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APPENDIX A

DWR STANDARDIZED TABLES

Submittal Table 2-1 Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020 *
Add additional rows as needed			
CA3610003	Liberty Utilities - Apple Valley	20,957	14,979
	TOTAL	20,957	14,979
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Source for "Number of Municipal Connections 2020": https://sdwis.waterboards.ca.gov/PDWW/			

Submittal Table 2-2: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable* (select from drop down list)
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

Submittal Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
☐	Supplier is a wholesaler
☑	Supplier is a retailer
Fiscal or Calendar Year (select one)	
☑	UWMP Tables are in calendar years
☐	UWMP Tables are in fiscal years
If using fiscal years provide month and date that the fiscal year begins (mm/dd)	
01/01	
Units of measure used in UWMP * (select from drop down)	
Unit	AF
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES:	

Submittal Table 2-4 Retail: Water Supplier Information Exchange
The retail Supplier has informed the following wholesale supplier(s) of projected water use in accordance with Water Code Section 10631.
Wholesale Water Supplier Name
Add additional rows as needed
Mojave Water Agency
NOTES:

Submittal Table 3-1 Retail: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	61,444	64,828	68,399	72,166	76,141	80,334
NOTES: The DWR Population Tool was used to estimate the 2020 population (See Section 5.4.1). Growth rates obtained from SCAG data were applied to the 2020 population and projected through 2045 (See Section 3.4.1).						

Submittal Table 4-1 Retail: Demands for Potable and Non-Potable[1] Water - Actual			
Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume[2]
Add additional rows as needed			
Single Family		Drinking Water	6,393
Commercial		Drinking Water	1,713
Industrial		Drinking Water	2
Institutional/Governmental	Public Authority	Drinking Water	510
Landscape		Drinking Water	580
Agricultural irrigation		Raw Water	4,847
Losses		Drinking Water	906
Other	Fire Services and Temporary Meter Services	Drinking Water	28
		TOTAL	14,979

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.*

[2] *Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

Submittal Table 4-2 Retail: Use for Potable and Non-Potable[1] Water - Projected						
Use Type	Additional Description (as needed)	Projected Water Use[2] *Report To the Extent that Records are Available*				
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Single Family		6,941	7,406	7,898	8,414	8,962
Commercial		1,812	1,883	1,958	2,037	2,120
Industrial		2	2	2	2	2
Institutional/Governmental	Public Authority	540	561	583	607	631
Landscape		613	637	662	689	717
Agricultural irrigation		4,950	4,950	4,950	4,950	4,950
Losses		958	996	1,035	1,077	1,121
Other	Fire Services and Temporary Meter Services	30	31	32	34	35
	TOTAL	15,846	16,466	17,120	17,810	18,538

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.*
Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.

[2]

NOTES:

Submittal Table 4-3 Retail: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045 (opt)
Potable Water, Raw, Other Non-potable *From Tables 4-1R and 4-2 R*	14,979	15,846	16,466	17,120	17,810	18,538
Recycled Water Demand[1] *From Table 6-4*	0	0	0	0	0	0
Optional Deduction of Recycled Water Put Into Long-Term Storage[2]						
TOTAL WATER USE	14,979	15,846	16,466	17,120	17,810	18,538

[1] Recycled water demand fields will be blank until Table 6-4 is complete

*[2] Long term storage means water placed into groundwater or surface storage that is not removed from storage in the same year. Supplier **may** deduct recycled water placed in long-term storage from their reported demand. This value is manually entered into Table 4-3.*

NOTES:

Submittal Table 4-4 Retail: Last Five Years of Water Loss Audit Reporting

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
01/2016	653
01/2017	771
01/2018	610
01/2019	1,265
01/2020	906

[1] *Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.* [2] ***Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: The "Volume of Water Loss" quantities for CY 2016 through CY 2020 were obtained from the annual AWWA Water Loss Audits (and based on the combination of apparent losses and real losses). The AWWA Water Loss Audits were reported on a calendar year basis.

Submittal Table 4-5 Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) *Drop down list (y/n)*	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, or otherwise are utilized in demand projections are found.	Section 4.2.6 and Chapter 8
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes
NOTES:	

Submittal Table 5-1 Baselines and Targets Summary From SB X7-7 Verification Form

Retail Supplier or Regional Alliance Only

Baseline Period	Start Year *	End Year *	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	*1995*	*2004*	*297*	*238*
5 Year	*2003*	*2007*	*264*	

**All cells in this table should be populated manually from the supplier's SBX7-7 Verification Form and reported in Gallons per Capita per Day (GPCD)*

NOTES:

Submittal Table 5-2: 2020 Compliance
From SB X7-7 2020 Compliance Form
Retail Supplier or Regional Alliance Only

2020 GPCD			2020 Confirmed Target GPCD*	Did Supplier Achieve Targeted Reduction for 2020? Y/N
Actual 2020 GPCD*	2020 TOTAL Adjustments*	Adjusted 2020 GPCD* *(Adjusted if applicable)*		
146	*0*	*146*	*238*	*Y*

**All cells in this table should be populated manually from the supplier's SBX7-7 2020 Compliance Form and reported in Gallons per Capita per Day (GPCD)*

NOTES:

Submittal Table 6-1 Retail: Groundwater Volume Pumped						
☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
☐	All or part of the groundwater described below is desalinated.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
Add additional rows as needed						
Alluvial Basin	Mojave Basin Area	13,724	14,106	14,307	13,539	14,979
	TOTAL	13,724	14,106	14,307	13,539	14,979
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES:						

Submittal Table 6-2 Retail: Wastewater Collected Within Service Area in 2020						
☐	There is no wastewater collection system. The supplier will not complete the table below.					
	Percentage of 2020 service area covered by wastewater collection system *(optional)*					
	Percentage of 2020 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? *Drop Down List*	Volume of Wastewater Collected from UWMP Service Area 2020 *	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? *Drop Down List*	Is WWTP Operation Contracted to a Third Party? *(optional)* *Drop Down List*
Town of Apple Valley	Estimated	4,100	Victor Valley Wastewater Reclamation Authority	Westside Regional Water Reclamation Plant	No	No
Total Wastewater Collected from Service Area in 2020:		4,100				
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3* **.**						
NOTES:						

Submittal Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2020

☑	**No wastewater is treated or disposed of within the UWMP service area.** The supplier will not complete the table below.

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)* [2]	Method of Disposal *Drop down list*	Does This Plant Treat Wastewater Generated Outside the Service Area? *Drop down list*	Treatment Level *Drop down list*	2020 volumes [1]				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
						Total	0	0	0	0	0

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.

[2] If the **Wastewater Discharge ID Number** is not available to the UWMP preparer, access the SWRCB CIWQS regulated facility website at https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility

NOTES:

Submittal Table 6-4 Retail: Recycled Water Direct Beneficial Uses Within Service Area

☑ Recycled water is not used and is not planned for use within the service area of the supplier.
The supplier will not complete the table below.

Name of Supplier Producing (Treating) the Recycled Water:	
Name of Supplier Operating the Recycled Water Distribution System:	
Supplemental Water Added in 2020 (volume) *Include units*	
Source of 2020 Supplemental Water	

Beneficial Use Type *Insert additional rows if needed.*	**Potential** Beneficial Uses of Recycled Water (Describe)	Amount of **Potential** Uses of Recycled Water (Quantity) *Include volume units* [1]	General Description of 2020 Uses	Level of Treatment *Drop down list*	2020 [1]	2025 [1]	2030 [1]	2035 [1]	2040 [1]	2045 [1] (opt)
Agricultural irrigation										
Landscape irrigation (exc golf courses)										
Golf course irrigation										
Commercial use										
Industrial use										
Geothermal and other energy production										
Seawater intrusion barrier										
Recreational impoundment										
Wetlands or wildlife habitat										
Groundwater recharge (IPR)										
Reservoir water augmentation (IPR)										
Direct potable reuse										
Other (Description Required)										
				Total:	0	0	0	0	0	0
				2020 Internal Reuse						

[1] ***Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

Submittal Table 6-5 Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual

☑	Recycled water was not used in 2015 nor projected for use in 2020. The supplier will not complete the table below. If recycled water was not used in 2020, and was not predicted to be in 2015, then check the box and do not complete the table.

Beneficial Use Type	2015 Projection for 2020 [1]	2020 Actual Use [1]
Insert additional rows as needed.		
Agricultural irrigation		
Landscape irrigation (exc golf courses)		
Golf course irrigation		
Commercial use		
Industrial use		
Geothermal and other energy production		
Seawater intrusion barrier		
Recreational impoundment		
Wetlands or wildlife habitat		
Groundwater recharge (IPR)		
Reservoir water augmentation (IPR)		
Direct potable reuse		
Other (Description Required)		
Total	0	0

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.

NOTE:

Submittal Table 6-6 Retail: Methods to Expand Future Recycled Water Use			
☑	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
Section 6.2.5	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use *
Add additional rows as needed			
		Total	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: VVWRA is currently testing the Apple Valley Subregional WRP which will generate recycled water for use at the Apple Valley Golf Course. However, it is not anticipated a significant quantity of recycled water will be available for use within Liberty Utilities' service area.			

Submittal Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☑	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
Section 6.2.8	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other suppliers?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Supplier* *This may be a range*
	Drop Down List (y/n)	*If Yes, Supplier Name*				
Add additional rows as needed						
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES:						

Submittal Table 6-8 Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2020		
Drop down list May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool		Actual Volume*	Water Quality Drop Down List	Total Right or Safe Yield* (optional)
Add additional rows as needed				
Groundwater (not desalinated)	Mojave Basin Area (Potable)	10,067	Drinking Water	
Groundwater (not desalinated)	Mojave Basin Area (Agricultural)	4,912	Other Non-Potable Water	
	Total	14,979		0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES:				

Submittal Table 6-9 Retail: Water Supplies — Projected

Water Supply	Additional Detail on Water Supply	Projected Water Supply * Report To the Extent Practicable									
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool		**2025**		**2030**		**2035**		**2040**		**2045** (opt)	
		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Add additional rows as needed											
Groundwater (not desalinated)	Mojave Basin Area (Potable)	11,256		11,876		12,530		13,220		13,948	
Groundwater (not desalinated)	Mojave Basin Area (Agricultural)	4,590		4,590		4,590		4,590		4,590	
	Total	15,846	0	16,466	0	17,120	0	17,810	0	18,538	0

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES

Submittal Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment)			
Year Type	**Base Year** If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2019-2020, use 2020	**Available Supplies if Year Type Repeats**	
		☐ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____	
		☑ Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available *	**% of Average Supply**
Average Year	2020	14,979	100%
Single-Dry Year	2017	14,106	94.2%
Consecutive Dry Years 1st Year	2011	18,230	121.7%
Consecutive Dry Years 2nd Year	2012	16,788	112.1%
Consecutive Dry Years 3rd Year	2013	17,124	114.3%
Consecutive Dry Years 4th Year	2014	16,486	110.1%
Consecutive Dry Years 5th Year	2015	13,515	90.2%

Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

Submittal Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	15,846	16,466	17,120	17,810	18,538
Demand totals *(autofill from Table 4-3)*	15,846	16,466	17,120	17,810	18,538
Difference	0	0	0	0	0
NOTES:					

Submittal Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 (Opt)
Supply totals*	14,922	15,506	16,122	16,772	17,458
Demand totals*	14,922	15,506	16,122	16,772	17,458
Difference	0	0	0	0	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES:					

Submittal Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	19,285	20,039	20,835	21,675	22,561
	Demand totals	19,285	20,039	20,835	21,675	22,561
	Difference	0	0	0	0	0
Second year	Supply totals	17,760	18,454	19,188	19,961	20,777
	Demand totals	17,760	18,454	19,188	19,961	20,777
	Difference	0	0	0	0	0
Third year	Supply totals	18,114	18,823	19,571	20,360	21,192
	Demand totals	18,114	18,823	19,571	20,360	21,192
	Difference	0	0	0	0	0
Fourth year	Supply totals	17,440	18,122	18,842	19,602	20,403
	Demand totals	17,440	18,122	18,842	19,602	20,403
	Difference	0	0	0	0	0
Fifth year	Supply totals	14,296	14,856	15,446	16,069	16,726
	Demand totals	14,296	14,856	15,446	16,069	16,726
	Difference	0	0	0	0	0
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES:						

Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)	
2021	**Total**
Total Water Use	18,441
Total Supplies	18,230
Surplus/Shortfall w/o WSCP Action	(211)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	211
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	1%

2022	Total
Total Water Use	17,177
Total Supplies	16,788
Surplus/Shortfall w/o WSCP Action	(389)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	389
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	2%

2023	Total
Total Water Use	17,718
Total Supplies	17,124
Surplus/Shortfall w/o WSCP Action	(594)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	594
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	3%

2024	Total
Total Water Use	17,249
Total Supplies	16,486
Surplus/Shortfall w/o WSCP Action	(763)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	763
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	4%

2025	Total
Total Water Use	14,296
Total Supplies	13,515
Surplus/Shortfall w/o WSCP Action	(781)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	781
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	5%

Submittal Table 8-1
Water Shortage Contingency Plan Levels

Shortage Level	Percent Shortage Range	Shortage Response Actions (*Narrative description*)
1	Up to 10%	Outdoor irrigation is restricted to no more than three (3) days per week, no more than 10 minutes per day per station, with no watering between 8:00 a.m. and 7:00 p.m. All leaks, breaks, or other malfunction must be repaired within five (5) days of written notification.
2	Up to 20%	In addition to Shortage Level 1; Outdoor irrigation is restricted to no more than two (2) days per week. All leaks, breaks, or other malfunction must be repaired within three (3) days of written notification. All usage in excess of the residential customer's allocation will be charged at the regular Schedule No. 1 quantity rate plus a drought emergency surcharge rate that is calculated from the Tier 1 quantity rate multiplied by a factor of 1.0. All usage for non-residential customers served under Tariff Schedule No. 3 will be charged at the regular Schedule No. 3 quantity rate plus a drought emergency surcharge rate that is calculated as the quantity rate multiplied by a factor of 0.15.
3	Up to 30%	In addition to Shortage Level 2, Liberty Utilities - Apple Valley may add actions if conditions warrant.
4	Up to 40%	In addition to Shortage Level 3; All usage in excess of the residential customer's allocation will be charged at the regular Schedule No. 1 quantity rate plus a drought emergency surcharge rate that is calculated from the Tier 1 quantity rate multiplied by a factor of 1.5. All usage for non-residential customers served under Tariff Schedule No. 3 will be charged at the regular Schedule No. 3 quantity rate plus a drought emergency surcharge rate that is calculated as the quantity rate multiplied by a factor of 0.30.
5	Up to 50%	In addition to Shortage Level 4, Liberty Utilities - Apple Valley may add actions if conditions warrant.
6	>50%	In addition to Shortage Level 5; All usage in excess of residential customer's allocation will be charged at the regular Schedule No.1 quantity rate plus a drought emergency surcharge rate that is calculated from the Tier 1 quantity rate multiplied by a factor of 2.0. All usage for non-residential customers served under Tariff Schedule No. 3 will be charged at the regular Schedule No. 3 quantity rate plus a drought emergency surcharge rate that is calculated as the quantity rate multiplied by a factor of 0.45
NOTES:		

Submittal Table 8-2: Demand Reduction Actions

Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
Add additional rows as needed				
1	Landscape - Limit landscape irrigation to specific days	Collective reduction from all Shortage Level 1 actions is up to 1,336 AFY	Maximum 3 days a week.	Yes
1	Landscape - Limit landscape irrigation to specific times	Collective reduction from all Shortage Level 1 actions is up to 1,336 AFY	between 9 a.m. or after 5 p.m.	Yes
2	Other	Collective reduction from Shortage Level 1 plus all Shortage Level 2 actions is up to 2,672 AFY	All actions under Shortage Level 1	Yes
2	Implement or Modify Drought Rate Structure or Surcharge	Collective reduction from all Shortage Level 1 actions is up to 2,672 AFY	All users in excess of allocation will be charged regular rate plus surcharge.	Yes
3	Other	Collective reduction from Shortage Level 2 plus all Shortage Level 3 actions is up to 4,008 AFY	All actions under Shortage Level 2	Yes
4	Other	Collective reduction from Shortage Level 3 plus all Shortage Level 4 actions is up to 5,344 AFY	All actions under Shortage Level 3	Yes
4	Implement or Modify Drought Rate Structure or Surcharge	Collective reduction from all Shortage Level 4 actions is up to 5,344 AFY	All users in excess of allocation will be charged regular rate plus surcharge.	Yes
5	Other	Collective reduction from Shortage Level 4 plus all Shortage Level 5 actions is up to 6,680 AFY	All actions under Shortage Level 4	Yes
6	Other	Collective reduction from Shortage Level 5 plus all Shortage Level 6 actions is greater than 6,680 AFY	All actions under Shortage Level 5	Yes
6	Implement or Modify Drought Rate Structure or Surcharge	Collective reduction from Shortage Level 6 actions is greater than 6,680 AFY	All users in excess of allocation will be charged regular rate plus surcharge.	Yes

NOTES:

Submittal Table 8-3: Supply Augmentation and Other Actions			
Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*
Add additional rows as needed			
1	Transfers	Not applicable (see Notes)	
2	Transfers	Not applicable (see Notes)	
3	Transfers	Not applicable (see Notes)	
4	Transfers	Not applicable (see Notes)	
5	Transfers	Not applicable (see Notes)	
6	Transfers	Not applicable (see Notes)	
NOTES: Liberty Utilities - Apple Valley will consider increased production from the Mojave Basin Area using existing facilities to address increased demands. As noted on Table 8-2, Liberty Utilities - Apple Valley plans to implement demand reduction measures in the event water supplies from existing sources are not sufficient to meet anticipated demands.			

Submittal Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Town of Apple Valley	Yes	Yes
City of Victorville	Yes	Yes
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
San Bernardino County	Yes	Yes
NOTES:		

APPENDIX B

DEMONSTRATION OF REDUCED IMPORTED WATER RELIANCE

Appendix A
Delta Reliance

This Appendix provides the Delta Reliance assessment for Liberty Utilities – Apple Valley. The Mojave Water Agency (MWA) service area boundary includes the following retail water service agencies: Liberty Utilities – Apple Valley Water Company, Bighorn-Desert View Water Agency, City of Adelanto Water District, San Bernardino County Service Area 64, San Bernardino County Service Area 70J, Golden State Water Company – Barstow System, Helendale Community Services District, Hesperia Water District, Hi-Desert Water District, Joshua Basin Water District, Phelan Pinon Hills Community Services District, and Victorville Water District. These retail agencies are subject to the minimum threshold requirements of the Urban Water Management Planning Act (UWMP Act) and work with MWA on managing regional water supplies. Additional entities that are not currently subject to the UWMP Act but may subject to the UWMP Act in the future and that rely upon water supplies derived from MWA's and the retail agencies' management are also considered in this assessment. This assessment is consistent with all applicable water management activities within the MWA service area boundary including the Mojave Basin Area Adjudication, the Warren Valley Basin Judgment, and the Ames/Reche Groundwater Storage and Recovery Program Management Agreement.

A.1 Delta Reform Act and Certification of Consistency

The Delta Reform Act of 2009 required state and local agencies to prepare a written certification of consistency with Delta Plan policies before initiating a covered action in the Delta.[1] The written certification of consistency must be submitted to the Delta Stewardship Council and include detailed findings as to whether the covered action is consistent with applicable Delta Plan policies.[2] The submitted certification of consistency may be appealed by any person and the Delta Stewardship Council may grant the appeal to address contested issues.[3] In short, water suppliers that anticipate participating in a proposed covered action must comply with the requirements of the Delta Reform Act. For more detail on the specific provisions of the Delta Reform Act covered by this Delta Reliance Analysis, see Mojave Water Agency's 2020 Urban Water Management Plan, Appendix A.

[1] California Water Code section 85057.5.

[2] California Water Code section 85225.

[3] California Water Code section 85225.10-85225.25.

A.2 Expected Outcomes for Reduced Delta Reliance and Regional Self Reliance

The expected outcomes for this Delta reliance and improved regional self-reliance assessment were developed using guidance described in Appendix C of DWR's Urban Water Management Plan Guidebook 2020 issued in March 2021 (Guidebook 2020). The data used in this assessment represent the total regional efforts of MWA and the retail agencies and were developed as part of a region-wide coordination process. Table A-1 shows MWA's expected outcomes for reduced Delta reliance.

Table A-1: Expected Outcomes for Reduced Reliance on the Delta

Year	2010	2015	2020	2025	2030	2035	2040	2045
Total Water Supplies from the Delta Watershed	34.2%	34.2%	31.9%	28.7%	26.2%	24.4%	22.9%	22.2%
Change in Water Supplies from the Delta Watershed		-0.1%	-2.4%	-5.6%	-8.0%	-9.8%	-11.4%	-12.1%

Table A-2 shows the expected outcomes for supplies contributing to regional self-reliance.

Table A-2: Supplies Contributing to Regional Self-Reliance

Water Supplies Contributing to Regional Self-Reliance	2010	2015	2020	2025	2030	2035	2040	2045
Water Use Efficiency	-	17,735	33,701	46,803	54,025	59,962	64,920	68,828
Water Recycling	62,000	47,825	52,536	47,495	49,699	50,930	52,172	53,559
Conjunctive Use Projects	54,045	57,349	57,349	57,349	57,349	57,349	57,349	57,349
Water Supplies Contributing to Regional Self-Reliance	116,045	122,909	143,586	151,647	161,073	168,241	174,441	179,736
Service Area Water Demands without Water Use Efficiency	2010	2015	2020	2025	2030	2035	2040	2045
Service Area Water Demands without Water Use Efficiency	145,066	155,744	163,296	176,846	188,351	196,641	203,965	210,600
Change in Regional Self Reliance (Acre-Feet)	2010	2015	2020	2025	2030	2035	2040	2045
Water Supplies Contributing to Regional Self-Reliance	116,045	122,909	143,586	151,647	161,073	168,241	174,441	179,736
Change in Water Supplies Contributing to Regional Self-Reliance		6,864	27,541	35,602	45,028	52,196	58,396	63,691
Percent Change in Regional Self Reliance	2010	2015	2020	2025	2030	2035	2040	2045
Water Supplies Contributing to Regional Self-Reliance	80.0%	78.9%	87.9%	85.8%	85.5%	85.6%	85.5%	85.3%
Change in Water Supplies Contributing to Regional Self-Reliance		-1.1%	7.9%	5.8%	5.5%	5.6%	5.5%	5.4%

The data presented in this section demonstrate the expected outcomes for reduced Delta reliance and regional self-sufficiency. The information contained in this Appendix is also intended to be an addendum to Liberty Utilities – Apple Valley's 2015 UWMP consistent with WR P1 subsection (c)(1)(C). The information has been noticed and presented in accordance with applicable law. Further information related to these determination may be found in Mojave Water Agency's 2020 Urban Water Management Plan, Appendix A.

APPENDIX C

COMPLETED PLAN CHECKLIST

Retail	Wholesale	2020 Guidebook Location	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Chapter 1	A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities.	Introduction and Overview	Chapter 1 Lay Description
x	x	Chapter 1	Each plan shall include a simple description of the supplier's plan including water availability, future requirements, a strategy for meeting needs, and other pertinent information. Additionally, a supplier may also choose to include a simple description at the beginning of each chapter.	Summary	Beginning of each Chapter
x	x	Section 2.2	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.2
x	x	Section 2.6	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 2.6
x	x	Section 2.6.2	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan and contingency plan.	Plan Preparation	Section 2.6.2
x		Section 2.6, Section 6.1	Retail suppliers will include documentation that they have provided their wholesale supplier(s) - if any - with water use projections from that source.	System Supplies	Sections 2.6 and 6.1
	x	Section 2.6	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	Section 2.6
x	x	Section 3.1	Describe the water supplier service area.	System Description	Section 3.1
x	x	Section 3.3	Describe the climate of the service area of the supplier.	System Description	Section 3.3
x	x	Section 3.4	Provide population projections for 2025, 2030, 2035, 2040 and optionally 2045.	System Description	Section 3.4
x	x	Section 3.4.2	Describe other social, economic, and demographic factors affecting the supplier's water management planning.	System Description	Section 3.4.2
x	x	Sections 3.4 and 5.4	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4
x	x	Section 3.5	Describe the land uses within the service area.	System Description	Section 3.5
x	x	Section 4.2	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2
x	x	Section 4.2.4	Retail suppliers shall provide data to show the distribution loss standards were met.	System Water Use	Section 4.2.4
x	x	Section 4.2.6	In projected water use, include estimates of water savings from adopted codes, plans and other policies or laws.	System Water Use	Section 4.2.6
x	x	Section 4.2.6	Provide citations of codes, standards, ordinances, or plans used to make water use projections.	System Water Use	Section 4.2.6
x	optional	Section 4.3.2.4	Report the distribution system water loss for each of the 5 years preceding the plan update.	System Water Use	Section 4.3.2
x	optional	Section 4.4	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.4
x	x	Section 4.5	Demands under climate change considerations must be included as part of the drought risk assessment.	System Water Use	Section 4.5
x		Chapter 5	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	Chapter 5
x		Chapter 5	Retail suppliers shall meet their water use target by December 31, 2020.	Baselines and Targets	Chapter 5
	x	Section 5.1	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	Not applicable

Retail	Wholesale	2020 Guidebook Location	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x		Section 5.2	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Not applicable
x		Section 5.5	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Sections 5.2, 5.3, and 5.5
x		Section 5.5 and Appendix E	Retail suppliers shall report on their compliance in meeting their water use targets. The data shall be reported using a standardized form in the SBX7-7 2020 Compliance Form.	Baselines and Targets	Section 5.5
x	x	Sections 6.1 and 6.2	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought.	System Supplies	Sections 6.1, 6.2, 7.1, and 7.2
x	x	Sections 6.1	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought, *including changes in supply due to climate change.*	System Supplies	Section 6.1
x	x	Section 6.1	When multiple sources of water supply are identified, describe the management of each supply in relationship to other identified supplies.	System Supplies	Section 6.1
x	x	Section 6.1.1	Describe measures taken to acquire and develop planned sources of water.	System Supplies	Section 6.1.1
x	x	Section 6.2.8	Identify and quantify the existing and planned sources of water available for 2020, 2025, 2030, 2035, 2040 and optionally 2045.	System Supplies	Section 6.2.8
x	x	Section 6.2	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2
x	x	Section 6.2.2	Indicate whether a groundwater sustainability plan or groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	Section 6.2.2
x	x	Section 6.2.2	Describe the groundwater basin.	System Supplies	Section 6.2.2
x	x	Section 6.2.2	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.2.2
x	x	Section 6.2.2.1	For unadjudicated basins, indicate whether or not the department has identified the basin as a high or medium priority. Describe efforts by the supplier to coordinate with sustainability or groundwater agencies to achieve sustainable groundwater conditions.	System Supplies	Section 6.2.2
x	x	Section 6.2.2.4	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	System Supplies	Section 6.2.2
x	x	Section 6.2.2	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Section 6.2.2
x	x	Section 6.2.7	Describe the opportunities for exchanges or transfers of water on a short-term or long- term basis.	System Supplies	Section 6.2.7
x	x	Section 6.2.5	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	Section 6.2.5
x	x	Section 6.2.5	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.2.5
x	x	Section 6.2.5	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.2.5
x	x	Section 6.2.5	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	Section 6.2.5
x	x	Section 6.2.5	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	Section 6.2.5
x	x	Section 6.2.5	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.2.5
x	x	Section 6.2.6	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.2.6
x	x	Section 6.2.5	Describe the wastewater collection and treatment systems in the supplier's service area with quantified amount of collection and treatment and the disposal methods.	System Supplies (Recycled Water)	Section 6.2.5
x	x	Section 6.2.8, Section 6.3.7	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and for a period of drought lasting 5 consecutive water years.	System Supplies	Sections 6.2.8 and 6.2.9

Retail	Wholesale	2020 Guidebook Location	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 6.4 and Appendix O	The UWMP must include energy information, as stated in the code, that a supplier can readily obtain.	System Suppliers, Energy Intensity	Section 6.4
x	x	Section 7.2	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Section 7.2
x	x	Section 7.2.4	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.2.4
x	x	Section 7.3	Service Reliability Assessment: Assess the water supply reliability during normal, dry, and a drought lasting five consecutive water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.3
x	x	Section 7.3	Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects.	Water Supply Reliability Assessment	Section 7.3
x	x	Section 7.3	Include a description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts 5 consecutive years.	Water Supply Reliability Assessment	Section 7.3
x	x	Section 7.3	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Water Supply Reliability Assessment	Section 7.3
x	x	Section 7.3	Include a comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.	Water Supply Reliability Assessment	Section 7.3
x	x	Section 7.3	Include considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.	Water Supply Reliability Assessment	Section 7.3
x	x	Chapter 8	Provide a water shortage contingency plan (WSCP) with specified elements below.	Water Shortage Contingency Planning	Chapter 8
x	x	Chapter 8	Provide the analysis of water supply reliability (from Chapter 7 of Guidebook) in the WSCP	Water Shortage Contingency Planning	Chapter 8
x	x	Section 8.10	Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Water Shortage Contingency Planning	Section 8.10
x	x	Section 8.2	Provide the written decision-making process and other methods that the supplier will use each year to determine its water reliability.	Water Shortage Contingency Planning	Section 8.2
x	x	Section 8.2	Provide data and methodology to evaluate the supplier's water reliability for the current year and one dry year pursuant to factors in the code.	Water Shortage Contingency Planning	Section 8.2
x	x	Section 8.3	Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and greater than 50 percent shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic interruption of supply.	Water Shortage Contingency Planning	Section 8.3
x	x	Section 8.3	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Water Shortage Contingency Planning	Section 8.3
x	x	Section 8.4	Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation actions.	Water Shortage Contingency Planning	Section 8.4.2
x	x	Section 8.4	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Water Shortage Contingency Planning	Section 8.4.1
x	x	Section 8.4	Specify locally appropriate operational changes.	Water Shortage Contingency Planning	Section 8.4.3
x	x	Section 8.4	Specify additional mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions are appropriate to local conditions.	Water Shortage Contingency Planning	Section 8.4.4
x	x	Section 8.4	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Water Shortage Contingency Planning	Section 8.4.7
x	x	Section 8.4.6	The plan shall include a seismic risk assessment and mitigation plan.	Water Shortage Contingency Plan	Section 8.4.6
x	x	Section 8.5	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Water Shortage Contingency Planning	Section 8.5

Retail	Wholesale	2020 Guidebook Location	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 8.5 and 8.6	Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other relevant communications.	Water Shortage Contingency Planning	Sections 8.5 and 8.6
x		Section 8.6	Retail supplier must describe how it will ensure compliance with and enforce provisions of the WSCP.	Water Shortage Contingency Planning	Section 8.6
x		Section 8.7	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Water Shortage Contingency Planning	Section 8.7
x	x	Section 8.7	Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3.	Water Shortage Contingency Planning	Section 8.7
x	x	Section 8.7	Provide a statement that the supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency.	Water Shortage Contingency Planning	Section 8.7
x	x	Section 8.8	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.8
x	x	Section 8.8	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.8
x		Section 8.8	Retail suppliers must describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought	Water Shortage Contingency Planning	Section 8.8
x		Section 8.9	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Water Shortage Contingency Planning	Section 8.9
x		Section 8.11	Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.	Water Shortage Contingency Planning	Section 8.11
x	x	Sections 8.12 and 10.4	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 30 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	Sections 8.12 and 10.4
x	x	Section 8.12	Make available the Water Shortage Contingency Plan to customers and any city or county where it provides water within 30 after adopted the plan.	Water Shortage Contingency Planning	Section 8.12
	x	Sections 9.1 and 9.3	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Not applicable
x		Sections 9.2 and 9.3	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Sections 9.2 and 9.3
x		Chapter 10	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets (recommended to discuss compliance).	Plan Adoption, Submittal, and Implementation	Chapter 10
x	x	Section 10.2.1	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Reported in Table 10-1.	Plan Adoption, Submittal, and Implementation	Section 10.2.1
x	x	Section 10.4	Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.	Plan Adoption, Submittal, and Implementation	Section 10.4
x	x	Sections 10.2.2, 10.3, and 10.5	Provide supporting documentation that the urban water supplier made the plan and contingency plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan and contingency plan.	Plan Adoption, Submittal, and Implementation	Sections 10.2, 10.3, and 10.5
x	x	Section 10.2.2	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Section 10.2.2
x	x	Section 10.3.2	Provide supporting documentation that the plan and contingency plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.2
x	x	Section 10.4	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4.3
x	x	Section 10.4	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4
x	x	Sections 10.4.1 and 10.4.2	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Sections 10.4.1 and 10.4.2
x	x	Section 10.5	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5

Retail	Wholesale	2020 Guidebook Location	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 10.5	Provide supporting documentation that, not later than 30 days after filing a copy of its water shortage contingency plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5
x	x	Section 10.6	If supplier is regulated by the Public Utilities Commission, include its plan and contingency plan as part of its general rate case filings.	Plan Adoption, Submittal, and Implementation	Section 10.6
x	x	Section 10.7.2	If revised, submit a copy of the water shortage contingency plan to DWR within 30 days of adoption.	Plan Adoption, Submittal, and Implementation	Section 10.7.2

APPENDIX D

60 – DAY NOTIFICATION LETTERS AND PUBLIC HEARING NOTIFICATIONS

Liberty™

01/14/2021

Golden State Water Company
13608 Hitt Road
Apple Valley, CA 92308

SUBJECT: 2020 Urban Water Management Plan Update

Liberty Utilities Apple Valley is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. Liberty Utilities Apple Valley is currently in the process of preparing the 2020 UWMP Update.

As an urban water supplier, Liberty Utilities Apple Valley is required pursuant to Section 10620(d)(3) of the California Water Code to coordinate with water management agencies, relevant public agencies, and other water suppliers regarding the preparation of the UWMP. Pursuant to Section 10621(b) of the California Water Code, Liberty Utilities Apple Valley will be reviewing the UWMP and will make amendments or changes, as appropriate. Liberty Utilities Apple Valley invites you to submit comments in anticipation of the development of our 2020 UWMP Update. Comments should be received no later than February 19, 2021, and may be provided via email to Carol.Thomas-Keefer@LibertyUtilities.com; or, send written comments to:

Liberty Utilities
21760 Ottawa Rd.
Apple Valley, CA 92308
Attn: Carol Thomas-Keefer, Operations Manager

Thank you,

Liberty Utilities
Apple Valley

Liberty™

01/14/2021

Town of Apple Valley
14955 Dale Evans Parkway
Apple Valley, CA 92307

SUBJECT: 2020 Urban Water Management Plan Update

Liberty Utilities Apple Valley is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. Liberty Utilities Apple Valley is currently in the process of preparing the 2020 UWMP Update.

As an urban water supplier, Liberty Utilities Apple Valley is required pursuant to Section 10620(d)(3) of the California Water Code to coordinate with water management agencies, relevant public agencies, and other water suppliers regarding the preparation of the UWMP. Pursuant to Section 10621(b) of the California Water Code, Liberty Utilities Apple Valley will be reviewing the UWMP and will make amendments or changes, as appropriate. Liberty Utilities Apple Valley invites you to submit comments in anticipation of the development of our 2020 UWMP Update. Comments should be received no later than February 19, 2021, and may be provided via email to Carol.Thomas-Keefer@LibertyUtilities.com; or, send written comments to:

Liberty Utilities
21760 Ottawa Rd.
Apple Valley, CA 92308
Attn: Carol Thomas-Keefer, Operations Manager

Thank you,

Liberty Utilities
Apple Valley

Liberty™

01/14/2021

State Water Resources Control Board
Division of Drinking Water – District Office
Attn: Mr. Eric Zuniga
464 West 4th Street, Suite 437
San Bernardino, CA 92401

SUBJECT: 2020 Urban Water Management Plan Update

Dear Mr. Eric Zuniga

Liberty Utilities Apple Valley is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. Liberty Utilities Apple Valley is currently in the process of preparing the 2020 UWMP Update.

As an urban water supplier, Liberty Utilities Apple Valley is required pursuant to Section 10620(d)(3) of the California Water Code to coordinate with water management agencies, relevant public agencies, and other water suppliers regarding the preparation of the UWMP. Pursuant to Section 10621(b) of the California Water Code, Liberty Utilities Apple Valley will be reviewing the UWMP and will make amendments or changes, as appropriate. Liberty Utilities Apple Valley invites you to submit comments in anticipation of the development of our 2020 UWMP Update. Comments should be received no later than February 19, 2021, and may be provided via email to Carol.Thomas-Keefer@LibertyUtilities.com; or, send written comments to:

Liberty Utilities
21760 Ottawa Rd.
Apple Valley, CA 92308
Attn: Carol Thomas-Keefer, Operations Manager

Thank you,

Liberty Utilities
Apple Valley

Liberty™

01/14/2021

Mojave Water Agency
Attn: Mr. Nicholas Schneider, Water Conservation and Forecast Manager
22450 Headquarters Drive
Apple Valley, CA 92307

SUBJECT: 2020 Urban Water Management Plan Update

Dear Nicholas Schneider:

Liberty Utilities Apple Valley is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. Liberty Utilities Apple Valley is currently in the process of preparing the 2020 UWMP Update.

As an urban water supplier, Liberty Utilities Apple Valley is required pursuant to Section 10620(d)(3) of the California Water Code to coordinate with water management agencies, relevant public agencies, and other water suppliers regarding the preparation of the UWMP. Pursuant to Section 10621(b) of the California Water Code, Liberty Utilities Apple Valley will be reviewing the UWMP and will make amendments or changes, as appropriate. Liberty Utilities Apple Valley invites you to submit comments in anticipation of the development of our 2020 UWMP Update. Comments should be received no later than February 19, 2021, and may be provided via email to Carol.Thomas-Keefer@LibertyUtilities.com; or, send written comments to:

Liberty Utilities
21760 Ottawa Rd.
Apple Valley, CA 92308
Attn: Carol Thomas-Keefer, Operations Manager

Thank you,

Liberty Utilities
Apple Valley

Liberty™

01/14/2021

City of Victorville
14343 Civic Drive P.O. Box 5001
Victorville, CA 92392

SUBJECT: 2020 Urban Water Management Plan Update

Liberty Utilities Apple Valley is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. Liberty Utilities Apple Valley is currently in the process of preparing the 2020 UWMP Update.

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Thank you,

Liberty Utilities
Apple Valley

Liberty™

01/14/2021

County of San Bernardino
385 North Arrowhead Ave.
San Bernardino, CA 92415-0160

SUBJECT: 2020 Urban Water Management Plan Update

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21760 Ottawa Rd.
Apple Valley, CA 92308
Attn: Carol Thomas-Keefer, Operations Manager

Thank you,

Liberty Utilities
Apple Valley

PROOF OF PUBLICATION

(2015.5 C.C.P.)

STATE OF CALIFORNIA,
County of San Bernardino

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the publisher of the DAILY PRESS, a newspaper of general circulation, published in the City of Victorville, County of San Bernardino, and which newspaper has been adjudicated a newspaper of general circulation by the Superior Court of the County of San Bernardino, State of California, under the date of November 21, 1938, Case number 43096, that the notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

June 10 and 17

All in the year 2021.

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Dated this: 17th **day of** June, **2021.**

Signature

Leslie Jacobs

This space is the County Clerk's Filing Stamp

Proof of Publication of

Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Liberty Utilities Apple Valley will hold a PUBLIC HEARING on June 24th for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. Liberty Utilities Apple Valley's 2020 Urban Water Management Plan incorporates its Water Shortage Contingency Plan.

The 2020 Urban Water Management Plan and Water Shortage Contingency Plan were prepared pursuant to the "Urban Water Management Planning Act" and the California Water Code. The California Department of Water Resources requires every urban water supplier to prepare and adopt an Urban Water Management Plan, including the Water Shortage Contingency Plan, and periodically update the Urban Water Management Plan at least once every five years, in years ending in six and one.

Liberty Utilities Apple Valley's PUBLIC HEARING will be held on:

Date: Thursday, June 24, 2021
Time: 10:00am - 11:00am
Place: Remote video conference via WebEx

The meeting link will be posted on Liberty Utilities Apple Valley's website at the following address: https://libertyutilities.com/avr/hearingnotice/

Liberty Utilities Apple Valley invites all interested entities to attend and present their comments. A copy of the draft 2020 Urban Water Management Plan and Water Shortage Contingency Plan will be available on Liberty Utilities Apple Valley's website. Comments must be received no later than 10 a.m. on June 24, 2021, or may be delivered at the time of the hearing. Written comments may be sent via email to Carol.Thomas-Keefer@LibertyUtilities.com or may be mailed to:

Liberty Utilities
Attn:
Carol Thomas-Keefer,
Operations Manager
21760 Ottawa Rd.
Apple Valley, CA 92308

Published in the Daily Press
June 10, 17, 2021
(Th-78)

Liberty Utilities (Apple Valley Ranchos Water) Corp.

June 7, 2021

Liberty Apple Valley
21760 Ottawa Road
Apple Valley CA 92308

Golden State Water Company
13608 Hitt Road
Apple Valley, CA 92308

SUBJECT: Notice of Public Hearing for
2020 Urban Water Management Plan and
Water Shortage Contingency Plan

Dear Golden State Water Company,

Liberty Utilities Apple Valley will hold a PUBLIC HEARING on June 24th for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. Liberty Utilities Apple Valley's 2020 Urban Water Management Plan incorporates its Water Shortage Contingency Plan.

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Liberty Utilities
Attn: Carol Thomas-Keefer, Operations Manager
21760 Ottawa Rd.
Apple Valley, CA 92308

Liberty Utilities (Apple Valley Ranchos Water) Corp.

June 7, 2021

Liberty Apple Valley
21760 Ottawa Road
Apple Valley CA 92308

Town of Apple Valley
14955 Dale Evans Parkway
Apple Valley, CA 92307

SUBJECT: Notice of Public Hearing for
2020 Urban Water Management Plan and
Water Shortage Contingency Plan

Dear Town of Apple Valley,

Liberty Utilities Apple Valley will hold a PUBLIC HEARING on June 24th for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. Liberty Utilities Apple Valley's 2020 Urban Water Management Plan incorporates its Water Shortage Contingency Plan.

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Liberty Utilities
Attn: Carol Thomas-Keefer, Operations Manager
21760 Ottawa Rd.
Apple Valley, CA 92308

Liberty Utilities (Apple Valley Ranchos Water) Corp.

June 7, 2021

Liberty Apple Valley
21760 Ottawa Road
Apple Valley CA 92308

State Water Resources Control Board
Division of Drinking Water – District Office
Attn: Mr. Eric Zuniga
464 West 4th Street, Suite 437
San Bernardino, CA 92401

SUBJECT: Notice of Public Hearing for
2020 Urban Water Management Plan and
Water Shortage Contingency Plan

Dear Mr. Eric Zuniga,

Liberty Utilities Apple Valley will hold a PUBLIC HEARING on June 24th for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. Liberty Utilities Apple Valley's 2020 Urban Water Management Plan incorporates its Water Shortage Contingency Plan.

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Liberty Utilities
Attn: Carol Thomas-Keefer, Operations Manager
21760 Ottawa Rd.
Apple Valley, CA 92308

Liberty Utilities (Apple Valley Ranchos Water) Corp.

June 7, 2021

Liberty Apple Valley
21760 Ottawa Road
Apple Valley CA 92308

Mojave Water Agency
Attn: Mr. Nicholas Schneider, Water Conservation and Forecast Manager
22450 Headquarters Drive
Apple Valley, CA 92307

SUBJECT: Notice of Public Hearing for
2020 Urban Water Management Plan and
Water Shortage Contingency Plan

Dear Mr. Nicholas Schneider,

Liberty Utilities Apple Valley will hold a PUBLIC HEARING on June 24th for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. Liberty Utilities Apple Valley's 2020 Urban Water Management Plan incorporates its Water Shortage Contingency Plan.

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Liberty Utilities
Attn: Carol Thomas-Keefer, Operations Manager
21760 Ottawa Rd.
Apple Valley, CA 92308

Liberty Utilities (Apple Valley Ranchos Water) Corp.

June 7, 2021

Liberty Apple Valley
21760 Ottawa Road
Apple Valley CA 92308

City of Victorville
14343 Civic Drive P.O. Box 5001
Victorville, CA 92392

SUBJECT: Notice of Public Hearing for
2020 Urban Water Management Plan and
Water Shortage Contingency Plan

Dear City of Victorville,

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Liberty Utilities
Attn: Carol Thomas-Keefer, Operations Manager
21760 Ottawa Rd.
Apple Valley, CA 92308

Liberty Utilities (Apple Valley Ranchos Water) Corp.

June 7, 2021

Liberty Apple Valley
21760 Ottawa Road
Apple Valley CA 92308

County of San Bernardino
385 North Arrowhead Ave.
San Bernardino, CA 92415-0160

SUBJECT: Notice of Public Hearing for
2020 Urban Water Management Plan and
Water Shortage Contingency Plan

Dear San Bernardino County,

Liberty Utilities Apple Valley will hold a PUBLIC HEARING on June 24th for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. Liberty Utilities Apple Valley's 2020 Urban Water Management Plan incorporates its Water Shortage Contingency Plan.

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Liberty Utilities
Attn: Carol Thomas-Keefer, Operations Manager
21760 Ottawa Rd.
Apple Valley, CA 92308

APPENDIX E

AWWA WATER LOSS AUDIT REPORTS

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.
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? Click to access definition
+ Click to add a comment

Water Audit Report for: APPLE VALLEY, CA (3610003)
Reporting Year: 2016 1/2016 - 12/2016

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<----------- Enter grading in column 'E' and 'J' ----------> Master Meter and Supply Error Adjustments

WATER SUPPLIED

				Pcnt:	Value:	
Volume from own sources:	5	9,244.131	acre-ft/yr	5	-21.103	acre-ft/yr
Water imported:	n/a	0.000	acre-ft/yr			acre-ft/yr
Water exported:	n/a	0.000	acre-ft/yr			acre-ft/yr
WATER SUPPLIED:		**9,265.234**	acre-ft/yr			

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

			Pcnt:	Value:	
Billed metered:	7	8,589.393	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	n/a	0.000	acre-ft/yr			
Unbilled unmetered:	5	23.163	acre-ft/yr		23.163	acre-ft/yr
AUTHORIZED CONSUMPTION:		**8,612.556**	acre-ft/yr			

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption)

652.678 acre-ft/yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:	23.163	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	7	121.000	acre-ft/yr	121.000	acre-ft/yr
Systematic data handling errors:		21.473	acre-ft/yr	0.25%	acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: **165.637** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **487.041** acre-ft/yr

WATER LOSSES: **652.678** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: **675.841** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	477.3	miles
Number of active AND inactive service connections:	10	21,006	
Service connection density:		44	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 7 89.0 psi

COST DATA

Total annual cost of operating water system:	10	$14,545,495	$/Year
Customer retail unit cost (applied to Apparent Losses):	9	$4.78	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	5	$110.96	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 64 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Variable production cost (applied to Real Losses)
3: Billed metered

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.
Copyright © 2014, All Rights Reserved.

? Click to access definition
+ Click to add a comment

Water Audit Report for: Liberty Utilities Apple Valley (3610003)
Reporting Year: 2017 | 1/2017 - 12/2017

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

						Pcnt:	Value:	
Volume from own sources:	5	9,469.906	acre-ft/yr	5			-9.895	acre-ft/yr
Water imported:	n/a	0.000	acre-ft/yr					acre-ft/yr
Water exported:	n/a	0.000	acre-ft/yr					acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 9,479.801 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	5	8,684.808	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	n/a	0.000	acre-ft/yr			
Unbilled unmetered:	5	23.700	acre-ft/yr		23.700	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: ? 8,708.508 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 771.294 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		23.700	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	7	39.420	acre-ft/yr		39.420	acre-ft/yr
Systematic data handling errors:		21.712	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? 84.832 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 686.462 acre-ft/yr

WATER LOSSES: 771.294 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 794.993 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	477.3	miles
Number of active AND inactive service connections:	9	21,223	
Service connection density:		44	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 7 95.6 psi

COST DATA

Total annual cost of operating water system:	10	$14,610,347	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$4.37	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	5	$116.07	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 62 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Billed metered
3: Variable production cost (applied to Real Losses)

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0
American Water Works Association.
Copyright © 2014, All Rights Reserved.

? Click to access definition
+ Click to add a comment

Water Audit Report for: Liberty Utilities Apple Valley (CA3610003)
Reporting Year: 2018 | 1/2018 - 12/2018

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

WATER SUPPLIED

					Master Meter and Supply Error Adjustments		
					Pcnt:	Value:	
Volume from own sources:	5	9,542.500	acre-ft/yr	3	-0.60%		acre-ft/yr
Water imported:	n/a	0.000	acre-ft/yr				acre-ft/yr
Water exported:	n/a	0.000	acre-ft/yr				acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 9,600.101 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option

				Pcnt:	Value:	
Billed metered:	7	8,966.312	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	n/a	0.000	acre-ft/yr			
Unbilled unmetered:	5	24.000	acre-ft/yr		24.000	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 8,990.312 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 609.788 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		24.000	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	7	85.939	acre-ft/yr		85.939	acre-ft/yr
Systematic data handling errors:	5	0.000	acre-ft/yr	0.25%		acre-ft/yr

Systematic data handling errors are likely, please enter a positive, non-zero value; otherwise grade = 1 (not displayed)

Apparent Losses: 109.939 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 499.849 acre-ft/yr

WATER LOSSES: 609.788 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 633.789 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	474.0	miles
Number of active AND inactive service connections:	9	20,924	
Service connection density:		44	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 7 | 95.6 psi

COST DATA

Total annual cost of operating water system:	10	$17,014,352	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$4.18	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	5	$111.72	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 62 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Systematic data handling errors
3: Variable production cost (applied to Real Losses)

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.
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? Click to access definition
+ Click to add a comment

Water Audit Report for: Liberty Utilities - Apple Valley (CA3610003)
Reporting Year: 2019 | 1/2019 - 12/2019

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

						Pcnt:	Value:	
Volume from own sources:	5	9,363.731	acre-ft/yr	3	-0.60%			acre-ft/yr
Water imported:	n/a	0.000	acre-ft/yr					acre-ft/yr
Water exported:	n/a	0.000	acre-ft/yr					acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 9,420.253 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	7	8,037.164	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	n/a	0.000	acre-ft/yr			
Unbilled unmetered:		117.753	acre-ft/yr	1.25%		acre-ft/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 8,154.917 acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption) 1,265.335 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		23.551	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	7	41.555	acre-ft/yr		41.555	acre-ft/yr
Systematic data handling errors:	5	20.093	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 85.199 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 1,180.137 acre-ft/yr

WATER LOSSES: 1,265.335 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 1,383.089 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	477.4	miles
Number of active AND inactive service connections:	9	21,011	
Service connection density:		44	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 7 | 95.6 psi

COST DATA

Total annual cost of operating water system:	10	$16,119,300	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$3.83	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	5	$0.25	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 64 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Variable production cost (applied to Real Losses)
3: Billed metered

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.
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? Click to access definition
+ Click to add a comment

Water Audit Report for: Liberty Utilities Apple Valley (CA3610003)
Reporting Year: 2020 1/2020 - 12/2020

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

					Pcnt:	Value:	
Volume from own sources:	9	10,067.000	acre-ft/yr	3		-110.880	acre-ft/yr
Water imported:	n/a	0.000	acre-ft/yr				acre-ft/yr
Water exported:	n/a	0.000	acre-ft/yr				acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 10,177.880 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	7	9,248.460	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	n/a	0.000	acre-ft/yr			
Unbilled unmetered:	5	23.121	acre-ft/yr		23.121	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: ? 9,271.581 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 906.299 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		25.445	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	7	93.419	acre-ft/yr	1.00%		acre-ft/yr
Systematic data handling errors:	5	23.121	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? 141.985 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 764.314 acre-ft/yr

WATER LOSSES: 906.299 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 929.420 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	475.0	miles	
Number of active AND inactive service connections:	9	21,485		
Service connection density:		45	conn./mile main	
Are customer meters typically located at the curbstop or property line?		Yes		
Average length of customer service line:				(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	7	95.6	psi	

COST DATA

Total annual cost of operating water system:	10	$11,906,449	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$4.95	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	5	$120.11	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 78 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Variable production cost (applied to Real Losses)
2: Billed metered
3: Volume from own sources

APPENDIX F

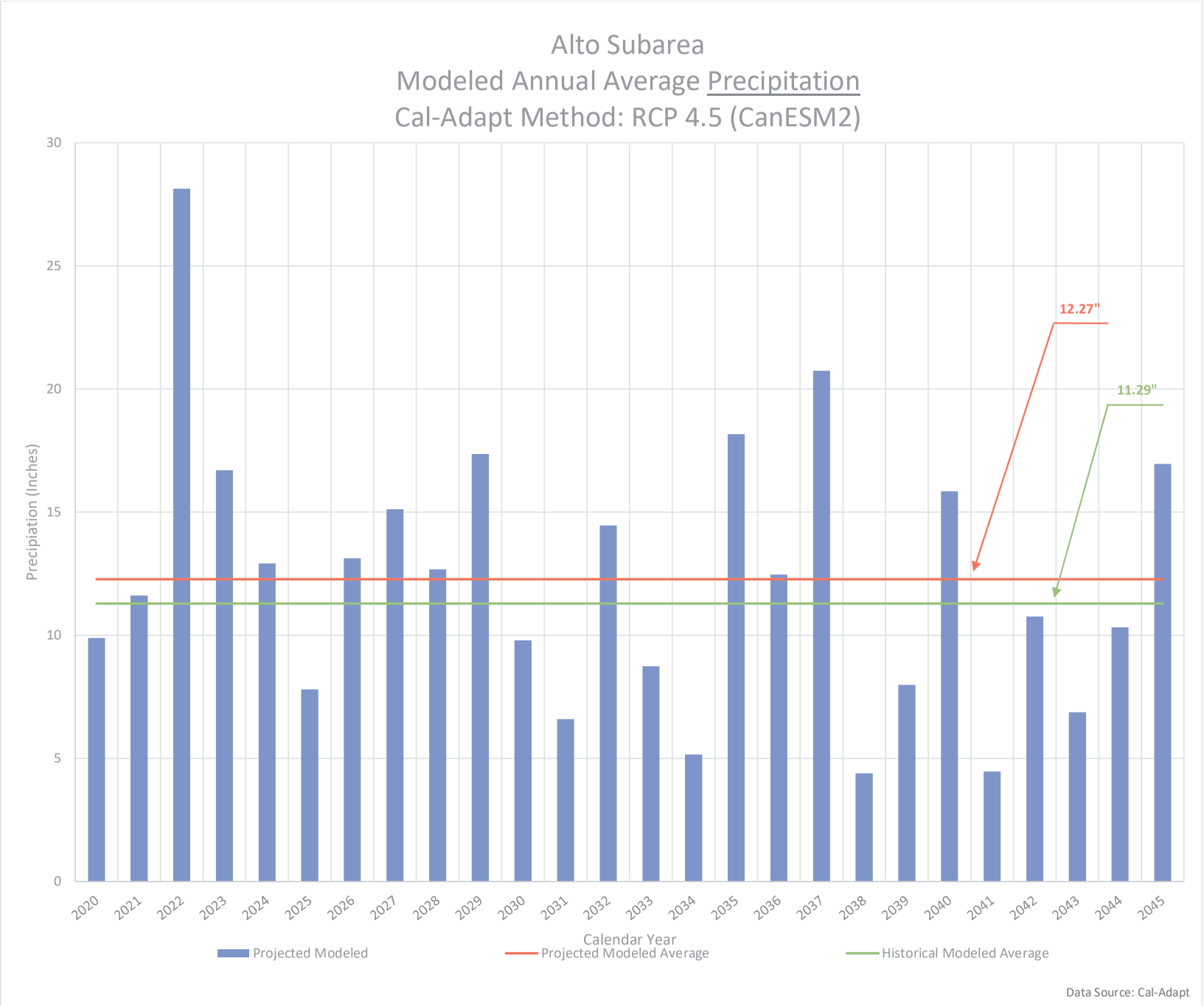
CLIMATE CHANGE CONSIDERATIONS (CAL- ADAPT DATA)

MOJAVE BASIN – ALTO SUBAREA

MODELED ANNUAL AVERAGE PRECIPITATION

CAL-ADAPT METHOD: RCP 4.5 (CANESM2)

CAL-ADAPT DATA



Notes:

Projected Modeled Average includes modeled years 2020 through 2045

Historical Modeled Average includes modeled years 1950 through 2019

Cal-Adapt defines the general circulation model (GCM) CanESM2 as an "average simulation"

Cal-Adapt defines RCP 4.5 as a scenario in which emissions peak around 2040, then decline

Cal-Adapt
Annual Averages Tool - Precipitation
Alto Subarea

location	User Defined Boundary - Alto Basin
climate variable	Precipitation
units	inches
scenario	rcp45

Projected Modeled Average: **12.27163645 [inches]**
Historical Modeled Average: **11.29102 [inches]**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Sun Jan 01 1950 00:00:00 GMT-0800 (Pacific Standard Time)	1950			2.925207
CanESM2	Mon Jan 01 1951 00:00:00 GMT-0800 (Pacific Standard Time)	1951			13.57581
CanESM2	Tue Jan 01 1952 00:00:00 GMT-0800 (Pacific Standard Time)	1952			12.44505
CanESM2	Thu Jan 01 1953 00:00:00 GMT-0800 (Pacific Standard Time)	1953			8.246573
CanESM2	Fri Jan 01 1954 00:00:00 GMT-0800 (Pacific Standard Time)	1954			11.9594
CanESM2	Sat Jan 01 1955 00:00:00 GMT-0800 (Pacific Standard Time)	1955			20.02555
CanESM2	Sun Jan 01 1956 00:00:00 GMT-0800 (Pacific Standard Time)	1956			5.681437
CanESM2	Tue Jan 01 1957 00:00:00 GMT-0800 (Pacific Standard Time)	1957			11.66785
CanESM2	Wed Jan 01 1958 00:00:00 GMT-0800 (Pacific Standard Time)	1958			4.930074
CanESM2	Thu Jan 01 1959 00:00:00 GMT-0800 (Pacific Standard Time)	1959			7.537669
CanESM2	Fri Jan 01 1960 00:00:00 GMT-0800 (Pacific Standard Time)	1960			10.14004
CanESM2	Sun Jan 01 1961 00:00:00 GMT-0800 (Pacific Standard Time)	1961			10.15627
CanESM2	Mon Jan 01 1962 00:00:00 GMT-0800 (Pacific Standard Time)	1962			16.43949
CanESM2	Tue Jan 01 1963 00:00:00 GMT-0800 (Pacific Standard Time)	1963			2.784712
CanESM2	Wed Jan 01 1964 00:00:00 GMT-0800 (Pacific Standard Time)	1964			20.94435
CanESM2	Fri Jan 01 1965 00:00:00 GMT-0800 (Pacific Standard Time)	1965			23.63121
CanESM2	Sat Jan 01 1966 00:00:00 GMT-0800 (Pacific Standard Time)	1966			8.883921
CanESM2	Sun Jan 01 1967 00:00:00 GMT-0800 (Pacific Standard Time)	1967			14.96588
CanESM2	Mon Jan 01 1968 00:00:00 GMT-0800 (Pacific Standard Time)	1968			11.42797
CanESM2	Wed Jan 01 1969 00:00:00 GMT-0800 (Pacific Standard Time)	1969			22.54526
CanESM2	Thu Jan 01 1970 00:00:00 GMT-0800 (Pacific Standard Time)	1970			10.53598
CanESM2	Fri Jan 01 1971 00:00:00 GMT-0800 (Pacific Standard Time)	1971			3.490305
CanESM2	Sat Jan 01 1972 00:00:00 GMT-0800 (Pacific Standard Time)	1972			11.14289
CanESM2	Mon Jan 01 1973 00:00:00 GMT-0800 (Pacific Standard Time)	1973			8.423543
CanESM2	Tue Jan 01 1974 00:00:00 GMT-0800 (Pacific Standard Time)	1974			25.52722
CanESM2	Wed Jan 01 1975 00:00:00 GMT-0800 (Pacific Standard Time)	1975			7.611193
CanESM2	Thu Jan 01 1976 00:00:00 GMT-0800 (Pacific Standard Time)	1976			11.74663
CanESM2	Sat Jan 01 1977 00:00:00 GMT-0800 (Pacific Standard Time)	1977			12.74881
CanESM2	Sun Jan 01 1978 00:00:00 GMT-0800 (Pacific Standard Time)	1978			9.868414
CanESM2	Mon Jan 01 1979 00:00:00 GMT-0800 (Pacific Standard Time)	1979			6.382079
CanESM2	Tue Jan 01 1980 00:00:00 GMT-0800 (Pacific Standard Time)	1980			4.521684
CanESM2	Thu Jan 01 1981 00:00:00 GMT-0800 (Pacific Standard Time)	1981			11.23473
CanESM2	Fri Jan 01 1982 00:00:00 GMT-0800 (Pacific Standard Time)	1982			16.49546
CanESM2	Sat Jan 01 1983 00:00:00 GMT-0800 (Pacific Standard Time)	1983			8.983441
CanESM2	Sun Jan 01 1984 00:00:00 GMT-0800 (Pacific Standard Time)	1984			10.19176
CanESM2	Tue Jan 01 1985 00:00:00 GMT-0800 (Pacific Standard Time)	1985			28.11741
CanESM2	Wed Jan 01 1986 00:00:00 GMT-0800 (Pacific Standard Time)	1986			6.71161
CanESM2	Thu Jan 01 1987 00:00:00 GMT-0800 (Pacific Standard Time)	1987			11.14323
CanESM2	Fri Jan 01 1988 00:00:00 GMT-0800 (Pacific Standard Time)	1988			7.699479
CanESM2	Sun Jan 01 1989 00:00:00 GMT-0800 (Pacific Standard Time)	1989			14.56015
CanESM2	Mon Jan 01 1990 00:00:00 GMT-0800 (Pacific Standard Time)	1990			13.68273
CanESM2	Tue Jan 01 1991 00:00:00 GMT-0800 (Pacific Standard Time)	1991			10.98519
CanESM2	Wed Jan 01 1992 00:00:00 GMT-0800 (Pacific Standard Time)	1992			12.89383
CanESM2	Fri Jan 01 1993 00:00:00 GMT-0800 (Pacific Standard Time)	1993			12.58987
CanESM2	Sat Jan 01 1994 00:00:00 GMT-0800 (Pacific Standard Time)	1994			10.83833
CanESM2	Sun Jan 01 1995 00:00:00 GMT-0800 (Pacific Standard Time)	1995			10.3653
CanESM2	Mon Jan 01 1996 00:00:00 GMT-0800 (Pacific Standard Time)	1996			7.523717
CanESM2	Wed Jan 01 1997 00:00:00 GMT-0800 (Pacific Standard Time)	1997			27.12318
CanESM2	Thu Jan 01 1998 00:00:00 GMT-0800 (Pacific Standard Time)	1998			7.110796
CanESM2	Fri Jan 01 1999 00:00:00 GMT-0800 (Pacific Standard Time)	1999			6.550072

Cal-Adapt
Annual Averages Tool - Precipitation
Alto Subarea

location	User Defined Boundary - Alto Basin
climate variable	Precipitation
units	inches
scenario	rcp45

Projected Modeled Average: **12.27163645 [inches]**
Historical Modeled Average: **11.29102 [inches]**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Sat Jan 01 2000 00:00:00 GMT-0800 (Pacific Standard Time)	2000			6.708164
CanESM2	Mon Jan 01 2001 00:00:00 GMT-0800 (Pacific Standard Time)	2001			6.529988
CanESM2	Tue Jan 01 2002 00:00:00 GMT-0800 (Pacific Standard Time)	2002			7.82745
CanESM2	Wed Jan 01 2003 00:00:00 GMT-0800 (Pacific Standard Time)	2003			10.14752
CanESM2	Thu Jan 01 2004 00:00:00 GMT-0800 (Pacific Standard Time)	2004			10.77568
CanESM2	Sat Jan 01 2005 00:00:00 GMT-0800 (Pacific Standard Time)	2005			19.91689
CanESM2	Sun Jan 01 2006 00:00:00 GMT-0800 (Pacific Standard Time)	2006			9.88042
CanESM2	Mon Jan 01 2007 00:00:00 GMT-0800 (Pacific Standard Time)	2007			2.579851
CanESM2	Tue Jan 01 2008 00:00:00 GMT-0800 (Pacific Standard Time)	2008			10.66968
CanESM2	Thu Jan 01 2009 00:00:00 GMT-0800 (Pacific Standard Time)	2009			9.275206
CanESM2	Fri Jan 01 2010 00:00:00 GMT-0800 (Pacific Standard Time)	2010			8.39035
CanESM2	Sat Jan 01 2011 00:00:00 GMT-0800 (Pacific Standard Time)	2011			16.09
CanESM2	Sun Jan 01 2012 00:00:00 GMT-0800 (Pacific Standard Time)	2012			4.456381
CanESM2	Tue Jan 01 2013 00:00:00 GMT-0800 (Pacific Standard Time)	2013			6.616965
CanESM2	Wed Jan 01 2014 00:00:00 GMT-0800 (Pacific Standard Time)	2014			7.248266
CanESM2	Thu Jan 01 2015 00:00:00 GMT-0800 (Pacific Standard Time)	2015			17.8635
CanESM2	Fri Jan 01 2016 00:00:00 GMT-0800 (Pacific Standard Time)	2016			27.71267
CanESM2	Sun Jan 01 2017 00:00:00 GMT-0800 (Pacific Standard Time)	2017			7.366127
CanESM2	Mon Jan 01 2018 00:00:00 GMT-0800 (Pacific Standard Time)	2018			4.090013
CanESM2	Tue Jan 01 2019 00:00:00 GMT-0800 (Pacific Standard Time)	2019	11.2910152		8.513192
CanESM2	Wed Jan 01 2020 00:00:00 GMT-0800 (Pacific Standard Time)	2020	11.2910152	12.27163645	9.886081
CanESM2	Fri Jan 01 2021 00:00:00 GMT-0800 (Pacific Standard Time)	2021	11.2910152	12.27163645	11.61794
CanESM2	Sat Jan 01 2022 00:00:00 GMT-0800 (Pacific Standard Time)	2022	11.2910152	12.27163645	28.12665
CanESM2	Sun Jan 01 2023 00:00:00 GMT-0800 (Pacific Standard Time)	2023	11.2910152	12.27163645	16.69752
CanESM2	Mon Jan 01 2024 00:00:00 GMT-0800 (Pacific Standard Time)	2024	11.2910152	12.27163645	12.9137
CanESM2	Wed Jan 01 2025 00:00:00 GMT-0800 (Pacific Standard Time)	2025	11.2910152	12.27163645	7.802321
CanESM2	Thu Jan 01 2026 00:00:00 GMT-0800 (Pacific Standard Time)	2026	11.2910152	12.27163645	13.12505
CanESM2	Fri Jan 01 2027 00:00:00 GMT-0800 (Pacific Standard Time)	2027	11.2910152	12.27163645	15.12095
CanESM2	Sat Jan 01 2028 00:00:00 GMT-0800 (Pacific Standard Time)	2028	11.2910152	12.27163645	12.67725
CanESM2	Mon Jan 01 2029 00:00:00 GMT-0800 (Pacific Standard Time)	2029	11.2910152	12.27163645	17.3538
CanESM2	Tue Jan 01 2030 00:00:00 GMT-0800 (Pacific Standard Time)	2030	11.2910152	12.27163645	9.796943
CanESM2	Wed Jan 01 2031 00:00:00 GMT-0800 (Pacific Standard Time)	2031	11.2910152	12.27163645	6.597362
CanESM2	Thu Jan 01 2032 00:00:00 GMT-0800 (Pacific Standard Time)	2032	11.2910152	12.27163645	14.45677
CanESM2	Sat Jan 01 2033 00:00:00 GMT-0800 (Pacific Standard Time)	2033	11.2910152	12.27163645	8.745313
CanESM2	Sun Jan 01 2034 00:00:00 GMT-0800 (Pacific Standard Time)	2034	11.2910152	12.27163645	5.159466
CanESM2	Mon Jan 01 2035 00:00:00 GMT-0800 (Pacific Standard Time)	2035	11.2910152	12.27163645	18.15989
CanESM2	Tue Jan 01 2036 00:00:00 GMT-0800 (Pacific Standard Time)	2036	11.2910152	12.27163645	12.47035
CanESM2	Thu Jan 01 2037 00:00:00 GMT-0800 (Pacific Standard Time)	2037	11.2910152	12.27163645	20.73441
CanESM2	Fri Jan 01 2038 00:00:00 GMT-0800 (Pacific Standard Time)	2038	11.2910152	12.27163645	4.397726
CanESM2	Sat Jan 01 2039 00:00:00 GMT-0800 (Pacific Standard Time)	2039	11.2910152	12.27163645	7.983463
CanESM2	Sun Jan 01 2040 00:00:00 GMT-0800 (Pacific Standard Time)	2040	11.2910152	12.27163645	15.84797
CanESM2	Tue Jan 01 2041 00:00:00 GMT-0800 (Pacific Standard Time)	2041	11.2910152	12.27163645	4.470012
CanESM2	Wed Jan 01 2042 00:00:00 GMT-0800 (Pacific Standard Time)	2042	11.2910152	12.27163645	10.76417
CanESM2	Thu Jan 01 2043 00:00:00 GMT-0800 (Pacific Standard Time)	2043	11.2910152	12.27163645	6.87697
CanESM2	Fri Jan 01 2044 00:00:00 GMT-0800 (Pacific Standard Time)	2044	11.2910152	12.27163645	10.32454
CanESM2	Sun Jan 01 2045 00:00:00 GMT-0800 (Pacific Standard Time)	2045	11.2910152	12.27163645	16.95592
CanESM2	Mon Jan 01 2046 00:00:00 GMT-0800 (Pacific Standard Time)	2046	11.2910152		18.21526
CanESM2	Tue Jan 01 2047 00:00:00 GMT-0800 (Pacific Standard Time)	2047	11.2910152		14.59646
CanESM2	Wed Jan 01 2048 00:00:00 GMT-0800 (Pacific Standard Time)	2048	11.2910152		18.5597
CanESM2	Fri Jan 01 2049 00:00:00 GMT-0800 (Pacific Standard Time)	2049	11.2910152		6.56571

Cal-Adapt
Annual Averages Tool - Precipitation
Alto Subarea

location	User Defined Boundary - Alto Basin
climate variable	Precipitation
units	inches
scenario	rcp45

Projected Modeled Average: **12.27163645 [inches]**
Historical Modeled Average: **11.29102 [inches]**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Sat Jan 01 2050 00:00:00 GMT-0800 (Pacific Standard Time)	2050	11.2910152		7.523601
CanESM2	Sun Jan 01 2051 00:00:00 GMT-0800 (Pacific Standard Time)	2051	11.2910152		6.320753
CanESM2	Mon Jan 01 2052 00:00:00 GMT-0800 (Pacific Standard Time)	2052	11.2910152		18.61942
CanESM2	Wed Jan 01 2053 00:00:00 GMT-0800 (Pacific Standard Time)	2053	11.2910152		7.780698
CanESM2	Thu Jan 01 2054 00:00:00 GMT-0800 (Pacific Standard Time)	2054	11.2910152		9.320993
CanESM2	Fri Jan 01 2055 00:00:00 GMT-0800 (Pacific Standard Time)	2055	11.2910152		7.131753
CanESM2	Sat Jan 01 2056 00:00:00 GMT-0800 (Pacific Standard Time)	2056	11.2910152		12.19318
CanESM2	Mon Jan 01 2057 00:00:00 GMT-0800 (Pacific Standard Time)	2057	11.2910152		11.73365
CanESM2	Tue Jan 01 2058 00:00:00 GMT-0800 (Pacific Standard Time)	2058	11.2910152		7.67683
CanESM2	Wed Jan 01 2059 00:00:00 GMT-0800 (Pacific Standard Time)	2059	11.2910152		20.68307
CanESM2	Thu Jan 01 2060 00:00:00 GMT-0800 (Pacific Standard Time)	2060	11.2910152		19.88737
CanESM2	Sat Jan 01 2061 00:00:00 GMT-0800 (Pacific Standard Time)	2061	11.2910152		7.82002
CanESM2	Sun Jan 01 2062 00:00:00 GMT-0800 (Pacific Standard Time)	2062	11.2910152		9.79248
CanESM2	Mon Jan 01 2063 00:00:00 GMT-0800 (Pacific Standard Time)	2063	11.2910152		3.552127
CanESM2	Tue Jan 01 2064 00:00:00 GMT-0800 (Pacific Standard Time)	2064	11.2910152		8.45048
CanESM2	Thu Jan 01 2065 00:00:00 GMT-0800 (Pacific Standard Time)	2065	11.2910152		11.53792
CanESM2	Fri Jan 01 2066 00:00:00 GMT-0800 (Pacific Standard Time)	2066	11.2910152		11.4468
CanESM2	Sat Jan 01 2067 00:00:00 GMT-0800 (Pacific Standard Time)	2067	11.2910152		16.2625
CanESM2	Sun Jan 01 2068 00:00:00 GMT-0800 (Pacific Standard Time)	2068	11.2910152		13.19267
CanESM2	Tue Jan 01 2069 00:00:00 GMT-0800 (Pacific Standard Time)	2069	11.2910152		18.29115
CanESM2	Wed Jan 01 2070 00:00:00 GMT-0800 (Pacific Standard Time)	2070	11.2910152		14.86365
CanESM2	Thu Jan 01 2071 00:00:00 GMT-0800 (Pacific Standard Time)	2071	11.2910152		18.16106
CanESM2	Fri Jan 01 2072 00:00:00 GMT-0800 (Pacific Standard Time)	2072	11.2910152		4.837879
CanESM2	Sun Jan 01 2073 00:00:00 GMT-0800 (Pacific Standard Time)	2073	11.2910152		17.87717
CanESM2	Mon Jan 01 2074 00:00:00 GMT-0800 (Pacific Standard Time)	2074	11.2910152		13.12803
CanESM2	Tue Jan 01 2075 00:00:00 GMT-0800 (Pacific Standard Time)	2075	11.2910152		13.65019
CanESM2	Wed Jan 01 2076 00:00:00 GMT-0800 (Pacific Standard Time)	2076	11.2910152		9.602093
CanESM2	Fri Jan 01 2077 00:00:00 GMT-0800 (Pacific Standard Time)	2077	11.2910152		17.45115
CanESM2	Sat Jan 01 2078 00:00:00 GMT-0800 (Pacific Standard Time)	2078	11.2910152		15.50068
CanESM2	Sun Jan 01 2079 00:00:00 GMT-0800 (Pacific Standard Time)	2079	11.2910152		15.05332
CanESM2	Mon Jan 01 2080 00:00:00 GMT-0800 (Pacific Standard Time)	2080	11.2910152		33.05051
CanESM2	Wed Jan 01 2081 00:00:00 GMT-0800 (Pacific Standard Time)	2081	11.2910152		13.1902
CanESM2	Thu Jan 01 2082 00:00:00 GMT-0800 (Pacific Standard Time)	2082	11.2910152		12.07045
CanESM2	Fri Jan 01 2083 00:00:00 GMT-0800 (Pacific Standard Time)	2083	11.2910152		12.16199
CanESM2	Sat Jan 01 2084 00:00:00 GMT-0800 (Pacific Standard Time)	2084	11.2910152		19.13374
CanESM2	Mon Jan 01 2085 00:00:00 GMT-0800 (Pacific Standard Time)	2085	11.2910152		6.12796
CanESM2	Tue Jan 01 2086 00:00:00 GMT-0800 (Pacific Standard Time)	2086	11.2910152		19.04116
CanESM2	Wed Jan 01 2087 00:00:00 GMT-0800 (Pacific Standard Time)	2087	11.2910152		8.274902
CanESM2	Thu Jan 01 2088 00:00:00 GMT-0800 (Pacific Standard Time)	2088	11.2910152		27.87444
CanESM2	Sat Jan 01 2089 00:00:00 GMT-0800 (Pacific Standard Time)	2089	11.2910152		13.61613
CanESM2	Sun Jan 01 2090 00:00:00 GMT-0800 (Pacific Standard Time)	2090	11.2910152		8.724906
CanESM2	Mon Jan 01 2091 00:00:00 GMT-0800 (Pacific Standard Time)	2091	11.2910152		4.839216
CanESM2	Tue Jan 01 2092 00:00:00 GMT-0800 (Pacific Standard Time)	2092	11.2910152		4.40281
CanESM2	Thu Jan 01 2093 00:00:00 GMT-0800 (Pacific Standard Time)	2093	11.2910152		20.08031
CanESM2	Fri Jan 01 2094 00:00:00 GMT-0800 (Pacific Standard Time)	2094	11.2910152		12.83169
CanESM2	Sat Jan 01 2095 00:00:00 GMT-0800 (Pacific Standard Time)	2095	11.2910152		5.033623
CanESM2	Sun Jan 01 2096 00:00:00 GMT-0800 (Pacific Standard Time)	2096	11.2910152		8.732234
CanESM2	Tue Jan 01 2097 00:00:00 GMT-0800 (Pacific Standard Time)	2097	11.2910152		12.97149
CanESM2	Wed Jan 01 2098 00:00:00 GMT-0800 (Pacific Standard Time)	2098	11.2910152		16.75494
CanESM2	Thu Jan 01 2099 00:00:00 GMT-0800 (Pacific Standard Time)	2099	11.2910152		9.216082

