wash	Right Bank	RCFCWCD	No	1911031033	*	06065C1567G, 06065C1586G
Palm Springs, City of	Palm Canyon Wash; Arenas Canyon Creek	Left Bank	RCFCWCD	No	1911031034	*	06065C1566G, 06065C1567G, 06065C1568G

*Data not available

Table 8: Levees *(continued)*

Community	Flooding Source	Levee Location	Levee Owner	USACE Levee	Levee ID	Covered Under PL84-99 Program?	FIRM Panel(s)
Palm Springs, City of	Tahquitz Creek	Left Bank	Palm Springs	No	1911031035	*	06065C1567G, 06065C1586G
Rancho Mirage, City of	Whitewater River	Left Bank	CVWD	No	1911031028	*	06065C1595G, 06065C2206G, 06065C2207H, 06065C2226H
Riverside County, Unincorporated Areas	Coachella Valley Stormwater Channel	Left Bank	CVWD	No		*	06065C2270H, 06065C2910J, 06065C2925J, 06065C2930J, 06065C2940J, 06065C2950J,
Riverside County, Unincorporated Areas	Big Morongo Wash	Left Bank	RCFCWCD - CVWD	No	1911031017	*	06065C0885G
Riverside County, Unincorporated Areas	North Shore Beach Channel	Left Bank	CVWD	No	1911031048	*	06065C2975G
Riverside County, Unincorporated Areas	North Shore Beach Channel	Right Bank	CVWD	No	1911031047	*	06065C2975G
Riverside County, Unincorporated Areas	Santa Ana River	Right Bank	RCFCWCD	No	1911031008	*	06065C0045G, 06065C0710G
Riverside County, Unincorporated Areas	Unnamed Creek	Right Bank	RCFCWCD - CVWD	No	1911031018	*	06065C1620G, 06065C1650G
Riverside County, Unincorporated Areas	Santa Ana River	Left Bank	USACE	Yes	3804010138	U	06065C0045H, 06065C0065H
Riverside, City of; Riverside County Unincorporated Areas	Santa Ana River	Right Bank	USACE	Yes	3804010036	U	06065C0045H, 06065C0710H
Riverside, City of	Santa Ana River	Left Bank	RCFCWCD	No	1911031009	*	06065C0045G, 06065C0065G, 06065C0710G
San Jacinto, City of	San Jacinto Reservoir	Ring Levee	RCFCWCD	No	1911031010	*	06065C1470G, 06065C1490H
Temecula, City of	Murrieta Creek	Left Bank	RCFCWCD	No	1911031013	*	06065C2715G, 06065C2720G

*Data not available

SECTION 5.0 – ENGINEERING METHODS

For the flooding sources in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded at least once on the average during any 10-, 25-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 25-, 50-, 100-, and 500-year floods, have a 10-, 4-, 2-, 1-, and 0.2-percent-annual-chance, respectively, of being equaled or exceeded during any year.

Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedance) during the term of a 30-year mortgage is approximately 26 percent (about 3 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

In addition to these flood events, the “1-percent-plus”, or “1%+”, annual-chance flood elevation has been modeled and included on the flood profile for certain flooding sources in this FIS Report. While not used for regulatory or insurance purposes, this flood event has been calculated to help illustrate the variability range that exists between the regulatory 1-percent-annual-chance flood elevation and a 1-percent-annual-chance elevation that has taken into account an additional amount of uncertainty in the flood discharges (thus, the 1-percent “plus”). For flooding sources whose discharges were estimated using regression equations, the 1-percent+ flood elevations are derived by taking the 1-percent-annual-chance flood discharges and increasing the modeled discharges by a percentage equal to the average predictive error for the regression equation. For flooding sources with gage- or rainfall-runoff-based discharge estimates, the upper 84-percent confidence limit of the discharges is used to compute the 1%+ flood elevations.

The engineering analyses described here incorporate the results of previously issued Letters of Map Change (LOMCs) listed in Table 26, “Incorporated Letters of Map Change”, which include Letters of Map Revision (LOMRs). For more information about LOMRs, refer to Section 6.5, “FIRM Revisions.”

5.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied. Hydrologic analyses are typically performed at the watershed level. Depending on factors such as watershed size and shape, land use and urbanization, and natural or man-made storage, various models or methodologies may be applied. A summary of the hydrologic methods applied to develop the discharges used in the hydraulic analyses for each stream is provided in Table 12. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

A summary of the discharges is provided in Table 9. A summary of stillwater elevations developed for non-coastal flooding sources is provided in Table 10. Stream gage information is provided in Table 11.

Table 9: Summary of Discharges

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
1001 Ranch Drain West Tributary	At Lakeside Drive	0.2	150	*	205	225	280
1001 Ranch Drain West Tributary	At confluence with 1001 Ranch Drain	0.2	135	*	185	205	225
Alamo Canyon	Apex of Alluvial Fan	6.7	*	*	*	7,450	*
Arroyo del Toro	Within City of Lake Elsinore	5.7	*	*	*	2,300 [2]	5,799
Barton Canyon	Downstream end of Subbasin 5.01	5.3	*	*	*	7,028	*
Bautista Wash	At Lyon Avenue	10.6 [1]	200	*	1,550	3,200	12,100
Bautista Wash	At San Jacinto Avenue	4.4 [1]	120	*	750	1,440	5,200
Bautista Wash	At Atchison, Topeka & Santa Fe Railroad	*	80	*	800	1,760	6,900
Bear Creek	At Adams Street	2.2	105	*	540	1,420	2,348
Bear Creek	At Avenida Bermudas	0.8	45	*	230	877	1,539
Beaumont Channel	At Sunnyslope Cemetery	1.5	650	*	1,000	1,200	2,200
Beaumont Channel	At First Street	1.3	550	*	820	1,000	1,900
Beaumont Channel	At Southern Pacific Railroad	1.1	460	*	680	820	1,600
Beaumont Channel	At Pennsylvania Avenue	1.1	520	*	760	940	1,800
Beaumont Channel	At Palm and East 5th Streets	0.4	240	*	340	410	780
Beaumont Channel	At East 8th Street	0.3	200	*	270	320	600
Beaumont Channel	At 12th Street	0.2	120	*	180	230	420
Beaumont Channel	At 13th Street	0.1	50	*	90	130	230
Big Morongo Wash	At Pierson Boulevard	42.0	1,000	*	6,590	11,560	31,020
Biskra Palms Channel	At Apex	0.9	620	*	950	1,090	1,390

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
Blind Canyon Channel	At confluence with Desert Hot Springs Channel	4.6	560	*	1,900	2,800	6,500
Blind Canyon Channel	Approximately 2,500 feet upstream of West 16'h Street	4.6	560	*	1,900	2,800	6,500
Blind Canyon Channel	At confluence with Colorado River Aqueduct	3.2	440	*	1,500	2,200	5,100
Box Springs Wash	At 12th Street	0.96 [3]	0	*	*	427	*
Box Springs Wash	At Gage Canal	0.60 [3]	338	*	*	491	*
Box Springs Wash	At Canyon Crest Drive	0.22 [3]	170	*	*	247	*
Channel A	Approximately 2,500 feet downstream of Control Point 175	0.2	70	*	150	220	430
Channel A	At California Avenue	0.1	40	*	90	120	230
Channel B	Approximately 3,200 feet downstream of Control Point 178	0.9	210	*	500	720	1,500
Channel B	At California Avenue	0.5	130	*	310	450	900
Channel B	At Beaumont Avenue	0.3	90	*	200	300	600
Channel H	Approximately 2,000 feet downstream of confluence with Wash G	1.5	220	*	630	990 [2]	2,200
Channel H	At confluence with Wash G	0.9	150	*	420	650	1,400
Channel H	At Grand Avenue	0.3	63	*	170	260	540
Cherry Avenue Channel	At Highland Avenue	1.4	300	*	730	1,070	2,300
Cherry Avenue Channel	At U.S. Highway 60 culvert	1.2	270	*	650	950	2,000
Cherry Avenue Channel	At East 6th Street	1.1	250	*	600	880	1,900

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs) 10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
Cherry Avenue Channel	At East 8th Street	1.0	200	*	530	810	1,700
Cherry Avenue Channel	At Channel Bend	0.9	180	*	490	740	1,600
Cherry Avenue Channel	At East 11th Street	0.6	140	*	350	530	1,100
Cherry Avenue Channel	At 14th Street	0.2	60	*	150	210	430
Cherry Avenue Channel	At 15th Street	0.1	40	*	80	120	230
Colorado River	At Needles	170,600.0	*	*	*	40,000	*
Colorado River	At Bullhead City	169,300.0	*	*	*	40,000	*
Colorado River	Just downstream of Piute Wash	*	*	*	*	45,000	*
Colorado River	Just downstream of Sacramento Wash	*	*	*	*	49,600	*
Colorado River	At Parker	*	*	*	*	40,000	*
Colorado River	At Palo Verde Dam	*	*	*	*	40,000	*
Colorado River	Just downstream of Tyson Wash	*	*	*	*	46,400	*
Colorado River	Just downstream of Arroyo Salada	*	*	*	*	46,600	*
Colorado River	At I-10/Blythe	*	*	*	*	43,200	*
Colorado River	Just downstream of Trigo Wash	*	*	*	*	46,900	
Colorado River	Just downstream of Gould Wash	*	*	*	*	47,000	*
Colorado River	At Imperial Dam	*	*	*	*	40,000	*
Colorado River	At I-8/Yuma	*	*	*	*	40,000	*
Country Club Creek	At confluence with Prado Impoundment	1.3	240	*	620	910	2,000
Country Club Creek North Tributary	At Paseo Grande	0.5	100	*	270	400	800

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
Dead Indian Canyon	At Della Robia Lane	16.5	1,000	*	4,200	6,700	20,000
Dead Indian Canyon	Approximately 200 feet south of Della Robia Lane	16.2	1,000	*	4,200	6,700	20,000
Deep Canyon Channel	Approximately 1,000 feet east of Haystack Channel Junction	63.8	2,000	*	8,200	13,000	40,000
Deep Canyon Channel	At Buckboard Trail	63.1	2,000	*	8,200	13,000	40,000
Deep Canyon Storm Water Channel	At Whitewater River	68.7	2,000	*	8,600	14,000	40,000
Deep Canyon Storm Water Channel	At Camino Del Ray	67.4	2,000	*	8,600	14,000	40,000
Deep Canyon Storm Water Channel	Approximately 700 feet south of El Dorado Drive	66.2	2,000	*	8,200	13,000	40,000
Deep Canyon Storm Water Channel	Approximately 1,000 feet east of Haystack Channel Junction	63.8	2,000	*	8,200	13,000	40,000
Deep Canyon Storm Water Channel	At Buckboard Trail	63.1	2,000	*	8,200	13,000	40,000
Desert Hot Springs Channel	At confluence with Big Morongo Wash	8.2	600	*	2,000	3,000	7,000
Desert Hot Springs Channel	Approximately 500 feet south of West 8th Street	7.9	600	*	2,000	3,000	7,000
Desert Hot Springs Channel	Below confluence with Blind Canyon Channel	5.8	600	*	2,000	3,000	7,000
Desert Hot Springs Channel	At Palm Drive	1.0	200	*	660	1,000	2,300

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
Desert Hot Springs Channel	At Verbena Drive	0.5	160	*	330	500	1,200
Dry Morongo Wash	At Apex	8.9	500	*	3,060	5,170	12,610
East Gilman Home Channel	At confluence with Gilman Home Channel	1.1	290	*	690	1,000	2,000
East Gilman Home Channel	At Canyon Base	1.0	290	*	690	1,000	2,000
East Pershing Channel	At Ramsey Street	0.7	140	*	380	590	1,200
East Pershing Channel	At corporate limits	0.2	70	*	160	240	460
East Rancho Mirage Storm Channel	At confluence with Palm Valley Drain	0.9	120	*	510	860	2,400
East Rancho Mirage Storm Channel	Approximately 4,000 feet southwest of Indian Trail Road	0.4	70	*	300	500	1,400
Elsinore Spillway Channel [4]	At Flint Street	5	540	*	1,100	1,440	11,000 [6]
Elsinore Spillway Channel [4]	At Lakeshore Drive	1.1	340	*	660	900	11,000 [6]
Gilman Home Channel	At confluence with Smith Creek	3.0	600	*	850	1,000	1,700
Gilman Home Channel	At Interstate Highway 10	2.3	660	*	1,400	2,000	4,100
Gilman Home Channel	Downstream of Interstate Highway 10	2.3	450	*	450	450	450
Gilman Home Channel	Downstream of George Street	2.0	600	*	1,300	1,820	3,700
Gilman Home Channel	At George Street	0.9	320	*	700	940	1,900
Gilman Home Channel	Downstream of confluence of Gilman Home Channels A and B	0.7	270	*	560	780	1,500

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
Gilman Home Channel A	At Canyon Base	0.3	120	*	250	350	670
Gilman Home Channel B	At Canyon Base	0.4	150	*	320	450	860
Hargrave Street Drain	At Interstate Highway 10	0.4	140	*	270	400	750
Hargrave Street Drain	At Gilman Street	0.2	90	*	160	220	410
Haystack Channel	At confluence with Deep Canyon Channel	0.7	100	*	440	730	2,000
Haystack Channel	At Medina Drive	0.1	30	*	120	200	600
Haystack Channel	Approximately 1,500 feet upstream of Medina Drive	0.1	20	*	80	131	400
Highland Springs Channel	At Ramsey Street	1.6	270	*	750	1,100	2,500
Highland Springs Channel	At corporate limits	1.4	250	*	670	1,000	2,200
Indian Canyon Channel	At Wilson Street	0.8	170	*	340	590	1,400
Indian Canyon Channel	At Canyon mouth	0.7	130	*	280	510	1,100
Interstate 10 Wash	At Apex	52.3 [7]	3,270	*	7,290	9,530	17,000
Lakeview Wash	At Juniper Flat Road	6.9	*	*	*	2,470	*
Leach Canyon Channel	At Machado Street	5.7	700	*	2,000	3,200	7,600
Lime Street Channel	At Lake Elsinore	0.6	110	*	300	460 [2]	983
Lime Street Channel	At Lake View	0.5	96	*	260	400	850
Lincoln Avenue Drain	At confluence with Oak Street Channel	2.2	380	*	1,300	2,000	4,500
Lincoln Avenue Drain	At Citron Street	2.0	330	*	1,200	1,900	4,100

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
Lincoln Avenue Drain	At Ontario Avenue	1.9	330	*	1,200	1,900	4,100
Little Morongo Wash	At Pierson Boulevard	63.7	1,250	*	9,090	16,420	46,320
Long Canyon	At 2S./5E.-34 SW. corner	26.0	6,570	*	11,300	13,350	19,600
Long Creek	At Apex	19.4	2,910	*	10,420	13,370	18,030
Macomber Palms Channel	At Apex	2.0	870	*	1,330	1,530	2,040
Magnesia Springs Channel	At confluence with Whitewater River	5.2	480	*	2,100	3,400	9,500
Magnesia Springs Channel	Approximately 4,000 feet southwest of Indian Trail Road	4.7	460	*	2,000	3,200	9,000
Mangular Channel	Upstream of confluence with Oak Street Channel	2.1	230	*	800	1,300	2,800
Mangular Channel	At Ontario Avenue	1.9	230	*	800	1,300	2,800
Mangular Channel	At corporate limits	1.5	190	*	660	1,000	2,300
Marshall Creek	Upstream of Interstate Highway 10	4.4	620	*	1,800	2,700	6,100
Marshall Creek Tributary	At Elm Street	0.2	80	*	200	240	460
Marshall Creek Tributary	At 14th Street	0.1	40	*	100	120	230
Martinez Canyon	Apex of Alluvial Fan	47.5	*	*	*	19,380	*
Mcvicker Canyon	At Lake Elsinore	*	*	*	*	4,060	*
Mcvicker Canyon	At mouth of canyon	2.5	*	*	*	1,690	*
Mission Creek	At Highway 62	41.1	1,930	*	8,480	13,170	28,550
Montgomery Creek	At confluence of Smith Creek	2.6	770	*	1,600	2,300	2,800

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
Montgomery Creek	At Ramsey Street	2.1	660	*	1,300	1,880	3,700
Montgomery Creek	Downstream of Interstate Highway 10	2.1	660	*	1,300	1,880	1,900
Montgomery Creek	At Sunrise Avenue	1.6	540	*	1,100	1,500	2,900
Montgomery Creek	At Sunset Avenue (at Canyon Base)	1.1	400	*	800	1,000	2,100
Montgomery Creek Tributary	At confluence with Montgomery Creek Channel	0.1	33	*	80	120	230
Murrieta Creek	At confluence	220.0	*	*	*	30,900	*
Murrieta Creek	At Washington Avenue	48.7	*	*	*	9,700	*
Murrieta Creek	At Lemon Street	32.8	*	*	*	9,700	*
Murrieta Creek	At Clinton Keith Road	12.3	*	*	*	5,364	*
Murrieta Creek	At McVicar Street	10.4	*	*	*	4,822	*
Murrieta Creek	Approximately 1,000 feet downstream of confluence with Santa Gertrudis Creek	*	*	*	*	19,300	*
Murrieta Creek	Approximately 3,200 feet upstream of confluence with Long Valley Creek	*	*	*	*	28,500	*
North Cathedral Channel	Downstream of confluence with Tramview Wash	3.9	400	*	1,550	2,600	7,400
North Norco Channel	At Rincon Street	7.8	530	*	1,700	2,900	7,400
North Norco Channel	Downstream of confluence with West Norco Channel	7.3	500	*	1,700	2,800	7,000
North Norco Channel	Upstream of confluence with West Norco Channel	6.2	460	*	1,500	2,500	6,400

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
North Norco Channel	At Hamner Avenue	5.2	410	*	1,300	2,200	5,500
North Norco Channel	Downstream of confluence with North Norco Channel, Tributary A	4.4	360	*	1,200	1,900	4,800
North Norco Channel	At Fifth Street	3.2	270	*	850	1,400	3,400
North Norco Channel	Downstream of confluence with North Norco Channel, Tributary B	2.9	270	*	850	1,400	3,400
North Norco Channel	At Valley View Avenue	1.3	130	*	410	670	1,600
North Norco Channel	At Corona Avenue	1.0	130	*	350	570	1,300
North Norco Channel, Tributary A	At confluence with North Norco Channel	1.0	130	*	410	660	1,600
North Norco Channel, Tributary A	At Valley View Avenue	1.0	130	*	410	660	1,600
North Norco Channel, Tributary A	At Hillside Avenue	0.5	70	*	200	320	740
North Norco Channel, Tributary B	At confluence with North Norco Channel	1.0	130	*	350	570	1,300
North Norco Channel, Tributary B	At Corona Avenue	0.7	90	*	270	430	980
North Norco Channel, Tributary B	At California Avenue	0.1	20	*	56	86	180

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
North Norco Channel, Tributary C	At Valley View Avenue	1.3	130	*	410	670	1,600
North Norco Channel, Tributary C	At Corona Avenue	0.7	90	*	270	430	980
North Norco Channel, Tributary C	At California Avenue	0.3	50	*	140	210	470
North Side Wolf Valley	At mouth	2.9	*	*	*	1,600	*
North Side Wolf Valley	Near AmFac Driveway	1.0	*	*	*	1,210	*
Oak Street Channel	At confluence with Temescal Creek	15.8	1,100	*	3,700	5,500	12,000
Oak Street Channel	At Riverside Freeway	11.4	1,000	*	3,500	5,500	12,000
Oak Street Channel	Downstream of confluence with Mangular Channel	9.0	900	*	3,100	4,800	11,000
Oak Street Channel	At confluence with Mangular Channel	6.9	900	*	3,100	4,500	10,000
Oak Street Channel	At Ontario Avenue	6.6	900	*	3,000	4,500	10,000
Oak Street Channel	At Chase Drive	6.2	900	*	3,000	4,500	9,800
Ortega Channel	At Grand Avenue	1.0	160	*	460	710	1,600
Ortega Channel	At Lake Elsinore	1.0	160	*	460	710	1,600
Palm Canyon Wash	Downstream of confluence with Tahquitz Creek	138.8	4,600	*	17,000	25,000	81,000
Palm Desert Channel	Downstream of confluence with Palm Desert Channel Tributary	18.0	1,000	*	4,400	7,000	21,000

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
Palm Desert Channel	At State Highway 74	1.4	160	*	800	1,250	3,500
Palm Valley Storm Water Channel	At confluence with Whitewater River	9.7	700	*	3,000	5,000	14,000
Palm Valley Storm Water Channel	At Park View Drive upstream of confluence with Diversion Channel	8.4	640	*	2,700	4,600	13,000
Palm Valley Storm Water Channel	At Pitahaya Street	7.9	620	*	2,700	4,500	12,000
Palm Valley Storm Water Channel	At Willow Street	7.0	560	*	2,500	4,200	12,000
Palm Valley Storm Water Channel	Approximately 1,500 feet southwest of State Highway 74 and Bel Air Road	6.2	520	*	2,400	3,800	11,000
Palm Valley Storm Water Channel	At Starburst Drive	4.6	450	*	2,000	3,200	9,000
Paloma Valley Channel	At Holland Road	8.6	*	*	*	2,820	*
Park Hill Drain	At mouth	4.1	*	*	*	1,220	*
Park Hill Drain Basin	At outlet of Park Hill Detention	2.8	*	*	*	700	*
Pechanga Creek	At mouth	14.0	3,920 [8]	*	5,840 [8]	6,680 [8]	8,980 [8]
Perris Valley Storm Drain	At confluence with San Jacinto River	82.5	2,200	*	8,100	13,000	34,000
Perris Valley Storm Drain	At Nuevo Road	75.7	2,200	*	8,100	13,000	34,000
Perris Valley Storm Drain	At Rider Street	67.7	1,900	*	7,000	11,300	30,000
Pershing Creek and Smith Creek	Downstream of Southern Pacific Railroad	7.4	1,200	*	400	5,100	9,300

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
Pershing Creek and Smith Creek	Upstream of Interstate Highway 10	7.3	1,200	*	4,000	6,000	13,700
Pushawalla Canyon	At Apex	33.7	3,460	*	6,680	8,050	11,700
Ramsey Street Drain	At San Gorgonio Avenue	1.1	310	*	620	870	1,800
Ramsey Street Drain	Upstream of Interstate Highway 10	0.7	210	*	430	600	1,200
Ramsey Street Drain	Downstream of Interstate Highway 10	0.7	210	*	430	600	640
Rice Canyon	At mouth	2.8	*	*	*	1,900	*
Salt Creek	At Lyon Avenue	42.4	1,500	*	5,700	9,200	24,000
Salt Creek Tributary	At State Street	7.0	500	*	1,700	2,800	7,000
San Gorgonio River	At San Gorgonio River - Banning Levee	22.4	2,400	*	8,000	12,000	28,000
San Jacinto River [9]	Downstream of Wash D	701.9	1,200	*	12,000	24,500	70,000
San Jacinto River [9]	At Gage Station	700.3	1,200	*	12,000	24,500	70,000
San Jacinto River [9]	At Spillway	692.0	1,200	*	12,000	24,500 [2]	70,000
San Jacinto River [9]	At I-215 Freeway	509.0	8,737 [10]	*	25,603 [10]	22,403 [10]	32,747 [10]
San Jacinto River [9]	At Bridge Street	343.0	27,405 [10]	*	51,730 [10]	62,068 [10]	87,110 [10]
Santa Ana River	At River Road	*	19,000	*	82,000	166,000	348,000
Santa Ana River	At Prado Basin Park Road	*	19,000	*	82,000	161,500	341,700
Santa Ana River	Approximately 3,000 feet downstream of I-15	*	19,000	*	82,000	157,200	335,300
Santa Ana River	Approximately 1.0 mile upstream of I-15	*	19,000	*	82,000	152,900	329,000
Santa Ana River	Near confluence with San Sevaine Channel	*	19,000	*	82,000	148,600	322,700
Santa Ana River	Approximately 1.0 mile downstream of Van Buren Boulevard	*	19,000	*	82,000	144,300	316,300