Cal-Adapt
Annual Averages Tool - Precipitation
Alto Subarea

location	User Defined Boundary - Alto Basin
climate variable	Precipitation
units	inches
scenario	rcp45

Projected Modeled Average: **12.27163645 [inches]**
Historical Modeled Average: **11.29102 [inches]**

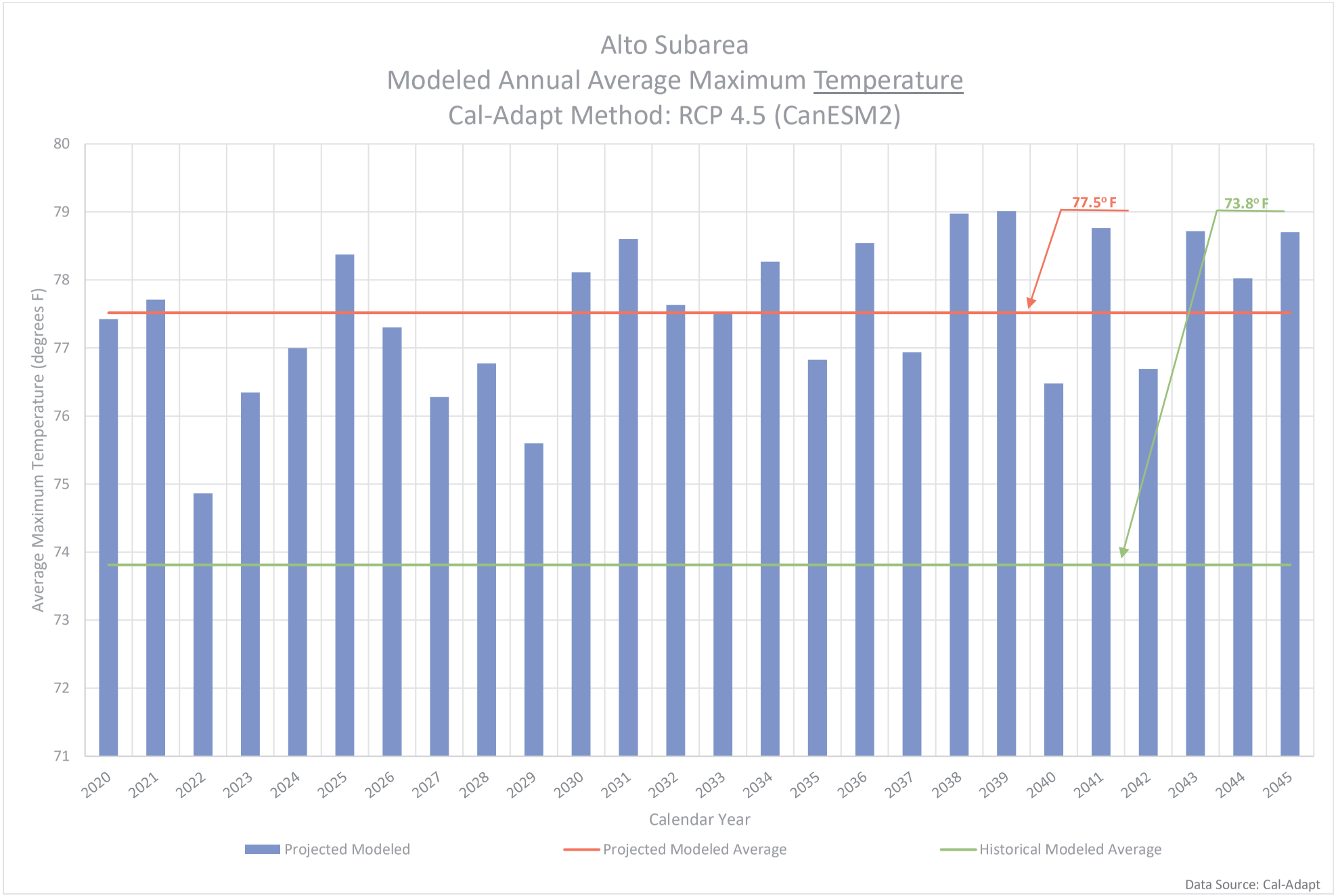
name	date	Year	Historical Average	Modeled Average	value
CanESM2	Fri Jan 01 2100 00:00:00 GMT-0800 (Pacific Standard Time)	2100	11.2910152		12.39521

MOJAVE BASIN – ALTO SUBAREA

MODELED ANNUAL AVERAGE TEMPERATURE

CAL-ADAPT METHOD: RCP 4.5 (CANESM2)

CAL-ADAPT DATA



Notes:

Projected Modeled Average includes modeled years 2020 through 2045

Historical Modeled Average includes modeled years 1950 through 2019

Cal-Adapt defines the general circulation model (GCM) CanESM2 as an "average simulation"

Cal-Adapt defines RCP 4.5 as a scenario in which emissions peak around 2040, then decline

Cal-Adapt
Annual Averages Tool - Maximum Temperature
Alto Subarea

location	User Defined Boundary - Alto SubArea
climate variable	Maximum Temperature
units	°F
scenario	rcp45

Projected Modeled Average: **77.5173 °F**
Historical Modeled Average: **73.81476 °F**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Sun Jan 01 1950 00:00:00 GMT-0800 (Pacific Standard Time)	1950			74.68543
CanESM2	Mon Jan 01 1951 00:00:00 GMT-0800 (Pacific Standard Time)	1951			72.68703
CanESM2	Tue Jan 01 1952 00:00:00 GMT-0800 (Pacific Standard Time)	1952			72.72375
CanESM2	Thu Jan 01 1953 00:00:00 GMT-0800 (Pacific Standard Time)	1953			73.32363
CanESM2	Fri Jan 01 1954 00:00:00 GMT-0800 (Pacific Standard Time)	1954			72.26727
CanESM2	Sat Jan 01 1955 00:00:00 GMT-0800 (Pacific Standard Time)	1955			71.5527
CanESM2	Sun Jan 01 1956 00:00:00 GMT-0800 (Pacific Standard Time)	1956			73.67762
CanESM2	Tue Jan 01 1957 00:00:00 GMT-0800 (Pacific Standard Time)	1957			73.53242
CanESM2	Wed Jan 01 1958 00:00:00 GMT-0800 (Pacific Standard Time)	1958			73.68918
CanESM2	Thu Jan 01 1959 00:00:00 GMT-0800 (Pacific Standard Time)	1959			74.32074
CanESM2	Fri Jan 01 1960 00:00:00 GMT-0800 (Pacific Standard Time)	1960			74.08301
CanESM2	Sun Jan 01 1961 00:00:00 GMT-0800 (Pacific Standard Time)	1961			72.24547
CanESM2	Mon Jan 01 1962 00:00:00 GMT-0800 (Pacific Standard Time)	1962			73.49336
CanESM2	Tue Jan 01 1963 00:00:00 GMT-0800 (Pacific Standard Time)	1963			75.86855
CanESM2	Wed Jan 01 1964 00:00:00 GMT-0800 (Pacific Standard Time)	1964			71.3068
CanESM2	Fri Jan 01 1965 00:00:00 GMT-0800 (Pacific Standard Time)	1965			69.79598
CanESM2	Sat Jan 01 1966 00:00:00 GMT-0800 (Pacific Standard Time)	1966			71.08547
CanESM2	Sun Jan 01 1967 00:00:00 GMT-0800 (Pacific Standard Time)	1967			73.47129
CanESM2	Mon Jan 01 1968 00:00:00 GMT-0800 (Pacific Standard Time)	1968			72.46453
CanESM2	Wed Jan 01 1969 00:00:00 GMT-0800 (Pacific Standard Time)	1969			72.18004
CanESM2	Thu Jan 01 1970 00:00:00 GMT-0800 (Pacific Standard Time)	1970			71.41293
CanESM2	Fri Jan 01 1971 00:00:00 GMT-0800 (Pacific Standard Time)	1971			72.94242
CanESM2	Sat Jan 01 1972 00:00:00 GMT-0800 (Pacific Standard Time)	1972			74.04738
CanESM2	Mon Jan 01 1973 00:00:00 GMT-0800 (Pacific Standard Time)	1973			71.68137
CanESM2	Tue Jan 01 1974 00:00:00 GMT-0800 (Pacific Standard Time)	1974			72.68898
CanESM2	Wed Jan 01 1975 00:00:00 GMT-0800 (Pacific Standard Time)	1975			73.8709
CanESM2	Thu Jan 01 1976 00:00:00 GMT-0800 (Pacific Standard Time)	1976			73.49492
CanESM2	Sat Jan 01 1977 00:00:00 GMT-0800 (Pacific Standard Time)	1977			71.59527
CanESM2	Sun Jan 01 1978 00:00:00 GMT-0800 (Pacific Standard Time)	1978			74.15188
CanESM2	Mon Jan 01 1979 00:00:00 GMT-0800 (Pacific Standard Time)	1979			74.00746
CanESM2	Tue Jan 01 1980 00:00:00 GMT-0800 (Pacific Standard Time)	1980			75.51711
CanESM2	Thu Jan 01 1981 00:00:00 GMT-0800 (Pacific Standard Time)	1981			74.7141
CanESM2	Fri Jan 01 1982 00:00:00 GMT-0800 (Pacific Standard Time)	1982			71.55113
CanESM2	Sat Jan 01 1983 00:00:00 GMT-0800 (Pacific Standard Time)	1983			73.29625
CanESM2	Sun Jan 01 1984 00:00:00 GMT-0800 (Pacific Standard Time)	1984			73.25371
CanESM2	Tue Jan 01 1985 00:00:00 GMT-0800 (Pacific Standard Time)	1985			71.69609
CanESM2	Wed Jan 01 1986 00:00:00 GMT-0800 (Pacific Standard Time)	1986			73.59313
CanESM2	Thu Jan 01 1987 00:00:00 GMT-0800 (Pacific Standard Time)	1987			72.69238
CanESM2	Fri Jan 01 1988 00:00:00 GMT-0800 (Pacific Standard Time)	1988			73.09691
CanESM2	Sun Jan 01 1989 00:00:00 GMT-0800 (Pacific Standard Time)	1989			72.38254
CanESM2	Mon Jan 01 1990 00:00:00 GMT-0800 (Pacific Standard Time)	1990			73.22953
CanESM2	Tue Jan 01 1991 00:00:00 GMT-0800 (Pacific Standard Time)	1991			74.08047
CanESM2	Wed Jan 01 1992 00:00:00 GMT-0800 (Pacific Standard Time)	1992			70.67563
CanESM2	Fri Jan 01 1993 00:00:00 GMT-0800 (Pacific Standard Time)	1993			74.63195
CanESM2	Sat Jan 01 1994 00:00:00 GMT-0800 (Pacific Standard Time)	1994			71.88434
CanESM2	Sun Jan 01 1995 00:00:00 GMT-0800 (Pacific Standard Time)	1995			74.3807
CanESM2	Mon Jan 01 1996 00:00:00 GMT-0800 (Pacific Standard Time)	1996			75.37969
CanESM2	Wed Jan 01 1997 00:00:00 GMT-0800 (Pacific Standard Time)	1997			72.34305
CanESM2	Thu Jan 01 1998 00:00:00 GMT-0800 (Pacific Standard Time)	1998			74.11367
CanESM2	Fri Jan 01 1999 00:00:00 GMT-0800 (Pacific Standard Time)	1999			75.12973

Cal-Adapt
Annual Averages Tool - Maximum Temperature
Alto Subarea

location	User Defined Boundary - Alto SubArea
climate variable	Maximum Temperature
units	°F
scenario	rcp45

Projected Modeled Average: **77.5173 °F**
Historical Modeled Average: **73.81476 °F**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Sat Jan 01 2000 00:00:00 GMT-0800 (Pacific Standard Time)	2000			75.06707
CanESM2	Mon Jan 01 2001 00:00:00 GMT-0800 (Pacific Standard Time)	2001			74.88133
CanESM2	Tue Jan 01 2002 00:00:00 GMT-0800 (Pacific Standard Time)	2002			75.51969
CanESM2	Wed Jan 01 2003 00:00:00 GMT-0800 (Pacific Standard Time)	2003			73.20766
CanESM2	Thu Jan 01 2004 00:00:00 GMT-0800 (Pacific Standard Time)	2004			74.58738
CanESM2	Sat Jan 01 2005 00:00:00 GMT-0800 (Pacific Standard Time)	2005			73.66734
CanESM2	Sun Jan 01 2006 00:00:00 GMT-0800 (Pacific Standard Time)	2006			73.82
CanESM2	Mon Jan 01 2007 00:00:00 GMT-0800 (Pacific Standard Time)	2007			76.0993
CanESM2	Tue Jan 01 2008 00:00:00 GMT-0800 (Pacific Standard Time)	2008			75.53438
CanESM2	Thu Jan 01 2009 00:00:00 GMT-0800 (Pacific Standard Time)	2009			76.36012
CanESM2	Fri Jan 01 2010 00:00:00 GMT-0800 (Pacific Standard Time)	2010			75.90711
CanESM2	Sat Jan 01 2011 00:00:00 GMT-0800 (Pacific Standard Time)	2011			75.9857
CanESM2	Sun Jan 01 2012 00:00:00 GMT-0800 (Pacific Standard Time)	2012			76.97699
CanESM2	Tue Jan 01 2013 00:00:00 GMT-0800 (Pacific Standard Time)	2013			78.04555
CanESM2	Wed Jan 01 2014 00:00:00 GMT-0800 (Pacific Standard Time)	2014			75.41215
CanESM2	Thu Jan 01 2015 00:00:00 GMT-0800 (Pacific Standard Time)	2015			75.20914
CanESM2	Fri Jan 01 2016 00:00:00 GMT-0800 (Pacific Standard Time)	2016			74.08438
CanESM2	Sun Jan 01 2017 00:00:00 GMT-0800 (Pacific Standard Time)	2017			75.63641
CanESM2	Mon Jan 01 2018 00:00:00 GMT-0800 (Pacific Standard Time)	2018			78.43578
CanESM2	Tue Jan 01 2019 00:00:00 GMT-0800 (Pacific Standard Time)	2019	73.81475949		76.60582
CanESM2	Wed Jan 01 2020 00:00:00 GMT-0800 (Pacific Standard Time)	2020	73.81475949	77.51730168	77.42438
CanESM2	Fri Jan 01 2021 00:00:00 GMT-0800 (Pacific Standard Time)	2021	73.81475949	77.51730168	77.71219
CanESM2	Sat Jan 01 2022 00:00:00 GMT-0800 (Pacific Standard Time)	2022	73.81475949	77.51730168	74.86203
CanESM2	Sun Jan 01 2023 00:00:00 GMT-0800 (Pacific Standard Time)	2023	73.81475949	77.51730168	76.34586
CanESM2	Mon Jan 01 2024 00:00:00 GMT-0800 (Pacific Standard Time)	2024	73.81475949	77.51730168	76.99719
CanESM2	Wed Jan 01 2025 00:00:00 GMT-0800 (Pacific Standard Time)	2025	73.81475949	77.51730168	78.37238
CanESM2	Thu Jan 01 2026 00:00:00 GMT-0800 (Pacific Standard Time)	2026	73.81475949	77.51730168	77.30445
CanESM2	Fri Jan 01 2027 00:00:00 GMT-0800 (Pacific Standard Time)	2027	73.81475949	77.51730168	76.28027
CanESM2	Sat Jan 01 2028 00:00:00 GMT-0800 (Pacific Standard Time)	2028	73.81475949	77.51730168	76.77363
CanESM2	Mon Jan 01 2029 00:00:00 GMT-0800 (Pacific Standard Time)	2029	73.81475949	77.51730168	75.59637
CanESM2	Tue Jan 01 2030 00:00:00 GMT-0800 (Pacific Standard Time)	2030	73.81475949	77.51730168	78.11168
CanESM2	Wed Jan 01 2031 00:00:00 GMT-0800 (Pacific Standard Time)	2031	73.81475949	77.51730168	78.60219
CanESM2	Thu Jan 01 2032 00:00:00 GMT-0800 (Pacific Standard Time)	2032	73.81475949	77.51730168	77.63316
CanESM2	Sat Jan 01 2033 00:00:00 GMT-0800 (Pacific Standard Time)	2033	73.81475949	77.51730168	77.50191
CanESM2	Sun Jan 01 2034 00:00:00 GMT-0800 (Pacific Standard Time)	2034	73.81475949	77.51730168	78.2677
CanESM2	Mon Jan 01 2035 00:00:00 GMT-0800 (Pacific Standard Time)	2035	73.81475949	77.51730168	76.82586
CanESM2	Tue Jan 01 2036 00:00:00 GMT-0800 (Pacific Standard Time)	2036	73.81475949	77.51730168	78.54168
CanESM2	Thu Jan 01 2037 00:00:00 GMT-0800 (Pacific Standard Time)	2037	73.81475949	77.51730168	76.93625
CanESM2	Fri Jan 01 2038 00:00:00 GMT-0800 (Pacific Standard Time)	2038	73.81475949	77.51730168	78.97457
CanESM2	Sat Jan 01 2039 00:00:00 GMT-0800 (Pacific Standard Time)	2039	73.81475949	77.51730168	79.01055
CanESM2	Sun Jan 01 2040 00:00:00 GMT-0800 (Pacific Standard Time)	2040	73.81475949	77.51730168	76.47984
CanESM2	Tue Jan 01 2041 00:00:00 GMT-0800 (Pacific Standard Time)	2041	73.81475949	77.51730168	78.76098
CanESM2	Wed Jan 01 2042 00:00:00 GMT-0800 (Pacific Standard Time)	2042	73.81475949	77.51730168	76.69168
CanESM2	Thu Jan 01 2043 00:00:00 GMT-0800 (Pacific Standard Time)	2043	73.81475949	77.51730168	78.71715
CanESM2	Fri Jan 01 2044 00:00:00 GMT-0800 (Pacific Standard Time)	2044	73.81475949	77.51730168	78.0234
CanESM2	Sun Jan 01 2045 00:00:00 GMT-0800 (Pacific Standard Time)	2045	73.81475949	77.51730168	78.7025
CanESM2	Mon Jan 01 2046 00:00:00 GMT-0800 (Pacific Standard Time)	2046			77.6957
CanESM2	Tue Jan 01 2047 00:00:00 GMT-0800 (Pacific Standard Time)	2047			77.0334
CanESM2	Wed Jan 01 2048 00:00:00 GMT-0800 (Pacific Standard Time)	2048			77.64773
CanESM2	Fri Jan 01 2049 00:00:00 GMT-0800 (Pacific Standard Time)	2049			78.24785

Cal-Adapt
Annual Averages Tool - Maximum Temperature
Alto Subarea

location	User Defined Boundary - Alto SubArea
climate variable	Maximum Temperature
units	°F
scenario	rcp45

Projected Modeled Average: **77.5173 °F**
Historical Modeled Average: **73.81476 °F**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Sat Jan 01 2050 00:00:00 GMT-0800 (Pacific Standard Time)	2050			78.59813
CanESM2	Sun Jan 01 2051 00:00:00 GMT-0800 (Pacific Standard Time)	2051			78.0727
CanESM2	Mon Jan 01 2052 00:00:00 GMT-0800 (Pacific Standard Time)	2052			77.0723
CanESM2	Wed Jan 01 2053 00:00:00 GMT-0800 (Pacific Standard Time)	2053			78.82043
CanESM2	Thu Jan 01 2054 00:00:00 GMT-0800 (Pacific Standard Time)	2054			79.59191
CanESM2	Fri Jan 01 2055 00:00:00 GMT-0800 (Pacific Standard Time)	2055			80.60223
CanESM2	Sat Jan 01 2056 00:00:00 GMT-0800 (Pacific Standard Time)	2056			78.30602
CanESM2	Mon Jan 01 2057 00:00:00 GMT-0800 (Pacific Standard Time)	2057			78.1352
CanESM2	Tue Jan 01 2058 00:00:00 GMT-0800 (Pacific Standard Time)	2058			80.60781
CanESM2	Wed Jan 01 2059 00:00:00 GMT-0800 (Pacific Standard Time)	2059			78.43129
CanESM2	Thu Jan 01 2060 00:00:00 GMT-0800 (Pacific Standard Time)	2060			77.38664
CanESM2	Sat Jan 01 2061 00:00:00 GMT-0800 (Pacific Standard Time)	2061			79.66828
CanESM2	Sun Jan 01 2062 00:00:00 GMT-0800 (Pacific Standard Time)	2062			80.11004
CanESM2	Mon Jan 01 2063 00:00:00 GMT-0800 (Pacific Standard Time)	2063			80.24703
CanESM2	Tue Jan 01 2064 00:00:00 GMT-0800 (Pacific Standard Time)	2064			80.33043
CanESM2	Thu Jan 01 2065 00:00:00 GMT-0800 (Pacific Standard Time)	2065			79.42055
CanESM2	Fri Jan 01 2066 00:00:00 GMT-0800 (Pacific Standard Time)	2066			78.52227
CanESM2	Sat Jan 01 2067 00:00:00 GMT-0800 (Pacific Standard Time)	2067			77.22141
CanESM2	Sun Jan 01 2068 00:00:00 GMT-0800 (Pacific Standard Time)	2068			78.29238
CanESM2	Tue Jan 01 2069 00:00:00 GMT-0800 (Pacific Standard Time)	2069			79.3107
CanESM2	Wed Jan 01 2070 00:00:00 GMT-0800 (Pacific Standard Time)	2070			78.32035
CanESM2	Thu Jan 01 2071 00:00:00 GMT-0800 (Pacific Standard Time)	2071			78.57941
CanESM2	Fri Jan 01 2072 00:00:00 GMT-0800 (Pacific Standard Time)	2072			80.25582
CanESM2	Sun Jan 01 2073 00:00:00 GMT-0800 (Pacific Standard Time)	2073			77.82211
CanESM2	Mon Jan 01 2074 00:00:00 GMT-0800 (Pacific Standard Time)	2074			80.8677
CanESM2	Tue Jan 01 2075 00:00:00 GMT-0800 (Pacific Standard Time)	2075			78.94332
CanESM2	Wed Jan 01 2076 00:00:00 GMT-0800 (Pacific Standard Time)	2076			80.20832
CanESM2	Fri Jan 01 2077 00:00:00 GMT-0800 (Pacific Standard Time)	2077			79.55352
CanESM2	Sat Jan 01 2078 00:00:00 GMT-0800 (Pacific Standard Time)	2078			78.44828
CanESM2	Sun Jan 01 2079 00:00:00 GMT-0800 (Pacific Standard Time)	2079			79.88234
CanESM2	Mon Jan 01 2080 00:00:00 GMT-0800 (Pacific Standard Time)	2080			78.20902
CanESM2	Wed Jan 01 2081 00:00:00 GMT-0800 (Pacific Standard Time)	2081			78.06316
CanESM2	Thu Jan 01 2082 00:00:00 GMT-0800 (Pacific Standard Time)	2082			80.38223
CanESM2	Fri Jan 01 2083 00:00:00 GMT-0800 (Pacific Standard Time)	2083			78.20133
CanESM2	Sat Jan 01 2084 00:00:00 GMT-0800 (Pacific Standard Time)	2084			78.70586
CanESM2	Mon Jan 01 2085 00:00:00 GMT-0800 (Pacific Standard Time)	2085			79.7575
CanESM2	Tue Jan 01 2086 00:00:00 GMT-0800 (Pacific Standard Time)	2086			78.41379
CanESM2	Wed Jan 01 2087 00:00:00 GMT-0800 (Pacific Standard Time)	2087			81.23977
CanESM2	Thu Jan 01 2088 00:00:00 GMT-0800 (Pacific Standard Time)	2088			78.83
CanESM2	Sat Jan 01 2089 00:00:00 GMT-0800 (Pacific Standard Time)	2089			78.79863
CanESM2	Sun Jan 01 2090 00:00:00 GMT-0800 (Pacific Standard Time)	2090			79.54715
CanESM2	Mon Jan 01 2091 00:00:00 GMT-0800 (Pacific Standard Time)	2091			78.63414
CanESM2	Tue Jan 01 2092 00:00:00 GMT-0800 (Pacific Standard Time)	2092			81.18012
CanESM2	Thu Jan 01 2093 00:00:00 GMT-0800 (Pacific Standard Time)	2093			78.71109
CanESM2	Fri Jan 01 2094 00:00:00 GMT-0800 (Pacific Standard Time)	2094			77.83094
CanESM2	Sat Jan 01 2095 00:00:00 GMT-0800 (Pacific Standard Time)	2095			80.24043
CanESM2	Sun Jan 01 2096 00:00:00 GMT-0800 (Pacific Standard Time)	2096			79.20668
CanESM2	Tue Jan 01 2097 00:00:00 GMT-0800 (Pacific Standard Time)	2097			79.89551
CanESM2	Wed Jan 01 2098 00:00:00 GMT-0800 (Pacific Standard Time)	2098			78.7307
CanESM2	Thu Jan 01 2099 00:00:00 GMT-0800 (Pacific Standard Time)	2099			80.1268

Cal-Adapt
Annual Averages Tool - Maximum Temperature
Alto Subarea

location	User Defined Boundary - Alto SubArea
climate variable	Maximum Temperature
units	°F
scenario	rcp45

Projected Modeled Average: **77.5173 °F**
Historical Modeled Average: **73.81476 °F**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Fri Jan 01 2100 00:00:00 GMT-0800 (Pacific Standard Time)	2100			80.45082

APPENDIX G

SB X7-7 VERIFICATION FORM

SB X7-7 Table 0: Units of Measure Used in UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent with Table 2-3*
NOTES:

SB X7-7 Table-1: Baseline Period Ranges			
Baseline	**Parameter**	**Value**	**Units**
10- to 15-year baseline period	2008 total water deliveries	15,735	Acre Feet
	2008 total volume of delivered recycled water	-	Acre Feet
	2008 recycled water as a percent of total deliveries	0.00%	Percent
	Number of years in baseline period[1, 2]	10	Years
	Year beginning baseline period range	1995	
	Year ending baseline period range[3]	2004	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2003	
	Year ending baseline period range[4]	2007	

[1] If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period. *[2] The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.*

[3] The ending year must be between December 31, 2004 and December 31, 2010.

[4] The ending year must be between December 31, 2007 and December 31, 2010.

NOTES:

SB X7-7 Table 2: Method for Population Estimates	
Method Used to Determine Population (may check more than one)	
☐	**1. Department of Finance** (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
☐	**2. Persons-per-Connection Method**
☑	**3. DWR Population Tool**
☐	**4. Other** DWR recommends pre-review
NOTES:	

SB X7-7 Table 3: Service Area Population		
Year		Population
10 to 15 Year Baseline Population		
Year 1	1995	38,621
Year 2	1996	39,220
Year 3	1997	41,497
Year 4	1998	43,016
Year 5	1999	44,471
Year 6	2000	45,212
Year 7	2001	46,231
Year 8	2002	47,980
Year 9	2003	50,507
Year 10	2004	52,699
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2003	50,507
Year 2	2004	52,699
Year 3	2005	55,886
Year 4	2006	58,074
Year 5	2007	58,357
2015 Compliance Year Population		
2015		59,601
NOTES:		

SB X7-7 Table 4: Annual Gross Water Use *								
Baseline Year *Fm SB X7-7 Table 3*		Volume Into Distribution System *This column will remain blank until SB X7-7 Table 4-A is completed.*	Deductions					Annual Gross Water Use
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water *This column will remain blank until SB X7-7 Table 4-B is completed.*	Water Delivered for Agricultural Use	Process Water *This column will remain blank until SB X7-7 Table 4-D is completed.*	
10 to 15 Year Baseline - Gross Water Use								
Year 1	1995	13,454			-		-	13,454
Year 2	1996	14,314			-		-	14,314
Year 3	1997	14,890			-		-	14,890
Year 4	1998	13,344			-		-	13,344
Year 5	1999	14,874			-		-	14,874
Year 6	2000	15,847			-		-	15,847
Year 7	2001	14,741			-		-	14,741
Year 8	2002	15,853			-		-	15,853
Year 9	2003	15,537			-		-	15,537
Year 10	2004	16,100			-		-	16,100
Year 11	0	-			-		-	-
Year 12	0	-			-		-	-
Year 13	0	-			-		-	-
Year 14	0	-			-		-	-
Year 15	0	-			-		-	-
10 - 15 year baseline average gross water use								**14,895**
5 Year Baseline - Gross Water Use								
Year 1	2003	15,537			-		-	15,537
Year 2	2004	16,100			-		-	16,100
Year 3	2005	15,346			-		-	15,346
Year 4	2006	16,723			-		-	16,723
Year 5	2007	17,605			-		-	17,605
5 year baseline average gross water use								**16,262**
2015 Compliance Year - Gross Water Use								
2015		9,582	-		-		-	**9,582**
* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3								
NOTES:								

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)

Complete one table for each source.

Name of Source	Mojave River Groundwater Basin
This water source is:	
☑	The supplier's own water source
☐	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1995	13,454		13,454
Year 2	1996	14,314		14,314
Year 3	1997	14,890		14,890
Year 4	1998	13,344		13,344
Year 5	1999	14,874		14,874
Year 6	2000	15,847		15,847
Year 7	2001	14,741		14,741
Year 8	2002	15,853		15,853
Year 9	2003	15,537		15,537
Year 10	2004	16,100		16,100
Year 11	0			0
Year 12	0			0
Year 13	0			0
Year 14	0			0
Year 15	0			0
5 Year Baseline - Water into Distribution System				
Year 1	2003	15,537		15,537
Year 2	2004	16,100		16,100
Year 3	2005	15,346		15,346
Year 4	2006	16,723		16,723
Year 5	2007	17,605		17,605
2015 Compliance Year - Water into Distribution System				
2015		9,582		9,582

** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1995	38,621	13,454	311
Year 2	1996	39,220	14,314	326
Year 3	1997	41,497	14,890	320
Year 4	1998	43,016	13,344	277
Year 5	1999	44,471	14,874	299
Year 6	2000	45,212	15,847	313
Year 7	2001	46,231	14,741	285
Year 8	2002	47,980	15,853	295
Year 9	2003	50,507	15,537	275
Year 10	2004	52,699	16,100	273
Year 11	0	-	-	
Year 12	0	-	-	
Year 13	0	-	-	
Year 14	0	-	-	
Year 15	0	-	-	
10-15 Year Average Baseline GPCD				**297**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use
Year 1	2003	50,507	15,537	275
Year 2	2004	52,699	16,100	273
Year 3	2005	55,886	15,346	245
Year 4	2006	58,074	16,723	257
Year 5	2007	58,357	17,605	269
5 Year Average Baseline GPCD				**264**
2015 Compliance Year GPCD				
2015		59,601	9,582	**144**
NOTES:				

SB X7-7 Table 6: Gallons per Capita per Day *Summary From Table SB X7-7 Table 5*	
10-15 Year Baseline GPCD	297
5 Year Baseline GPCD	264
2015 Compliance Year GPCD	144
NOTES:	

SB X7-7 Table 7: 2020 Target Method *Select Only One*		
Target Method		Supporting Documentation
☑	Method 1	SB X7-7 Table 7A
☐	Method 2	SB X7-7 Tables 7B, 7C, and 7D *Contact DWR for these tables*
☐	Method 3	SB X7-7 Table 7-E
☐	Method 4	Method 4 Calculator
NOTES:		

SB X7-7 Table 7-A: Target Method 1 20% Reduction	
10-15 Year Baseline GPCD	**2020 Target GPCD**
297	**238**
NOTES:	

SB X7-7 Table 7-E: Target Method 3				
Agency May Select More Than One as Applicable	Percentage of Service Area in This Hydrological Region	Hydrologic Region	"2020 Plan" Regional Targets	Method 3 Regional Targets (95%)
☐		North Coast	137	130
☐		North Lahontan	173	164
☐		Sacramento River	176	167
☐		San Francisco Bay	131	124
☐		San Joaquin River	174	165
☐		Central Coast	123	117
☐		Tulare Lake	188	179
☑	100%	South Lahontan	170	162
☐		South Coast	149	142
☐		Colorado River	211	200
Target *(If more than one region is selected, this value is calculated.)*				**162**
NOTES:				

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target			
5 Year Baseline GPCD *From SB X7-7 Table 5*	Maximum 2020 Target[1]	Calculated 2020 Target[2]	**Confirmed 2020 Target**
264	251	238	**238**

[1] Maximum 2020 Target is 95% of the 5 Year Baseline GPCD *[2] 2020 Target is calculated based on the selected Target Method, see SB X7-7 Table 7 and corresponding tables for agency's calculated target.*

NOTES:

SB X7-7 Table 8: 2015 Interim Target GPCD		
Confirmed 2020 Target *Fm SB X7-7 Table 7-F*	10-15 year Baseline GPCD *Fm SB X7-7 Table 5*	**2015 Interim Target GPCD**
238	297	**268**
NOTES:		

SB X7-7 Table 9: 2015 Compliance								
Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments *(in GPCD)* Enter "0" if Adjustment Not Used: Extraordinary Events	Weather Normalization	Economic Adjustment	TOTAL Adjustments	Adjusted 2015 GPCD	2015 GPCD *(Adjusted if applicable)*	**Did Supplier Achieve Targeted Reduction for 2015?**
144	268	*0*	*0*	*0*	0	144	144	**YES**
NOTES:								

APPENDIX H

SB X7-7 2020 COMPLIANCE FORM

SB X7-7 2020 Compliance Form

The SB X7-7 2020 Compliance Form is for the calculation of 2020 compliance only. All retail suppliers must complete the SB X7-7 Compliance Form. Baseline and target calculations are done in the SB X 7-7 Verification Form.

The SB X7-7 Verification Form is for the calculation of baselines and targets and is a separate workbook from the SB X7-7 2020 Compliance Form.

Most Suppliers will have completed the SB X7-7 Verification Form with their 2015 UWMP and do not need to complete this form again in 2020. See Chapter 5 Section 5.3 of the UWMP Guidebook for more information regarding which Suppliers must, or may, complete the SB X7-7 Verification Form for their 2020 UWMP. 2020 compliance calculations are done in the SB X7-7 2020 Compliance Form.

WUE Data Portal Entry Exceptions

The data from the tables below will not be entered into WUE Data Portal tables. These tables will be submitted as separate uploads, in Excel, to WUE Data Portal.

Process Water Deduction

SB X7-7 tables 4-C, 4-C.1, 4-C.2, 4-C.3, 4-C.4 and 4-D

A supplier that will use the process water deduction will complete the appropriate tables in Excel, submit them as a separate upload to the WUE Data Portal, and include them in its UWMP.

SB X7-7 Table 0: Units of Measure Used in 2020 UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent throughout the UWMP, as reported in Submittal Table 2-3.*
NOTES:

SB X7-7 Table 2: Method for 2020 Population Estimate	
Method Used to Determine 2020 Population (may check more than one)	
☐	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☐	**2. Persons-per-Connection Method**
☑	**3. DWR Population Tool**
☐	**4. Other** DWR recommends pre-review
NOTES:	

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	61,444
NOTES:	

SB X7-7 Table 4: 2020 Gross Water Use							
Compliance Year 2020	2020 Volume Into Distribution System *This column will remain blank until SB X7-7 Table 4-A is completed.*	2020 Deductions					2020 Gross Water Use
		Exported Water *	Change in Dist. System Storage* (+/-)	Indirect Recycled Water *This column will remain blank until SB X7-7 Table 4-B is completed.*	Water Delivered for Agricultural Use*	Process Water *This column will remain blank until SB X7-7 Table 4-D is completed.*	
	14,979			-	4,912	-	**10,067**

* **Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Mojave Basin Groundwater
This water source is *(check one)* **:**	
☑	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	14,979	-	14,979

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES: Includes agricultural water deliveries.

SB X7-7 Table 4-B: 2020 Indirect Recycled Water Use Deduction *(For use only by agencies that are deducting indirect recycled water)*

2020 Compliance Year	2020 Surface Reservoir Augmentation					2020 Groundwater Recharge			Total Deductible Volume of Indirect Recycled Water Entering the Distribution System
	Volume Discharged from Reservoir for Distribution System Delivery[1]	Percent Recycled Water	Recycled Water Delivered to Treatment Plant	Transmission/ Treatment Loss[1]	Recycled Volume Entering Distribution System from Surface Reservoir Augmentation	Recycled Water Pumped by Utility[1,2]	Transmission/ Treatment Losses[1]	Recycled Volume Entering Distribution System from Groundwater Recharge	
			-		-			-	-

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] *Suppliers will provide supplemental sheets to document the calculation for their input into "Recycled Water Pumped by Utility". The volume reported in this cell must be less than total groundwater pumped - See Methodology 1, Step 8, section 2.c.*

SB X7-7 Table 4-C: 2020 Process Water Deduction Eligibility (For use only by agencies that are deducting process water) Choose Only One	
☐	**Criteria 1**- Industrial water use is equal to or greater than 12% of gross water use. Complete SB X7-7 Table 4-C.1
☐	**Criteria 2** - Industrial water use is equal to or greater than 15 GPCD. Complete SB X7-7 Table 4-C.2
☐	**Criteria 3** - Non-industrial use is equal to or less than 120 GPCD. Complete SB X7-7 Table 4-C.3
☐	**Criteria 4** - Disadvantaged Community. Complete SB x7-7 Table 4-C.4
NOTES:	

SB X7-7 Table 4-C.1: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 1)*				
Criteria 1 Industrial water use is equal to or greater than 12% of gross water use				
2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction	2020 Industrial Water Use	Percent Industrial Water	**Eligible for Exclusion Y/N**
	10,067		0%	NO
NOTES:				

SB X7-7 Table 4-C.2: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 2)*				
Criteria 2 Industrial water use is equal to or greater than 15 GPCD				
2020 Compliance Year	2020 Industrial Water Use	2020 Population	2020 Industrial GPCD	**Eligible for Exclusion Y/N**
		61,444	-	NO
NOTES:				

SB X7-7 Table 4-C.3: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 3)*						
Criteria 3 Non-industrial use is equal to or less than 120 GPCD						
2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction *Fm SB X7-7 Table 4*	2020 Industrial Water Use	2020 Non-industrial Water Use	2020 Population *Fm SB X7-7 Table 3*	Non-Industrial GPCD	**Eligible for Exclusion Y/N**
	10,067		10,067	61,444	146	NO
NOTES:						

SB X7-7 Table 4-C.4: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 4)*

Criteria 4

Disadvantaged Community. A "Disadvantaged Community" (DAC) is a community with a median household income less than 80 percent of the statewide average.

SELECT ONE

"Disadvantaged Community" status was determined using one of the methods listed below:

1. IRWM DAC Mapping tool https://gis.water.ca.gov/app/dacs/

☐	If using the IRWM DAC Mapping Tool, include a screen shot from the tool showing that the service area is considered a DAC.

2. 2020 Median Income

	California Median Household Income*		Service Area Median Household Income	Percentage of Statewide Average	**Eligible for Exclusion? Y/N**
☐	**2020**	**$75,235**		0%	YES

*California median household income 2015 -2019 as reported in US Census Bureau QuickFacts.

NOTES

SB X7-7 Table 4-D: 2020 Process Water Deduction - Volume *Complete a separate table for each industrial customer with a process water exclusion*					
Name of Industrial Customer					
Compliance Year 2020	Industrial Customer's Total Water Use *	Total Volume Provided by Supplier*	% of Water Provided by Supplier	Customer's Total Process Water Use*	Volume of Process Water Eligible for Exclusion for this Customer
					-
*** Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.					
NOTES:					

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water *Fm SB X7-7 Table 4*	**2020 Population** *Fm SB X7-7 Table 3*	**2020 GPCD**
10,067	61,444	**146**
NOTES:		

SB X7-7 Table 9: 2020 Compliance							
Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD Enter "0" if Adjustment Not Used Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]	TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
146	-	-	-	-	146	238	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

APPENDIX I

MOJAVE BASIN JUDGMENT

JUDGMENT AFTER TRIAL

JANUARY 10, 1996

MOJAVE BASIN AREA ADJUDICATION
CITY OF BARSTOW, ET AL V. CITY OF ADELANTO, ET AL
RIVERSIDE COUNTY SUPERIOR COURT CASE NO. 208568

CHAMBERS OF
VICTOR MICELI
JUDGE OF THE SUPERIOR COURT

Superior Court
STATE OF CALIFORNIA
COUNTY OF RIVERSIDE

COURTHOUSE
4050 MAIN STREET
RIVERSIDE, CALIFORNIA 92501

January 10, 1996

TO: ALL PARTIES LISTED ON THE ATTACHED MAILING LIST

FROM: E. MICHAEL KAISER, JUDGE

SUBJECT: CITY OF BARSTOW VS CITY OF ADELANTO, Case No.: 208568

The Judgment in the above-entitled case was signed on January 10, 1996. Please find attached the amended two pages of Exhibit B, Table B-1.

Please find attached two amended pages of Exhibit B, Table B-1.

~~-13/10/93-~~
~~-01/30/93-~~
~~-02/03/93-~~
~~-04/16/93-~~
~~-04/28/93-~~
09/25/95

EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
SAN BERNARDINO CO SERVICE AREA 70J	1,005	0.8213	1,005	954	904	854	804
SAN BERNARDINO CO SERVICE AREA 70L	355	0.2901	355	337	319	301	284
SAN FILIPPO, JOSEPH & SHELLEY	35	0.0286	35	33	31	29	28
SILVER LAKES ASSOCIATION	3,987	3.2583	3,987	3,787	3,588	3,388	3,189
SOUTHDOWN, INC	1,519	1.2414	1,519	1,443	1,367	1,291	1,215
SOUTHERN CALIFORNIA WATER COMPANY	940	0.7682	940	893	846	799	752
SPRING VALLEY LAKE ASSOCIATION	3,056	2.4974	3,056	2,903	2,750	2,597	2,444
SPRING VALLEY LAKE COUNTRY CLUB	977	0.7984	977	928	879	830	781
STORM, RANDALL	62	0.0507	62	58	55	52	49
SUDMEIER, GLENN W	121	0.0989	121	114	108	102	96
SUMMIT VALLEY RANCH	452	0.3694	452	429	406	384	361
TATRO, RICHARD K & SANDRA A	280	0.2288	280	266	252	238	224
TATUM, JAMES B	829	0.6775	829	787	746	704	663
TAYLOR, ALLEN C / HAYMAKER RANCH	456	0.3727	456	433	410	387	364
THOMAS, S DALE	440	0.3596	440	418	396	374	352
THOMAS, WALTER	36	0.0294	36	34	32	30	28
THOMPSON, JAMES A	418	0.3416	418	397	376	355	334
THOMPSON, RODGER	76	0.0621	76	72	68	64	60
THRASHER, GARY	373	0.3048	373	354	335	317	298
THUNDERBIRD COUNTY WATER DISTRICT	118	0.0964	118	112	106	100	94
TURNER, ROBERT	70	0.0572	70	66	63	59	56
VAIL, JOSEPH B & PAULA E	126	0.1030	126	119	113	107	100
★ VAN BURGER, CARL	710	0.5802	710	674	639	603	568
VAN LEEUWEN FAMILY TRUST	341	0.2787	341	323	306	289	272

★ Durston Well, location 06N/04W-16F, APN 468-151-11 - water production right of 357 acre/feet, claimed by Durston/Van Burger/CVB Investments and Industrial Asphalt. Product right to be determined in a subsequent severed proceeding, jurisdiction reserved.

~~-13/10/93-~~
~~-01/30/93-~~
~~-02/03/93-~~
~~-04/16/93-~~
~~-04/28/93-~~
09/25/95

EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN CENTRO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

CENTRO SUBAREA PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
AGCON, INC	0	0.0000	0	0	0	0	0
AGUAYO, JEANETTE L	212	0.3742	212	201	190	180	169
ATCHISON, TOPEKA, SANTA FE RAILWAY CO	120	0.2118	120	114	108	102	96
AVDEEF, THOMAS	34	0.0600	34	32	30	28	27
AZTEC FARM DEVELOPMENT COMPANY (Now, Virgil Gorman)	220	0.3883	220	209	198	187	176
BARNES, FAY - EXECUTOR OF ESTATE OF WAYNE BARNES	243	0.4289	243	230	218	206	194
BROMMER, MARVIN	361	0.6372	361	342	324	306	288
BURNS, RITA J & PAMELA E	16	0.0282	16	15	14	13	12
CHAPA, LARRY R	96	0.1694	96	91	86	81	76
CHOI, YONG IL & JOUNG AE	38	0.0671	38	36	34	32	30
CHRISTISON, JOEL	75	0.1324	75	71	67	63	60
COOK, KWON W	169	0.2983	169	160	152	143	135
DE VRIES, NEIL	3,800	6.7070	3,800	3,610	3,420	3,230	3,040
DESERT COMMUNITY BANK	156	0.2753	156	148	140	132	124
DURAN, FRANK T	50	0.0883	50	47	45	42	40
GAINES, JACK	117	0.2065	117	111	105	99	93
GESIRICH, WAYNE	121	0.2136	121	114	108	102	96
GORMAN, VIRGIL	138	0.2436	138	131	124	117	110
GRISDER, RAYMOND H & DORISANNE	30	0.0530	30	28	27	25	24
GRILL, NICHOLAS P & HILLIE D	21	0.0371	21	19	18	17	16
GROEN, CORNELIS	1,043	1.8409	1,043	990	938	886	834
HANIPY, DBA - WHITE BEAR RANCH	152	0.2683	152	144	136	129	121
HARNSEN, JAMES & RUTH ANN	1,522	2.6863	1,522	1,445	1,369	1,291	1,217
HARPER LAKE COMPANY	1,433	2.5293	1,433	1,361	1,289	1,218	1,146

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Attorneys for Cross-Complainant MOJAVE WATER AGENCY

FILED
RIVERSIDE COUNTY
JAN 10 1996
ARTHUR A. [illegible], Clerk
By Y.A. Burns Y.A. Burns
Deputy

SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF RIVERSIDE

CITY OF BARSTOW, et al, Plaintiff, v. CITY OF ADELANTO, et al, Defendant.	CASE NO. 208568 ASSIGNED TO JUDGE KAISER DEPT.4 FOR ALL PURPOSES JUDGMENT AFTER TRIAL
MOJAVE WATER AGENCY, Cross-complainant, v. ANDERSON, RONALD H. et al, Cross-defendants.	

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Exhibit "A" - Map entitled, "Map showing Mojave Water Agency, Mojave River, Mojave Basin Area and Hydrologic Subareas and Limits of Adjudicated Area Together with Geologic and Other Pertinent Features."

Exhibit "B" - Tables entitled, "Table B-1: Table Showing Base Annual Production, Base Annual Production Right of Each Producer Within Each Subarea, and Free Production Allowance for Subareas for First Five Years of the Judgment" and "Table B-2: Table Showing Total Water Production for Aquaculture and Recreational Lake Purposes."

Exhibit "C" - Engineering Appendix.

Exhibit "D" - Time Schedules.

Exhibit "E" - List of Producers and Their Designees.

Exhibit "F" - Transfers of Base Annual Production Rights.

Exhibit "G" - Subarea Obligations.

Exhibit "H" - Biological Resource Mitigation.

Exhibit "I" - Map Showing Potential Groundwater Recharge Areas

I. INTRODUCTION

A. The Complaint. The original complaint herein was filed by the City of Barstow and Southern California Water Company (collectively "Plaintiffs") in San Bernardino Superior Court, North Desert District, on May 30, 1990 as Case No. BCV6672, and transferred to Riverside County Superior Court on November 27, 1990. Plaintiffs allege that the cumulative water Production upstream of the City of Barstow Overdrafted the Mojave River system, and request an average Annual flow of 30,000 acre-feet of surface water to the City of Barstow area. The complaint also includes a request for a writ of mandate to require the Mojave Water Agency ("MWA") to act pursuant to its statutory authority to obtain and provide Supplemental Water for use within the Mojave Basin Area.

B. The MWA Cross-Complaint. On July 26, 1991, the MWA filed its first amended cross-complaint in this case. The MWA first amended cross-complaint and its ROE amendments name Producers who collectively claim substantially all rights of water use within the Mojave Basin Area, including Parties downstream of the City of Barstow. The MWA cross-complaint, as currently amended, requests a declaration that the available native water supply to the Mojave Basin Area (not including water imported from the California State Water Project) is inadequate to meet the demands of the combined Parties and requests a determination of the water rights of whatever nature within the MWA boundaries and the Mojave Basin Area. The MWA has named as Parties several hundred Producers within the Basin Area.

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C. The Arc Las Flores Cross-Complaint. On July 3, 1991, Arc Las Flores filed a cross-complaint for declaratory relief seeking a declaration of water rights of certain named cross-defendants and a declaration that the appropriative, overlying and riparian rights of Arc Las Flores be determined to be prior and paramount to any rights of the Plaintiffs and other appropriators.

D. Stipulation and Trial. On October 16, 1991, the Court ordered a litigation standstill. The purpose of the standstill was to give the parties time to negotiate a settlement and develop a solution to the overdraft existing in the Mojave River Basin.

A committee of engineers and attorneys, representing a variety of water users and interests throughout the Mojave River Basin, was created to develop a physical solution to the water shortage problem. The work of the committee resulted in a stipulated interlocutory order and judgment, which was entered by the court on September 23, 1993.

Several non-stipulating parties requested a trial. On April 20, 1994, the Court issued a memorandum setting forth the trial issues. This cause came on regularly for trial on February 6, 1995, and was tried in Department 4 of the above-entitled Court, the Honorable E. Michael Kaiser, Judge, Presiding, without a jury. Oral and documentary evidence was introduced on behalf of the respective parties and the cause was argued and submitted for decision.

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II. DECREE

NOW, THEREFORE, IT IS ORDERED, ADJUDGED AND DECREED:

A. JURISDICTION, PARTIES, DEFINITIONS.

1. Jurisdiction and Parties.

a. Jurisdiction. This Court has jurisdiction to enter Judgment declaring and adjudicating the rights to reasonable and beneficial use of water by the Parties in the Mojave Basin Area pursuant to Article X, Section 2 of the California Constitution. This Judgment constitutes an adjudication of water rights of the Mojave Basin Area pursuant to Section 37 of Chapter 2146 of Statutes of 1959 ("the MWA Act").

b. Parties. All Parties to the MWA cross-complaint are included in this Judgment. The MWA has notified those Persons claiming any right, title or interest to the natural waters within the Mojave Basin Area to make claims. Such notice has been given: 1) in conformity with the notice requirements of Water Code §§ 2500 et seq.; 2) pursuant to Section 37 of the MWA Act; and 3) pursuant to order of this Court. Subsequently, all Producers making claims have been or will be included as Parties. The defaults of certain Parties have been entered, and certain named cross-defendants to the MWA cross-complaint who are not Producers have been dismissed. All named Parties who have not been dismissed have appeared herein or have been given adequate opportunity to appear herein. The Court has jurisdiction of the subject matter of this action and of the Parties hereto.

c. Minimal Producers. There are numerous Minimal Producers in the Basin Area and their number is expected to increase in the future. In order to minimize the cost of

administering this Judgment and to assure that every Person producing water in the Basin Area participates fairly in the Physical Solution, MWA shall:

i. within one Year following entry of this Judgment, prepare a report to the Court: 1) setting forth the identity and verified Base Annual Production of each Minimal Producer in each Subarea of the Basin Area; and 2) recommending a proposed system of Minimal Producer Assessments. The system of Minimal Producer Assessments shall achieve an equitable allocation of the costs of the Physical Solution that are attributable to Production of verified Base Annual Production amounts by Minimal Producers in each Subarea to and among such Minimal Producers. Minimal Producer Assessments need not be the same for existing Minimal Producers as for future Minimal Producers.

ii. within one Year following entry of this Judgment, prepare a report to the Court setting forth a proposed program to be undertaken by MWA, pursuant to its statutory authority, to implement the proposed system of Minimal Producer Assessments. The Court may order MWA to implement the proposed program or, if MWA's statutory authority is inadequate to enable implementation, or if either the proposed program or the proposed system of Minimal Producer Assessments is unacceptable to the Court, the Court may then order MWA either to implement an alternative program or system, or in the alternative, to name all Minimal Producers as Parties to this litigation and to serve them for the purpose of adjudicating their water rights.

Any Minimal Producer whose Annual Production exceeds ten (10) acre-feet in any Year following the date of entry of Judgment shall be made a Party pursuant to Paragraph 12 and shall be subject to Administrative, Replacement Water, Makeup Water and Biological Resources Assessments. Any Minimal Producer who produced during the 1986-1990 period may become a Party pursuant to Paragraph 40 with a Base Annual Production Right based on such Minimal Producer's verified Base Annual Production. To account properly for aggregate Production by Minimal Producers in each Subarea, Table B-1 of Exhibit B shall include an estimated aggregate amount of Base Annual Production by all Minimal Producers in each Subarea. The Base Annual Production of any Minimal Producer who becomes a Party shall be deducted from the aggregate amount and assigned to such Minimal Producer.

2. Physical and Legal Complexity. The physical and legal issues of the case as framed by the complaint and cross-complaints are extremely complex. Production of more than 1,000 Persons producing water in the Basin Area has been ascertained. In excess of 1,000 Persons have been served. The water supply and water rights of the entire Mojave Basin Area and its hydrologic Subareas extending over 4000 square miles have been brought into issue. Most types and natures of water right known to California law are at issue in the case. Engineering studies by the Parties, jointly and severally, leading toward adjudication of these rights and a Physical Solution, have required the expenditure of over two Years' time and hundreds of thousands of dollars.

3. Need for a Declaration of Rights and Obligations and for Physical Solution. A Physical Solution for the Mojave Basin

Area based upon a declaration of water rights and a formula for Intra- and Inter-Subarea allocation of rights and obligations is necessary to implement the mandate of Article X, Section 2 of the California Constitution and California water policy. Such Physical Solution requires the definition of the individual rights of all Producers within the Basin Area in a manner which will equitably allocate the natural water supplies and which will provide for equitable sharing of costs for Supplemental Water. Nontributary supplemental sources of water are or will be available in amounts, which when combined with water conservation, water reclamation, water transfers, and improved conveyance and distribution methods within the Basin Area, will be sufficient in quantity and quality to assure implementation of a Physical Solution. Sufficient information and data are known to formulate a reasonable and just allocation of existing water supplies as between the hydrologic Subareas within the Basin Area and as among the water users within each Subarea. Such Physical Solution will allow the public water supply agencies and individual water users within each hydrologic Subarea to proceed with orderly water resource planning and development. It will be necessary for MWA to construct conveyance facilities to implement the Physical Solution. Absent the construction of conveyance facilities, some Subareas may be deprived of an equitable share of the benefits made possible by the Physical Solution. Accordingly, this Physical Solution mandates the acquisition or construction of conveyance facilities for importation and equitable distribution of Supplemental Water to the respective Subareas. Such construction is dependent on the availability of appropriate financing, and any such financing

assessed to the Parties will be based upon benefit to the Parties in accordance with the MWA Act.

4. Definitions. As used in this judgment, the following terms shall have the meanings herein set forth:

a. Afton - The United States Geological Survey gauging station "Mojave River at Afton, CA."

b. Annual or Year - As used in this Judgment refers to the Annual period beginning October 1 and ending September 30 of the following Year.

c. Aquaculture Water - Water so identified in Exhibit "B". Such water may be used only for fish breeding and rearing. The Annual Consumptive Use of such water in acre-feet is equal to the water surface area, in acres, of the fish rearing facilities multiplied by seven (feet).

d. Assessments - Those Assessments levied and collected pursuant to this judgment including Replacement Water, Makeup Water, Administrative and Biological Resource Assessments.

e. Barstow - The United States Geological Survey Gauging Station "Mojave River at Barstow, CA."

f. Base Annual Production - The verified maximum Year Production, in acre-feet, for each Producer for the five Year Period 1986-1990 as set forth in Table B-1 of Exhibit "B", except where otherwise noted therein. The maximum Year Production for each Producer was verified based on one or more of the following: flow meter readings, electrical power

or diesel usage records or estimated applied water duty. The Base Annual Production for recreational lakes in the Baja Subarea and for Aquaculture shall be equal either to the area of water surface multiplied by seven feet or to verified Production, whichever is less. The five Year period 1986-1990 shall also be the time period for which Base Annual Production for Minimal Producers shall be calculated.

g. Base Annual Production Right - The relative Annual right of each Producer to the Free Production Allowance within a given Subarea, expressed as a percentage of the aggregate of all Producers' Base Annual Production in the Subarea. The percentage for each Producer is calculated by multiplying that Producer's Base Annual Production in a Subarea times one hundred (100) and dividing the result by the aggregate Base Annual Production for all Producers in the Subarea. The percentage shall be rounded off to the nearest one ten-thousandth of one per cent.

h. Base Flow - That portion of the total surface flow measured Annually at Lower Narrows which remains after subtracting Storm Flow.

i. Carry Over Right - The right of a Producer to delay and accumulate the Production of such Producer's share of a Subarea Free Production Allowance until

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and only until the following Year free of any Replacement Water Assessment.

j. Consumption or Consumptive Use - The permanent removal of water from the Mojave Basin Area through evaporation or evapo-transpiration. The Consumptive Use rates resulting from particular types of water use are identified in Paragraph 2 of Exhibit "F".

k. Free Production Allowance - The total amount of water, and any Producer's share thereof, that may be Produced from a Subarea each Year free of any Replacement Obligation.

l. Groundwater - Water beneath the surface of the ground and within the zone of saturation; i.e., below the existing water table, whether or not flowing through known and definite channels.

m. Harper Lake Basin - That portion of the Centro Subarea identified as such on Exhibit "A".

n. Lower Narrows - The United States Geological Survey gauging station "Mojave River near Victorville, CA."

o. Makeup Water - Water needed to satisfy a Minimum Subarea Obligation.

p. Makeup Obligation - The obligation of a Subarea to pay for Makeup Water to satisfy its Subarea Obligation.

q. Minimal Producer - Any Person whose Base Annual Production, as verified by MWA is not greater than

ten (10) acre-feet. A Person designated as a Minimal Producer whose Annual Production exceeds ten (10) acre-feet in any Year following the date of entry of Judgment is no longer a Minimal Producer.

r. Minimum Subarea Obligation - The minimum Annual amount of water a Subarea is obligated to provide to an adjoining downstream Subarea or the Transition Zone or, in the case of the Baja Subarea, the minimum Annual Subsurface Flow at the MWA eastern boundary toward Afton in any Year, as set forth in Exhibit "G".

s. Mojave Basin Area or Basin Area - The area shown on Exhibit "A" that lies within the boundaries of the line labelled "Limits of Adjudicated Area" which generally includes the area tributary to the Mojave River and its tributaries except for such area not included within the Mojave Water Agency's jurisdiction.

t. MWA - Cross complainant Mojave Water Agency.

u. Overdraft - A condition wherein the current total Annual Consumptive Use of water in the Mojave Basin Area or any of its Subareas exceeds the long term average Annual natural water supply to the Basin Area or Subarea.

v. Party (Parties) - Any Person(s) named in this action who has intervened in this case or has

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become subject to this Judgment either through stipulation, default, trial or otherwise.

w. Person(s) - Any natural person, firm, association, organization, joint venture, partnership, business, trust, corporation, or public entity.

x. Produce - To pump or divert water.

y. Producer(s) - A Person, other than a Minimal Producer, who Produces water.

z. Production - Annual amount of water produced, stated in acre-feet of water.

aa. Production Safe Yield - The highest average Annual Amount of water that can be produced from a Subarea: (1) over a sequence of years that is representative of long-term average annual natural water supply to the Subarea net of long-term average annual natural outflow from the Subarea, (2) under given patterns of Production, applied water, return flows and Consumptive Use, and (3) without resulting in a long-term net reduction of groundwater in storage in the Subarea.

bb. Purpose of Use - The broad category of type of water use including but not limited to municipal, irrigation, industrial, aquaculture, and lakes purposes. A change in Purpose of Use includes any reallocation of water among mixed or sequential uses, excluding direct reuse of municipal wastewater.

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cc. Recirculated Water - Water that is Produced but not consumed by the Parties listed in Table B-2 of Exhibit "B" and then returned either to the Mojave River or to the Groundwater basin underlying the place of use.

dd. Replacement Obligation - The obligation of a Producer to pay for Replacement Water for Production from a Subarea in any Year in excess of the sum of such Producer's share of that Year's Free Production Allowance for the Subarea plus any Production pursuant to a Carry Over Right.

ee. Replacement Water - Water purchased by Watermaster or otherwise provided to satisfy a Replacement Obligation.

ff. Responsible Party - The Person designated by a Party as the Person responsible for purposes of filing reports and receiving notices pursuant to the provisions of this Judgment.

gg. Stored Water - Water held in storage pursuant to a Storage Agreement with Watermaster.

hh. Storm Flow - That portion of the total surface flow originating from precipitation and runoff without having first percolated to Groundwater storage in the zone of saturation and passing a particular point of reckoning, as determined annually by the Watermaster.

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ii. Subareas - The five Subareas of the Mojave Basin Area -- Este, Oeste, Alto, Centro and Baja -- as shown on Exhibit "A".

jj. Subarea Obligation - The average Annual amount of water that a Subarea is obligated to provide to an adjoining downstream Subarea or the Transition Zone or, in the case of the Baja Subarea, the average Annual Subsurface Flow toward Afton at the MWA eastern boundary as set forth in Exhibit "G".

kk. Subsurface Flow - Groundwater which flows beneath the earth's surface.

ll. Supplemental Water - Water imported to the Basin Area from outside the Basin Area, water that would otherwise be lost from the Basin Area but which is captured and made available for use in the Basin Area, or any Producer's share of Free Production Allowance that is not Produced and is acquired by Watermaster pursuant to this Judgment.

mm. Transition Zone - The portion of the Alto Subarea, shown on Exhibit "A", that lies generally between the Lower Narrows and the Helendale Fault.

nn. Watermaster - The Person(s) appointed by the Court to administer the provisions of this Judgment.

5. Exhibits. The following exhibits are attached to this Judgment and made a part hereof.

Exhibit "A" - Map entitled, "Map showing Mojave Water Agency, Mojave River, Mojave Basin Area and Hydrologic Subareas and

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Limits of Adjudicated Area Together with Geologic and Other Pertinent Features."

Exhibit "B" - Table entitled, "Table B-1: Table Showing Base Annual Production and Base Annual Production Right of Each Producer Within Each Subarea, and Free Production Allowances for Subareas for First Five Years after entry of the Interlocutory Judgment" and "Table B-2: Table Showing Total Water Production for Aquaculture and Recreational Lake Purposes."

Exhibit "C" - Engineering Appendix.

Exhibit "D" - Time Schedules.

Exhibit "E" - List of Producers and Their Designees.

Exhibit "F" - Transfers of Base Annual Production Rights.

Exhibit "G" - Subarea Obligations.

Exhibit "H" - Biological Resource Mitigation.

Exhibit "I" - Map Showing Potential Groundwater Recharge Areas

B. DECLARATION OF HYDROLOGIC CONDITIONS.

6. Mojave Basin Area as Common Source of Supply. The area shown on Exhibit "A" as the Mojave Basin Area is comprised of five Subareas. The waters derived from the Mojave River and its tributaries constitute a common source of supply of the five Subareas and of the Persons producing therefrom.

7. Existence of Overdraft. In each and every Year, for a period in excess of five (5) years prior to the May 30, 1990 filing date of Plaintiffs' Complaint, the Mojave Basin Area and each of its respective Subareas have been and are in a state of Overdraft, and it is hereby found that there is no water available

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for Production from the Basin Area or any Subarea therein except pursuant to this Judgment.

C. DECLARATION OF RIGHTS AND OBLIGATIONS.

8. Production Rights of the Parties. The Base Annual Production and Base Annual Production Right of each Party are declared as set forth in Table B-1 of Exhibit "B". Certain Parties also have the right to continue to Produce Recirculated Water in the amounts set forth in Table B-2 of Exhibit "B", subject to the following:

a. Aquaculture. Two of the Producers listed in Table B-2 of Exhibit "B", California Department of Fish and Game Mojave River Fish Hatchery (Hatchery) and Jess Ranch Water Company (Jess), Produce Recirculated Water for Aquaculture. The Hatchery and Jess or their successors or assignees shall have the right to continue to Produce up to the amounts listed in Table B-2 of Exhibit "B" as Recirculated Water for Aquaculture on the property where it was used in the Year for which Base Annual Production was verified. Production of such amount of Recirculated water by Jess shall be free of any Replacement Water Assessments, Makeup Water Assessments or Administrative Assessments but shall be subject to Biological Resources Assessments and each Jess well producing Recirculated Water shall be subject to an Annual administrative fee equal to the lowest Annual fee paid to MWA by a Minimal Producer. Neither the Hatchery nor Jess Recirculated Water may be transferred or used for any other purpose or transferred for use on any other property, except as provided in Paragraph 7 of Exhibit "F" for the Hatchery. Any Production of Recirculated Water by Jess in excess of the amount shown in Table B-2 shall be subject to all

Assessments. Production of Recirculated Water by the Hatchery will be subject to the rules set forth in Paragraph 7 of Exhibit "F". All Jess Aquaculture Recirculated Water shall be discharged immediately and directly to the Mojave River.

b. Camp Cady. One Producer listed in Table B-2 of Exhibit "B", California Department of Fish and Game-Camp Cady (Camp Cady), Produces Recirculated Water for Lakes containing Tui Chub, an endangered species of fish. Camp Cady or its successors or assignees shall have the right to continue to Produce up to the amount listed in Table-B-2 of Exhibit "B" as Recirculated Water at Camp Cady. Production of each amount of Recirculated water shall be free of any Assessments. Camp Cady Recirculated Water may not be transferred or used for any other purpose or transferred for use on any other property. Any Production of Recirculated Water by Camp Cady in excess of the amount shown in Table B-2 of Exhibit "B" shall be subject to all Assessments except Biological Resource Assessments. All Camp Cady Recirculated Water shall be allowed to percolate immediately and directly to the Groundwater basin underlying Camp Cady.

c. Recreational Lakes in Baja Subarea. All Producers listed in Table B-2 of Exhibit "B" except the Hatchery, Jess and Camp Cady Produce Recirculated Water for recreational lakes in the Baja Subarea. Such Producers or their successors or assignees shall have the right to continue to Produce up to the amounts identified in Table B-2 of Exhibit "B" as Recirculated Water for use in recreational lakes on the property where it was used in the Year for which Base Annual Production was verified, free of any Replacement Water Assessments, Makeup Water

Assessments, or Administrative Assessments, but such Production shall be subject to any Biological Resource Assessment. Each well producing such Recirculated Water shall be subject to an Annual administrative fee equal to the lowest Annual fee paid by a Minimal Producer. Recirculated Water cannot be transferred or used for any other purpose. All recreational lake Recirculated Water shall be allowed to percolate immediately and directly to the Groundwater basin underlying the recreational lake.

9. MWA Obligations. The Physical Solution is intended to provide for delivery and equitable distribution to the respective Subareas by MWA of the best quality of Supplemental Water reasonably available. MWA shall develop conveyance or other facilities to deliver this Supplemental Water to the areas depicted in Exhibit "I," unless prevented by forces outside its reasonable control such as an inability to secure financing consistent with sound municipal financing practices and standards.

a. Secure Supplemental Water. MWA, separate and apart from its duties as the initial Watermaster designated under this Judgment, shall exercise its authority under Sections 1.5 and 15 of the MWA Act to pursue promptly, continuously and diligently all reasonable sources to secure Supplemental Water as necessary to fully implement the provisions of this Judgment.

b. Supplemental Water Prices. The MWA shall establish fair and equitable prices for Supplemental Water delivered to the Watermaster under this Judgment.

c. Supplemental Water Delivery Plan. Not later than September 30, 1996, MWA shall prepare a report on potential alternative facilities or methods to deliver Supplemental Water to

the areas shown on Exhibit "I." The report shall include, for each alternative, a development time schedule, a summary of cost estimates, an analysis of the relative benefits to Producers in each Subarea and an analysis of alternative methods of financing and cost allocation, including any state or federal sources of funding that may be available.

d. Water Delivery Cost Allocation. The report required by subdivision (c) above shall recommend methods of financing and cost allocation that are based on benefits to be received. MWA's cost allocation plan shall be subject to Court review as provided in subdivision (f) below to verify that costs are allocated fairly and according to benefits to be received. The MWA financing and cost allocation plan may include a mix of revenue sources including the following:

(1) Developer or connection fees to the extent MWA can demonstrate a nexus, as required by law, between the fees and the impact of the development upon the water resources of the Mojave Basin Area and each subarea thereof;

(2) Other methods of financing available to MWA, including but not limited to property based taxes, assessments or standby charges;

(3) Water sales revenues, but only to the extent other sources are not available or appropriate, and in no event shall the water sales price to cover facility

capital costs exceed a rate equal to fifty percent of the variable cost rate charged to MWA under its contract for water delivery from the California State Water Project;

e. Legislative Changes. MWA shall seek promptly to have enacted amendments to the MWA Act (Water Code Appendix, Part 97) that allow MWA to implement any methods of governmental financing available to any public entity in California.

f. Court Review and Determination of Benefit. Not later than September 30, 1996, MWA shall submit its report to the Court in a noticed motion pursuant to Paragraph 36. The report shall set forth MWA's recommendations as to the following: (1) which alternatives should be implemented; (2) methods of cost allocation for the recommended alternatives; (3) financing for the recommended alternatives; and (4) a time schedule to complete the recommended alternatives. The Court may approve or reject the recommendations. The Court may further order the use of alternatives and time schedules or it may order additional studies and resubmittals, as it may deem proper.

10. Priority and Determination of Production Rights. The water rights involved herein are of differing types and commenced at different times. Many of the rights involved are devoted to public uses. The Declaration of Water Rights that is part of the judgment and the Physical Solution decreed herein takes into consideration the competing priorities which have been asserted in addition to the equitable principles applicable to apportionment of water in this situation. The following factors

have been considered in the formulation of each Producer's Base Annual Production Right:

a. The Mojave Basin Area and each of its hydrologic Subareas have continuously for many Years been in a state of system-wide Overdraft;

b. All Producers have contributed to the Overdraft;

c. None of the priorities asserted by any of the Producers is without dispute;

d. Under the complex scheme of California water law, the allocation of water and rights mechanically based upon the asserted priorities would be extremely difficult, if not impossible, and would not result in the most equitable apportionment of water;

e. Such mechanical allocation would, in fact, impose undue hardship on many Parties;

f. There is a need for conserving and making maximum beneficial use of the water resources of the State;

g. The economy of the Mojave Basin Area has to a great extent been established on the basis of the existing Production;

h. The Judgment and Physical Solution take into consideration the unique physical and climatic conditions of the Mojave Basin Area, the Consumptive Use of water in the several sections of the Basin, the character and rate of return flows, the extent of established uses, the availability of storage water, the relative benefits and detriments between upstream areas and downstream areas if a limitation is imposed on one and not the

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other, and the need to protect public interest and public trust concerns.

In consideration of the foregoing factors, and in accordance with the terms and conditions of this Judgment, the Parties are estopped and barred from asserting special priorities or preferences.

11. Exercise of Carry Over Rights. The first water Produced by a Producer during any Year shall be deemed to be an exercise of any Carry Over Right. Such Carry Over Right may be transferred in accordance with Exhibit "F".

12. Production Only Pursuant to Judgment. This Judgment, and the Physical Solution decreed herein, addresses all Production within the Mojave Basin Area. Because of the existence of Overdraft, any Production outside the framework of this Judgment and Physical Solution will contribute to an increased Overdraft, potentially damage the Mojave Basin Area and public interests in the Basin Area, injure the rights of all Parties, and interfere with the Physical Solution. Watermaster shall bring an action or a motion to enjoin any Production that is not pursuant to the terms of this Judgment.

13. Declaration of Subarea Rights and Obligations. In the aggregate, Producers within certain Subareas have rights, as against those in adjoining upstream Subareas, to receive average Annual water supplies and, in any one Year, to receive minimum Annual water supplies equal to the amounts set forth in Exhibit "G", in addition to any Storm Flows. In turn, in the aggregate, Producers within certain Subareas have an obligation to provide to adjoining downstream Subareas such average Annual water supplies in

the amounts and in the manner set forth in Exhibit "G". In any one Year, Producers within certain Subareas have an obligation to provide to adjoining downstream Subareas such minimum Annual water supplies in the amounts and in the manner set forth in Exhibit "G". The Producers in the Baja Subarea have an obligation to provide average and minimum Subsurface Flows toward Afton at the MWA eastern boundary equal to the amounts shown in Exhibit "G". Producers in each of the Subareas have rights in the aggregate, as against each adjoining downstream Subarea or, in the case of the Baja Subarea, as against flows at the MWA eastern boundary toward Afton, to divert, pump, extract, conserve, and use all surface water and Groundwater supplies originating therein or accruing thereto, and so long as the adjoining downstream Subarea Obligations are satisfied under this Judgment and there is compliance with all of its provisions. Watermaster shall maintain a continuing account of the status of each Subarea's compliance with its Subarea Obligation, including any cumulative credits or debits and any requirement for providing Makeup Water. The accounting and determinations relative to Subarea Obligations shall be made in accordance with procedures set forth in Exhibit "G".

III. INJUNCTION

14. Injunction Against Unauthorized Production. Each and every Party, its officers, agents, employees, successors, and assigns, is ENJOINED AND RESTRAINED from Producing water from the Basin Area except pursuant to the provisions of the Physical Solution in this Judgment.

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15. Injunction Re Change in Purpose of Use Without Notice Thereof to Watermaster. Each and every Party, its officers, agents, employees, successors, and assigns, is ENJOINED AND RESTRAINED from changing its Purpose of Use at any time without first notifying Watermaster of the intended change.