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
Santa Ana River	Approximately 0.5 mile downstream of Union Pacific Railroad	*	19,000	*	82,000	140,000	310,000
Santa Ana River	At Sanitary Landfill	*	17,100[14]	*	77,950[14]	127,057	295,905[14]
Santa Ana River	Split Channel – At Sanitary Landfill	*	1,900[14]	*	4,050[14]	12,943[14]	14,095 [14]
Sheep Canyon 1	Apex of Alluvial Fan	*	*	*	*	*	*
Sheep Canyon 2	Apex of Alluvial Fan	6.1	*	*	5,368	*	*
Sidney Street Channel	At Wilson Street	0.3	100	*	210	300	590
Sidney Street Channel	At Canyon mouth	0.1	33	*	80	120	230
Smith Creek	At City of Banning corporate limits	29.1	3,200	*	11,000	16,000	37,000
Smith Creek	Approximately 500 feet downstream of Hathaway Street	26.1	2,800	*	9,400	14,000	33,000
Smith Creek	At Banning Idyllwild Road	22.5	2,600	*	8,700	13,000	31,000
Smith Creek	Downstream of Pershing Creek	15.5	2,000	*	6,700	10,000	24,000
Smith Creek East Tributary	At confluence with Smith Creek West Tributary	0.2	56	*	140	210	410
Smith Creek East Tributary	At corporate limits	0.1	33	*	80	120	230
Smith Creek West Tributary	At Ramsey Street	5.1	920	*	3,000	4,600	11,000
Smith Creek West Tributary	At corporate limits	4.5	860	*	2,900	4,300	10,000
South Norco Channel	At confluence with Temescal Wash	4.3	150 [11]	*	440 [11]	1,700	4,700

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
South Norco Channel	At River Road	4.1	107 [11]	*	340 [11]	1,600	4,700
South Norco Channel	Approximately 4,000 feet downstream of First Street	0.5	70	*	200	320	740
South Norco Channel, Tributary A	Approximately 500 feet downstream of Parkridge Avenue	1.3	0	*	0	390	1,500
South Norco Channel, Tributary A	At Hamner Avenue	1.0	130	*	350	570	1,300
South Norco Channel, Tributary A	Approximately 4,000 feet downstream of First Street	0.8	98	*	300	480	1,100
South Norco Channel, Tributary A	At First Street	0.5	70	*	200	320	740
South Norco Channel. Tributary B	At confluence with South Norco Channel	1.3	130	*	410	670	1,600
South Norco Channel. Tributary B	At Hillside Avenue	1.1	130	*	370	600	1,400
Spring Brook Wash	At Lake Evans	18.8	1,990	*	*	2,900	*
Spring Brook Wash	At confluence with University Wash	9.4	680	*	*	1,000	*
Stetson Avenue Channel	At Hemet Storm Channel	2.5	500	*	850	1,100	2,600
Stetson Avenue Channel	At Palm Avenue	2.1	450	*	700	950	2,200
Stetson Avenue Channel	At State Street	1.9	400	*	650	850	2,000
Stetson Avenue Channel	At San Jacinto Street	1.3	300	*	490	650	1,500

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
Stovepipe Canyon Creek	At State Highway 71	1.3	150	*	460	750	1,700
Stream A	At 2S./5E.-29 NW. corner	0.6	440	*	620	740	970
Taylor Avenue Drain	At Cota Street	1.5	280	*	590	850	1,900
Taylor Avenue Drain	At Riverside Freeway	1.4	260	*	550	800	1,800
Taylor Avenue Drain	At Grand Boulevard	1.3	220	*	500	750	1,700
Taylor Avenue Drain	At Olive Avenue	0.9	160	*	370	550	1,200
Taylor Avenue Drain	At Citron Avenue	0.8	150	*	340	500	1,100
Taylor Avenue Drain	At Ontario Avenue	0.7	130	*	300	450	1,000
Temecula Creek	At mouth	370.0	7,500	*	27,000	36,000	58,000
Temescal Wash	Below confluence with Oak Street	249.0	4,170	*	9,900	12,700	19,400
Temescal Wash	Below confluence with Arlington Channel	224.0	3,840	*	9,030	11,500	17,500
Temescal Wash	Above confluence with Arlington Channel	*	1,970	*	12,180	24,000	58,090
Temescal Wash	At Magnolia Avenue	134.0	1,800	*	11,700	22,000	52,000
Tequesquite Arroyo	At Tequesquite Avenue	4.89 [12]	1,972	*	*	2,880	*
Tequesquite Arroyo	At Magnolia Avenue	3.54 [12]	685	*	*	750	*
Tequesquite Arroyo	At Atchison, Topeka & Santa Fe Railway	3.01 [12]	1,240	*	*	2,350	*
Thousand Palms Canyon	At Apex	84.1	5,330	*	11,170	14,510	24,600
Thousand Palms Main Channel	At Apex	7.5	1,240	*	2,350	2,820	4,090

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
Thousand Palms Tributary A	At Apex	1.4	640	*	980	1,160	1,650
Thousand Palms Tributary B	At Apex	0.9	560	*	850	1,000	1,400
Thousand Palms Tributary C	At Apex	1.1	680	*	1,030	1,220	1,780
Thunderbird Wash	At confluence with Whitewater River	1.0	120	*	550	920	2,600
Thunderbird Wash	At Pecos Road	0.6	90	*	400	660	1,900
Thunderbird Wash	At Thunderbird Road	0.4	70	*	300	500	1,400
Tramview Tributary	At State Highway 111	1.1	180	*	700	1,160	3,170
Tramview Wash	Approximately 230 feet upstream of upstream corporate limits	1.7	240	*	920	1,530	4,240
University Wash	At confluence with Springbrook Wash	9.1	1,000	*	*	1,900	*
University Wash	At Gage Canal crossing	3.8	500	*	*	1,600	*
Unnamed Canyon South of Barton Canyon	Apex of Alluvial Fan	5.9	*	*	*	0	*
Unnamed Canyon South of Sheep Canyon	Apex of Alluvial Fan	1.3	*	*	*	2,541	*
Unnamed Tributary	Apex of Alluvial	2.4	*	*	*	3,074	.
Unnamed Stream A	At 2S./5E.-29 NW. corner	0.6	0.6	*	470	715	1,450
Unnamed Stream B	At 2S./5E.-29 S. Half	1.1	160	*	750	1,160	2,460
Unnamed Stream C	At 2S./5E.-33 NE. Quarter	0.7	120	*	520	790	1,620
Unnamed Tributary 1	Downstream end of Subbasin 1.01	2.4	*	*	*	3,074	*

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
Wardlow Wash	At Palisades Drive	*	*	*	*	1,877	*
Wardlow Wash	Downstream of Serfas Club Drive	*	*	*	*	1,711	*
Warm Springs Tributary C - Benton Creek	At Winchester Road	3.0	*	*	*	1,160	*
Warm Springs Tributary C - Benton Creek	At Benton Road	2.0	*	*	*	775	*
Warm Springs Tributary C - Benton Creek	At Pourroy Road	1.5	*	*	*	580	*
Warm Springs Tributary C - Benton Creek	At Washington Avenue	0.6	*	*	*	160	*
Wash D	At confluence with San Jacinto River	0.9	110	*	340	530	1,200
Wash D	At State Highway 71	0.6	82	*	240	390	880
Wash G	At confluence with Channel H	0.5	90	*	260	390	840
Wash G	At Machado Street	0.2	45	*	120	180	380
Wash I	At Lake Elsinore	0.5	90	*	240	380	890
Wash I	At Grand Avenue	0.4	80	*	210	330	700
Wasson Canyon Creek	At confluence with Temescal Wash	8.3 [13]	580	*	1,900	2,400 [2]	2,540
Wasson Canyon Creek	At State Highway 71	8.2 [13]	580	*	1,900	2,400 [2]	2,540
West Macomber Palms Channel	At Apex	2.9	1,260	*	1,930	2,220	2,980
West Norco Channel	At confluence with North Norco Channel	0.9	200	*	400	550	1,200
West Norco Channel	At Pine Avenue	0.5	130	*	250	350	740

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10-Percent-Annual-Chance	4-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent Annual-Chance	0.2-Percent-Annual-Chance
West Pershing Channel	At Ramsey Street	1.3	230	*	630	960	2,100
West Pershing Channel	At corporate limits	0.7	140	*	380	580	1,200
Whitewater River	Below Palm Valley Drain	*	8,800	*	28,000	46,000	106,000
Whitewater River	At Salton Sea	1,600.0	8,500	*	27,000	43,000	100,000
Whitewater River	At Point Happy	843.0	8,500	*	27,000	43,000	100,000
Whitewater River	Downstream of confluence with Palm Canyon Wash	743.0	9,000	*	30,000	47,000	110,000
Whittier Avenue Channel	At Hemet Storm Channel	1.9	400	*	630	840	1,900
Whittier Avenue Channel	At Lyon Avenue	1.8	380	*	610	800	1,800
Whittier Avenue Channel	At Palm Avenue	1.3	300	*	460	610	1,400
Whittier Avenue Channel	At San Jacinto Avenue	0.8	200	*	320	410	900

[1] Excluding Bautista Wash Non-Contributing Area (1.1 square miles)
[2] Peak discharge provided by Riverside County Flood Control and Water Conservation District
[3] Drainage area reflects on the contributory portion of drainage basin
[4] Flows going toward Lake Elsinore
[5] Flows represent 60 percent of flows leaving Wasson Canyon Creek
[6] Represents spillway flow out of Lake Elsinore
[7] Does not include 33.2 square miles behind West Wide Canyon Dam
[8] Includes adjustment for flow transfer from Pechanga Creek
[9] Excludes 18 square miles above Pidgeon Pass and Perris Drive
[10] Represents flow rate at peak stage (elevation) at this location for updated unsteady San Jacinto River model. San Jacinto unit hydrograph data downstream of Bridge St. to mouth of Railroad Canyon, used in unsteady hydraulic analysis for this reach, foundin Section 10 “1st Revision”
[11] Decrease due to storage upstream
[12] Drainage area reflects only the contributing portion of the drainage basin
[13] Flows limited by freeway culvert
[14] Split channel
* Data not available

Figure 7: Frequency Discharge-Drainage Area Curves

[Not Applicable to this Flood Risk Project]

Table 10: Summary of Non-Coastal Stillwater Elevations

		Elevations (feet NAVD88)				
Flooding Source	Location	10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Lake Elsinore	USGS Survey Gage No. 11-705	1,260	*	1,265	1,266	1,270
Santa Ana River	Upstream of Prado Dam	*	*	*	556.5	*

*Not calculated for this Flood Risk Project

Table 11: Stream Gage Information used to Determine Discharges

Flooding Source	Gage Identifier	Agency that Maintains Gage	Site Name	Drainage Area (Square Miles)	Period of Record	
					From	To
Andreas Canyon Wash	10259000	USGS	Upstream ofthe Palm Springs corporate limits	-[1]	-[1]	26*
Andreas Creek	10-2590	USGS	Andreas Creek near Palm Springs	8.6	-[1]	23*
Arch Creek	9-4285.3	USGS	At Arch Creek, NearEarp	1.52	-[1]	15*
Bautista Creek	11-700	USGS	Bautista Creek near Hemet	39.4	-[1]	22*
Betz Wash	10.2540.2	USGS	At Betz Wash, nearSalton Beach, California	5.95	-[1]	14*
Cajon Creek	11-630	USGS	Cajon Creek near Keen Brook, California	40.6	-[1]	52*
Chemehuevi Wash Tributary	9-4240.5	USGS	At Chemehuevi Wash Tributary, Near Needles	2.04	-[1]	14*
City Creek	11-558	USGS	City Creek near Highland	19.6	-[1]	53*
Colorado River Tributary	4285.3	USGS	At Colorado River Tributary, Near Vidal	1.12	-[1]	14*
Cottonwood Wash	10-2596	USGS	At Cottonwood Wash, near Cottonwood Spring, California	0.71	-[1]	14*
Cucamonga Creek	11-734.7	USGS	Cucamonga Creek at Upland	101.1	-[1]	43*
Day Creek	11-670	USGS	Day Creek at Etiwanda	4.6	-[1]	45*
Devil Canyon Creek	11-636.8	USGS	Devil Canyon Creek near San Bernardino	5.6	-[1]	50*

*The Period of Record date information is not available. This is the total number of years of record.
[1]Data not available

Table 11: Stream Gage Information used to Determine Discharges *(continued)*

Flooding Source	Gage Identifier	Agency that Maintains Gage	Site Name	Drainage Area (Square Miles)	Period of Record	
					From	To
East Twin Creek	11-585	USGS	East Twin Creek near Arrowhead Springs	8.8	-[1]	53*
Glamis Wash	10-2544.75	USGS	At Glamis Wash, Near Glamis	0.6	-[1]	14*
Lone Pine Creek	11-635	USGS	Lone Pine Creek Near Keen Brook	15.1	-[1]	42*
Long Canyon	18100200	USGS	Long Canyon, near Desert Hot Springs	19.4	-[1]	16*
Long Creek	18100200	USGS	Long Creek, near Desert Hot Springs	19.4	-[1]	16*
Lytle Creek	11-620	USGS	Lytle Creek near Fontana	46.3	-[1]	39*
Mill Creek	11-540	USGS	Mill Creek near Yucaipa	38.1	-[1]	50*
Mission Creek	10257600	USGS	At Mission Creek, near Desert Hot Springs	35.7	-[1]	20*
Monument Wash	10-2537.5	USGS	At Monument Wash, Near Desert Center	4.29	-[1]	14*
Palm Canyon	10-2585	USGS	Palm Canyon near Palm Springs	93.3	-[1]	38*
Palm Canyon Tributary	10-2581	USGS	Palm Canyon Tributary Near Anza	0.5	-[1]	9*
Plunge Creek	11-555	USGS	Plunge Creek near East Highlands	16.9	-[1]	53*
Reche Canyon	S-2702A	USGS	Reche Canyon at Barton Road	11.2	-[1]	15*
San Antonio Creek	11-730	USGS	San Antonio Creek near Claremont	16.5	-[1]	55*
San Jacinto River	11- 695	USGS	San Jacinto River Near San Jacinto	141.0	-[1]	44*

*The Period of Record date information is not available. This is the total number of years of record.
[1]Data not available

Table 11: Stream Gage Information used to Determine Discharges *(continued)*

Flooding Source	Gage Identifier	Agency that Maintains Gage	Site Name	Drainage Area (Square Miles)	Period of Record	
					From	To
San Timoteo Creek	11-570	USGS	San Timoteo Creek near Redlands	119.0	-[1]	41*
Santa Ana River	11-515	USGS	Santa Ana River at Mentone	209.0	-[1]	55*
Santa Ana River	11-665	USGS	Santa Ana River at Riverside Narrows	850.0	-[1]	45*
South Fork San Jacinto Tributary	11-693	USGS	South Fork San Jacinto Tributary near Valley Vista	2.2	-[1]	9*
Tahquitz Creek	10-2580	USGS	Tahquitz Creek near Palm Springs	16.8	-[1]	25*
Temescal Creek	11-720	USGS	Temescal Creek Near Corona	164.0	-[1]	43*
Waterman Canyon Creek	11-586	USGS	Waterman Canyon Creek near Arrowhead Springs	4.7	-[1]	49*
Whitewater River	10-2560	USGS	Whitewater River at Whitewater	57.4	-[1]	23*

*The Period of Record date information is not available. This is the total number of years of record.
[1]Data not available

5.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Base flood elevations on the FIRM represent the elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations. These whole- foot elevations may not exactly reflect the elevations derived from the hydraulic analyses. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. The hydraulic analyses for this FIS were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

For streams for which hydraulic analyses were based on cross sections, locations of selected cross sections are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 6.3), selected cross sections are also listed on Table 23, "Floodway Data."

A summary of the methods used in hydraulic analyses performed for this project is provided in Table 12. Roughness coefficients are provided in Table 13. Roughness coefficients are values representing the frictional resistance water experiences when passing overland or through a channel. They are used in the calculations to determine water surface elevations. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

Table 12: Summary of Hydrologic and Hydraulic Analyses

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
1001 Ranch Drain	33.967754, -117.469601	33.973696, -117.464798	*	*	8/28/2008	A	*
1001 Ranch Drain	33.973849, -117.464881	33.9935, -117.4501	*	*	8/28/2008	AE w/ Floodway	*
1001 Ranch Drain West Tributary	33.978968, -117.460631	33.983488, -117.461342	*	*	7/11/2023	AE w/ Floodway	Incorporation of LOMR case 10-09-2063P
Alamo Canyon	Apex of Fan	Salton Sea	HEC-HMS 3.0 and up (Dec 2005)	Fan	2/09/2018	AE, AO	*
Alessandro Reservoir	N/A	N/A	*	*	*	A	*
Alessandro Wash	33.931945, -117.379255	33.929812, -117.3656	*	*	*	AE	*
Anza Creek	33.549978, -116.670195	33.555061, -116.673671	*	*	*	A	*
Arenas Canyon Creek	33.788848, -116.522246	33.784655, -116.528171	Log Pearson Type III Frequency Analysis	*	August 1979	AE	Gage 10259000 used in hydrologic analysis.
Arenas Canyon Creek	33.784655, -116.528171	33.772295, -116.545509	*	*	*	A	Levee 14: Based on engineering judgment, the shaded Zone X behind these levees was recommended as the levee failure floodplain
Arlington Channel	33.880785, -117.554794	33.890003, -117.500631	*	*	9/17/1980	AE	*
Arroyo Del Toro Creek	33.695995, -117.34092	33.702068, -117.330134	*	*	*	A	Hydrologic studies prepared by the Riverside County Flood Control District
Avery Canyon	33.702935, -116.962467	33.701378, -116.953829	*	*	*	A	Entire surface of wash considered to be in 1-percent acf. Depth calculated based on equation by Dawdy, D. R. 1979. (ASCE 1979)

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Barton Canyon	Apex of Fan	Salton Sea	HEC-HMS 3.0 and up (Dec 2005)	Fan	2/09/2018	AO	*
Bautista Creek	At Lyon Ave	*	Log Pearson Type III Frequency Analysis	*	*	A	*
Bautista Wash	San Jacinto Avenue	Charlton Avenue	*	HEC2	*	A	Hydrological discharges taken from USACE. May 1973. Unpublished FIS, San Jacinto CA (USACE May 1973)
Bear Creek	33.678137, -116.312955	33.644794, -116.319042	HEC 1	HEC 2	10/17/1978	A	There is a flood profile and floodway data table for Bear Creek, but the reach is a Zone A on panel 1360.
Beaumont Channel	33.921879, -116.964152	33.943391, -116.976411	*	*	*	AO	HEC 1 AND regional regression equation (USGS 1970) were used. The effects of urbanization on runoff were accounted for by utilizing the results of a USGS study (USGS February 1974).
Bedford Canyon Wash	33.824312, -117.506234	33.818678, -117.515226	*	*	*	A	There is a flood profile and floodway data table for Bedford Canyon Wash, but the reach is a Zone A on panel 1360.
Big Morongo Wash	33.883297, -116.499857	33.902965, -116.505909	Regional Regression equation	*	*	A	Approximate methods
Big Morongo Wash	33.902965, -116.505909	34.00033, -116.559396	Regional Regression equation	HEC 2	*	AO	*
Biskra Palms Channel	33.789586, -116.25788	33.792794, -116.253288	*	*	*	AO	Entire surface of wash considered to be in 1-percent acf. Depth calculated based on equation by Dawdy, D. R. 1979. (ASCE 1979)
Blaisdel Canyon Creek	33.885629, -116.600907	33.87854, -116.632817	*	*	8/28/2008	A	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Blind Canyon Channel	33.975213, -116.504738	33.984906, -116.497883	RCFCWCD unpublished hydrology report	HEC 2	*	AE	*
Bly Channel	33.988134, -117.483351	34.018952, -117.492029	*	*	*	AE w/ Floodway	*
Box Springs Wash	33.974183, -117.368745	33.961689, -117.331229	*	*	*	AE	*
Bundy Canyon	33.596073, -117.267524	33.612286, -117.269293	*	*	*	A	*
Cactus Valley	33.683713, -116.95549	33.668735, -116.920513	*	*	*	A	Entire surface of wash considered to be in 1-percent acf. Depth calculated based on equation by Dawdy, D. R. 1979. (ASCE 1979)
Cahuilla Creek	33.541882, -116.683526	33.568343, -116.690502	*	*	*	A	*
Cahuilla Creek Tributary	33.559729, -116.691143	33.561332, -116.696424	*	*	*	A	*
Calimesa Channel	34.00324, -117.065134	34.004535, -117.040414	*	*	10/17/1978	AE	*
Cat Creek	33.68992, -116.408036	33.691157, -116.42282	*	*	1/19/1982	A	*
Channel A	33.922685, -116.995007	33.924428, -116.981739	Regional regression equation	Normal depth calculations	1/19/1982	X	To define discharge-frequency data for the streams under study, a regional relationship of basin characteristics to streamflow characteristics (U.S. Department of the Interior 1970) was used. The effects of urbanization on runoff were accounted for by utilizing the results of a USGS study (USGS February 1974).
Channel A	33.691537, -116.371798	33.687177, -116.37281	*	*	10/17/1978	A	Levee 39: Based on engineering judgment the shaded Zone X behind these levees was recommended as the levee failure floodplain (1/19/82)

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Channel B	33.691998, -116.365785	33.684505, -116.365071	*	*	9/17/1980	AE	*
Channel B	33.922754, -116.99636	33.921542, -116.976855	*	Normal depth calculations	10/17/1978	X	*
Channel C	33.68647, -116.372297	33.683802, -116.365259	*	*	*	AE	*
Channel H	*	*	*	*	*	*	Hydrologic studies prepared by the Riverside County Flood Control District
Cherry Avenue Channel	33.928836, -116.957802	33.950915, -116.964067	Regional Regression equation	Normal depth calculations	*	A	To define discharge-frequency data for the streams under study, a regional relationship of basin characteristics to streamflow characteristics (U.S. Department of the Interior 1970) was used. The effects of urbanization on runoff were accounted for by utilizing the results of a USGS study (USGS February 1974)
Cherry Valley Creek	33.964442, -116.993771	33.976095, -116.985151	*	*	*	A	*
Chino Canyon Creek	33.864033, -116.513836	33.869846, -116.561599	*	*	*	AE	Levee 9: For the western part of the levee, failure floodplain was developed using Alluvial Fan analysis. A discharge of 4,000 cfs was computed for a drainage area of 49 sq. mi. using the USGS NFF equations for California
Coachella Valley Stormwater Channel (Whitewater River)	33.508459, -116.058311	33.736942, -116.241511	USACE Report (USACE 1980)	HEC-RAS 4.1 (channel)/FLO-2D 2007.06 (overbanks)	2018	AE	LAMP Analysis on right and left levees used Structural-Based Inundation procedure (FEMA 2013). Hydrographs developed at the breach locations using HEC-RAS unsteady for use in 2D analysis.
Country Club Creek	33.881868, -117.620024	33.870378, -117.606283	*	*	*	AE with Floodway	*
Country Club Creek North Tributary	33.878315, -117.613335	33.871974, -117.604045	*	*	*	AE	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Day Creek	33.967093, -117.53183	34.025909, -117.541916	*	*	*	A	*
Day Creek	33.967093, -117.53183	34.025909, -117.541916	*	*	*	AE	LOMR 13-09-2159P
Day Creek Line J	Downstream side of 68th Street	Approximately 2,030 feet upstream of 68th Street	*	*	*	X	LOMR 14-09-1024P
Desert Hot Springs Creek	33.906852, -116.497393	33.945631, -116.49444	*	*	*	AO	*
Dry Morongo Wash	33.999798, -116.56804	34.009828, -116.574357	Regional Regression equation	*	*	X	*
East Cathedral Channel	33.778928, -116.452133	33.759548, -116.476532	*	*	*	AE	Flood discharges taken from the FIS for the unincorporated areas of Riverside County, California (FEMA 1980). Flood boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 10 feet. Levee 21: Based on engineering judgment the shaded Zone X behind these levees was recommended as the levee failure floodplain. Levee 22: Based on engineering judgment the shaded Zone X behind these levees was recommended as the levee failure floodplain.
East Gilman Home Channel	33.930927, -116.889298	33.939791, -116.896077	*	Sheet flow analysis	*	X	1-percent-annual-chance discharge from studies prepared by the Riverside County Flood Control and Water Conservation District (RCFCWCD Unpublished). Discharge bulked by 1.25 to account for debris.
East Hemet Wash	33.729854, -116.938306	33.730879, -116.927681	*	*	*	X	*
East La Quinta Channel	33.66338, -116.299977	33.655118, -116.303788	*	*	*	A	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
East Pershing Channel	*	*	*	*	*	A	Floodplain boundaries were determined by topography and hand calculations using Manning's equation.
Edgemont B East Fork	33.93162, -117.280707	33.923293, -117.286247	*	*	*	A, X	*
El Cerrito Channel	33.839511, -117.511687	33.827107, -117.537325	*	*	10/17/1978	A	*
El Cerrito Channel	33.838873, -117.515762	33.831525, -117.530821	*	*	10/17/1978	AE	*
El Cerrito Tributary	33.838019, -117.519053	33.839651, -117.526622	*	*	10/17/1978	A	Boundaries taken from the 1977 FHBM for the City of Corona (HUD May 1974)
Ethanac Wash	*	*	*	*	*	A	Entire surface of wash considered to be in 1-percent-annual-chance flood. Depth calculated based on equation by Dawdy, D. R. 1979. (ASCE 1979)
Garden Air Golf Course Wash	33.98919, -117.055579	33.998812, -117.026975	*	*	*	AE	*
Garner Valley Wash	33.618263, -116.627133	33.593273, -116.595093	*	*	9/29/1978	A	*
Gilman Home Channel	33.908593, -116.878814	33.937269, -116.896407	*	HEC 2, sheet flow analysis	10/17/1978	AE	1-percent-annual-chance discharge were obtained from studies prepared by the Riverside County Flood Control and Water Conservation District (RCFCWCD Unpublished).
Gilman Home Channel A	33.937296, -116.89682	33.940208, -116.901655	*	*	*	X	Flood discharges determined by a regional relationship of basin characteristics to streamflow characteristics was used (USACE June 1973). The effects of urbanization on runoff were accounted for by using the results of a USGS study (USGS February 1974). Flood boundaries determined by topography.