16. Injunction Against Unauthorized Recharge. Each and every Party, its officers, agents, employees, successors and assigns, is ENJOINED AND RESTRAINED from claiming any right to recapture Water that has been recharged in the Basin Area except pursuant to a Storage Agreement with Watermaster. This provision does not prohibit Parties from importing Supplemental Water into the Basin Area for direct use.

17. Injunction Against Transportation from Mojave Basin Area. Except upon further order of the Court, each and every Party, its officers, agents, employees, successors and assigns, is ENJOINED AND RESTRAINED from transporting water hereafter Produced from the Basin Area to areas outside the Basin Area.

18. Injunction Against Diverting Storm Flows. No Party may undertake or cause the construction of any project that will directly reduce the amount of Storm Flow that would otherwise go through the naturally occurring hydrologic regime to a downstream Subarea or that will reduce the surface area over which Storm Flow currently occurs by alteration to the bed of the Mojave River. This paragraph shall not prevent any flood control agency or municipality from taking such emergency action as may be necessary to protect the physical safety of its residents and its structures from flooding. Any such action shall be done in a manner that will minimize any reduction in the quantity of Storm Flows.

IV. CONTINUING JURISDICTION

19. Jurisdiction Reserved. Full jurisdiction, power and authority are retained by and reserved to the Court for purposes of enabling the Court upon the application of any Party, by a motion noticed in accordance with the notice procedures of Paragraph 36 hereof, to make such further or supplemental order or directions as may be necessary or appropriate for interim operation before the Physical Solution is fully operative, or for interpretation, enforcement or carrying out of this Judgement, and to modify, amend or amplify any of the provisions of this Judgment or to add to the provisions thereof consistent with the rights herein decreed; provided, that nothing in this paragraph shall authorize either a reduction of the Base Annual Production Right of any Party, except in accordance with the rules set forth in Exhibit "F", or a reduction of the Base Flow portion of any Subarea Obligation.

V. Physical Solution

A. GENERAL

20. Purpose and Objective. The Court hereby declares and decrees that the Physical Solution herein contained: 1) is a fair and equitable basis for satisfaction of all water rights in the Mojave Basin Area; 2) is in furtherance of the mandate of the State Constitution and the water policy of the State of California; and 3) takes into account applicable public trust interests; and therefore adopts and orders the Parties to comply with the Physical Solution. As noted in Paragraph 3 of this Judgment, the declaration of rights and obligations of the Parties and Subareas is a necessary component of this Physical Solution. The purpose of

the Physical Solution is to establish a legal and practical means for making the maximum reasonable beneficial use of the waters of the Basin Area by providing for the long-term conjunctive utilization of all water available thereto to meet the reasonable beneficial use requirements of water users therein.

21. Need for Flexibility. It is essential that this Physical Solution provide maximum flexibility and adaptability in order that the Court may be free to use existing and future technological, social, institutional and economic options in order to maximize reasonable beneficial use of the waters of the Basin Area. To that end, the Court's retained jurisdiction may be utilized where appropriate, to supplement the Physical Solution.

22. General Pattern of Operations. The Producers will be divided into five Subareas for purposes of administration. The Subarea rights and obligations are herein decreed. A fundamental premise of the Physical Solution is that all Parties will be allowed, subject to this Judgment, to Produce sufficient water to meet their reasonable beneficial use requirements. To the extent that Production by a Producer in any Subarea exceeds such Producer's share of the Free Production Allowance of that Subarea, Watermaster will provide Replacement Water to replace such excess Production according to the methods set forth herein. To the extent that any Subarea incurs a Makeup Obligation, Watermaster will provide Supplemental Water to satisfy such Makeup Obligation according to the methods set forth herein. For the initial five (5) full Years after entry of this Judgment (including any interlocutory Judgment), the Free Production Allowance for each Subarea shall be set as the amount of water equal to the following

percentages of the aggregate Base Annual Production for that Subarea:

	Judgment Year	Percentage
1993-1994	First Full Year	100
1994-1995	Second Full Year	95
1995-1996	Third Full Year	90
1996-1997	Fourth Full Year	85
1997-1998	Fifth Full Year	80

The extent of Overdraft now varies between Subareas and the reasonableness of any physical solution as applied to each Producer depends in part upon such Producer's foreseeable needs and the present and future availability of water within the Subarea in which each Producer is located. The Physical Solution described in this Judgment in part generally contemplates (i) initially allowing significant unassessed production on a substantially uniform basis for all Producers and Subareas and (ii) a phasing in of the monetary obligations necessary to obtain Supplemental Water. The above two provisions will affect each Subarea differently, may not be sufficient to ultimately eliminate the condition of Overdraft in each Subarea and could result in increased Overdraft within a Subarea. Any adverse impact to any Subarea caused by the implementation of the provisions shall be the responsibility of the Producers in each such Subarea.

B. ADMINISTRATION.

23. Administration by Watermaster. Watermaster shall administer and enforce the provisions of the Judgment and any subsequent instructions or orders of this Court.

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(a) Standard of Performance. Watermaster shall, in carrying out its duties, powers and responsibilities herein, act in an impartial manner without favor or prejudice to any Subarea, Producer, Party or Purpose of Use.

(b) Removal of Watermaster. Full jurisdiction, power and authority are retained and reserved by the Court for the purpose of enabling the Court on its own motion, or upon application of any Party, and upon notice in accordance with the notice procedures of paragraph 36 hereof, and after hearing thereon, to remove any appointed Watermaster and substitute a new Watermaster in its place. The Court shall find good cause for the removal of Watermaster upon a showing that Watermaster has failed to perform its duties, powers and responsibilities in an impartial manner, or has otherwise failed to act in the manner consistent with the provisions set forth in this Judgment or subsequent order of the Court.

(c) MWA Appointed as Initial Watermaster. The MWA is hereby appointed, until further order of the Court, as Watermaster to administer and enforce the provisions of this Judgment and any subsequent orders of this Court issued in the performance of its continuing jurisdiction. In carrying out this appointment, MWA shall segregate and separately exercise in all respects the Watermaster powers delegated by the Court under this Judgment from MWA's statutory powers. All funds received, held, and disbursed by MWA as Watermaster shall be by way of separate Watermaster accounts, subject to separate accounting and auditing. Meetings and hearings held by the MWA Board of Directors when acting as Watermaster shall be noticed and conducted separately from MWA

meetings. All Watermaster staff and consultant functions shall be separate and distinct from MWA staff and consultant functions; provided, however, that pursuant to duly adopted Watermaster rules, which shall be subject to review according to Paragraph 36 hereof, Watermaster staff and consultant functions may be accomplished by MWA staff and consultants, subject to strict time and cost accounting principles so that Watermaster functions, and the Assessments provided under this Judgment, do not subsidize, and are not subsidized by, MWA functions. Subject to these principles, MWA shall implement practicable cost efficiencies through consolidation of Watermaster and MWA staff and consultant functions.

24. Powers and Duties. Subject to the continuing supervision and control of the Court, Watermaster shall have and may exercise the following express powers, and shall perform the following duties, together with any specific powers, authority and duties granted or imposed elsewhere in this Judgement or hereafter ordered or authorized by the Court in the exercise of its continuing jurisdiction:

a. Rules and Regulations. To adopt any and all appropriate rules and regulations for conduct pursuant to this Judgment after public hearing. Notice of hearing and a copy of the proposed rules and regulations, and any amendments thereof, shall be mailed to all Parties thirty days prior to the date of the hearing thereon.

b. Employment of Experts and Agents. To employ such administrative personnel, engineering, legal, accounting, or other specialty services and consulting assistants as may be deemed appropriate in carrying out the terms of this Judgment.

c. Makeup and Replacement Obligations. To determine the Makeup Obligations for each Subarea and Replacement Obligations for each Producer and each Subarea, pursuant to the terms of the Judgment.

d. Measuring Devices, etc. To adopt rules and regulations regarding determination of amounts of Production and installation of individual water meters. The rules and regulations shall provide for approved devices or methods to measure or estimate Production. Producers who meter Production on the date of entry of this Judgment shall continue to meter Production. Thereafter, Producers who do not meter Production on the effective date of entry of this Judgment may be required by Watermaster rules and regulations to install water meters upon a showing that then employed measurement devices or methods do not accurately determine actual Production. The rules and regulations shall require that within three Years after the date of entry of this Judgment, any Producer who provides piped water for human Consumption to more than five service connections shall have installed an individual water meter on each service connection.

e. Hydrologic Data Collection. To install, operate and maintain such wells, measuring devices and/or meters necessary to monitor stream flow, precipitation and groundwater levels and to obtain such other data as may be necessary to carry out the provisions of this Judgment, including a study of the Basin Area phreatophyte consumptive use.

f. Assessments. To set, levy and collect all Assessments specified herein.

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g. Purchase of and Recharge with Supplemental Water. In accordance with Paragraph 27, to the extent Supplemental Water is available and is reasonably needed for Replacement Water or Makeup Water, to use Replacement Water Assessment proceeds to purchase Replacement Water, and to use Makeup Water Assessment proceeds to purchase Makeup Water and to have such Replacement Water and Makeup Water provided to the appropriate Subarea as soon as practicable. Watermaster may prepurchase Supplemental Water and apply subsequent Assessments towards the costs of such prepurchases.

h. Water Quality. To take all reasonable steps to assist and encourage appropriate regulatory agencies to enforce reasonable water quality regulations affecting the Basin Area, including regulation of solid and liquid waste disposal.

i. Notice List. To maintain a current list of Responsible Parties to receive notice hereunder.

j. Annual Administrative Budget. To prepare a proposed administrative budget for each Year, hold hearings thereon, and adopt an administrative budget according to the time schedule set forth in Exhibit "D". The administrative budget shall set forth budgeted items and Administrative Assessments in sufficient detail to show the allocation of the expense among the Producers. Following the adoption of the budget, expenditures within budgeted items may thereafter be made by Watermaster in the exercise of powers herein granted, as a matter of course.

k. Annual Report to Court.

(1) To file an Annual report with this Court not later than April 1 of each Year beginning April 1 following the

first full Year after entry of Judgment. Prior to filing the Annual report with the Court, Watermaster shall notify all Parties that a draft of the report is available for review and shall provide notice of a hearing to receive comments and recommendations for changes in the report. The public hearing shall be conducted on the same date and at the same place as the hearings required by Paragraphs 3 and 4 of Exhibit "D". The notice of hearing may include such summary of the draft report as Watermaster may deem appropriate. Watermaster shall also distribute the report to the Parties requesting copies.

(2) The Annual report shall include an Annual fiscal report of the preceding Year's operation and shall include details as to operation of each of the Subareas and an audit of all Assessments and expenditures pursuant to this Physical Solution and a review of Watermaster activities pursuant to this Judgment. The Annual report shall include a compilation of at least the following:

Determinations and data required by:

i) Paragraph 24(c) (Makeup and Replacement Obligations)

ii) Paragraph 24(e) (Hydrologic Data Collection)

iii) Paragraph 24(g) (Purchase of and Recharge with Supplemental Water)

iv) Paragraph 24(i) (Notice List)

Rules and regulations adopted pursuant to:

v) Paragraph 24(a) (Rules and Regulations)

vi) Paragraph 24(d) (Measuring Devices, etc.)

vii) Paragraph 24(s) (Storage Agreements)

Reports required by:

viii)Paragraph 24(j) (Annual Administrative Budget)

ix) Paragraph 24(n) (Transfers)

x) Paragraph 24(o) (Free Production Allowance)

xi) Paragraph 24(p) (Production Reports)

xii)Exhibit "D" (Prior Year Report)

xiii)Exhibit "F" (Transfers of Base Annual Production Rights)

xiv) Exhibit "G" (Status of Subarea Obligation)

xv) Exhibit "H" (Biological Resource Mitigation)

l. Investment of Funds. To hold and invest any funds in investments authorized from time to time for public agencies in the State of California.

m. Borrowing. To borrow in anticipation of receipt of Assessment proceeds in an amount not to exceed the Annual amount of Assessments levied but uncollected.

n. Transfers. To prepare on an Annual basis and maintain a report or record of any transfer of Base Annual Production Rights. Such report or record shall be available for inspection by any Party upon reasonable notice to the Watermaster.

o. Free Production Allowance. Not later than the end of the 1997-1998 Water Year, and Annually thereafter, to recommend in the Watermaster Annual Report an adjustment, if needed, to the Free Production Allowance for any Subarea. In making its recommendation, Watermaster shall be guided by the factors set forth in Exhibit "C", including but not limited to an annual calculation of the change of water in storage. The Annual report shall include all assumptions and calculations relied upon in making its recommendations. Following the 1997-1998 Water Year,

or any time thereafter, Watermaster shall obtain prior Court approval for any increase or reduction of any Subarea's Free Production Allowance. In no event shall a reduction in any Year for a Subarea exceed five percent of the aggregate Base Annual Production of that Subarea. In the event Watermaster recommends in its report to the Court that the Free Production Allowance for any Subarea may need to be increased or reduced, the Court shall conduct a hearing, after notice given by Watermaster according to paragraph 36, upon Watermaster's recommendations and may order such changes in Subarea Free Production Allowance. The most recent Subarea Free Production Allowances shall remain in effect until revised according to this Paragraph 24(o).

p. Production Reports. To require each Producer to file with Watermaster, pursuant to procedures and time schedules to be established by Watermaster, a report on a form to be prescribed by Watermaster showing the total Production of such Party for each reporting period rounded off to the nearest tenth of an acre foot, and such additional information and supporting documentation as Watermaster may require.

q. Production Adjustment for Change in Purpose of Use. If Watermaster determines, using the Consumptive Use rates set forth in Exhibit "F", that a new Purpose of Use of any Producer's Production for any Year has resulted in a higher rate of Consumption than the rate applicable to the original Purpose of Use of that Producer's Production in the Year for which Base Annual Production was determined, Watermaster shall use a multiplier (1) to adjust upward such Production for the purpose of determining the Producer's Replacement Water Assessment and, (2) to adjust upward

the Free Production Allowance portion of such Production for the purpose of determining the Producer's Makeup Water Assessment. The multiplier shall be determined by dividing the number of acre feet of Consumption that occurred under the new Purpose of Use by the number of acre feet of Consumption that would have occurred under the original Purpose of Use for the same Production.

r. Reallocation of Base Annual Production Rights. To reallocate annually the Base Annual Production Rights in each Subarea to reflect any permanent transfers of such Rights among Parties.

s. Storage Agreements. To enter into Storage Agreements with any Party in order to accommodate the acquisition of Supplemental Water. Watermaster may not enter into Storage Agreements with non-Parties unless such non-Parties become subject to the provisions of this Judgment and the jurisdiction of the Court. Such Storage Agreements shall by their terms preclude operations which will have a substantial adverse impact on any Producer. If a Party pursuant to a Storage Agreement has provided for predelivery or postdelivery of Replacement Water for the Party's use, Watermaster shall at the Party's request credit such water to the Party's Replacement Obligation. Watermaster shall adopt uniformly applicable rules for Storage Agreements. Watermaster shall calculate additions, extractions and losses of water stored under Storage Agreements and maintain an Annual account of all such water.

t. Subarea Advisory Committee Meetings. To meet on a regular basis and at least semi-annually with the Subarea Advisory Committees to review Watermaster activities pursuant to

this Judgment and to receive advisory recommendations from the Subarea Advisory Committees.

u. Unauthorized Production. To bring such action or motion as is necessary to enjoin unauthorized Production as provided in Paragraph 12 hereinabove.

v. Meetings and Records. To ensure that all meetings and hearings by Watermaster shall be noticed and conducted according to then current requirements of the Ralph M. Brown Act, Government Code Sections 54950, et seq. Watermaster files and records shall be available to any person according to the provisions of the Public Records Act, Government Code §§ 6200 et seq.

w. Data, Estimates and Procedures. To rely on and use the best available records and data to support the implementation of this Judgment. Where actual records of data are not available, Watermaster shall rely on and use sound scientific and engineering estimates. Watermaster may use preliminary records of measurements, and, if revisions are subsequently made, Watermaster may reflect such revisions in subsequent accounting. Exhibit "C" sets forth methods and procedures for determining surface flow components. Watermaster shall use either the same procedures or procedures that will yield results of equal or greater accuracy.

x. Biological Resource Mitigation. To implement the Biological Resource Mitigation measures set forth in Exhibit "H" herein.

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C. ASSESSMENTS

25. Purpose. Watermaster shall levy and collect Assessments from the Parties based upon Production in accordance with the time schedules set forth in Exhibit "D". Watermaster shall levy and collect such Assessments as follows:

a. Administrative Assessments. Administrative Assessments to fund the Administrative Budget adopted by the Watermaster pursuant to Paragraph 24(j) shall be levied uniformly against each acre foot of Production. A Producer who does not Produce in a given Year shall pay an Administrative Assessment in amount equal to the lowest MWA assessment for Minimal Producers for that Year.

b. Replacement Water Assessments. Replacement Water Assessments shall be levied against each Producer on account of such Producer's Production, after any adjustment pursuant to Paragraph 24(q), in excess of such Producer's share of the Free Production Allowance in each Subarea during the prior Year.

c. Makeup Water Assessments. Makeup Water Assessments shall be levied against each Producer in each Subarea on account of each acre-foot of Production therein which does not bear a Replacement Assessment hereunder, after any adjustment pursuant to Paragraph 24(q), to pay all necessary costs of satisfying the Makeup Obligation, if any, of that Subarea.

d. Biological Resource Assessment. To establish and, to the extent needed, to maintain the Biological Resource Trust Fund balance at one million dollars (in 1993 dollars) pursuant to Paragraph 24(x) and Exhibit "H", a Biological Resource Assessment in an amount not to exceed fifty cents (in 1993 dollars)

for each acre-feet of Production shall be levied uniformly against each producer except the California Department of Fish and Game.

e. MWA Assessment of Minimal Producers. The MWA shall identify and assess Minimal Producers through its own administrative procedures, and not acting as Watermaster.

26. Procedure. Each Party hereto is ordered to pay the Assessments herein provided for, which shall be levied and collected in accordance with the procedures and schedules set forth in Exhibit "D". Any Assessment which becomes delinquent, as defined in Paragraph 7 of Exhibit "D", shall bear interest at the then current San Bernardino County property tax delinquency rate Said interest rate shall be applicable to any said delinquent Assessment from the due date thereof until paid. Such delinquent Assessment, together with interest thereon, costs of suit, attorneys fees and reasonable costs of collection, may be collected pursuant to motion giving notice to the delinquent Party only, or Order to Show Cause proceeding, or such other lawful proceeding as may be instituted by the Watermaster; and shall, if provided for in the MWA Act, constitute a lien on the property of the Party as of the same time and in the same manner as does the tax lien securing County property taxes. The Watermaster shall Annually certify a list of all such unpaid delinquent Assessments to the MWA (in accordance with applicable provisions of the MWA Act). The MWA (in accordance with applicable provisions of the MWA Act) shall include the names of those Parties and the amounts of the liens in its list to the County Assessor's Office in the same manner and at the same time as it does its administrative assessments. MWA shall account for receipt of all collections of Assessments collected pursuant to

this Judgment, and shall pay such amounts collected pursuant to this Judgment to the Watermaster. The Watermaster shall also have the ability to enjoin production of those Persons who do not pay Assessments pursuant to this Judgment.

27. Availability of Supplemental Water. All Replacement and Makeup Water Assessments collected by the Watermaster shall be used to acquire Supplemental Water from MWA. Watermaster shall determine when to request Supplemental Water from MWA and shall determine the amount of Supplemental Water to be requested. MWA shall use its best efforts to acquire as much Supplemental Water as possible in a timely manner. If MWA encounters delays in the acquisition of Supplemental Water which, due to cost increases, results in collected assessment proceeds being insufficient to purchase all Supplemental Water for which the Assessments were made, MWA shall purchase as much water as the proceeds will allow when the water becomes available. If available Supplemental Water is insufficient to meet all Makeup and Replacement Water obligations, Watermaster shall allocate the Supplemental Water for delivery to the Subareas on an equitable and practicable basis pursuant to duly adopted Watermaster rules and regulations, giving preference to: First, Transition Zone Replacement Water Obligations as set forth in Exhibit "G"; Second, Makeup Water Obligations; and Third, other Replacement Water Obligations. MWA may acquire Supplemental Water at any time. MWA shall be entitled to enter into a Storage Agreement with Watermaster to store water MWA acquires prior to being paid to do so by Watermaster. Such water, including such water acquired and stored prior to the date of this Judgment or prior to the entry of

a Storage Agreement, may later be used to satisfy MWA's duty under this paragraph.

28. Use of Replacement Water Assessment Proceeds and Makeup Water Assessment Proceeds. The Proceeds of Replacement Water Assessments and any interest accrued thereon shall only be used for the purchase of Replacement Water for that Subarea from which they were collected. In addition, the proceeds of Replacement Water Assessments collected on account of Production in the Transition Zone, except as provided in Exhibit "G", shall only be used for the purchase of Replacement Water for the Transition Zone, and the proceeds of Replacement Water Assessments collected on account of Production in that portion of the Baja Subarea downstream of the Calico-Newberry fault shall only be used for the purchase of Replacement Water for that portion of the Baja Subarea downstream of the Calico-Newberry fault. The proceeds of Makeup Water Assessments and any interest accrued thereon shall only be used for the purchase of Makeup Water to satisfy the Makeup Obligation for which they are collected.

29. MWA Annual Report to the Watermaster. MWA shall Produce and deliver to Watermaster an Annual written report regarding actions of MWA required by the terms of this Judgment. The report shall contain: 1) a summary of the actions taken by MWA in identifying and assessing Minimal Producers, including a report of Assessments made and collected; 2) a summary of other MWA activities in collecting Assessment on behalf of Watermaster; 3) a report of water purchases and water distribution for the previous Year; 4) actions taken to implement its Regional Water Management Plan, including actions relating to conveyance facilities referred

to in this Judgment. The MWA report will be provided to Watermaster not less than 30 days prior to the Annual Watermaster report to the Court required by this Judgment.

D. SUBAREA ADVISORY COMMITTEES.

30. Authorization. The Producers in each of the five Subareas are hereby authorized and directed to cause committees of Producer representatives to be organized and to act as Subarea Advisory Committees.

31. Composition and Election. Each Subarea Advisory Committee shall consist of five (5) Persons who shall be called advisors. In the election of advisors, every Party shall be entitled to one vote for every acre-foot of Base Annual Production for that Party in that particular Subarea. Parties may cumulate their votes and give one candidate a number of votes equal to the number of advisors to be elected multiplied by the number of votes to which the Party is normally entitled, or distribute the Party's votes on the same principle among as many candidates as the Party thinks fit. In any election of advisors, the candidates receiving the highest number of affirmative votes of the Parties are elected. Elections shall be held upon entry of this Judgment and thereafter every third year. In the event a vacancy arises, a temporary advisor shall be appointed by unanimous decision of the other four advisors to continue in office until the next scheduled election. The California Department of Fish and Game shall serve as a permanent ex-officio member of the Alto and Baja Subarea Advisory Committees. Rules and regulations regarding organization, meetings and other activities shall be at the discretion of the individual

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Subarea Advisory Committees, except that all meetings of the committees shall be open to the public.

32. Compensation. The Subarea Advisory Committee members shall serve without compensation.

33. Powers and Functions. The Subarea Advisory Committee for each Subarea shall act in an advisory capacity only and shall have the duty to study, review and make recommendations on all discretionary determinations made or to be made hereunder by Watermaster which may affect that Subarea.

E. TRANSFERABILITY.

34. Assignment, Transfer, etc. of Rights. In order to further the purposes of this Judgment and Physical Solution, any Base Annual Production Right, or any portion thereof, may be sold, assigned, transferred, licensed or leased pursuant to the rules and procedures set forth in Exhibit "F".

F. MISCELLANEOUS PROVISIONS.

35. Water Quality. Nothing in this Judgment shall be interpreted as relieving any Party of its responsibilities to comply with state or federal laws for the protection of water quality or the provisions of any permits, standards, requirements, or orders promulgated thereunder.

36. Review Procedures. Any action, decision, rule or procedure of Watermaster pursuant to this Judgment shall be subject to review by the Court on its own motion or on timely motion by any Party, as follows:

a. Effective Date of Watermaster Action. Any order, decision or action of Watermaster pursuant to this Judgment on noticed specific agenda items shall be deemed to have occurred

on the date of the order, decision or action.

b. Notice of Motion. Any Party, may, by a regularly noticed motion, petition the Court for review of Watermaster's action or decision pursuant to this Judgment. The motion shall be deemed to be filed when a copy, conformed as filed with the Court, has been delivered to Watermaster together with the service fee established by Watermaster sufficient to cover the cost to photocopy and mail the motion to each Party. Watermaster shall prepare copies and mail a copy of the motion to each Party or its designee according to the official service list which shall be maintained by Watermaster according to Paragraph 37. A Party's obligation to serve notice of a motion upon the Parties is deemed to be satisfied by filing the motion as provided herein. Unless ordered by the Court, any such petition shall not operate to stay the effect of any Watermaster action or decision which is challenged.

c. Time for Motion. A motion to review any Watermaster action or decision shall be filed within ninety (90) days after such Watermaster action or decision, except that motions to review Watermaster Assessments hereunder shall be filed within thirty (30) days of mailing of notice of the Assessment.

d. De Novo Nature of Proceeding. Upon filing of a petition to review Watermaster action, the Watermaster shall notify the Parties of a date when the Court will take evidence and hear argument. The Court's review shall be de novo and the Watermaster decision or action shall have no evidentiary weight in such proceeding.

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e. Decision. The decision of the Court in such proceeding shall be an appealable Supplemental Order in this case. When the same is final, it shall be binding upon Watermaster and the Parties.

f. Payment of Assessments. Payment of Assessments levied by Watermaster hereunder shall be made pursuant to the time schedule in Exhibit "D"; notwithstanding any motion for review of Watermaster actions, decisions, rules or procedures, including review of Watermaster Assessments.

37. Designation of Address for Notice and Service. Each Party shall designate the name and address to be used for purposes of all subsequent notices and service herein, either by its endorsement on the Stipulation for Judgment or by a separate designation to be filed within thirty (30) days after Judgment has been entered. Said designation may be changed from time to time by filing a written notice of such change with Watermaster. Any Party desiring to be relieved of receiving notices of Watermaster activity may file a waiver of notice on a form to be provided by Watermaster. Watermaster shall maintain at all times a current list of Parties to whom notices are to be sent and their addresses for purposes of service. Watermaster shall also maintain a full current list of names and addresses of all Parties or their successors, as filed herein. Copies of such lists shall be available to any Person. If no designation is made, a Party's designee shall be deemed to be, in order of priority: i) the Party's attorney of record; ii) if the Party does not have an attorney of record, the Party itself at the address on the Watermaster list.

38. Service of Documents. Delivery to or service upon any Party by Watermaster, by any other Party, or by the Court, of any document required to be served upon or delivered to a Party under or pursuant to the Judgment shall be deemed made if made by Deposit thereof (or by copy thereof) in the mail, first class, postage prepaid, addressed to the designee of the Party and at the address shown in the latest designation filed by that Party.

39. No Abandonment of Rights. It is in the interest of reasonable beneficial use of the Basin Area and its water supply that no Party be encouraged to take and use more water in any Year than is actually required. Failure to Produce all of the water to which a Party is entitled hereunder shall not, in and of itself, be deemed or constitute an abandonment of such Party's right, in whole or in part.

40. Intervention After Judgment. Any person who is not a Party or successor to a Party and who proposes to Produce water from the Basin Area may seek to become a Party to this Judgment through a Stipulation for Intervention entered into with Watermaster. Watermaster may execute said Stipulation on behalf of the other Parties herein but such Stipulation shall not preclude a Party from opposing such Intervention at the time of the Court hearing thereon. Said Stipulation for Intervention must thereupon be filed with the Court, which will consider an order confirming said intervention following thirty (30) days' notice to the Parties. Thereafter, if approved by the Court, such intervenor shall be a Party bound by this Judgment and entitled to the rights and privileges accorded under the Physical Solution herein.

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41. Recordation of Notice. MWA shall within sixty (60) days following entry of this Judgment record in the Office of the County Recorder of the County of San Bernardino a notice substantially complying with the notice content requirements set forth in Section 2529 of the California Water Code.

42. Judgment Binding on Successors, etc. Subject to specific provisions hereinbefore contained, this Judgment and all provisions thereof are applicable to and binding upon and inure to the benefit of not only the Parties to this action, but as well to their respective heirs, executors, administrators, successors, assigns, lessees, licensees and to the agents, employees and attorneys in fact of any such Persons.

43. Costs. No Party stipulating to this Judgment shall recover any costs or attorneys fees in this proceeding from another stipulating Party.

44. Entry of Judgment. The Clerk shall enter this Judgment.

Dated: JAN 10 1996

E. MICHAEL KAISER

E. Michael Kaiser, Judge
Superior Court of the State
of California for the
County of Riverside

EXHIBIT A

MAP OF MOJAVE BASIN AREA

[INDEX MAP AND DETAIL SHEET CONSISTING OF 42 1" = 4,000' SCALE MAPS COVERING THE BASIN AREA; THE MAP IS ON DISPLAY AT THE OFFICE OF THE MOJAVE WATER AGENCY, 22450 HEADQUARTERS, APPLE VALLEY, CA 92307 AND ON FILE WITH THE COURT]

EXHIBIT B

PRODUCTION TABLES

CONTENTS

TABLE B-1: TABLE SHOWING BASE ANNUAL PRODUCTION AND BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN EACH SUBAREA AND FREE PRODUCTION ALLOWANCES FOR EACH SUBAREA FOR THE FIRST FIVE YEARS AFTER ENTRY OF THE INTERLOCUTORY JUDGMENT

TABLE B-2: TABLE SHOWING TOTAL VERIFIED PRODUCTION, BASE ANNUAL PRODUCTION AND RECIRCULATED WATER PRODUCTION FOR AQUACULTURE AND FOR RECREATIONAL LAKES

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EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ESTE SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ESTE SUBAREA / PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
ABGHIAN, DAVID V	24	0.1093	24	23	21	20	19
ANDERSON, ROSS C & BETTY J	34	0.1548	34	32	30	28	27
BAR N MUTUAL WATER COMPANY	53	0.2414	53	50	47	45	42
BELL, CHUCK	494	2.2497	494	469	444	419	395
BURNS, BOBBY J & EVELYN J	1,300	5.9204	1,300	1,235	1,170	1,105	1,040
CASA COLINA FOUNDATION	90	0.4099	90	85	81	76	72
CENTER WATER CO	40	0.1822	40	38	36	34	32
CLUB VIEW PARTNERS	1,276	5.8111	1,276	1,212	1,148	1,084	1,020
CROSS, LAWRENCE H	23	0.1047	23	21	20	19	18
CRYSTAL HILLS WATER COMPANY	194	0.8835	194	184	174	164	155
DAHLQUIST, GEORGE R	594	2.7052	594	564	534	504	476
DELPERDANG, ROBERT H	56	0.2550	56	53	50	47	44
DESERT DAWN MUTUAL WATER COMPANY	15	0.0683	15	14	13	12	12
GARTA, TRINIDAD	512	2.3317	512	486	460	435	409
GAYJIKIAN, SAMUEL & HAZEL	102	0.4645	102	96	91	86	81
GRACETOWN INVESTMENT CO - JETCO PROP FUND	752	3.4247	752	714	676	639	601
GUBLER, HANS	30	0.1366	30	28	27	26	24
HAL-DOR LTD	23	0.1047	23	21	20	19	18
HANDLEY, DON R & MARY ANN	73	0.3325	73	69	65	62	58
HART, MERRILL W	473	2.1541	473	449	425	402	378
HERT, SCOTT	276	1.2569	276	262	248	234	220
HI-GRADE MATERIALS	442	2.0129	442	419	397	375	353
HITCHIN LUCERNE, INC	16	0.0729	16	15	14	13	12
JAMS RANCH	28	0.1275	28	26	25	23	22

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EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ESTE SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ESTE SUBAREA / PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
JUBILEE MUTUAL WATER COMPANY	142	0.6667	142	134	127	120	113
JUNIPER RIVIERA COUNTY WATER DISTRICT	37	0.1665	37	35	33	31	29
LEE, DOO HWAN	78	0.3552	78	74	70	66	62
LOPEZ, BALTASAR	385	1.7533	385	365	346	327	308
LUA, ANTONIO	348	1.5848	348	330	313	295	278
LUCERNE VALLEY MUTUAL WATER COMPANY	54	0.2459	54	51	48	45	43
LUCERNE VALLEY PARTNERS	1,213	5.5242	1,213	1,152	1,091	1,031	970
LUCERNE VISTA WATER CO	21	0.0956	21	19	18	17	16
MITSUBISHI CEMENT CORPORATION	1,299	5.9158	1,299	1,234	1,169	1,104	1,039
MONACO INVESTMENT COMPANY	70	0.3188	70	66	63	59	56
MOSS, LAWRENCE W & HELEN J	43	0.1958	43	40	38	36	34
PARK, CHANHO	597	2.7188	597	567	537	507	477
PARK, JEONG, IL & HEA JA	96	0.4372	96	91	86	81	76
PEREZ, EVA	247	1.1249	247	234	222	209	197
PETTIGREW, DAN	1,422	6.4760	1,422	1,350	1,279	1,208	1,137
PETTIGREW, HOWARD L	1,500	6.8312	1,500	1,425	1,350	1,275	1,200
PLUESS-STAUFER CALIFORNIA INC	23	0.1047	23	21	20	19	18
REED, MIKE	58	0.2641	58	55	52	49	46
ROGERS, ROY	1,449	6.5990	1,449	1,376	1,304	1,231	1,158
SAN BERNARDINO CO SERVICE AREA 29	21	0.0956	21	19	18	17	16
SEALS, LAWRENCE	113	0.5146	113	107	101	96	90
SON'S RANCH	140	0.6376	140	133	126	119	112
SOUTHERN CALIFORNIA WATER COMPANY	178	0.8106	178	169	160	151	142
SPECIALTY MINERALS, INC	42	0.1913	42	39	37	35	33

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EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ESTE SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ESTE SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
SPILLMAN, JAMES R & NANCY J	23	0.1047	23	21	20	19	18
STEWART WATER COMPANY	54	0.2459	54	51	48	45	43
STRINGER, W EDWARD	573	2.6095	573	544	516	487	458
THE CUSHENBURY TRUST, C/O SPECIALTY MINERALS, INC	10	0.0455	10	9	9	8	8
TURNER, LOYD & CAROL	77	0.3507	77	73	69	65	61
VISOSKY, JOSEPH F JR	1,120	5.1006	1,120	1,064	1,008	952	896
WEISER, SIDNEY & RAQUEL	90	0.4099	90	85	81	76	72
WILLOW WELLS MUTUAL WATER COMPANY	30	0.1366	30	28	27	25	24

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BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ESTE SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ESTE SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
MINIMAL PRODUCER POOL	2,000	9.1083	2,000	1,900	1,800	1,700	1,600
UNIDENTIFIED/UNVERIFIED PRODUCER POOL	1,495	6.7629					
ESTE SUBAREA TOTALS =	21,958	100					

1 Base Annual Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records, site inspection, land use estimates from 1987 and 1989 aerial photography and responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production Right expressed as a percentage of the Total Base Annual Production.

3 Values based on production ramp down of five percent (5%) per year. Free Production Allowance for the fifth year is equal to eighty percent (80%) of the Base Annual Production.

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EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN OBSTB SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

OBSTB SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
AEROCHEM, INC	660	5.3645	660	627	594	561	528
BROWN, DOUG & SUE	46	0.3739	46	43	41	39	36
CHAMISAL MUTUAL	96	0.7803	96	91	86	81	76
DAVIS, PAUL	19	0.1544	19	18	17	16	15
DOSSEY, D A	14	0.1138	14	13	12	11	11
MEADOWBROOK DAIRY	2,335	18.9791	2,335	2,218	2,101	1,984	1,868
REGEROUH, JOHN & BILL	259	2.1052	259	246	233	220	207
SAN BERNARDINO CO SERVICE AREA 70G	110	0.8941	110	104	99	93	88
SAN BERNARDINO CO SERVICE AREA 70L	1,306	10.6153	1,306	1,240	1,175	1,110	1,044
THOMSON, ROBERT F & M KATHLEEN	40	0.3251	40	38	36	34	32
TROESER, RICHARD H	112	0.9103	112	106	100	95	89
VAN DAM BROTHERS	1,860	15.1183	1,860	1,767	1,674	1,581	1,488

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EXHIBIT B
TABLE B-1
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BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN OBSTB SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

OBSTB SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
MINIMAL PRODUCER POOL	1,500	12.1921	1,500	1,425	1,350	1,275	1,200
UNIDENTIFIED/UNVERIFIED PRODUCER POOL	3,946	32.0735					
OBSTB SUBAREA TOTALS =	12,303	100					

1 Base Annual Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records, site inspection, land use estimates from 1987 and 1989 aerial photography and responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production Right expressed as a percentage of the Total Base Annual Production.

3 Values based on production ramp down of five percent (5%) per year. Free Production Allowance for the fifth year is equal to eighty percent (80%) of the Base Annual Production.

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EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
ABBOND, EDWARD & GRACE	28	0.0229	28	26	25	23	22
ABBOTT, LEONARD C	284	0.2321	284	269	255	241	227
ADELANTO, CITY OF	1,573	1.2855	1,573	1,494	1,415	1,337	1,258
ADELANTO, CITY OF - GEORGE A F B	3,433	2.8055	3,433	3,261	3,089	2,918	2,746
AGICON, INC	384	0.3138	384	364	345	326	307
APPLE VALLEY COUNTRY CLUB	709	0.5794	709	673	638	602	567
APPLE VALLEY DEVELOPMENT	724	0.5917	724	687	651	615	579
APPLE VALLEY FOOTHILL CO WATER DISTRICT	167	0.1365	167	158	150	141	133
APPLE VALLEY HEIGHTS COUNTY WATER DISTRICT	125	0.1022	125	118	112	106	100
APPLE VALLEY RANCHOS WATER COMPANY	13,022	10.6419	13,022	12,370	11,719	11,068	10,417
APPLE VALLEY RECREATION & PARKS	45	0.0368	45	42	40	38	36
APPLE VALLEY VIEW MUTUAL WATER CO	36	0.0294	36	34	32	30	28
APPLE VALLEY, TOWN OF	298	0.2435	298	283	268	253	238
ARC LAS FLORES	6,331	5.1739	6,331	6,014	5,697	5,381	5,064
BACA, ENRIQUE	74	0.0605	74	70	66	62	59
BALDY MESA WATER DISTRICT	1,495	1.2218	1,495	1,420	1,346	1,270	1,196
BASS, NEWTON T	514	0.4201	514	488	462	436	411
BASTIANON, REMO	77	0.0629	77	73	69	65	61
BASURA, STEVE	25	0.0204	25	23	22	21	20
BEINSCHROTH, A J	90	0.0736	90	85	81	76	72
BOYCE, KENNETH & WILLA	102	0.0834	102	96	91	86	81
BROWN, BOBBY G & VALERIA R	42	0.0343	42	39	37	35	33
BURNS, ULYSSES & ANNIE L	164	0.1340	164	155	147	139	131
CARDOZO, MANUEL & MARIA	909	0.7429	909	863	818	772	727

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EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
CDFG - MOJAVE NARROWS REGIONAL PARK	2,107	1.7219	2,107	2,001	1,896	1,790	1,685
CDFG - MOJAVE RIVER FISH HATCHERY	20	0.0163	20	19	18	17	16
CLARK, KENNETH R	223	0.1822	223	211	200	189	178
CLEAR VIEW FARMS	501	0.4094	501	476	450	425	400
COPELAND, ET AL (C/O DON W. LITTLE)	175	0.1430	175	166	157	148	140
CRAMER, MARGARET MUIR	280	0.2288	280	266	252	238	224
CUNNINGHAM, WILLIAM	29	0.0237	29	27	26	24	23
DEXTER, CLAIR F	175	0.1430	175	166	157	148	140
DEXTER, J P	515	0.4209	515	489	463	437	412
DIBERNARDO, JOHN	203	0.1659	203	192	182	172	162
DOLCH, ROBERT & JUDY	426	0.3481	426	404	383	362	340
DOMBROWSKI, MICHAEL W & SUSAN M	19	0.0155	19	18	17	16	15
DOWSE, PHILIP	20	0.0163	20	19	18	17	16
EVENSON, EDWIN H & JOYCELAINE	70	0.0572	70	66	63	59	56
FISHER, DOLORES DR	48	0.0392	48	45	43	40	38
FISHER, JEROME	633	0.5173	633	601	569	538	506
FITZWATER, R E	291	0.2378	291	276	261	247	232
GARCIA, SONIA L	288	0.2354	288	273	259	244	230
GOMEZ, CIRIL - LIVING TRUST	330	0.2697	330	313	297	280	264
GRASS ACRES ESTATES	25	0.0204	25	23	22	21	20
GULBRANSON, MERLIN	163	0.1332	163	154	146	138	130
HELENDALE SCHOOL DISTRICT	18	0.0147	18	17	16	15	14
HESPERIA GOLF AND COUNTRY CLUB	678	0.5541	678	644	610	576	542
HESPERIA WATER DISTRICT	12,213	9.9808	12,213	11,602	10,991	10,381	9,770

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EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
HI-GRADE MATERIALS	149	0.1218	149	141	134	126	119
HODGE, STANLEY W	67	0.0548	67	63	60	56	53
HOLWAY, ROBERT	88	0.0719	88	83	79	74	70
HRUBIK, THOMAS A	3,862	3.1561	3,862	3,668	3,475	3,282	3,089
INDUSTRIAL ASPHALT	109	0.0891	109	101	96	92	87
JESS RANCH WATER COMPANY	7,480	6.1129	7,480	7,106	6,732	6,358	5,984
JOHNSON, LARRY & CARLEAN	82	0.0670	82	77	73	69	65
JOHNSON, RONALD	31	0.0253	31	29	27	26	24
JOHNSTON, HARRIET AND LARRY W	127	0.1038	127	120	114	107	101
KEMPER CAMPBELL RANCH	473	0.3865	473	449	425	402	378
LAKE ARROWHEAD COMMUNITY SERVICES DISTRICT	658	0.5377	658	625	592	559	526
LAWSON, ERNEST & BARBARA	15	0.0123	15	14	13	13	12
LEMERT, RONALD & TONI	37	0.0302	37	35	33	31	29
LEWIS HOMES OF CALIFORNIA	1,693	1.3836	1,693	1,608	1,523	1,439	1,354
LONGMAN, JACK	115	0.0940	115	109	103	97	92
LOUNSBURY, J PETER & CAROLYN	208	0.1700	208	197	187	176	166
LOW, ROBERT	399	0.3261	399	379	359	339	319
LUCKEY, MANLEY J	800	0.6538	800	760	720	680	640
LUTH, KEN	27	0.0221	27	25	24	22	21
MARIANA RANCHOS COUNTY WATER DISTRICT	245	0.2002	245	232	220	208	196
MCCALL, REX	44	0.0360	44	41	39	37	35
MCINNIS, WILLIAM S	30	0 0245	30	28	27	25	24
MITCHELL, ROBIN & JUDITH	36	0.0294	36	34	32	30	28
MURPHY, BERNARD H	25	0.0204	25	23	23	21	20

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EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
MURPHY, BERNARD TRUST	162	0.1324	162	153	145	137	129
MURPHY, KENNETH	42	0.0343	42	39	37	35	33
MUTUAL FUNDING CORP	101	0.0825	101	95	90	85	80
NAVAJO MUTUAL WATER CO	88	0.0719	88	83	79	74	70
NUSS, DONALD & PEARL	66	0.0539	66	62	59	56	52
O'BRYANT, ROBERT C & BARBARA	107	0.0874	107	101	96	90	85
ORMSBY, HARRY G	386	0.3154	386	366	347	328	308
PALISADES RANCH	824	0.6734	824	782	741	700	659
PARKER, DAVID E	37	0.0302	37	35	33	31	29
PEARL, ALICE	147	0.1201	147	139	132	124	117
PEARSON, DERYL B	22	0.0180	22	20	19	18	17
PERRY, THOMAS A	35	0.0286	35	33	31	29	28
PETTIS TRUST	126	0.1030	126	119	113	107	100
PHENIX PROPERTIES LTD	652	0.5328	652	619	586	554	521
PITTMAN, LENUS W	148	0.1209	148	140	133	125	118
POLICH, LEO & DONNA	65	0.0531	65	61	58	55	52
RANCHERITOS MUTUAL WATER CO	169	0.1381	169	160	152	143	135
RIVERSIDE CEMENT CO - ORO GRANDE PLANT	3,452	2.8211	3,452	3,279	3,106	2,934	2,761
ROGERS, ROY (ORO GRANDE RANCH)	115	0.0940	115	109	103	97	92
RUDMAN, ROBERT T	300	0.2452	300	285	270	255	240
RUH RANCH	30	0.0245	30	28	27	25	24
SAN BERNARDINO CO SERVICE AREA 42	465	0.3800	465	441	418	395	372
SAN BERNARDINO CO SERVICE AREA 64	3,822	3.1234	3,822	3,630	3,439	3,248	3,057
SAN BERNARDINO CO SERVICE AREA 70C	2,346	1.9172	2,346	2,228	2,111	1,994	1,876

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TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
SAN BERNARDINO CO SERVICE AREA 70J	1,005	0.8213	1,005	954	904	854	804
SAN BERNARDINO CO SERVICE AREA 70L	355	0.2901	355	337	319	301	284
SAN FILIPPO, JOSEPH & SHELLEY	35	0.0286	35	33	31	29	28
SILVER LAKES ASSOCIATION	3,987	3.2583	3,987	3,787	3,588	3,388	3,189
SOUTHDOWN, INC	1,519	1.2414	1,519	1,443	1,367	1,291	1,215
SOUTHERN CALIFORNIA WATER COMPANY	940	0.7682	940	893	846	799	752
SPRING VALLEY LAKE ASSOCIATION	3,056	2.4974	3,056	2,903	2,750	2,597	2,444
SPRING VALLEY LAKE COUNTRY CLUB	977	0.7984	977	928	879	830	781
STORM, RANDALL	62	0.0507	62	58	55	52	49
SUDMEIER, GLENN W	121	0.0989	121	114	108	102	96
SUMMIT VALLEY RANCH	452	0.3694	452	429	406	384	361
TATRO, RICHARD K & SANDRA A	280	0.2288	280	266	252	238	224
TATUM, JAMES B	829	0.6775	829	787	746	704	663
TAYLOR, ALLEN C / HAYMAKER RANCH	456	0.3727	456	433	410	387	364
THOMAS, S DALE	440	0.3596	440	418	396	374	352
THOMAS, WALTER	36	0.0294	36	34	32	30	28
THOMPSON, JAMES A	418	0.3416	418	397	376	355	334
THOMPSON, RODGER	76	0.0621	76	72	68	64	60
THRASHER, GARY	373	0.3048	373	354	336	317	298
THUNDERBIRD COUNTY WATER DISTRICT	116	0.0964	118	112	106	100	94
TURNER, ROBERT	70	0.0572	70	66	63	59	56
VAIL, JOSEPH B & PAULA B	126	0.1030	126	119	113	107	100
VAN BURGER, CARL	710	0.5802	710	674	639	603	568
VAN LEEUWEN FAMILY TRUST	341	0.2787	341	323	306	289	272

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TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
VANNI, MIKE	54	0.0441	54	51	48	45	43
VICTOR VALLEY COMMUNITY COLLEGE DIST	240	0.1961	240	228	216	204	192
VICTOR VALLEY WATER DISTRICT	13,354	10.9133	13,354	12,686	12,018	11,350	10,683
VICTORVILLE, CITY OF	12	0.0098	12	11	10	10	9
VOGLER, ALBERT H	132	0.1079	132	125	118	112	106
WACKERH, CAESAR	1,635	1.3362	1,635	1,553	1,471	1,389	1,308
WAKULA, JOHN	291	0.2376	291	276	261	247	232
WARD, KEN & BARBARA	65	0.0531	65	61	58	55	52
WEBER, DAVE	80	0.0654	80	76	72	68	64
WEST, CAROLYN & SMITH, RICHARD	24	0.0196	24	22	21	20	19
WEST, HOWARD & SUEY	72	0.0588	72	68	64	61	57
WHITTINGHAM, RICHARD V	15	0.0123	15	14	13	12	12
YEAGER, W L - CONSTRUCTION COMPANY INC	34	0.0278	34	32	30	28	27

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TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
MINIMAL PRODUCER POOL	4,000	3.2689	4,000	3,800	3,600	3,400	3,200
UNIDENTIFIED/UNVERIFIED PRODUCER POOL	4,967	4.0592					
ALTO SUBAREA TOTALS =	122,365	100					

1 Base Annual Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records, site inspection, land use estimates from 1987 and 1989 aerial photography and responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production Right expressed as a percentage of the Total Base Annual Production.

3 Values based on production ramp down of five percent (5%) per year. Free Production Allowance for the fifth year is equal to eighty percent (80%) of the Base Annual Production.

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TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN CENTRO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

CENTRO SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
AGCON, INC	0	0.0000	0	0	0	0	0
AGUAYO, JEANETTE L	212	0.3742	212	201	190	180	169
ATCHISON, TOPEKA, SANTA FE RAILWAY CO	120	0.2118	120	114	108	102	96
AVDEEF, THOMAS	34	0.0600	34	32	30	28	27
AZTEC FARM DEVELOPMENT COMPANY	220	0.3883	220	209	198	187	176
BARNES, FAY - EXECUTOR OF ESTATE OF WAYNE BARNES	243	0.4289	243	230	218	206	194
BROWNER, MARVIN	361	0.6372	361	343	324	306	288
BURNS, RITA J & PAMELA H	16	0.0282	16	15	14	13	12
CHAPA, LARRY R	96	0.1694	96	91	86	81	76
CHOI, YONG IL & JOUNG AE	38	0.0671	38	36	34	32	30
CHRISTISON, JOEL	75	0.1324	75	71	67	63	60
COOK, KWON W	169	0.2983	169	160	152	143	135
DE VRIES, NEIL	3,800	6.7070	3,800	3,610	3,420	3,230	3,040
DESERT COMMUNITY BANK	156	0.2753	156	148	140	132	124
DORAN, FRANK T	50	0.0883	50	47	45	42	40
GAINES, JACK	117	0.2065	117	111	105	99	93
GERRISCH, WAYNE	121	0.2136	121	114	108	102	96
GORMAN, VIRGIL	138	0.2436	138	131	124	117	110
GRISDER, RAYMOND M & DORISANNE	30	0.0530	30	28	27	25	24
GRILL, NICHOLAS P & MILLIE D	21	0.0371	21	19	18	17	16
GROEN, CORNELIS	1,043	1.8409	1,043	990	938	886	834
HANIPY, DBA - WHITE BEAR RANCH	152	0.2683	152	144	136	129	121
HARRACH, JAMES A RUTH ANN	1,522	2.6863	1,522	1,445	1,369	1,293	1,217
HARPER LAKE COMPANY	1,433	2.5293	1,433	1,361	1,289	1,218	1,146

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BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN CENTRO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

CENTRO SUBAREA / PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
[illegible] WATER CO	34	0.0600	34	32	30	28	27
HILEMAN, KATHERINE	19	0.0335	19	18	17	16	15
HILL, MELVIN	2,335	4.1213	2,335	2,218	2,101	1,984	1,868
HOY, MIKE	632	1.1155	632	600	568	537	505
JORDAN, RAYMOND	460	0.8119	460	437	414	391	368
JUSTICE, CHRIS	421	0.7431	421	399	378	357	336
KING, GENEVIEVE E	69	0.1218	69	65	62	58	55
LEE, SEPOONG ETAL & WOO POONG	77	0.1359	77	73	69	65	61
LEVERLY, GENEVA	65	0.1147	65	61	58	55	52
LEVERLY, RICHARD	862	1.5214	862	818	775	732	689
LUDINGTON, JAMES E & JO ANN	58	0.1024	58	55	52	49	46
LYON, LOUIS & ERIKA	130	0.2295	130	123	117	110	104
MARTIN, LENDELL	14	0.0247	14	13	12	11	11
MCCALLUM, CHARLES L	347	0.6125	347	329	312	294	277
MEAD, G C	90	0.1589	90	85	81	76	72
MEYERS, LONNIE	27	0.0477	27	25	24	22	21
MITCHELL, CHARLES A	201	0.3548	201	190	180	170	160
MOFFITT, THOMAS R & EDITH I	62	0.1094	62	58	55	52	49
MOST, MILTON W	9,660	17.0500	9,660	9,177	8,694	8,211	7,728
NELSON, MILDRED L	52	0.0918	52	49	46	44	41
NEWBERRY SPRINGS COMPANY, INC	2,489	4.3931	2,489	2,364	2,240	2,115	1,991
OHAI, REYNOLDS & DOROTHY	137	0.2418	137	130	123	116	109
OROPEZA, JOSE M	190	0.3354	190	180	171	161	152
OSTERKAMP, GEROLD	260	0.4589	260	247	234	221	208

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TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

CENTRO SUBAREA / PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
OWL ROCK PRODUCTS COMPANY	466	0.8225	466	442	419	396	373
PG & E	1,657	2.9246	1,657	1,574	1,491	1,408	1,325
REDDY, BOMMI V & KARUNA V	24	0.0424	24	22	21	20	19
[illegible]	22	0.0389	22	20	19	18	17
RUISCH, DALE W	650	1.1473	650	617	585	552	520
SHIRKEY, ALAN G & MARY E	35	0.0618	35	33	31	29	28
SMITH, ROBERT A	43	0.0759	43	40	38	36	34
[illegible]	783	1.3820	783	743	704	665	626
SOUTHERN CALIFORNIA WATER COMPANY	11,309	19.9605	11,309	10,743	10,178	9,612	9,047
SPINK, WALTHALL	44	0.0777	44	41	39	37	35
ST CHARLES, DONALD B	609	1.0749	609	578	548	517	487
SUN 'N SKY COUNTRY CLUB	337	0.5948	337	320	303	286	269
TALLAKSON, WILLIAM V	17	0.0300	17	16	15	14	13
TILLEMA, HAROLD	874	1.5426	874	830	786	742	699
VAN DAM, ELDERT & SUSAN	722	1.2743	722	685	649	613	577
VAN LEEUWEN, JOHN	1,922	3.3923	1,922	1,825	1,729	1,633	1,537
VAN VLIET, HENDRIKA	820	1.4473	820	779	738	697	656
[illegible]	23	0.0406	23	21	20	19	18
VERNOLA, PAT	3,116	5.4998	3,116	2,960	2,804	2,648	2,492
VISSER, ANNIE	91	0.1606	91	86	81	77	72
YANG, YOUNG MO	371	0.6548	371	352	333	315	296
YKEMA HARMSEN DAIRY	1,000	1.7650	1,000	950	900	850	800

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FOR FIRST FIVE YEARS OF THE JUDGMENT

CENTRO SUBAREA / PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
MINIMAL PRODUCER POOL	2,000	3.5300	2,000	1,900	1,800	1,700	1,600
UNIDENTIFIED/UNVERIFIED PRODUCER POOL	864	1.5250					
CENTRO SUBAREA TOTALS =	56,657	100					

1 Base Annual Production is the reported maximum year production for each producer for the five year period 1965-1989. These values reflect the maximum production determined by one or more of the following: Southern California Edison records, site inspection, land use estimates from 1987 and 1989 aerial photography and responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production Right expressed as a percentage of the Total Base Annual Production.

3 Values based on production ramp down of five percent (5%) per year. Free Production Allowance for the fifth year is equal to eighty percent (80%) of the Base Annual Production.

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TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA / PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
AKE, CHARLES J & MARJORIE M	23	0.0333	23	21	20	19	18
ANGERER, ROBERT J & PEGGY	24	0.0347	24	22	21	20	19
APPLEGATE VALLEY DAIRY	5,430	7.8597	5,430	5,158	4,887	4,615	4,344
ARGUELLES, ALFREDO	1,047	1.5155	1,047	994	942	889	837
ATCHISON, TOPSKA, SANTA FE RAILWAY CO	80	0.1158	80	76	72	68	64
BAGLEY, ROY	20	0.0289	20	19	18	17	16
BALDERRAMA, ALFRED & LINDA	250	0.3619	250	237	225	212	200
BALL, DAVID P	81	0.1172	81	76	72	68	64
BARAK, RICHARD	132	0.1911	132	125	118	112	105
BARBER, JAMES B	167	0.2417	167	158	150	141	133
BARSTOW CALICO K O A	24	0.0347	24	22	21	20	19
BAUR, KARL & RITA	26	0.0376	26	24	23	22	20
BEDINGFIELD, LYNDELL & CHARLENE	56	0.0811	56	53	50	47	44
BENTON, PHILIP G	35	0.0507	35	33	31	29	28
BOSSOMD, STEVEN & LILLIAN H	1,844	2.6691	1,844	1,751	1,659	1,567	1,475
BOWMAN, EDWIN L	31	0.0449	31	29	27	26	24
BROWN, RONALD A	1,080	1.5632	1,080	1,026	972	918	864
BROWY, ORVILLE & LOUISE	33	0.0478	33	31	29	28	26
BRUINS, NICHOLAS	29	0.0420	29	27	26	24	23
CALICO LAKES HOMEOWNERS ASSOCIATION	1,031	1.4923	1,031	979	927	876	824
CALIF DEPT OF TRANSPORTATION	71	0 1028	71	67	63	60	56
CAMPBELL, M A & DIANNE	22	0.0318	22	20	19	18	17
CARTER, JOHN THOMAS	746	1.0798	746	708	671	634	596
CDFG - CAMP CADY	14	0.0203	14	13	12	11	11

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TOGETHER WITH FREE PRODUCTION ALLOWANCES
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BAJA SUBAREA / PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
CHANG, TIMOTHY & JANE	18	0.0261	18	17	16	15	14
CHASTAIN, W C	100	0.1447	100	95	90	85	80
CHEYENNE LAKE, INC	122	0.1766	122	115	109	103	97
CHIAO MEI DEVELOPMENT	451	0.6528	451	428	405	383	360
CHO BROTHERS RANCH	758	1.0972	758	720	682	644	606
CHUANG, MARSHAL	70	0.1013	70	66	63	59	56
CONNER, WILLIAM H	25	0.0362	25	23	23	21	20
COOL WATER RANCH	76	0.1100	76	72	68	64	60
CRYSTAL LAKES PROPERTY OWNERS ASSOCIATION	447	0.6470	447	424	402	379	357
DAGGETT COMMUNITY SERVICES DISTRICT	235	0.3402	235	223	211	199	188
DALJO CORPORATION	31	0.0449	31	29	27	26	24
DAVIS, RONALD & DONNA	53	0.0767	53	50	47	45	42
DE JONG, ALAN L	1,648	2.3854	1,648	1,565	1,483	1,400	1,318
DENNISON, QUENTIN D	29	0.0420	29	27	26	24	23
DESERT LAKES CORPORATION - (LAKE DOLORES)	483	0.6991	483	458	434	410	386
DOCINO, DONALD P & PATRICIA J	23	0.0333	23	21	20	19	18
DONALDSON, JERRY & BEVERLY	90	0.1303	90	85	81	76	72
ELLISON, SUSAN	15	0.0217	15	14	13	13	13
EVKHANIAN, JAMES H	110	0.1592	110	104	99	93	88
FAWCETT, EDWARD C	20	0.0289	20	19	18	17	16
FELIX, ALAN E & CAROL L	36	0.0521	36	34	32	30	28
FERRO, DENNIS & NORMA	32	0.0463	32	30	28	27	25
FRIEND, JOSEPH & DEBORAH	60	0.0868	60	57	54	51	48
FUNDAMENTAL CHRISTIAN ENDEAVOR	285	0.4125	285	270	256	242	228

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GARCIA, DANIEL	23	0.0333	23	21	20	19	18
GOLD, HAROLD	249	0.3604	249	236	224	211	199
GRAVES, CHESTER B	32	0.0463	32	30	28	27	25
HAIGH, WHILLDYN & MARGARET	32	0.0463	32	30	28	27	25
HALL, LARRY	23	0.0333	23	21	20	19	18
HARALIK, BESS & ROBERT	27	0.0391	27	25	24	22	21
HARDESTY, LESLIE E & BECKY J	47	0.0680	47	44	42	38	37
HARRAH, NICHOLAS & MARY	30	0.0434	30	28	27	25	24
HARTER FARMS	1,083	1.5676	1,083	1,028	974	920	866
HARTER, JOE & SON	738	1.0682	738	701	664	627	590
HARTLEY, LONNIE	19	0.0275	19	18	17	16	15
HARVEY, FRANK	38	0.0550	38	36	34	32	30
HENDLEY, RICK & BARBARA	48	0.0695	48	45	43	40	38
HIETT, PATRICIA J	16	0.0232	16	15	14	13	12
HILARIDES, FRANK	1,210	1.7514	1,210	1,149	1,089	1,028	968
HOLLISTER, ROBERT H & RUTH M	44	0.0637	44	41	39	37	35
HONG, PAUL B & MAY	95	0.1375	95	90	85	80	76
HORTON'S CHILDREN'S TRUST	106	0.1534	106	100	95	90	84
HORTON, JOHN MD	183	0.2649	183	173	164	155	146
HOSKING, JOHN W & JEAN	94	0.1361	94	89	84	79	75
HUBBARD, ESTER & MIZUNO, ARLEAN	28	0.0405	28	26	25	23	22
HUNT, RALPH M & LILLIAN F	31	0.0449	31	29	27	26	24
HUTCHISON, WILLIAM O	901	1.3042	901	855	810	765	720
HYATT, JAMES & SERENA	210	0.3040	210	199	189	178	168

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FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT (PERCENT) [2]	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
IRVIN, BERTRAND W	29	0.0420	29	27	26	24	23
J V A AIR INC	54	0.0782	54	51	48	45	43
JACKSON, RAY	20	0.0289	20	19	18	17	16
JOHNSON, JAMES R	247	0.3575	247	234	221	209	197
JUSTICE, CHRIS	6	0.0087	6	5	5	5	4
KAPLAN, ABRAHAM M	76	0.1100	76	72	68	64	60
KASNER, ROBERT	1,001	1.4489	1,001	950	900	850	800
KATCHER, AUGUST M & MARCELINE	23	0.0333	23	21	20	19	18
KEMP, ROBERT & ROSE	32	0.0463	32	30	28	27	25
KIEL, MARY	34	0.0492	34	32	30	28	27
KIM, JOON HO	764	1.1059	764	725	687	649	611
[illegible], JOHN & JOANNE	54	0.0782	54	51	48	45	43
LAKE JODIE PROPERTY OWNERS ASSOCIATION	254	0.3677	254	241	228	215	203
LAKE WAIKIKI	98	0.1419	98	93	88	83	78
LAKE WAINANI OWNERS ASSOCIATION	202	0.2924	202	191	181	171	161
[illegible], MICHAEL R	20	0.0289	20	19	18	17	16
[illegible], WILLIAM W	45	0.0651	45	42	40	38	36
LEE, ROSH & DEBRA	49	0.0709	49	46	44	41	39
LEE, VIN JANG T	630	0.9119	630	598	567	535	504
LESHIN, CONNIE & SOL	1,416	2.0496	1,416	1,345	1,274	1,203	1,132
LESHIN, SOL	1,997	2.8906	1,997	1,897	1,797	1,697	1,597
LEVINE, DR LESLIE	1,637	2.3695	1,637	1,555	1,473	1,391	1,309
LONG, BALLARD	35	0.0507	35	33	31	29	28
M BIRD CONSTRUCTION	41	0.0593	41	38	36	34	32

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EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT (PERCENT) [2]	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND YEAR [3]	THIRD YEAR [3]	FOURTH YEAR [3]	FIFTH YEAR [3]
MAHJOUBI, AFSAR S	63	0.0912	63	59	56	53	50
MALIN, LILY	54	0.0782	54	51	48	45	43
[illegible], JANICE	36	0.0521	36	34	32	30	28
MARCROFT, JAMES A & JOAN	38	0.0550	38	36	34	32	30
MARSHALL, CHARLES	20	0.0289	20	19	18	17	16
MAYBERRY, DONALD J	41	0.0593	41	38	36	34	32
MILBRAT, IRVING	73	0.1057	73	69	65	62	58
[illegible], CHARLOTTE	115	0.1665	115	109	103	97	92
MITCHELL, JAMES L & CHERYL A	155	0.2244	155	147	139	131	124
[illegible], WAYNE H & JULIA H	103	0.1491	103	97	92	87	82
MORRIS, KARL	304	0.4400	304	288	273	258	243
MULLIGAN, ROBERT & INEZ	35	0.0507	35	33	31	29	28
NEWBERRY COMMUNITY SERVICE DIST	23	0.0333	23	21	20	19	18
[illegible] VIEW DEVELOPMENT, INC	2,899	4.1962	2,899	2,754	2,609	2,464	2,319
O P D L INC	109	0.1578	109	103	98	92	87
O'KEEFE, SARAH-LEE & JOHN H	50	0.0724	50	47	45	42	40
P & H ENGINEERING & DEV CORP	667	0.9654	667	633	600	566	533
PARKER, GEORGE R	144	0.2084	144	136	129	122	115
PATHFINDER INVESTORS	472	0.6832	472	448	424	401	377
PAYAN, PAUL	32	0.0463	32	30	28	27	25
PERKO, BERT K	132	0.1911	132	125	118	112	105
PITTS, JOE	30	0.0434	30	28	27	25	24
[illegible], ANDREAS L CATHLYN	17	0.0246	17	16	15	14	13
[illegible], JOHN H & SANDRA M	92	0.1332	92	87	82	78	73

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TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
PRICE, ALAN E	37	0.0536	37	35	33	31	29
PRICE, DONALD	42	0.0608	42	39	37	35	33
PUCKHABER, WILLIAM F TRUST	63	0.0912	63	59	56	53	50
PURCIO, THOMAS P & PATRICIA A	80	0.1158	80	76	72	68	64
RANDOLPH, JOAN E	24	0.0347	24	22	21	20	19
REEVES, RICHARD	230	0.3329	230	218	207	195	184
RICE, DANIEL & MARY	121	0.1751	121	114	108	102	96
RICH, HENRY C & DIANA	24	0.0347	24	22	21	20	19
RIEGER, WALTER M	62	0.0897	62	58	55	52	49
RIKUO CORPORATION	1,517	2.1958	1,517	1,441	1,365	1,289	1,213
ROSSI, JAMES L & NAOMI I	614	0.8887	614	583	552	521	491
ROTEX CONSTRUCTION COMPANY	2,529	3.6606	2,529	2,402	2,276	2,149	2,023
SAN BERNARDINO COUNTY BARSTOW - DAGGETT AIRPORT	168	0.2432	168	159	151	142	134
SANTUCCI, ANTONIO & WILDA	30	0.0434	30	28	27	25	24
SCOGGINS, JERRY	105	0.1520	105	99	94	89	84
SHEPPARD, THOMAS & GLORIA	217	0.3141	217	206	195	184	173
SHORT, CHARLES & MARGARET	54	0.0782	54	51	48	45	43
SHORT, JEPP	30	0.0434	30	28	27	25	24
SILVER VALLEY RANCH, INC	109	0.1578	109	103	98	92	87
SMITH, WILLIAM E	19	0.0275	19	18	17	16	15
SNYDER, KRYL K & ROUTH, RICHARD J	64	0.0926	64	60	57	54	51
SOUTHERN CALIFORNIA EDISON CO - AGRICULTURE	5,858	8.4792	5,858	5,565	5,272	4,979	4,686
SOUTHERN CALIFORNIA EDISON CO - INDUSTRIAL	4,565	6.6076	4,565	4,336	4,108	3,880	3,652
SOUTHERN CALIFORNIA GAS COMPANY	98	0.1419	98	93	88	83	78

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EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA / PRODUCER	BASE ANNUAL PRODUCTION [1] (ACRE-FEET)	BASE ANNUAL PRODUCTION RIGHT [2] (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
ST ANTONY COPTIC ORTHODOX MONASTERY	130	0.1882	130	123	117	110	104
STEWART, STANLEY & PATRICIA	27	0.0391	27	25	24	22	21
SUGA, TAKEAKI	154	0.2229	154	146	138	130	123
SUNDOWN LAKES, INC	168	0.2432	168	159	151	142	134
SWARTZ, ROBERT & IRENE	50	0.0724	50	47	45	42	40
TAFOYA, RAYMOND & MURIEL	18	0.0261	18	17	16	15	14
TAYLOR, TOM	503	0.7281	503	477	452	427	402
THAYER, SHARON	58	0.0840	58	55	52	49	46
THE LEE HENNESSY RANCH CALIFORNIA, LTD	1,033	1.4952	1,033	981	929	878	826
TRIPLE N PARTNERSHIP	993	1.4373	993	943	893	844	794
UNION PACIFIC RAILROAD COMPANY	249	0.3604	249	236	224	211	199
VAN BASTELAAR, ALPHONSE	78	0.1129	78	74	70	66	62
VAN DIEST, CORNELIUS	934	1.3519	934	887	840	793	747
VAN LEEUWEN, JOHN	1,084	1.5690	1,084	1,029	975	921	867
VANDER GUIEEN, AGNES	1,792	2.5938	1,792	1,702	1,612	1,523	1,433
VAUGHT, ROBERT E & KAREN M	43	0.0622	43	40	38	36	34
VERNOLA, PAT	1,310	1.8962	1,310	1,244	1,179	1,113	1,048
WARD, ERNEST & LAURA	38	0.0550	38	36	34	32	30
WARD, RONNY H	130	0.1882	130	123	117	110	104
WEBER, F E & JUDELL	96	0.1390	96	91	86	81	76
WEBSTER, THOMAS M & PATRICIA J	24	0.0347	24	22	21	20	19
WEIDKNECHT, ARTHUR J & PEGGY A	79	0.1143	79	75	71	67	63
WESTERN HORIZON ASSOCIATES INC	1,188	1.7196	1,188	1,128	1,069	1,009	950
WESTERN ROCK PRODUCTS	31	0.0449	31	29	27	26	24

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EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET) FIRST YEAR	SECOND [3] YEAR	THIRD [3] YEAR	FOURTH [3] YEAR	FIFTH [3] YEAR
WET SET, INC	129	0.1867	129	122	116	109	103
WITTE, E DANIEL	27	0.0391	27	25	24	22	21
WLSR INC	133	0.1925	133	126	119	113	106
WORSBY, REVAE	29	0.0420	29	27	26	24	23
YARD, BETTY	26	0.0376	26	24	23	22	20
YERMO WATER COMPANY	453	0.6557	453	430	407	385	362
YOUNG, KEITH O - (DESERT TURF)	312	0.4516	312	296	280	265	249
[illegible]	3,500	5.0661	3,500	3,325	3,150	2,975	2,800
UNIDENTIFIED/UNVERIFIED PRODUCER POOL	328	0.4632					
BAJA SUBAREA TOTALS =	69,087	100					

1 Base Annual Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records, site inspection, land use estimates from 1987 and 1989 aerial photography and responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production Right expressed as a percentage of the Total Base Annual Production.

3 Values based on production ramp down of five percent (5%) per year. Free Production Allowance for the fifth year is equal to eighty percent (80%) of the Base Annual Production.

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EXHIBIT B
TABLE B-2
TABLE SHOWING TOTAL WATER PRODUCTION
FOR AQUACULTURE AND RECREATIONAL LAKE PURPOSES
ALTO SUBAREA

PRODUCER	TOTAL WATER [1] PRODUCTION (ACRE-FEET)	BASE ANNUAL [2] PRODUCTION (ACRE-FEET)	RECIRCULATED [3] WATER (ACRE-FEET)
CDFG - MOJAVE RIVER FISH HATCHERY	10,678	20	10,658
JESS RANCH WATER COMPANY	18,625	7,480	11,145
ALTO SUBAREA TOTALS =	29,303	7,500	21,803

1 Total Water Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records; James C. Hanson site inspection; land use estimates from 1989 aerial photography; responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production as shown on Table B-1.

3 Amount shown is the difference between the Total Water Production and the Base Annual Production.

EXHIBIT B
TABLE B-2
TABLE SHOWING TOTAL WATER PRODUCTION
FOR AQUACULTURE AND RECREATIONAL LAKE PURPOSES
BAJA SUBAREA

PRODUCER	TOTAL WATER [1] PRODUCTION	BASE ANNUAL [2] PRODUCTION	RECIRCULATED [3] WATER
	(ACRE-FEET)		
BROWY, ORVILLE & LOUISE	210	33	177
CALICO LAKES HOMEOWNERS ASSOCIATION	2,513	1,031	1,482
CDFG - CAMP CADY	102	14	88
CHEYENNE LAKE, INC	638	122	516
CRYSTAL LAKES PROPERTY OWNERS ASSOCIATION	6,575	447	6,128
DESERT LAKES CORPORATION - (LAKE DOLORES)	928	483	445
FUNDAMENTAL CHRISTIAN ENDEAVOR	440	285	155
HORTON'S CHILDREN'S TRUST	1,291	106	1,185
HORTON, JOHN MD	672	183	489
KIEL, MARY	188	34	154
LAKE JODIE PROPERTY OWNERS ASSOCIATION	2,805	254	2,551
LAKE WAIKIKI	400	98	302
LAKE WAINANI OWNERS ASSOCIATION	1,420	202	1,218
LEE, MOON & OKBEA	171	49	122
O F D L INC	434	109	325
RICE, DANIEL & MARY	614	121	493
SCOGGINS, JERRY	922	105	817
SILVER VALLEY RANCH, INC	455	109	346
SMITH, WILLIAM E	153	19	134
SUNDOWN LAKES, INC	1,109	168	941
TAPIE, RAYMOND & MURIEL	108	18	90
THAYER, SHARON	159	58	101
WET SET, INC	441	129	312
WLSR INC	678	133	545

EXHIBIT B
TABLE B-2
TABLE SHOWING TOTAL WATER PRODUCTION
FOR AQUACULTURE AND RECREATIONAL LAKE PURPOSES
BAJA SUBAREA

PRODUCER	TOTAL WATER [1] PRODUCTION	BASE ANNUAL [2] PRODUCTION	RECIRCULATED [3] WATER
	(ACRE-FEET)		
BAJA SUBAREA TOTALS =	23,426	4,310	19,116

1 Total Water Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records; James C. Hanson site inspection; land use estimates from 1989 aerial photography; responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production as shown on Table B-1.

3 Amount shown is the difference between the Total Water Production and the Base Annual Production.

EXHIBIT C

ENGINEERING APPENDIX

CONTENTS

A. ADJUSTMENT OF FREE PRODUCTION ALLOWANCES

B. DETERMINATION OF SURFACE FLOW COMPONENTS

TABLE C-1: MOJAVE BASIN AREA ADJUDICATION SUBAREA HYDROLOGICAL INVENTORY BASED ON LONG-TERM AVERAGE NATURAL WATER SUPPLY AND OUTFLOW AND CURRENT YEAR IMPORTS AND CONSUMPTIVE USE

EXHIBIT C

ENGINEERING APPENDIX

The purpose of this Engineering Appendix is to establish the basis for measurements, calculations and determinations required in the operation of the Physical Solution.