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Gilman Home Channel B	33.937681, -116.896997	33.940446, -116.898725	*	*	*	X	Flood discharges determined by a regional relationship of basin characteristics to streamflow characteristics was used (USACE June 1973). The effects of urbanization on runoff were accounted for by using the results of a USGS study (USGS February 1974). Flood boundaries determined by topography.
Hamilton Creek	33.551252, -116.665788	33.564132, -116.629383	*	*	*	A	*
Hargrave Street Drain	33.925477, -116.867867	33.938164, -116.867967	Regional regression equation	*	6/17/1991	X	Flood discharges were developed with a regional relationship of basin characteristics to streamflow characteristics (USACE 1973). The effects of urbanization on runoff were accounted for by using the results of a USGS study (USGS February 1974).
Harrison Wash	33.893063, -117.437583	33.886929, -117.432202	*	*	*	AE	*
Haystack Channel	*	*	*	*	*	*	Levee 34: Based on engineering judgment the shaded Zone X behind these levees was recommended as the levee failure floodplain. Levee 35: Based on engineering judgment the shaded Zone X behind these levees was recommended as the levee failure floodplain.
Hemet Storm Channel	33.719773, -117.046155	33.731255, -117.015316	Unknown	Unknown	*	AE	*
Highgrove Channel	Confluence with Santa Ana River	Approximately 260 feet downstream of upper crossing of Trailer Park	Other	WSPGW 12.96 (October 2000)	03/19/2020	AE w/ Floodway	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Highland Springs Channel	33.932871, -116.946981	33.937346, -116.947143	Regional regression equation	*	11/20/1996	AE	Flood discharges were developed with a regional relationship of basin characteristics to streamflow characteristics (USGS 1970). The effects of urbanization on runoff were accounted for by using the results of a USGS study (USGS February 1974).
Homeland – East Fork	*	*	*	*	6/18/1987	A	*
Homeland – West Fork	*	*	*	*	8/28/2008	A	*
Howell Canyon	33.595008, -117.276665	33.59375, -117.282222	*	*	9/17/1980	X	*
Indian Canyon Channel	33.92782, -116.876137	33.940271, -116.885272	*	Sheet flow analysis	*	AO, X	*
Interstate 10 Wash	*	*	*	*	*	A	*
Jenson Creek	33.899774, -116.747535	33.875911, -116.742851	*	*	*	A	1-percent discharges developed by shallow flooding analysis
Joseph Canyon	33.828963, -117.511301	33.828118, -117.513541	*	*	9/17/1980	A	*
Kalmia Street Wash	33.551892, -117.223285	33.567191, -117.209297	*	*	4/16/1979	AE	*
Kitching Drain	33.882579, -117.213717	33.918851, -117.217788	*	*	*	A	Floodplain boundaries taken from USGS flood prone area maps (USGS 1974). Boundaries reflect channel improvements made by the Riverside County Flood Control and Water Conservation District (RCFCWCD 1986)

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Lake Elsinore	N/A	N/A	*	*	*	AE	USACE HEC-5 (USACE 1999), RCFCWCD synthetic unit hydrograph rainfall runoff model (RCFCWCD 1978)
Lake Elsinore Spillway Channel	33.670334, -117.329106	33.663732, -117.332929	*	*	*	AE	Boundaries developed with normal-depth calculations with extensive field investigation and analysis of existing topography.
Lakeland Village Area	*	*	*	*	*	A	*
Lakeland Village Channel	33.639714, -117.343693	33.634888, -117.34796	*	*	*	AE	*
Leach Canyon Channel	33.670787, -117.37235	33.676928, -117.398687	*	*	*	X	*
Lime Street Channel	33.663836, -117.377064	33.661573, -117.380796	*	*	10/17/1978	X	Hydrologic studies prepared bythe Riverside County Flood Control District
Line "J" Channel	*	*	*	*	10/17/1978	*	Boundaries determined by a synthesis of normal depth calculations and engineering judgment based on topography and field investigations
Little Morongo Wash	33.970724, -116.531564	33.990228, -116.524044	Regional Regression equation	FEMA alluvial fan methodology	*	AO	Regional regression equations developed from select gages noted in effective FIS
Long Canyon	33.909987, -116.473257	33.961643, -116.44378	Synthetic Unit Hydrograph method from RCFCWCD Hydrology Manual (1978)	FEMA alluvial fan methodology	4/16/1979	AO	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
			AND least-squares fit of a Log Pearson Type III distribution				
Macomber Palms Channel	33.789351, -116.265715	33.796286, -116.262873	*	*	*	AO	*
Magnesia Falls Road	33.736058, -116.400114	33.733086, -116.417019	*	HEC 2	*	A	Entire surface of wash considered to be in 1-percent acf. Depth calculated based on equation by Dawdy, D. R. 1979. (ASCE 1979)
Magnesia Springs Channel	33.748653, -116.419051	33.731484, -116.432134	*	HEC 2	*	A	*
Main Street Channel	33.87529, -117.549016	33.831397, -117.569419	*	*	*	AE	*
Mangular Channel	33.854616, -117.598333	33.850406, -117.608667	*	*	*	AE	Discharges taken from hydrology study prepared by the USACE (USACE 1975)
Marshall Creek	33.945106, -116.983899	33.948454, -116.97891	*	HEC 2	10/17/1978	AE	Flood discharges were developed with a regional relationship of basin characteristics to streamflow characteristics (USGS 1970). The effects of urbanization on runoff were accounted for by using the results of a USGS study (USGS 1974).
Marshall Creek Tributary	33.944552, -116.983593	33.945806, -116.979437	*	Normal depth calculations	10/17/1978	A, X	Flood discharges were developed with a regional relationship of basin characteristics to streamflow characteristics (USGS 1970). The effects of urbanization on runoff were accounted for by using the results of a USGS study (USGS 1974).

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Martinez Canyon	Apex of Fan	Salton Sea	HEC-HMS 3.0 and up (Dec 2005)	Fan	2/09/2018	AO	*
McVicker Canyon	33.68477, -117.396674	33.687306, -117.416682	*	Unknown		A, X	Boundaries taken from City of Lake Elsinore FIS (HUD 1980)
Metz Road Basin	*	*	*	Unknown	4/16/1979	A	*
Millard Canyon	33.918816, -116.77677	33.947925, -116.79775	*	Unknown	4/16/1979	A	*
Mirage Indian Trail	33.745079, -116.415953	33.739893, -116.421215	*	HEC 2	*	A	*
Mission Creek	33.905268, -116.524167	33.991638, -116.572504	Synthetic Unit Hydrograph method from RCFCWCD Hydrology Manual (1978) AND least-squares fit of a log Pearson Type III distribution. 1% annual chance peak discharges for these streams	Manning's equation and highway culvert nomographs (US Department of Transportation, 1985)	*	AO, X	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
			were taken from report entitled "Mission Creek Flow Conditions Near the I-10 Embankment" , Schall, James D., 1989				
Mockingbird Canyon Wash	33.893658, -117.415042	33.86428, -117.380916	*	*	11/20/1996	A	*
Mockingbird Canyon Wash	33.908461, -117.427121	33.894534, -117.41979	*	*	11/20/1996	AE	*
Mockingbird Reservoir	*	*	*	*	*	A	*
Montgomery Creek	33.909144, -116.882687	33.936013, -116.912642	Regional regression equation	HEC 2, sheet flow analysis	*	AE	A portion of stream discharges are from 1-percent-annual-chance discharge from studies prepared by the Riverside County Flood Control and Water Conservation District (RCFCWCD unpublished). Discharge bulked by 1.25 to account for debris.
Montgomery Creek Tributary	*	*	Regional regression equation	*	2/15/1979	*	A regional relationship of basin characteristics to streamflow characteristics was used (USGS 1970). The effects of urbanization on runoff were accounted for by using the results of a USGS study (USGS 1974).
Moreno Beach Wash	*	*	*	*	2/15/1979	*	Entire surface of wash considered to be in 1-percent acf. Depth calculated based on equation by Dawdy, D. R. 1979. (ASCE 1979)

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Mountain Avenue Wash	33.758571, -117.235459	33.772608, -117.246428	*	Entire surface of wash considered to be in 1-percent acf. Depth calculated based on equation by Dawdy, D. R. 1979.	2/15/1979	A	*
Mountain Avenue Wash	33.746722, -117.230596	33.758592, -117.235464	*	*	*	AE	*
Murrieta Creek	33.594816, -117.266213	33.608962, -117.285952	*	HEC 2	*	A	Boundaries taken from "Riverside County Flood Hazard Investigation - Murrieta Creek" (CADWR 1975).
Murrieta Creek	33.474228, -117.141659	33.594816, -117.266213	*	HEC 2	9/2/1993	AE	Levee 44: The levee failure floodplain was developed using engineering judgment based on alluvial fan analysis concepts and contours developed from USGS 10-meter DEMs. Levee 45: The levee failure floodplain was developed using engineering judgment based on alluvial fan analysis concepts and contours developed from USGS 10-meter DEMs.
Murrieta Creek Tributary	*	*	*	HEC 2	4/16/1979	*	Entire surface of wash considered to be in 1-percent-annual-chance flood. Depth calculated based on equation by Dawdy, D. R. 1979. (ASCE 1979)

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Murrieta Hot Springs Creek	*	*	*	*	9/17/1980	A	*
North Cathedral Channel	33.779803, -116.453448	33.78669, -116.473133	*	*	*	AE	Flood discharges taken from the FIS for the City of Palm Springs (FEMA 1982). Boundaries were delineated using approximate hydraulic calculations in conjunction with existing topographic mapping (RCFCD 1968, 1972).
North Norco Channel	33.900702, -117.595117	33.938353, -117.551087	Regional regression equation	*	*	AE w/ Floodway	*
North Norco Channel	Approximately 6,000 feet above confluence	Limit of Study	*	*	*	AE	LOMR 15-09-0162P
North Norco Channel Tributary A	33.926289, -117.555856	33.925659, -117.538164	*	*	*	X	*
North Norco Channel Tributary B	33.933545, -117.551916	33.933004, -117.52838	*	*	*	X	*
North Norco Channel Tributary C	33.93834, -117.551203	33.942887, -117.544611	*	*	*	A	Boundaries were delineated using approximate hydraulic calculations in conjunction with existing topographic mapping (RCFCD 1968, 1972)
North Palm Springs Wash	33.904714, -116.544784	33.982862, -116.587037	*	*	*	X	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
North Shore Beach Channel	33.514789, -115.934818	33.527789, -115.919629	*	*	*	A	*
North Side Wolf Valley Creek	*	*	RCFCWCD synthetic unit hydrograph rainfall run off model (1978)	Shallow flooding analysis	9/2/1993	AH	*
Oak Street Channel	33.846339, -117.596459	33.83959, -117.597574	*	*	6/18/1987	AE w/ Floodway	Discharges taken from hydrology study prepared by the USACE (USACE 1975)
Ocotillo Drive	33.738397, -116.409754	33.73521, -116.417319	*	HEC 2	6/18/1987	A	*
Orange Lateral	*	*	*	*	7/4/1905	*	*
Ortega Channel	*	*	*	*	10/17/1978	*	*
Ortega Wash	*	*	*	*	6/18/1987	*	Boundaries taken from City of Lake Elsinore FIS (HUD 1980)
Palm Canyon Wash	33.794199, -116.471538	33.77413, -116.532958	Log Pearson Type III Frequency Analysis	HEC 2	6/18/1987	A, AE	USGS Gage 1258500. Levee 14 and 15: Based on engineering judgment, the shaded Zone X behind these levees was recommended as the levee failure floodplain.

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Palm Valley Drain	33.741456, -116.395657	33.732821, -116.399751	*	Normal depth calculations	*	A	*
Palm Valley Stormwater Channel	33.732821, -116.399751	33.68992, -116.408036	*	*	*	A	Levee 27, 29, 33: Based on engineering judgment the shaded Zone X behind these levees was recommended as the levee failure floodplain. Levee 29 analysis completed 06/18/1987.
Paloma Valley Channel	33.690608, -117.177911	33.666915, -117.175161	*	*	*	AE	*
Park Hill Drain	33.764671, -116.963719	33.751093, -116.947976	*	Shallow flooding analysis	10/17/1978	AH	*
Pechanga Creek	33.450847, -117.103707	33.448291, -117.093833	1% discharges developed by shallow flooding analysis	HEC 2	*	A	*
Pechanga Creek	33.473395, -117.129774	33.456233, -117.111434	Rainfall Runoff modeling	HEC 2	*	AE	RCFCWCD synthetic unit hydrograph rainfall run off model (RCFCWCD 1978)
Perris Lateral A	*	*	*	*	9/17/1980	D	*
Perris Lateral B	*	*	*	*	*	D	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Perris Valley Storm Drain	33.773376, -117.19964	33.858917, -117.213015	*	HEC 2	*	AE	USACE Flood Information report (USACE 1970)
Pershing Creek	33.904258, -116.88582	33.92527, -116.922885	*	HEC 2	*	A	Discharges taken from USACE Floodplain Information report (USACE June 1973). Discharges bulked by 1.25 to account for debris.
Pigeon Pass Channel	33.941356, -117.236012	33.94643, -117.243558	*	*	9/29/1978	A	*
Pigeon Pass Channel	33.934013, -117.231632	33.942159, -117.238838	*	*	*	AE	*
Prenda Reservoir	33.912437, -117.371168	33.90942, -117.364784	*	*	9/29/1978	A	*
Prenda Wash	33.923778, -117.400998	33.912464, -117.371228	*	*	10/17/1978	AE	*
Pushawalla Canyon	*	*	*	FEMA alluvial fan methodology	10/17/1978	AO, X	*
Pyrite Channel	33.975096, -117.499378	34.004247, -117.466062	*	*	4/16/1979	A	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Pyrite Channel	At confluence with Santa Ana River	At 59th Street	*	*	03/07/2016	A	Confluence of Santa Ana River was redelineated for this PMR
Pyrite Channel	34.004247, -117.466062	34.015822, -117.461381	*	*	*	AE	*
Quincy Wash	33.904074, -117.182448	33.925037, -117.165501	*	*	LOMR 11-09-0820P. PMR date 5/24/2011	A	Entire surface of wash considered to be in 1-percent acf. Depth calculated based on equation by Dawdy, D. R. 1979. (ASCE 1979)
Railroad Canyon Reservoir	N/A	N/A	*	*	*	A	*
Ramsey Street Drain	33.923197, -116.84174	33.92782, -116.876137	Regional regression equation	HEC 2, sheet flow analysis	*	A, X	A regional relationship of basin characteristics to streamflow characteristics was used (USGS 1970). The effects of urbanization on runoff were accounted for by using the results of a USGS study (USGS 1974). Discharges bulked by factor of 1.25 to account for debris.
Reche Canyon	34.005106, -117.2535	33.98489, -117.218399	*	*	9/2/1993	A	*
Reche Canyon	34.018677, -117.272009	34.005106, -117.2535	*	*	*	AE	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Rice Canyon	33.709824, -117.397652	33.696539, -117.416511	*	*	10/17/1978	A, X	*
Romoland Wash	*	*	*	*	*	A	*
Salt Creek	33.678399, -117.23548	33.712357, -117.015243	*	*	*	A	*
Salt Creek	33.692878, -117.211302	33.71634, -116.988999	*	HEC 2	10/17/1978	AE	*
Salt Creek Overflow	*	*	*	*	10/17/1978	*	*
Salt Creek Tributary	33.725526, -116.962822	33.714524, -116.892631	Regional regression equation	HEC 2	10/17/1978	A, X	Regional regression equation (URA 1972)
Salt Creek Tributary	33.721909, -116.97162	33.723763, -116.96715	Regional regression equation	HEC 2	10/17/1978	AE	Regional regression equation (URA 1972)
San Gorgonio River	33.904685, -116.75461	34.025569, -116.875	Regional regression equation	HEC 2	*	A	A regional relationship of basin characteristics to streamflow characteristics was used (USGS 1970). The effects of urbanization on runoff were accounted for by using the results of a USGS study (USGS 1974).

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
San Gorgonio River	33.946346, -116.8591	33.950427, -116.878725	Regional regression equation	HEC 2	*	AE	A regional relationship of basin characteristics to streamflow characteristics was used (USGS 1970). The effects of urbanization on runoff were accounted for by using the results of a USGS study (USGS 1974).
San Jacinto Lateral	*	*	*	*	2/15/1979	*	*
San Jacinto River	33.665153, -117.276064	33.747217, -116.857879	*	*	*	A	USACE Flood Information report (USACE 1970)
San Jacinto River	33.655344, -117.304852	33.862927, -117.059995	*	HEC-RAS 4.1 for LOMR. HEC 2, normal-depth calculations with extensive field investigation and analysis of existing topography	*	AE	Hydrologic studies prepared by the Riverside County Flood Control District. Levee 158: For the left levee, the levee failure floodplain was developed using engineering judgment based on alluvial fan analysis concepts and contours developed from USGS 10-meter DEMs. For the right levee, HEC-RAS version 4.1 was used to revise the shaded X area. Discharges from levee certification reports prepared in 2012 by Tetra Tech were used in the modeling (Tetra Tech 2012). Topographic data used for the study was 2007 LiDAR data provided by RCFCWCD (RCFCWCD 2007).
San Sevaine Channel	33.973588, -117.505345	34.033505, -117.51563	*	*	9/29/1978	A, AE, X	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Santa Ana River	At Prado Dam	At County Boundary	Gage	HEC-RAS 4.1	03/07/2016	AE w/ Floodway	The HEC-RAS model was created using the Santa Ana River HEC-2 model revised July 1990. The study was revised to add the levee accreditation on panels 06065C0045H, 06065C0063H and 06065C0710H. Study data available via the Mapping Information Platform.
Santa Ana River	33.870266, -117.672443	33.889296, -117.644685	*	*	09/17/1980	A	Hydrologic study (USACE 1975)
Santa Ana River (Split Channel)	Confluence with Santa Ana River	Approximately 0.9 miles downstream of Mission Blvd	Gage	HEC-RAS 4.1	03/07/2016	AE w/ Floodway	*
Santa Gertrudis Creek	33.540374, -117.125839	33.543048, -117.118145	*	*	*	A	*
Sedco Hills Creek	33.643241, -117.29303	33.644386, -117.28779	*	*	*	A	*
Sheep Canyon 1	Apex of Fan	Salton Sea	HEC-HMS 3.0 and up (Dec 2005)	Fan	2/09/2018	AE, AO	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Sidney Street Channel	33.932745, -116.879106	33.946359, -116.880662	Regional regression equation	Sheet flow analysis	*	A, X	A regional relationship of basin characteristics to streamflow characteristics was used (USACE, 1973). The effects of urbanization on runoff were accounted for by using the results of a USGS study (U.S. Department of the Interior, 1974). Discharge bulked by 1.25 to account for debris. The capacity of the channel was determined from the improvement plans and the excess discharge treated as overland flow with the boundaries determined by topography and field investigation and depths checked by using Manning's equation.
Sinclair Wash	*	*	*	*	*	*	Entire surface of wash considered to be in 1-percent-annual-chance flood. Depth calculated based on equation by Dawdy, D. R. 1979. (ASCE 1979)
Small Unnamed Streams	*	*	Unknown	Entire surface of wash considered to be in 1-percent acf. Depth calculated based on equation by Dawdy, D. R. 1979.	*	A	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Smith Creek	33.921799, -116.925428	33.943892, -116.937258	Regional regression equation	HEC 2	*	A	A regional relationship of basin characteristics to streamflow characteristics was used (USGS 1970). The effects of urbanization on runoff were accounted for by using the results of a USGS study (USGS 1974).
Smith Creek	33.917628, -116.840709	33.90148, -116.891382	*	HEC 2	6/18/1987	AE	Hydrology taken from USACE Floodplain Information report (USACE June 1973).
Smith Creek West Tributary	33.925442, -116.925339	33.936439, -116.937229	Regional regression equation	HEC 2	*	AE	A regional relationship of basin characteristics to streamflow characteristics was used (USGS 1970). The effects of urbanization on runoff were accounted for by using the results of a USGS study (USGS 1974).
South Norco Channel	33.895123, -117.57953	33.918659, -117.546004	HEC 1	*	*	AE w/ Floodway	Modified Puls routing used to determine elevation behind structure
South Norco Channel, Tributary A	33.897677, -117.570283	33.901955, -117.545773	HEC 1	*	*	AE, X	Modified Puls routing used to determine elevation behind structure
South Norco Channel Tributary B	33.905758, -117.554531	33.905023, -117.541428	*	*	*	AE, X	*
Spring Brook Wash	33.993862, -117.381174	33.918659, -117.546004	*	*	9/2/1993	AE	*
Spring Brook Wash	34.012263, -117.345077	34.012263, -117.345077	*	*	9/2/1993	A	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
St. Johns Canyon	33.669454, -116.966604	33.636118, -116.939502	*	*	*	A	Entire surface of wash considered to be in 1-percent acf. Depth calculated based on equation by Dawdy, D. R. 1979. (ASCE 1979)
Stetson Avenue Channel	*	*	Regional regression equation	Shallow flooding analysis	*	A, X	A regional relationship of basin characteristics to streamflow characteristics was used (USGS 1970). The effects of urbanization on runoff were accounted for by using the results of a USGS study (USGS 1974).
Stovepipe Canyon Creek	33.703895, -117.353008	33.707239, -117.34409	*	*	*	A	*
Strawberry Creek	33.731857, -116.74262	33.767947, -116.688235	*	*	4/16/1979	A	*
Strawberry Creek Tributary	33.746179, -116.707201	33.747628, -116.70442	*	*	*	A	*
Sun City Channel A-A	33.69958, -117.203847	33.721574, -117.197423	*	*	*	AE	*
Sun City Channel A-A	33.693967, -117.204027	33.69958, -117.203847	*	*	*	A	*
Sun City Channel H-H	33.716826, -117.198992	33.714194, -117.187611	*	*	*	A	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Sun City Channel H-H	33.714194, -117.187611	33.714189, -117.182937	*	*	*	AE	*
Sun City Southeast Tributary	33.704757, -117.201806	33.707057, -117.186173	*	*	*	A	*
Sunnymead Storm Channel	33.919275, -117.242001	33.942584, -117.22544	*	*	*	AE	*
Sunnyslope Channel	33.987728, -117.422017	34.007302, -117.421593	*	*	*	AE	*
Tahquitz Creek	33.811347, -116.544709	33.81062, -116.553894	*	*	*	A	*
Tahquitz Creek	33.801404, -116.492974	33.802275, -116.564024	Log Pearson Type III Frequency Analysis	HEC 2, normal-depth calculations with extensive field investigation s and analysis of existing topography	*	AE	LP Analysis used USGS gage 10258000,Tahquitz Creek near Palm Springs. Levee 16: Based on engineering judgment the shaded Zone X behind these levees was recommended as the levee failure floodplain.
Taylor Avenue Drain	*	*	*	*	*	AO, X	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Temecula Creek	33.47398, -117.111356	33.501244, -117.003378	*	*	*	A	*
Temecula Creek	33.474739, -117.14102	33.474218, -117.111806	*	*	*	AE	*
Temescal Wash	33.904802, -117.611408	33.680929, -117.331863	Log Pearson Type III Frequency Analysis	HEC 2, normal-depth calculations with extensive field investigations and analysis of existing topography	*	AE	LP Analysis used USGS gage 11072000, Temescal Wash near Corona. Portion of boundary taken from City of Corona FIS (HUD 1978). Levee 5: An attempt was made to map the riverside base flood elevations on the landward side of the levee using detailed topographic data provided by Riverside County. Using the riverside base flood elevations, a levee failure floodplain could not be mapped (11/20/1996).
Temescal Wash	33.904802, -117.611408	33.680929, -117.331863	*	*	02/02/2018	AE w/ Floodway	LOMR 17-09-1498P
Tequesquite Arroyo	33.975537, -117.398942	33.954758, -117.343908	*	*	11/20/1996	AE	*
The Veldt	*	*	*	HEC 2	9/17/1980	A	*
Third Street Basin	*	*	*	*	9/17/1980	A	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Thousand Palms Canyon	*	*	*	FEMA alluvial fan methodology	9/17/1980	AO	*
Thousand Palms Main Channel	*	*	*	*	*	AO	*
Thousand Palms Tributary A	33.845755, -116.403091	33.848664, -116.403234	*	*	*	AO	*
Thousand Palms Tributary B	33.850705, -116.394252	33.852658, -116.395779	*	*	10/17/1978	AO	*
Thousand Palms Tributary C	33.847906, -116.384715	33.85207, -116.385118	*	*	*	AO	*
Thunderbird Wash	33.753323, -116.426485	33.747851, -116.442561	*	*	*	X	Hydraulic analysis completed by synthesis of hand calculations and engineering judgment
Tin Mine Canyon Creek	33.83959, -117.597574	33.836619, -117.604511	*	*	*	AE	No profile or Floodway Data Table in FIS
Tramview Wash	33.786945, -116.475352	33.781933, -116.48552	Regional regression equation	HEC 2	*	AO, A	To assist in defining the relationship at drainage areas of less than approximately 10 square miles, equations developed by the USGS and shown in Water Resources Investigation 77-21 (USGS 1977) were used.