A. Adjustment of Free Production Allowances. In the preparation of the report required by Paragraph 24 (o) of this Judgment, the Watermaster shall take into account all available pertinent hydrologic data and estimates, including at least the factors, or changes in the factors, shown in the attached Table C-1, "MOJAVE BASIN AREA ADJUDICATION SUBAREA HYDROLOGICAL INVENTORY BASED ON LONG-TERM AVERAGE NATURAL WATER SUPPLY AND OUTFLOW AND CURRENT YEAR IMPORTS AND CONSUMPTIVE USE," and changes in storage as determined by well levels, the factors listed in Paragraph 2(a) of Exhibit "H", and other pertinent data. The numbers for each of the factors for each Subarea shown in Table C-1 are Sample Numbers only, and are not intended to be used in determining actual water supply, Consumptive Use and outflow, or Free Production Allowance of the Subareas.

B. Determination of Surface Flow Components. The procedures used to determine the historical surface flow components of the Mojave River at various locations are summarized below.

1. Determination of Surface Flow Components at Lower Narrows. Since the records available for the discharge of the Mojave River at Lower Narrows only provide data on the total amount of surface flow and since Storm Flow occurs during and following periods of rainfall, it was necessary to determine what portion of

total measured surface flow at Lower Narrows was Storm Flow and what portion was Base Flow.

The Parties in reaching the physical solution provided for in the Judgment, used certain procedures to separate the Storm Flow and Base Flow components of the total measured surface flow at Lower Narrows. Hydrographs of the mean daily discharge at Lower Narrows were plotted for the Year under consideration together with corresponding rainfall data obtained from the National Oceanic and Atmospheric Administration (NOAA) for Lake Arrowhead. Hydrographs were also plotted for the combined flow of West Fork Mojave River and Deep Creek which together with the Lake Arrowhead precipitation data served as a guide for interpreting those periods during which Storm Flow was likely to have occurred at Lower Narrows.

Other factors considered included:

- Occurrences of Storm Flow at Barstow and Afton Canyon,
- Precipitation at Victorville and Barstow,
- Consideration of the time of Year and temperature, &
- Shape of hydrographs for Years having similar Base Flow characteristics.

Based on interpretation of all of the foregoing information, the flows occurring on those days during which Storm Flow most likely occurred were "scalped" by projecting an estimated Base Flow Curve through the Storm Flow Period. The Base Flow component of the total monthly flow was then determined as follows:

a. For those periods during which there was obviously no Storm Flow, the entire recorded mean daily flows were assumed to be Base Flow.

b. For the remaining Storm Flow periods, the Base Flow component was taken as the area under the Base Flow Curve, except that for those days within the Storm Flow period when the actual mean daily discharge is less than the amount indicated by the Base Flow Scalping Curves, then the actual recorded amount is used.

2. Determination of Surface Flow Components at Waterman Fault. The total amount of surface flow passing the Waterman Fault (under current riverbed conditions) is considered to be Storm Flow and can be estimated from the Storm Flow passing the USGS gauging station Mojave River at Barstow. The following table was developed to provide a method for estimating flow at Waterman Fault:

Storm Flow At Barstow Gage[1] (Acre-Feet)	Estimated Surface Flow at Waterman Fault (Acre-Feet)
2,000	0
10,000	6,200
20,000	14,300
30,000	22,600
40,000	31,400
50,000	40,500
60,000	49,200
70,000	58,400
80,000	67,800
90,000	76,800
100.000	85,400

[1]From Recorded Flow at USGS Gaging Station Mojave River at Barstow. Relationship is based on single storm events. More than one storm event separated by more than five day of zero flow will be considered as separate storms.

3. Determination of Surface Flow Components at Afton. Records available for the discharge of the Mojave River at Afton, California, provide data on the total mount of surface flow and since storm runoff occurs during and immediately following a major storm event in the watershed area tributary to the Baja Basin below Barstow or in the event of large Storm Flows at Barstow which reach Afton, it was necessary to determine what portion of the total measured surface flow at Afton is Storm Flow and what portion of Base Flow.

The Parties, in reaching the physical solution provided for in the Judgment, used certain procedures to separate the Storm Flow and Base Flow components of the total measured surface flow at Afton. Hydrographs of the mean daily discharge at Afton were plotted for the water Year under consideration. In the absence of Storm Flow, the Base Flow curve at Afton was generally a relatively constant amount. Storm Flows were evidenced by sharp spikes or abrupt departures from the antecedent Base Flow and a fairly rapid return to pre-storm Base Flow Condition. The hydrograph of flows at Barstow served as a guide for identifying those periods during which Storm Flow was likely to have occurred at Afton.

Based on interpretation of all of the foregoing information, the flows occurring on those days during which Storm Flow most likely occurred were "scalped" by projecting an estimated Base Flow Curve through the Storm Flow Period. The Base Flow component of the total monthly flow was then determined as follows:

a. For those periods during which there is obviously no Storm Flow, the entire recorded mean daily flows were assumed to be Base Flow.

b. For the remaining Storm Flow periods, the Base Flow component was taken as the area under the Base Flow Curve except that for those days within the Storm Flow period when the actual mean daily discharge was less than the amount indicated by the Base Flow Scalping Curves, then the actual recorded amount was used.

4. Engineers' Work Papers. These procedures are reflected in the Work Papers of the Engineers, copies of which are filed with the Watermaster.

TABLE C-1
Mojave Basin Area Adjudication
Subarea Hydrological Inventory Based On
Long-Term Average Natural Water Supply and Outflow
and Current Year Imports and Consumptive Use
(All Amounts in Acre-Feet)

	Este	Oeste	Alto	Centro	Baja	Basin Totals
WATER SUPPLY						
Surface Water Inflow						
Gaged	0	0	65,000	0 [1]	0 [2]	65,000 [3]
Ungaged	1,700	1,500	3,000	37,300	14,300 [2]	6,500 [4]
Subsurface Inflow	0	0	1,000	2,000	1,200	0 [4]
Deep Percolation of Precipitation	0	0	3,500	0	100	3,600
Imports						
Lake Arrowhead CSD	0	0	1,500	0	0	1,500
Big Bear ARWWA	2,000	0	0	0	0	2,000
TOTAL	3,700	1,500	74,000	39,300	15,600	78,600
CONSUMPTIVE USE AND OUTFLOW						
Surface Water Outflow						
Gaged	0	0	0	0 [1]	8,200	8,200
Ungaged	0	0	37,300 [4]	14,000 [2]	0	0
Subsurface Outflow	300	800	2,000	37,300	0	0
Consumptive Use						
Agriculture	6,800	2,900	16,300	20,300 [5]	30,200	76,500
Urban	1,900	1,200	36,300	9,500	9,700	58,600 [6]
Phreatophytes	0	0	3,100	900	1,500	7,500 [6]
Exports	0	0	0	0	0	0
TOTAL	8,900	4,900	97,000	45,900	49,600	150,800
Surplus / (Deficit)	(5,200)	(3,400)	(23,000)	(6,600)	(34,000)	(72,200)
Total Estimated Production (Current Year)[7]	15,700	7,600	98,900	46,500	54,300	223,000
PRODUCTION SAFE YIELD (Original Year)	10,500	4,200	75,900	39,900	20,300	150,800

SAMPLE CALCULATIONS

[1] Estimated from reported flows at USGS gaging station, Mojave River at Victorville Narrows.

[2] Includes 14,000 acre-feet of Mojave River surface flow across the Waterman Fault estimated from reported flows at USGS gaging station, Mojave River at Barstow, and 300 acre-feet of local surface inflow from Kane Wash.

[3] Represents the sum of Este (1,700 af), Oeste (1,500 af), Alto (3,000 af) and Baja (300 af from Kane Wash).

[4] Inter subarea subsurface flows do not accrue to the total basin water supply.

[5] Estimated from reported flows at USGS gaging station, Mojave River at Barstow.

[6] Estimated by Bookman-Edmonston.

[7] For purposes of this Table, the current year is 1990.

EXHIBIT D

TIME SCHEDULES

1. Prior Year Report. Annually not later than February 1 Watermaster shall provide to each Party a report covering the prior Year and setting forth at least the following:

a. Each Producer's Replacement Water Assessment, including any surcharges, based on rates applicable during the prior Year.

b. Each Producer's Makeup Water Assessment, based on rates applicable during the prior water Year.

2. MWA Supplemental Water Rates. Annually, not later than December 1, MWA shall set the rates per acre foot to be charged for Supplemental Water for the following Year, and shall project the rates for the following two Years.

3. Budget and Assessment Rates. Annually, not later than February 1, Watermaster shall provide to all Parties its proposal for its Administrative Budget, Administrative Assessment Rates, Replacement Water Rates, and Makeup Water Rates for the next ensuing Year and its rate projections for the next two (2) years. No later than March 1 of each Year, the Watermaster shall hold a public hearing to receive comments from Parties as to its proposal. Not later than April 1 of each Year, Watermaster shall adopt its final Budget and assessment rates for the next ensuing Year, and shall notify all Parties of its final Budget and Assessments rates within fifteen (15) days of adoption.

4. Free Production Allowance Adjustment. In any Year that Watermaster prepares a report pursuant to Paragraph 24 (o) of this Judgment that includes a recommendation for an adjustment of a Free

Production Allowance, Watermaster shall notify all Parties as to its recommendation not later than February 1, shall hold a public hearing thereon not later than March 1, and shall submit any such recommendation, which may be revised pursuant to the public hearing, to the Court not later than April 1.

5. Payment of Administrative Assessments and Biological Resource Assessments. Each Producer shall submit quarterly along with the Production report required by Paragraph 24 (p) an Administrative Assessment payment in an amount equal to the current Year Administrative Assessment Rate multiplied times the acre-feet of water Produced during the quarter and a Biological Resource Assessment payment in an amount equal to the current Year Biological Resource Assessment Rate multiplied times the acre-feet of water Produced during the quarter.

6. Payment of Replacement Water Assessments and Makeup Water Assessments. Replacement Water Assessments and Makeup Water Assessments for the prior Year shall be due and payable on July 1.

7. Delinquency of Assessments. Any assessment payable pursuant to this Judgment shall be deemed delinquent: i) if paid in Person, if not paid within five (5) days of the date due; ii) if paid by electronic funds transfer, if not paid within three (3) banking days of the date due; or iii) if paid by any other means, if not paid within ten (10) days of the date due. "Payment" shall occur when good and sufficient funds have been received by the Watermaster. Any assessment shall also be deemed delinquent in the event that any attempted payment is by funds that are not good and sufficient.

EXHIBIT E

LIST OF PRODUCERS AND THEIR DESIGNEES

EXHIBIT E

PRODUCER	DESIGNEE
ABBOND, EDWARD & GRACE	Same
ABBOTT, LEONARD C	Therese E. Parker, Esq.
ABSHIRE, DAVID V	Same
ADELANTO, CITY OF	Michael B. Jackson, Esq.
ADELANTO, CITY OF/GEORGE AFB	
AEROCHEM, INC	James Heiser, Esq.
AGCON, INC	Robert E. Hove
AGCON, INC.	Robert E. Hove
AGUAYO, JEANETTE L.	Same
AKE, CHARLES J & MARJORIE M	Same
ANDERSON, ROSS C & BETTY J	Same
ANGERER, ROBERT J & PEGGY	Same
ANTELOPE VALLEY DAIRY	Dick Van Dam
APPLE VALLEY COUNTRY CLUB	Terry Caldwell, Esq.
APPLE VALLEY DEVELOPMENT	Same
APPLE VALLEY FOOTHILL CO WATER	Doreen Ryssel
APPLE VALLEY HEIGHTS CO. WATER	Elizabeth Hanna, Esq.
APPLE VALLEY RANCHOS WATER	Fredric Fudacz, Esq.
APPLE VALLEY REC. & PARKS	Elizabeth Hanna, Esq.
APPLE VALLEY VIEW MUTUAL WATER CO.	Joseph Saltmeris, Esq.
APPLE VALLEY, TOWN OF	Sandra Dunn, Esq.
ARC LAS FLORES	William De Wolfe, Esq.
ARGUELLES, ALFREDO	Therese Parker, Esq.
ATCHISON, TOPEKA, SANTA FE	Curtis Ballantyne, Esq.
ATCHISON, TOPEKA, SANTA FE	Curtis Ballantyne, Esq.
AVDEEF, THOMAS & LUCILLE	Same
AZTEC FARM DEVELOPMENT CO	Al Jackson
BACA, ENRIQUE	Same
BAGLEY, ROY	Same
BALDERRAMA, ALFRED & LINDA	Same
BALDY MESA WATER DISTRICT	William Smillie

PRODUCER	DESIGNEE
BALL, DAVID P	Same
BAR H MUTUAL WATER COMPANY	Paul Nelson, President
BARAK, RICHARD	Therese Parker, Esq.
BARBER, JAMES B	Same
BARNES, FAY	Kirtland Mahlum, Esq.
BARSTOW CALICO K O A	Robert L. Moore
BASS, NEWTON T	Barbara Davisson, Business Manager
BASTIANON, REMO	Same
BASURA, STEVE	Same
BAUR, KARL & RITA	Same
BEDINGFIELD, LYNDELL&CHARLENE	Same
BEINSCHROTH, A J	Same
BELL, CHUCK	Therese Parker, Esq.
BENTON, PHILIP G	Same
BORGOGNO, STEVEN & LILLIAN	Same
BOWMAN, EDWIN L	Same
BOYCE, KENNETH & WILLA	Same
BROMMER, MARVIN	Same
BROWN, BOBBY G & VALERIA R	Same
BROWN, DOUG & SUE	Same
BROWN, RONALD A	Same
BROWY, ORVILLE & LOUISE	Same
BRUINS, NICHOLAS	Same
BURNS, BOBBY J & EVELYN J	Therese Parker, Esq.
BURNS, RITA J & PAMELA E	Same
BURNS, ANNIE L	Same
CALICO LAKES HOMEOWNERS	Billy Wyckoff
CALIF DEPT OF TRANSPORTATION	Alexander De Vorkin, Esq.
CAMPBELL, M A & DIANNE	Same
CARDOZO, MANUEL & MARIA	Robert Dougherty, Esq.
CARTER, JOHN THOMAS	Therese Parker, Esq.
CASA COLINA FOUNDATION	Charles E. Schwartz
CDFG - CAMP CADY	Marilyn Levin, Esq.

PRODUCER	DESIGNEE
CDFG - MOJAVE NARROWS REG.	Marilyn Levin, Esq.
CDFG - MOJAVE RIVER FISH	Marilyn Levin, Esq.
CENTER WATER CO	Morgan Daniels
CHAFA, LARRY R	Same
CHAMISAL MUTUAL	Earl D. McCool
CHANG, TIMOTHY & JANE	Same
CHASTAIN, W C	Same
CHEYENNE LAKE, INC	Michael Hayes
CHIAO MEI DEVELOPMENT	Maple Sia
CHO BROTHERS RANCH	Chung Cho Gong
CHOI, YONG IL & JOUNG AE	Same
CHRISTISON, JOEL	Same
CHUANG, MARSHAL	Therese Parker, Esq.
CLARK, KENNETH R	Same
CLEAR VIEW FARMS	Terry Caldwell, Esq.
CLUB VIEW PARTNERS	Manoucher Sarbaz
CONNER, WILLIAM H	Same
COOK, KWON W	Same
COOL WATER RANCH	Paul Henderson, Esq.
COPELAND, ETAL	Don W. Little
CRAMER, MARGARET MUIR	Terry Caldwell, Esq.
CROSS, LAWRENCE E & SHARON I	Same
CRYSTAL HILLS WATER COMPANY	Same
CRYSTAL LAKES PROPERTY OWNERS	Russell Khouri
CUNNINGHAM, WILLIAM	Same
DAGGETT COMMUNITY SERVICES	Lawrence Alf, CSD Chairman
DAHLQUIST, GEORGE R	Therese Parker, Esq.
DALJO CORPORATION	George Rubsch
DAVIS, Paul	Same
DAVIS, RONALD & DONNA	Same
DEJONG, ALAN L	Therese Parker, Esq.
DELPERDANG, ROBERT H	Same
DENNISON, QUENTIN c/o Clegg, Frizell & Joke	Same

PRODUCER	DESIGNEE
DESERT DAWN MUTUAL WATER COMPANY	Same
DESERT LAKES CORPORATION - (LAKE DOLORES)	Terry Christianson
DESERT COMMUNITY BANK	Same
DEVRIES, NEIL	Robert Dougherty, Esq.
DEXTER, CLAIR F	Same
DEXTER, J P	Same
DIBERNARDO, JOHN	Same
DOCIMO, DONALD P & PATRICIA J	Terry Caldwell, Esq.
DOLCH, ROBERT & JUDY	Same
DOMBROWSKI, MICHAEL W & SUSAN M	Same
DONALDSON, JERRY & BEVERLY	Same
DOSSEY, D A	Same
DOWSE, PHILIP	Same
DURAN, FRANK T	Therese Parker, Esq.
ELLISON, SUSAN	Same
EVENSON, EDWIN H & JOYCELAINE	Same
EVKHANIAN, JAMES H & PHYLLIA	Same
FAWCETT, EDWARD C	Same
FELIX, ALAN E & CAROL L	Same
FERRO, DENNIS & NORMA	Same
FISHER, DR DOLORES	Same
FISHER, JEROME	Same
FITZWATER, R E	Robert Dougherty, Esq.
FRIEND, JOSEPH & DEBORAH	Same
FUNDAMENTAL CHRISTIAN ENDEAVOR	Betty Brock
GAETA, TRINIDAD C/O BLUE BEAD FARMS	Therese Parker, Esq.
GAINES, JACK & MARY	Same
GARCIA, DANIEL	Same
GARCIA, SONIA L	Same
GAYJIKIAN, SAMUEL & HAZEL	Same
GESIRIECH, WAYNE	Therese Parker, Esq.
GILBERT, HERBERT & BERNICE	Same
GOLD, HAROLD	Therese Parker, Esq.

PRODUCER	DESIGNEE
GOMEZ, CIRIL - LIVING TRUST	Therese Parker, Esq.
GORMAN, VIRGIL	Robert Dougherty, Esq.
GRACETOWN INVESTMENT CO - JETCO PROP FUND	Same
GRAVES, CHESTER B	Same
GREEN ACRES ESTATES	Susan Zutavern
GRIEDER, RAYMOND H & DORISANNE	Same
GRILL, NICHOLAS P & MILLIE D	Therese Parker, Esq.
GROEN, CORNELIUS	Robert Dougherty, Esq.
GUBLER, HANS	Same
GULBRANSON, MERLIN	Therese Parker, Esq.
HAIGH, WHILLDYN & MARGARET	Same
HAL-DOR LTD	Russ Jones, Owner
HALL, LARRY	Same
HANDLEY, DON R & MARY ANN	Same
HANIFY, DBA - WHITE BEAR RANCH	Same
HARALIK, BESS & ROBERT	Same
HARDESTY, LESLIE E & BECKY J	Same
HARESON, NICHOLAS & MARY	Same
HARPER LAKE CO;UC OPERATING/HARPER DRY LAKE	David J. Cooper, Esq.
HART, MERRILL W	Same
HARTER FARMS	Richard Slivikin, Esq.
HARTER, JOE & SUE	Richard Slivikin, Esq.
HARTLEY, LONNIE	Same
HARVEY, FRANK	Same
HELENDALE SCHOOL DISTRICT	Patricia Bristol
HENDLEY, RICK & BARBARA	Same
HERT, SCOTT	Therese Parker, Esq.
HESPERIA GOLF AND COUNTRY CLUB	Michael Davis, Esq.
HESPERIA WATER DISTRICT	James Markman, Esq.
HI DESERT MUTUAL WATER CO	Stanley Derryberry
HI-GRADE MATERIALS	Robert E. Hove
HI-GRADE MATERIALS CO.	Robert E. Hove
HIETT, HARRY L & PATRICIA J	Same

PRODUCER	DESIGNEE
HILARIDES, FRANK	Same
HILEMAN, KATHERINE	Same
HILL, MELVIN	Therese Parker, Esq.
HITCHIN LUCERNE, INC	Same
HODGE, STANLEY W	Same
HOLLISTER, ROBERT H & RUTH M	Same
HOLWAY, ROBERT	Same
HONG, PAUL B & MAY	Same
HORTON'S CHILDREN'S TRUST	John W. Horton, M.D.
HORTON, JOHN MD	Same
HOSKING, JOHN W & JEAN	Same
HOY, MIKE	Therese Parker, Esq.
HRUBIK, THOMAS A	Dan McKinney, Esq.
HUBBARD, ESTER & MIZUNO, ARLEAN	Same
HUNT, RALPH M & LILLIAN F	Same
HUTCHISON, WILLIAM O	Same
HYATT, JAMES & BRENDA	Same
INDUSTRIAL ASPHALT	Martha Guy, Esq.
IRVIN, BERTRAND W	Same
JACKSON, RAY	Same
JAMS RANCH	Melvin Finklestein
JESS RANCH WATER COMPANY	Calvin House, Esq.
JOHNSON, JAMES R	Same
JOHNSON, LARRY & CARLEAN	Same
JOHNSON, RONALD	Same
JOHNSTON, HARRIET AND LARRY W	Same
JORDAN, RAYMOND	Same
JUBILEE MUTUAL WATER COMPANY	Ray Clark
JUNIPER RIVIERA COUNTY WATER DISTRICT	William Smillie
JUSTICE, CHRIS	Same
JUSTICE, CHRIS	Same
J V A AIR INC	Jim Anders
KAPLAN, ABRAHAM M	Same

PRODUCER	DESIGNEE
KASNER, ROBERT	Same
KATCHER, AUGUST M & MARCELINE	Same
KEMP, ROBERT & ROSE	Same
KEMPER CAMPBELL RANCH	Steve Abbott
KIEL, MARY	Same
KIM, JOON HO	Same
KING, GENEVIEVE E	Same
KOSHAREK, JOHN & JOANN	Same
LAKE ARROWHEAD COMMUNITY SERVICES DISTRICT	Steve Abbott, Esq.
LAKE JODIE PROPERTY OWNERS ASSOCIATION	Same
LAKE WAIKIKI	Virginia Cahill, Esq.
LAKE WAINANI OWNERS ASSOCIATION	Same
LANGLEY, MICHAEL R & SHARON	Same
LAWRENCE, WILLIAM W	Same
LAWSON, ERNEST & BARBARA	Same
LEE, DOO HWAN	Same
LEE, MOON & OKBEA	Same
LEE, SEPOONG ETAL & WOO POONG	Same
LEE PHD, VIN JANG T C/O ARCHIBEK, ERIC&SANDI	Same
LENHERT, RONALD & TONI	Same
LESHIN, CONNIE & SOL	Same
LESHIN, SOL	Same
LEVINE, DR LESLIE	Therese Parker, Esq.
LEWIS HOMES OF CALIFORNIA	Kenneth P. Corhan, Esq.
LEYERLY, GENEVA	Robert Dougherty, Esq.
LEYERLY, RICHARD	Robert Dougherty, Esq.
LINT, GORDON	Same
LONG, BALLARD	Same
LONGMAN, JACK	Same
LOPEZ, BALTAZAR	Same
LOUNSBURY, J PETER & CAROLYN	Therese Parker, Esq.
LOW, ROBERT	Same
LUA, ANTONIO	Same

PRODUCER	DESIGNEE
LUCERNE VALLEY MUTUAL WATER COMPANY	Alice Feese
LUCERNE VALLEY PARTNERS	Manoucher Sarbaz
LUCERNE VISTA WATER CO	Thomas Stavros, Director
LUCKEY, MANLEY J	Terry Caldwell, Esq.
LUDINGTON, JAMES E & JO ANN	Same
LUTH, KEN	Therese Parker, Esq.
LYON, LOUIS & ERIKA	Same
MAHJOUBI, AFSAR S	Same
MALIN, LILY	Same
MALONEY, JANICE	Same
MARCROFT, JAMES A & JOAN	Same
MARIANA RANCHOS COUNTY WATER DISTRICT	Gary Shelton
MARSHALL, CHARLES	Same
MARTIN, LENDELL	Same
MAYBERRY, DONALD J & SANDRA D	Same
M BIRD CONSTRUCTION	Same
MCCALL, REX	Same
MCCOLLUM, CHARLES L	Same
MCINNIS, WILLIAM S	Same
MEAD, G C	Therese Parker, Esq.
MEADOWBROOK DAIRY	Same
MEYERS, LONNIE	Same
MILBRAT, IRVING & DIXIE	Same
MITCHELL, CHARLES A	Same
MITCHELL, CHARLOTTE	Same
MITCHELL, JAMES L & CHERYL A	Same
MITCHELL, ROBIN & JUDITH	Same
MITSUBISHI CEMENT CORPORATION	Michael Davis, Esq.
MOFFITT, THOMAS R & EDITH I	Same
MONACO INVESTMENT COMPANY	Manoucher Sarbaz
MOORE, WAYNE G & JULIA H	Same
MORRIS, JULIA V	Same
MOSS, LAWRENCE W & HELEN J	Same

PRODUCER	DESIGNEE
MOST, MILTON W	Therese Parker, Esq.
MULLIGAN, ROBERT & INEZ	Same
MURPHY, BERNARD H	Same
MURPHY, BERNARD TRUST	Same
MURPHY, KENNETH	Same
MUTUAL FUNDING CORP	Ron Yee-Dong, President
NAVAJO MUTUAL WATER CO	James Hanson
NELSON, MILDRED L	Same
NEWBERRY COMMUNITY SERVICE DIST	Vicki Morris
NEWBERRY SPRINGS COMPANY	Ed Dygert, Esq.
NUNN, DONALD & PEARL	Paul Henderson, Esq.
NU VIEW DEVELOPMENT, INC	Richard Slivkin, Esq.
O'BRYANT, ROBERT C & BARBARA	Same
O F D L INC	Virginia Cahill, Esq.
OHAI, REYNOLDS & DOROTHY	Same
O'KEEFE, SARAH-LEE & JOKE E	Same
ORMSBY, HARRY G	Same
OROPEZA, JOSE M	Same
OSTERKAMP, GEROLD	Robert Dougherty, Esq.
OWL ROCK PRODUCTS COMPANY	Vince Dommarito, Area Manager
P & H ENGINEERING & DEV CORP	Same
PALISADES RANCH	Robert Dougherty, Esq.
PARK, CHANHO	Same
PARK, HEA JA & JEONG IL	Same
PARKER, DAVID E	Same
PARKER, GEORGE R	Therese Parker, Esq.
PATHFINDER INVESTORS	Same
PAYAN, PAUL	Same
PEARL, ALICE	Same
BORUFF, PAUL & LINDA; PEARSON, DERYL B	Same
PEREZ, EVA	Therese Parker, Esq.
PERKO, BERT K	Same
PERRY, THOMAS A	Same

PRODUCER	DESIGNEE
PETTIGREW, DAN	Therese Parker, Esq.
PETTIGREW, HOWARD L	Therese Parker, Esq.
PETTIS FAMILY TRUST	Therese Parker, Esq.
P G & E	Robert Rickett, Esq.
PHENIX PROPERTIES LTD	Elizabeth Taylor, Manager
PITTMAN, LEROY W	Same
PITTS, JOE & STELLA	Same
PLUESS-STAUFER CALIFORNIA INC	David Aladjem, Esq.
POHL, ANDREAS & CATHLYN	Same
POLAND, JOHN R & SANDRA M	Same
POLICH, LEE & DONNA	Same
PRICE, ALAN E	Same
PRICE, DONALD & RUTH	Same
PUCKHABER TRUST, WILLIAM F	Same
PURCIO, THOMAS F & PATRICIA A	Same
RANCHERITOS MUTUAL WATER CO	Same
RANDOLPH, JOAN E	Therese Parker, Esq.
REDDY, BOMMI V & KARUNA V	Same
REED, MIKE	Same
REEVES, RICHARD	Same
RESSEQUE, JOHN & BILL	Same
RICE, DANIEL & MARY	Same
RICE, HENRY C & DIANA	Same
RIEGER, WALTER M	Same
RIKUO CORPORATION	Joseph Deering, Jr., Esq.
RIVERSIDE CEMENT CO - ORO GRANDE PLANT	Warren P. Felger, Esq.
ROGERS, ROY	Terry Caldwell, Esq.
ROGERS, ROY (ORO GRANDE RANCH)	Terry Caldwell, Esq.
ROSSI, JAMES L & NAOMI I	Same
ROTEX CONSTRUCTION COMPANY	Yong Cho
ROWLAND, JAMES & HELEN	Same
RUDMAN, ROBERT T	Terry Caldwell, Esq.
RUE RANCH	Joe Zack Feltz, President

PRODUCER	DESIGNEE
RUISCH, DALE W	Same
SAN BERNARDINO CSA #29	William Smillie
SAN BERNARDINO CSA #42	William Smillie
SAN BERNARDINO CSA #64	William Smillie
SAN BERNARDINO CSA #70C	William Smillie
SAN BERNARDINO CSA #70G	William Smillie
SAN BERNARDINO CSA #70J	William Smillie
SAN BERNARDINO CSA #70L	William Smillie
SAN BERNARDINO CO. BARSTOW-DAGGETT AIRPORT	William Smillie
SAN FILIPPO, JOSEPH & SHELLEY	Same
SANTUCCI, ANTONIO & WILSA	Same
SAN BERNARDINO CSA #70L	William Smillie
SCOGGINS, JERRY	Same
SEALS, LAWRENCE	Same
SHEPPARD, THOMAS & GLORIA	Same
SHIRKEY, ALAN G & MARY E	Same
SHORT, CHARLES & MARGARET	Therese Parker, Esq.
SHORT, JEFF	Same
SILVER LAKES ASSOCIATION	Michael Davis, Esq.
SILVER VALLEY RANCH, INC	Richard A. Ruben, Esq.
SMITH, ROBERT A	Therese Parker, Esq.
SMITH, WILLIAM E	Same
SNYDER, KRYL K & ROUTH, RICHARD J	Terry Caldwell, Esq.
SON'S RANCH	Therese Parker, Esq.
SOPPELAND, WAYNE	Terry Caldwell, Esq.
SOUTHERN CALIFORNIA EDISON CO - AGRICULTURE	Douglas Ditonto, Esq.
SOUTHERN CALIFORNIA EDISON CO - INDUSTRIAL	Douglas Ditonto, Esq.
SOUTHERN CALIFORNIA GAS COMPANY	Jane Goichman, Esq.
SOUTHERN CALIFORNIA WATER CO	Arthur Kidman, Esq.
SOUTHDOWN, INC.	Steve Abbott, Esq.
SOUTHERN CALIFORNIA WATER CO	Arthur Kidman, Esq.
SOUTHERN CALIFORNIA WATER CO	Arthur Kidman, Esq.
SPECIALTY MINERALS, INC	Michael Davis

PRODUCER	DESIGNEE
SPILLMAN, JAMES R & NANCY J	Same
SPINK, WALTHALL	Same
SPRING VALLEY LAKE ASSOCIATION	Thomas Bunn, III, Esq.
SPRING VALLEY LAKE COUNTRY CLUB	Richard Opper, Esq.
ST ANTHONY COPTIC ORTHODOX MONASTERY	Mike Stiller, Esq/Karas (Bishop)
DONALD B ST CHARLES, ATTY AT LAW	Same
STEWART WATER COMPANY	Isidro Baca
STEWART, STANLEY & PATRICIA	Therese Parker, Esq.
STORM, RANDALL	Same
STRINGER, W EDWARD	Therese Parker, Esq.
SUDMEIER, GLENN W	Same
SUGA, TAKEAKI	Same
SUMMIT VALLEY RANCH	Michael Davis, Esq.
SUNDOWN LAKES, INC	Thomas Hargraves
SUN & SKY COUNTRY CLUB	Everett Hughes
SWARTZ, ROBERT & IRENE	Same
TALLAKSON, WILLIAM V & ELIZABETH A	Same
TAPIE, RAYMOND & MURIEL	Same
TATUM, JAMES B	Same
TATRO, RICHARD K. & SANDRA A.	Same
TAYLOR, ALLEN C / HAYMAKER RANCH	Same
TAYLOR, TOM	Therese Parker, Esq.
THAYER, SHARON	Same
THE 160 NEWBERRY RANCH CALIFORNIA, LTD	Therese Parker, Esq.
THE CUSHENBURY TRUST, C/O SPECIALTY MINERALS	Michael Davis, Esq.
THOMAS FARMS	Therese Parker, Esq.
THOMAS, WALTER	Same
THOMPSON, JAMES A	Therese Parker, Esq.
THOMPSON, RODGER	Same
THORESON, ROBERT F & A KATHLEEN	Same
THRASHER, GARY	Same
THUNDERBIRD COUNTY WATER DISTRICT	Peter Taylor, General Manager
TILLEMA, HAROLD	Same

PRODUCER	DESIGNEE
TRIPLE H PARTNERSHIP	Ronald A. Van Blarcom, Esq.
TROEGER FAMILY TRUST, RICHARD H	Rollin N. Rauschl, Esq.
TURNER, LOYD & CAROL	Same
TURNER, ROBERT	Same
UNION PACIFIC RAILROAD COMPANY	Jim Barclay
VAIL, JOSEPH B & PAULA E	Same
VAN BASTELAAR, ALPHONSE	Same
VAN DAM BROTHERS	Same
VAN DAM, ELDERT & SUSAN	Same
VAN DIEST, CORNELIUS	Therese Parker, Esq.
VAN LEEUWEN FAMILY TRUST	Therese Parker, Esq.
VAN LEEUWEN, JOHN	Robert Dougherty, Esq.
VAN VLIET, HENDRIKA	Robert Dougherty, Esq.
VANDER DUSSEN, ED	Steve Tyler, Esq.
VANHOY, LUTHER C & ROBERTA L	Same
VANNI, MIKE	Tom O'Donnell
VAN BURGER, CARL c\o CVB INVESTMENT	Same
VAUGHT, ROBERT E. & KAREN M.	Same
VERNOLA, PAT	Robert Dougherty, Esq.
VERNOLA, PAT	Robert Dougherty, Esq.
VICTOR VALLEY COMMUNITY COLLEGE DIST	W. W. Miller, Esq.
VICTOR VALLEY WATER DISTRICT	Thomas McGuire, Esq.
VICTORVILLE, CITY OF	Thomas McGuire, Esq.
VISOSKY JR, JOSEPH F	Same
VISSER, ANNIE	Same
VOGLER, ALBERT H	Therese Parker, Esq.
WACKEEN, CAESAR	Jack W. Evarone, Esq.
WAKULA, JOHN & HELEN	Same
WARD, KEN & BARBARA	Same
WARD, RONNY H	Same
WEBER, DAVE	Same
WEBER, F R & JUNELL	Same
WEBSTER, THOMAS M & PATRICIA J	Same

PRODUCER	DESIGNEE
WEIDKNECHT, ARTHUR J & PEGGY A	Same
WEISER, SIDNEY & RAQUEL	Same
WEST, CAROLYN & SMITH, RICHARD	Same
WEST, HOWARD & SUZY	Same
WESTERN HORIZON ASSOCIATES INC	Ernest Leff, Esq.
WESTERN ROCK PRODUCTS	Kathleen Daprato
WET SET, INC	Thomas Ferruzzo, Esq.
WHITTINGHAM, RICHARD V	Same
WILLOW WELLS MUTUAL WATER COMPANY	Richard A. Joh
WITTE, E DANIEL & MARCIA	Same
WLSR INC	Steve Winfield
WOO, CHEN C/O ASTER DUCK CO	Same
WORSEY, JOSEPH A & REVAE	Same
YANG, YOUNG MO	Same
YARD, WILLIAM & BETTY	Same
YEAGER, E L - CONSTRUCTION COMPANY INC	Roger Luebs, Esq.
YERMO WATER COMPANY	Donald Walker
YKEMA HARMSEN DAIRY	Therese Parker. Esq.
YKEMA TRUST	Therese Parker, Esq.
YOUNG, KEITH O - (DESERT TURF)	Therese Parker, Esq.

EXHIBIT F

TRANSFERS OF BASE ANNUAL PRODUCTION RIGHTS.

EXHIBIT F

TRANSFERS OF
BASE ANNUAL PRODUCTION RIGHTS

1. Transferability. Any Base Annual Production Right, including any Carryover Right (Right) or any portion thereof may be sold, assigned, transferred, licensed or leased subject to the rules set forth in this Exhibit "F".

2. Consumptive Use Adjustments. A transferred Right shall be adjusted so as not to cause an increased Consumptive Use of water. For either inter Subarea or intra Subarea transfers, if the transferee's Consumptive Use of water Produced under the transferred Right would be at a higher rate than that of transferor, the transferred Right shall be reduced by Watermaster to a level that equalizes the Consumptive Use to that of transferor. Any such adjustments by Watermaster shall be made using the following Consumptive Use rates. If a transfer would cause the same or a decreased Consumptive Use, no adjustment shall be made.

Type of Water Use	Consumptive Use Rate
Municipal	50%
Irrigation	50%
Industrial	case by case
Lakes or Aquaculture	surface acres x 7 ft.

For mixed or sequential uses of water excluding direct reuse of municipal wastewater, the total acre-feet of Consumptive Use shall be the sum of Consumptive Uses for each use.

3. Notice to Watermaster. No transfer shall become operable until the Parties to the transfer have jointly notified Watermaster of the terms and conditions of the transfer, the price to be paid by the transferee, the name of the Responsible Party and the name of the Person who will pay any applicable Assessments. Intra-Subarea transfers shall not require Watermaster authorization after giving notice. No inter-Subarea transfer shall become operable until authorized by Watermaster after giving notice. Watermaster shall authorize such transfers in the order of the date of notice, provided that funds are available as set forth in Paragraph 4 of this Exhibit "F".

4. Inter Subarea Transfers of Rights. A Party's Right in a (Source) Subarea may be transferred (by lease only) to a Party in another (Use) Subarea provided that in any Year the resulting unconsumed water in the Source Subarea due to all such transfers shall not be greater than the Replacement Water requirement of the Source Subarea in the preceding Year. Watermaster shall replace the resulting Consumptive Use in the Use Subarea that is attributable to the transfer, utilizing Replacement Water Assessments from the Source Subarea.

5. Transfers to Meet Replacement Water or Makeup Water Obligations. Watermaster may use Assessment proceeds to purchase or lease Rights in a Subarea in order to obtain water to meet an Obligation. The water so obtained shall be equal to the Consumptive Use portion of the transferred and unproduced Rights. No such purchases of leases of Rights in the Harper Lake Basin may be used to satisfy Obligations in other parts of the Centro Subarea.

6. Inter Subarea Transfers of Water. Water Produced in one (source) Subarea and exported to another Subarea for use or disposal shall bear a Replacement Water Obligation equal to the sum of the Production in excess of the Producer's share of the Free Production Allowance in the source Subarea plus the amount of water exported that would normally have been returned to the source Subarea. Such exported water shall be credited to the appropriate Subarea Obligation unless it has been purchased or leased as Replacement Water pursuant to a transfer agreement.

7. Verde Ranch Producers. Together the Spring Valley Lake Country Club ("the Country Club"), the Spring Valley Lake Association ("the Association"), the California Department of Fish and Game (DFG) Mojave Narrows Regional Park ("the Park") the Kemper Campbell Ranch ("the Ranch") comprise a group herein called the Verde Ranch Producers. Each Verde Ranch Producer has the ability physically both to Produce Groundwater and to Produce water that originated as tailwater flowing from the DFG Mojave River Fish Hatchery. DFG Producer Groundwater to supply the Hatchery, and Hatchery tailwater can be discharged in part or entirely to the Mojave River or in part or entirely to a lined channel that conveys tailwater to points where the Verde Ranch Producers can Produce it. The present flow regimen is as follows: Hatchery Production flows through the Hatchery and is then discharged to the River and/or the lined channel. Water discharged to the lined channel flows to a Country Club lake. The Country Club Produces Groundwater that is discharged to the Country Club lake. The Country Club property is irrigated by pumping from the Country Club lake. Water overflowing from the Country Club lake flows through a lined channel and

through other Country Club lakes, and finally is discharged to Spring Valley Lake. The Association Produces Groundwater that is discharged to Spring Valley Lake. Water overflowing from Spring Valley Lake flows to lakes in the Park. The Park Produces Groundwater that is discharged to the lakes in the Park. The Park also Produces Groundwater that is used directly for irrigation of the Park. The Park is also irrigated by pumping from the lakes in the Park. Water overflowing from the lakes in the Park is discharged to the Mojave River. Some water from the lakes in the Park also flows to a lake on the Ranch. The Ranch also Produces Groundwater. The Ranch is irrigated from the lake on the Ranch. No water flows on the surface from the Ranch property to the Mojave River.

In order to continue the present arrangements among the Hatchery and the Verde Ranch Producers while assuring that they participate fairly in the Physical Solution the following rules shall apply:

a. Total Production by the Country Club will be calculated as the sum of Country Club Groundwater Production plus inflow of Hatchery tailwater minus outflow to Spring Valley Lake. The Country Club shall monitor and report to Watermaster the amounts of such Groundwater Production, inflow and outflow.

b. Total Production by the Association will be calculated as the sum of Association Groundwater Production plus inflow from the Country Club minus outflow to the Park. The Association shall monitor and report to Watermaster the amounts of such Groundwater Production, inflow and outflow.

c. Total Production by the Park will be calculated as the sum of Park Groundwater Production plus inflow from the Association minus outflow to the Ranch minus outflow to the Mojave River. The Park shall monitor and report to Watermaster as to such Groundwater Production, inflow and outflows.

d. Total Production by the Ranch will be calculated as the sum of Ranch Groundwater Production plus inflow from the Park. The Ranch shall monitor and report to Watermaster the amounts of such Groundwater Production and inflow.

e. Hatchery Production up to 10,678 acre-feet per Year will be permitted free of any Assessments against the Hatchery. The Hatchery shall monitor and report to Watermaster its Groundwater Production and the amounts of tailwater discharged to the River and to the artificial channel. In any Year the Hatchery may Produce more than 10,678 acre-feet free of any Assessments against the Hatchery, provided such Production in excess of 10,678 acre-feet is reported as Groundwater Production by one or more of the Verde Ranch Producers in the same Year pursuant to operating agreements by and between the Hatchery and such Producer(s) filed with the Watermaster. The operating agreement shall specify the responsibility for payment of assessments. In the operating agreement, the Verde Ranch Producers may elect to have assessments be based on the aggregate Production of the Verde Ranch Producers, and may freely transfer Base Annual Production Rights internally, provided that the aggregate consumptive use of the Verde Ranch Producers shall not be increased. In the absence of such operating agreements, or if the operating agreements do not otherwise allocate responsibility for payment of Assessments, the Hatchery

shall be liable for Administrative, Replacement Water and Biological Resource Assessments on the amount of water Produced by the Hatchery in excess of 10,678 acre-feet in any Year. In the event that Verde Ranch Producer who is allocated responsibility for payment of Assessments pursuant to an operating agreement is delinquent in making any such payment, the Hatchery shall not be liable therefor.

f. In any Year, if the total discharge to the River from the Hatchery and the Verde Ranch Producers exceeds the Groundwater Production by the Hatchery, such excess discharge shall be subject to Administrative, Replacement Water and, except for the Park, Biological Resource Assessments. Such Assessments shall be levied against individual Verde Ranch Producers in proportion to the extent that outflow from each Producer exceeds inflow to that Producer.

g. The Hatchery and the Verde Ranch Producers shall install all stage recorders, meters or other measuring devices necessary to determine inflows, outflows and Production that they are responsible for monitoring and reporting to Watermaster. Such stage recorders, meters or other measuring devices shall be installed, calibrated and operated in manner satisfactory to Watermaster.

h. Any change in the flow regimen described above will be subject to the same general rules set forth in this Paragraph 7. Any such change shall be reported to Watermaster in advance.

8. Harper Lake Basin. No Producer in the Harper Lake Basin may transfer any Base Annual Production Right or any portion thereof to Producers outside of Harper Lake Basin except by

physically conveying the water in compliance with the rules set forth in this Exhibit "F".

EXHIBIT G

SUBAREA OBLIGATIONS

EXHIBIT G

SUBAREA OBLIGATIONS

1. Subarea Obligations. Producers in the respective Subareas shall have the obligation to provide the following average Annual and minimum Annual Subsurface Flows and/or Base Flows per Year:

a. Este Subarea Producers--200 acre-feet per Year of Subsurface Flow to the Alto Subarea, except that in any Year the Subsurface Flow obligation shall be not be less than 160 acre-feet plus one-third of any cumulative debit plus any additional amount of water required to reduce the cumulative debit to 200 acre-feet.

b. Oeste Subarea Producers--800 acre-feet per Year of Subsurface Flow to the Alto Subarea, except that in any Year the Subsurface Flow obligation shall be not less than 640 acre-feet plus one-third of any cumulative debit plus any additional amount of water required to reduce the cumulative debit to 800 acre-feet.

c. Centro Subarea Producers--1200 acre-feet per Year of Subsurface Flow to the Baja Subarea, except that in any Year the Subsurface Flow Obligation shall be not less than 960 acre-feet plus one-third of any cumulative debit plus any additional amount of water required to reduce the cumulative debit to 1200 acre-feet.

d. Baja Subarea Producers--400 acre-feet per Year of Subsurface Flow toward Afton across the MWA eastern boundary, except that in any Year the Subsurface Flow Obligation shall not be less than 320 acre-feet plus one-third of any cumulative debit plus any additional amount of water required to reduce the cumulative debit to 400 acre-feet.

e. Alto Subarea Producers--an average Annual combined Subsurface Flow and Base Flow of 23,000 acre-feet per Year to the Transition Zone. For the purposes of Paragraph 6 of this Exhibit G, the Subsurface Flow component shall be deemed to be 2,000 acre-feet per Year. In any Year Alto Subarea Producers shall have an obligation to provide to the Transition Zone a minimum combined Subsurface Flow and Base Flow as follows:

i. If the accounting pursuant to Paragraph 5, below, reflects a net cumulative credit at the beginning of the Year, the combined minimum flow obligation shall be 18,400 acre-feet minus any net cumulative credit, but shall be not less than 15,000 acre-feet.

ii. If the accounting pursuant to Paragraph 5, below, does not reflect a net cumulative credit at the beginning of the Year, the combined minimum flow obligation shall be 18,400 acre-feet plus one-third of any net cumulative debit plus any additional amount of water required to reduce the net cumulative debit to 23,000 acre-feet.

2. Obligation for Transition Zone Replacement Water.

a. Until the Court approves Groundwater levels to be established and maintained pursuant to Subparagraph 2b of this Exhibit, Watermaster shall provide Replacement Water in the Transition Zone equal to Production in the Transition Zone that is in excess of the Transition Zone Producers' share of the Alto Subarea Free Production Allowance for that Year. All such Replacement Water shall be provided as soon as practicable during the next ensuing Year.

b. As soon as is practicable, the MWA shall establish key wells to be used to monitor Groundwater levels in the Transition Zone and, subject to approval by the Court, Watermaster shall establish minimum water levels to be maintained in the key wells.

c. After water level elevations have been established pursuant to Subparagraph 2b of this Exhibit, Watermaster shall provide Replacement Water in the Transition Zone as necessary to maintain the minimum water levels. Water purchased with Replacement Water Assessments paid by Producers in the Transition Zone in excess of the quantity of water needed to maintain said water levels shall be provided elsewhere in the Alto Subarea.

3. Other Water. "Other Water" that may be credited to a Subarea Obligation may include water conveyed and discharged across a boundary or Free Production Allowance water that is not Produced. Water other than Base Flow, Subsurface Flow or Storm Flow that is conveyed and discharged across a boundary between Subareas other than pursuant to a transfer agreement, shall be credited or debited, as appropriate, to the pertinent Subarea Obligation during the Year in which it is so conveyed and discharged. Any portion of the Subarea's Free Production Allowance that is allowed to remain unproduced in a Subarea pursuant to transfer agreements in order to satisfy a Subarea Obligation shall be credited to the pertinent Subarea Obligation in accordance with the terms of the transfer agreements.

4. Makeup Water. Assessments for Makeup Water shall be paid in accordance with the time schedule set forth in Exhibit D.

Makeup Water shall be credited to the Subarea Obligation at the end of the Year in which the Makeup Water Assessment is paid.

5. Accounting. Watermaster shall Annually not later than February 1 cause to be prepared a report of the status of each Subarea Obligation as of the end of the prior Year. The report shall set forth at least the following information for each Subarea Obligation:

a. The cumulative total of the average Annual Subarea Obligations since the Judgment was entered as of the beginning of the prior Year;

b. The cumulative total of all water credited to the Subarea Obligation since the Judgment was entered as of the beginning of the prior Year;

c. The net cumulative credit or debit [the difference between (a) and (b)] as of the beginning of the prior Year;

d. The amounts of water credited to the Subarea Obligation during the prior Year including, as appropriate, Base Flow, Subsurface Flow, Other Water and Makeup Water;

e. The cumulative total of the average Annual Subarea Obligations as of the end of the prior Year;

f. The cumulative total of all water credited to the Subarea Obligation as of the end of the prior Year;

g. The net cumulative credit or debit as of the end of the prior Year;

h. Any Makeup Water Obligation;

i. The Minimum Subarea Obligation for the current Year.

6. Subsurface Flow Assumptions. Some Subarea Obligations are expressed as average Annual or minimum Annual Subsurface Flow.

In all cases the Subsurface Flow obligations have been established initially at amounts equal to the estimated historical average Subsurface Flow across Subarea boundaries. Not later than two Years following entry of this Judgment MWA shall begin to install monitoring wells to be used to obtain data to enable improved estimates of Subsurface Flow at each Subarea boundary where there is a Subsurface Flow obligation and to develop methodology for future determinations of actual Subsurface Flow. Not later than ten years following entry of this Judgment Watermaster shall prepare a report setting forth the results of the monitoring program and the future methodology. Following opportunity for review of Watermaster's report by all Parties, Watermaster shall prepare a recommendation to the Court as to the likely accuracy of the estimated historical Subsurface Flows and any revision of Subarea Obligations that may be indicated. Pending Watermaster's report to the Court, Subsurface Flows shall be assumed to be equal to the Subsurface Flow obligations for purposed of accounting for compliance therewith.

7. Example Calculation. Table G-1 sets forth an example of Subarea Obligation accounting procedures using hypothetical flows.

TABLE G-1
HYPOTHETICAL EXAMPLE
ACCOUNTING FOR COMPLIANCE WITH SUBAREA OBLIGATIONS

OBLIGATION OF SUBAREA A TO SUBAREA B
AVERAGE ANNUAL: 23,000 AFA (21,000 AFA BASEFLOW + 2,000 AFA SUBSURFACE FLOW)
MINIMUM ANNUAL: 18,400 AFA + 1/3 OF ANY NET CUMULATIVE DEBIT; OR 18,400 AFA - ANY NET CUMULATIVE CREDIT, BUT NOT LESS THAN 15,000 AFA

	YEAR 1 AF	YEAR 2 AF	YEAR 3 AF	YEAR 4 AF	YEAR 5 AF	YEAR 6 AF	YEAR 7 AF	YEAR 8 AF	YEAR 9 AF	YEAR 10 AF
STATUS AT BEGINNING OF YEAR										
CUMULATIVE OBLIGATION	0	23,000	46,000	69,000	92,000	115,000	138,000	161,000	184,000	207,000
CUMULATIVE FLOW	0	17,000	32,600	50,800	69,067	87,067	107,111	139,978	168,378	190,978
NET CUMULATIVE CREDIT (DEBIT)	0	(6,000)	(13,400)	(18,200)	(22,933)	(27,933)	(30,889)	(21,022)	(15,622)	(8,022)
FLOW DURING THE YEAR (HYPOTHETICAL)										
BASE FLOW	8,000	5,000	4,000	4,000	2,000	2,000	15,000	18,000	20,000	23,000
SUBSURFACE FLOW	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
OTHER WATER	7,000	7,200	7,600	7,600	7800	8,000	8,200	8,400	8,600	8800
MAKEUP WATER PURCHASED	0	1,400	4,000	4,667	6,200	8,044	7,667	0	0	0
TOTAL FLOW	17,000	15,600	18,200	18,267	18,000	20,044	32,867	28,400	30,600	33,800
MINIMUM OBLIGATION DURING THE YEAR	18,400	20,400	22,067	24,467	26,044	27,711	28,696	25,407	23,607	21,074
MAKEUP OBLIGATION INCURRED	1,400	4,000	4,667	6,200	8,044	7,667	0	0	0	0
STATUS AT END OF YEAR										
CUMULATIVE OBLIGATION	23,000	46,000	69,000	92,000	115,000	138,000	161,000	184,000	207,000	230,000
CUMULATIVE FLOW	17,000	32,600	50,800	69,067	87,067	107,111	139,978	168,378	198,978	232,778
NET CUMULATIVE CREDIT (DEBIT)	(6,000)	(13,400)	(18,200)	(22,933)	(27,933)	(30,889)	(21,022)	(15,622)	(8,022)	2,778
FOLLOWING YEAR MINIMUM OBLIGATION										
18,400 + 1/3 OF NET CUM. DEBIT	20,400	22,067	24,467	26,044	27,711	28,696	25,407	23,607	21,074	0
ADDITIONAL TO REDUCE DEBIT TO 23,000	0	0	0	0	0	0	0	0	0	0
18,400 - CUM. CREDIT, BUT NLT 15,000	0	0	0	0	0	0	0	0	0	15,622
MINIMUM OBLIGATION	20,400	22,067	24,467	26,044	27,711	28,696	25,407	23,607	21,074	15,622

EXHIBIT H

BIOLOGICAL RESOURCE MITIGATION

EXHIBIT H

BIOLOGICAL RESOURCE MITIGATION

1. Protection of and Description of Existing Riparian Habitat. In arriving at a Physical Solution, the Parties have taken into consideration the water needs of the public trust resources of the Mojave Basin Area, including but not limited to, those species listed in Table H-1 within each of the areas as shown on Figure H-1 and the riparian habitat areas shown on Figure H-1 and described generally as follows:

a. The area which extends, south to north, in the Alto Subarea, from the intersection of the north line of Section 36, Township 5 North, Range 4 West with the Mojave River channel to the United States Geological Survey gauging station at the Lower Narrows;

b. The Lower Narrows to the Helendale Fault (Transition Zone);

c. The Harvard/Eastern Baja Subarea reach of the Mojave River that extends west to east, from Harvard Road to the Iron Ranch/Iron Mountain area (0.5 miles east of the west line of Section 20, Township 10 North, Range 4 East).

2. Protection Pursuant to Physical Solution. The following aspects of the Physical Solution must be implemented to seek to achieve the water table standards set forth in Table H-2 which were proposed by DFG as being necessary to maintain and converse the riparian resources in the areas shown on Figure H-1, including the species listed in Table H-1:

a. Pursuant to Paragraph 24(o) of the Judgment, the Watermaster in recommending an adjustment in Free Production

Allowance, shall compare the Free Production Allowance with the estimated Production Safe Yield. In the event the Free Production Allowance exceeds the estimated Production Safe Yield by five percent or more, Watermaster shall recommend a reduction of the Free Production Allowance equal to a full five percent of the aggregate Subarea Base Annual Production. In considering whether to increase or decrease the Free Production Allowance in a Subarea, Watermaster shall, among other factors, take into consideration for the areas shown on Figure H-1 the Consumptive Use of water by riparian habitat, the protection of public trust resources, including the species listed in Table H-1 and the riparian habitat areas shown on Figure H-1, and whether an increase would be detrimental to the protection of public trust resources.

b. If, pursuant to Paragraph 27, Watermaster buys or leases Free Production Allowance in the Baja Subarea below the Calico-Newberry Fault to satisfy the need for Replacement Water, priority shall be given to purchases or leases that will result in reducing Production in or near the area described in Subparagraph 1(c) of this Exhibit.

c. Pursuant to Paragraph 2 of Exhibit "G", Watermaster shall purchase Replacement Water to maintain Groundwater levels in the Transition Zone.

3. Additional Protection Pursuant to Trust Fund Established by Watermaster Using the Proceeds of Biological Resource Assessments.

a. Watermaster shall establish a Biological Resources Trust Fund account for the benefit of the riparian habitat areas shown on Figure H-1 and the species listed on Table H-1. To

establish and maintain the Trust Fund Watermaster shall levy against each acre-foot of Production within the Basin Area, other than Production by the California Department of Fish and Game (DFG), a Biological Resource Assessment of fifty cents ($0.50) (1993 dollars) to be collected at the same time and in the same manner as the Administrative Assessment, except that no Biological Resources Assessment shall be levied whenever the Trust Fund account balance exceeds $1,000,000 (1993 dollars).

b. Watermaster shall make funds held in the Biological Resources Trust Fund available to DFG only in the event that Groundwater levels are not maintained as set forth in Table H-2. Watermaster shall take action to acknowledge any proposed expenditure from the Biological Resources Trust Fund by DFG. Such Watermaster action shall be subject to the review procedures set forth in Paragraph 36 of the Judgment, provided that any motion made pursuant thereto and any Court disapproval of such Watermaster action and proposed DFG expenditure may be based only: 1) on the ground that the Groundwater levels set forth in Table H-2 are being maintained; and/or 2) the ground that the proposed expenditure is not for any of the purposes set forth in Subparagraphs 3.b.(i), (ii), or (iii) below in this Exhibit. The Biological Resources Trust Fund may be used only for the following purposes and only in the three areas identified on Figure H-1:

i. not to exceed $100,000 for the preparation by DFG of a DFG habitat water supply management plan, which plan shall include the water needs of the species listed in Table H-1 and the riparian habitat areas shown on Figure H-1.

ii. the purchase or lease by DFG of Supplemental Water or the lease or purchase of DFG of Base Annual Production Rights to be used to meet riparian habitat water needs of the species listed in Table H-1 and the riparian habitat areas shown on Figure H-1.

iii. the construction, repair and replacement of wells or other facilities identified in the plan prepared pursuant to Subparagraph (i), above, and/or any other measures necessary to implement the plan.

DFG shall not prepare or make any expenditure from the trust fund for the payment of administrative overhead or staff of DFG.

4. DFG agrees that absent substantial changed circumstances, DFG shall not seek to modify the provisions of this Judgment in any way to add to or change the above-stated measures to protect the referenced species or habitat. Nothing stated in this Judgment or in this Exhibit "H" is intended nor shall be deemed to relieve any Party hereto from any obligation or obligations not specifically referenced in this Exhibit H. Nothing in this Judgment or in this Exhibit H is intended or shall be construed to be a waiver by the State or any of its departments or agencies, including DFG, of its rights and obligations under the common law, the public trust doctrine, the constitution, statutes and regulations to preserve, protect or enhance the natural resources of the State including rare, threatened or endangered species or species of concern.

TABLE H-1

LIST OF SPECIES

SPECIES	ALTO			CENTRO		BAJA		
	Forks Dam to Upper Narrows	Upper Narrows to Lower Narrows	Lower Narrows to Helendale	Helendale to Hodge	Hodge to Barstow	Barstow to Harvard Road	Harvard Road to Mannix Wash	Afton Canyon
Purple Monkeyflower	6							
Mohave Monkeyflower	5		6	6	6	6		
Mohave Tarweed	5							
Desert Cymopterus	6				6	6		
Barstow Woolly Sunflower								
Victorville Shoulderband	6	6						
Mohave Tui Chub							1,3	
California Red-legged Frog	6	6	6	5		6	6	6
Southwestern Pond Turtle	6		6	6				
Desert Tortoise	2,4		2,4	2,4	2,4	2,4		
San Diego horned Lizard	5							
Cooper's Hawk	8	8						
Ferruginous Hawk	8	8						
Swainson's Hawk	4	4						
Bald Eagle	1,3	1,3						
Merlin	8,8	8,8						
Prairie Falcon	8, 8	6, 8	6, 8	6, 8	6, 8	6,8		
Western Yellow-billed Cuckoo	3,7			3,7	3,7			
Southwestern Willow Flycatcher	8							
Brown-crested Flycatcher		8				8	8	8
Vermillion Flycatcher	8							
Le Conte's Thrasher	8							
Least Bell's Vireo	1,3							1,3

TABLE H-2

RIPARIAN HABITAT MONITORING WELL
WATER LEVEL CRITERIA

ZONE	WELL NUMBER	MAXIMUM DEPTH BELOW GROUND
Victorville/Alto	H1-1	Seven (7) Feet
Victorville/Alto	H1-2	Seven (7) Feet
Lower Narrows/Transition	H2-1	Ten (10) Feet
Harvard/Eastern Baja Riparian Forest Habitat	H3-1	Seven (7) Feet
Harvard/Eastern Baja Surface Water Habitat	H3-2	Plus One (1) Foot (1705 Ft msl)*

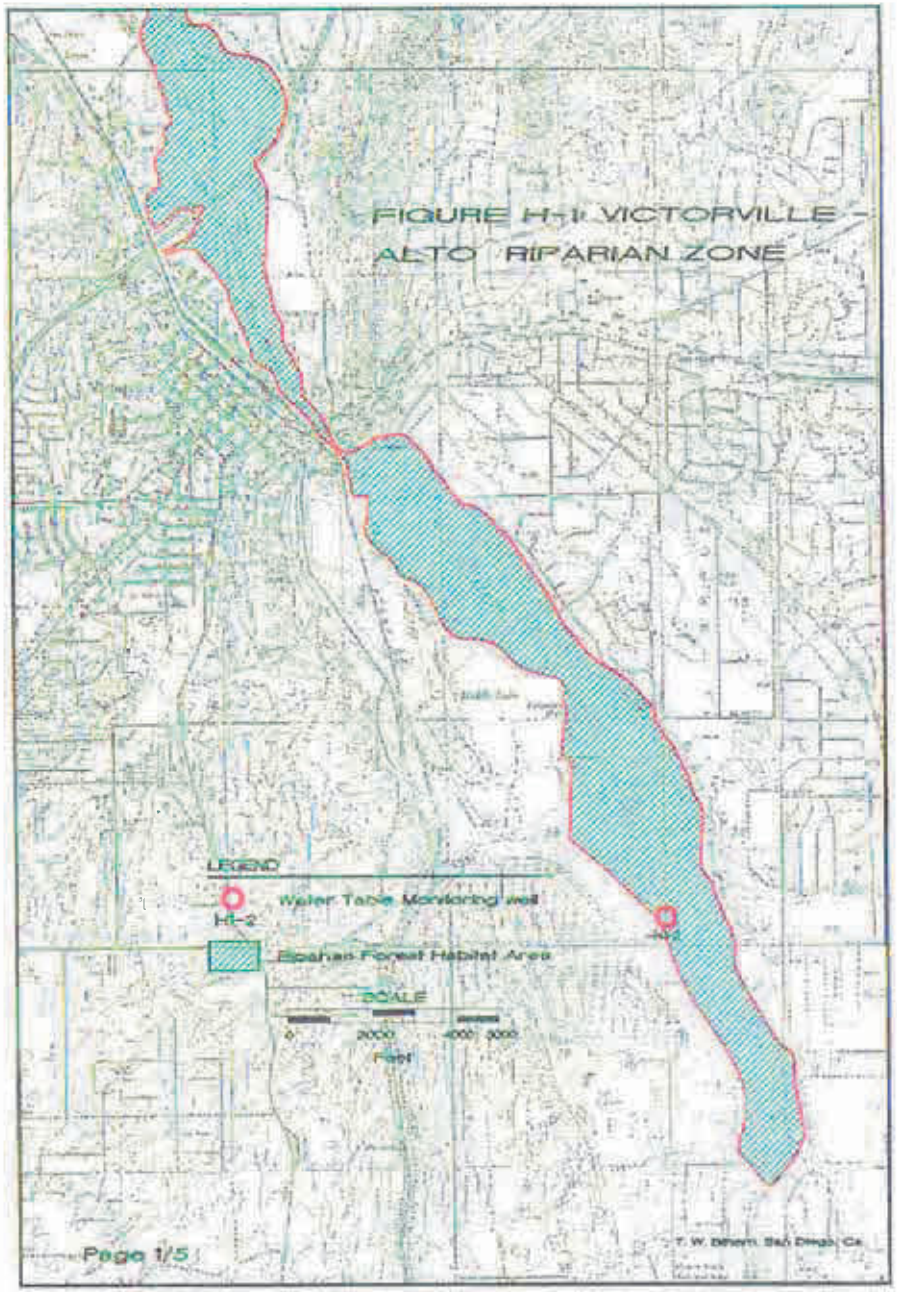
* Surface Water Habitat water surface elevation of 1705 ft. msl is approximate pending ground elevation survey.

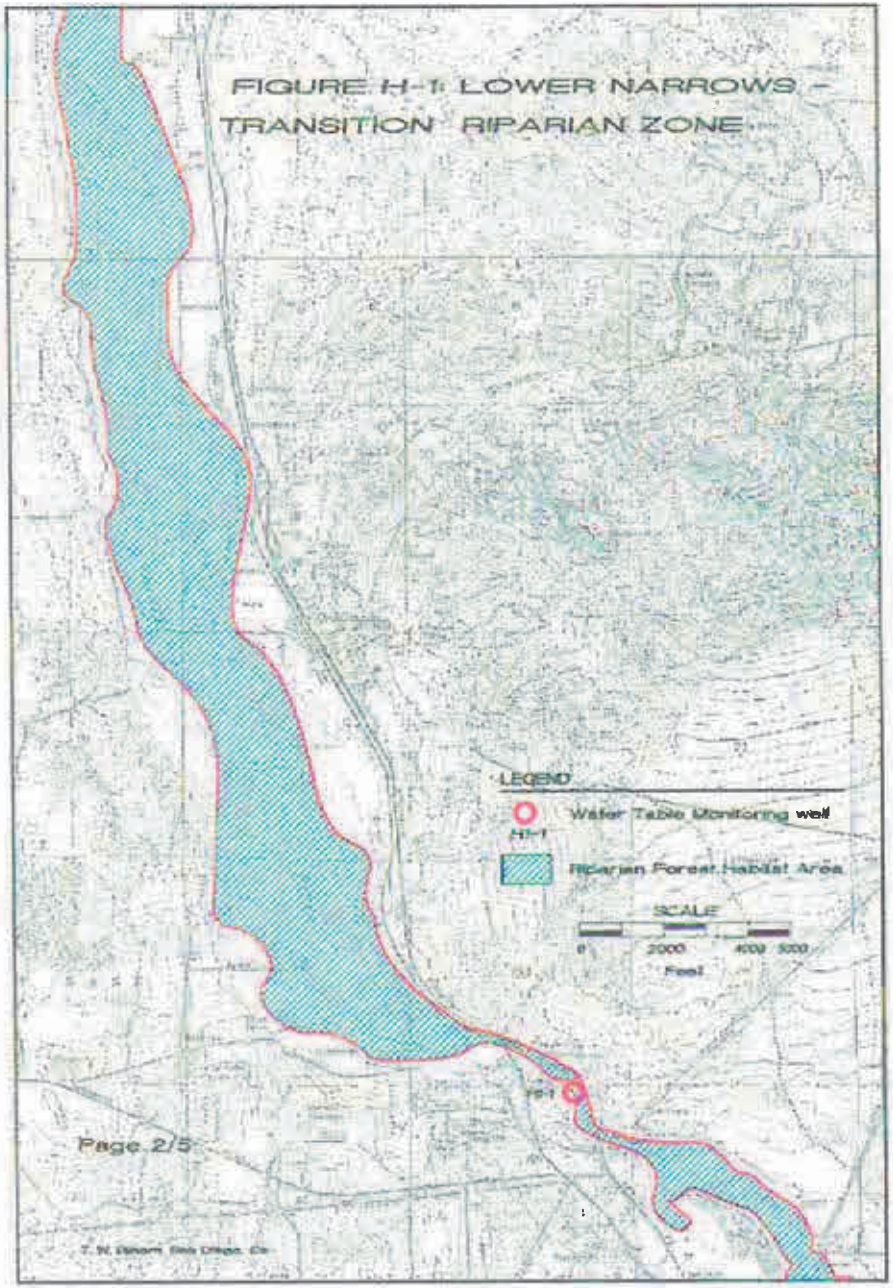
TABLE H-1

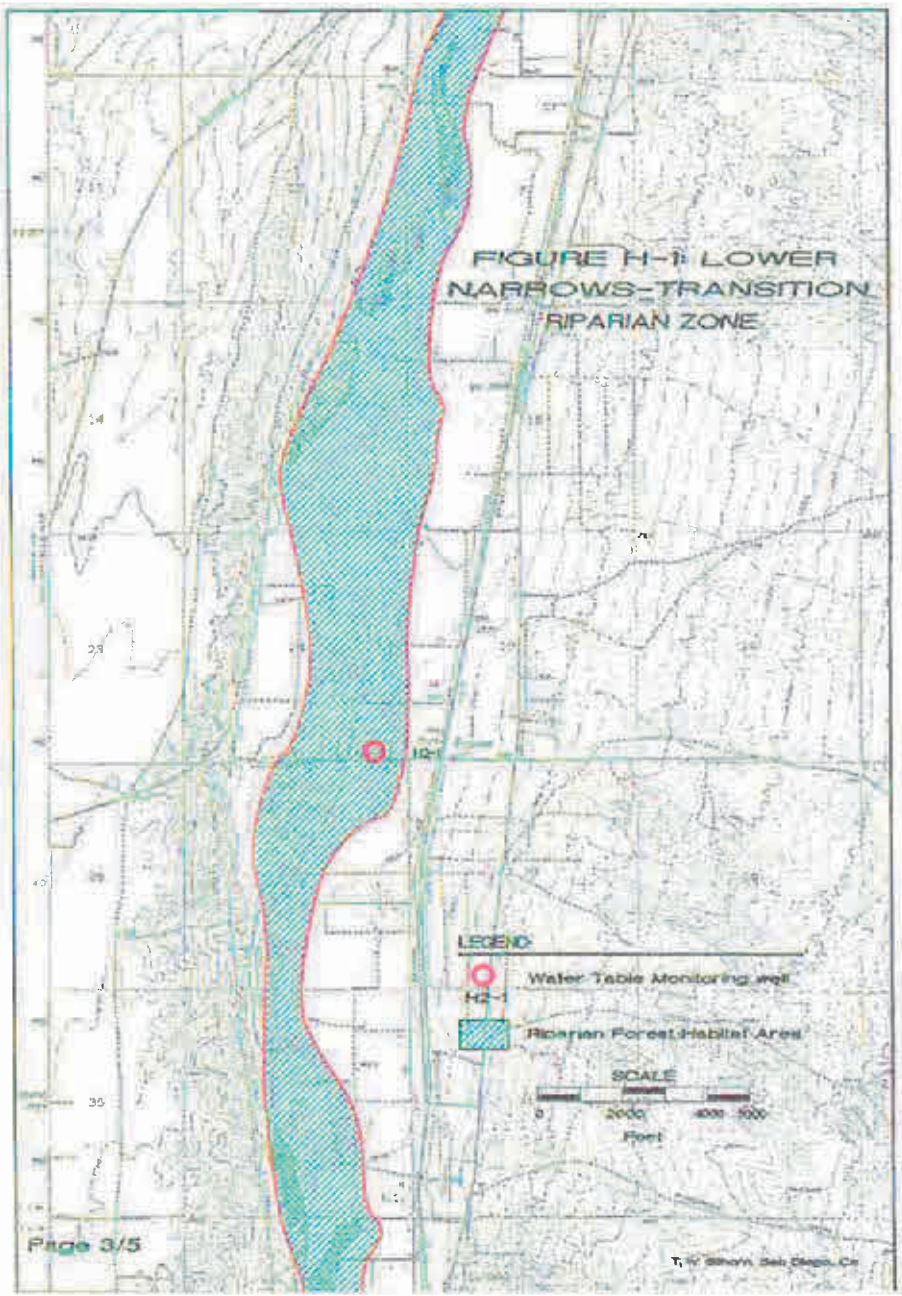
LIST OF SPECIES
(CONT'D)

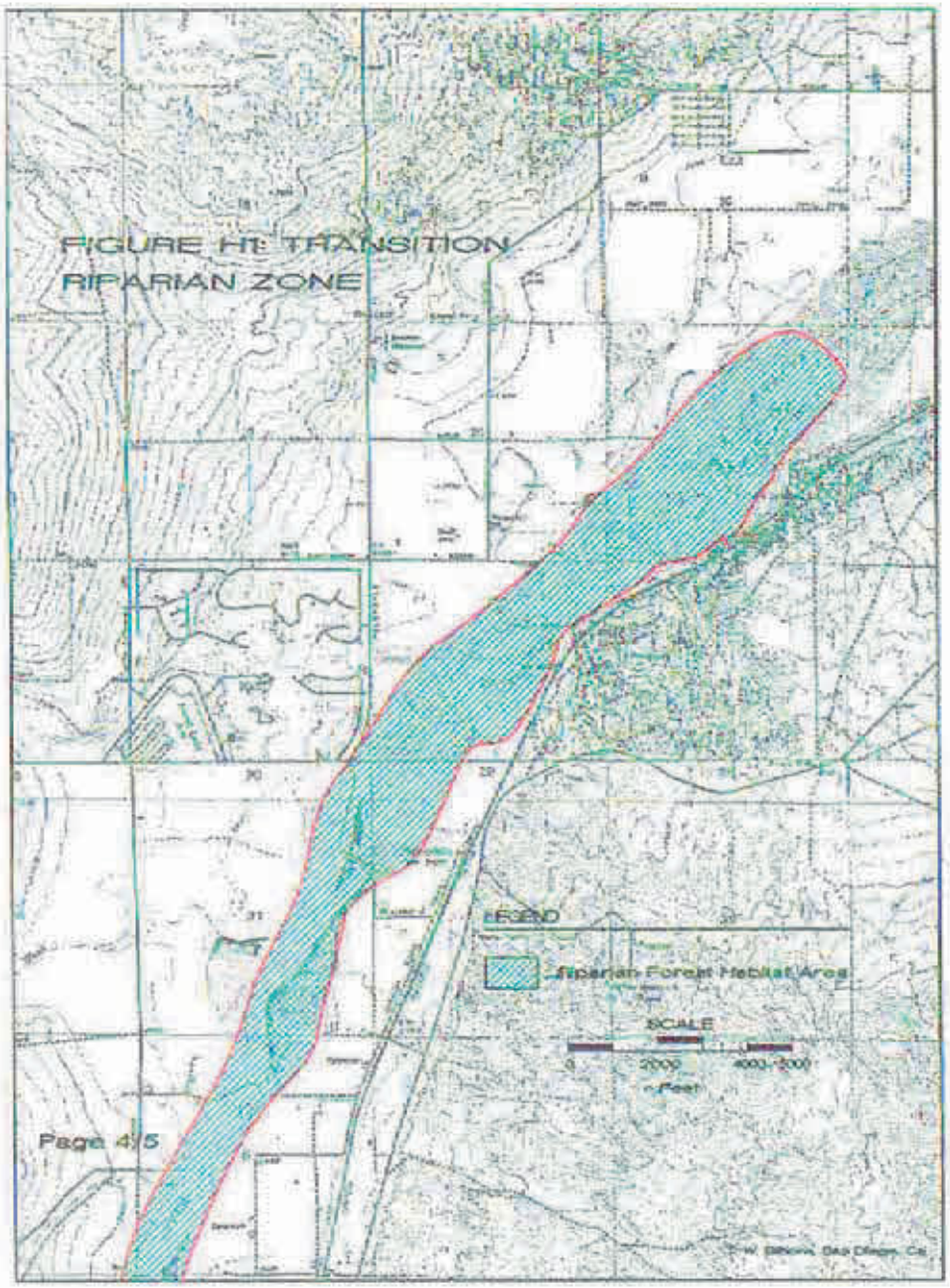
	ALTO			CENTRO		BA/A		
SPECIES	Forks Dam to Upper Narrows	Upper Narrows to Lower Narrows	Lower Narrows to Helendale	Helendale to Hodge	Hodge to Barstow	Barstow to Harvard Road	Harvard Road to Mannix Wash	Afton Canyon
Yellow Warbler	9	8			8	A		
Yellow-breasted Chat	8	8						8
Summer Tanager	8	8						
Pale Big Eared Bat	8							
Mohave Ground Squirrel	4, 6		4, 6	4, 6				
Mojave Vole			6	6				
Nelson's Bighorn Sheep					10	10		10
TOTAL NUMBER OF SPECIES = 36								
TOTAL NUMBER OF SPECIES IN EACH AREA:	25	11	7	8	7	6	3	3

1 = Federally Endangered
2 = Federally Threatened
3 = State Endangered
4 = State Threatened
5 = Federal Category: 1
6 = Federal Category: 2
7 = Federal Category: 3b
8 = State: Special Concern
9 = State: Sensitive
10 = State: Fully Protected


FIGURE H-1: VICTORVILLE - ALTO RIPARIAN ZONE
LEGEND
Water Table Monitoring well
H1-2
Riparian Forest Habitat Area
SCALE
0
2000
4000
6000
Feet
T. W. Ehlers, San Diego, Ca.
Page 1/5


FIGURE H-1: LOWER NARROWS - TRANSITION RIPARIAN ZONE
LEGEND
Water Table Monitoring well
H1-1
Riparian Forest Habitat Area
SCALE
0
2000
4000
6000
Feet
Page 2/5


FIGURE H-1: LOWER NARROWS-TRANSITION RIPARIAN ZONE
LEGEND
Water Table Monitoring well
H2-1
Riparian Forest Habitat Area
SCALE
0
2000
4000 5000
Feet
Page 3/5


FIGURE H1: TRANSITION RIPARIAN ZONE
LEGEND
Riparian Forest Habitat Area
SCALE
0
2000
4000 5000
Feet
Page 4/5

MOJAVE WATER AGENCY
REGIONAL WATER MANAGEMENT PLAN

FIGURE H-1: HARVARD/EASTERN BAJA RIPARIAN ZONE
Harvard Road
Camp Cady Ranch
Mojave Trails Rd
Water Table Monitoring well
Piper en Forest Habitat area
Surface Water Habitat Area
SCALE
LEGEND

APPENDIX J

WATER WASTE RULES, SCHEDULES, AND ORDINANCES

STATE OF CALIFORNIA
PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

EDMUND G. BROWN JR., *Governor*

October 12, 2015

Edward N. Jackson
Director, Revenue Requirements
Apple Valley Ranchos Water Company
P.O. Box 7005
Apple Valley, CA 92307

Dear Mr. Jackson,

The Commission has approved Apple Valley Ranchos Water Company's Advice Letter No. 201-W, filed on September 22, 2015, to modify Rule 14.1 which was submitted in accordance with Resolution W-4976.