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Tramview Wash Tributary	33.788585, -116.480679	33.791289, -116.486174	*	HEC 2	9/29/1978	AO	To assist in defining the relationship at drainage areas of less than approximately 10 square miles, equations developed by the USGS and shown in Water Resources Investigation 77-21 (USGS 1977) were used.
Tributary to Oak Street Channel	*	*	*	*	*	A	*
University Wash	34.001228, -117.368493	33.979642, -117.309212	*	*	*	AE w/ Floodway	
University Wash	Downstream of North Orange Street	Approximately 300 feet updates of West LA Cadena Drive	*	*	12/06/2023	AE w/ Floodway	Incorporation of LOMR case 22-09-1386P.
Unnamed Canyon South of Barton Canyon	Apex of Fan	Salton Sea	HEC-HMS 3.0 and up (Dec 2005)	Fan	2/09/2018	AO	*
Unnamed Stream A	33.969822, -116.489778	33.972667, -116.487612	Regional regression equation	*	*	AO	Regional regression equations developed from select gages noted in effective FIS
Unnamed Stream B	33.961888, -116.487197	33.967174, -116.480401	Regional regression equation	*	*	AO	Regional regression equations developed from select gages noted in effective FIS
Unnamed Stream C	33.956489, -116.465865	33.959247, -116.462559	Regional regression equation	*	*	AO	Regional regression equations developed from select gages noted in effective FIS
Unnamed Tributary South of Sheep Canyon	Apex of Fan	Salton Sea	HEC-HMS 3.0 and up (Dec 2005)	Fan	2/09/2018	AO	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Valle Vista Drain	33.756622, -116.893116	33.746349, -116.885977	*	*	*	A	*
Vander Veer Creek	33.531376, -115.940515	33.547403, -115.936446	*	*	*	A	*
Vander Veer Creek East Tributary	33.534359, -115.928999	33.535704, -115.923317	*	*	*	A	*
Wardlow Wash	33.882077, -117.62919	33.857279, -117.613022	*	*	*	A	*
Wardlow Wash	Limit of Detailed Study	Limit of Study	*	*	*	AE	*
Warm Spring Creek	33.54497, -117.172435	33.5625, -117.161111	*	*	*	A	*
Warm Spring Creek	33.526265, -117.184498	33.54497, -117.172435	*	*	*	AE	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Warm Springs Tributary C - Benton Creek	At State Road 79	At Washington Street	HEC-HMS	HEC-RAS 5.06	3/09/2020	AE	*
Wash I	33.660476, -117.371278	33.657862, -117.373495	*	*	*	X	*
Wasson Canyon Creek	33.698422, -117.311888	33.707841, -117.302693	*	*	*	A	Hydrologic studies prepared by the Riverside County Flood Control District. Hydraulic analysis used normal-depth calculations with extensive field investigation and analysis of existing topography.
West Cathedral Channel	33.784135, -116.469222	33.761736, -116.482253	*	*	*	AE	Flood discharges taken from the FIS for the unincorporated areas of Riverside County, California (FEMA 1980).Flood boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 10 feet. Levee 17: Based on engineering judgment the shaded Zone X behind these levees was modified based on contours developed from the USGS 1-=m DEMs to develop the recommended levee failure floodplain. Levee 18: Based on engineering judgment the shaded Zone X behind these levees was recommended as the levee failure floodplain.
West Norco Channel	33.90759, -117.585721	33.913247, -117.579923	Regional regression equation	*	*	AE w/ Floodway	*

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
West Pershing Channel	33.92527, -116.922885	33.938534, -116.929406	Regional regression equation	HEC 2	*	AE	A regional relationship of basin characteristics to streamflow characteristics was used (USGS 1970). The effects of urbanization on runoff were accounted for by using the results of a USGS study (USGS 1974).
White House Canyon Wash	33.984661, -116.530297	33.989538, -116.537349	*	*	*	A, X	*
Whitewater River	33.7371, -116.241641	33.776146, -116.447887	Unknown	HEC 2	*	A	In the City of Cathedral flood discharges for the Whitewater River at the confluence with Palm Canyon Wash were taken from a report prepared by Philip Abrams Consulting Engineers for the Riverside County Flood Control District (Philip 1975).
Whitewater River	33.776146, -116.447887	33.879157, -116.534358	Unknown	HEC 2	*	AE	In the City of Cathedral flood discharges for the Whitewater River at the confluence with Palm Canyon Wash were taken from a report prepared by Philip Abrams Consulting Engineers for the Riverside County Flood Control District (Philip 1975). Levees 10, 20 and 23: FEMA has certified these levees so no levee failure analysis was performed. For Levees 19, 28,30: Based on engineering judgment the shaded Zone X behind these levees was recommended as the levee failure floodplain. For Levees 36 and 38: Based on engineering judgment the levee failure floodplain was delineated using contours derived from the USGS 10-meter DEM.

*Data not available

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Whittier Avenue Channel	*	*	Regional regression equation	Shallow flooding analysis	*	A, X	Hydrology developed with regional regression equation (URA 1972). A combination of extensive field examination of critical street cross sections, normal depth calculations, and a study of current mapping (HUD 1974) was used to determine flood boundaries.
Wide Canyon Wash	33.909404, -116.463243	33.935372, -116.394852	*	*	*	A	*
Wilson Canyon	33.604316, -117.279694	33.596672, -117.291027	*	HEC 2	*	A	*
Woodcrest Reservoir	33.902605, -117.379818	33.903337, -117.375258	*	*	*	A	*

*Data not available

Table 13: Roughness Coefficients

Flooding Source	Channel "n"	Overbank "n"
Arlington Channel	0.015	0.04
Arroyo Del Toro	0.040-0.045	0.045-0.050
Bautista Wash	0.030-0.080	0.065-0.140
Beaumont Channel	*	0.015-0.080
Blind Canyon Channel	0.015-0.035	0.035
Channel H	0.015-0.040	0.040-0.090
Cherry Avenue Channel	0.015-0.040	0.030-0.080
Country Club Creek	0.035-0.060	0.030-0.100
Deep Canyon Storm Water Channel	0.016-0.030	0.025-0.060
Desert Hot Springs Channel	0.015-0.035	0.035
East Cathedral Channel	0.03	0.03
East Gilman Home Channel	0.017	0.035
East Pershing Channel	0.04	0.04
Elsinore Spillway Channel	0.040-0.060	0.035-0.090
Gilman Home Channel	0.015-0.035	0.030-0.100
Highgrove Channel	0.0130-0.030	0.030-0.050
Highland Springs Channel	0.015	0.040-0.050
Indian Canyon Channel	0.017	0.035-0.100
Leach Canyon	0.015-0.040	0.030-0.075
Lime Street Channel	0.015-0.018	0.035-0.050
Lincoln Avenue Drain	*	0.030-0.060
Main Street Channel	0.015	0.040-0.125
Mangular Channel	0.015-0.075	0.020-0.075
Marshall Creek	0.030-0.050	0.035-0.040
McVicker Canyon	0.030-0.040	0.035-0.050
Montgomery Creek	0.015-0.035	0.031-0.100
Murrieta Creek	0.020-0.035	0.025-0.035
North Cathedral Channel downstream of confluence with West Cathedral Channel	0.014	0.050-0.080
North Cathedral Channel upstream of confluence with West Cathedral Channel	0.015-0.125	*
North Norco Channel	0.030-0.060	0.035-0.095
North Norco Channel, Tributary A	0.015-0.040	0.035-0.100
North Norco Channel, Tributary B	*	0.075-0.080
North Norco Channel, Tributary C	*	0.07
Oak Street Channel	0.018-0.065	0.030-0.080
Ortega Channel	0.015-0.040	0.035-0.085
Palm Canyon Wash	0.03	0.03
Pechanga Creek	0.040-0.080	0.065-0.140
Perris Valley Storm Drain	0.03	0.03
Pyrite Channel	0.040	0.040
Ramsey Street Drain	0.014-0.035	0.017-0.100
Rice Canyon	0.030-0.040	0.035-0.050
Salt Creek	0.035	0.035

Table 13: Roughness Coefficients *(continued)*

Flooding Source	Channel "n"	Overbank "n"
Salt Creek Tributary	0.035	0.035
San Gorgonio River	0.035	0.04
San Jacinto River	0.025-0.060	0.025-0.060
Santa Ana River	0.035-0.065	0.015-0.100
Santa Ana River (Split Channel)	0.064	0.064
Sidney Street Channel	0.014-0.020	0.035-0.060
Smith Creek	0.027	0.035
Smith Creek West Tributary	0.03	0.04
South Norco Channel	0.030-0.050	0.035-0.095
South Norco Channel Tributary A	0.035-0.045	0.035-0.125
South Norco Channel, Tributary B	0.030-0.075	0.045-0.095
Stetson Avenue Channel	0.015	0.035-0.040
Stovepipe Canyon Creek	0.020-0.030	0.020-0.030
Temescal Canyon	0.035-0.060	0.035-0.045
Temescal Wash	0.030-0.100	0.025-0.095
Tramview Wash	0.015-0.125	*
Tramview Wash Tributary	0.015-0.125	*
Warm Springs Tributary C – Benton Creek	0.013-0.100	0.013-0.045
Wash D	0.024-0.040	0.035-0.050
Wash G	0.014-0.050	0.040-0.090
Wash I	*	0.030-0.090
Wasson Canyon Creek	0.030-0.050	0.035-0.050
West Cathedral Channel	0.014	0.014
West Norco Channel	0.035-0.060	0.030-0.100
West Pershing Channel	0.015-0.040	0.030-0.035
Whitewater River	0.020-0.400	0.030-0.100
Whittier Avenue Channel	0.013	0.035-0.040

* Data not available

5.3 Coastal Analyses

This section is not applicable to this Flood Risk Project.

Table 14: Summary of Coastal Analyses

[Not Applicable to this Flood Risk Project]

5.3.1 Total Stillwater Elevations

This section is not applicable to this Flood Risk Project.

Figure 8: 1-Percent-Annual-Chance Total Stillwater Elevations for Coastal Areas

[Not Applicable to this Flood Risk Project]

Table 15: Tide Gage Analysis Specifics

[Not Applicable to this Flood Risk Project]

5.3.2 Waves

This section is not applicable to this Flood Risk Project.

5.3.3 Coastal Erosion

This section is not applicable to this Flood Risk Project.

5.3.4 Wave Hazard Analyses

This section is not applicable to this Flood Risk Project.