Enclosed are copies of the following revised tariff sheets for the utility's files:

P.U.C. Sheet No.	Title of Sheet
831-W	Rule 14.1, Page 1
832-W	Rule 14.1, Page 2
833-W	Rule 14.1, Page 3
834-W	Rule 14.1, Page 4
835-W	Rule 14.1, Page 5
836-W	Rule 14.1, Page 6
837-W	Rule 14.1, Page 7
838-W	Rule 14.1, Page 8
839-W	Rule 14.1, Page 9
840-W	Rule 14.1, Page 10
841-W	Rule 14.1, Page 11
842-W	Rule 14.1, Page 12
843-W	Table of Contents, Page 1

Please contact Jim Boothe at (415) 703-1748 if you have any questions.

Thank you,

Jennifer Perez
Water & Sewer Advisory Branch
Division of Water and Audits

Enclosures

CALIFORNIA PUBLIC UTILITIES COMMISSION
DIVISION OF WATER AND AUDITS
Advice Letter Cover Sheet

(Date Filed / Received Stamp by CPUC)

FILED

SEP 22 2015

PUBLIC UTILITIES COMMISSION
DIVISION OF WATER AND AUDITS

AL # 201-W	Date Mailed to Service List:	Requested Effective Date:	Requested Tier:
	September 22, 2015	Upon Commission Approval	☐Tier 1 ■Tier 2 ☐Tier 3

Replacing AL #:	Authorization for Filing:	Compliance Filing?	Rate Impact		
	Res. W-4976	■Yes ☐No		$	n/a
				%	n/a

The public has 20 days from Date Mailed (above) to protest this advice letter. If you chose to protest or respond to the advice letter, send Protest and/or Correspondence within 20 days to:	Director Division of Water and Audits 505 Van Ness Ave. San Francisco, CA 94102
and if you have email capability, also email to:	water_division@cpuc.ca.gov
Your protest also must be served on the Utility	(see attached advice letter for more information and grounds for protest)

Company Name: Apple Valley Ranchos Water Company

Address: 21760 Ottawa Road, P.O. Box 7005

City, State, Zip: Apple Valley, CA 92307-7005

CPUC Utility Number:
WTA U-346-W
WTB
WTC
WTD
SWR

	Contact Name:	Phone No.	Fax No.	Email Address:
Filer	Edward N. Jackson	562.923.0711	562.861.5902	ed.jackson@parkwater.com
Alternate	Ellen M. Zimbalist	562.923.0711	562.861.5902	ezimbalist@parkwater.com

Description: These tariffs are submitted pursuant to Resolution 4976, Drought Procedures for Conservation, Rationing, and Service Connection Moratoria. The tariffs affected are 831-W, 832-W, 833-W, 834-W, 835-W, 836-W, 837-W, 838-W, 839-W, 840-W, 841-W, 842-W, and 843-W.

(FOR CPUC USE ONLY)

WTS Budget/Activity/Type		Process as: ☐Tier 1 ☐Tier 2 ☐ Tier 3	
/ /		20th Day	30th Day
Project Manager:		Suspended on:	
Analyst:		Extended on:	
Due Date:		Resolution No.:	
Completion Date:		AL/Tariff Effective Date:	

Rev. 03/04/08

APPLE VALLEY RANCHOS **WATER COMPANY**™

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SEP 22 20[illegible]
PUBLIC UTILITIES COMMISSION
DIVISION OF WATER AND AUDITS

Advice Letter No. 201-W

September 22. 2015

TO THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Apple Valley Ranchos Water Company (U 346 W) ("AVR") hereby transmits the following revised tariff sheets applicable to water service in its service territory:

Calif. P.U.C. Sheet No.	Title of Sheet	Schedule Number	Canceling Sheet No.
831-W	Rule 14.1, page 1		593-W
832-W	Rule 14.1, page 2		594-W
833-W	Rule 14.1, page 3		595-W
834-W	Rule 14.1, page 4		596-W
835-W	Rule 14.1, page 5		Original
836-W	Rule 14.1, page 6		Original
837-W	Rule 14.1, page 7		Original
838-W	Rule 14.1, page 8		Original
839-W	Rule 14.1, page 9		Original
840-W	Rule 14.1, page 10		Original
841-W	Rule 14.1, page 11		Original
842-W	Rule 14.1, page 12		Original
843-W	Table of Contents, page 1		820-W

Summary

AVR requests Commission approval to modify its existing Rule No. 14.1, such that it will contain an updated Water Shortage Contingency Plan consistent with Resolution W-5034, adopted by the Commission on April 19, 2015, ordering compliance with the requirements of the State Water Resource Control Board.

Background

In Advice Letter 146-W, AVR sought, and the Commission approved, a proposed Rule 14.1 that was based upon the sample Rule 14.1 in Standard Practice U-40-W ("SP U-40"), dated July 2007. AVR's Rule 14.1 became effective on October 17, 2008. On February 27, 2014, the Commission adopted Drought Procedures in Resolution No. W-4976, Appendix B to those

PO Box 7002
21760 Ottawa Road
Apple Valley, CA 92308
760.247.6484

Drought Procedures contains an "Example of Rule 14.1" that modifies the sample Rule 14.1 in the July 2007 version of SP U-40. For Class A and B water companies like AVR that have an existing Rule 14.1, Ordering Paragraph No. 2 of Resolution W-4976 requires the submission of a letter notifying the Division of Water & Audits ("DWA") that the companies are activating their Tariff Rule No. 14.1. AVR submitted that notification to DWA on March 25, 2014.

Discussion

In Resolution W-5034, the Commission described the steps that its regulated water utilities should take to comply with the mandatory use restrictions and penalties for violations established by the State Water Resources Control Board.

As required by that resolution, AVR submitted Advice Letter 197-W requesting approval to add a proposed Schedule 14.1 to its tariffs. Advice Letter 197-W was approved with an effective date of June 21, 2015. The modifications proposed herein mirror the framework and language in AVR's approved Schedule No. 14.1.

Tier Designation

Pursuant to Resolutions W-4976 and W-5034, AVR submits this as a Tier 2 advice letter.

Requested Effective Date

Pursuant to General Order 96-B, and General Rule 7.3.1, AVR requests this filing become effective when Division of Water and Audits approves the proposed Rule 14.1 presented in this advice letter filing, after completion of individual customer notice requirements.

Notice and Service

In accordance with General Order 96-B, General Rule 4.3 and 7.2 and Water Industry Rule 4.1, a copy of this advice letter will be mailed or electronically transmitted September 22, 2015 to competing and adjacent utilities and other utilities or interested parties having requested such notification. A list of those utilities and/or parties is attached. AVR will provide customer notice of this advice letter by bill insert.

Response or Protest

Anyone may respond to or protest this advice letter. When submitting a response or protest, please include the utility name and advice letter number in the subject line. A response supports the filing and may contain information that proves useful to the Commission in evaluating the advice letter. A protest objects to the advice letter in whole or in part and must set forth the specific grounds on which it is based. A protest shall provide citations or proofs where available to allow staff to properly consider the protest. The grounds for a protest are:

1. The utility did not properly serve or give notice of the advice letter;
2. The relief requested in the advice letter would violate statute or Commission order, or is not authorized by statute or Commission order on which the utility relies;
3. The analysis, calculations, or data in the advice letter contain material error or omissions;
4. The relief requested in the advice letter is pending before the Commission in a formal proceeding; or
5. The relief requested in the advice letter requires consideration in a formal hearing, or is otherwise inappropriate for the advice letter process; or
6. The relief requested in the advice letter is unjust, unreasonable, or discriminatory (provided that such a protest may not be made where it would require relitigating a prior order of the Commission.)

A response or protest must be made in writing or by electronic mail and must be received by the Division of Water and Audits within 20 days of the date this advice letter is filed. The address for mailing or delivering a protest is:

Tariff Unit, Division of Water and Audits, 3rd Floor
California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102
water_division@cpuc.ca.gov

On the same date the response or protest is submitted to the Division of Water and Audits, the respondent or protestant shall send a copy by mail (or e-mail) to us, addressed to:

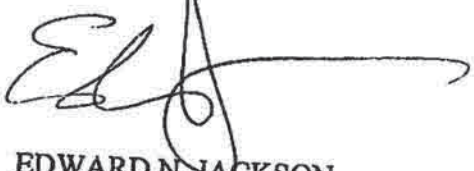
Edward N. Jackson
Representative
Director of Revenue Requirements
Park Water Company
9750 Washburn Road
P. O. Box 7002
Downey, CA 90241
Fax: (562) 861-5902
E-Mail: regulatoryaffairs@parkwater.com

Cities and counties that need Board of Supervisors or Board of Commissioners approval to protest should inform the Division of Water and Audits, within the 20 day protest period, so that

a late filed protest can be entertained. The informing document should include an estimate of the date the proposed protest might be voted on.

If you have not received a reply to your protest within 10 business days, contact this person at (562) 923-0711, ext. 1212.

APPLE VALLEY RANCHOS WATER COMPANY



EDWARD N. JACKSON
Representative
Director of Revenue Requirements
Park Water Company
9750 Washburn Road
Downey, CA 90241
562.923.0711, ext. 1212
ed.jackson@parkwater.com

ENJ/emz

Attachment

RULE NO. 14.1
WATER SHORTAGE CONTINGENCY PLAN

(N)

The water supply for Apple Valley Ranchos Water Company ("AVR") may be interrupted or reduced due to a variety of circumstances, for instance, in response to a drought or a catastrophic event, such as an earthquake or fire that damages water delivery and storage facilities, or a power outage that affects water treatment or pumping operations. This Water Shortage Contingency Plan enables the utility to respond efficiently and effectively to all water shortage contingencies.

A. GENERAL INFORMATION

1. Wasteful water use practices, as outlined in Section B of this Rule, constitute prohibited, non-essential or unauthorized water use, and are declared to be a waste of water, subject to the terms and conditions of Rule No. 11, which allow AVR to discontinue service after due notice to the customer of wasteful or negligent use of water on the customer's premises. AVR's customers shall be notified of these conservation measures through a bill insert or a direct mailing, and/or through electronic communications, pursuant to the direction of the California Public Utilities Commission ("Commission").

2. If water supplies are projected to be insufficient to meet normal customer demand for reasons beyond the control of AVR, or if directed under an emergency regulation by an authorized government agency, commission, or official, AVR may implement additional water-saving conservation measures and mandatory restrictions, as described in Section C of this Rule. As directed by the Commission, AVR's customers shall be notified of the applicable mandatory restrictions or conservation measures through newspaper inserts, website and other electronic communications, bill inserts or direct mailings, as appropriate, as long as the declaration of emergency is in effect.

3. Should supply conditions or government directives dictate, prior to, or in response to, executive orders, state agency-promulgated emergency regulations, or a declaration of emergency issued by a water wholesaler or other government agency, AVR may request permission from the Commission to add a Schedule No. 14.1 – Water Shortage Contingency Plan with Staged Mandatory Reductions, Restrictions, and Drought Surcharges, via a Tier 2 advice letter as set forth in Section D. Utilities without a full decoupling Water Revenue Adjustment Mechanism ("WRAM") balancing account in one or more ratemaking areas also may request a lost revenue memorandum account at this time.

4. AVR shall file a Tier 2 advice letter to request activation of a particular stage of Schedule 14.1 – Water Shortage Contingency Plan with Staged Mandatory Reductions, Restrictions and Drought Surcharges, as set forth in Section D, under the following conditions:

(N)

RULE NO. 14.1
WATER SHORTAGE CONTINGENCY PLAN

(N)

A. GENERAL INFORMATION (Continued)

a. If the Commission, wholesale water supplier, or AVR declares an emergency requiring mandatory water use restrictions, or;

b. If a government agency with legal jurisdiction over AVR or its service area declares a state of emergency in response to severe drought conditions, earthquake or other catastrophic event that severely reduces AVR's water supply, or;

c. If voluntary conservation levels or mandatory restrictions on certain uses of water, set by the Commission, AVR, wholesale water supplier, or government agency, are insufficient, or;

d. If a Declaration of Mandatory Water Restrictions is made by Park or governing body or agency, or;

e. If AVR chooses to subsequently activate a different stage.

5. All monies collected by AVR through surcharges, penalties or fees shall be booked to the WRAM or a memorandum account to offset recovery of lost revenues.

6. All expenses incurred by AVR to implement Rule No.14.1 and Schedule No.14.1 that have not been considered in a General Rate Case or other proceeding shall be recoverable by AVR if determined to be reasonable by the Commission. These additional monies shall be accumulated by AVR in a separate memorandum account, authorized in Resolution W-4976 for disposition as directed or authorized from time to time by the Commission.

7. When Schedule No.14.1 is in effect, but AVR determines that water supplies are again sufficient to meet normal demands, and mandatory restrictions are no longer necessary, or if AVR wants to implement a lower stage of mandatory restrictions, AVR shall seek Commission approval via a Tier 1 advice letter to de-activate the particular stage of mandatory reductions or allocations that had been authorized.

8. None of the restrictions listed below apply to the use of recycled water.

B. NON-ESSENTIAL OR UNAUTHORIZED WATER USES

The following non-essential or unauthorized uses of water are declared to be a waste of water and are subject to the terms and conditions of Rule No. 11:

(N)

RULE NO. 14.1
WATER SHORTAGE CONTINGENCY PLAN

(N)

B. NON-ESSENTIAL OR UNAUTHORIZED WATER USES (Continued)

1. The application of potable water to outdoor landscape in a manner that causes runoff such that water flow onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, or structures.

2. The use of a hose that dispenses potable water to wash a motor vehicle, except where the hose is fitted with a shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use.

3. The use of potable water for washing buildings, structures, sidewalks, walkways, patios, tennis courts, or other hard-surfaced, non-porous areas.

4. The use of potable water in a fountain or other decorative water feature, except where the water is part of a recirculating system.

5. The use of potable water for watering outside plants, lawn, landscape, and turf area during certain hours prohibited by applicable laws, during and up to 48 hours after measurable rainfall (0.1" or more).

6. The failure to promptly repair any leaks, breaks, or other malfunction resulting in water waste in a customer's domestic or outdoor water system after notification by AVR, unless other, specific arrangements are made with and agreed to by AVR.

7. The serving of water, other than upon request, in eating and drinking establishments, including but not limited to restaurants, hotels, cafes, bars, or other public places where food or drink are served and/or purchased.

8. Hotels/motels must provide guests with the option of choosing not to have towels and linens laundered daily and prominently display notice of this option in each guestroom.

9. The use of potable water for irrigation of ornamental turf on public street medians.

10. The use of potable water for irrigation outside of newly constructed homes and buildings that is not delivered by drip or micro spray systems.

11. Commercial, industrial, and institutional properties, such as campuses, golf courses, and cemeteries, immediately implement water efficiency measures to reduce potable water use in an amount consistent with the mandated reduction.

(N)

RULE NO. 14.1
WATER SHORTAGE CONTINGENCY PLAN

(N)

B. NON-ESSENTIAL OR UNAUTHORIZED WATER USES (Continued)

12. Further reduction in or the complete prohibition of any other use of water declared non-essential, unauthorized, prohibited, or unlawful by an authorized government or regulatory agency or official.

13. Use of potable water for watering streets with trucks, or other vehicles, except for initial wash-down for construction purposes (if street sweeping is not feasible), or to protect the health and safety of the public.

14. Other restrictions on use of potable water as prescribed from time to time by the Commission, AVR, or another governing body or agency.

C. STAGED REDUCTION OF WATER USAGE AND MANDATORY RESTRICTIONS

If a water supply shortage exists or is threatening, or if AVR is unable to meet conservation targets as set by a wholesale provider or governing body or agency, in addition to the restrictions on wasteful water use practices outlined above, the following restrictions may be imposed by AVR in stages, as indicated below. Failure to comply with these mandatory restrictions will be deemed a wasteful and unreasonable use of water and may result in the installation of a flow restrictor, discontinuance of service, or other actions as authorized by Rule No.11.

The following stages will be implemented as needed to achieve the mandated reduction. AVR may implement Stage 2 without first implementing Stage 1 if warranted by the mandated reduction.

STAGE 1:
A Stage 1 Water Shortage occurs when the Commission or AVR determines that measures are needed to reduce water consumption. In addition to the non-essential, unauthorized uses of water listed in Section B, the following restrictions may be imposed:

1. Outdoor irrigation restricted to no more than three days per week, on a schedule established and posted by AVR on its website or otherwise provided to customers by bill message, bill insert, direct mail, or email, or as follows:

Addresses Ending In:	Watering Days
Even Numbers (0, 2, 4, 6, 8)	Monday, Wednesday, and Saturday
Odd Numbers (1, 3, 5, 7, 9)	Tuesday, Thursday, and Sunday

2. Watering or outdoor irrigation of outside plants, lawn, landscape, and turf areas with potable water using a landscape irrigation system or a watering

(N)

RULE NO. 14.1
WATER SHORTAGE CONTINGENCY PLAN

(N)

C. STAGED REDUCTION OF WATER USAGE AND MANDATORY RESTRICTIONS (Continued)

device that is not continuously attended is limited to no more than 10 minutes of watering per day per station, with no watering between 8:00 a.m. and 7:00 p.m. This provision does not apply to landscape irrigation zones that exclusively use drip-type irrigation systems that use less than 1.0 inch per hour. This provision also does not apply to watering or irrigating by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive action shut-off nozzle or device that causes it to cease dispensing water immediately when not in use, or for the express purpose of adjusting or repairing an irrigation system. However, no irrigation that results in runoff can occur regardless of method.

3. Apart from the above outdoor irrigation restrictions, when a city, county, or other local public agency in AVR's service area adopts restrictions on the number of days or hours of the day that customers may irrigate that are different than those adopted by AVR, AVR may enforce the city, county, or other local public agency's restrictions.

4. All leaks, breaks, or other malfunctions in the customer's plumbing fixtures and/or irrigation system must be repaired within five (5) business days of written notification by AVR, unless other arrangements are made with AVR.

5. Failure to comply with these restrictions may result in the installation of a flow restrictor device along with associated fees for installation and removal.

6. Failure to comply with these restrictions may result in the installation of a real time measurement device on the customer's service line to provide the customer and AVR with access to information from the device. The cost of the device, including installation, shall be billed to the customer, and nonpayment may result in discontinuance of service.

7. If conditions warrant, AVR may change the number of watering days and the specific day of watering after first notifying its customers in accordance with Rule No. 14.1. (N)

RULE NO. 14.1
WATER SHORTAGE CONTINGENCY PLAN

(N)

C. STAGED REDUCTION OF WATER USAGE AND MANDATORY RESTRICTIONS (Continued)

8. If conditions warrant, AVR may change the number of days allowed for a customer to fix leaks, breaks or other malfunctions after first notifying its customers in accordance with Rule No. 14.1.

9. Other restrictions on use of potable water as prescribed by the Commission, AVR, or another governing body or agency.

STAGE 2:

Stage 2 Water Shortage occurs when the Stage 1 conditions are deemed insufficient to achieve identified water usage goals established by an authorized government agency or official. The following water restrictions may be imposed by AVR if directed by an authorized government or regulatory agency or official, or in an effort by AVR to comply with water-saving conservation goals or requirements applicable to AVR. The following restrictions are designed to allow AVR additional flexibility in imposing water use restrictions.

In addition to the restrictions identified in Stage 1, the following restrictions will be enacted:

1. Outdoor irrigation restricted to no more than two (2) days per week for non-residential customers. Watering or outdoor irrigation of outside plants, lawn, landscape, and turf areas with potable water using a landscape irrigation system or a watering device that is not continuously attended is limited to no more than ten (10) minutes of watering per day per station.

2. All leaks, breaks, or other malfunctions in the customer's plumbing fixtures and/or irrigation system must be repaired within three (3) business days of written notification by AVR, unless other arrangements are made with AVR.

3. The use of potable water to refill residential swimming pools or outdoor spas more than one foot or initial filling with potable water except when existing pools are drained to repair leaks.

4. Other restrictions on use of potable water as prescribed by the Commission, AVR, or another governing body or agency.

(N)

RULE NO. 14.1
WATER SHORTAGE CONTINGENCY PLAN

(N)

C. STAGED REDUCTION OF WATER USAGE AND MANDATORY RESTRICTIONS (Continued)

STAGE 3:

Stage 3 Water Shortage occurs when the Stage 2 conditions are deemed insufficient to achieve identified water usage reductions established by an authorized government agency or official.

In addition to the restrictions identified in Stage 2, the following restrictions will be enacted:

1. Outdoor irrigation restricted to no more than two (2) days per week. Watering or outdoor irrigation of outside plants, lawn, landscape, and turf areas with potable water using a landscape irrigation system or a watering device that is not continuously attended limited to no more than five (5) minutes of watering per day per station.
2. All leaks, breaks, or other malfunctions in the customer's plumbing fixtures and/or irrigation system must be repaired within two (2) business days of written notification by AVR, unless other arrangements are made with AVR.
3. Other restrictions on use of potable water as prescribed by the Commission, AVR, or another governing body or agency.

STAGE 4:

Stage 4 Water Shortage will be implemented if the Stage 3 conditions are deemed insufficient to achieve reductions due to water supply shortages or to achieve identified water usage goals established by an authorized government agency or official.

In addition to the restrictions identified in Stage 3, the following restrictions will be enacted:

1. Outdoor irrigation restricted to no more than one (1) day per week. Watering or outdoor irrigation of outside plants, lawn, landscape, and turf areas with potable water using a landscape irrigation system or a watering device that is not continuously attended limited to no more than five (5) minutes of watering per day per station.
2. Other restrictions on use of potable water as prescribed by the Commission, AVR, or another governing body or agency.

(N)

RULE NO. 14.1
WATER SHORTAGE CONTINGENCY PLAN

(N)

D. STAGED MANDATORY WATER REDUCTIONS – SCHEDULE NO. 14.1

1. Upon the declaration of a water shortage emergency by a water wholesaler, government agency or the governing body of a distributor of a public water supply (per Water Code Section 350), AVR may request addition of a Schedule No. 14.1 – Water Shortage Contingency Plan with Staged Mandatory Reductions, Restrictions and Drought Surcharges tariff, via a Tier 2 advice letter, with full justification. AVR may not activate Schedule No. 14.1 until it has been authorized to do so by the Commission, as delegated to the Division of Water and Audits.

   a. A staged Schedule No. 14.1 that has been authorized by the Commission shall remain dormant until triggered by specific conditions detailed in the Schedule No. 14.1 tariff and AVR has requested and received authorization for activating a stage by the Commission.

   b. Notice of the Tier 2 advice letter and associated public participation hearing if required shall be provided to customers through a bill insert or a direct mailing.

   c. AVR shall comply with all requirements of Sections 350-358 of the California Water Code.

   d. The Tier 2 advice letter requesting the addition of a Schedule No. 14.1 shall include but not be limited to:

      i. The proposed Schedule No. 14.1 tariff, which shall include but not be limited to:

         1. Applicability;
         2. Applicable Territory;
         3. A detailed description of each Stage of Mandatory Water Reductions;
         4. A detailed description of the Trigger that Activates each Stage of Mandatory Water Reductions;
         5. A detailed description of each water use restriction, prohibition and/or reduction level for each Stage of Mandatory Water Reduction;
         6. Water use violation levels, written warning levels, applicable rate schedules and drought surcharges, associated penalties, surcharges or fees, if applicable, and exception procedures;
         7. Conditions for installation of a flow restrictor;
         8. Charges for installation and removal of flow restrictors, and
         9. Special Conditions.

(N)

RULE NO. 14.1
WATER SHORTAGE CONTINGENCY PLAN

(N)

D. STAGED MANDATORY WATER REDUCTIONS – SCHEDULE NO. 14.1 (Continued)

ii. Justification for, and documentation and calculations in support of the Schedule, including but not limited to each item in D.1.d.i above.

2. The number of Stages requested by each utility/district/water system may vary, depending on local conditions and specifics of the water shortage event. AVR shall file a Tier 2 advice letter to request activation of a particular stage of Schedule No. 14.1 – Water Shortage Contingency Plan with Staged Mandatory Reductions, Restrictions and Drought Surcharges under the following conditions:

   a. If the Commission, wholesale water supplier, or AVR declares an emergency requiring mandatory water use restrictions, or;

   b. If a government agency with legal jurisdiction over AVR or its service area declares a state of emergency in response to severe drought conditions, earthquake or other catastrophic event that severely reduces AVR's water supply, or;

   c. If voluntary conservation levels or mandatory restrictions on certain uses of water, set by the Commission, AVR, wholesale water supplier, or government agency are insufficient, or;

   d. If a Declaration of Mandatory Water Reductions is made by AVR or governing body or agency, or;

   e. If AVR chooses to subsequently activate a different stage.

3. The Tier 2 advice letter requesting activation of a Schedule No. 14.1 shall include but not be limited to:

   a. Justification for activating this particular stage of reductions, as well as the period during which this particular stage of mandatory restrictions and reductions measures will be in effect.

   b. When AVR requests activation of a particular Stage, it shall notify its customers as detailed in Section E. below.

E. ENFORCEMENT OF STAGED MANDATORY WATER REDUCTIONS

1. The staged reduction of water usage and mandatory restrictions in Section C of this Plan become enforceable through additional tariff rates when the Schedule No. 14.1-Water Shortage Contingency Plan with Staged Mandatory Water Reductions and Drought Surcharges program is triggered, at which time, AVR files a Tier 2 (N)

RULE NO. 14.1
WATER SHORTAGE CONTINGENCY PLAN

(N)

E. ENFORCEMENT OF STAGED MANDATORY WATER REDUCTIONS (Continued)

advice letter requesting activation of a particular stage, and authorization is received from the Commission as delegated to the Division of Water and Audits.

a. In the event a customer is observed to be using water for any nonessential or unauthorized use as defined in Section B and C of this Rule, AVR may charge a water use violation fine in accordance with Schedule No. 14.1.

b. In the event an authorized governing body has established water usage levels through an executive order or emergency regulation, AVR may establish water usage targets conforming to the level established by the regulation and adopt appropriate rate schedules for the target levels decreed in the order in accordance with Schedule No. 14.1.

2. AVR may, after one written warning, install a flow-restricting device on the service line of any customer observed by utility personnel to be using water for any non-essential or unauthorized use as defined in Section B and C above.

3. A flow restrictor shall not restrict water delivery by greater than 50% of normal flow and shall be capable of providing the premise with a minimum of 3 Ccf/person/month. The restricting device may be removed only by the utility, only after a three-day period has elapsed, and only upon payment of the appropriate removal charge as set forth in Schedule No. 14.1.

4. After the removal of the restricting device, if any non-essential or unauthorized use of water continues, the utility may install another flow-restricting device without written notice. This device shall remain in place until water supply conditions warrant its removal and until the appropriate charge for removal has been paid to AVR.

5. Any tampering with flow restricting device by customer can result in discontinuation of water use at AVR's discretion.

6. If, despite installation of such flow-restricting device pursuant to the provisions of the previous enforcement conditions, any such non-essential or unauthorized use of water continues, then the utility may discontinue water service to such customer. In such latter event, a charge as provided in Rule No. 11 shall be paid to AVR as a condition for restoration of service.

(N)

RULE NO. 14.1
WATER SHORTAGE CONTINGENCY PLAN

(N)

E. ENFORCEMENT OF STAGED MANDATORY WATER REDUCTIONS (Continued)

7. The charge for removal of a flow-restricting device shall be in accordance with Schedule No.14.1.

F. APPEAL PROCEDURE

1. Any customer who seeks a variance from any of the provisions of this Water Shortage Contingency Plan shall notify AVR in writing using the appeals form, explaining in detail the reason for such a variation. AVR shall respond to each such request in writing.

2. The appeals form is available online at AVR's website, www.avrwater.com, the AVR office located 21760 Ottawa Road, Apple Valley, CA 92308 or call 760.247.6484.

3. If the customer disagrees with such disposition, the customer may contact the Commission.

4. Except as set forth in this Section, no person shall have any right or claim in law or in equity, against AVR or any of its employees, or the Commission because of, or as a result of, any matter or thing done or threatened to be done pursuant to the provisions of the Water Shortage Contingency Plan.

G. NOTICE

1. As stated under Section D.1.b and c, when AVR requests the addition of a Schedule 14.1 – Staged Mandatory Water Allocation tariff, via a Tier 2 advice letter, it shall provide notice of the Tier 2 advice letter and associated public hearing, if necessary. Notice will be provided to customers through bill inserts or direct mailing, and it shall comply with all requirements of Sections 350-358 of the California Water Code (CWC), including but not limited to the following:

   a. In order to be in compliance with both General Order 96-B and CWC, AVR shall provide notice via both newspaper and bill insert/direct mailing.

   b. AVR shall file one notice for each advice letter filed, that includes both notice of the filing of the Tier 2 advice letter as well as the details of the public hearing (date, time, place, etc.).

   c. The public meeting shall be held after AVR files the Tier 2 advice letter, and before the Commission authorizes the addition of Schedule 14.1 to the tariff (N)

RULE NO. 14.1
WATER SHORTAGE CONTINGENCY PLAN

(N)

G. NOTICE (Continued)

except in cases of emergency water shortages approved by the Division of Water and Audits.

d. AVR shall consult with the Division of Water and Audits staff prior to filing the advice letter, in order to determine the details of the public meeting.

In the event that Schedule 14.1 – Water Shortage Contingency Plan with Staged Mandatory Reductions, Restrictions and Drought Surcharges is triggered, and AVR requests activation through the filing of a Tier 2 advice letter, AVR shall notify its customers and provide each customer with a summary of Schedule No. 14.1 by means of bill insert or direct mailing. Notification shall take place prior to imposing any fines associated with this plan. If activation of Schedule No. 14.1 occurs one year or more since the public hearing associated with adding Schedule No. 14.1 to its tariffs, then AVR shall conduct a public hearing pursuant to California Water Code Section 351 prior to activating the rationing stage.

2. During the period that a stage of Schedule No. 14.1 is activated, AVR shall provide customers with updates in at least every other bill, regarding its water supply status and the results of customers' conservation and water-use reduction efforts. (N)

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The following listed tariff sheets contain all effective rates and rules affecting the charges and service of the utility, together with other pertinent information:

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Service Area Map		653-W	
Rate Schedules:			
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No. 12	Information Available to Public	366-W, 367-W	
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No. 21	Military Family Relief Program	371-W	
No. 22	Fire Protection	543-W, 544-W, 716-W	

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(continued)

APPLE VALLEY RANCHOS WATER COMPANY

ADVICE LETTER 201-W
DISTRIBUTION LIST

Jim Hansen
Navajo Mutual Water Company
P. O. Box 392
Apple Valley, CA 92307
jhansenjr@email.com

Town of Apple Valley
Attention: Dennis Cron
14955 Dale Evans Parkway
Apple Valley, CA 92307
dcron@applevalley.org

Manuel Benitez
County of San Bernardino
Special Districts Department
Water and Sanitation Division
12402 Industrial Blvd.
Bldg. D, Ste. 6
Victorville, CA 92392

California Public Utilities Commission
Attention Ting-Pong Yuen
Division of Ratepayer Advocates
505 Van Ness Avenue
San Francisco, CA 94102
tpy@cpuc.ca.gov

Kathleen Rollings-McDonald
Executive Officer
Local Agency Formation Commission
175 West Fifth St., Second Floor
San Bernardino, CA 92415-0490
lafco@lafco.sbcounty.gov

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APPLE VALLEY RANCHOS WATER COMPANY SCHEDULE 14.1 Page 1 of 7 (N)
WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS, RESTRICTIONS AND DROUGHT SURCHARGES

A. APPLICABILITY

This schedule applies to all water customers served under Tariff Schedules 1 and 3 authorized by the California Public Utilities Commission (Commission) for the Apple Valley Ranchos Water Company (AVR) service areas. This schedule is only effective in times of mandatory conservation, as required by Rule No. 14.1, and only for the period noted in the Special Conditions section below. The drought emergency surcharges listed in this schedule are in addition to the regular water use charges under the current Schedules referenced above as authorized by the Commission.

To the extent that a stage of the water shortage contingency plan in Schedule No. 14.1 has been activated, and a provision of Rule No. 14.1 is inconsistent with the activated stage in Schedule No. 14.1, the provisions of Schedule No. 14.1 apply.

B. TERRITORY

This schedule is applicable to customers in Apple Valley and vicinity, San Bernardino County.

C. MANDATORY WATER USE REDUCTIONS, MANDATORY RESTRICTIONS, AND DROUGHT EMERGENCY SURCHARGES

In response to the Governor's Executive Order (B-29-15) the State Water Resources Control Board (Water Board) imposed restrictions to achieve a statewide 25% reduction in potable urban water usage through February 28, 2016. These restrictions are designed to strongly encourage those customers with high per capita usage to achieve proportionally greater reduction than those with low use. Water users will need to reduce usage as compared to the amount they used in 2013. The mandated water use reduction for AVR's service area is 28%. AVR customers reduced usage in 2014, but will need to achieve additional water conservation in 2015-16 to achieve the statewide goal.

The Water Board has established the following mandatory restrictions for all water users.

No customer shall use utility-supplied water for non-essential or unauthorized uses as defined below:

(continued) (N)

APPLE VALLEY RANCHOS WATER COMPANY SCHEDULE 14.1 Page 2 of 7 (N)
WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS, RESTRICTIONS AND DROUGHT SURCHARGES
(continued)

C. **MANDATORY WATER USE REDUCTIONS, MANDATORY RESTRICTIONS, AND DROUGHT EMERGENCY SURCHARGES** (continued)

a. The application of potable water to outdoor landscapes in a manner that causes runoff such that water flow onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, or structures.

b. The use of a hose that dispenses potable water to wash a motor vehicle, except where the hose is fitted with a shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use.

c. The use of potable water for washing buildings, structures, sidewalks, walkways, patios, tennis courts, or other hard-surfaced, non-porous areas.

d. The use of potable water in a fountain or other decorative water feature, except where the water is part of a recirculating system.

e. The use of potable water for watering outside plants, lawn, landscape, and turf area during certain hours prohibited by applicable laws, during and up to 48 hours after measurable rainfall (0.1" or more).

f. AVR will promptly notify customers when aware of leaks within the customer's control. The failure to promptly repair any leaks, breaks, or other malfunction resulting in water waste in a customer's domestic or outdoor water system after notification by AVR, unless other, specific arrangements are made with and agreed to by AVR.

g. The serving of water, other than upon request, in eating and drinking establishments, including but not limited to restaurants, hotels, cafes, bars, or other public places where food or drink are served and/or purchased.

h. Hotels/motels must provide guests with the option of choosing not to have towels and linens laundered daily and prominently display notice of this option in each guestroom.

i. The use of potable water for irrigation of ornamental turf on public street medians.

j. The use of potable water for irrigation outside of newly constructed homes and buildings that is not delivered by drip or micro spray systems.

k. Commercial, industrial, and institutional properties, such as campuses, golf courses, and cemeteries, immediately implement water efficiency measures to reduce potable water use in an amount consistent with the mandated reduction.

(continued) (N)

APPLE VALLEY RANCHOS WATER COMPANY SCHEDULE 14.1 Page 3 of 7 (N)
WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS, RESTRICTIONS AND DROUGHT SURCHARGES
(continued)

C. **MANDATORY WATER USE REDUCTIONS, MANDATORY RESTRICTIONS, AND DROUGHT EMERGENCY SURCHARGES** (continued)

l. Further reduction in or the complete prohibition of any other use of water declared non-essential, unauthorized, prohibited, or unlawful by an authorized government or regulatory agency or official.
m. Use of potable water for watering streets with trucks, or other vehicles, except for initial wash-down for construction purposes (if street sweeping is not feasible), or to protect the health and safety of the public.

The following stages will be implemented as needed to achieve the annual mandated reduction. The utility may implement Stage 2 and the associated Drought Emergency Surcharge without first implementing Stage 1 if warranted by the mandated reduction.

Stage 1

1. Outdoor irrigation is restricted to no more than three days per week:

Addresses Ending In:	Watering Days
Even Numbers (0, 2, 4, 6, 8)	Monday, Wednesday, and Saturday
Odd Numbers (1, 3, 5, 7, 9)	Tuesday, Thursday, and Sunday

2. Watering or outdoor irrigation of outside plants, lawn, landscape, and turf areas with potable water using a landscape irrigation system or a watering device that is not continuously attended is limited to no more than 10 minutes of watering per day per station, with no watering between 8:00 a.m. and 7:00 p.m. This provision does not apply to landscape irrigation zones that exclusively use drip-type irrigation systems that use less than 1.0 inch per hour. This provision also does not apply to watering or irrigating by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive action shut-off nozzle or device that causes it to cease dispensing water immediately when not in use, or for the express purpose of adjusting or repairing an irrigation system. However, no irrigation can occur regardless of method that results in runoff.
3. Apart from the above outdoor irrigation restrictions, when a city, county, or other local public agency in AVR's service area adopts restrictions on the number of days or hours of the day that customers may irrigation that are different than those adopted by AVR, AVR may adopt the city, county, or other local public agency's restrictions.

(continued) (N)

APPLE VALLEY RANCHOS WATER COMPANY SCHEDULE 14.1 Page 4 of 7 (N)
WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS, RESTRICTIONS AND DROUGHT SURCHARGES
(continued)

4. All leaks, breaks, or other malfunctions in the customer's plumbing fixtures and/or irrigation system must be repaired within five (5) business days of written notification by AVR, unless other arrangements are made with AVR.
5. Failure to comply with these restrictions may result in the installation of a flow restrictor device along with associated fees for installation and removal.
6. Failure to comply with these restrictions may result in the installation of a real time measurement device on the customer's service line to provide the customer and AVR with access to information from the device. The cost of the device, including installation, shall be billed to the customer, and nonpayment may result in discontinuance of service.
7. If conditions warrant, AVR will change the number of watering days and the specific day of watering after first notifying its customers in accordance with Rule No. 14.1.
8. If conditions warrant, AVR will change the number of days allowed for a customer to fix leaks, breaks or other malfunctions after first notifying its customers in accordance with Rule No. 14.1.

Stage 2

Will be implemented if the Stage 1 restrictions are deemed insufficient to achieve reductions due to water supply shortages or to achieve identified water usage goals established by an authorized government agency or official.

In addition to the restrictions identified in Stage 1, the following restrictions, allocations, and drought emergency surcharges are in effect:

1. Outdoor irrigation is restricted to no more than two (2) days per week for non-residential customers. Watering or outdoor irrigation of outside plants, lawn, landscape, and turf areas with potable water using a landscape irrigation system or a watering device that is not continuously attended is limited to no more than ten (10) minutes of watering per day per station.
2. All leaks, breaks, or other malfunctions in the customer's plumbing fixtures and/or irrigation system must be repaired within three (3) business days of written notification by AVR, unless other arrangements are made with AVR.

(continued) (N)

APPLE VALLEY RANCHOS WATER COMPANY SCHEDULE 14.1 Page 5 of 7 (N)
WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS, RESTRICTIONS AND DROUGHT SURCHARGES
(continued)

Stage 2 (continued)

3. The use of potable water to refill residential swimming pools or outdoor spas more than one foot or initial filling with potable water except when existing pools are drained to repair leaks.
4. All customers will have their baseline established by using the system wide average use for 2013.
5. The customer's allocation will be based on the 2013 baseline less 28%.
6. Residential customer's allocation will be set at nine (9) Ccf per month for the months of November, December, January, February, March, April, and May. For the months of June, July, August, September, and October the allocation will be set at sixteen (16) Ccf per month.
7. All usage in excess of residential customer's allocation will be charged at the regular Schedule No. 1 quantity rate plus a drought emergency surcharge rate that is calculated from the Tier 1 quantity rate multiplied by a factor of 1.0.
8. All usage for non-residential customers served under Tariff Schedule No. 3 will be charged at the regular Schedule No. 3 quantity rate plus a drought emergency surcharge rate that is calculated as the quantity rate multiplied by a factor of 0.15.
9. If feasible, customer's allocation may be based on a customer's consumption during a historical base period and will include a percentage reduction designed to meet necessary water use reductions. In addition to the normal rate paid for the unit of water, a drought surcharge will be charged to a customer for each unit of water used over the established allocation for the billing period.

Stage 3

Will be implemented if the Stage 2 allocations and drought emergency surcharges are deemed insufficient to achieve reductions due to water supply shortages or to achieve identified water usage goals established by an authorized government agency or official.

In addition to the restrictions identified in Stage 2, the following restrictions and drought emergency surcharges are in effect:

(continued) (N)

APPLE VALLEY RANCHOS WATER COMPANY SCHEDULE 14.1 Page 6 of 7 (N)
WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS, RESTRICTIONS AND DROUGHT SURCHARGES
(continued)

Stage 3 (continued)

1. Outdoor irrigation is restricted to no more than two (2) days per week. Watering or outdoor irrigation of outside plants, lawn, landscape, and turf areas with potable water using a landscape irrigation system or a watering device that is not continuously attended is limited to no more than five (5) minutes of watering per day per station.
2. All leaks, breaks, or other malfunctions in the customer's plumbing fixtures and/or irrigation system must be repaired within two (2) business days of written notification by AVR, unless other arrangements are made with AVR.
3. All usage in excess of residential customer's allocation will be charged at the regular Schedule No. 1 quantity rate plus a drought emergency surcharge rate that is calculated as the Tier 1 quantity rate multiplied by a factor of 1.5.
4. All usage for non-residential customers served under Tariff Schedule No. 3 will be charged at the regular Schedule 3 quantity rate plus a drought emergency surcharge rate that is calculated as the quantity rate multiplied by a factor of 0.30.

Stage 4

Will be implemented if the Stage 3 allocations and drought emergency surcharges are deemed insufficient to achieve reductions due to water supply shortages or to achieve identified water usage goals established by an authorized government agency or official.

In addition to the restrictions identified in Stage 3, the following restrictions and drought emergency surcharges are in effect:

1. Outdoor irrigation is restricted to no more than one (1) day per week. Watering or outdoor irrigation of outside plants, lawn, landscape, and turf areas with potable water using a landscape irrigation system or a watering device that is not continuously attended is limited to no more than five (5) minutes of watering per day per station.
2. All usage in excess of residential customer's allocation will be charged at the regular Schedule No. 1 quantity rate plus a drought emergency surcharge rate that is calculated as the Tier 1 quantity rate multiplied by a factor of 2.0.
3. All usage for non-residential customers served under Tariff Schedule No. 3 will be charged at the regular Schedule No. 3 quantity rate plus a drought emergency surcharge rate that is calculated as the quantity rate multiplied by a factor of 0.45.

(continued) (N)

APPLE VALLEY RANCHOS WATER COMPANY SCHEDULE 14.1 Page 7 of 7 (N)
WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS, RESTRICTIONS AND DROUGHT SURCHARGES
(continued)

D. FLOW RESTRICTOR REMOVAL CHARGE

The charge for installation and removal of a flow-restricting device shall be:
$100 during normal business hours, and $150 during outside normal business hours.

The flow restrictor will remain installed for a minimum of 7 days.

E. EXEMPTION AND APPEALS PROCESS

Any customer who seeks a variance from any of the provisions of this Water Shortage Contingency plan shall notify the utility in writing using the appeals form, explaining in detail the reason for such a variation. The utility shall respond to each such request in writing.

The appeals form is available online at AVR website: www.avrwater.com, the AVR office located at 21760 Ottawa Road, Apple Valley, CA 92308 or telephone 760.247.6484.

If the customer disagrees with such disposition, the customer shall have the right to file a complaint with the Commission.

Educational facilities may be partially or fully exempted from mandatory shortage allocations if they have submitted to a water audit and are complying with the recommendations of the water audit.

Except as set forth in this section, no person shall have any right or claim in law or in equity against AVR, or any of its employees, or the Commission because of, or as a result of, any matter or thing done or threatened to be done pursuant to the provisions of this Schedule No. 14.1.

F. SPECIAL CONDITIONS

1. The active stage of Schedule No. 14.1 is to remain in effect until a Tier 2 advice letter is filed with the Commission to activate a different Stage or when Schedule 14.1 is deactivated.
2. Drought Emergency Surcharges must be separately identified on each bill.
3. All bills are subject to reimbursement fee set forth on Schedule No. UF.
4. All monies collected by AVR through Drought Emergency Surcharges shall not be accounted for as income, but shall be accumulated in the Water Revenue Adjustment Mechanism (WRAM) Balancing Account and used to offset under-collected revenues.
5. All expenses incurred by AVR to implement Rule No. 14.1, and Schedule No. 14.1, and requirements of the Water Board that have not been considered in a General Rate Case or other proceeding shall be accumulated by AVR in a separate memorandum account, authorized in Resolution No. W-4976, for disposition as directed or authorized from time to time by the Commission. (N)

Rule No. 20

WATER CONSERVATION

A. Purpose
The purpose of this rule is to ensure that water resources available to the utility are put to a reasonable beneficial use and that the benefits of the utility's water water supply and service extend to the largest number of persons.

B. Waste of Water Discouraged
Refer to Rule 11 B. (3).

C. Use of Water-Saving Devices and Practices
Each customer of the utility is encouraged to install water saving devices to reduce the quantity of water used within the residence. Each customer is further encouraged to adopt such other water usage and re-usage practices and procedures as are feasible and reasonable. (T) (T)

D. Water-Saving Kits
The utility will make available, without initial cost to the customer, for use in each residence receiving water service from the utility, a water-saving kit containing the following:

(D)

(1) A device or devices for reducing faucet and shower flow rates; (T)

(2) A dye tablet or tablets for determining if a toilet tank leaks;

(3) Other devices and programs from time to time approved by the utility; (T)

(4) Installation and other instructions and information pertinent to conserving water. (T)

Chapter 6.40 - WATER CONSERVATION PLAN

6.40.010 - Findings.

The Town Council finds that by reason of an apparent overdraft of the water table and because of the current problem existing with respect to the over use of the waste of water in connection with the irrigation of landscape and other outdoor vegetation, lawns and other growth, it is necessary to adopt and enforce a water conservation plan to conserve the water supplies of the Town for the greatest public benefit with particular regard to domestic use, sanitation, and fire protection; and it is the intent of the Town Council to achieve at least an approximately 10% reduction in water use.

6.40.020 - Purpose.

The Town finds that certain water uses regulated or prohibited in this Chapter are non-essential and if allowed would constitute wastage of water.

6.40.030 - Water regulations.

A. No water user within the Town of Apple Valley shall knowingly make, cause, use, or permit the use of water for residential, commercial, industrial, agricultural or any other purpose in the manner contrary to any provision of this Chapter.

B. All water users in the Town of Apple Valley shall abide by the following water conservation measures:

(1) The use of water for any purpose shall not result in flooding or runoff in gutters, driveways, streets or adjacent lands.

(2) Lawns, trees, shrubs, and other landscaping shall not be watered beyond what they need for growth and to sustain life, and water shall not be permitted to pool or to run off property onto streets or adjacent land.

(3) Sidewalks, walkways, driveways, parking areas, patios, porches or verandahs or any other like area shall not be washed off with water from hoses or by any other means. The exception to this shall be the washing of flammable or other similar dangerous substances that require direct hose flushing using recognized safety control measures for the benefit of the public health and safety. Notification to the Town of such wash down is required.

(4) Water, sprinkling, aerial watering or irrigating of any landscaped or vegetated areas, including lawns, trees, shrubs, grass, ground cover, plants, vines, gardens, vegetables, flowers, or other landscaping shall not occur between the hours of 9:00 a.m. and 6:00 p.m. during the months of April through September provided, however, that these restrictions shall not apply to hand-held hose or drip irrigation systems or to establishment of new lawns, landscaping, or gardens.

(5) Non-commercial washing of privately owned vehicles, trailers, motor homes, buses, boats and

mobile homes is prohibited except from a bucket, and except that a hose equipped with an automatic shut-off nozzle may be used for a quick rinse.

(6) Water shall not be used to clean, fill, operate or maintain levels in decorative fountains unless such water is for replenishment of a recycling system.

(7) Water lines, faucets, and other facilities shall be maintained so that they do not leak water. Existing leaks shall be repaired in a timely manner.

(8) Restaurants, other food establishments, or other public places where food is served, shall not routinely provide glasses of drinking water to customers unless specifically requested by the customer.

(9) Water for construction purposes including, but not limited to, debrushing of vacant land, compaction of fills and pads, trench backfill and other construction uses, shall be used in an efficient manner. The use of aerial type sprinklers is not recommended but, if used, shall not be operated between the hours of 9:00 a.m. and 6:00 p.m.

(10) All new residential, commercial and industrial construction shall be equipped with low-flush toilets and low-flow showers and faucets.

(11) Water used for cooling systems must be recycled to the extent possible.

(12) Evaporation resistant covers are required for all new swimming pools and hot tubs and are encouraged to be installed for existing pools. The covers required by this Chapter shall, at the time of purchase, installation and all subsequent maintenance, meet or exceed current standards and specifications for swimming pool, spa and hot tub covers adopted by the American Society for Testing and Materials (ASTM).

(13) Hotels/motels are required to post a notice in substantially the form provided by the Town of Apple Valley urging guests to conserve water.

(14) All current and future water customers are encouraged to install flow restrictors or pressure reducers and to install toilet tank displacement devices (dams, bottles or bags), and as appliances or fixtures wear out, replace them with water-saving models.

(15) Parks, schools, golf courses, cemeteries, school grounds and all public use lands shall not irrigate between the hours of 9:00 a.m. and 6:00 p.m. during the months of April through September inclusive and are encouraged to use water conservation irrigation equipment.

(16) The use of drought-tolerant or native plant material is encouraged for exterior landscaping in all new residential, and required for new commercial and industrial construction.

(17) The use of low precipitation sprinkler heads, bubblers, drip irrigation and timing devices are required in the exterior landscaping in all new residential, commercial and industrial construction.

(18) At least 50% of all new model homes shall include as a part of the exterior landscape development low water use, drought-tolerant or native plants.

(19) Projects, including commercial and planned unit developments, which utilize recycled water

from sewage treatment or agricultural operations, may receive an exemption from paragraphs (15) through (18) of this Section by approval of the Town Council.

6.40.040 - Exceptions.

The prohibited or restricted uses of water under this Chapter shall not be applicable in those instances when the Town Manager or his or her designee finds:

(1) The use is essential to avoid an undue hardship for a water user;

(2) Special circumstances exist for a particular water user, as distinguished from other water users, which justify allowing an exception;

(3) The use is essential for required government or public utility services, including but not limited to police protection, fire protection, sanitation, and other critical or emergency services; or

(4) The use is essential to maintain the public health and safety.

(Ord. 58, 7-24-90)

6.40.050 - Penalties.

Any person who violates any provision or who fails to comply with any of the requirement of this Chapter shall be guilty of an infraction and, upon conviction thereof, shall be punished in accordance with the provisions of Sections 1.01.200 through 1.01.230 of Chapter 1.01 of Title 1 of this Code.

(Ord. 156, 11-14-95)

ORDINANCE NO. 479

AN ORDINANCE OF THE TOWN COUNCIL OF THE TOWN OF APPLE VALLEY, CALIFORNIA, AMENDING TITLE 9 "DEVELOPMENT CODE" OF THE TOWN OF APPLE VALLEY MUNICIPAL CODE, BY AMENDING CHAPTER 9.75 "WATER CONSERVATION/LANDSCAPING REGULATIONS" TO COMPLY WITH THE STATE OF CALIFORNIA CODE OF REGULATIONS TITLE 23, DIVISION 2, CHAPTER 2.7 "MODEL WATER EFFICIENT LANDSCAPE ORDINANCE" AND TO ADD LANDSCAPING STANDARDS APPLICABLE TO SINGLE-FAMILY, INFILL DEVELOPMENT

WHEREAS, Title 9 "Development Code" of the Municipal Code of the Town of Apple Valley was adopted by the Town Council on April 27, 2010; and

WHEREAS, Title 9 (Development Code) of the Municipal Code of the Town of Apple Valley has been previously modified by the Town Council on the recommendation of the Planning Commission; and

WHEREAS, on April 7, 2015, the Community Development Department hosted a workshop with developers and others to hear concerns regarding single family infill development; and

WHEREAS, on June 9, 2015, the Town of Apple Valley Town Council formed an Ad Hoc Committee for Infill Residential Issues that met on three (3) occasions to discuss issues relating to single family infill development and provided recommendations for a Development Code Amendment; and

WHEREAS, Specific changes to Chapter 9.75 "Water Conservation/Landscaping Regulations" as it pertains to Governor Brown's Executive Order B-29-15 for compliance with the State Model Water Efficient Landscape Ordinance and landscape standards for single family infill development; and

WHEREAS, The project is not subject to the California Environmental Quality Act (CEQA) pursuant to Section 15061(b)(3) of the State Guidelines to Implement CEQA, which states that the activity is covered by the general rule that CEQA applies only to projects that have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question, the proposed Code Amendment, may have a significant effect on the environment, the activity is not subject to CEQA; and

WHEREAS, on November 4, 2015, the Planning Commission of the Town of Apple Valley conducted a duly noticed public hearing on Development Code Amendment No. 2015-006, receiving testimony from the public and adopting Planning Commission Resolution No. 2015-010 forwarding a recommendation to the Council; and

WHEREAS, on December 8, 2015, the Town Council of the Town of Apple Valley conducted a duly noticed and advertised public hearings on Development Code Amendment No. 2015-006, receiving testimony from the public.

NOW, THEREFORE, the Town Council of the Town of Apple Valley, State of California, does ordain as follows:

Section 1. Find that the changes proposed by Development Code Amendment No. 2015-006 is consistent with the Goals and Policies of the Town of Apple Valley adopted General Plan.

Section 2. Pursuant to Section 15061(b)(3) of the State Guidelines to Implement the California Environmental Quality Act (CEQA), it can be determined that the Code amendment is covered by the general rule that CEQA applies only to projects that have the potential for causing a significant effect on the environment. Where it can be seen with certainty, as with the proposed Code Amendment, that there is no possibility that the proposal approved under Development Code Amendment No. 2015-006 will have a significant effect on the environment and, therefore, the Amendment is EXEMPT from further environmental review.

Section 3. Amend Development Code as shown in Attachment A, "Development Code Section 9.75 Text Changes".

Section 4. Notice of Adoption. The Town Clerk of the Town of Apple Valley shall certify to the adoption of this ordinance and cause publication to occur in a newspaper of general circulation and published and circulated in the Town in a manner permitted under Section 36933 of the Government Code of the State of California.

Section 5. Effective Date. This Ordinance shall become effective thirty (30) days after the date of its adoption.

Section 6. Severability. If any provision of this Ordinance, or the application thereof to any person or circumstance is held invalid, such invalidity shall not affect other provisions or applications and, to this end, the provisions of this Ordinance are declared to be severable.

APPROVED and **ADOPTED** by the Town Council and signed by the Mayor and attested to by the Town Clerk this 12th day of January, 2016.

Barb Stanton, Mayor

ATTEST:

La Vonda M-Pearson, Town Clerk

APPROVED AS TO FORM:

John Brown, Town Attorney

APPROVED AS TO CONTENT:

Frank Robinson, Town Manager

STATE OF CALIFORNIA

COUNTY OF SAN BERNARDINO

TOWN OF APPLE VALLEY

I, LA VONDA M-PEARSON, TOWN CLERK of the Town of Apple Valley, California, hereby certify that the foregoing Ordinance No. 479 was duly introduced on December 8, 2015 and adopted at the Town Council regular meeting on January 12, 2016, by the following vote:

AYES: Council Members Bishop, Cusack, Emick, Mayor Pro Tem Nassif, Mayor Stanton.

NOES: None.

ABSENT: None.

ABSTAIN: None.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the Town of Apple Valley, California, this 13th day of January, 2016.

LA VONDA M-PEARSON, CMC
TOWN CLERK

by. _____
Yvonne Rivera, Deputy

(SEAL)

STATE OF CALIFORNIA

COUNTY OF SAN BERNARDINO

TOWN OF APPLE VALLEY

I, La Vonda M-Pearson, Town Clerk of the Town of Apple Valley, California, do hereby certify that the attached Ordinance No. 479 was adopted on January 12, 2016 by the Town Council of the Town of Apple Valley and has been published in a newspaper of general circulation, published and circulated in the Town in a manner permitted under Section 36933 of the Government Code.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the Town of Apple Valley, California, this 13th day of January, 2016.

LA VONDA M-PEARSON, CMC
TOWN CLERK

Yvonne Rivera, Deputy

(SEAL)

CHAPTER 9.75 WATER CONSERVATION/LANDSCAPING REGULATIONS

9.75.010 PURPOSE

The purpose of this Chapter is to provide minimum water conservation and landscape development standards which will promote the general welfare of Apple Valley residents through the provision of an outdoor environment which will:

A. Use water efficiently without waste by setting a Maximum Applied Water Allowance as an upper limit for water use and reduce water use to the lowest practical amount.
B. Create aesthetically pleasing views and vistas along public streets.
C. Complement and enhance the functional and aesthetic design of new building and site development projects so as to protect and enhance property values.
D. Use water conservation designs that create a mini-oasis concept, where plants and turf are concentrated in areas near buildings where they may be enjoyed at a pedestrian level.
E. Provide visual screening of parking, service and storage areas.
F. Mitigate the adverse impacts of higher intensity land uses upon lower intensity uses through the provision of needed landscape buffers.
G. Promote water conservation by restricting the use of turf and ornamental water features and requiring the utilization of low water use plant materials.
H. Promote climate modifications for enhancement of pedestrian environment at street frontages, parking lots and building facades.
I. Provide maximum shade on ground surfaces to reduce the "urban heat island effect" produced by large expanses of unprotected paved areas.

9.75.020 APPLICABILITY

A. All persons owning, developing or maintaining property subject to the provisions of this Chapter shall comply with all applicable provisions contained herein. The landscape standards and requirements established by this Chapter shall apply to all new developments that require the approval of a building permit, site development plan or Development Permit.
B. No Building Permit shall be approved or issued unless the Planning Division finds that the project satisfies the criteria set forth in this Chapter.
C. Cemeteries shall only be required to provide scheduled irrigation based on CIMIS (California Irrigation Management Information System) or conduct water audits every three (3) years with strict adherence to the recommendations in the water audit. CIMIS and water audits shall be submitted to the water serving entity for compliance.
D. This Chapter does not apply to the following:

1. Registered local, state or federal historical sites;
2. Ecological restoration projects that do not require a permanent irrigation system;
3. Mined-land reclamation projects that do not require a permanent irrigation system; or
4. Existing plant collections, as part of botanical gardens and arboretums open to the public.

E. The provisions California Code of Regulations Title 23, Division 2, Chapter 2.7 "Model Water Efficient Landscape Ordinance (MWELO)", which may be amended from time to time are made part of this Chapter by reference with the same force and effect as if the provisions therein were specifically and fully set out herein, excepting that when the provisions of this chapter are more restrictive than conflicting State provisions, this chapter shall prevail.

9.75.030 DEFINITIONS

Application Rate means the depth of water applied to a given area, usually measured in inches per hour.

Applied Water means the portion of water supplied by the irrigation system to the landscape.

Automatic Irrigation Controller means a timing device used to remotely control valves that operate an irrigation system. Automatic irrigation controllers are able to self-adjust and schedule irrigation events using either evapotranspiration (weather-based) or soil moisture data.

Backflow Prevention Device means a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

Bubbler Emitter – See Low Volume Irrigation Systems

Certified Irrigation Designer means a person certified to design irrigation systems by an accredited academic institution, a professional trade organization or other program such as the US Environmental Protection Agency's WaterSense irrigation designer certification program and Irrigation Association's Certified Irrigation Designer program.

Certified Landscape Irrigation Auditor means a person certified to perform landscape irrigation audits by an accredited academic institution, a professional trade organization or other program such as the US Environmental Protection Agency's WaterSense irrigation auditor certification program and Irrigation Association's Certified Landscape Irrigation Auditor program.

Check Valve or anti-drain valve means a valve located under a sprinkler head, or other location in the irrigation system, to hold water in the system to prevent drainage from sprinkler heads when the sprinkler is off.

Common Open Space means the land within or serving as a part of a development, not individually owned or dedicated for public use, which is designed and intended for the common use or enjoyment of the residents of the development and may include such complementary structures and improvements as are necessary and appropriate.

Compost means the safe and stable product of controlled biologic decomposition of organic materials that is beneficial to plant growth.

Conversion Factor (0.62) means the number that converts acre-inches per acre per year to gallons per square foot per year.

Distribution Uniformity means the measure of the uniformity of irrigation water over a defined area.

Drip Emitter – See Low Volume Irrigation System.

Drip Irrigation means any non-spray low volume irrigation system utilizing emission devices with a flow rate measured in gallons per hour. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

Ecological Restoration Project means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

Effective Precipitation or Usable Rainfall (EPPT) means the portion of total precipitation which becomes available for plant growth.

Electric Automatic Controllers refers to time clocks that have the capabilities of multi-programming and multiple start times in order to control amount of water applied to landscaping.

Emitter means a drip irrigation emission device that delivers water slowly from the system to the soil.

Established Landscaping means the point at which new plants in the landscape have developed roots into the soil adjacent to the root ball.

Establishment Period means the first year after installing the plant in the landscape.

Estimated Total Water Use (ETWU) is the estimated water needs calculated and based on the plants used and irrigation method selected for the landscape design. The ETWU must be below the Maximum Applied Water Allowance.

ET Adjustment Factor (ETAF) means a factor of 0.55 for residential areas and 0.45 for non-residential areas, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape. The ETAF for new and existing (non-rehabilitated) Special Landscape Areas shall not exceed 1.0. The ETAF for existing non-rehabilitated landscapes is 0.8.

Evapotranspiration Rate means the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants during a specified time.

Flow Rate means the rate at which water flows through pipes, valves and emission devices, measured in gallons per minute, gallons per hour, or cubic feet per second.

Flow Sensor means an inline device installed at the supply point of the irrigation system that produces a repeatable signal proportional to flow rate. Flow sensors must be connected to an automatic irrigation controller, or flow monitor capable of receiving flow signals and operating master valves. This combination flow sensor/controller may also function as a landscape water meter or submeter.

Friable means a soil condition that is easily crumbled or loosely compacted down to a minimum depth per planting material requirements, whereby the root structure of newly planted material will be allowed to spread unimpeded.

Fuel Modification Plan Guideline means guidelines from a local fire authority to assist residents and businesses that are developing land or building structures in a fire hazard severity zone.

Graywater means untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. "Graywater" includes, but is not limited to, wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs, but does not include wastewater from kitchen sinks or dishwashers. Health and Safety Code Section 17922.12.

Hardscapes shall mean any durable material (pervious and non-pervious) such as concrete and/or inorganic decorative landscape materials, including but not limited to, stones, boulders, cobbles, pavers, decorative concrete, etc.

Hydrozone means a portion of the landscaped area having plants with similar water needs and rooting depth. A hydrozone may be irrigated or non-irrigated. Hydrozones are categorized as low, moderate, high water, or mixed water use. Temporarily irrigated areas of the landscape shall be included in the low water use hydrozone for the water budget calculation.

Infiltration Rate means the rate of water entry into the soil expressed as a depth of water per unit of time (inches per hour).

Interior Open Space is that open space enclosed by line extensions of the exterior walls of one or more buildings constructed on a common building site.

Invasive Plant Species means species of plants not historically found in California that spread outside cultivated areas and can damage environmental or economic resources. Invasive species may be regulated by county agricultural agencies as noxious species. Lists of invasive plants are maintained at the California Invasive Plant Inventory and USDA invasive and noxious weeds database.

Irrigation Audit means an in-depth evaluation of the performance of an irrigation system conducted by a Certified Landscape Irrigation Auditor. An irrigation audit includes, but is not limited to: inspection, system tune-up, system test with distribution uniformity or emission uniformity, reporting overspray or runoff that causes overland flow, and preparation of an irrigation schedule. The audit must be conducted in a manner consistent with the Irrigation Association's Landscape Irrigation Auditor Certification program or other U.S. Environmental Protection Agency "Watersense" labeled auditing program.

Irrigation Efficiency means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The minimum irrigation efficiency for purposes of these regulations is 0.75 for overhead spray devices and 0.81 for drip systems .

Irrigation Survey means an evaluation of an irrigation system that is less detailed than an irrigation audit. An irrigation survey includes, but is not limited to: inspection, system test, and written recommendations to improve performance of the irrigation system.

Irrigation Water Use Analysis means an analysis of water use data based on meter readings and billing data.

Landscape Architect means a person who holds a license to practice landscape architecture in the state of California Business and Professions Code, Section 5615.

Landscape Area means all the planting areas, turf areas, and water features in a landscape design plan subject to the Maximum Applied Water Allowance calculation. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation).

Landscape Contractor means a person licensed by the state of California to construct, maintain, repair, install, or subcontract the development of landscape systems.

Landscaping means all living plants such as trees, shrubs, vines, vegetative ground cover, organic or inorganic materials, earthen berms, walls, walkways, plazas, courtyards, lighting, benches, trash containers, ponds, fountains, sculptures, and other site furnishings creating an attractive environment. It also includes decorative materials such as bark, rock or stone which are allowed to be used in conjunction with live material planting beds.

Landscape Plan. A graphic representation of the development of a site that illustrates the nature, design, and location of all landscaping and irrigation elements and materials.

Landscape Water Meter means an inline device installed at the irrigation supply point that measures the flow of water into the irrigation system and is connected to a totalizer to record water use.

Lateral Line means the water delivery pipeline that supplies water to the emitters or sprinklers from the valve.

Low Volume Irrigation systems means the application of irrigation water at low pressure through a system of tubing or lateral lines and low-volume emitters such as drip, drip lines, and bubblers. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

Low Water Use Plant Material means trees, shrubs and ground covers that survive with a limited amount of supplemental water, as identified in the Approved Plant list.

Main Line is the pressurized pipeline that delivers water from the water source to a valve or outlet.

Master Shut-Off Valve is an automatic valve installed at the irrigation supply point which controls water flow into the irrigation system. When this valve is closed water will not be supplied to the irrigation system. A master valve will greatly reduce any water loss due to a leaky station valve.

Maximum Applied Water Allowance (MAWA) means the upper limit of annual applied water for the established landscaped area as specified in Section 492.4. It is based upon the area's reference evapotranspiration, the ET Adjustment Factor, and the size of the landscape area. The Estimated Total Water Use shall not exceed the Maximum Applied Water Allowance. Special Landscape Areas, including recreation areas, areas permanently and solely dedicated to edible plants such as orchards and vegetable gardens, and areas irrigated with recycled water are subject to the MAWA with an ETAF not to exceed 1.0. MAWA = (ETo) (0.62) [(ETAF x LA) + ((1-ETAF) x SLA)]. The ETo factor for Apple Valley is 66.2 and the ETAF is 0.55 for residential and 0.45 for non-residential.

Median is an area between opposing lanes of traffic that may be unplanted or planted with trees, shrubs, perennials, and ornamental grasses.

Micro Sprinkler - See Low Volume Irrigation Systems.

Microclimate means the climate of a small, specific area that may contrast with the climate of the overall landscape area due to factors such as wind, sun exposure, plant density, or proximity to reflective surfaces.

Mined-Land Reclamation Projects means any surface mining operation with a reclamation plan approved in accordance with the Surface Mining and Reclamation Act of 1975.

Mulch means any organic material such as leaves, bark, straw, compost or inorganic mineral material such as pebbles, stones, gravel and decorative sand or decomposed granite left loose and applied to the soil surface to reduce evaporation suppressing weeds, moderating soil temperature, and preventing soil erosion.

Native Plants means plants that are : (1) Indigenous to the desert region of California, Nevada and/or Arizona; and (2) Native to the southwestern United States and northern Mexico and (3) are low to minimal water users.

New Construction means, for the purposes of this ordinance, a new building with a landscape or other new landscape, such as a park, playground, or greenbelt without an associated building.

Non-Residential Landscape means landscapes in commercial, institutional, industrial and public settings that may have areas designated for recreation or public assembly. It also includes portions of common areas of common interest developments with designated recreational areas.

Operating Pressure means the pressure at which the parts of an irrigation system are designed by the manufacturer to operate.

Overdraft shall mean that situation wherein the current total annual consumptive use of water in the Mojave Basin Area exceeds the long-term average annual natural water supply to the Basin Area or Sub Area.

Overhead Sprinkler Irrigation Systems or Overhead Spray Irrigation Systems means systems that deliver water through the air (e.g., spray heads and rotors).

Overspray shall mean the water, which is delivered beyond the landscaped area, wetting pavements, walks, structures or other non-landscaped areas.

Parkway means the area of a public street that lies between the curb and the adjacent property line or physical boundary definition such as fences or walls, which is used for landscaping and/or passive recreational purposes.

Pervious means any surface or material that allows the passage of water through the material and into the underlying soil.

Plant Factor Or Plant Water Use Factor is a factor, when multiplied by ETo, estimates the amount of water needed by plants. For purposes of this ordinance, the plant factor range for very low water use plants is 0 to 0.1, the plant factor range for low water use plants is 0.1 to 0.3, the plant factor range for moderate water use plants is 0.4 to 0.6, and the plant factor range for high water use plants is 0.7 to 1.0. Plant factors cited in this ordinance are derived from the publication "Water Use Classification of Landscape Species". Plant factors may also be obtained from horticultural researchers from academic institutions or professional associations as approved by the California Department of Water Resources (DWR).

Qualified Professional means a person who has been certified by his or her professional organization or a person who has demonstrated knowledge and is locally recognized as qualified around Landscape Architects due to long time experience.

Rain Sensor or Rain Shutoff Device shall mean a system which automatically shuts off the irrigation system when it rains.

Reclaimed Water, Recycled Water, or Treated Sewage Effluent Water, means treated or recycled waste water of a quality suitable for nonpotable uses such as landscape irrigation and water features. This water is not intended for human consumption.

Recreation Areas means areas, excluding private single family residential areas, designated for active play, recreation or public assembly in parks, sports fields, picnic grounds, amphitheaters or golf course tees, fairways, roughs, surrounds and greens.

Reference Evapotranspiration (ETo) means a standard measurement of environmental parameters which affect the water use of plants. The ETo for Apple Valley is 66.2 inches per year, and is an estimate of the evapotranspiration of a large field of four- to seven-inch tall, cool-season grass that is well watered. Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowances so that regional differences in climate can be accommodated.

Rehabilitated Landscape means any relandscaping project that requires a permit, plan check, or design review, and the modified landscape area is equal to or greater than 2,500 square feet.

Residential Landscape means landscapes surrounding single or multifamily homes.

Run Off means water which is not absorbed by the soil or landscape to which it is applied and flows from the area. For example: Run off may result from water that is applied at too great a rate (application rate exceeds infiltration rate), or when there is a severe slope.

Salvaged/Harvested Water. Storm water collected for landscape use.

Soil Moisture Sensing Device or Soil Moisture Sensor means a device that measures the amount of water in the soil. The device may also suspend or initiate an irrigation event.

Soil Texture means the classification of soil based on its percentage of sand, silt, and clay.

Special Landscape Area (SLA) means an area of the landscape dedicated solely to edible plants, recreational areas, areas irrigated with recycled water, or water features using recycled water.

Sprinkler Head shall mean a device which sprays water through a nozzle.

Static Water Pressure means the pipeline or municipal water supply pressure when water is not flowing.

Station shall mean an area served by one valve or by a set of valves that operate simultaneously.

Swing Joint means an irrigation component that provides a flexible, leak-free connection between the emission device and lateral pipeline to allow movement in any direction and to prevent equipment damage.

Submeter means a metering device to measure water applied to the landscape that is installed after the primary utility water meter.

Turf shall mean a surface layer of earth containing mowed grass with its roots.

Valve shall mean a device used to control the flow of water in the irrigation system.

Water Conserving Plant Species means a plant species identified as having a very low or low plant factor.

Water Feature means a design element where open water performs an aesthetic or recreational function. Water features include ponds, lakes, waterfalls, fountains, artificial streams, spas, and swimming pools (where water is artificially supplied). The surface area of water features is included in the high water use hydrozone of the landscape area. Constructed wetlands used for on-site wastewater treatment or stormwater best management practices that are not irrigated and used solely for water treatment or stormwater retention are not water features and, therefore, are not subject to the water budget calculation.

Water Waste shall mean any unreasonable or non-beneficial use of water or any unreasonable method or use of water, including but expressly not limited to, the specific uses, conditions, actions or omissions prohibited or restricted by the Ordinance, as hereinafter set forth.

Watering Window means the time of day irrigation is allowed.

WUCOLS means the Water Use Classification of Landscape Species published by the University of California Cooperative Extension and the Department of Water Resources 2014.

Xeriscape Landscaping. A water conservation concept that stresses the use of the appropriate plant material and irrigation techniques which are well suited for the local micro-climate. This concept incorporates native plants, selected hardscapes, and proper planting and irrigation techniques that improve the overall water efficiency of a landscape system.

Zone means an area served by one valve, sometimes referred to as a Station.

9.75.040 Processing Procedures and Submittal Requirements

As a condition of approval for any development proposal, the applicant shall submit a landscape documentation package to the Planning Division that include the following:

A. ***Landscape Plans.*** Plans submitted for residential development are not required to be prepared by a licensed Landscape Architect. All non-residential development requires a California licensed Landscape Architect, Architect, Landscape Contractor (within the scope of his/her license) or Certified Irrigation Designer shall prepare the landscape plans. All landscape plans submitted by the applicant shall be fully dimensioned and drawn at a minimum scale of one (1) inch equals thirty (30) feet (maximum sheet size 30" X 42") and contain the following information:

1. Date
2. Project applicant
3. Project address (if available, parcel and/or lot number(s))
4. Total landscape area (square feet), including a breakdown of turf and plant material
5. Project type (e.g., new, rehabilitated, public, private, cemetery, homeowner-installed)
6. Water supply type (e.g., potable, recycled, well) and identify the local retail water purveyor if the applicant is not served by a private well
7. Contact information for the project applicant and property owner
8. Applicant signature and date with statement, "I agree to comply with the requirements of the prescriptive compliance option to the MWELO" or for landscape area over 2,500 square feet , include the statement, "I agree to comply with the requirements of the water efficient landscape ordinance and submit a complete Landscape Documentation Package".
9. A table containing Lot size and breakdown of square feet with total percentage of lot area occupied by each of the following:
    a. Buildings;
    b. Paved areas;
    c. Irrigated landscape area
    d. Irrigated Turf area; and
    e. Hardscape area
10. A table listing the plant material including the plant symbols, common and botanical names, plant factor, sizes, spacing (if applicable), quantities, required guarantee and other remarks as appropriate to describe the plant selection. Table shall also include symbols and description of all inorganic materials schedule including type of materials (i.e. decomposed granite, river rock, Arizona stone, etc.).
11. Show all existing and proposed buildings, roof overhangs and other structures, paved areas, landscaped areas (including non-irrigated areas), power poles, fire hydrants, water meters, light standards, streets, street names, signs, fences/walls, water features (including pools and ponds), storm water retention/detention areas and other permanent features to be added and/or retained on site;
12. Show the location of existing and proposed plant materials. If required, to be preserved in place, indicated by botanical name and variety, common name, size and location. The location of all plant material shall be shown on the plan at approximately two-thirds the mature size of the plant material.
13. A diagram showing the amount of shading that the landscaping is expected to provide at its maturity with sun at its apex.
14. ***Additional Requirements.*** Landscape areas with an average WUCOL Plant Factor exceeding 0.3 and/or landscape areas that exceed 2,500 square feet, shall also include the following on the Landscape Plan:

    a. Delineate and label each hydrozone by number, letter, or other method;

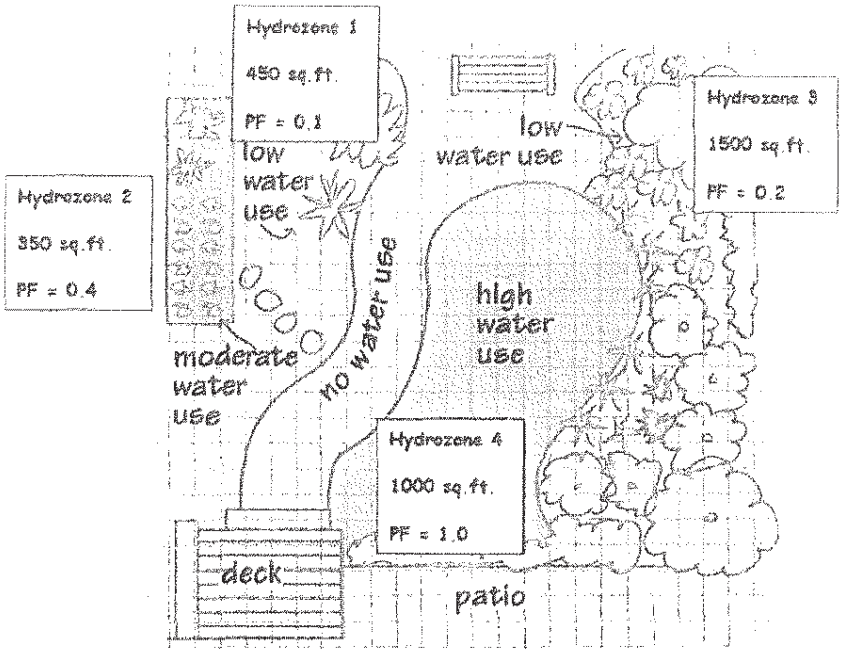


Figure 9.75.040A

Source: Santa Clara Valley Water District, "Rules of Thumb for Water-Wise Gardening"

b. Identify each hydrozone as low, moderate, high water, or mixed water use. Temporarily irrigated areas of the landscape shall be included in the low water use hydrozone for the water budget calculation.

c. Identify recreational areas.

d. Identify areas permanently and solely dedicated to edible plants;

e. Identify areas irrigated with recycled water;

f. Identify type of mulch and application depth (three (3)-inch minimum within all planting areas);

g. Identify soil amendments, type, and quantity;

h. Identify type and surface area of water features.

i. Identify any applicable rain harvesting or catchment technologies and its 24-hour retention or infiltration capacity.

j. Identify any applicable graywater discharge piping, system components and area(s) of distribution.

k. Attach a completed Water Efficient Landscape Worksheet with hydrozone information table and water budget calculations.

l. Soils Management Report. In order to reduce runoff and encourage healthy plant growth, a soil management report shall be completed by the project applicant, or his/her designee, as follows:

1) Submit soil samples to a laboratory for analysis and recommendations.

2) Soil sampling shall be conducted in accordance with laboratory protocol, including protocols regarding adequate sampling depth for the intended plants.

3) The soil analysis shall include:

a) Soil texture;

b) Infiltration rate determined by laboratory test or soil texture infiltration rate table;

c) Ph;

d) Total soluble salts;

e) Sodium;

f) Percent organic matter; and

g) Recommendations.

4) In projects with multiple landscape installations (i.e. production home developments) a soil sampling rate of 1 in 7 lots or approximately 15% will satisfy this requirement. Large landscape projects shall sample at a rate equivalent to 1 in 7 lots.

5) The project applicant, or his/her designee, shall comply with one of the following:

a) If significant mass grading is not planned, the soil analysis report shall be submitted to the local agency as part of the Landscape Documentation Package; or

b) If significant mass grading is planned, the soil analysis report shall be submitted to the local agency as part of the Certificate of Completion.

6) The soil analysis report shall be made available, in a timely manner, to the professionals preparing the landscape design plans and irrigation design plans to make any necessary adjustments to the design plans.

7) The project applicant, or his/her designee, shall submit documentation verifying implementation of soil analysis report recommendations to the local agency with Certificate of Completion.

B. ***Irrigation Design Plan.*** All irrigation plans shall contain the following minimum information:

1. Location and size of separate water meters for landscape, if applicable.
2. Location, type and size of all components of the irrigation system, including controllers, main and lateral lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, pressure regulators, and backflow prevention devices;
3. A table including the manufacturer and a description of all parts use in the irrigation plan.
4. Details of the backflow prevention devices, valves, sprinkler heads, controllers, etc.
5. Static water pressure at the point of connection to the public water supply;
6. Flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (pressure per square inch) for each station;
7. Recycled water irrigation systems, if any;
8. The following statement: "I have complied with the criteria of the ordinance and applied them accordingly for the efficient use of water in the irrigation design plan"; and
9. The signature of a licensed landscape architect, certified irrigation designer, licensed landscape contractor, or any other person authorized to design an irrigation system.

C. ***Additional requirements.*** Landscape areas with an average WUCOL Plant Factor exceeding 0.3 and/or landscape areas that exceed 2,500 square feet, shall also provide the following documentation upon submittal:

1. Water Efficient Landscape Worksheet;

a. Hydrozone information table
b. Water budget calculations

1) Maximum Applied Water Allowance (MAWA)
2) Estimated Total Water Use (ETWU)

2. Soil management report;
3. Grading design plan.

D. ***Project Completion.*** Landscape areas 500 square feet or greater shall submit the following to the Planning Division prior to the project's final inspection for occupancy:

1. ***A Certificate of Completion*** shall be provided to the Planning Division, local water purveyor and the property owner or his or her designee. containing the following information:

a. Project information sheet that contains:

1) date;
2) project name;
3) project applicant name, telephone, and mailing address;
4) project address and location; and
5) property owner name, telephone, and mailing address;

b. Certification by either the signer of the landscape design plan, the signer of the irrigation design plan, or the licensed landscape contractor that the landscape project has been installed per the approved Landscape Documentation Package:

1) Where there have been significant changes made in the field during construction, these "as-built" or record drawings shall be included with the certification;
2) A diagram of the irrigation plan showing hydrozones shall be kept with the irrigation controller for subsequent management purposes.
3) Irrigation scheduling parameters used to set the controller

2. ***Landscape and irrigation maintenance schedule.*** Landscapes shall be maintained to ensure water use efficiency. A regular maintenance schedule shall be submitted with the Certificate of Completion.

a. A regular maintenance schedule shall include, but not be limited to, routine inspection; auditing, adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; topdressing with compost, replenishing mulch; fertilizing; pruning; weeding in all landscape areas, and removing obstructions to emission devices. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.
b. Repair of all irrigation equipment shall be done with the originally installed components or their equivalents or with components with greater efficiency.
c. A project applicant is encouraged to implement established landscape industry sustainable Best Practices for all landscape maintenance activities.

3. **Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis.**

a. (a) All landscape irrigation audits shall be conducted by a local agency landscape irrigation auditor or a third party certified landscape irrigation auditor. Landscape audits shall not be conducted by the person who designed the landscape or installed the landscape.
b. (b) In large projects or projects with multiple landscape installations (i.e. production home developments) an auditing rate of 1 in 7 lots or approximately 15% will satisfy this requirement.
c. The project applicant shall submit an irrigation audit report with the Certificate of Completion to the Planning Division that may include, but is not limited to: inspection, system tune-up, system test with distribution uniformity, reporting overspray or run off that causes overland flow, and preparation of an irrigation schedule, including configuring irrigation controllers with application rate, soil types, plant factors, slope, exposure and any other factors necessary for accurate programming;

9.75.050 WATER CONSERVING LANDSCAPE DESIGN STANDARDS

For the efficient use of water, a landscape shall be carefully designed and planned for the intended function of the project. All landscape design plans must meet the following design criteria:

A. Use only those plants officially approved on the currently adopted plant list or alternative plants as approved by the Director.

B. Any plant from the list may be selected for the landscape, providing the Estimated Total Water Use in the landscape area does not exceed the Maximum Applied Water Allowance.

C. Turf Limitations on New Landscaping Projects.

1. Turf shall not exceed twenty-five (25) percent of the total landscape in any residential areas.
2. Except for Special Landscape Areas, the use of turf for non-residential uses is prohibited.
3. Turf is not allowed on slopes greater than 25% where the toe of the slope is adjacent to an impermeable hardscape and where 25% means 1 foot of vertical elevation change for every 4 feet of horizontal length (rise divided by run x 100 = slope percent).
4. Turf is prohibited within public rights-of-way, including parkways.

D. Each zone (hydrozone) shall have plant materials with similar water use.

E. Water Features

1. Recirculating water systems shall be used for water features.
2. Where available, recycled water shall be used as a source for decorative water features.
3. Surface area of a water feature shall be included in the high water use hydrozone area of the water budget calculation.
4. Pool and spa covers are highly recommended.

F. High water use plants, characterized by a plant factor of 0.7 to 1.0, are prohibited in street medians or right-of-way.

G. The use of invasive plant species, such as those listed by the California Invasive Plant Council, is strongly discouraged.

H. Artificial turf/plants are not limited.

I. Compacted soils, including areas of caliches, shall be transformed to a friable condition. On engineered slopes, only amended planting holes need meet this requirement.

J. Add soil additives within landscape areas to increase the water holding capacity of the soil and improve the health of the plants. For landscape installations, compost at a rate of a minimum of four cubic yards per 1,000 square feet of permeable area shall be incorporated to a depth of six inches into the soil. Soils with greater than 6% organic matter in the top 6 inches of soil are exempt from adding compost and tilling.

K. Cover final soil surfaces with organic or inorganic mulches to insulate against soil temperature extremes and conserve moisture. A minimum three inch (3") layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers, or direct seeding applications where mulch is contraindicated.

L. ***Unity and Continuity*** Landscape unity and continuity may be significantly enhanced through the selection of a dominant tree and shrub species. Such dominance shall be established by making the selected species clearly in the majority of sixty (60) percent or more.

M. ***Tree and Shrub Placement in Proximity to Fire Hydrant.*** Trees, as measured from trunk center, shall be placed a minimum of five (5) feet from fire hydrants. Shrubs, as measured from their mature perimeter, shall be located a minimum of five (5) feet from the rear of a fire hydrant. In no case shall any material other than groundcover be placed between the street or roadway and within fifteen (15) feet of either side or front of a fire hydrant (Figure 9.75.050-A).

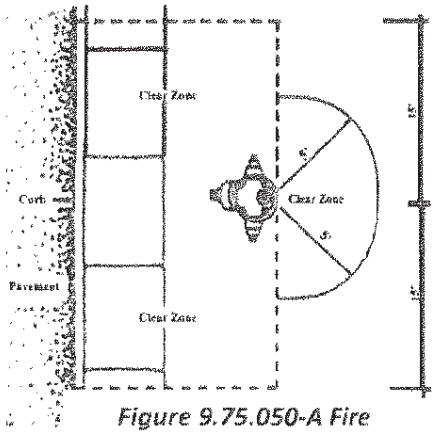


Figure 9.75.050-A Fire

N. Ground Surface Treatment

1. ***Pre-Treatment of Ground Surfaces Required.*** A mesh weed barrier shall be applied to the ground prior to the placement of natural surface materials (decomposed granite, gravel, crushed rock, river run rock, etc.) in any landscaped area to prevent weed growth.
2. ***Inorganic Ground Cover.*** Inorganic ground covers (decomposed granite, crushed stone, etc.) shall be of a natural color harmonious with other site and architectural materials and shall be installed to a minimum depth of two (2) inches.
3. ***Plant Cover/Dust Control.*** Unless otherwise provided for within this Chapter, all portions of a development site (including future building pads) not occupied by buildings, structures, paved improvements, and required landscape areas shall be temporarily landscaped with plant materials in accordance with this Chapter or treated with an appropriate inorganic ground cover and maintained in a weed and dust free condition.

*O. **Plant Massing.*** The massing of trees and shrubs into groups containing three (3) or more plants is required unless standards elsewhere within this Chapter require only a single element, e.g., single trees within parking lot planter islands. Planting of single shrub specimens, unless used to repeat an element already established within a massed planting within the same visual area, is prohibited.

*P. **Plant Groupings (Hydrozones).*** The grouping of plant species commonly found together in natural associations or of common environmental requirements (soil type, water, sun exposure, temperature limitations, etc.) is required.

*Q. **Plant Spacing.*** In order to foster a more natural look, an uneven spacing of plants is required unless such plants are being used to create a massed shrub or groundcover bed. The spacing of shrubs shall be sufficient to allow plants to reach their natural mature size and form.

*R. **Consistency with Existing Streetscape Standards.*** Street frontage landscaping shall be consistent with any previously adopted specific streetscape standards.

9.75.060 LANDSCAPE AREA AND MATERIAL REQUIREMENTS

*A. **Landscape Area Requirements for Residential Tracts, Multi-family Residential and All Non-Residential Development.***

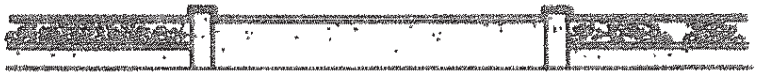
All portions of a development site not utilized for building development, service areas, paved or improved storage areas, parking, driveways, etc., shall be landscaped. Minimum areas of landscaping are as follows:

1. ***Front Building Setback/Street Right-of-Way Areas.*** All front building setback and street right-of-way areas located between on-site improvements and the back of existing or future public sidewalks or street curbs, except needed access driveways, shall be fully landscaped, unless otherwise provided for in this Development Code.
2. ***Parking Lot Area.*** The following landscaping standards apply to parking lots (Figure 9.75.060-A, B and C):
   a. In order to reduce the "heat island effect" of large expanses of unprotected paved areas, a minimum of thirty (30) percent of the interior parking surface of all parking lots shall be shaded at the maturity of the landscaping.
   b. Provide a minimum of one (1) tree (minimum fifteen (15) gallon size when planted) for each seven (7) parking spaces located so as to visually disrupt long rows of parking spaces, trees may be clustered where appropriate.
   c. A thirty-six to forty-two (36-42)-inch high decorative masonry wall, hedge or landscaped berm, as measured from the finished grade of the parking area, shall also be used adjacent to public rights-of-way to screen the parking area. The height of the screening wall or berm may be reduced when the parking lot is below grade. Horizontal and vertical variations in the design of screening walls are

required where the length of such walls exceed forty (40) feet. Said variations are subject to Planning Staff approval.



Elevation Of Staggered Wall



Elevation Of Solid Planters/Wall



Elevation Of Wall With Breaks

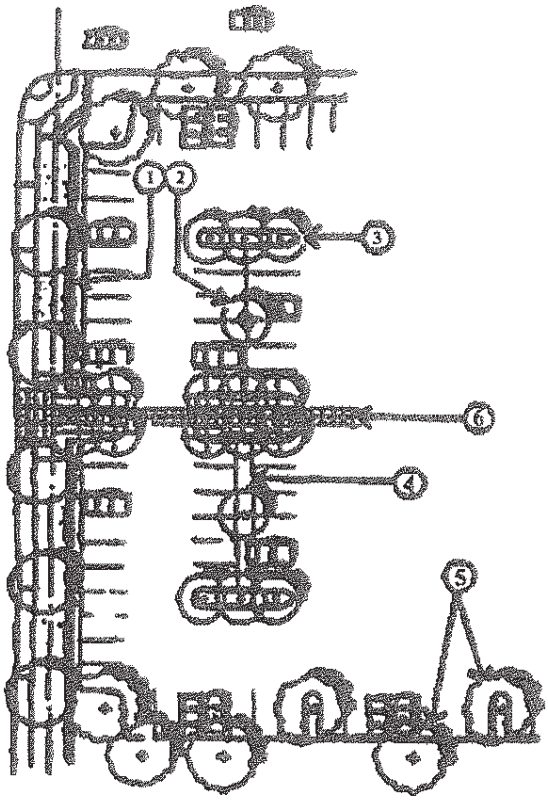
Figure 9.75.060-A Recommended Design Features and Materials

d. A minimum of five (5) percent of the interior parking surface area of all parking lots shall be landscaped. Such percentage may be achieved by combining the following:

1) Planter islands a minimum of five (5) feet in width shall be located at the ends of all rows of parking stalls between the last stall and any drive aisle. Where drive aisles are curved, alternative dimensions with similar area may be approved (Figure 9.75.060-B); and

2) Planter islands, shall be uniformly distributed throughout the interior parking area, and protected by raised curbs (Figure 9.75.060-B); or

3) Planter strips, located between double rows of parking stalls, shall be a minimum of four (4) feet in width. Each parking stall may overhang two (2) feet into this area (Figure 9.75.060-B).



LEGEND
1 30" - 42" Block wall and/or berm.
2 Minimum 6' square tree well.
3 Minimum 6'x18' end of row planter island.
4 Planter strips a mimimum of 4' in width between double rows.
5 Minimum one tree per each 7 uninterrupted parking stalls.
6 Special paving at pedestrian circulation areas.

Figure 9.75.060-B Planter Islands/Strips

e. Trees within parking lots shall be kept trimmed to a minimum clear canopy height of six (6) feet for visual safety.

f. A landscaped strip with a minimum width of ten (10) feet shall be provided where parking lots are adjacent to a public right-of-way or residential uses or districts, unless otherwise provided for in this Code.

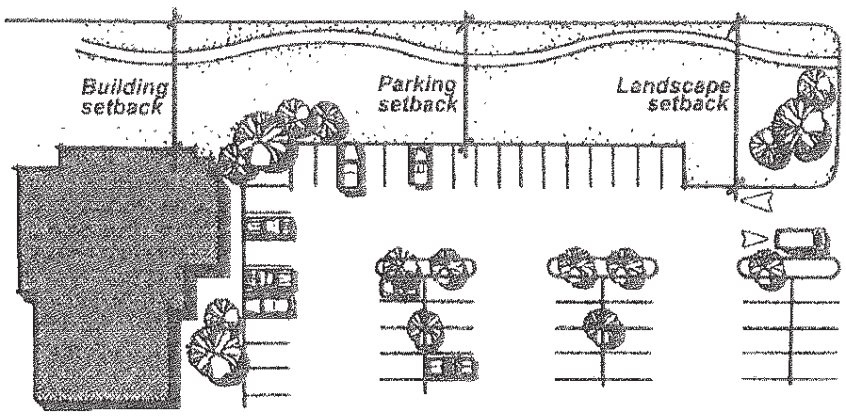


Figure 9.75.060-C Landscape Areas

3. ***Landscape Buffers/Perimeter Landscape Strips***

   a. ***Landscape Buffers.*** When providing a buffer between commercial/industrial and residential uses or districts the following features are required:

      1) Landscaping shall include one (1) tree for each 200 square feet of required landscape area. Said tree shall be a minimum fifteen (15) gallon size when planted, twenty (20) percent of such required trees shall be twenty-four (24)-inch box size; and

      2) A six (6)-foot decorative masonry wall reflecting the design, material, and color of the primary structures within the project, excluding approved gate openings; and

      3) Evergreen trees a minimum of six (6) feet in height planted at a maximum spacing of twenty (20) feet on center and shrubs planted at a rate of five (5) per one hundred linear feet.

4. ***Front Building Setback Area.*** Landscaping in the front building setback area shall be provided at a minimum rate of one (1) tree and six (6) shrubs per thirty (30) linear feet of frontage plus sufficient groundcover plantings to provide combined shrub and ground coverage of fifty (50) percent of the total landscaped area. Trees and shrubs may be grouped, but gaps between groupings of plants shall not exceed forty (40) feet.

5. ***Other Perimeter Areas. Landscaping in other perimeter areas shall be provided at a minimum*** rate of one (1) tree and six (6) shrubs per forty (40) linear feet plus sufficient groundcover plantings to provide combined shrub and ground coverage of forty (40) percent of the total landscaped area, except where screening is required. Trees shall be a minimum fifteen (15) gallon size when planted, twenty (20) percent of which shall be twenty-four (24) inch box size. Trees and shrubs may be grouped, but gaps between groupings of plants shall not exceed fifty (50) feet.

B. ***Landscape Improvement Requirements.*** The following minimum landscape improvements are required within the following landscape areas:

1. ***Single-Family Residential Tracts and Multi-Family Residential Developments***

   a. Common open space/retention areas. A minimum of one (1) tree and six (6) shrubs per 500 square feet of open space plus such additional vegetative ground cover as is necessary to cover a minimum of fifty (50) percent of the total landscaped area with shrubs, ground cover and turf.

b. Arterial and collector street rights-of-way. Arterial and collector street rights-of-way adjacent to and within single and multi-family residential developments shall be landscaped at a rate of one (1) tree and three (3) shrubs per 30 linear feet plus such vegetative ground cover necessary to cover a minimum of forty (40) percent of the total landscaped area with shrubs and ground cover. Turf is prohibited within public rights-of-way.

2. ***Commercial/Office/Institutional Developments.*** One (1) tree and six (6) shrubs per 500 square feet of interior open space plus such additional ground cover which, upon maturity, will cover a minimum of fifty (50) percent of all interior open space surfaces. The inclusion of turf is subject to the limitations established in subsection 9.75.050.

3. ***Industrial Developments.*** One (1) tree and six (6) shrubs per 750 square feet of interior open space plus such additional vegetative ground cover which, upon maturity, will cover a minimum of forty (40) percent of all interior open space surfaces. The inclusion of turf is subject to the limitations established in subsection 9.75.050.

4. ***Grading in the Front Building Setback.*** Front setback areas shall be graded in a manner which creates natural and pleasing ground forms in accordance with the following guidelines:

   a. A maximum of fifty (50) percent of the front building setback area may be used for storm water retention;

   b. Soil excavated to create needed retention basins shall, within the slope limitations established below, be used to create complementary earth mounds elsewhere within the same front building setback area;

   c. Earth mounds with a maximum slope ratio of four to one (4:1), horizontal to vertical, shall be located and designed to minimize street views into retention basins;

   d. Grading and other site preparation shall preclude the run-off of rain and/or irrigation water from landscaped surfaces onto paved surfaces.

5. ***Finished Grade Surfaces.*** All landscaped areas shall be graded so that finish grade surfaces of all nonliving materials (i.e., decomposed granite, crushed rock, mulch, and the like) are at least one and one-half (1 1/2) inches below concrete or other paved surfaces.

6. ***Protection of Landscaped Areas.*** Landscaped areas adjacent to vehicular drives or parking areas shall be protected by a six (6)-inch vertical curb. Areas surfaced with different materials (i.e. lawn and decomposed granite) shall be separated by masonry, wood, or mowing strips.

C. ***Landscape Requirements for Single-Family In-fill Development.*** The following minimum landscape improvements are required within the following landscape areas:

1. The minimum landscaped area shall be determined as follows:

   a. Front yard - 25% of the land area within the required front yard setback or 5,000 square feet, whichever is less.

   b. Street Side yard - 25% of the land area within the required street side yard setback or 2,500 square feet, whichever is less. This area can further be reduced with the installation of a solid wall or fence, then only the strip of land between the wall or fence and public right of way shall be landscaped.

2. Minimize the removal of native vegetation and incorporate these plants into the final landscape design.

3. The required landscape areas shall include a mix of organic and inorganic materials (i.e., gravel, crushed rock, river run rock, etc.). Decomposed granite is not a permitted ground cover within any irrigated, landscaped area.

4. A minimum of four (4) yards of compost per 1,000 square feet of irrigated landscaped area is required.

5. A mesh weed barrier is required prior to the placement of inorganic ground cover.

6. In all areas, imported, inorganic ground cover shall be installed to a minimum depth of two (2) inches.

7. In order to minimize run-off and increase water infiltration, areas identified with high caliche concentrations will require excavation, to a level below the caliche, prior to landscape installation.

8. Xeriscape landscaping is required for all front yards, street side yards. The use of turf is strongly discouraged.
9. The use of turf may not exceed twenty-five (25) percent of the total landscaped area.
10. Low water use plants and low volume irrigations systems are to be used on all additional landscape areas.
11. The use of artificial turf is not limited.
12. A minimum of one (1) tree and ten (10) shrubs shall be required per fifty (50) feet of street frontage.
13. Minimum size shall be five (5) gallon shrubs and fifteen (15) gallon trees.
14. Fifty (50) percent of trees shall be canopy trees as defined within the Section 9.75.100 "Approved Plant List".
15. Grouping of plants with similar water needs is required.
16. Uneven spacing is required to create a natural look.

17. ***Deferment of Landscape Installation Provisions.*** No Building Permit shall be approved or issued unless the Planning Division finds that the project satisfies the criteria set forth in this Chapter. Residential infill lots not built and permitted to the owner of the property is exempt from this requirement, provided that a deposit of an amount adopted by Council Resolution is submitted prior to issuance of building permits. For this exemption, a landscape plan implementing the criteria of this Chapter must be submitted and approved by the Planning Division prior to occupancy of the residence. The property owner is required to install the approved landscaping within six (6) months from the date of occupancy. Failure to complete the approved landscaping in said time frame will result in forfeiting the deposit to the Town and having the non-compliance of landscape requirements forwarded to the Code Enforcement Division for legal action. One extension of time not to exceed six (6) months may be approved at the discretion of the Director for special circumstances.

9.75.070 Irrigation Design Standards

This section applies to landscaped areas requiring permanent irrigation, not areas that require temporary irrigation solely for the plant establishment period. For the efficient use of water, an irrigation system shall meet all the requirements listed in this section and the manufacturers' recommendations. The irrigation system and its related components shall be planned and designed to allow for proper installation, management, and maintenance. An irrigation design plan meeting the following design criteria shall be submitted as part of the Landscape Documentation Package.

A. Automatic irrigation controllers are required and must use evapotranspiration or soil moisture sensor data and utilize a rain sensor. Sensors (rain, freeze, wind, etc.), either integral or auxiliary, that suspend or alter irrigation operation during unfavorable weather conditions shall be required on all irrigation systems, as appropriate for local climatic conditions. Irrigation should be avoided during windy or freezing weather or during rain.
B. Irrigation controllers shall be of a type which does not lose programming data in the event the primary power source is interrupted.
C. Pressure regulators shall be installed on the irrigation system to ensure the dynamic pressure of the system is within the manufacturers recommended pressure range.
D. Manual shut-off valves (such as a gate valve, ball valve, or butterfly valve) shall be installed as close as possible to the point of connection of the water supply to minimize water loss in case of an emergency (such as a main line break) or routine repair.
E. Backflow prevention devices shall be required to protect the water supply from contamination by the irrigation system. A project applicant shall refer to the applicable local agency code (i.e., public health) for additional backflow prevention requirements.
F. Flow sensors that detect high flow conditions created by system damage or malfunction are required for all on non-residential landscapes and residential landscapes of 5000 sq. ft. or larger.

G. Master shut-off valves are required on all projects except landscapes that make use of technologies that allow for the individual control of sprinklers that are individually pressurized in a system equipped with low pressure shut down features.

H. All irrigation emission devices must meet the requirements set in the ANSI standard, ASABE/ICC 802-2014, "Landscape Irrigation Sprinkler and Emitter Standard," All sprinkler heads installed in the landscape must document a distribution uniformity low quarter of 0.65 or higher using the protocol defined in ASABE/ICC 802-2014.

I. The irrigation system shall be designed to prevent runoff, low head drainage, overspray, or other similar conditions where irrigation water flows onto non-targeted areas, such as adjacent property, non-irrigated areas, hardscapes, roadways, or structures.

J. Relevant information from the soil management plan, such as soil type and infiltration rate, shall be utilized when designing irrigation systems.

K. The design of the irrigation system shall conform to the hydrozones of the landscape design plan.

L. The irrigation system must be designed and installed to meet, at a minimum, the irrigation efficiency criteria as described in the submitted Water Efficient Landscape Worksheet and the Maximum Applied Water Allowance.

M. Areas less than ten (10) feet in width in any direction shall be irrigated with subsurface irrigation or other means that produces no runoff or overspray.

N. In mulched planting areas, the use of low volume irrigation is required to maximize water infiltration into the root zone.

O. Sprinkler heads and other emission devices shall have matched precipitation rates, unless otherwise directed by the manufacturer's recommendations.

P. Head to head coverage is recommended. However, sprinkler spacing shall be designed to achieve the highest possible distribution uniformity using the manufacturer's recommendations.

Q. Swing joints or other riser-protection components are required on all risers subject to damage that are adjacent to hardscapes or in high traffic areas of turfgrass.

R. Check valves or anti-drain valves are required on all sprinkler heads where low point drainage could occur.

S. For non-residential projects with landscape areas of 1,000 sq. ft. or residential irrigated landscapes of 5,000 sq. ft. or greater, a submeter(s), to measure landscape water use shall be installed. The submeter may be privately owned or provided by the water purveyor,

T. At the time of final inspection, the permit applicant must provide the owner of the property with a certificate of completion, certificate of installation, irrigation schedule and a schedule of landscape and irrigation maintenance.

U. It is highly recommended that the project applicant or local agency inquire with the local water purveyor about peak water operating demands (on the water supply system) or water restrictions that may impact the effectiveness of the irrigation system.

V. Overhead irrigation shall not be permitted within 24 inches of any non-permeable surface. Allowable irrigation within the setback from non-permeable surfaces may include drip, drip line, or other low flow non-spray technology. The setback area may be planted or unplanted. The surfacing of the setback may be mulch, gravel, or other porous material. These restrictions may be modified if:

1. The landscape area is adjacent to permeable surfacing and no runoff occurs; or
2. The adjacent non-permeable surfaces are designed and constructed to drain entirely to landscaping; or
3. The irrigation designer specifies an alternative design or technology, as part of the Landscape Documentation Package and clearly demonstrates strict adherence to irrigation system design criteria within this chapter. Prevention of overspray and runoff must be confirmed during the irrigation audit.

W. Slopes greater than 25% shall not be irrigated with an irrigation system with a application rate exceeding 0.75 inches per hour. This restriction may be modified if the landscape designer specifies an alternative design or technology, as part of the Landscape Documentation Package, and clearly demonstrates no runoff or erosion will occur. Prevention of runoff and erosion must be confirmed during the irrigation audit.

X. Hydrozone

1. Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions, and plant materials with similar water use.

2. Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plant type within that hydrozone.
3. Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and turf to facilitate the appropriate irrigation of trees. The mature size and extent of the root zone shall be considered when designing irrigation for the tree.
4. Individual hydrozones that mix plants of moderate and low water use, or moderate and high water use, may be allowed if:
   a. Plant factor calculation is based on the proportions of the respective plant water uses and their plant factor; or
   b. The plant factor of the higher water using plant is used for calculations.
   c. Individual hydrozones that mix high and low water use plants shall not be permitted.
   d. On the landscape design plan and irrigation design plan, hydrozone areas shall be designated by number, letter, or other designation. On the irrigation design plan, designate the areas irrigated by each valve, and assign a number to each valve. Use this valve number in the Hydrozone Information Table. This table can also assist with the irrigation audit and programming the controller.

Y. Irrigation Scheduling. For the efficient use of water, all irrigation schedules shall be developed, managed, and evaluated to utilize the minimum amount of water required to maintain plant health. Irrigation schedules shall meet the following criteria:

1. Irrigation scheduling shall be regulated by automatic irrigation controllers.
2. Overhead sprinkler irrigation shall be scheduled to operate during the months of May through October, between the hours of 6:00 P.M. and 9:00 A.M. and during the remaining months of November through April, between the hours of 9:00 A.M. and 3:00 P.M. to reduce water loss from wind and evaporation and to avoid ice during winter months. Drip irrigation and subterranean devices shall not be subject to this water window.
3. For implementation of the irrigation schedule, particular attention must be paid to irrigation run times, emission device, flow rate, and current reference evapotranspiration, so that applied water meets the Estimated Total Water Use. Total annual applied water shall be less than or equal to Maximum Applied Water Allowance (MAWA). Actual irrigation schedules shall be regulated by automatic irrigation controllers using current reference evapotranspiration data (e.g., CIMIS) or soil moisture sensor data.
4. Parameters used to set the automatic controller shall be developed and submitted for each of the following:
   a. the plant establishment period;
   b. the established landscape; and
   c. temporarily irrigated areas.
5. Each irrigation schedule shall consider for each station all of the following that apply:
   a. irrigation interval (days between irrigation);
   b. irrigation run times (hours or minutes per irrigation event to avoid runoff);
   c. number of cycle starts required for each irrigation event to avoid runoff;
   d. amount of applied water scheduled to be applied on a monthly basis;
   e. application rate setting;
   f. root depth setting;
   g. plant type setting;
   h. soil type;
   i. slope factor setting;
   j. shade factor setting; and
   k. irrigation uniformity or efficiency setting.

9.75.080 Enforcement/Reporting.

A. The Town shall administer programs that may include, but not be limited to, irrigation water use analysis, irrigation audits, and irrigation surveys for compliance with the Maximum Applied Water Allowance.

B. All existing landscapes that were installed before December 1, 2015 and are over one acre in size, that have a water meter, the Town, or other designated authority, shall administer programs that may include, but not be limited to, irrigation water use analyses, irrigation surveys, and irrigation audits to evaluate water use and provide recommendations as necessary to reduce landscape water use to a level that does not exceed the Maximum Applied Water Allowance for existing landscapes.

C. For landscapes that do not have a meter, the Town, or other designated authority, shall administer programs that may include, but not be limited to, irrigation surveys and irrigation audits to evaluate water use and provide recommendations as necessary in order to prevent water waste.

D. All landscape irrigation audits shall be conducted by a certified landscape irrigation auditor.

9.75.090 Public Education

The Town of Apple Valley shall make available information about water efficient landscaping to water users throughout the community. The Town will also use public education to encourage users to conserve water through voluntary compliance. In addition to education, the Town may use enforcement measures to curb water waste.

A. Information shall be provided to new homeowners about designing, installing and maintaining water efficient landscapes.

B. Model Homes. All model homes that are landscaped shall use signs and written information to demonstrate the principles of water efficient landscapes described in this ordinance as follows:

1. Signs shall be used to identify the model as an example of a water efficient landscape featuring elements such as hydrozones, irrigation equipment, and others that contribute to the overall water efficient theme. Signage shall include information about the site water use as designed per the local ordinance; specify who designed and installed the water efficient landscape; and demonstrate low water use approaches to landscaping such as using native plants, graywater systems, and rainwater catchment systems.
2. Information shall be provided about designing, installing, managing, and maintaining water efficient landscapes.

9.75.100 Approved Plant List

All landscape shall strive to maximize the use of native species as provided in the approved plant list in this Section or as approved by the Director. Where native material is not appropriate for the intended use or appearance, plant species that are regionally adapted and non-invasive may be used with the approval of the Director. *Source: University of California Water Use Classification of Landscape Species (WUCOLS IV).*

Ground Cover			
Botanical Name	**Common Name**	**Water Use**	**Plant Factor**
Abelia x grandiflora and cvs.	glossy abelia	Moderate	0.5
Acacia redolens	prostrate acacia	Low	0.2
Achillea millefolium (non-native hybrids)	yarrow (non-native hybrids)	Low	0.2
Achillea millefolium (CA native cultivars)	yarrow	Low	0.2
Ajuga reptans (shade)	carpet bugle	Moderate	0.5
Artemisia spp. (herbaceous)	angel"s hair	Moderate	0.5

Artemisia spp. (shrubby)	sagebrush	Low	0.2
Ground Cover (cont.)			
Botanical Name	**Common Name**	**Water Use**	**Plant Factor**
Baccharis "Starn"	Starn coyote brush	Low	0.2
Berberis aquifolium "Compacta" (partial shade in South Inland)	compact Oregon grape holly	Moderate	0.5
Berberis aquifolium var. repens (shade)	creeping mahonia	Moderate	0.5
Cerastium tomentosum	snow in summer	Moderate	0.5
Cistus spp. and cvs.	rockrose	Moderate	0.5
Convolvulus mauritanicus	ground morning glory	Moderate	0.5
Cotoneaster horizontalis	rock cotoneaster	Moderate	0.5
Cotoneaster spp.(ground covers)	cotoneaster	Moderate	0.5
Cuphea llavea	bat-faced cuphea	Moderate	0.5
Cytisus x kewensis	Kew broom	Moderate	0.5
Dalea capitata	dalea (capitata)	Moderate	0.5
Dalea greggii	trailing indigo bush	Low	0.2
Euonymus fortunei	purple winter creeper	Moderate	0.5
Fragaria spp. (CA native and non-natives species)	strawberry	Moderate	0.5
Gazania spp.	gazania	Moderate	0.5
Geranium spp.	cranesbill	Moderate	0.5
Juniperus spp.	juniper	Moderate	0.5
Lantana camara & cvs.	lantana	Moderate	0.5
Lantana hybrids	hybrid lantana	Moderate	0.5
Lantana montevidensis (sellowiana)	trailing lantana	Moderate	0.5
Lantana "New Gold"	New Gold lantana	Moderate	0.5
Lonicera japonica	Japanese honeysuckle	Moderate	0.5
Malephora spp.	ice plant (Maleophora)	Low	0.2
Myoporum parvifolium & cvs.	myoporum	Moderate	0.5
Oenothera speciosa (O. berlandieri)	Mexican evening primrose	Moderate	0.5
Oenothera stubbei	Baja evening primrose	Low	0.2
Parthenocissus quinquefolia	Virginia creeper	Moderate	0.5
Parthenocissus tricuspidata	Boston ivy	Moderate	0.5
Potentilla verna	spring cinquefoil	Moderate	0.5
Rosa hybrids..ground covers	carpet roses	Moderate	0.5
Rosmarinus cvs.	trailing rosemary	Moderate	0.5
Santolina spp.	lavender cotton	Low	0.2
Teucrium chamaedrys	germander	Moderate	0.5
Thymus spp. and cvs.	thyme	Moderate	0.5
Trachelospermum asiaticum	Asian star jasmine	Moderate	0.5
Trachelospermum jasminoides	star jasmine	Moderate	0.5
Verbena peruviana	Peruvian verbena	Moderate	0.5
Verbena rigida	vervain	Moderate	0.5
Verbena stricta	hoary vervain	Moderate	0.5
Verbena tenera (pulchella)	rock verbena	Moderate	0.5
Verbena tenuisecta	moss verbena	Moderate	0.5
Vinca minor	periwinkle	Moderate	0.5
Wedelia trilobata	trailing daisy	Moderate	0.5
Zinnia grandiflora	prairie zinnia	Low	0.2

Perennials			
Botanical Name	Common Name	Water Use	Plant Factor
Melampodium leucanthum	blackfoot daisy	Low	0.2
Nolina spp. (CA natives and non-natives)	bear grass	Low	0.2
Oenothera caespitosa	tufted (white) evening primrose	Low	0.2
Oenothera stubbei	Baja evening primrose	Low	0.2
Penstemon SW native spp. and cvs.	penstemon (SW natives)	Low	0.2
Perovskia spp. & cvs.	Russian sage	Low	0.2
Poliomintha longiflora	Rosemary mint	Low	0.2
Portulacaria afra & cvs.	elephant"s food	Low	0.2
Psilostrophe tagetina	paper flower	Low	0.2
Romneya coulteri	Matilija poppy	Low	0.2
Ruellia brittoniana	Mexican petunia	Low	0.2
Salvia dorrii	purple sage	Low	0.2
Santolina spp.	lavender cotton	Low	0.2
Tetraneuris acaulis (Hymenoxys acaulis)	stemless four-nerve daisy	Low	0.2
Tetraneuris scaposa	four-nerve daisy	Low	0.2
Thymophylla acerosa (Dyssodia acerosa)	shrubby dogweed	Low	0.2
Thymophylla pentachaeta (Dyssodia pentachaeta)	golden fleece	Low	0.2
Verbena gooddingii (Glandularia gooddingii)	Goodding verbena	Low	0.2
Zinnia acerosa	desert zinnia	Low	0.2
Zinnia grandiflora	prairie zinnia	Low	0.2
Achillea millefolium (non-native hybrids)	yarrow (non-native hybrids)	Low	0.2
Achillea millefolium (CA native cultivars)	yarrow	Low	0.2
Adiantum spp. (shade) CA native and non-native	maidenhair fern	Moderate	0.5
Agastache coccinea pink	agastache	Moderate	0.5
Agave americana (and thick-leaved relatives)(CA native and non-native	agave	Very Low	0.05
Agave attenuata (and thin-leaved relatives) (Ca native and non-native)	agave	Low	0.2
Ajuga reptans (shade)	carpet bugle	Moderate	0.5
Argemone corymbosa	prickly poppy	Low	0.2
Artemisia spp. (herbaceous)	angel's hair	Moderate	0.5
Asclepias (CA native species)	milk/silk weed	Low	0.2
Asclepias subulata	desert milkweed	Low	0.2
Asclepias tuberosa	orange milkweed	Moderate	0.5
Asparagus aethiopicus and cvs. (A. densiflorus)	asparagus fern	Moderate	0.5
Aspidistra elatior (shade)	cast iron plant	Moderate	0.5
Baileya multiradiata	desert marigold	Low	0.2
Perennials (cont.)			

Botanical Name	Common Name	Water Use	Plant Factor
Berlandiera lyrata	chocolate scented daisy	Low	0.2
Bulbine frutescens	stalked bulbine	Low	0.2
Calibrachoa cvs	million bells	Moderate	0.5
Calylophus drummondiana	Texas primrose	Moderate	0.5
Calylophus hartwegii	Sierra sundrop	Moderate	0.5
Carex divulsa (sold as C. tumulicola)	European gray sedge	Moderate	0.5
Carex tumulicola	Berkeley sedge	Moderate	0.5
Catharanthus roseus	Madagascar periwinkle	Moderate	0.5
Centaurea cineraria	dusty miller (cineraria)	Moderate	0.5
Centranthus ruber	red valerian	Moderate	0.5
Conoclinium greggii "Boothill"	blue mist flower	Moderate	0.5
Coreopsis auriculata "Nana"	dwarf coreopsis	Moderate	0.5
Coreopsis grandiflora	large flower tickseed	Moderate	0.5
Coreopsis lanceolata	lanceleaf tickseed	Moderate	0.5
Coreopsis rosea	pink tickseed	Moderate	0.5
Coreopsis verticillata cvs.	threadleaf coreopsis	Moderate	0.5
Dianella tasmanica (shade in desert)	Tasman flax lily	Moderate	0.5
Dianthus spp.	pink/carnation	Moderate	0.5
Dietes bicolor and cvs	fortnight lily	Moderate	0.5
Dietes iridioides and cvs.	fortnight lily	Moderate	0.5
Echinacea spp.	cone flower	Moderate	0.5
Echinopsis spp. (Trichocereus spp.)	torch cactus	Low	0.2
Epilobium spp (Zauschneria) and cvs.	California fuchsia	Moderate	0.5
Equisetum spp. (native and non-native spp.)	horsetail	Moderate	0.5
Erigeron divergens	native fleabane	Moderate	0.5
Erigeron karvinskianus	fleabane	Moderate	0.5
Eriogonum spp. (CA native and non-native spp.)	buckwheat	Low	0.2
Erysimum "Bowles Mauve"	Bowles Mauve wallflower	Moderate	0.5
Eupatorium spp.	mistflower	Moderate	0.5
Euphorbia antisyphilitica	candelilla	Low	0.2
Euryops pectinatus	euryops/shrub daisy	Moderate	0.5
Euryops pectinatus viridis	green euryops	Moderate	0.5
Gaillardia x grandiflora and cultivars	blanket flower	Moderate	0.5
Gaura lindheimeri and cvs.	gaura	Moderate	0.5
Geranium spp.	cranesbill	Moderate	0.5
Glandularia aristigera and cvs (Verbena tenuisecta)	South American rock vervain	Moderate	0.5
Helianthus maximiliani	Maximilian sunflower	Moderate	0.5
Hemerocallis spp.	day lily	Moderate	0.5
Heuchera sanguinea	coral bells	Moderate	0.5
Hibiscus moscheutos & cvs.	mallow rose	Moderate	0.5
Iris germanica	bearded iris	Moderate	0.5
Kniphofia spp. and cvs.	poker plant	Moderate	0.5
Perennials (cont.)			

Botanical Name	Common Name	Water Use	Plant Factor
Liatris spicata	gay feather	Moderate	0.5
Kniphofia uvaria hybrids and cvs.	red hot poker	Moderate	0.5
Liriope spp.	lilyturf	Moderate	0.5
Mammillaria geminispina	cactus	Very Low	0.05
Mammillaria melanocentra	cactus	Very Low	0.05
Manfreda spp.	manfreda	Moderate	0.5
Melampodium leucanthum	blackfoot daisy	Low	0.2
Nolina spp. (CA natives and non-natives)	bear grass	Low	0.2
Mirabilis jalapa	four o"clock	Moderate	0.5
Monarda didyma	scarlet bee balm	Moderate	0.5
Nepeta spp.	catmint/catnip	Moderate	0.5
Nephrolepis cordifolia (SHADE IN DESERT)	southern sword fern	Moderate	0.5
Nephrolepis exaltata SHADE	Boston fern	Moderate	0.5
Oenothera caespitosa	tufted (white) evening primrose	Low	0.2
Oenothera speciosa (O. berlandieri)	Mexican evening primrose	Moderate	0.5
Oenothera stubbei	Baja evening primrose	Low	0.2
Ophiopogon clarkei SHADE in desert	Clark lily turf	Moderate	0.5
Ophiopogon jaburan SHADE in desert	giant lily turf	Moderate	0.5
Ophiopogon japonicus SHADE in desert	mondo grass	Moderate	0.5
Ophiopogon planiscapus var. nigrescens SHADE in desert	black mondo grass	Moderate	0.5
Penstemon garden hybrids	penstemon (hybrids)	Moderate	0.5
Penstemon SW native spp. and cvs.	penstemon (SW natives)	Low	0.2
Perovskia spp. & cvs.	Russian sage	Low	0.2
Poliomintha longiflora	Rosemary mint	Low	0.2
Portulacaria afra & cvs.	elephant"s food	Low	0.2
Psilostrophe tagetina	paper flower	Low	0.2
Ratibida columnifera	Mexican hat	Moderate	0.5
Romneya coulteri	Matilija poppy	Low	0.2
Ruellia brittoniana	Mexican petunia	Low	0.2
Salvia coccinea	Texas sage	Moderate	0.5
Salvia dorrii	purple sage	Low	0.2
Salvia farinacea and cvs.	Mealy cup sage	Moderate	0.5
Salvia "Gayle Nielson" (also Trident as registered trademark name)	Gayle Nielson/Trident sage	Very Low	0.05
Salvia greggii & hybrids	autumn sage	Moderate	0.5
Salvia officinalis and cvs.	garden/kitchen sage	Moderate	0.5
Santolina spp.	lavender cotton	Low	0.2
Sphaeralcea spp. (CA native and non-native spp.)	desert/globe mallow	Very Low	0.05
Stachys byzantina	lamb"s ears	Moderate	0.5
Symphotrichum praealtum (Aster praealtum)	Rodney"s aster	Moderate	0.5
Perennials			

Botanical Name	Common Name	Water Use	Plant Factor
Tagetes lemmonii	mountain marigold	Moderate	0.5
Tagetes lucida	Mexican tarragon	Moderate	0.5
Tetraneuris acaulis (Hymenoxys acaulis)	stemless four-nerve daisy	Low	0.2
Tetraneuris scaposa	four-nerve daisy	Low	0.2
Teucrium chamaedrys	germander	Moderate	0.5
Thunbergia battiscombei	thunbergia (battiscombei)	Moderate	0.5
Thymophylla acerosa (Dyssodia acerosa)	shrubby dogweed	Low	0.2
Thymophylla pentachaeta (Dyssodia pentachaeta)	golden fleece	Low	0.2
Thymus spp. and cvs.	thyme	Moderate	0.5
Tulbaghia fragrans	sweet garlic	Moderate	0.5
Tulbaghia violacea	society garlic	Moderate	0.5
Verbena bonariensis	verbena (bonariensis)	Moderate	0.5
Verbena gooddingii (Glandularia gooddingii)	Goodding verbena	Low	0.2
Verbena hybrids	garden verbena	Moderate	0.5
Verbena peruviana	Peruvian verbena	Moderate	0.5
Verbena rigida	vervain	Moderate	0.5
Verbena stricta	hoary vervain	Moderate	0.5
Verbena Tapien hybrids	Tapien verbena	Moderate	0.5
Verbena tenera (pulchella)	rock verbena	Moderate	0.5
Verbena tenuisecta	moss verbena	Moderate	0.5
Vinca major	periwinkle	Moderate	0.5
Vinca minor	periwinkle	Moderate	0.5
Wedelia trilobata	trailing daisy	Moderate	0.5
Zinnia acerosa	desert zinnia	Low	0.2
Zinnia grandiflora	prairie zinnia	Low	0.2
Shrubs			
Botanical Name	**Common Name**	**Water Use**	**Plant Factor**
Abutilon palmeri	Indian mallow	Moderate	0.5
Acacia constricta	whitethorn acacia	Low	0.2
Acacia craspedocarpa	leatherleaf acacia	Low	0.2
Acacia greggii	catclaw acacia	Low	0.2
Acacia pennatula	pennatula acacia	Low	0.2
Acacia redolens	prostrate acacia	Low	0.2
Acanthus mollis (shade in the desert) (dormant in summer in CV)	bear"s breech	Moderate	0.5
Achillea millefolium (non-native hybrids)	yarrow (non-native hybrids)	Low	0.2
Achillea millefolium (CA native cultivars)	yarrow	Low	0.2
Agave americana (and thick-leaved relatives)(CA native and non-native	agave	Very Low	0.05

Shrubs (cont.)			
Botanical Name	Common Name	Water Use	Plant Factor
Agave attenuata (and thin-leaved relatives) (Ca native and non-native)	agave	Low	0.2
Aloe saponaria	African aloe	Low	0.2
Aloysia macrostachya	aloysia	Low	0.2
Aloysia triphylla	lemon verbena	Low	0.2
Ambrosia deltoidea	triangleleaf bursage	Low	0.2
Ambrosia dumosa	white bursage	Low	0.2
Ambrosia monogyra (Hymenoclea monogyra)	burrow bush	Very Low	0.05
Amorpha fruticosa	false indigobush	Moderate	0.5
Anisacanthus spp.	desert honeysuckle	Low	0.2
Arbutus unedo	strawberry tree	Moderate	0.5
Artemisia arborescens	large wormwood	Moderate	0.5
Artemisia filifolia	sand sagebrush	Very Low	0.05
Artemisia "Powis Castle"	Powis Castle sagebrush	Moderate	0.5
Artemisia spp. (shrubby)	sagebrush	Low	0.2
Artemisia tridentata	big sagebrush	Low	0.2
Atriplex spp	Salt bush	Low	0.2
Baccharis "Centennial"	Centennial baccharis	Low	0.2
Baccharis pilularis cvs.	dwarf coyote brush	Moderate	0.5
Baccharis salicifolia	mule fat	Moderate	0.5
Baccharis sarothroides	desert broom	Low	0.2
Baccharis "Starn"	Starn coyote brush	Low	0.2
Bahiopsis deltoidea (Viguiera deltoidea)	goldeneye	Low	0.2
Bambusa spp.	bamboo (Bambusa)	Moderate	0.5
Berberis aquifolium var. repens (shade)	creeping mahonia	Moderate	0.5
Berberis bealei (Mahonia bealei)	leatherleaf mahonia	Moderate	0.5
Berberis "Golden Abundance" (Mahonia)	golden abundance mahonia	Moderate	0.5
Berberis nevinii	Nevin mahonia	Moderate	0.5
Berberis pinnata & cvs. (Mahonia pinnata)	California holly grape	Moderate	0.5
Buddleja alternifolia	fountain butterfly bush	Moderate	0.5
Buddleja davidii and hybrids	butterfly bush	Moderate	0.5
Buddleja marrubiifolia	woolly butterfly bush	Low	0.2
Buxus microphylla japonica	Japanese boxwood	Moderate	0.5
Buxus sempervirens	English boxwood	Moderate	0.5
Caesalpinia gilliesii	desert bird of paradise	Low	0.2
Caesalpinia mexicana	Mexican bird of paradise	Low	0.2
Caesalpinia pulcherrima (deciduous in desert)	dwarf poinciana	Low	0.2
Calliandra "Sierra Star"	fairy duster hybrid	Low	0.2
Calliandra californica	Baja fairy duster	Low	0.2
Calliandra eriophylla	fairy duster	Low	0.2
Callistemon "Little John"	Little John bottlebrush	Moderate	0.5
Cephalocereus spp.	old man cactus	Low	0.2
Ceratostigma abyssinicum	African plumbago	Moderate	0.5

Shrubs (cont.)			
Botanical Name	Common Name	Water Use	Plant Factor
Ceratostigma griffithii	Burmese plumbago	Moderate	0.5
Cercocarpus betuloides	mountain ironwood	Very Low	0.05
Chaenomeles cvs.	flowering quince	Low	0.2
Chamaerops humilis	Mediterranean fan palm	Moderate	0.5
Chrysactinia mexicana	damianita daisy	Low	0.2
Chrysothamnus nauseosus	rabbit brush	Very Low	0.05
Cistus spp. and cvs.	rockrose	Moderate	0.5
Cleome isomeris	bladder pod	Low	0.2
Cneoridium dumosum	bushrue	Low	0.2
Coleogyne ramosissima	blackbrush	Very Low	0.05
Condea emoryi (Hyptis emoryi)	desert lavender	Low	0.2
Convolvulus cneorum	bush morning glory	Low	0.2
Cordia parvifolia	little leaf cordia	Low	0.2
Cortaderia selloana	Pampas grass	Low	0.2
Cotinus coggygria	smoke tree	Low	0.2
Cotoneaster spp. (shrubs)	cotoneaster	Moderate	0.5
Cuphea hyssopifolia	false heather	Moderate	0.5
Cuphea llavea	bat-faced cuphea	Moderate	0.5
Cycas revoluta	sago palm	Moderate	0.5
Dalea bicolor	dalea (bicolor)	Low	0.2
Dalea frutescens	black dalea	Low	0.2
Dalea pulchra	indigo/pea bush	Low	0.2
Dalea versicolor	dalea (versicolor)	Low	0.2
Dasylirion spp.	desert spoon	Low	0.2
Dioon spp.	Mexican cycad	Moderate	0.5
Dodonaea viscosa	hopseed bush	Moderate	0.5
Dodonaea viscosa "Purpurea"	purple hopseed bush	Moderate	0.5
Elaeagnus x ebbingei	Ebbinge"s silverberry	Moderate	0.5
Encelia farinosa	brittle bush	Very Low	0.05
Ephedra nevadensis	Nevada ephedra	Very Low	0.05
Ephedra viridis	green mormon tea	Very Low	0.05
Eremophila maculata	spotted emu bush	Low	0.2
Eremophila racemosa	Easter egg bush	Low	0.2
Eremophila x "Summertime Blue"	Summertime Blue emu	Low	0.2
Ericameria laricifolia	turpentine bush	Low	0.2
Eriobotrya "Coppertone"	coppertone loquat	Moderate	0.5
Eriodictyon tomentosum	woolly yerba santa	Very Low	0.05
Eriogonum fasciculatum and cvs. (not listed above)	California buckwheat	Very Low	0.05
Eriogonum spp. (CA native and non-native spp.)	buckwheat	Low	0.2
Espostoa lanata	Peruvian old man cactus	Low	0.2
Euonymus japonicus	evergreen euonymus	Moderate	0.5
Euryops pectinatus	euryops/shrub daisy	Moderate	0.5
Euryops pectinatus viridis	green euryops	Moderate	0.5
Fallugia paradoxa	Apache plume	Low	0.2
Ferocactus spp. (CA native and non-native spp.)	barrel cactus	Low	0.2
Forestiera pubescens	desert olive	Low	0.2
Shrubs (cont.)			

Botanical Name	Common Name	Water Use	Plant Factor
Fouquieria macdougalii	Mexican tree ocotillo	Low	0.2
Fouquieria splendens	ocotillo	Very Low	0.05
Gutierrezia sarothrae	matchweed	Very Low	0.05
Hamelia patens	Texas firecracker bush	Moderate	0.5
Hesperaloe campanulata	bell flower hesperaloe	Low	0.2
Hesperaloe funifera	Coahuilan hesperaloe	Low	0.2
Hesperaloe nocturna	seven-son flower	Low	0.2
Hesperaloe parviflora	red/ yellow yucca	Low	0.2
Hesperoyucca spp. (Yucca whipplei, Yucca californica)	yucca	Low	0.2
Heteromeles arbutifolia	toyon	Low	0.2
Hibiscus rosa-sinensis	Chinese hibiscus	Moderate	0.5
Hibiscus syriacus	Rose of Sharon	Moderate	0.5
Ilex comuta "Burfordii"	Burford holly	Moderate	0.5
Ilex vomitoria	yaupon	Moderate	0.5
Ilex x altaclarensis "Wilsonii"	Wilson holly	Moderate	0.5
Isocoma spp. (Haplopappus)	goldenbush	Very Low	0.05
Jasminum mesnyi	primrose jasmine	Moderate	0.5
Juniperus californica	California juniper	Low	0.2
Juniperus spp.	juniper	Moderate	0.5
Justicia californica (Beloperone californica)	chuparosa	Low	0.2
Justicia spicigera	Mexican honeysuckle	Low	0.2
Kerria japonica	Japanese rose	Moderate	0.5
Kolkwitzia amabilis	beauty bush	Moderate	0.5
Krascheninnikovia lanata	winterfat	Low	0.2
Lantana camara & cvs.	lantana	Moderate	0.5
Larrea tridentata	Creosote Bush	Low	0.5
Lavandula spp. & cvs.	lavender	Moderate	0.5
Leonotis leonurus	lion"s tail	Moderate	0.5
Leucophyllum langmaniae "Lynn"s legacy"	Lynn"s everblooming texas sage	Low	0.2
Leucophyllum spp. & cvs.	purple sage, Texas ranger etc.	Low	0.2
Ligustrum japonicum	Japanese privet	Moderate	0.5
Lobelia laxiflora	Mexican lobelia	Moderate	0.5
Lycium fremontii	wolfberry	Low	0.2
Mahonia oiwakensis (M. lomariifolia)	Chinese holly grape	Moderate	0.5
Malpighia glabra	Barbados cherry	Moderate	0.5
Myoporum parvifolium & cvs.	myoporum	Moderate	0.5
Myrtus communis	true myrtle	Moderate	0.5
Nandina domestica	heavenly bamboo	Moderate	0.5
Nandina domestica "Purpurea"	heavenly bamboo (Nana)	Moderate	0.5
Nerium oleander & cvs.	oleander	Moderate	0.5
Nolina spp. (CA natives and non-natives)	bear grass	Low	0.2
Opuntia spp. & cvs. (CA natives and non-natives)	prickly pear/cholla	Very Low	0.05
Osmanthus spp.	sweet olive/osmanthus	Moderate	0.5
Shrubs (cont.)			

Botanical Name	Common Name	Water Use	Plant Factor
Pachycereus marginatus	Mexican fence post cactus	Very Low	0.05
Pedilanthus bracteatus	tall slipper plant	Low	0.2
Pedilanthus macrocarpus	slipper plant	Low	0.2
Peritoma arborea (Isomeris arborea)	bladderpod	Low	0.2
Perovskia spp. & cvs.	Russian sage	Low	0.2
Phlomis fruticosa	Jerusalem sage	Moderate	0.5
Photinia serratifolia (P. serrulata)	Chinese photinia	Moderate	0.5
Photinia x fraseri	Fraser photinia	Moderate	0.5
Phyllostachys spp.	bamboo (Phyllostachys)	Moderate	0.5
Pinus mugo	mugo pine	Moderate	0.5
Pittosporum tobira and cvs.	mock orange	Moderate	0.5
Pluchea sericea	Coville arrow weed	Low	0.2
Plumbago scandens	summer snow	Moderate	0.5
Podocarpus macrophyllus	yew pine	Moderate	0.5
Portulacaria afra & cvs.	elephant"s food	Low	0.2
Prunus fasciculata	desert almond	Very Low	0.05
Psilostrophe cooperi	paper flower	Very Low	0.05
Psilostrophe tagetina	paper flower	Low	0.2
Punica granatum & cultivars	dwarf pomegranate	Moderate	0.5
Pyracantha sp.	Firethorn	Moderate	0.5
Quercus berberidifolia	California scrub oak	Low	0.2
Quercus dumosa	Nutall"s scrub oak	Low	0.2
Quercus turbinella	shrub live oak	Low	0.2
Rhaphiolepis indica & cvs	Indian hawthorne	Moderate	0.5
Rhus ovata	sugar bush	Low	0.2
Rhus typhina	staghorn sumac	Low	0.2
Romneya coulteri	Matilija poppy	Low	0.2
Rosa woodsii subsp. ultramontana	mountain wood rose	Moderate	0.5
Rosmarinus cvs.	trailing rosemary	Moderate	0.5
Rosmarinus officinalis & prostratus	rosemary	Moderate	0.5
Ruellia brittoniana	Mexican petunia	Low	0.2
Ruellia "Little Katie"	dwarf ruellia	Low	0.2
Ruellia peninsularis	Baja ruellia	Low	0.2
Russelia equisetiformis	coral fountain	Moderate	0.5
Sabal spp.	palmetto	Moderate	0.5
Salvia "Allen Chickering"	Allen Chickering sage	Low	0.2
Salvia apiana	white sage	Low	0.2
Salvia chamaedryoides	blue sage	Moderate	0.5
Salvia clevelandii & hybrids	salvia Cleveland/Alan Chickering etc.	Low	0.2
Salvia dorrii	purple sage	Low	0.2
Salvia "Gayle Nielson" (also Trident as registered trademark name)	Gayle Nielson/Trident sage	Very Low	0.05
Salvia greggii & hybrids	autumn sage	Moderate	0.5
Salvia leucophylla and cvs.	purple sage	Moderate	0.5
Salvia officinalis and cvs.	garden/kitchen sage	Moderate	0.5
Shrubs (cont.)			

Botanical Name	Common Name	Water Use	Plant Factor
Sambucus spp. (CA native and non-native spp.)	elderberry	Moderate	0.5
Santolina spp.	lavender cotton	Low	0.2
Senecio cineraria (Jacobaea maritima)	dusty miller	Moderate	0.5
Senna armata (Cassia armata)	spicy senna	Very Low	0.05
Senna artemisioides (Cassia artemisioides)	feathery cassia/senna	Low	0.2
Senna covesii	desert senna	Very Low	0.05
Senna lindheimeriana (Cassia lindheimeriana)	Lindheimer"s senna/cassia	Low	0.2
Senna nemophila (Cassia nemophila)	desert cassia	Low	0.2
Senna phyllodinea (Cassia phyllodinea)	silver leaf cassia/senna	Low	0.2
Senna sturtii (Cassia sturtii)	Sturt"s cassia/senna	Low	0.2
Senna wislizeni (Cassia wislizeni)	shrubby senna	Low	0.2
Simmondsia chinensis	jojoba	Low	0.2
Sophora secundiflora	Texas mountain laurel	Low	0.2
Sorbus aucuparia	European mountain ash	Moderate	0.5
Spartium junceum	Spanish broom	Very Low	0.05
Spiraea spp. (CA native and non native spp.)	spiraea	Moderate	0.5
Strelitzia reginae (shade in desert)	bird of paradise	Moderate	0.5
Styrax redivivus (S. californicus, S. fulvescens))	snowdrop bush	Moderate	0.5
Syringa hybrids (including Descanso hybrids)	lilac	Moderate	0.5
Syringa vulgaris	lilac	Moderate	0.5
Syringa x persica	Persian lilac	Moderate	0.5
Taxus baccata	English yew	Moderate	0.5
Taxus baccata "Fastigiata"	Irish yew	Moderate	0.5
Tecoma "Crimson Flare"	yellow bells	Moderate	0.5
Tecoma fulva spp. guarume (T."Orange Jubilee"	Orange Jubilee tecoma	Moderate	0.5
Tecoma stans	yellow bells	Moderate	0.5
Tecoma "Sunrise"	Sunrise tecoma	Moderate	0.5
Tecomaria capensis	cape honeysuckle	Moderate	0.5
Teucrium chamaedrys	germander	Moderate	0.5
Teucrium fruticans	bush germander	Moderate	0.5
Thuja occidentalis	American arborvitae	Moderate	0.5
Trachelospermum asiaticum	Asian star jasmine	Moderate	0.5
Trachelospermum jasminoides	star jasmine	Moderate	0.5
Trixis californica	trixis	Low	0.2
Ungnadia speciosa	Mexican buckeye	Low	0.2
Vauquelinia californica	Arizona rosewood	Low	0.2
Vauquelinia corymbosa var. heterodon	narrow leaf rosewood	Low	0.2
Viburnum tinus	laurustinus	Moderate	0.5
Viguiera parishii	desert goldeneye	Low	0.2
Shrubs (cont.)			

Botanical Name	Common Name	Water Use	Plant Factor
Wedelia texana (Zexmenia hispida)	hairy wedelia	Low	0.2
Weigela florida	weigela	Moderate	0.5
Xylosma congestum	shiny xylosma	Moderate	0.5
Yucca aloifolia	Spanish bayonet	Low	0.2
Yucca baccata	banana yucca	Very Low	0.05
Yucca brevifolia	Joshua tree	Very Low	0.05
Yucca decipiens	palma China	Very Low	0.05
Yucca elata	soaptree yucca	Very Low	0.05
Yucca faxoniana	giant white yucca	Very Low	0.05
Yucca filamentosa & cvs.	Adam"s needle	Low	0.2
Yucca glauca	soapweed yucca	Low	0.2
Yucca gloriosa	Spanish dagger	Low	0.2
Yucca recurvifolia	curve leaf yucca	Low	0.2
Yucca rigida	blue yucca	Very Low	0.05
Yucca rostrata	beaked yucca	Very Low	0.05
Yucca rupicola	twisted yucca	Low	0.2
Yucca schidigera (Y. californica, Y. mohavensis)	Mojave yucca	Very Low	0.05
Yucca schottii	mountain yucca	Very Low	0.05
Yucca thompsoniana	Thompson"s yucca	Very Low	0.05
Ornamental Trees			
Botanical Name	**Common Name**	**Water Use**	**Plant Factor**
Acacia constricta	whitethorn acacia	Low	0.2
Acacia craspedocarpa	leatherleaf acacia	Low	0.2
Acacia greggii	catclaw acacia	Low	0.2
Acacia pennatula	pennatula acacia	Low	0.2
Arbutus unedo	strawberry tree	Moderate	0.5
Azara microphylla	box leaf azara	Moderate	0.5
Brahea armata	blue hesper palm	Moderate	0.5
Brahea edulis	Guadalupe palm	Moderate	0.5
Butia odorata (B. capitata)	pindo palm	Moderate	0.5
Celtis pallida	desert hackberry	Low	0.2
Celtis reticulata	western hackberry	Low	0.2
Cercis occidentalis	western redbud	Moderate	0.5
Chilopsis linearis	desert willow	Moderate	0.5
Cotinus coggygria	smoke tree	Low	0.2
Cupressus sempervirens	Italian cypress	Moderate	0.5
Dioon spp.	Mexican cycad	Moderate	0.5
Eysenhardtia orthocarpa	kidneywood	Low	0.2
Havardia pallens (Pithecellobium pallens)	tenaza	Low	0.2
Hesperocyparis stephensonii (Cupressus arizonica ssp. arizonica, C. arizonica var. glabra))	Cuyamaca cypress	Low	0.2
Heteromeles arbutifolia	toyon	Low	0.2
Juniperus scopulorum cvs.	Rocky Mountain juniper	Moderate	0.5
Juniperus spp.	juniper	Moderate	0.5

Ornamental Trees (cont.)			
Botanical Name	**Common Name**	**Water Use**	**Plant Factor**
Lagerstroemia spp., hybrids and cvs.	crape myrtle	Moderate	0.5
Olneya tesota	desert ironwood	Low	0.2
Parkinsonia aculeata	Mexican palo verde/ Jerusalem thorn	Low	0.2
Parkinsonia floridum	Blue Palo Verde	Low	0.2
Parkinsonia microphyllum	Little leaf palo verde	Low	0.2
Phoenix dactylifera	date palm	Moderate	0.5
Photinia serratifolia (P. serrulata)	Chinese photinia	Moderate	0.5
Phyllostachys spp.	bamboo (Phyllostachys)	Moderate	0.5
Podocarpus henkelii	long leaf yellow wood	Moderate	0.5
Prosopis alba	Argentine mesquite	Low	0.2
Prosopis glandulosa (P. chilensis)	Chilean mesquite	Low	0.2
Prosopis glandulosa var. torreyana	honey mesquite	Low	0.2
Prosopis hybrids and cvs.	prosopis hybrids	Low	0.2
Prosopis juliflora	Arizona mesquite	Low	0.2
Prosopis pubescens	screwbean mesquite	Low	0.2
Prosopis velutina	velvet mesquite	Low	0.2
Prunus caroliniana	Carolina laurel cherry	Moderate	0.5
Prunus spp. edible	apricot	Moderate	0.5
Prunus spp. edible	nectarine	Moderate	0.5
Prunus spp. edible	nectarine (low chill)	Moderate	0.5
Prunus spp. edible	peach	Moderate	0.5
Prunus spp. edible	peach (low chill)	Moderate	0.5
Prunus spp. edible	plum	Moderate	0.5
Prunus spp. edible	plum (low chill)	Moderate	0.5
Prunus spp. peach	flowering peach	Moderate	0.5
Prunus spp. plum	flowering plum	Moderate	0.5
Punica granatum	pomegranate	Moderate	0.5
Pyrus kawakamii	evergreen pear	Moderate	0.5
Rhaphiolepis "Majestic Beauty"	majestic beauty	Moderate	0.5
Sabal spp.	palmetto	Moderate	0.5
Syagrus romanzoffiana (Arecastrum romanzoffiana)	queen palm	Moderate	0.5
Tecoma stans	yellow bells	Moderate	0.5
Trachycarpus fortunei	windmill palm	Moderate	0.5
Vitex Agnus-castus	Chaste Tree	Moderate	0.5
Washingtonia filifera	California fan palm	Moderate	0.5
Washingtonia Robusta	Mexican Fan Palm	Moderate	0.5
Yucca brevifolia	Joshua Tree	Low	0.2
Canopy Trees			
Botanical Name	**Common Name**	**Water Use**	**Plant Factor**
Ailanthus altissima	Tree of heaven	Low	0.2
Albizia julibrissin	silk tree	Moderate	0.5
Allocasuarina verticillata (Casuarina stricta)	coast beefwood	Moderate	0.5
Calocedrus decurrens	incense cedar	Moderate	0.5
Carya illinoensis	pecan	Moderate	0.5

Canopy Trees (cont.)			
Botanical Name	**Common Name**	**Water Use**	**Plant Factor**
Casuarina cunninghamiana	river she-oak	Moderate	0.5
Catalpa speciosa	western catalpa	Moderate	0.5
Cedrus atlantica	Atlas cedar	Moderate	0.5
Cedrus deodara	deodar cedar	Moderate	0.5
Celtis australis	European hackberry	Moderate	0.5
Celtis occidentalis	common hackberry	Moderate	0.5
Celtis sinensis	Chinese hackberry	Moderate	0.5
Chitalpa tashkentensis	Pink Dawn	Low	0.2
Cordia boissieri	Texas olive	Low	0.2
Cordia parvifolia	little leaf cordia	Low	0.2
Diospyros kaki	Japanese persimmon	Moderate	0.5
Eucalyptus gunnii	Cider Gum	Moderate	0.5
Eucalyptus microtheca	coolibah	Moderate	0.5
Eucalyptus nicholii	Nichol"s willow leaf peppermint	Moderate	0.5
Eucalyptus polyanthemos	silver dollar gum	Moderate	0.5
Eucalyptus rudis	flooded gum	Moderate	0.5
Eucalyptus sideroxylon	red iron bark	Moderate	0.5
Fraxinus angustifolia "Raywood" (F. oxycarpa)	Raywood ash	Moderate	0.5
Fraxinus "Moraine"	moraine ash	Moderate	0.5
Fraxinus uhdei	evergreen ash	Moderate	0.5
Fraxinus velutina	Arizona ash	Moderate	0.5
Fraxinus velutina "Modesto"	Modesto ash	Moderate	0.5
Geijera parviflora	Australian willow	Moderate	0.5
Ginkgo biloba	maiden hair tree	Moderate	0.5
Gleditsia triacanthos	honey locust	Low	0.2
Hesperocyparis arizonica (Cupressus arizonica)nomen. unresolved	Arizona cypress	Low	0.2
Koelreuteria paniculata	golden rain tree	Moderate	0.5
Laurus nobilis	sweet bay	Moderate	0.5
Laurus "Saratoga"	Saratoga laurel	Moderate	0.5
Ligustrum lucidum	glossy privet	Moderate	0.5
Liquidambar styraciflua	sweet gum	Moderate	0.5
Malus hybrids	crabapple	Moderate	0.5
Malus spp.(edible)	apple	Moderate	0.5
Melia Azedarach	Chinaberry	Low	0.2
Morus alba	white mulberry	Moderate	0.5
Olea Eruopaea	Olive	Low	0.2
Picea glauca	Alberta spruce	Moderate	0.5
Picea pungens	Colorado spruce	Moderate	0.5
Pinus brutia	Calabrian pine	Moderate	0.5
Pinus brutia ssp. eldarica	eldarica pine	Moderate	0.5
Pinus canariensis	Canary Island pine	Moderate	0.5
Pinus coulteri	Coulter pine	Moderate	0.5
Pinus edulis	pinyon pine	Low	0.2
Pinus halepensis	Aleppo pine	Moderate	0.5
Pinus monophylla	single leaf pinyon pine	Low	0.2
Pinus nigra	Austrian black pine	Moderate	0.5
Canopy Trees (cont.)			