Table 16: Coastal Transect Parameters

[Not Applicable to this Flood Risk Project]

Figure 9: Transect Location Map

[Not Applicable to this Flood Risk Project]

5.4 Alluvial Fan Analyses

Alluvial fan flooding can pose significant risk to communities due to uncertain flow paths and the potential for mud and debris flows. Alluvial fans and flooding on alluvial fans show great diversity because of variations in climate, fan history, rates and styles of tectonism, source area lithology, vegetation, and land use. Acknowledging this diversity, FEMA developed an approach that considers site-specific conditions in the identification and mapping of flood hazards on alluvial fans. The FEMA alluvial fan methodology was used to determine the flood depths and velocities on the alluvial fans described in Table 17.

A summary of the peak discharge at the fan apex and results for the 1-percent-annual-chance determinations for all the streams studied by alluvial fan analyses is shown in Table 18, “Results of Alluvial Fan Analyses.”

Table 17: Summary of Alluvial Fan Analyses

Flooding Source	Location From (apex)	Location To (toe)	Drainage Area above Apex (sq. mi)	Model(s) Used	Date Analysis was Completed	Method Description
Alamo Canyon	Apex of fan	Salton Sea	6.68	FAN	2018	FEMA Fan Analysis
Avery Canyon	Apex of fan	Confluence with Salt Creek	*	N/A	*	No significant entrenched channels identified on topographic maps (RCFCWCD, 1966, etc.) so entire fan included in 1-percent-annual-chance boundary
Barton Canyon	Apex of fan	Salton Sea	5.26	FAN	2018	FEMA Fan Analysis
Biskra Palms Channel	Apex of fan	Confluence with Unnamed Stream	0.9	*	1995	Unknown, area modified by LOMR dated May 16, 1995
Cactus Valley	Apex of fan	Confluence with Salt Creek	*	N/A	*	No significant entrenched channels identified on topographic maps (RCFCWCD, 1966, etc.) so entire fan included in 1-percent-annual-chance boundary
Chino Canyon	Tram Way	Blue Sky Way	49.0	*	2008	The landward side of the western part of Levee 9 mapped using regression analysis and topographic data.
Corona Alluvial Fan	City of Corona Corporate Limits	Temescal Wash	10.3[1]	*	*	Boundaries were established by extensive field investigations, topography, and evaluation of historical flooding
Deep Canyon Alluvial Fan	Apex of fan	Southern terminus of Deep Canyon Stormwater Channel	*	*	*	A synthesis of engineering judgments based on topography, field investigation, and historic flooding patterns
Dry Morongo Wash	Apex of fan	Confluence with Big Morongo Creek	8.91	*	*	Regional regression equations used for hydrology. Hydraulic methodology unknown.

*Data not available

Table 17: Summary of Alluvial Fan Analyses *(continued)*

Flooding Source	Location From (apex)	Location To (toe)	Drainage Area above Apex (sq. mi)	Model(s) Used	Date Analysis was Completed	Method Description
Ethanac Wash	Apex of fan	Confluence with San Jacinto River	*	N/A	*	No significant entrenched channels identified on topographic maps (RCFCWCD, 1966, etc.) so entire fan included in 1-percent-annual-chance boundary. The elevated railroad grade was assumed to control flooding.
Interstate 10 Wash	West Wide Canyon Dam	I-10	52.3	Computer Program for Determining Flood Depths and Velocities on Alluvial Fans (Harty,D.S., 1982)	*	Studied by employing a computer solution (Harty, D.S., 1982) of the FEMA alluvial fan methodology (Dawdy, D.R., 1979).
Long Creek Alluvial Fan	Apex of fan	20th Avenue	19.4	Computer Program for Determining Flood Depths and Velocities on Alluvial Fans (Harty, D.S., 1982)	*	Aerial photographs of the floods of August 8, 1963, and October 22, 1974, on the Long Creek alluvial fan show multiple channels occurring downfan from the two hills north of Dillon Road and west of Wide Canyon Road. The multiple channel region option of the alluvial fan methodology (Dawdy, D.R., 1979) was used to determine depths and velocities for Long Creek downfan from the two hills. The roughness value (n=0.035) used in the multiple channel region analysis was obtained from a report, entitled "Desert Hot Springs Area Flood Insurance Study" (Simons and Associates, 1986). The slope value (s=0.024) was measured from the topographic maps received from RCFCWCD (Riverside County Flood Control and Water Conservation District, 1982).
Macomber Palms Channel	Apex of fan	Confluence with Unnamed Stream	2.0	*	1995	Unknown, area modified by LOMR dated May 16, 1995

*Data not available

Table 17: Summary of Alluvial Fan Analyses *(continued)*

Flooding Source	Location From (apex)	Location To (toe)	Drainage Area above Apex (sq. mi)	Model(s) Used	Date Analysis was Completed	Method Description
Martinez Canyon	Apex of fan	Salton Sea	47.49	FLO 2D	2018	The Martinez Canyon alluvial fan is subject to active alluvial fan flooding. The base flood discharges for Martinez Canyon were computed using regional regression equations developed by the USGS (B. E. Thomas, 1993).
Moreno Beach Wash	*	*	*	*	*	No significant entrenched channels identified on topographic maps (RCFCWCD, 1966, etc.) so entire fan included in 1-percent-annual-chance boundary
Pushawalla Canyon	Apex of fan	Confluence with Unnamed Stream	33.7	*	1995	Unknown, area modified by LOMR dated May 16, 1995
Quincy Wash	Apex of fan	Approximately 900 feet downstream of Nason Street.	*	*	*	No significant entrenched channels identified on topographic maps (RCFCWCD, 1966, etc.) so entire fan included in 1-percent-annual-chance boundary
Rancho Mirage Alluvial Fan	Apex of fan	Confluence with Whitewater River	4.7	*	*	Due to the indeterminate nature of flow paths on an alluvial cone, the entire Rancho Mirage cone was delineated as being within the 0.2-percent annual chance flood. The HEC-2 program (USACE, 1973) was used in the analysis of the Magnesia Spring Canyon Flood Control Project including Magnesia Springs Channel, East Rancho Mirage Storm Channel, Mirage, Indian trail, Dunes View and Magnesia Falls Roads, Ocotillo Drive, and the Veldt. The 1-percent-annual-chance flood is contained within the channels, levees and streets of the Magnesia Spring Canyon Flood Control Project.
Sheep Canyon 1	Apex of fan	Salton Sea	12.12	FAN	2018	FEMA Fan Analysis

*Data not available

Table 17: Summary of Alluvial Fan Analyses *(continued)*

Flooding Source	Location From (apex)	Location To (toe)	Drainage Area above Apex (sq. mi)	Model(s) Used	Date Analysis was Completed	Method Description
Sinclair Wash	*	*	*	*	*	No significant entrenched channels identified on topographic maps (RCFCWCD, 1966, etc.) so entire fan included in 1-percent-annual-chance boundary
St. Johns Canyon	Apex of fan	Confluence with Salt Creek	*	N/A	*	No significant entrenched channels identified on topographic maps (RCFCWCD, 1966, etc.) so entire fan included in 1-percent-annual-chance boundary
Thousand Palms Canyon Fan	Apex of fan	I-10	84.1	*	1995	Unknown, area modified by LOMR dated May 16, 1995
Thousand Palms Main Channel	Apex of fan	I-10	7.5	*	1995	Unknown, area modified by LOMR dated May 16, 1995
Thousand Palms Tributary A	Apex of fan	I-10	1.4	*	1995	Unknown, area modified by LOMR dated May 16, 1995
Thousand Palms Tributary B	Apex of fan	I-10	0.9	*	1995	Unknown, area modified by LOMR dated May 16, 1995
Thousand Palms Tributary C	Apex of fan	I-10	1.1	*	1995	Unknown, area modified by LOMR dated May 16, 1995
Tramview Canyon	Apex of fan	Confluence with West Cathedral Channel	1.7	*	*	Statistical analyses were used to compute flood depths and velocities for the area of Tramview Wash subject to alluvial fan flooding. The depths of flooding on the alluvial fan were computed according to the guidelines issued by FEMA (U.S. Department of Housing and Urban Development, 1979).
Unnamed Canyon South of Barton Canyon	Apex of fan	Salton Sea	12.12	FAN	2018	FEMA Fan Analysis
Unnamed Tributary South of Sheep Canyon	Apex of fan	Salton Sea	12.12	FAN	2018	FEMA Fan Analysis
West Macomber Palms Channel	Apex of fan	Confluence with Unnamed Stream	2.9	*	1995	Unknown, area modified by LOMR dated May 16, 1995

[1]Estimated based on drainage areas from Lincoln Avenue Drain, Mangular Channel, Oak Street Channel, and Taylor Avenue Drain
[2]Does not include 33.2 square miles behind West Wide Canyon Dam
* Data not available

Table 18: Results of Alluvial Fan Analyses

Flooding Source	Location From (apex)	Location To (toe)	1-Percent-Annual-Chance Peak Flow at Fan Apex (cfs)	Flood Zones and Depths (ft)	Minimum Velocity (fps)	Maximum Velocity (fps)
Alamo Canyon	Apex of fan	Salton Sea	7,413	AE, AO 1-3'	3.5	8.5
Avery Canyon	Apex of fan	Confluence with Salt Creek	*	A	*	*
Barton Canyon	Apex of fan	Salton Sea	6,040	AO 1-3'	3.5	7.5
Biskra Palms Channel	Apex of fan	Confluence with Unnamed Stream	1,090	AO 1'	5	6
Cactus Valley	Apex of fan	Confluence with Salt Creek	*	A	*	*
Chino Canyon	Tram Way	Blue Sky Way	4,000	X	*	*
Corona Alluvial Fan	City of Corona Corporate Limits	Temescal Wash	*	A, AE, X	*	*
Deep Canyon Alluvial Fan	Apex of fan	Southern terminus of Deep Canyon Stormwater Channel	*	A, AO 3'	*	*
Dry Morongo Wash	Apex of fan	Confluence with Big Morongo Creek	5,170	X	*	*
Ethanac Wash	Apex of fan	Confluence with San Jacinto River	*	A	*	*
Interstate 10 Wash	West Wide Canyon Dam	I-10	9,350	A	*	*
Long Creek alluvial fan	Apex of fan	20th Avenue	13,370	AO 1-5'	6	10
Macomber Palms Channel	Apex of fan	Confluence with Unnamed Stream	1,530	AO 1-2'	5	6
Martinez Canyon	Apex of fan	Confluence with Coachella Valley Stormwater Channel (Whitewater River)	2,376	A	*	*
Martinez Canyon	Apex of fan	Salton Sea	26,417	AO 6'	3.5	10.5

*Data not available

Table 18: Results of Alluvial Fan Analyses *(continued)*

Flooding Source	Location From (apex)	Location To (toe)	1-Percent-Annual-Chance Peak Flow at Fan Apex (cfs)	Flood Zones and Depths (ft)	Minimum Velocity (fps)	Maximum Velocity (fps)
Moreno Beach Wash	*	*	*	*	*	*
Pushawalla Canyon	Apex of fan	Confluence with Unnamed Stream	8,050	AO 3', X	8	9
Quincy Wash	Apex of fan	Approximately 900 feet downstream of Nason Street.	*	A, X	*	*
Rancho Mirage Alluvial Fan	Apex of fan	Confluence with Whitewater River	3,200[1]	A, X	*	*
Sheep Canyon 1	Apex of fan	Salton Sea	9,543	AE, AO 1-3'	3.5	8.5
Sinclair Wash	*	*	*	*	*	*
St. Johns Canyon	Apex of fan	Confluence with Salt Creek	*	A	*	*
Thousand Palms Canyon Fan	Apex of fan	I-10	14,510	AO 1-4'	5	10
Thousand Palms Main Channel	Apex of fan	I-10	2,820	AO 2-3'	7	8
Thousand Palms Tributary A	Apex of fan	I-10	1,160	AO 1-2'	5	6
Thousand Palms Tributary B	Apex of fan	I-10	1,000	AO 1-2'	5	6
Thousand Palms Tributary C	Apex of fan	I-10	1,220	AO 1-3'	5	8
Tramview Canyon	Apex of fan	Confluence with West Cathedral Channel	1,530	AO 1-2'	*	*
Unnamed Canyon South of Barton Canyon	Apex of fan	Salton Sea	6,503	AO 1-3'	3.5	7.5
Unnamed Tributary South of Sheep Canyon	Apex of fan	Salton Sea	1,557	AE, AO 1-2'	3.5	5.5
West Macomber Palms Channel	Apex of fan	Confluence with Unnamed Stream	2,220	AO 2'	6	6

[1]From Magnesia Springs Channel discharge in Summary of Discharges table
[2]From Tramview Wash discharge in Summary of Discharges table
*Data not available