Botanical Name	Common Name	Water Use	Plant Factor
Pinus patula	Jelecote pine	Moderate	0.5
Pinus pinea	Italian stone pine	Moderate	0.5
Pinus roxburghii	chir pine	Moderate	0.5
Pinus thunbergii	Japanese black pine	Moderate	0.5
Pistacia chinensis	Chinese pistache	Moderate	0.5
Pistacia x "Red Push"	red push pistache	Moderate	0.5
Pithecllobium Flexicaule	Texas Ebony	Low	0.2
Pittosporum tobira and cvs.	mock orange	Moderate	0.5
Podocarpus macrophyllus	yew pine	Moderate	0.5
Populus "Mohavensis"	Mohave poplar	Moderate	0.5
Pyrus calleryana cultivars	Callery pear	Moderate	0.5
Pyrus communis	edible pear	Moderate	0.5
Quercus dumosa	Nutall"s scrub oak	Low	0.2
Quercus fusiformis	escarpment live oak	Low	0.2
Quercus gambelii	Gambel oak	Low	0.2
Quercus ilex	holly oak	Moderate	0.5
Quercus lobata	Valley Oak	Moderate	0.5
Quercus macrocarpa	burr oak	Moderate	0.5
Quercus muehlenbergii	chinquapin oak	Low	0.2
Quercus suber	cork oak	Low	0.2
Quercus texana	Texas red oak	Low	0.2
Quercus virginiana	southern live oak	Moderate	0.5
Quercus wislizeni	interior live oak	Moderate	0.5
Quercus x Heritage	Heritage oak	Moderate	0.5
Robinia x ambigua	locust	Moderate	0.5
Sambucus spp. (CA native and non-native spp.)	elderberry	Moderate	0.5
Schinus polygamus	Peruvian pepper tree	Low	0.2
Searsia lancea (Rhus lancea)	African sumac	Moderate	0.5
Sophora secundiflora	Texas mountain laurel	Low	0.2
Sorbus aucuparia	European mountain ash	Moderate	0.5
Styphnolobium japonicum ((Sophora japonica)	Japanese pagoda tree	Moderate	0.5
Styrax japonicus	Japanese snowbell	Moderate	0.5
Taxus baccata	English yew	Moderate	0.5
Taxus baccata "Fastigiata"	Irish yew	Moderate	0.5
Ulmus crassifolia	cedar elm	Moderate	0.5
Ulmus parvifolia	Chinese evergreen elm	Moderate	0.5
Ulmus pumila	Siberian elm	Moderate	0.5
Ungnadia speciosa	Mexican buckeye	Low	0.2
Zelkova serrata	saw leaf zelkova	Moderate	0.5
Ziziphus jujuba	Chinese jujube	Moderate	0.5
Vines			
Botanical Name	**Common Name**	**Water Use**	**Plant Factor**
Ampelopsis brevipedunculata	blueberry creeper	Moderate	0.5
Bignonia capreolata	cross vine	Moderate	0.5
Campsis spp.	trumpet creeper	Moderate	0.5
Vines (cont.)			
Botanical Name	**Common Name**	**Water Use**	**Plant Factor**

Clematis armandii	evergreen clematis	Moderate	0.5
Clematis hybrids and cvs.	clematis	Moderate	0.5
Euonymus fortunei radicans	winter creeper	Moderate	0.5
Fallopia baldschuanica (Polygonum aubertii)	fleeceflower	Moderate	0.5
Ficus pumila (repens)	creeping fig	Moderate	0.5
Gelsemium sempervirens	Carolina jessamine	Moderate	0.5
Lonicera hildebrandiana	giant Burmese honeysuckle	Moderate	0.5
Lonicera japonica	Japanese honeysuckle	Moderate	0.5
Lonicera sempervirens	trumpet honeysuckle	Moderate	0.5
Lonicera x americana	Americana honeysuckle	Moderate	0.5
Macfadyena unguis-cati	cat"s claw	Low	0.2
Parthenocissus quinquefolia	Virginia creeper	Moderate	0.5
Parthenocissus tricuspidata	Boston ivy	Moderate	0.5
Rosa banksiae	Lady Banks rose	Moderate	0.5
Rosa "Cecile Brunner"	Cecile Brunner rose	Moderate	0.5
Tecomaria capensis	cape honeysuckle	Moderate	0.5
Thunbergia alata	black eyed susan	Moderate	0.5
Trachelospermum asiaticum	Asian star jasmine	Moderate	0.5
Trachelospermum jasminoides	star jasmine	Moderate	0.5
Vitis californica	California wild grape	Moderate	0.5
Vitis girdiana	desert grape	Moderate	0.5
Vitis labrusca	American grape	Moderate	0.5
Vitis "Roger"s Red"	Roger"s Red grape	Moderate	0.5
Vitis vinifera	European grape	Moderate	0.5
Wisteria spp.	wisteria	Moderate	0.5
Bamboo			
Botanical Name	**Common Name**	**Water Use**	**Plant Factor**
Bambusa spp.	bamboo (Bambusa)	Moderate	0.5
Phyllostachys spp.	bamboo (Phyllostachys)	Moderate	0.5
Bulbs			
Botanical Name	**Common Name**	**Water Use**	**Plant Factor**
Allium spp. mostly from CA or Mediterranean	allium	Low	0.2
Calochortus spp.	Mariposa lily	Very Low	0.2
Lilium columbianum	Columbia lily	Moderate	0.5
Lilium formosanum	Formosan lily	Moderate	0.5
Lilium humboldtii	Humboldt lily	Moderate	0.5
Lilium pardalinum	leopard lily and Wiggins lily	Moderate	0.5
Lilium parryi	lemon lily	Moderate	0.5
Lilium parvum	alpine lily	Moderate	0.5
Lilium tigrinum	tiger lily	Moderate	0.5
Lilium wallichianum	wallichianum lily	Moderate	0.5
Ranunculus spp. (winter growing)	Persian ranunculus	Moderate	0.5
Zephyranthes candida	white rain lily	Low	0.2
Zephyranthes spp.	zephyr flower	Low	0.2
Grass			
Botanical Name	**Common Name**	**Water Use**	**Plant Factor**
Andropogon gerardii	big bluestem	Low	0.2

Andropogon scoparius	little bluestem	Low	0.2
Aristida purpurea	purple threeawn	Low	0.2
Bouteloua curtipendula	sideoats grama	Low	0.2
Bouteloua gracilis and cvs.	blue grama	Low	0.2
Calamagrostis x acutiflora cvs. e.g. Karl Foerster	feather reed grass	Moderate	0.5
Festuca californica and cvs.	California fescue	Moderate	0.5
Festuca glauca	blue fescue	Moderate	0.5
Festuca ovina and cvs.	sheep fescue	Moderate	0.5
Festuca "Siskiyou Blue"	Siskiyou Blue fescue	Moderate	0.5
Hilaria rigida (Pleuraphis rigida)	big galleta grass	Moderate	0.5
Muhlenbergia capillaris and cvs.	hairy awn muhly	Moderate	0.5
Muhlenbergia dumosa	bamboo muhly	Moderate	0.5
Muhlenbergia emersleyi	bull grass	Moderate	0.5
Muhlenbergia lindheimeri	Lindheimer muhly	Moderate	0.5
Muhlenbergia porteri	bush muhly	Moderate	0.5
Muhlenbergia rigens	deer grass	Moderate	0.5
Muhlenbergia rigida "Nashville"	Nashville deer grass	Moderate	0.5
Panicum virgatum and cvs.	switch grass	Moderate	0.5
Pennisetum x advena (P. setaceum hybrids)	purple/burgundy fountain grass	Moderate	0.5
Saccharum ravennae (Erianthus ravennae)	plume grass	Moderate	0.5
Schizachyrium scoparium	little bluestem	Low	0.2
Sporobolus airoides	alkalai sacaton	Low	0.2
Sporobolus wrightii	big sacaton	Low	0.2
Stenotaphrum secundatum	St Augustine grass	Moderate	0.5
Stipa hymenoides (Oryzopsis hymenoides)	Indian rice grass	Low	0.2
Stipa tenuissima (Nassella tenuissima)	Mexican feather grass	Low	0.2
Zoysia tenuifolia	Mascarene grass	Moderate	0.5
Palm & Cycad			
Botanical Name	**Common Name**	**Water Use**	**Plant Factor**
Brahea armata	blue hesper palm	Moderate	0.5
Brahea edulis	Guadalupe palm	Moderate	0.5
Butia odorata (B. capitata)	pindo palm	Moderate	0.5
Chamaerops humilis	Mediterranean fan palm	Moderate	0.5
Cycas revoluta	sago palm	Moderate	0.5
Dioon spp.	Mexican cycad	Moderate	0.5
Phoenix canariensis	Canary Island date palm	Moderate	0.5
Sabal spp.	palmetto	Moderate	0.5
Syagrus romanzoffiana (Arecastrum romanzoffiana)	queen palm	Moderate	0.5
Trachycarpus fortunei	windmill palm	Moderate	0.5
Washingtonia filifera	California fan palm	Moderate	0.5

Succulents			
Botanical Name	Common Name	Water Use	Plant Factor
Dasylirion spp.	desert spoon	Low	0.2
Echinopsis spp. (Trichocereus spp.)	torch cactus	Low	0.2
Euphorbia antisyphilitica	candelilla	Low	0.2
Ferocactus spp. (CA native and non-native spp.)	barrel cactus	Low	0.2
Fouquieria macdougalii	Mexican tree ocotillo	Low	0.2
Fouquieria splendens	ocotillo	Very Low	0.05
Hesperaloe campanulata	bell flower hesperaloe	Low	0.2
Hesperaloe funifera	Coahuilan hesperaloe	Low	0.2
Hesperaloe nocturna	seven-son flower	Low	0.2
Hesperaloe parviflora	red/ yellow yucca	Low	0.2
Hesperoyucca spp. (Yucca whipplei, Yucca californica)	yucca	Low	0.2
Mammillaria geminispina	cactus	Very Low	0.05
Mammillaria melanocentra	cactus	Very Low	0.05
Opuntia spp. & cvs. (CA natives and non-natives)	prickly pear/cholla	Very Low	0.05
Pachycereus marginatus	Mexican fence post cactus	Very Low	0.05
Pedilanthus bracteatus	tall slipper plant	Low	0.2
Pedilanthus macrocarpus	slipper plant	Low	0.2
Portulacaria afra & cvs.	elephant"s food	Low	0.2
Yucca aloifolia	Spanish bayonet	Low	0.2
Yucca baccata	banana yucca	Very Low	0.05
Yucca brevifolia	Joshua tree	Very Low	0.05
Yucca decipiens	palma China	Very Low	0.05
Yucca elata	soaptree yucca	Very Low	0.05
Yucca faxoniana	giant white yucca	Very Low	0.05
Yucca filamentosa & cvs.	Adam"s needle	Low	0.2
Yucca glauca	soapweed yucca	Low	0.2
Yucca gloriosa	Spanish dagger	Low	0.2
Yucca recurvifolia	curve leaf yucca	Low	0.2
Yucca rigida	blue yucca	Very Low	0.05
Yucca rostrata	beaked yucca	Very Low	0.05
Yucca schottii	mountain yucca	Very Low	0.05
Yucca thompsoniana	Thompson"s yucca	Very Low	0.05

APPENDIX K

TOWN OF APPLE VALLEY LOCAL HAZARD MITIGATION PLAN

Town of Apple Valley

LOCAL HAZARD MITIGATION PLAN

2017 PLAN UPDATE



This Hazard Mitigation Plan was created by the Town of Apple Valley's Office of Emergency Preparedness. This document can be viewed at www.ReadyAppleValley.org. For additional information regarding the creation of this document call 760-240-7000.

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Section 1. Introduction

Natural disasters cause death and injuries, as well as significant damage to our communities, businesses, public infrastructure, and environment. The impacts of these damages result in the displacement of people and tremendous costs due to response and recovery dollars, economic loss, and burden. The Town of Apple Valley (Apple Valley) Local Hazard Mitigation Plan (LHMP) is an effort undertaken by the Town to mitigate the effects of natural hazards and return to "the norm" sooner, with fewer impacts to people and infrastructure.

Hazard mitigation planning is the process through which hazards are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented. While natural disasters cannot be prevented from occurring, the effects of natural disasters can be reduced or eliminated through a well-organized public education and awareness effort, preparedness activities, and mitigation actions.

After disasters, repairs and reconstruction are often completed in such a way as to simply restore to pre-disaster conditions. Such efforts expedite a return to normalcy; however, the replication of pre-disaster conditions results in a cycle of damage, reconstruction, and repeated damage. Hazard mitigation ensures that such cycles are broken and that post-disaster repairs and reconstruction result in increased resiliency for Apple Valley residents, business owners and city officials.

1.1 Your Jurisdiction

The Town of Apple Valley is located in the heart of the Victor Valley in the County of San Bernardino. In a region known as the High Desert. Apple Valley is strategically located 35 minutes north of the Inland Empire, along Interstate 15. The Town has 78 square miles in its incorporated boundaries, and a sphere of influence encompassing 200 square miles. 2015 census data list Apple Valley with a population of 71,107 residents.

1.2 Purpose of the Plan

Each year in the United States, natural disasters take the lives of hundreds of people and injure thousands more, as well as destroy or severely damage existing buildings, structures, infrastructure, and other facilities. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. Many disasters cause extreme burden to city governments and small communities throughout California.

The intent of hazard mitigation is to reduce and/or eliminate loss of life and property. Hazard mitigation is defined by FEMA as "*any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.*" A hazard is defined by FEMA as "*any event or condition with the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, environmental damage, business interruption, or other loss.*"

The purpose of the Hazard Mitigation Plan (HMP) is to demonstrate the plan for reducing and/or eliminating risk in the Town of Apple Valley. The HMP process encourages communities to develop goals and projects that will reduce risk and build a more disaster resilient community by analyzing potential hazards.

Mitigation is one of the primary phases of emergency management specifically dedicated to breaking the cycle of damage. Hazard mitigation is distinguished from other disaster management functions by measures that make San Bernardino County,

Town of Apple Valley development and the natural environment safer and more disaster resilient. Mitigation generally involves alteration of physical environments, significantly reducing risks and vulnerability to hazards by altering the built environment so that life and property losses can be avoided or reduced.

Mitigation also makes it easier and less expensive to respond to and recover from disasters.

Also with an approved (and adopted) HMP, Apple Valley will become eligible for federal disaster mitigation funds/grants (Hazard Mitigation Grant Program, Pre-Disaster Mitigation, and Flood Management Assistance) aimed to reduce and/or eliminate risk.

1.3 Authority

In 2000, FEMA adopted revisions to the Code of Federal Regulations. This revision is known as the "Disaster Mitigation Act (DMA)." DMA 2000, Section 322 (a-d) requires that local governments, as a condition of receiving federal disaster mitigation funds, have a Hazard Mitigation Plan (HMP) that describes the process for assessing hazards, risks and vulnerabilities, identifying and prioritizing mitigation actions, and engaging/soliciting input from the community (public), key stakeholders, and adjacent jurisdictions/agencies.

Senate Bill No. 379 will, upon the next revision of a local hazard mitigation plan on or after January 1, 2017, or, if the local jurisdiction has not adopted a local hazard mitigation plan, beginning on or before January 1, 2022, require the safety element to be reviewed and updated as necessary to address climate adaptation and resiliency strategies applicable to that city or county.

1.4 Community Profile

This section is to provide a broad perspective, brief history and describes the makeup and development of the community.

1.4.1 Physical Setting

The Town of Apple Valley is located in the Mojave Desert of the County of San Bernardino, at an elevation of 3,000 feet. In a region known as the High Desert, Apple Valley consists of 78 square miles in its incorporated boundaries and a sphere of influence encompassing 200 square miles. The Town borders Interstate 15 to the north, Joshua Road to the east, the foothills of the San Bernardino Mountains to the south, and the Mojave River to the west.

Apple Valley is primarily desert-rural and consists of a typical mountain-and-basin topography with sparse vegetation. The natural geographic vulnerabilities are: Mojave River, San Bernardino Mountains, Dry Lake Bed, and the Desert Knolls area (generally an area with a slope greater than 15%).

Apple Valley experiences an average of 350 days of sunshine per year with summer temperatures ranging from 40 degrees Fahrenheit (F) to 110 degrees F., and winter temperatures dipping down to low 20 degrees F. to a high of 70 degrees F. Prevailing winds range from 5-20 knots/hour from the south/southwest to the northeast.

The Mojave River rises in the San Bernardino Mountains at the Lake Silverwood and Mojave River Forks Reservoirs. The River runs in a northerly direction the entire length of the Town's western boundary. Due to the porous soil and rapid evaporation, the River is primarily dry in the area adjacent to Apple Valley. A flow of water is present during major rains

and upon release of water from Lake Silverwood (contained by the Cedar Springs Dam and Mojave Dam).

The Town of Apple Valley also contains a 1,870 acre dry lake bed area. This area and the area along the Mojave River is part of the 100 Year Flood Area (Flood Zone A).

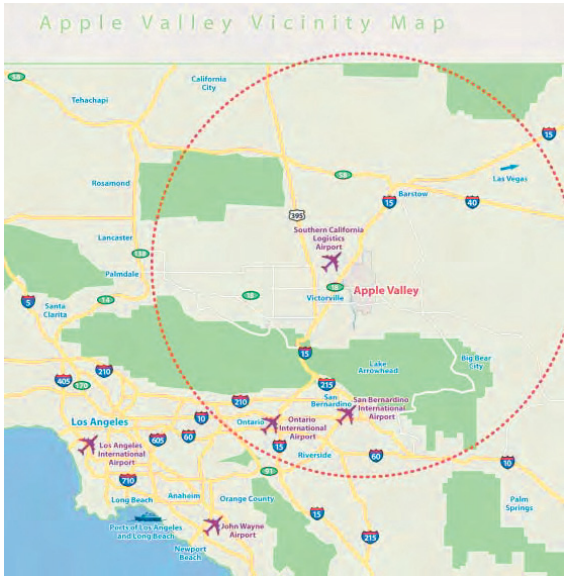


Figure 1-1: Regional Setting

Source: www.applevalley.org 2015

1.4.2 History

The Town of Apple Valley was incorporated in 1988; however, its history goes back much further. Local historians have found signs of Serrano Indian camps along the Mojave River in Apple Valley. They were already there when Father Francisco Garces arrived in 1776, as he established the Spanish missions throughout California. In the late 1800s, the Paiute Indians also migrated to this area. The Mojave River Trail hosted trappers, gold prospectors, pack mules and Mormon wagon trains—over 13,000 people passed through the area between 1849 and 1859. It was in 1860 that the first cabin was built in Apple Valley by Silas Cox, and the first road was cut the following year.

There are many stories as to how Apple Valley acquired its name. According to the late Mary Hampton, local historian, the name arose from the abundance of apple orchards that existed there in the 1920s. Some say the name "Apple Valley" originated from The Appleton Land Company that was based in this area in the early 1900s. Ursula Poates, one of the first settlers in the area, is credited with saying, "There were some apples being raised along the river in those early days, but

not by the ton, so I just cut it down and called it Apple Valley!" By 1920, apples were being grown by the ton at award-winning orchards. Unfortunately, with the Great Depression and the cost of pumping water for irrigation, the orchards died off in the 1930s.

With a pleasant climate and lots of land, many types of ranches were built in the area. They touted the dry desert air as a cure for ailments of all sorts, including tuberculosis and asthma. Other ranches provided a haven for shell-shock victims of World War I, while still others developed into guest ranches. People would come to Apple Valley to enjoy the western lifestyle where they could ride horses, attend rodeos and just get away from the big city.

The modern founders of Apple Valley were Newton T. Bass and B.J. "Bud" Westlund, who were partners in the oil and gas industry in Long Beach, CA. Westlund and Bass formed the Apple Valley Ranchos Land Co. in 1946 and marketed the area as a destination resort and quality residential community - "The Golden Land of Apple Valley". They built the Apple Valley Inn and Hilltop House, and invited famous celebrities of Hollywood to come visit. Within ten years there were banks, churches and a school, along with a golf course, hospital and 180 businesses.

1.4.3 Climate

The climate of Apple Valley is characterized by hot dry summers, mild winters and little rainfall. In summer, temperatures often reach above 100 degrees Fahrenheit (F). Winter temperatures are usually mildly cold but sometimes fall below 30ºF.

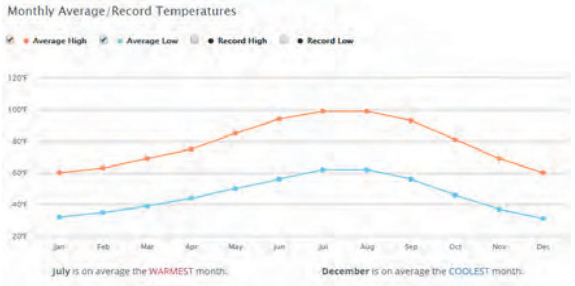


Figure 1-2: Weather.com/2016

Precipitation generally occurs in mid to late winter months (December to February). Average total annual precipitation for the area averages 6.2 inches (in), with most rainfall occurring in November to March (Weather.com 2016).

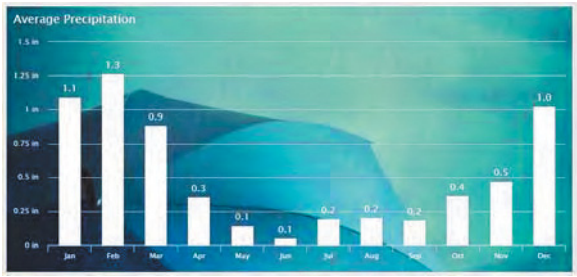


Figure 1-3: Weather.com/2016

1.4.4 Demographics

San Bernardino County has been designated as a Coastal County within the State of California. The number of Americans residing in a coastal county passed the 159 million mark in 2010, making the coastal population larger than the entire U.S. population in 1950. Today, more than half of the U.S. population lives in a coastal area (as defined by the National Oceanic and Atmospheric Administration - NOAA), even though the 673 coastal counties constitute only about one fourth of the country's landmass.

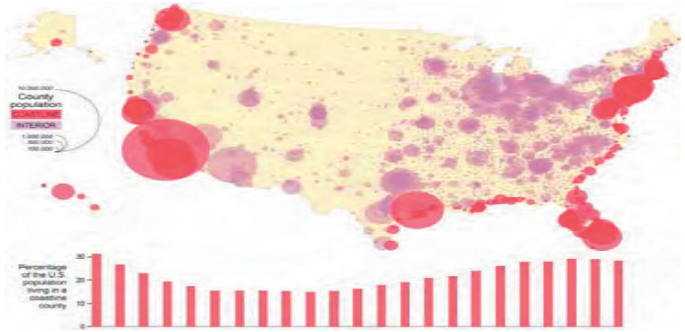


Figure 1-4: U.S. Census Bureau

As indicated by the map prepared by the U. S. Census Bureau, San Bernardino County is designated as a Coastal County within the State of California. Particular data exists demonstrating the effects of various types of risks within the county. It is important to use this information as a source point for evaluating the various risks that prevail not only in San Bernardino County, but the Town of Apple Valley.

The growth in population of coastal areas illustrates the importance of emergency planning and preparedness for areas that are more susceptible to inclement weather conditions. The U.S. Census Bureau's official population estimates, along with annually updated socioeconomic data from the new American Community Survey, provide a detailed look at the nation's growing coastal population. Emergency planners and community leaders can better assess the needs of coastal populations using census data.

In 2010, the Town of Apple Valley had a population of 69,135 and that population has increased to 71,107 in 2015, with a median age of 37.5 and an average household size of 2.90.

Table 1-1: ESRI 2015; Opportunity High Desert 2015 Brochure

Demographic Overview	
Current population (2015):	71,107
Current regional population (2015) :	443,000
Avg. Household Size (2015) :	2.90
Median Age (2015):	37.5
Home Ownership (2015):	61%
Total Households (2015):	24,332
* Regional population estimate is based on a total of Victorville, Hesperia, Apple Valley, and Adelanto populations; unincorporated areas are not included in this estimate.	



Figure 1-5: Historic and Projected Population Estimates

Source: Demographics Town of Apple Valley 2015

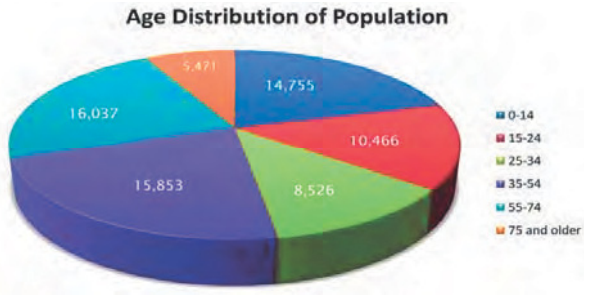


Figure 1-6: Demographics Town of Apple Valley 2015

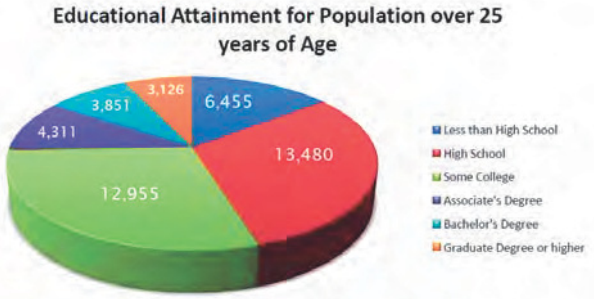


Figure 1-7: Demographics Town of Apple Valley 2015

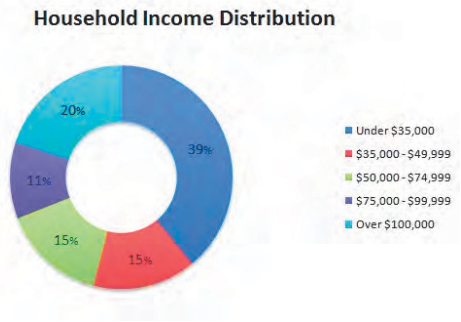


Figure 1-8: Demographics Town of Apple Valley 2015

Table 1-2: Income Level

Per Capita (2015)	Median Household (2015)	Average Household (2015)
$21,614	$45,554	$62,760

Source: U.S. Census Bureau, Census 2010 Summary File 1; ESRI forecasts for 2015

1.4.5 Existing Land Use

The land use types in Apple Valley are all related to a single, over-arching concept: that Apple Valley's quality of life is tied to its rural character, and that this character is to be preserved and protected for the long term health of the community. In Apple Valley "rural" means space -- unscarred mountains and vistas of desert valleys, neighborhoods of large lots where keeping horses is allowed, an extensive multi-use trail system, and landscaping consistent with the desert environment. The land use designations established in this General Plan are provided below.

Very Low Density Residential (R-VLD; 1 dwelling unit per 5 or more gross acres): This land use designation allows detached single family homes on lots of at least five gross acres. Multi-use trails should be integrated into all new projects in this designation, as appropriate. Also permitted are agricultural and ranching activities, animal keeping (both personal use and commercial) and home occupations. May be appropriate for bed and breakfast and similar uses, and animal-keeping or agricultural-related commercial enterprises, such as feed stores, commercial stables and similar uses with approval of a conditional use permit.

Low Density Residential (R-LD; 1 dwelling unit per 2.5 to 5 gross acres): This land use designation allows detached single family homes on lots of two and a half to five gross acres. This designation provides for the rural and suburban environment. Multi-use trails should be integrated into all new projects in this designation, as appropriate. Also permitted are agricultural and ranching activities, animal keeping (both personal use and commercial) and home occupations. May

be appropriate for bed and breakfast and similar uses, with approval of a conditional use permit.

Estate Residential (R-E; 1 dwelling unit per 1 to 2.5 gross acres): This land use designation allows detached single family homes on lots of one to two and a half gross acres. Access on local roads in new subdivisions within this designation should be paved. Multi-use trails should be integrated into all new projects in this designation, as appropriate. Animal keeping for personal use, ranching activities and home occupations are appropriate land uses in this designation. May be appropriate for bed and breakfast and similar uses, with approval of a conditional use permit.

Estate Residential ¾ (R-E 3/4; 1 dwelling unit per 0.75 to 1.0 net acre): This land use designation is specifically designed for animal keeping. Multi-use trails should be integrated into all new projects in this designation, as appropriate. Animal keeping for personal use, ranching activities and home occupations are appropriate land uses in this designation. Centralized stables, corrals, show rings and similar facilities, available to all residents of a development project are encouraged. May be appropriate for bed and breakfast and similar uses, with approval of a conditional use permit.

Single Family Residential (R-SF; 1 dwelling unit per 0.4 to 0.9 net acre): Lots in this designation must be a minimum of 18,000 square feet net, and may range to 39,200 square feet. This designation is intended to be composed of planned subdivisions with all utilities and public services. Animal keeping is permitted on lots zoned Equestrian Residential in the Development Code. Multi-use trails should be integrated into all new projects in this designation, as appropriate.

Medium Density Residential (R-M; 4 to 20 dwelling units per net acre): This designation is intended to promote a wide range of higher density residential units, including: single family attached; and multi-family units, including condominiums, townhomes and apartments. Projects restricted to senior citizens (age 55 and older) and providing various levels of care are also appropriate in this designation. Single family detached units are only permitted on lots of 18,000 square feet or greater in the Mountain Vista Estates area, as defined in General Plan Program 2.G.1. On all other lands designated Medium Density Residential within Town limits, single family detached units are prohibited. This land use designation should be a buffer between less intense residential designations and commercial or industrial designations, or major roadways. Future projects should be located in close proximity to commercial services, public transit and schools.

Mobile Home Park (MHP; 5-15 units per acre): This designation is applied to mobile home parks that existed upon adoption of this General Plan. New mobile home parks would be required to file a General Plan Amendment and Change of Zone to assign this designation to the project. This designation applies to mobile home parks and mobile home subdivisions. Home occupations and recreational facilities and amenities associated with the mobile home use are also appropriate in this designation.

Mixed Use (M-U): The land use designation has been created to allow for the development of projects that include residential and retail and office commercial development in an integrated, master planned project. Residential development should occur over commercial development, or within a commercial complex (i.e. residential building abutting a commercial building). Residential development must occur at a density of 4 to 30 units per acre. Mixed Use projects are encouraged in The Village, on major roadways, and in close proximity to employment centers, such as the North Apple Valley Industrial Specific Plan area. Projects that propose residential parcels adjacent to commercial parcels, and do not truly integrate the land uses, will not qualify for this designation. The minimum size for a Mixed Use project is 1 acre.

Office Professional (O-P): This designation allows professional offices, and is intended to act as a buffer between General Commercial and residential land uses. This designation encourages high quality professional services with only ancillary retail commercial components. There is no minimum size for project sites in this designation, but assemblage of smaller parcels is encouraged.

General Commercial (C-G): This designation allows a broad range of retail uses, as well as office and service land uses. Typical uses will serve the needs of the Town's residents and businesses, in a shopping center setting. General retail stores, including all types of consumer goods, furniture and appliance sales, auto repair and sales are permitted in this designation. Restaurants, both sit-down and fast food, gasoline service stations and general office (secondary to retail uses) are also permitted in this designation. There is no minimum size for project sites in this designation, but assemblage of smaller parcels is encouraged.

Service Commercial (C-S): This designation is assigned to lands in The Village, and is intended as a transition designation allowing commercial and industrial land uses on a smaller scale. Its location in an established area of Town necessitates flexibility in development standards, due to existing development and infrastructure constraints. Land uses in this designation include vehicle sales and service; lumber, home repair and building supply, general retail, warehousing and manufacturing uses completely contained within an enclosed structure. There is no minimum size for project sites in this designation, but assemblage of smaller parcels is encouraged.

Regional Commercial (C-R): This land use category allows retail uses that serve not only the residents and businesses of Apple Valley, but also of the surrounding region. Permitted uses in this designation include auto malls, regional malls, business parks, factory stores and outlets, entertainment commercial, hotels and motels, restaurants, institutional and public uses. The minimum size for a Regional Commercial project site is 10 acres.

Planned Industrial (I-P): This land use designation allows high quality, non-polluting industrial land uses, either as free-standing uses or as part of master planned industrial parks. Uses permitted include warehousing, light manufacturing, research and development and administrative facilities. The minimum size for a Planned Industrial project site is 5 acres.

Public Facility (PF): This land use designation is assigned to public and quasi-public land uses, including Town Hall and other Town facilities, fire stations, schools, facilities of the County, State and federal government, water and sewer district, and utility substations and facilities. There is no minimum size in this land use designation.

Open Space (OS): This land use designation is applied to natural and active open space areas, including the knolls, Bell and Fairview Mountains, the Mojave River, lands owned by Town, County, State and federal agencies for the purposes of recreation or conservation, and golf courses, parks or other recreational facilities.

Mineral Resources (MR): This land use designation is applied to lands in active mining operations. One such operation exists in Town at the present time, located near Interstate 15. This land use designation allows mining operations permitted by the State for lands with significant deposits of concrete aggregate.

Specific Plan: This designation is applied to lands on which a specific plan has been approved by the Town Council. The Specific Plan must conform to State law, and include maps and text that establish the land use designations; standards and guidelines for development; infrastructure requirements; and phasing for the specific plan area.

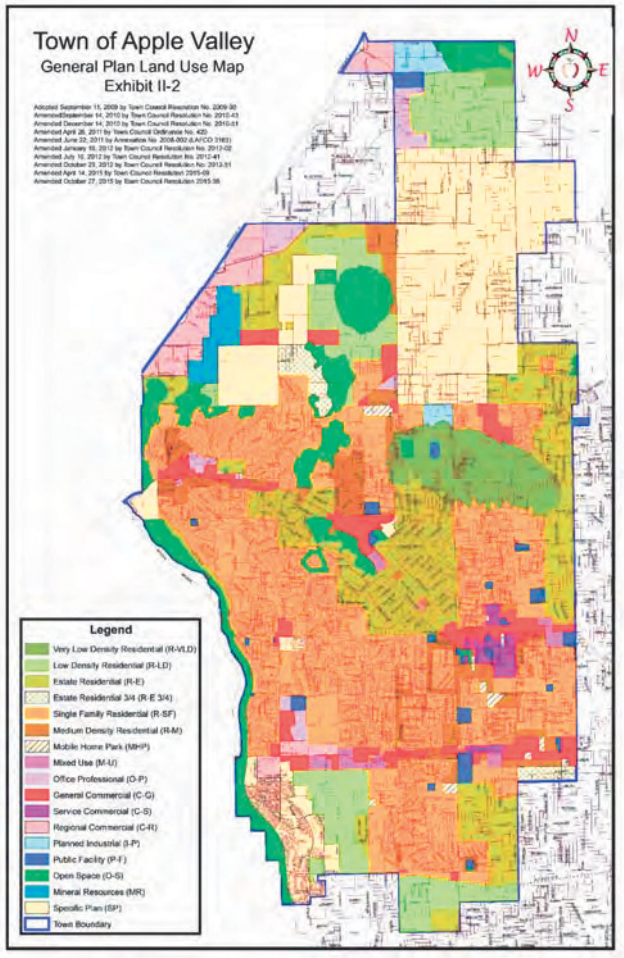


Figure 1-9: 2015 Land Use Map, Exhibit II-2

Source: Town of Apple Valley General Plan

1.5 Build Out Statistics

The Town consists of a total of 50,532 acres, of which 46,948.3 acres were within the Town limits prior to the addition of the two annexation areas. 3,583.2 acres were added as part of Annexations 2008-001 and 2008-002. The acreage, by land use designation, is shown in Table 1-3 & 1-4, below.

Table 1-3: Statistical Summary of Land Uses (2008 Town Limits)

Land Use Designation	Developed Acres	Vacant Acres	Total Acres
Residential Land Uses			
Very Low Density Residential (1 du/5 or more gross ac)	212.0	1,749.5	1,961.5
Low Density Residential (1 du/2.5 - 5 gross ac)	450.7	3,071.7	3,522.4
Estate Residential (1du/1 – 2.5 gross ac)	3,308.2	3,308.0	6,616.3
Estate Residential ¾ (1 du/0.75 – 1 ac)	26.1	449.6	475.7
Single family Residential (1 du/0.4-0.9 ac)	8,811.2	3,770.7	12,581.9
Medium Density Residential (4- 20 du/ac)	826.2	1,057.0	1,883.1
Mobile Home Park (5-15 du/ac)	178.5	1.5	180.0
Mixed Use	90.8	229.7	320.5
Specific Plan	1,359.0	5,653.7	7,012.7
Total Residential Uses	**15,262.7**	**19,291.5**	**34,554.2**
Commercial Land Uses			
Mixed Use[1]	90.8	229.7	320.5
General Commercial	480.3	1,066.5	1,546.8
Regional Commercial	99.6	1,203.3	1,303.0
Service Commercial	152.4	179.2	331.6
Office Professional	64.7	546.7	611.3
Specific Plan/Commercial[1]	1,359.0	5,653.7	7,012.7
Specific Plan/Industrial[1]	1,359.0	5,653.7	7,012.7

Land Use Designation	Developed Acres	Vacant Acres	Total Acres
Total Industrial Uses[1]	**21.4**	**623.9**	**645.3**
Other Land Uses			
Public Facility	330.2	132.0	462.2
Open Space	291.2	2,796.4	3,087.5
Mineral Resources	129.4	323.2	452.5
Street Rights-of-Way	2,771.1	1,182.8	3,953.9
Total Other Land Uses	**3,521.8**	**4,434.4**	**7,956.2**
Grand Total	**19,602.8**	**27,345.5**	**46,948.3**

Source: Apple Valley General Plan 2009

Table 1-4: Statistical Summary of Land Uses (Annexation No. 2008-001 and No. 2008-002)

General Plan Land Use Designation	Developed Acres	Vacant Acres	Total Acres
Residential Land Uses			
Estate Residential (1du/1 – 2.5 gross ac)	55.7	722.3	778.0
Medium Density Residential (4- 20 du/ac)	41.5	177.3	218.7
Mixed Use (4-30 du/ac)	0.0	94.8	94.9
Total Residential Uses	**97.2**	**994.4**	**1,091.6**
Commercial Land Uses			
Mixed Use[1]	0.0	94.9	94.9
General Commercial	12.3	50.5	62.8
Regional Commercial	7.2	435.7	442.9
Office Professional	0.0	183.1	183.1
Total Commercial Uses	**19.5**	**669.3**	**688.8**

General Plan Land Use Designation	Developed Acres	Vacant Acres	Total Acres
Industrial Land Uses			
Planned Industrial	64.3	1,538.5	1,602.8
Other Land Uses			
Public Facility	0.0	5.1	5.1
Street Rights-of-Way	43.8	151.1	194.9
Grand Total All Land Uses	**224.8**	**3,358.4**	**3,583.2**

Source: Apple Valley General Plan 2009

The build out potential of these lands is shown categorically in Table 1-5, Residential Land Use Designation Build Out Summary; Table 1-6, Commercial and Industrial Land Use Designation Build Out Summary; and Table 1-7, Other Land Use Designation Build Out Summary.

Table 1-5: Residential Land Use Designation Build Out Summary

	Town Limits						Annexation Areas					
Designation	**AC Dev.**	**AC Vacant**	**AC Total**	**Exist. Units**	**Future Units**	**Total Units**	**AC Dev**	**AC Vacant**	**AC Total**	**Exist. Units**	**Future Units**	**Total Units**
Very Low Density Residential (1 du/5 or more gross ac)	212.0	1,749.5	1,961.5		350	350	--	--	--	--	--	--
Low Density Residential (1 du/2.5 - 5 gross ac)	450.7	3,071.7	3,522.4		1,229	1,229	--	--	--	--	--	--
Estate Residential (1du/1 – 2.5 gross ac)	3,308.2	3,308.0	6,616.3	20,107	3,308	23,415	55.7	722.3	778.0	--	722	722
Estate Residential ¾ (1 du/0.75 – 1 ac)	26.1	449.6	475.7		599	599	--	--	--	--	--	--
Single family Residential (1 du/0.4-0.9 ac)	8,811.2	3,770.7	12,581.9		5,656	5,656	--	--	--	--	--	--
Medium Density Residential (4- 20 du/ac)	826.2	1,057.0	1,883.1	3,775	15,854	19,629	41.4	177.3	218.7	--	2,659	2,659
Mobile Home Park (5-15 du/ac)	178.5	1.5	180.0	1,043	23	1,066	--	--	--	--	--	--
Mixed Use	90.8	229.7	320.5		2,068	2,068	0.00	94.8	94.8	--	854	854
Specific Plan	1,068.6	5,959.0	7,027.6		2,629	2,629	--	--	--	--	--	--
Residential Total	**15,262.7**	**19,291.5**	**34,554.2**	**24,925**	**31,716**	**56,641**	**97.2**	**994.4**	**1,091.6**	**--**	**4,236**	**4,236**

Source: Apple Valley General Plan 2009

Table 1-6: Commercial and Industrial Land Use Designation Build Out Summary

	Town Limits				Annexation Areas			
Designation	**Acres Dev.**	**Acres Vacant**	**Acres Total**	**Total Potential SF**	**Acres Dev.**	**Acres Vacant**	**Acres Total**	**Total Potential SF**
Mixed Use[1]	90.8	229.7	320.5	1,541,035	0.0	94.9	94.9	636,612
General Commercial	480.3	1,066.5	1,546.8	14,823,253	12.3	50.5	62.8	601,824
Regional Commercial	99.6	1,203.3	1,303.0	12,486,485	7.2	435.7	442.9	4,244,469
Service Commercial	152.4	179.2	331.6	3,177,665	0.0	183.1	183.1	1,754,639
Office Professional	64.7	546.7	611.3	5,858,606	0.0	94.9	94.9	636,612
Specific Plan[1]	1,359.0	5,653.7	7,012.7	6,663,010	--	--	--	--
Commercial Sub Total	**887.7**	**3,225.4**	**4,113.2**	**44,550,054**	**19.5**	**669.3**	**688.8**	**7,874,156**
Planned Industrial	21.4	623.9	645.3	6,183,941	64.3	1,538.5	1,602.8	15,359,953
Specific Plan[1]	1,359.0	5,653.7	7,012.7	36,938,445	--	--	--	--
Industrial Sub Total	**21.4**	**623.9**	**645.3**	**43,122,386**	**64.3**	**1,538.5**	**1,602.8**	**15,359,953**
Grand Total Com. & Indust.	**909.1**	**3,849.4**	**4,758.5**	**87,672,440**	**83.9**	**2,302.7**	**2,386.5**	**23,234,109**

Source: Apple Valley General Plan 2009

Table 1-7: Other Land Use Designation Build Out Summary

	Town Limits			Annexation Areas		
Designation	**Acres Dev.**	**Acres Vacant**	**Acres Total**	**Acres Dev.**	**Acres Vacant**	**Acres Total**
Public Facility	330.2	132.0	462.2	0.00	5.1	5.1
Open Space	291.2	2,796.4	3,087.5	--	--	--
Mineral Resources	129.4	323.2	452.5	--	--	--
Street Rights-of-Way	2,771.1	1,182.8	3,953.9	43.8	151.1	194.9
Grand Total Other Uses	**3,521.8**	**4,434.4**	**7,956.2**	**43.8**	**156.2**	**200.0**

Source: Apple Valley General Plan 2009

1.6 Build Out Potential and Population

As indicated in above, the Land Use Map creates a potential for up to 60,877 housing units. Based on 2008 average household size, these units could support a build out population of 185,858 people.

The Land Use Map further establishes 4,791.3 acres of commercial land, which has a potential to generate 51,685,423 square feet of commercial space. There is also a potential for 58,629,920 square feet of industrial space, mostly to be located in the North Apple Valley Industrial Specific Plan area. This Land Use Element also provides 3,068.5 acres of Open Space, and 481.2 acres of Public Facilities, which include schools, parks, fire stations and government buildings.

1.7 Development Trends

After a lengthy and competitive site selection process, Apple Valley successfully attracted a major industrial project, a 1.35 million square foot distribution center, to the North Apple Valley Industrial Specific Plan. In June 2015, the Town Council approved an Owner Participation Agreement to invest $1.2 million dollars into the construction of off-site regional street improvements. The distribution center will occupy 106 acres near Navajo Road and La Fayette Street, north of Apple Valley Airport. The $115 million project will bring 400 to 500 permanent jobs to the community and is expected to break ground in 2017 with another 300 construction jobs estimated during the 18-month build.

Apple Valley Choice Energy (AVCE), launched in 2017, is Apple Valley's, locally-operated, locally-controlled electrical power provider. We anticipate rate savings of 1% to 5% for our citizens. We've partnered with SCE to deliver greener, more affordable power to electricity customers. AVCE procures electricity while SCE delivers that energy to doorsteps, maintains and repairs the infrastructure that carries it, and provides convenient customer services including billing. The Town Council has approved an implementation plan for AVCE that has been approved by the California Public Utilities Commission.

The Apple Valley Planning Commission approved Apple Valley Gateway, a 10-acre, 80,480 square foot commercial project at the northeast corner of Interstate 15 and Dale Evans Parkway. Belco Development, of Murrieta, is proposing to construct an 84-room, 43,000 square foot, three-story hotel, a 3,500 square-foot restaurant, a 10,261 square foot retail building, and six separate buildings, totaling 23,719 square feet that includes three drive-through restaurants, two gasoline stations, one with a drive-through, and a retail building with a drive-through. The approved parcel map subdivides 8.7-acres into eight parcels ranging in size from 0.61-acres to 2.6-acres. The project area contains two existing parcels totaling 9.9-acres located at the northeast corner of Interstate 15, Dale Evans Parkway and bisected by Willow Springs Road.

The County Board of Supervisors recently approved a 249-acre project to be rezoned from agricultural to residential within the Town's sphere of influence. The Lewis Operating Company's Deep Creek Project extends from Deep Creek Road and Mockingbird Road, and is divided by Ocotillo Way. This project will require improvements along these three roadways, as well as Rock Springs Road, to help mitigate traffic and the risk of washout. Construction for Rock Springs Road improvements is set to begin in 2018.

The Yucca Loma Bridge was recently completed in May 2017. Major improvements to Yucca Loma Road were also included in the bridge opening such as widening, bike lanes and major storm drain infrastructure from Apple Valley Road to the bridge, as well as traffic signals at the Fire Station and Havasu Road.

The $37-million-dollar Yucca Loma Bridge project alleviates congestion along east/west regional arterials including Bear Valley Road and allows residents to travel to and from Apple Valley, Victorville and Spring Valley Lake with more ease. This phase of the corridor will connect to Ridgecrest Road and includes bikeways and barrier-protected sidewalks across the bridge. The project will also pave the way for The Fountains at Quail Ridge, a 346,500 square foot mixed-use commercial center at the northeast corner of Yucca Loma Road and Apple Valley Road.

The Victor Valley Wastewater Reclamation Authority is constructing a sub-regional water reclamation plant at Brewster Park. More than 20 years in the making, this water reclamation plant will produce a million gallons a day of non-potable, recycled water that can be used to keep Apple Valley's parks and golf course green. The plant is expected to be completed by late 2017.

While all these development trends may not be recognized over the next five years, all future development that will take place is planned to occur in accordance with the General Plan Land Use Zones and will consider all potential hazards identified within this plan. Additionally, all development will be in compliance with all Fire, Flood and Seismic codes of the Town, County and State at the time of development.

Section 2. Plan Adoption

2.1 Adoption by local governing body

A (draft) Resolution of the Town Council of the Town of Apple Valley, California, adopting the Local Hazard Mitigation Plan as required by the Disaster Mitigation Act of 2000 is included in this Plan (located before the Table of Contents). Upon receipt of an "approvable pending adoption" status from FEMA, the Town will formally adopt the Resolution and forward adopting documentation to FEMA.

2.2 Promulgation Authority

Art Bishop, Mayor
Description of involvement: Mayor Bishop represents the elected body governing the Town of Apple Valley and will sign as the official final approving authority.
Contact Information:
Town of Apple Valley
14955 Dale Evans Parkway,
Apple Valley, CA 92307
760-240-7000
abishop@applevalley.org

Doug Robertson, Town Manager
Description of Involvement: Doug Robertson represents the staff of the Town of Apple Valley and authorized the development and approval process.
Contact Information:
Town of Apple Valley
14955 Dale Evans Parkway,
Apple Valley, CA 92307
760-240-7000
drobertson@applevalley.org

The Apple Valley Town Council will review the Hazard Mitigation Plan prior to its approval.

2.3 Primary Point of Contact

Joseph Ramos, Emergency Services Officer
Town of Apple Valley
14955 Dale Evans Parkway
Apple Valley, CA 92307
760-240-7000 ext. 7890
jramos@applevalley.org

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Section 3. Planning Process

The planning process for the Town's Hazard Mitigation Plan included the creation of a Planning Team representing various agencies and organizations whose input was vital to the plan. The Planning Team reviewed, analyzed, revised, and updated each Section within this Plan as required. Pursuant to Section 4(F) of the Crosswalk, the process used to review and analyze each Section is included within that Section.

3.1 Preparing for the Plan

Hazard Mitigation Planning is a process State, Tribal, and local governments use to identify risks and vulnerabilities associated with natural disasters, and to develop long-term strategies for protecting people and property from future hazard events. Planning creates a way to solicit and consider input from diverse interests. Involving stakeholders is essential to building community-wide support for the plan. In addition to emergency managers, the planning process involves other government agencies (e.g., zoning, floodplain management, public works, community, and economic development, businesses, civic groups, environmental groups, and schools.

San Bernardino County Fire OES hired a contractor (Dynamic Planning + Science) to offer support to the Cities/Towns, and Special Districts to update the 55 local HMP's. The DPS Team offers experienced, field-tested Hazard Mitigation and planning professionals who have developed similar comprehensive HMPs. This support includes providing technical expertise, resource material and tools to ensure that the updates are in compliance with federal requirements of the program. The tools, resource material, and other project related information are being maintained on a project portal (https:www.mitigatehazards.com) to ensure the consistent information is available to all participants.

Additionally, it was concluded that the Plan will include information and data supplied by supporting local agencies as listed in Section 3.2 "Coordination with Other Jurisdictions, Agencies, and Organizations", and 3.3 "Public Involvement", of this Plan, along with internet surveys published on the Town's website, public comments received during community-wide events, discussions during quarterly Disaster Council meetings and other sources developed through discussions during Planning Team meetings.

Drafting the Hazard Mitigation Plan was accomplished in 8 Phases:

- Phase 1 – Establish the Planning Team
- Phase 2 – Coordination with Other Jurisdictions, Agencies, and Organizations
- Phase 3 – Public Involvement
- Phase 4 – Assess the Hazards
- Phase 5 – Set Goals
- Phase 6 – Review and Propose Possible Mitigation Measures
- Phase 7 – Draft the Hazard Mitigation Plan
- Phase 8 – Adopt the Plan

The Town initiated its Plan Update by meeting the requirements of Title 44, Code of Federal Regulations, Part 201 (44 CFR 201.6) through the initial implementation of the 2011 Local Hazard Mitigation Plan.

The Planning Team agreed to meet as necessary during the ensuing review process so that the culmination of information would be available for review by constituents and partners prior to adoption. The Planning Team agreed that the Apple Valley Hazard Mitigation Plan (2011) was sufficient to meet the requirements set forth by 44 CFR Section 201.6 at that time. Since that time, the community has expanded its awareness of hazards and their specific relativity to protect the needs of the community and it is the intent of the Planning Team to ensure that this is captured in the 2017 Plan update. In addition, the Planning Team agreed that a more specific approach would provide that benefit and promote improved quality of life.

3.1.1 Building the Planning Team

To complete these objectives, the Town compiled a qualified team with various expertise, including public safety, engineering and public works, water infrastructure, and emergency response agencies to participate in, and guide the development of the Town's comprehensive Hazard Mitigation Plan. In addition, Apple Valley solicited public involvement throughout the planning process, including public invitation to all planning meetings, the release of a public survey through the Town's website, allowing the public to comment during the drafting stage, and making the draft Plan available to allow the public to comment on its content. The Planning Team agreed that the updated plan will conform to the requirements of 44 CFR Section 201.6 and will include a description and documentation of:

- Why the update is necessary and how the update will build on the existing approved mitigation plan.
- The process and data deficiencies/limitations that will be addressed.
- The participatory planning process used to develop the plan to include how each section was reviewed and analyzed and how/why the decision was made to modify (or not) specific areas in the plan.
- The opportunities provided for public participation, modified as necessary, based on previous experience.
- The contribution from other stakeholders.
- The new/additional research conducted and data included in the plan.
- The modified risk assessment based on latest best available data.
- The prioritized mitigation action plan.
- The progress made in local mitigation efforts.
- The plan maintenance process to include: an evaluation of what was supposed to happen verses what happened; a discussion of how the community was involved in the plan maintenance process; and a discussion of how the mitigation plan was incorporated into other planning mechanisms, and what worked/did not work.

Leadership, management and oversight for the plan development process were provided through the Town's Planning Team. The Planning Team was led by the Emergency Services Officer. Team members were selected based on current emergency management responsibilities and familiarity with prior mitigation planning and programs. The Planning Team

met regularly to provide guidance, review progress, identify issues, and to coordinate stakeholder meetings. The Planning Team also provided background documents, facilitated data collection, and reviewed all draft documents. The resulting plan, along with the entire planning process, is a living document that will continue to place mitigation as a priority in the Town of Apple Valley.

This HMP was compiled and authored under the direction of the Project Planning Team listed below in Table 3-1.

3.1.2 Planning Team

This Hazard Mitigation Planning team included members of various agencies, and organizations who were familiar with mitigation planning and have some type of emergency management responsibilities within their organizations.

Table 3-1: Planning team

Name	Organization
Patrick Carroll	TOAV Building Official
Pam Cupp	TOAV GIS
Dawn Harrison	CERT Commander
Sid Hultquist	AV Fire Chief
Lori Lamson	TOAV Planning/Comm Dev.
Kathie Martin	TOAV PIO
Brad Miller	TOAV Engineer
Carol Miller	TOAV Planner
Brett Morgan	TOAV Senior Construction Inspector
Joseph Ramos	TOAV Emergency Management
Greg Snyder	TOAV Public Works
Rich Unferdorfer	Captain, Apple Valley Fire Protection District
Ralph Wright	TOAV Parks/Rec Manager

3.1.2 Planning team meetings

Table 3-2: Planning team meetings

Date	Item	Location
06/23/2016	SBC Kickoff Meeting	SBC - OES
08/02/2016	Planning Team Meeting Kick Off	TOAV
10/18/2016	Planning Team Meeting #1	TOAV
2/21/2017	Planning Team Meeting #2	TOAV
3/23/2017	Planning Team Meeting #3	TOAV
4/28/2017	Planning Team Meeting #4	TOAV

3.2 Coordination with other Jurisdictions, Agencies, and Organizations

The Town of Apple Valley Planning Team consulted members from adjacent jurisdictions as well as the County of San Bernardino. Email invites were provided to each neighboring jurisdiction/agency starting with the kick-off meeting in August 2016 (See Appendix B.2).

Table 3-3: Coordination with other Jurisdictions, Agencies, and Organizations

Agency	Representative	Title/Position
Apple Valley Unified School District	Janet Gould	Risk Manager
American Red Cross	Don Gordon	Disaster Program Manager
Cal Office of Emergency Services		HMP Division
City of Hesperia	Rachel Molina	Assistant to City Manager
City of Victorville	Dana Welborn	Emergency Services Officer
County of San Bernardino	Miles Wagner	Emergency Services Officer
Disaster Service Workers	Mark Yosten	ECS
FEMA		Region IX HMP Division
Liberty Utilities (Water)	Kevin Phillips	Manager
National Weather Service	Alex Tardy	Manager-Meteorologist
St. Joseph/St. Mary Medical (Hospital)	Shannon Welsh	Executive Director
Southern California Edison	Bob Stiens	Gov. Affairs Rep.
Southwest Gas Company	Bill Hensley	Executive Officer
Victor Valley Transit Authority	Christine Plasting	Senior Procurement Specialist

In addition, the Town of Apple Valley participated in the San Bernardino County Fire Department Office of Emergency Services (OES) Stakeholder meetings noted in Table 3-4. San Bernardino County Fire OES hired a contractor (Dynamic Planning) to support the County, Cities and Towns, and Special Districts to update the local Hazard Mitigation Plans and the County's HMP. The Dynamic Planning Team, offered experienced, field-tested Hazard Mitigation and planning professionals who have developed similar comprehensive Hazard Mitigation Plans. This support included providing technical expertise, resource material and tools to help ensure that the updates are in compliance with federal requirements of the program.

Table 3-4: Stakeholder meetings

Date	Item	Location
06/23/2016	Stakeholders Kickoff Meeting #1	SBC OES
10/26/2016	Stakeholders Update Meeting #2	SBC OES
12/15/2016	Stakeholders Update Meeting #3	SBC OES
2/14/2017	Stakeholders Update Meeting #4	Virtual Meeting
3/28/2017	Stakeholders Update Meeting #5	SBC OES

3.3 Public Involvement/Outreach

The Town of Apple Valley undertook a number of methods to inform the public of the effort to solicit their input on the Hazard Mitigation Plan and efforts of the town involving mitigation and emergency preparedness. On an ongoing basis, the Town of Apple Valley participates in public events and meetings to inform and solicit feedback regarding emergency preparedness and mitigation from the public.

Public outreach efforts included an invitation to the kick-off meeting via media alerts (See Appendix B.2). Also the creation of a survey for all Apple Valley residents including those who work but do not live in Apple Valley. A total of 123 citizens participated in the survey. Other public outreach efforts included discussion on items on the agenda during CERT bi-monthly meetings, quarterly Disaster Council meetings and at one Town Council meeting.

The following is a list of public meetings and events that have taken place during the drafting stage:

Table 3-5: Public meetings and events

Date	Item	Location
8/2/2016	Planning Kick Off Meeting	TOAV
8/4/2016	CERT meeting	Station #336
9/29/2016 to 2/5/2017	On-line Survey	On line
10/6/2016	CERT meeting	Station #336
10/18/2016	Disaster Council meeting	Conference Center
1/10/2017	Disaster Council meeting	Conference Center
2/2/2017	CERT meeting	Station #336
3/28/2017	Town Council meeting	Council Chambers
4/6/2017	CERT meeting	Station #336
4/11/2017	Disaster Council meeting	Conference Center
6/1/2017	CERT meeting	Station #336
7/11/2017	Disaster Council meeting	Conference Center

3.3.1 Mitigation Survey

The Planning Team developed a web-based hazard mitigation survey to identify and plan for future disasters. The survey was designed to help the Planning Team determine the level of knowledge local citizens already have about potential disasters and assess areas of vulnerability to various types of disasters. The survey was available to the public for two months. Citizens have provided input about their concerns about each hazard, what they are doing to prepare for and to mitigate high-risk hazards and what activities the Town should engage to prepare for, mitigate, and respond to the highest risk hazards. A copy of the survey questions and results summary can be found in the Appendix C.2.

3.3.2 Web Posting

The survey mentioned above was posted on the Town of Apple Valley's website and Facebook page. The public was invited to submit comments on the Hazard Mitigation Plan Update, attend the stakeholder meetings notated in Table 3-5.

3.3.3 Public Meeting Process

The Town continues to hold many public meetings and provides notice of these meetings through posted Agendas and through the Town's web site (www.applevalley.org). Prior to Council adoption of the final Hazard Mitigation Plan, the item will be placed on the agenda for a public hearing and posted for public review on the Town's web site. The Planning Team will determine how public comments, if offered, would be included in the draft plan prior to final adoption.

3.4 Assess the Hazard

Data collection and document review are important first steps in the identification and screening of hazards. The Planning Team identified new or emerging hazards, obtained updated hazard maps, hazard probability research studies and reports, reviewed data from new or updated local plans (i.e. safety element of the General Plan, threat assessments, disaster planning scenarios, community wildfire protection plans, etc.) and obtained information about emergencies or disasters that have occurred since the 2011 Hazard Mitigation Plan to provide insights into which parts of the risk assessment warrants updates.

The first step in this process was to identify which natural hazards are present in the community, augmenting the 2011 Hazard Mitigation Plan as necessary. The intent of screening of hazards is to help prioritize which hazard creates the greatest concern in the community. This step had the planning team review a total of sixteen hazards via the FEMA Hazard Summary Sheet (See Appendix D.1, D.2). The Hazard Summary Sheet was used to summarize hazard description information and identify which hazards are most significant to the Town. We considered those hazards that ranked medium to high into Step 2. We also included Climate Change since it is a requirement. The summary sheet includes classifications for location and maximum probable extent.

The second step had the planning team review a total of six hazards- *wildfire, flood, earthquake, erosion, flooding and climate change*. These six hazards were put through Dynamic Planning + Science Risk Factor (RF) Approach. The RF approach combines historical data, local knowledge, and consensus opinions to produce numerical values that allow identified hazards to be ranked against one another. These criteria are used to evaluate hazards and identify the highest risk hazard in the project region. Additional information regarding these steps are discussed in further detail in Section 4.1. The final results agreed upon by the Planning Team can be found in Appendix D.4.

Table 3-6: RF Approach

Rank	Natural Hazards	Probability (1-4)	Factor1 = (Probability Index * .30)	Impact (1-4)	Factor2 = (Impact Index * .30)	Spatial Extent (1-4)	Factor3 = (Spatial Extent Index * .20)	Warning Time (1-4)	Factor4 = (Warning Time Index * .10)	Duration (1-4)	Factor5 = (Probability Index * .10)	RF Factor Total = (Add Factors 1-5)
1	Hazard 1		0		0		0		0		0	0
2	Hazard 2		0		0		0		0		0	0
3	Hazard 3		0		0		0		0		0	0
4	Hazard 4		0		0		0		0		0	0
5	Hazard 5		0		0		0		0		0	0
6	Hazard 6		0		0		0		0		0	0

3.5 Goal Setting

Project and community hazard mitigation goals and objectives for the Town of Apple Valley were set by the Planning Team to guide the development of the Plan using FEMA National Mitigation Strategies and Goals to substantially increase public awareness of natural hazard risks so that the public demands safer communities in which to live and work; and to significantly reduce the risk of loss of life, injuries, economic costs, and destruction of natural and cultural resources that result from natural hazards.

As part of this process, the Planning Team also reviewed the County of San Bernardino's Operational MJHMP, the State of California MJHMP, Floodplain Management Plans, and adjacent local jurisdiction MJHMPs to ensure the Goals and Objectives were comprehensive and compatible.

3.6 Review and Propose Mitigation Measures

A wide variety of mitigation measures that can be identified to help reduce the impact of the hazards or the severity of damage from hazards was examined. The projects were identified to help ensure the implementation of the Planning Team's goals and objectives. The following categories were used in the review of possible mitigation measures:

1. Public Information and Education- Outreach projects and technical assistance.
2. Preventive Activities- Zoning, building codes, storm water ordinances
3. Structural Projects- Detention basins, reservoirs, road and bridge improvements
4. Property Protection- Acquisition, retrofitting
5. Emergency Services- Warning, sandbagging, road signs/closures, evacuation
6. Natural Resource Protection: Wetlands, protection, best management practices.

Once the projects were identified, the Planning Team utilized the STAPLEE methodology to assess and prioritize the projects.

STAPLEE stands for the following:

- **Social:** Social criteria are based on the idea that community consensus is a necessary precondition for successful implementation of mitigation measures (i.e., measures should be supported and accepted by the entire community). This also means that measures should not affect adversely a particular segment of the population or a particular neighborhood, or adversely impact local cultural values or resources.
- **Technical:** Technical criteria address the technical feasibility of the proposed measures, in terms of effectiveness, secondary impacts, and the technical capabilities of the community to implement and sustain these measures.
- **Administrative:** Administrative criteria address the administrative capabilities required to implement each mitigation measure. For example, does the City have the necessary organization, staff, and funding sources to implement and sustain the mitigation process?

- **Political:** Political criteria consider the need for political support for mitigation measures. This means that all stakeholders in the political process, especially political organizations and institutions both inside and outside of the community, should support the measure.
- **Legal:** Legal criteria are used to determine the appropriate legal authority necessary to implement each mitigation measure and whether such an authority can be delegated. The mitigation measure is examined from the standpoint of current statutes, codes, ordinances, and other regulations, as well as the possible legal ramifications of the measure's implementation.
- **Economic:** Economic criteria address the cost-effectiveness of the proposed measure and its economic impact on the community. It is only reasonable to expect that the benefits of implementation will exceed the costs incurred. Economic considerations also consider the economic impact on the community's future development.
- **Environmental:** Environmental criteria have become an important consideration in examining mitigation options. Although most mitigation measures are usually beneficial for the environment, some measures may have adverse effects, which must be considered and addressed.

Next the planning team performed a cost/benefit analysis to help prioritize each of the mitigation projects.

3.7 Draft the Hazard Mitigation Plan

The Hazard Mitigation Plan Update was drafted by the Planning Team. As indicated previously, the Planning Team used the 2011 HMP as a starting point but revised it to reflect updated information. The Planning Team also used the FEMA Guidance and materials provided to aide in the Planning Team's understanding of the level of detail and type of information that is excepted in each section.

The development of actions and projects to meet the goals and objectives identified in the HMP is based on the Town's abilities under state law; zoning, health regulations and financial resources available to reduce losses and vulnerability from potential hazards. The HMP's goals and objectives are long-term and support the Town's mitigation strategy.

Following the identification of goals and objectives, the mitigation planning regulation 44 CFR 201 requires the Town to identify, analyze and prioritize alternative actions by hazard types. Federal guidance for the HMP recommends that the Town develop objectives/actions that can be implemented using local tools, such as, capital improvement projects, special district funds, or executing changes by adopting laws, policies, or procedures. HMP requirements recommend the consideration of mitigation actions that may are not currently feasible, but may be possible following a catastrophe event.

The Town is required, after five years of implementing mitigation strategies, to update goals and actions. In all HMP updates, the goals and objectives may be reaffirmed or updated based on current conditions, including the completion of mitigation proposals, an updated risk assessment. At five-year intervals, the Town is required to review any changes of approved HMP to determine whether goals were met or if they remain consistent with current conditions.

While some Planning Team members were responsible for updating select sections, all members are responsible for reviewing and commenting on the entire HMP. The Planning Team Project Manager was responsible for version control and distribution of the final HMP for review.

Once the HMP update was drafted, the Planning Team provided opportunities for the public to review and comment on the plan. After the public comment period was closed, the Planning Team finalized the plan and forwarded to Cal OES and FEMA for approval.

3.8 Adopt the Plan

After the public review, the draft plan will be submitted to Cal OES/FEMA for review and approval. FEMA will provide the Town with an "Approval Pending Adoption" letter if the Hazard Mitigation Plan update meets all federal requirements. Upon receipt of this letter, the final plan will be submitted to the Apple Valley Town Council for consideration and adoption. Once adopted, the final Resolution will be submitted to FEMA for incorporation into the Hazard Mitigation Plan.

The Town of Apple Valley's adoption of the Hazard Mitigation Plan is only the beginning of this effort. Town offices, other agencies, and private partners will implement the Hazard Mitigation Plan activities. The Planning Team will monitor implementation progress, evaluate the effectiveness of the actions, and periodically recommend action items. Progress of the implementation of the Plan and the recommended action/mitigation strategies will be assessed annually. The Plan will be submitted and updated to FEMA every five years, which is required by FEMA in order to remain eligible for pre and post-disaster mitigation funding.

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Section 4. Risk Assessment

The risk assessment is the process of measuring the potential impact to life, property and economic impact resulting from natural hazards. The intent of the Risk Assessment is to identify, as much as practicable given existing/available data, the qualitative and quantitative vulnerabilities of a community. The results of the risk assessment allow for a better understanding of the impacts of natural hazards to the community and provides a foundation in which to develop and prioritize mitigation actions to reduce damage from natural disasters through increased preparedness and response times and better allocation of resources to areas of greatest vulnerability.

This Risk Assessment Section evaluates the potential loss from a hazard event by assessing the vulnerability of buildings, infrastructure, and population. It identifies the characteristics and potential consequences of hazards, how much of the Town of Apple Valley could be affected by a hazard, and the impact on Town area assets. The Risk Assessment approach consists of three (3) components:

- Hazard Identification – Identification and screening of hazards (Section 4.1)
- Hazard Profiles – Review of historic occurrences and assessment of the potential for future events (Section 4.2)
- Vulnerability Assessment – Determination of potential losses or impacts to buildings, infrastructure and population (Section 4.3)

4.1 Hazard Identification

Per FEMA Guidance, the first step in developing the Risk Assessment is identifying the hazards. The Town's HMP Planning Team reviewed a number of previously prepared hazard mitigation plans and other relevant documents to determine the universe of natural hazards that have the potential to affect the Town and the nearby region.

The planning team used the below Table 4-1 which provides a list of hazards identified in the 2010 San Bernardino County Multijurisdictional Hazard Mitigation Plan Update, the County of San Bernardino 2007 General Plan Safety Element, Apple Valley's 2011 Hazard Mitigation Plan and the 2013 CA State Hazard Mitigation Plan. This table was used to develop a preliminary list of fifteen hazards for the Town's HMP Planning Team to evaluate which hazards were truly relevant to the Town and which ones are not. For example, expansive soils was considered to be of little relevance, while earthquake, flooding, and wildfire were indicated in almost all hazard documentation.

Table 4-1: SBC & TOAV Hazard Identification

Hazards	*2010 San Bernardino County Multijurisdictional Hazard Mitigation Plan Update*	*County of San Bernardino 2007 General Plan Safety Element*	*Apple Valley 2011 Hazard Mitigation PLan*	*2013 CA State Hazard Mitigation Plan*
Climate Change				■
Dam Inundation				■
Drought	■			■
Earthquake/ Geologic Hazards	■	■	■	■
Erosion				■
Expansive Soils				■
Extreme Cold				■
Extreme Heat	■			■
Flood	■	■	■	■
Hazardous Waste		■		■
High Winds/ Straight Line Winds	■	■		
Lightning	■			
Terrorism				■
Wildfire	■	■	■	■
Winter Storm (Heavy Snowfall)				■

In addition to a document review, previous hazard occurrences were used to identify hazards for this plan. Previous hazard occurrences provide a historical view of hazards that have affected the Town in the past, and thus provide a window into the potential hazards that can affect our community in the future. Information about federal and state disaster declarations in San Bernardino County (declarations are declared by County) was compiled from FEMA and Cal EMA's databases, as shown in Table 4-2. Though not a complete snapshot of hazard incidences in the County (since not all hazard events are federally or state declared), Table 4-2 provided the Town's HMP Planning Team with solidified accounts of the types and extent of disasters that have affected the County dating back to 1965 when flooding affected entire regions of San Bernardino County.

As indicated in the below table large regional incidents have affected San Bernardino County, including the California Wildfires of 1999. Most recently, disasters for terrorist attacks (2015), flood (2011) and severe storms (2010) were declared in San Bernardino County. The disaster declarations in Table 4-2, provide a baseline for consideration in the hazard prioritization process.

Table 4-2: Federal and State Declared Disasters

Disaster Number	Declaration Date	Disaster Type	Incident Type	Title
Federal Declarations				
Major Disaster Declarations				
1952	1/26/2011	DR	Flood	Severe Winter Storms, Flooding, and Debris and Mud Flows
1884	3/8/2010	DR	Severe Storm(s)	Severe Winter Storms, Flooding, and Debris and Mud Flows
1731	10/24/2007	DR	Fire	Wildfires, Flooding, Mud Flows, and Debris Flows
1689	3/13/2007	DR	Freezing	Severe Freeze
1585	4/14/2005	DR	Severe Storm(s)	Severe Storms, Flooding, Landslides, and Mud and Debris Flows
1577	2/4/2005	DR	Severe Storm(s)	Severe Storms, Flooding, Debris Flows, and Mudslides
1498	10/27/2003	DR	Fire	Wildfires, Flooding, Mudflow and Debris Flow Directly Related
1203	2/9/1998	DR	Severe Storm(s)	Severe Winter Storms and Flooding
1046	3/12/1995	DR	Severe Storm(s)	Severe Winter Storms, Flooding Landslides, Mud Flow
1044	1/10/1995	DR	Severe Storm(s)	Severe Winter Storms, Flooding, Landslides, Mud Flows
1005	10/28/1993	DR	Fire	Fires, Mud/Landslides, Flooding, Soil Erosion
979	2/3/1993	DR	Flood	Severe Winter Storm, Mud & Land Slides, & Flooding
947	7/2/1992	DR	Earthquake	Earthquake & Aftershocks
935	2/25/1992	DR	Flood	Rain/Snow/Wind Storms, Flooding, Mudslides
894	2/11/1991	DR	Freezing	Severe Freeze
872	6/30/1990	DR	Fire	Fires
690	9/22/1983	DR	Flood	Flash Flooding
687	7/1/1983	DR	Flood	Flooding
677	2/9/1983	DR	Coastal Storm	Coastal Storms, Floods, Slides & Tornadoes
635	11/27/1980	DR	Fire	Brush & Timber Fires
615	2/21/1980	DR	Flood	Severe Storms, Mudslides & Flooding
547	2/15/1978	DR	Flood	Coastal Storms, Mudslides & Flooding
521	9/21/1976	DR	Flood	Flooding, Tropical Storm Kathleen
295	9/29/1970	DR	Fire	Forest & Brush Fires
253	1/26/1969	DR	Flood	Severe Storms & Flooding
223	1/2/1967	DR	Flood	Severe Storms & Flooding
211	12/7/1965	DR	Flood	Heavy Rains & Flooding
145	2/25/1963	DR	Flood	California Severe Storms, Heavy Rains, & Flooding
47	12/23/1955	DR	Flood	California Flood
15	2/5/1954	DR	Flood	California Flood & Erosion

Disaster Number	Declaration Date	Disaster Type	Incident Type	Title
Fire Management Assistance Declarations				
5147	8/16/2016	FM	Fire	Blue Cut Fire
5144	8/7/2016	FM	Fire	Pilot Fire
5089	7/17/2015	FM	Fire	North Fire/ Pine Fire
2955	9/2/2011	FM	Fire	Hill Fire
2841	10/4/2009	FM	Fire	Sheep Fire
2836	9/1/2009	FM	Fire	Pendleton Fire
2833	8/31/2009	FM	Fire	Oak Glen Fire
2792	11/15/2008	FM	Fire	Freeway Fire Complex
3279	10/23/2007	EM	Fire	Wildfires
2738	10/22/2007	FM	Fire	Grass Valley Fire
2728	9/15/2007	FM	Fire	Butler 2 Fire
2653	7/12/2006	FM	Fire	Sawtooth Fire Complex
3248	9/13/2005	EM	Hurricane	Hurricane Katrina Evacuation
2503	10/25/2003	FM	Fire	Old Fire
2501	10/23/2003	FM	Fire	Ca-Grand Prix Fire-10-23-2003
2497	9/6/2003	FM	Fire	Ca-Bridge Fire-09-05-2003
2491	8/19/2003	FM	Fire	Ca-Locust Wildfire-08-19-2003
2464	9/24/2002	FM	Fire	Williams Canyon Fire (Mt. Baldy)
2433	6/17/2002	FM	Fire	Louisiana Fire (Cajon Pass)
2425	6/17/2002	FM	Fire	California Blue Cut Fire (Cajon Pass/ Oak Hills)
Emergency Declarations				
3279	10/23/2007	EM	Fire	Wildfires
3248	9/13/2005	EM	Hurricane	Hurricane Katrina Evacuation
3140	9/1/1999	EM	Fire	Ca-Wildfires-08/25/1999
CAL OES/ State Emergency And Disaster Proclamations/ Executive Orders				
Other Disasters				
2464	9/24/2002	FS	Fire	Williams Fire
2433	6/27/2002	FS	Fire	Louisiana Fire
State Declarations				
5147	8/16/2016	FM	Fire	Blue Cut Fire
CDAA	12/18/2015	CDAA	Terrorist Attack	Waterman Incident Mass Shooting
None	8/5/2014	None	Severe Storm(s)	August Severe Weather - Dir. Concurrence
None	1/17/2014	None	Drought	California Drought
None	12/1/2011	None	Winds	December High Wind Event – Rancho Cucamonga
1952	1/21/2011	DR	Flood	Severe Winter Storms, Flooding, and Debris and Mud Flows
None	11/20/2010	None	Water	Golden State Water Company (GSWC) Contamination
1884	3/8/2010	DR	Severe Storm(s)	Severe Winter Storms, Flooding, and Debris and Mud Flows

Disaster Number	Declaration Date	Disaster Type	Incident Type	Title
2841	10/4/2009	FM	Fire	Sheep Fire
2836	9/1/2009	FM	Fire	Pendleton Fire
2833	8/31/2009	FM	Fire	Oak Glen Fire
2792	11/17/2008	FM	Fire	Freeway Fire Complex - (Ex. Ord. S-15-08 11/18/08)
None	10/15/2008	None	Fire	October Fire events (Foxborough, San Antonio, San Bernardino)
None	10/15/2008	None	Winds	San Bernardino Wind Event - (Ex. Ord. S-11-08 10/16/08)
1731	10/24/2007	DR	Fire	Wildfires, Flooding, Mud Flows, and Debris Flows
3279	10/23/2007	EM	Fire	Wildfires
2738	10/22/2007	FM	Fire	Grass Valley Fire
2728	9/15/2007	FM	Fire	Butler 2 Fire
None	7/27/2007	None	Severe Storm(s)	Severe Weather/Flooding (City of Needles)- Dir. Concurrence
1689	3/13/2007	DR	Freezing	Severe Freeze
2653	7/12/2006	FM	Fire	Sawtooth Fire Complex
3248	9/13/2005	EM	Hurricane	Hurricane Katrina Evacuation
1585	4/14/2005	DR	Severe Storm(s)	Severe Storms, Flooding, Landslides, and Mud/Debris Flows
1577	2/4/2005	DR	Severe Storm(s)	Severe Storms, Flooding, Debris Flows, and Mudslides
2503	10/25/2003	FM	Fire	Old Fire
2501	10/23/2003	FM	Fire	Ca-Grand Prix Fire-10-23-2003
CDAA 2003-02	8/22/2003	CDAA	Flood	Summer Floods (Yucca Valley/Lower Desert)
None	3/7/2003	None	Fire Danger	Bark Beetle Infestation (San Bernardino Mountains)
None	1/17/2001	None	Energy	Statewide Energy Emergency
3140	9/1/1999	EM	Fire	Ca-Wildfires-08/25/1999
1203	2/9/1998	DR	Severe Storm(s)	Severe Winter Storms and Flooding
1044	1/10/1995	DR	Severe Storm(s)	Severe Winter Storms, Flooding, Landslides, Mud Flows
1005	10/28/1993	DR	Fire	Fires, Mud/Landslides, Flooding, Soil Erosion
979	2/3/1993	DR	Flood	Severe Winter Storm, Mud & Land Slides, & Flooding
947	7/2/1992	DR	Earthquake	Earthquake & Aftershocks
935	2/19/1992	DR	Flood	California Snow Storms, Flooding, & Mudslides
894	1/11/1991	DR	Freeze	California Severe Freeze
145	2/14/1963		Severe Storms	California Severe Storms, Heavy Rains, & Flooding
47	12/22/1955		Flood	California Flood
15	2/5/1954		Flood	California Flood & Erosion

Disaster Number	Declaration Date	Disaster Type	Incident Type	Title
County Declarations				
5147	8/16/2016	FM	Fire	Blue Cut Fire
5144	8/9/2016	FM	Fire	Pilot Fire
CDAA	12/15/2015	CDAA	Terrorist Attack	Waterman Incident Mass Shooting
None	6/25/2015	None	Fire	Lake Fire
None	8/5/2014	None	Severe Storm(s)	August Severe Weather - Dir. Concurrence
None	8/5/2014	None	Drought	California Drought
None	4/30/2014	None	Fire	Etiwanda Fire
2955	9/3/2011	FM	Fire	Hill Fire
1952	1/21/2011	DR	Flood	Severe Winter Storms, Flooding, and Debris and Mud Flows
None	11/20/2010	None	Water	Golden State Water Company (GSWC) Contamination
1884	1/21/2010	DR	Severe Storm(s)	Severe Winter Storms, Flooding, and Debris and Mud Flows
2841	10/4/2009	FM	Fire	Sheep Fire
2836	9/1/2009	FM	Fire	Pendleton Fire
2833	9/1//2009	FM	Fire	Oak Glen Fire
2792	11/16/2008	FM	Fire	Freeway Fire Complex - (Ex. Ord. S-15-08 11/18/08)
None	10/14/2008	None	Fire	October Fire events (Foxborough, San Antonio, San Bernardino)
None	10/14/2008	None	Wind	San Bernardino Wind Event
1731	10/24/2007	DR	Fire	Wildfires, Flooding, Mud Flows, and Debris Flows
3279	10/22/2007	EM	Fire	Wildfires
2738	10/22/2007	FM	Fire	Grass Valley Fire
2728	9/14/2007	FM	Fire	Butler 2 Fire
None	8/8/2007	None	Water Shortage	Lucerne Valley Water Crisis
1689	1/17/2007	DR	Freezing	Severe Freeze
2653	7/11/2006	FM	Fire	Sawtooth Fire Complex
None	9/30/2005	None	Fire	Thurman Fire (San Bernardino Mountains)
3248	9/8/2005	EM	Hurricane	Hurricane Katrina Evacuation
1585	10/26/2004	DR	Severe Storm(s)	Severe Storms, Flooding, Landslides, and Mud and Debris Flows
1577	10/26/2004	DR	Severe Storm(s)	Severe Storms, Flooding, Debris Flows, and Mudslides
None	10/26/2004	None	Severe Storm(s)	Winter Storms (10/21 & 10/28/04)
None	6/29/2004	None	Water Shortage	Acute Water Shortage (Wrightwood 07, 08, & 09/04)
2503	10/21/2003	FM	Fire	Old Fire
2501	10/21/2003	FM	Fire	Ca-Grand Prix Fire-10-23-2003

Disaster Number	Declaration Date	Disaster Type	Incident Type	Title
CDAA 2003-02	8/22/2003	CDAA	Flood	Summer Floods (Yucca Valley/Lower Desert)
None	9/24/2002	None	Infestation	Bark Beetle Infestation (San Bernardino Mountains)
3140	9/1/1999	EM	Fire	Ca-Wildfires-08/25/1999
None	7/12/1999	None	Flood	County Flood July 99 (Forest Falls, Apple Valley, and Big Bear)
1203	2/24/1998	DR	Severe Storm(s)	Severe Winter Storms and Flooding
None	3/19/1997	None	EQ	Earthquake (Barstow/Calico RP)
None	2/1/1996	None	Hazmat	Cajon Pass Train Derailment/Hazmat Incident
1044	1/6/1995	DR	Severe Storm(s)	Severe Winter Storms, Flooding, Landslides, Mud Flows
None	6/26/1994	None	Heat/Fire Danger	Severe Heat & Wildland Fire Threat
979	1/8/1993	DR	Flood	Severe Winter Storm, Mud & Land Slides, & Flooding
947	6/28/1992	DR	Earthquake	Earthquake & Aftershocks
935	2/18/1992	DR	Flood	Rain/Snow/Wind Storms, Flooding, Mudslides
894	1/14/1991	DR	Freezing	Severe Freeze
872	6/28/1990	DR	Fire	Fires
None	3/13/1990		Earthquake	Upland Earthquake
None	10/31/1988		Fire	Texas Fire (Watershed Damage)
None	9/3/1987		Fire	Wildland Fires
None	7/13/1984		Weather	Unstable Weather Conditions (City of Big Bear Lake, CSD, Co. Flood Control, Victor Valley Waste Water Authority, Juniper Riviera County Water District)
687	7/1/1983	DR	Flood	Flooding
677	3/7/1983	DR	Coastal Storm	Coastal Storms, Floods, Slides & Tornadoes
635	11/5/1980	DR	Fire	Brush & Timber Fires
615	1/15/1980	DR	Flood	Severe Storms, Mudslides & Flooding
None	9/29/1979		Gasoline Shortage	Gasoline Shortage Emergency
None	6/28/1979		Water Shortage	Water Shortage (Lake Gregory)
None	7/21/1960		Fire	Major and Widespread Fires

4.2 Hazard Prioritization

The Town of Apple Valley HMP Planning Team used a two-step process to derive at our final four hazards to profile.

The first step had the planning team review a total of sixteen hazards via the FEMA Hazard Summary Sheet (See Appendix D.1, D.2). The Hazard Summary Sheet was used to summarize hazard description information and identify which hazards are most significant to the Town. We considered those hazards that ranked medium to high into step two. We also included Climate Change since it is a new requirement. The summary sheet includes classifications for location and maximum probable extent.

The second step had the planning team review a total of six hazards- *wildfire, flood, earthquake, erosion, flooding and climate change*. These six hazards were put through Dynamic Planning + Science Risk Factor (RF) Approach (See Appendix D.3, D.4). The RF approach combines historical data, local knowledge, and consensus opinions to produce numerical values that allow identified hazards to be ranked against one another. These criteria are used to evaluate hazards and identify the highest risk hazard in the project region.

The RF approach produces numerical values that allow identified hazards to be ranked against one another (the higher the RF value, the greater the hazard risk). RF values are obtained by assigning varying degrees of risk to five categories for each hazard: probability, impact, spatial extent, warning time, and duration. Each degree of risk is assigned a value ranging from 1 to 4 and a weighing factor for each category should be agreed upon by the planning committee.

The following values were derived for each hazard from the planning team: Earthquake-3.6, Wildfire-2.3, Flooding-2.25, Extreme Heat-1.9, Climate Change-1.7, and Erosion-1.4. Due to limited resources the planning team agreed to focus on the top three hazards which ranked within moderate to high risk (2.0-4.0). Climate change was included as a requirement per FEMA for 2017. See Figure 4-1 for final results.

LHMP RISK FACTOR EXCEL WORKSHEET

HAZARD PRIORITIZATION /

MITIGATE HAZARDS

Rank	Natural Hazards	Probability (1-4)	Factor1 = (Probability Index * .30)	Impact (1-4)	Factor2 = (Impact Index * .30)	Spatial Extent (1-4)	Factor3 = (Spatial Extent Index * .20)	Warning Time (1-4)	Factor4 = (Warning Time Index * .10)	Duration (1-4)	Factor5 = (Probability Index * .10)	RF Factor Total = (Add Factors 1-5)
1	Climate Change	1	0.3	1	0.3	3	0.6	1	0.1	4	0.4	1.7
2	Earthquake	3	0.9	4	1.2	4	0.8	4	0.4	3	0.3	3.6
3	Erosion	1.5	0.45	1	0.3	1	0.2	3	0.3	1.5	0.15	1.4
4	Extreme Heat	2.5	0.75	1	0.3	2.5	0.5	1	0.1	2.5	0.25	1.9
5	Flooding	2	0.6	2	0.6	2	0.4	4	0.4	2.5	0.25	2.25
6	Wildfire	2	0.6	2	0.6	2	0.4	4	0.4	3	0.3	2.3

The RF approach combines historical data, local knowledge, and consensus opinions to produce numerical values that allow identified hazards to be ranked against one another. These criteria were used to evaluate hazards and identify the highest risk hazard in the Lawndale region.
The RF approach produces numerical values that allow identified hazards to be ranked against one another (the higher the RF value, the greater the hazard risk). RF values are obtained by assigning varying degrees of risk to five categories for each hazard: probability, impact, spatial extent, warning time, and duration. Each degree of risk is assigned a value ranging from 1 to 4 and a weighing factor for each category was agreed upon by the MPC.

Calculated Field

Figure 4-1: RF Final Worksheet as Agreed Upon by Planning Team

4.3 Hazards Profiles

The planning team initially identified six hazards to be included on the RF Approach Worksheet, some of these hazards were ultimately ranked low risk/low impact or could potentially be secondary to higher ranked hazards. As a result, it was the consensus of the Planning Team to focus on the three hazards that scored High and Moderate Risk in the RF Approach Worksheet (See Figure 4-1): ***Earthquake, Flooding***, and ***Wildfires***. ***Climate Change*** is included as a requirement per FEMA for 2017. These four hazards will be identified in detail starting with 4.3 and beyond. The following natural hazards were reviewed and analyzed by the Planning Team but due to their limited risk and inclusion on other hazards they will not be included as one of the hazards identified with mitigation strategies:

1. Dam Failure ranked low by the planning team in the initial Hazard Summary and may be secondary to earthquakes, therefore dam failure was not included as a primary hazard. A dam is defined as a barrier constructed across a watercourse for the purpose of storage, control, or diversion of water. Dams typically are constructed of earth, rock, concrete, or mine tailings. A dam failure is the collapse, breach, or other failure resulting in downstream flooding or a severe natural occurrence, such as an earthquake.

   Dam failure can result from any one or a combination of the following causes:

   - Prolonged periods of rainfall and flooding, which causes most failures;
   - Inadequate spillway capacity, resulting in excess overtopping flows;
   - Internal erosion caused by embankment or foundation leakage or piping;
   - Improper maintenance, including failure to remove trees, repair internal seepage problems, replace lost material from the cross section of the dam and abutments;
   - Improper design, including the use of improper construction materials and construction practices;
   - Negligent operation, including failure to remove or open gates or valves during high flow periods;
   - Failure of upstream dams on the same waterway;
   - Landslides into reservoirs, which cause surges that result in overtopping;
   - High winds, which can cause significant wave action and result in substantial erosion; and Earthquakes, which typically cause longitudinal cracks at the tops of embankments that weaken entire structures.

   Description:

   Two major dams -- Cedar Springs Dam and Mojave Dam -- could have a significant impact on the Town of Apple Valley in the event of dam failure. Both are located in the San Bernardino National Forest in the upper portion of the Mojave River Basin, southwest of Apple Valley. The Cedar Springs Dam and the Mojave Dam are both managed and operated by the State Department of Water Resources. See Table 4-3 for detailed information on both dams.

Table 4-3: Local Dam Data

	Cedar Springs Dam	Mojave Dam
DWR Number	1-063	9000-021
National ID	CA00049	CA10021
Dam Type	Rock	Earth
Crest Length	2,235 ft.	2,200 ft.
Height (measured above the dam crest)	236 ft.	204 ft.
Crest Width	42 ft.	20 ft.
Total Freeboard	23 ft.	21 ft.
Reservoir	Lake Silverwood	Mojave River Forks
Reservoir Storage Capacity	78,000 acre-ft.	89,700 acre-ft.
Reservoir Drainage Area	34.0 sq. miles	70.3 sq. miles

Fortunately, neither the Cedar Springs Dam nor the Mojave Dam have experienced dam failure. For Apple Valley to be affected by flood waters due to dam failure, both of these dams would need to fail simultaneously or the failure of the Cedar Springs Dam would need to occur at a time when rising flood waters were already a problem at the Mojave Dam.

Failure of these dams during a catastrophic event, such as a severe earthquake, is considered to be an unlikely event. Both dams have performed well in past earthquakes due to the type and method of construction.

2. Drought and Water Shortage ranked as a low hazard but provided for discussion based on the recent drought that the state of California is in and the amount of rain that has been produced in the early months of 2017.

   A drought is a period of drier-than-normal conditions that results in water-related problems. Precipitation (rain or snow) falls in uneven patterns across the country. When no rain or only a small amount of rain falls, soils can dry out and plants can die. If dry weather persists and water supply problems develop, the dry period can become a drought. Droughts differ from typical emergency events such as floods or forest fires, in that they occur slowly over a multiyear period.

   California has faced numerous challenges in recent years, including a nearly decade-long drought on the Colorado River, snowpacks that are below normal, and court-mandated reductions in the amount of water available for delivery by the State Water Project. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline. Climate change, population growth, and the increasing instability of the water supplies in the delta formed by the confluence of the Sacramento and San Joaquin rivers threaten to exacerbate the crisis. Drought will also be discussed in our required hazard of climate change.

   Extreme Heat initially ranked as a medium hazard by the planning group but once we put it through the Risk Factor Worksheet it scored a 1.9 which would drop it to Low Risk. Temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat. Temperatures in Apple Valley often reach 10 degrees above average however they rarely last more than a few days. Heat will also be discussed in our required hazard of climate change.

3. Erosion initially ranked as a low to medium hazard by the planning team but once we put it through the Risk Factor Worksheet it scored a 1.4 which would drop it to Low Risk. Since the Town of Apple Valley is located in an area of extreme topographic relief between the valley and the surrounding mountains and is therefore subject to erosion, runoff, and sedimentation. Key factors affecting these processes include climate, topography, soil and rock types.

   Natural erosion may be accelerated by human activities such as agricultural or land development, as well as grading that may involve altering natural drainage patterns. Grading and construction activities such as soil compaction, and cut and fill slopes also increase the potential for erosion, and sedimentation. The increase in impermeable surfaces associated with development may impact conditions downstream of development, increasing the potential for flooding and sedimentation.

   The planning team viewed erosion as secondary to flooding and with limited history of erosion occurring in Apple Valley the planning team did not include it as a primary hazard.

4. High Winds initially ranked as a low to medium hazard by the planning team. Although high winds and gusts are common to Apple Valley, the plannning team did not include it on the Risk Factor Worksheet because the disruption of services and spatial extent to our community is extremely minimal. When it has occurred the impacts are isolated with only infrequent reports of personal property damage due to property not being secured properly. If disruption of services occur, services are normally restored within a few hours.

High winds can result from thunderstorm inflow and outflow, or downburst winds when the storm cloud collapses, and can result from strong frontal systems, gradient winds (high or low pressure systems), or foehn winds, such as the Santa Ana's. High winds are speeds reaching 50 miles per hour or greater, either sustaining or gusting.

4.4 Flood Hazard Profile



Floods are the second most common and widespread of all natural disasters faced by the region and cities and towns like Apple Valley. Most communities in the United States have experienced some kind of flooding during or after spring rains, heavy thunderstorms, winter snow thaws, or summer thunderstorms.

A flood, as defined by FEMA's National Flood Insurance Program (NFIP) is: "A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties (at least one of which is the policyholder's property) from:

- Overflow of inland or tidal waters, or
- Unusual and rapid accumulation or runoff of surface waters from any source, or
- Mudflow, or
- Collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels."

Floods can be slow or fast rising but generally develop over a period of hours or days. Mitigation includes any activities that prevent an emergency, reduce the chance of an emergency happening, or lessen the damaging effects of unavoidable emergencies. Investing in mitigation measures now, such as: engaging in floodplain management activities, constructing barriers such as levees, and purchasing flood insurance will help reduce the amount of structural damage and financial loss from other types of property damage should a flood or flash flood occur.

The standard for flooding is the 1% annual chance flood, commonly called the 100-year flood, the benchmark used by the FEMA to establish a standard of flood control in communities throughout the country. The 1% annual chance flood is also referred to as the base flood.

The 1% annual chance flood is the flood that has a 1% chance of being equaled or exceeded in any given year and it could occur more than once in a relatively short period of time. By comparison, the 10% flood (10-year flood) means that there is a 10% chance for a flood of its size to occur in any given year.

While not considered a "high risk area", the Town does have areas that are considered "flood potential". The most crucial areas pertaining to flooding are the dry lake bed (consisting of limited residential) and Desert Knolls. Flooding is expected to occur within the general location of these risk areas, and not expected to threaten or endanger the safety or well being of the entire community. It is noted that flooding in the risk areas can occur rapidly depending on the heaviness and severity of rainfall and run-off. However, since the installation of dry wells in low-lying areas, severe flooding occurrences have become less frequent.

Since incorporation in 1988, the Emergency Operations Center has activated more often due to flooding than any other type disaster. The Town's emergency responders continue to rely on the National Weather Service for weather advisories, storm watch conditions, and storm warnings.

4.4.1 National Flood Insurance Program (NFIP)

The NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in participating communities. As a participating member of the NFIP, Town of Apple Valley is dedicated to protecting more than 363 homes with policies currently in force. Like most communities participating in NFIP, FEMA has prepared a detailed Flood Insurance Study (FIS) for areas of San Bernardino County, including the Town of Apple Valley. The study presents water surface elevations for floods of various magnitudes, including the 1-percent annual chance of flood (the 100-year flood) and the 0.2-percent annual chance of flood (the 500-year flood). Base flood elevations and the boundaries of the 100 and 500-year floodplains are shown on FIRMs (Flood Insurance Rate Maps). More information on location and geographic extent of the FIRMs see Figure 4-2.

The Town of Apple Valley entered the regular phase of the NFIP on March 3, 1996. As a participant in the NFIP, the Town of Apple Valley is dedicated to regulating development in the FEMA regulated floodplain areas in accordance with NFIP criteria. Before a permit to build in a floodplain area is issued, Apple Valley ensures that two basic criteria are met:

- All new buildings and developments undergoing substantial improvements must, at a minimum, be elevated to protect against damage by the 100-year flood.
- New floodplain developments must not aggravate existing flood problems or increase damage to other properties.

Structures permitted or built in the County/City before the NFIP regulatory requirements were incorporated into the Town of Apple Valley ordinances (before the effective date of the Town of Apple Valley's FIRM) are called "pre-FIRM" structures. For Apple Valley, pre-FIRM structures are those permitted or built before March 3, 1996.

Extensive FEMA NFIP databases are used to track claims for every participating community including Apple Valley. NFIP insurance data provided by FEMA indicates that as of November 30, 2016 there were ***363*** policies in the Town of Apple Valley, resulting in ***$95,511,700*** of insurance in force; this amounts to ***$229,603*** in total premiums. Of the ***363*** policies, only ***115*** are for structures located within the 1% annual chance flood zones, while the remaining ***248*** policies are for structures located outside of the FEMA identified floodplain.

There have been ***17*** closed paid losses totaling ***$437,469***. Of the closed 17 paid losses there has been ***1*** substantial damage claims. Substantial damage means damage of any origin sustained by a structure whereby the cost of restoring the structure to it's before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

Based on this analysis of insurance coverage, the Town of Apple Valley has significant assets at risk to the 100-year flood. Currently, Town of Apple Valley contains ***3*** RL properties under their jurisdictional umbrella. The total dollar amount of claims paid to date by the NFIP is ***$437,471***. The Town of Apple Valley also contains ***1*** Severe Repetitive Loss structure.

The RL property that experienced flooding in the Town of Apple Valley was due to overbank flooding in localized areas. Every loss claim is seasonal in nature as all loss claims have been in December, January or February. Some mitigation on these properties have been conducted and the Town of Apple Valley is currently tracking mitigation actions through standardized forms as required by FEMA. Of the 1 repetitive loss properties, 1 has been mitigated.

4.4.2 Past Flood Occurrences

Historical Events: The following describes the significant historical events associated with this hazard:

1. January; 1/24/2017
   A series of three consecutive rainstorms brought snow to local low mountains, swift water rescues, flooded roads and school closures. Close to .75 inches of rain fell between all three storms. A swift water rescue occurred in the Mojave River Bottom on the Victorville side. Public works had to close several streets due to flooding. Sandbags were offered to residents as needed.

   Source: Town of Apple Valley records; Daily Press newspaper

2. February; 2/28/2014
   A strong storm cell hit the high desert on February 28, 2014 causing several traffic accidents along highways and roadways. Isolated flooding occurred on roadways. Sandbags were provided to residents in need.

   Source: Town of Apple Valley records; Daily Press newspaper

3. Series of Rainstorms; 1/22/10 (FEMA-1844-DR)

   A series of severe rainstorms occurred in southern California on or about January 17, 2010 to February 6, 2010. A local declaration was issued by the Town Manager on January 21, 2010 (Resolution #2010-08). Governor Schwarzenegger proclaimed a State of Emergency for San Bernardino County on January 22, 2010, and President Bush declared a major for public assistance. The local Emergency Operations Center was activated to a level 1.

   The series of rainstorms caused 0.43 inches of rainfall in Apple Valley over one 24-hour period. About 6,000 sandbags were issued throughout the week. A Sewer Lift Station suffered major damage to the facility, sewer pipes, and manhole. Other work throughout the community included:

   - Debris removal
   - Sandbagging and road closures
   - Remove/replace asphalt and curbing
   - Repair severe road edge erosion
   - Base fill, grade, and recompact

   Source: Town of Apple Valley records; Daily Press newspaper

   Hazard: Flooding
   Deaths: 0
   Injuries: 0
   Displaced People: unknown

4. Series of Rainstorms; 1/8/2005 (FEMA-1577-DR)

A series of severe rainstorms occurred in southern California on or about December 27, 2004 to January 11, 2005. A local declaration was issued by the Town Manager on January 21, 2005 (Resolution #2005-06), and ratified by the Town Council on January 25, 2005 (Resolution #2005-07). Governor Schwarzenegger proclaimed a State of Emergency for San Bernardino County on January 15, 2005, and President Bush declared a major disaster on February 4, 2005 for public assistance. The local Emergency Operations Center was not activated.

The series of rainstorms caused 0.43 inches of rainfall in Apple Valley over one 24-hour period. About 3,000 sandbags were issued throughout the week. The rainstorms caused the release of up to 5,500 CFS of water from Silverwood Lake reservoir over a 3-4 day period. At one point the water in the Mojave River measured at 6-feet, and caused minor damage to rear yard properties along the west side of Riverside Drive. Sewer Lift Station 3-A suffered major damage (approximately $500,000) to the facility, sewer pipes, and manhole. Other work throughout the community included:

- Debris removal
- Sandbagging and road closures
- Remove/replace asphalt and curbing
- Repair severe road edge erosion
- Base fill, grade, and recompact

Source: Town of Apple Valley records; Daily Press newspaper

Hazard: Flooding
Deaths: 0
Injuries: 0
Displaced People: 0

5. 7/11/1999 (NDAA 99-04; OES #99-04-010)

On or about 4:00 p.m. on July 11, 1999, local flooding due to heavy rains occurred at various locations throughout the community. Resolution #99-27 confirming existence of a local emergency was signed by the Mayor. The Emergency Operations Center was partially activated.

Flooding led to multiple road closures, including the major arterial of Highway 18 and Tao Road. Approximately 29 other areas of road damage were noted. Water and mud damage destroyed three apartment units forcing the evacuation of residents. Apple Valley Fire Protection District conducted numerous rescues from stranded motorists. Apple Valley Chamber of Commerce went door-to-door to businesses in the Desert Knolls area (hardest hit area) to assist as necessary with storm damage. Approximately 14 businesses suffered moderate damage, as well as 34 single family residences.

Activities included:

- Sandbagging and road closures
- Remove/replace asphalt and curbing
- Repair severe road edge erosion
- Base fill, grade, and recompact

Source: Town of Apple Valley records; Daily Press newspaper

Hazard: Flash Flooding
Deaths: 0
Injuries: Unknown
Displaced People: Unknown

6. El Nino Conditions; 2/23/1998 (FEMA-1203-DR; NDAA-OES #98-01-285)

On or about 10:00 p.m. on February 23, 1998, local flooding due to heavy rains occurred at various locations. Resolution #98-13 confirming existence of a local emergency was issued, and the Emergency Operations Center was activated.

A total of 2.87-inches of rain poured on the High Desert in a 24-hour period. It was thought to be the third wettest month in Apple Valley since 1938 as the rain total for the month was 5.03-inches! Major damage occurred to 6 businesses and 21 apartment units and minor damage to another 35 apartment units, for a total of $8.9 million in damages.

Activities included:

- Sandbagging and road closures
- Debris removal; barricade placement
- Road shoulder erosion protection
- Repair to concrete casing for sewer line crossing at the wash
- Clean manholes and repair potholes
- Remove/replace asphalt

Source: Town of Apple Valley records, Daily Press Newspaper, Apple Valley News

Hazard: Flash Flooding
Deaths: 0
Injuries: 0
Displaced People: Unknown

7. 1/12/1993

On or about midnight on January 12, 1993, local flooding due to heavy rains occurred at various locations throughout the community. Resolution #93-05 confirming existence of a local emergency was signed by the Mayor.

The rainstorm dumped nearly 9-inches of rain in two days, with a constant rain lasting 11 days. The conditions worsened when there was a release of water from the Lake Silverwood reservoir.

Activities included:

- Sandbagging and road closures
- Debris removal
- Rescue of two rafters in the Mojave River (AVFPD)

- Construction of embankment to redirect flow of the Mojave River (San Bernardino County Flood Control)

Source: Town of Apple Valley records and Daily Press Newspaper

Hazard: Flash Flooding
Deaths: 0
Injuries: Unknown
Displaced People: Unknown

8. 12/7/1992
On or about 8:00 a.m. on December 7, 1992, local flooding due to heavy rains occurred at various locations throughout the community. Town of Apple Valley Resolution #92-80 confirming existence of a local emergency was signed by the Mayor. In fact, all four cities in the High Desert proclaimed a local emergency. A total of 2.4-inches of rain poured down in the High Desert in an 18-hour period. It was thought to be the most rain to drop in the High Desert in the past ten years.

Activities included:

- Evacuation of residents (6 apartment units)
- Sandbagging and road closures
- Debris removal

Source: Town of Apple Valley records; Daily Press Newspaper

Hazard: Flash Flooding
Deaths: 0
Injuries: 0
Displaced People: Unknown

9. El Nino Conditions; 2/12/1992
On or about 7:30 p.m. on February 12, 1992, local flooding due to heavy rains occurred at various locations throughout the community. A resolution proclaiming existence of a local emergency was signed by the Assistant Director of Emergency Services and the Deputy Town Manager.

Activities included:

- Sandbagging and road closures
- Debris removal
- Barricade placement and placement of cold mix asphalt into potholes
- Remove/replace asphalt, repaint stop bars/legends; replace striping
- Asphalt overlay and asphalt berms

Source: Town of Apple Valley records and Daily Press Newspaper

Hazard: Flash Flooding

Deaths: 0
Injuries: Unknown
Displaced People: Unknown

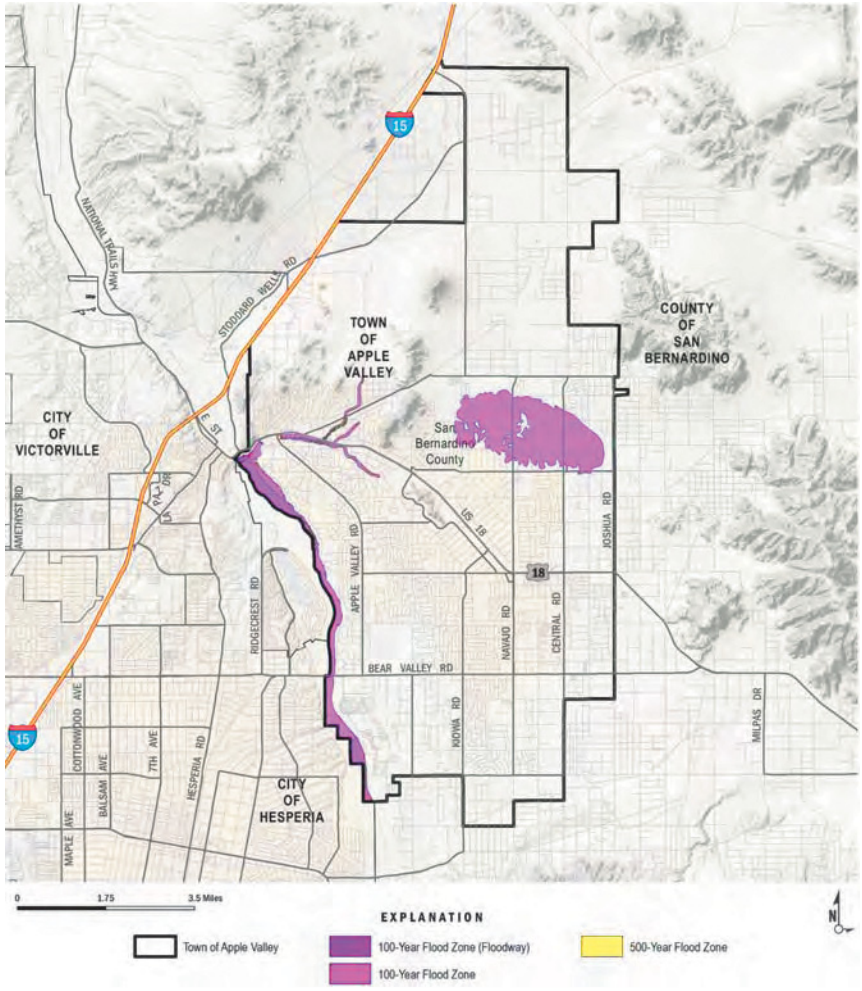


Figure 4-2: 100/500 Flood Zone Map

4.4.3 Location/ Geographic Extent

A majority of the flood risk within the Town of Apple Valley is specifically subject to inundation as a result of heavy rainfall and resulting stream and drainage canal overflows. The extent of flooding associated with a 1-percent annual probability of occurrence (the base flood or 100-year flood) is used as the regulatory boundary by many agencies, and helps identify the location and extent of flooding in areas across the Town of Apple Valley. This area is also referred to as the SFHA, and is a convenient tool for assessing vulnerability and risk in flood-prone communities.

Figure 4-2 shows 100-year and 500-year floodplain zones, which are estimated inundation areas based on a flood that has a 1-percent (100-year) and 2-percent (500-year) chance of occurring in any given year. Town of Apple Valley contains over 2,859 acres of identified flood hazard areas. Table 4-4 provides the total area for both the 100-year and 500-yr. flood hazard areas.

Table 4-4: Special Flood Hazard Area for Apple Valley

Flood Hazard Type	Sum of Acres	Sum of Square Miles
100-Year Flood	2,454	3.83
100-Year, Floodway	357	0.56
500-Year Flood	48	.07
500-Year, Protected by Levee	-	-
Total	**2,859**	**4.47**

4.4.4 Magnitude/ Severity

In urban areas like Apple Valley, flood problems are typically intensified as new homes and other structures are built. New streets, driveways, parking lots, and other paved areas decrease the amount of open land available to absorb rainfall and runoff, thus increasing the volume of water that must be carried away by waterways. However, in the absence of flood water conveyance systems, the Town's development code requires flood mitigation in the form of onsite detention, retention, and infiltration.

Unfortunately the Town does not have exact data or resources to obtain data on the strength of the flooding hazard such as flood depth grids, duration and speed of onset. However, what we can show using 2012 population data aggregated by census blocks, an estimate was made of the population exposed to the 100- and 500-year floodplain. To account for census blocks that were partially within the floodplain, a weighted average was employed to calculate the proportion of the population within the floodplain. The results of the population overlay are shown in Figure 4-18. More than 1400 residents live near or within the 100-year floodplain and approximately 1500 residents live within the 500-year floodplain.

4.4.4.1 Flash Flooding (From San Bernardino County Operational Area Plan)

Flash flooding tends to occur in the summer and early fall because of the monsoon rains and is typified by increased humidity and high summer temperatures.

The desert area contains many mountain ranges that are steep and experience summer thunder storms causing flash floods in many dry washes on the desert floor. The water collects in dry lake beds throughout the desert area. Environmental permit processing has delayed or prohibited work in the washes to provide flow lines to many bridges on county highways.

Many highways do not have bridges but convey water across the road with dip crossings. Flash flooding causes road and bridge wash outs and erosion of earthen channels and basins when they occur near these facilities. Cities and towns often experience street closures for several days due to sediment transport and road damage. Because of the sheet flow character of the desert, many private properties experience erosion and sediment deposits.

The urban valley also can experience flash flooding in its narrow canyons and within the many unimproved creeks and interim channels feeding the Santa Ana River. The valley floor in many areas is very flat so even minor rain events can produce flooding of roads and private property. In coordination with local jurisdictions, the County of San Bernardino Flood Control District has prepared Master Drainage plans for many cities and towns to provide a plan for reducing flooding due to minor storms. Maps can be found on the County's Department of Public Works website here:

http://cms.sbcounty.gov/dpw/FloodControl/Planning/MPD.aspx

However, local resources are not sufficient to cover the cost of the construction of the drainage systems. The densely populated (75% of the county population) urban valley region contains the headwaters of the Santa Ana River. The San Gabriel and San Bernardino Mountains border the North side of the valley are steep reaching 5,000 feet with alluvial fans which are developed and densely populated.

4.4.5 Frequency/ Probability of Future Occurrences

The FIRM maps not only identify the flood hazard zones for insurance and floodplain management purposes, but also provide a statement of probability of future occurrence.

A 500-year flood has a 0.2-percent chance of occurring in any given year; a 100-year flood has a 1-percent chance, a 50-year flood has a 2-percent chance, and a 10-year flood has a 10-percent chance of occurrence. Although the recurrence interval represents the long-term average period between floods of specific magnitude, significant floods could occur at shorter intervals or even within the same year. The FIRM maps typically identify components of the 500-year and 100-year floodplains.

4.5 Wildfire Hazard Profile



As defined in the California Fire Protection (CAL FIRE) 2010 Strategic Fire Plan, a wildfire event is an unwanted wildland fire including unauthorized human-caused fires, escaped wildfire use events, escaped prescribed wildfire projects, and all other wildfires.

4.5.1 Regulatory Environment

Wildfire regulatory requirements are mandated by the State of California and the Town of Apple Valley.

4.5.1.1 State

Wildfire State Responsibility Area (SRA) Fire Safe Regulations outline basic wildland fire protection standards for local jurisdictions. SRA Fire Safe Regulations (if policed) can decrease the risk of wildfire events in the wildland interface. SRA Fire Safe Regulations do not supersede local regulations, which equal or exceed minimum state regulations. The State statute for wildfire protection is Public Resources Code, Section 4290. Requirements in the code include information on the following (CA Fire Alliance):

1. Road Standards for Fire Equipment Access
2. Standards for Signs Identifying Streets, Roads and Buildings
3. Minimum Private Water Supply Reserves for Emergency Fire Use
4. Fuel Breaks and Greenbelts

4.5.1.2 Local

The Apple Valley Fire Protection District provides fire protection services to the Town of Apple Valley and the vicinity. It is an independent District whose western boundary is the Mojave River, and extends east as far as the dry lakes toward Lucerne Valley. It serves the Town and unincorporated areas of San Bernardino County, with a total service area of over 206 square miles. District staff includes paid, professional personnel and support staff.

The Fire Protection District maintains a mutual aid agreement with Victorville, San Bernardino County Fire Department, and the Bureau of Land Management. This agreement allows for fire departments within the region to actively support one another regardless of geographic or General Plan V-41jurisdictional boundaries. A joint dispatch center serving the mutual aid agencies is located in Victorville. There are currently a total of 43 paid staff in the Fire Protection District.

4.5.2 Past Occurrences

Wildfire events are of major concern to the Town of Apple Valley. Cal FIRE maintains a database of wildfire perimeters. Table 4-5 gives the dates and fire names of the historical wildfires that have burned within or near Town of Apple Valley limits. In the past five years there have been six significant wildland fires in or near to the Town of Apple Valley. These fires are listed in Table 4-5, and several of the more damaging fires are discussed below.

Table 4-5: Wildfire Occurrences 2011-2016

Year	Fire Name	Acres
6/1/2011	Roundup	144
6/9/2011	Bowen	295
7/3/2011	Deep	119
3/31/2015	River Bottom	185
8/7/2016	Pilot	8,110
8/16/2016	Blue Cut	36,274
Total		**45,127**

Source: Cal Fire

River Bottom Fire: On March 31, 2015 a fire erupted within Mojave Narrows Regional Park and quickly spread towards homes in Apple Valley off Riverside Drive. A few outbuildings and vehicles were lost but no homes. The fire was contained by the next day. American Red Cross opened a shelter for those evacuated at Sitting Bull Academy.

Pilot Fire: The Pilot Fire started at about 12:10 pm on Sunday August 7, 2016 near the Miller Canyon OHV area off of Highway 138. The Pilot Fire burned 8110 acres and was declared controlled on August 16, 2016 as a result of significant rainfall. AVUSD was closed for a few days due to air quality.

Blue Cut: The Blue Cut Fire started on August 16, 2016 at 10:36 AM in the Cajon Pass along Old Cajon Blvd. north of Kenwood Avenue west of Interstate 15. The fire quickly spotted across Cajon Creek and grew into a large wildland fire. During the course of the fire fight, railroad lines, local roads, highway 138 and Interstate 15 were closed along with a large evacuation area that included Lytle Creek, Wrightwood, Summit Valley, Baldy Mesa, Phelan and Oak Hills.

At the peak of the battle to control this blaze there were 2,684 personnel actively involved in the fight to contain the Blue Cut Fire. These personnel have come from all over the nation to help with this firefight. The Blue Cut Fire burned 36,274 acres, destroying an estimated 105 single family residences and 216 outbuildings. In addition, 3 single family residences and 5 other structures were damaged. Apple Valley took in over 480 small animals due to the Blue Cut fire. The Town had nearly $65,000 in reimbursable expenses related to small animal sheltering.

4.5.3 Location/Geographic Extent

Wildfires present a significant threat in the unincorporated area of Apple Valley, particularly in the summer months when temperatures are high and precipitation is rare. The period between June and September is typically considered "fire season".

The area known as the Marianas in the southern foothill area of Apple Valley is a fire hazard area due to the abundance of brush and mountainous terrain, which makes it difficult to gain access to fight fire. This area is primarily in the unincorporated region of Apple Valley with homes scattered throughout the vegetation.

The Mojave Riverbed is the second significant threat of wildland fire in the Apple Valley area. Because of its significant slope to the bottom of the riverbed and the soft soil, it is difficult to gain access to this area to fight fire. The Mojave River is the Town's western boundary with residential properties along Riverside Drive. Schools are located on the southernmost and northernmost ends of the natural extension of Riverside Drive.

4.5.4 Magnitude/Severity

The magnitude and severity of a wildfire event is measured by calculating the number of acres burned in a specific wildfire event. CAL FIRE adopted Fire Hazard Severity Zone maps for LRA in June 2008. The Fire Severity Zones are identified as Very High, High, and Moderate fire hazard severity throughout the County and are mapped for Apple Valley in Figure 4-3. According to LRA Apple Valley has nothing higher than moderate fire hazard severity.

Fire Severity Zones are used in determining additional protective measures required when building new structures or remodeling older structures within the particular zone. Additional measures must be taken on the property around a structure in the higher ranked fire Severity Zones.

Fire hazard mapping is a way to measure the physical fire behavior to predict the damage a fire is likely to cause. Fire hazard measurement includes vegetative fuels, probability of speed at which a wildfire moves the amount of heat the fire produces, and most importantly, the burning fire brands that the fire sends ahead of the flaming front.

The model used to develop the information in accounts for topography, especially the steepness of the slopes (fires burn faster as they burn up-slope.). Weather (temperature, humidity, and wind) also has a significant influence on fire behavior. The areas depicted as moderate and high in are of particular concern and potential fire risk in these are constantly increasing as human development, and the wildland urban interface areas expand.

4.5.5 Frequency/Probability of Future Occurrences

In San Bernardino County, wildfire season commences in late Spring when temperatures begin to rise, humidity is low, and drier conditions persist. The season continues into the Fall, when the County experiences high velocity, very dry winds coming out of the desert. A statewide drought beginning in 2011 has caused the state to be the driest it's been since record keeping began back in 1895 (California, 2016). This has caused extremely dry conditions in unincorporated areas of the County creating plentiful fuel sources for wildfires.

USGS LANDFIRE (Landscape Fire and Resource Management Planning Tools), is a shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior, providing landscape scale geo-spatial products to support cross-boundary planning, management, and operations. Historical fire regimes, intervals, and vegetation conditions are mapped using the Vegetation Dynamics Development Tool (VDDT). This USGS data supports fire and landscape management planning goals in the National Cohesive Wildland Fire Management Strategy, the Federal Wildland Fire Management Policy, and the Healthy Forests Restoration Act.

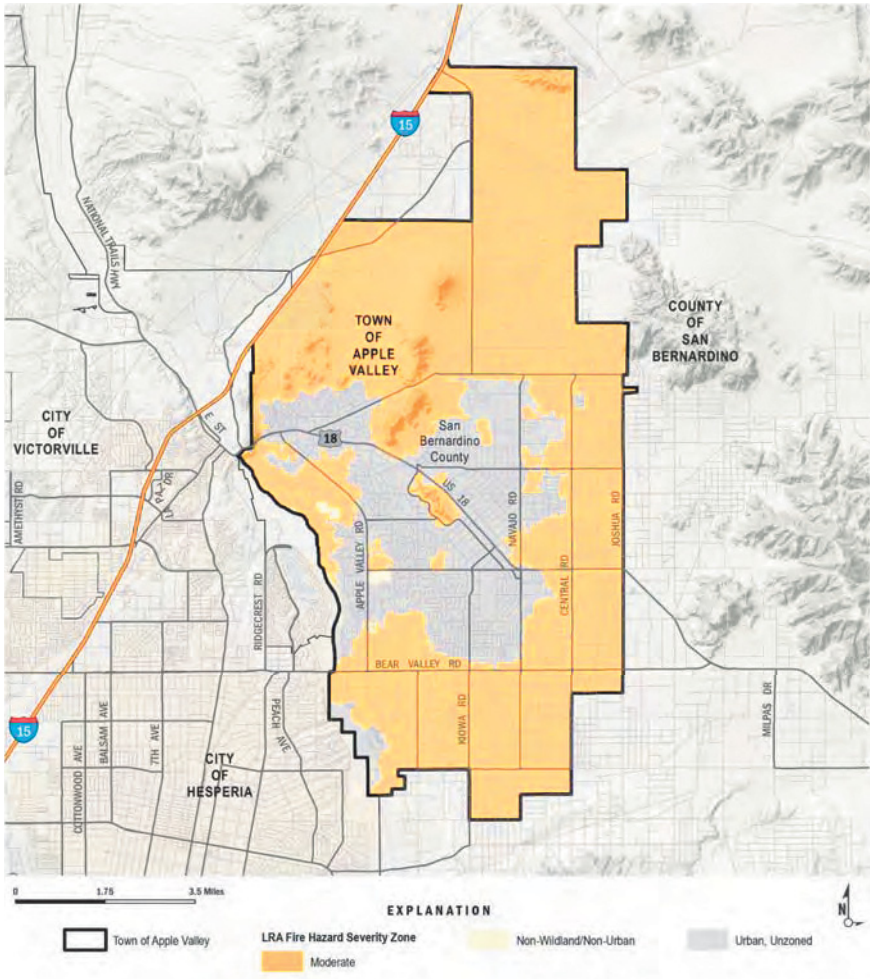


Figure 4-3: Wildfire Hazard Severity Zones

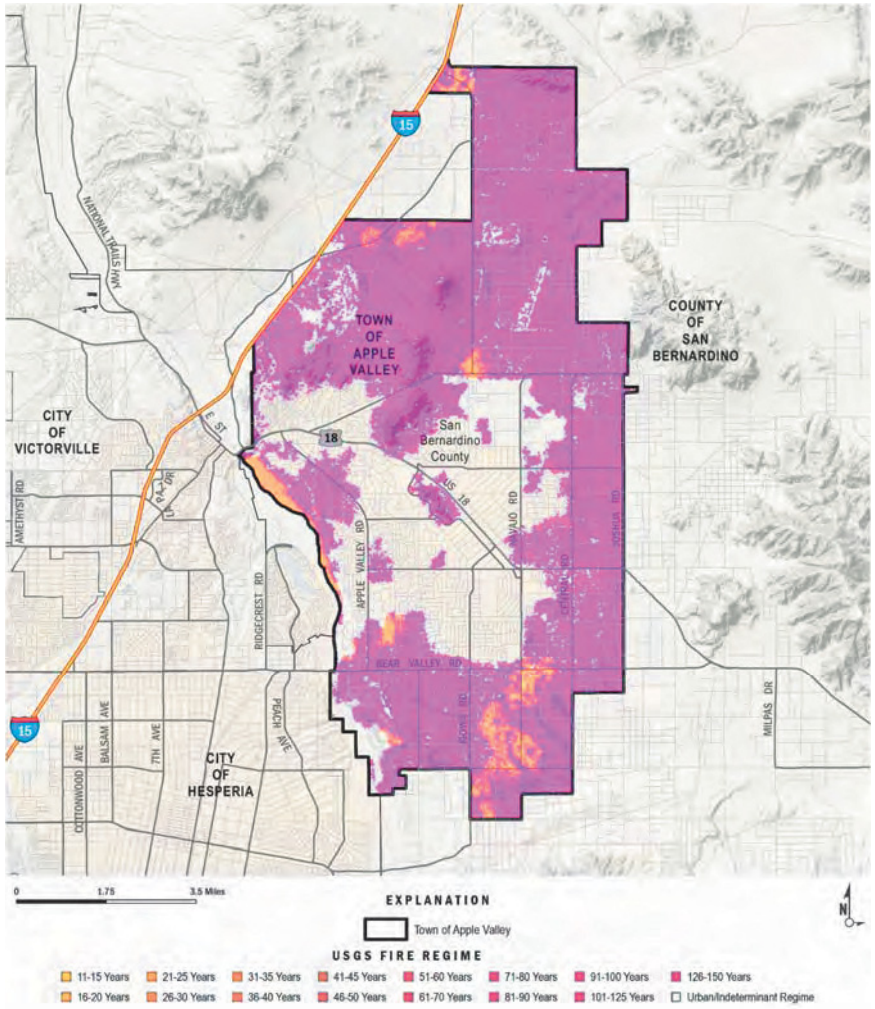


Figure 4-4: Wildfire Return Interval Map

As part of the USGS Landfire data sets, the Mean Fire Return Interval (MFRI) layer quantifies the average period between fires under the presumed historical fire regime. MFRI is intended to describe one component of historical fire regime characteristics in the context of the broader historical time period represented by the Landfire Biophysical Settings (BPS) layer and BPS Model documentation.

MFRI is derived from the vegetation and disturbance dynamics model VDDT (Vegetation Dynamics Development Tool) (LF_1.0.0 CONUS only used the vegetation and disturbance dynamics model LANDSUM). This layer is created by linking the BpS Group attribute in the BpS layer with the Refresh Model Tracker (RMT) data and assigning the MFRI attribute. This geospatial product should display a reasonable approximation of MFRI, as documented in the RMT. See Figure 4-4 for predicted fire return interval for the jurisdictional area.

For more information on the USGS wildfire mapping tools visit: http://www.landfire.gov/fireregime.php

4.6 Earthquake/Geologic Hazard Profile



An earthquake is both the sudden slip on an active fault and the resulting shaking and radiated seismic energy caused by the slip (USGS, 2016). The majority of major active faults in the Apple Valley area are strike-slip faults. For this type of fault, during an earthquake event, one side of a fault line slides past the other. The rupture from this type of fault extends almost vertically into the ground.

Earthquakes are a significant concern to Apple Valley. The area around Apple Valley is seismically active since it is situated on the boundary between two tectonic plates. Describe seismic activity and faults for the region. Earthquakes can cause serious structural damage to buildings, overlying aqueducts, transportation facilities, utilities, and can lead to loss of life. In addition, earthquakes can cause collateral emergencies including dam and levee failures, fires, and landslides. Seismic shaking is by far the single greatest cause of damage from an earthquake in Apple Valley, followed by liquefaction.

Liquefaction occurs when loosely packed sandy or silty materials saturated with water are shaken hard enough to lose strength and stiffness. Liquefied soils behave like a liquid and are responsible for tremendous damage in an earthquake. For example, it can cause buildings to collapse, pipes to leak, and roads to buckle.

4.6.1 Regulatory Environment

Numerous building and zoning codes exist at a state and local level to decrease the impact of an earthquake event and resulting liquefaction on residents and infrastructure. Building and zoning codes include the Alquist-Priolo Earthquake Fault Zoning Act of 1972, Seismic Hazards Mapping Act of 1990, 2013 California Standards Building Code (CSBC), and Town of Apple Valley's General Plan. To protect lives and infrastructure in the Town of Apple Valley, the following building and zoning codes are used.

4.6.1.1 State

The 1971 San Fernando Earthquake resulted in the destruction of numerous structures built across its path. This led to passage of the Alquist-Priolo Earthquake Fault Zoning Act. This Act prohibits the construction of buildings for human occupancy across active faults in the State of California. Similarly, extensive damage caused by ground failures during the 1989 Loma Prieta Earthquake focused attention on decreasing the impacts of landslides and liquefaction. This led to the creation of the Seismic Hazards Mapping Act. This Act increases construction standards at locations where ground failures are probable during earthquakes. Active faults in San Bernardino County have been included under the Alquist-Priolo Geologic Hazards Zones Act and Seismic Hazards Mapping Act.

4.6.1.2 Local

The 2013 California Building Standards Code (also known as Title 24) became effective for the County on January 1st, 2014. Title 24 includes CBC Section 3417: Earthquake Evaluation and Design for Retrofit of Existing Buildings which can be viewed at http://www.documents.dgs.ca.gov/bsc/2015TriCycle/Pre-Cycle-2015/CBC-CEBC/BSC-0X-15-ET-Pt10-Agenda-4d.pdf.

The 2013 CSBC is based on the International Building Codes (IBC), which is widely used throughout the United States. CSBC was modified for California's conditions to include more detailed and stringent building requirements. The Town of Apple Valley, Building and Safety Department utilizes the 2013 CSBC to regulate the infrastructure in the Town of Apple Valley.

This includes unreinforced masonry (URM) buildings. For new buildings, Town of Apple Valley includes earthquake safety provisions, with enhancements for essential services buildings, hospitals, and public schools.

4.6.1.3 General Plan Geologic Hazard Reduction Policies

The Town of Apple Valley's General Plan includes the following policies for lowering the impacts of earthquakes on infrastructure:

- The Town shall begin and maintain an information database including maps and other information that describe and illustrate seismic and other geotechnical hazards that occur within and in proximity to the Town boundaries.
- In areas identified as being susceptible to slope instability, development shall be avoided unless adequately engineered to eliminate geotechnical hazards.
- The Town shall require that future development avoid disturbing unique rock outcroppings within the Town boundary and Sphere of Influence.
- The Town shall actively support and participate in local and regional efforts at groundwater conservation and recharge, in order to minimize the potential impacts of subsidence due to extraction of groundwater.
- In areas identified as being susceptible to rockfall, landslide, liquefaction and/or other associated hazards as depicted in the General Plan EIR, development shall be required to prepare detailed technical analysis, which shall include mitigation measures intended to reduce potential hazards below levels of significance.
- Development in areas susceptible to collapsible or expansive soils as shown in soils mapping in the General Plan EIR shall be required to conduct soil sampling and laboratory testing and to implement mitigation measures that reduce potential hazards below levels of significance.
- The Town shall coordinate and cooperate with public and quasi-public agencies to ensure that major utility systems and roadways have continued functionality in the event of a major earthquake.
- To minimize the potential for localized collapse of soils, new septic tank leach fields, seepage pits, drainage facilities, and heavily irrigated areas shall be located away from structural foundations and supports.

4.6.2 Past Occurrences

The HMP Planning Team noted the following regional and local events for the seismic activity in Apple Valley. Table 4-6 shows earthquakes greater than Magnitude 4.0 that have been felt within or near Apple Valley area in the last five years.

Table 4-6: Earthquakes: 2011-2016 San Bernardino County

Date	Name
1/15/2014	Fontana 4.4
7/5/2014	Running Springs 4.6
6/11/2014	Barstow 4.0
7/25/2015	Fontana 4.2
9/16/15	Big Bear Lake 4.0
12/30/2015	Muscoy 4.4
1/6/2016	Banning 4.4
2/20/2016	Lucerne Valley 4.3

There are hundreds more small (M<4.0) earthquakes that have occurred within San Bernardino County during this same time frame. Those with a magnitude of below 4.0 are not listed.

4.6.3 Location/Geographic Extent

Historical and geological records show that Southern California has a long history of seismic events. The risk of seismic hazards to residents of Apple Valley is based on the approximate location of earthquake faults within and outside the region. This map includes Alquist-Priolo Geologic Hazards Zones Act created under the Seismic Hazards Mapping Act and the USGS Quaternary Fault and Fold Database of the United States. The USGS database contains information on faults and associated folds in California that are believed to be sources of M>6 earthquakes during the Quaternary (the past 2.6 million years).

Figure 4-5 shows fault zones nearest to Apple Valley. Per the California Department of Conservation's Earthquake Fault Zone Maps, Apple Valley is near the following active fault zones or regulatory fault zones managed by the Department of Conservation. Some of these fault lines along with probability of occurrence are shown in Figure 4-7.

4.6.3.1 North Frontal Fault

The North Frontal fault is closest to and therefore has the potential to generate the strongest seismic shaking in the area. The North Frontal fault is a partially blind reverse fault zone comprised of several fault splays; it trends south along the eastern flank of the San Bernardino Mountains, and has a combined total length of approximately 40 miles. Several of the fault splays interact with other faults that traverse the region. The most significant fault with which the North Frontal relates is the Helendale fault, which offsets and divides the North Frontal into two main segments, referred to as the East and West segments. The West segment is approximately 22 miles long, and is less than 0.5 miles from Apple Valley at the closest point.

The North Frontal fault is considered an active fault, based on its having moved within the last 10,000 years. However, it has not been studied in detail, and while it is has been attributed a slip rate of approximately 0.5 mm per year, the parameters of this fault are not well understood. It is thought that movement on this fault causes an average uplift rate of the San Bernardino Mountains of about 1 mm per year. The West segment of the North Frontal fault zone is considered capable of generating a maximum magnitude 7.2 earthquake, based on its length. Such an earthquake on this fault would generate peak ground accelerations in the planning area of between about 1.1g and 0.4g, which converts to Modified Mercalli intensities as high as XI. Based on rupture of the East segment of the North Frontal fault zone in a 6.7 earthquake, ground shaking of about 0.26g to 0.14g would be felt in the planning area. This converts to Modified Mercalli intensities in the IX to VIII range.

4.6.3.2 Helendale Fault

There are several right-lateral strike-slip faults within what is known as the Eastern California Shear Zone, of which the Helendale fault is the westernmost. Approximately 9 to 23% of the total movement along the North American/Pacific plate boundary motion occurs along this zone. The Helendale fault itself is 56 miles long, but it also seems to form a continuous fault with the South Lockhart fault to the north. The southern end of the Helendale fault apparently offsets the North Frontal fault, as discussed above, forming the East and West segments. The Helendale fault extends to the northeast of the planning area, outside of Apple Valley's northeastern corporate limits and within the Sphere of Influence. The Helendale fault has an annual slip rate calculated at 0.8 mm/year; it has a recurrence interval for large surface-rupturing events of 3,000 to 5,000 years. Based on currently available data, the California Geological Survey estimates that a

maximum earthquake of magnitude 7.3 along the combined Helendale-South Lockhart faults would generate horizontal peak ground accelerations in Apple Valley of between 0.75g and 0.3g, with Modified Mercalli Intensities of between XI and IX.

4.6.3.3 San Andreas Fault

Southern California is probably best known for the San Andreas Fault, a 400-mile long fault running from the Mexican border to a point offshore, west of San Francisco. Geologic studies show that over the past 1,400 to 1,500 years, large earthquakes have occurred at about 130-year intervals on the southern San Andreas fault.

The San Andreas Fault zone is located approximately 23 miles southwest of Apple Valley. The longest fault in the State of California, it extends approximately 750 miles from Cape Mendocino in northern California to the Salton Sea in southern California. The San Andreas, a right-lateral transform fault, is regarded as a "Master Fault" that controls the seismic hazard for central and southern California. The magnitude 8.0 Fort Tejon earthquake, which occurred in 1857, is the last major earthquake to have occurred on the southern San Andreas. As previously discussed, at least one other fault occurs closer to Apple Valley and has the potential to cause stronger ground

shaking, and therefore more damage, than the San Andreas Fault. Nonetheless, the San Andreas Fault is considered to have a high probability of causing an earthquake in the near future and should therefore be considered in all seismic hazard assessment studies in southern California given its.

The Fort Tejon earthquake in 1857 ruptured the Cholame, Carrizo, and Mojave segments of the San Andreas fault, and displacements occurred along of as much as 27 feet of the rupture zone. It is estimated that peak ground accelerations in Apple Valley as a result of the 1857 earthquake may have been as high as 0.38g. Another similar earthquake that ruptured the entire southern San Andreas Fault, with its epicenter along the section of fault closest to Apple Valley, could generate even higher peak ground accelerations in Apple Valley, estimated at between 0.48g and 0.25g.

4.6.3.4 Lenwood – Lockhart – Old Woman Springs Faults

Another of the Eastern California Shear Zone faults is the Lenwood fault, a right-lateral strike slip fault approximately 47 miles long. It has a slip rate of about 0.8 mm/year. Based on trenching studies, this fault has ruptured at least three times and these ruptures have occurred as recently as approximately 200 to 400 years ago. Other ruptures are estimated as occurring between 5,000 and 6,000 years ago, and 8,300 years ago. Therefore a recurrence between major surface ruptures is estimated at between 4,000 to 5,000 years. Prior to the 1992 Landers earthquake the yearly slip rate on this fault had been recorded but not verified.

The Lockhart fault is approximately 44 miles long and is north of the Lenwood fault. The North Lockhart fault, a segment that evidences no activity within the last 11,000 years, is approximately 6 miles. The Lockhart fault is estimated to have an interval of between 3,000 and 5,000 years for major surface-rupture.

The Old Woman Springs segment is about 6 miles long and is the main trace in a complex fault system where the Eastern segment of the North Frontal Fault Zone and the Lenwood fault intersect. It is considered an active fault.

The Lenwood and Lockhart faults essentially form a continuous, 90-miles long system. While there is no evidence that both of these faults have ruptured together in the past, such an event may be possible, as evidenced by rupture of five separate fault segments during the Landers earthquake. The technical background study assumes a scenario wherein the Lenwood

and Lockhart faults, together with the Old Woman Springs fault, rupture together in a magnitude 7.5 maximum earthquake. Such an event would generate peak ground accelerations in Apple Valley of about 0.42g to 0.19g, with Modified Mercalli Intensities in the IX to VIII range. A smaller magnitude event involving rupture along only one of these faults ruptures would cause lesser ground motions in Apple Valley than those reported above.

4.6.3.5 Cleghorn Fault

The Cleghorn fault, also known as the Silverwood Lake fault due to its extension across the lake, is approximately 19-miles long. Studies suggest that the fault zone has had about 650 feet of motion in the last 50,000 to 100,000 years, which results in a slip rate of 2 to 4 mm/year. A magnitude 6.5 earthquake on this fault is considered capable of generating horizontal peak ground accelerations in the Apple Valley area of between about 0.33g and 0.11g, with Modified Mercalli Intensities in the IX to VII range.

4.6.3.6 Cucamonga Fault

The Cucamonga fault zone is approximately 16-miles long. As one element of the Transverse Ranges family of thrust faults, it runs along the southern front of the San Gabriel Mountains from San Antonio Canyon eastward to the Lytle Creek area. It has a slip rate of between approximately 5.0 and 2.0 mm/year with an estimated average recurrence interval of 625 years. The Cucamonga fault is thought capable of generating a maximum magnitude 6.9 earthquake, based on length, and such a scenario would result in peak horizontal ground acceleration in the Apple Valley area of between about 0.28g and 0.15g, with Modified Mercalli intensities in the IX to VIII range.

4.6.3.7 Landers (or Kickapoo) Fault

The group of faults that ruptured during the 1992 Landers earthquake, including the Homestead Valley, Kickapoo, and Johnson Valley faults, and segments of the Burnt Mountain and Eureka Peak faults, are known as the Landers fault. The Landers fault now refers to the Kickapoo fault. These faults are part of the Eastern Mojave Shear Zone and were discovered after they ruptured the surface during the 1992 Landers earthquake. It is estimated that intervals between major ruptures is in the thousands of years, The 1992 earthquake resulted in substantial lateral displacement along some of these faults, for instance nearly 9.5 feet in the case of the Kickapoo fault. Individually, these faults could rupture in smaller earthquakes. Their combined lengths allowed for the magnitude 7.3 earthquake that shook southern California on June 28, 1992.

Ground shaking in the Apple Valley area due to a Landers-type earthquake on these faults would cause horizontal ground accelerations of between 0.27g and 0.14g, with Modified Mercalli intensities in the IX to VIII range.

4.6.3.8 Sierra Madre Fault

The Sierra Madre fault zone or complex is approximately 47 miles long and extends along the base of the San Gabriel Mountains from the San Fernando Valley to San Antonio Canyon; from there it continues southeastward as the Cucamonga fault. The estimated slip rate of the Sierra Madre fault is estimated to be approximately 0.6 mm/year with a recurrence interval of about 8,000 years. Recent studies suggest that the last rupture event on the eastern segments of the fault occurred about 8,000 years ago, therefore, the Sierra Madre fault may be near the end of its cycle, and therefore it has potential generate an earthquake in the not too distant future. The Sierra Madre fault is estimated to be capable of producing a magnitude 7.2 earthquake, resulting in peak horizontal ground accelerations in Apple Valley of between about 0.21g and 0.14g.

4.6.3.9 Gravel Hills – Harper Lake Fault

This fault zone is between 31 and 44 miles long, depending on how many fault segments are included and is considered active. The estimated annual slip rate on this fault zone is 0.9 mm/year; the recurrence interval between earthquakes is about 3,500 years. The combined fault segments are estimated to be capable of generating 7.1 magnitude earthquake, which would generate peak horizontal ground accelerations in the Apple Valley area of between 0.20g and 0.11g, with Modified Mercalli intensities in the VIII to VII range.

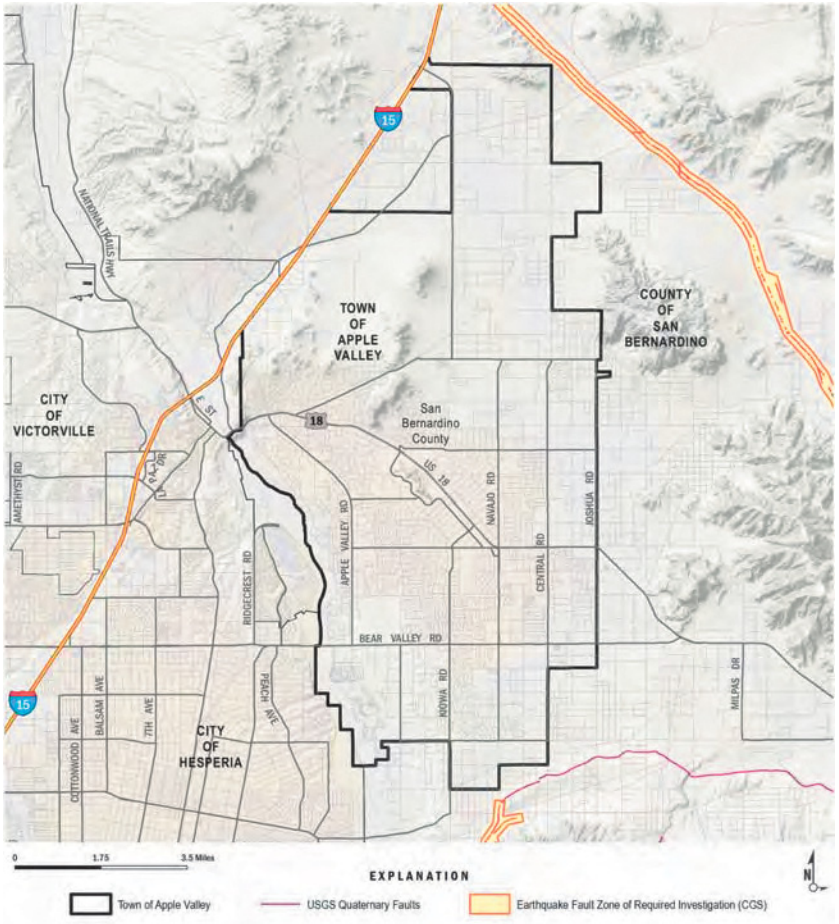


Figure 4-5: Active Fault Map

Source: Department of Conservation & USGS

4.6.4 Magnitude/Severity

Classification of seismic events is based on their magnitude and intensity. The intensity of ground shaking is determined by several factors, such as the earthquake's magnitude, the distance from the epicenter, and the geologic composition of local soils and rocks. Seismic intensity is most commonly measured by the Modified Mercalli Intensity (MMI) scale, which includes twelve levels of damage. The MMI is derived from actual observations of damage to structures and human reactions to earthquakes. Based on this scale, an earthquake tremor at Level I earthquake tremor is generally not felt and is considered unlikely to result in damage, whereas a Level XII earthquake results in total destruction. Earthquake intensities may result in damage such as partial or complete collapse of masonry structures, severe damage to complete destruction of underground pipelines, rock and landslides, and massive damage or destruction of bridges, overpasses and other improvements.

Figure 4-6 shows MMI classes for Apple Valley based on the Great Shakeout Scenario of a magnitude 7.8 earthquake along the southern San Andreas Fault.

Earthquake magnitude is measured by the Richter Scale on a continuum of one to nine, with each level-of-magnitude increase representing a tenfold increase in the amplitude of the waves on a seismogram. The most notable historic earthquake in the Apple Valley region was the Landers earthquake of 1992, which had a magnitude of 7.3 on the Richter Scale. The Landers earthquake, so named for its epicenter near the small desert community of Landers, also ruptured five other separate faults.

The largest earthquake likely to occur on a fault or fault segment within a specified period of time is considered the Maximum Probable Earthquake (MPE). The MPE is useful during emergency and engineering planning. It provides a means to assess the potential seismic risk within a region, is referenced to establish safe construction and design parameters, and facilitates the preparation of policies and programs that are responsive to the potential impacts of an earthquake.

Defined as the largest earthquake a fault is estimated to be capable of generating, the Maximum Credible Earthquake (MCE) also provides a useful gauge for emergency and engineering planning efforts. In the Apple Valley area, the North Frontal fault (West) is expected to generate a magnitude 7.2 earthquake with a Peak Ground Acceleration (PGA) ranging from 1.13g to 0.38g, which is equivalent to a Level XI to X on the Modified Mercalli Intensity Scale (MMI). Table 4-7 shows a list of faults that could generate significant impacts within Apple Valley and the surrounding area.

Table 4-7: Seismic Intensities

Table IV-1
Estimated Horizontal Peak Ground Accelerations and Seismic Intensities in the Apple Valley Area

Fault Name	Distance to Apple Valley (km)	Distance to Apple Valley (mi)	Magnitude of M_{max} *	PGA (g) from M_{max}	MMI from M_{max}
North Frontal Fault (West)	<0.5 – 16.2	0.5 – 26.1	7.2	1.13 – 0.38	XI - X
Helendale – South Lockhart	<0.5 – 13.9	0.5 – 22.4	7.3	0.75 – 0.33	XI - IX
San Andreas (Whole Southern)	14.4 – 31.4	23.1 – 50.6	8.0	0.48 – 0.25	X - IX
Lenwood – Lockhart – Old Woman Springs	12.1 – 28.7	19.4 – 46.2	7.5	0.42 – 0.19	IX - VIII
San Andreas (San Bernardino – Coachella)	14.4 – 31.4	23.1 – 50.6	7.7	0.41 – 0.20	X - VIII
San Andreas (1857 Rupture or Cholame – Mojave)	16.9 – 33.2	27.2 – 53.5	7.8	0.38 – 0.20	IX - VIII
San Andreas (San Bernardino)	14.4 – 31.4	23.1 – 50.6	7.5	0.36 – 0.17	IX – VIII
Cleghorn	8.1 – 24.4	13.1 – 39.2	6.5	0.33 – 0.11	IX - VII
San Andreas (Mojave)	16.9 – 32.2	27.2 – 53.5	7.4	0.30 – 0.15	IX - VIII
Cucamonga	18 – 34.4	29 – 55.3	6.9	0.28 – 0.15	IX - VIII
Landers	17.3 – 34.5	27.9 – 55.6	7.3	0.27 – 0.14	IX - VIII
North Frontal (East)	17.3 – 32.2	27.9 – 51.9	6.7	0.26 – 0.14	IX – VIII
Sierra Madre	29.6 – 45.1	47.7 – 72.6	7.2	0.21 – 0.14	VIII
Gravel Hills – Harper Lake	20.8 – 37.5	33.5 – 60.3	7.1	0.20 – 0.11	VIII - VII
Calico – Hidalgo	29.1 – 43.6	43.1 – 70.2	7.3	0.18 – 0.11	VIII - VII
San Jacinto (San Bernardino)	18.6 – 35.7	29.9 – 57.4	6.7	0.17 – 0.09	VIII - VII
Johnson Valley (Northern)	19.9 – 32.4	32 – 52.1	6.7	0.16 – 0.10	VIII – VII
Puente Hills Blind Thrust	42.7 – 58.9	68.7 – 94.8	7.1	0.14 – 0.10	VIII - VII
Blackwater	30 – 45.2	46.8 – 72.8	7.1	0.14 – 0.09	VIII - VII
San Jacinto (San Jacinto Valley)	26.2 – 42.8	42.2 – 68.8	6.9	0.14 – 0.09	VIII - VII
Pinto Mountain	31.5 – 48.8	50.7 – 78.5	7.2	0.14- 0.09	VIII - VII
Pisgah – Bullion Mtn. – Mesquite Lake	35.5 – 51.4	57.1 – 82.7	7.3	0.13 – 0.09	VIII - VII
Emerson South – Copper Mtn.	29 – 40.6	46.7 – 65.3	7.0	0.13 – 0.09	VIII - VII

Abbreviations: mi – miles; km – kilometer; M_{max} – maximum magnitude earthquake; PGA – peak ground acceleration as a percentage of "g", which is the acceleration of gravity; MMI – Modified Mercalli Intensity.
Source: Technical Background Report to the Safety Element for the Town of Apple Valley, prepared by Earth Consultants International, 2007.

Potential adverse effects from earthquakes may be substantial and range from property damage, to the loss of public services and facilities, to loss of life. Apple Valley and the surrounding area are most susceptible to severe impacts associated with strong ground shaking.

Strong ground shaking can cause other geologic hazards, including landslides, ground lurching, structural damage or destruction, and liquefaction, which can further disrupt affected areas through fire, the interruption of essential services or damage to facilities and infrastructure, such as water, sewer, gas, electric, transportation, communications, drainage, as well as release of hazardous materials. Dam or water tank failure brought about by seismic activity can result in flood inundation.

There are no faults mapped by the State of California within the Town's corporate limits or within either of the proposed annexation areas; however two faults occur within portions of the Town's Sphere of Influence (Figure 4-6).

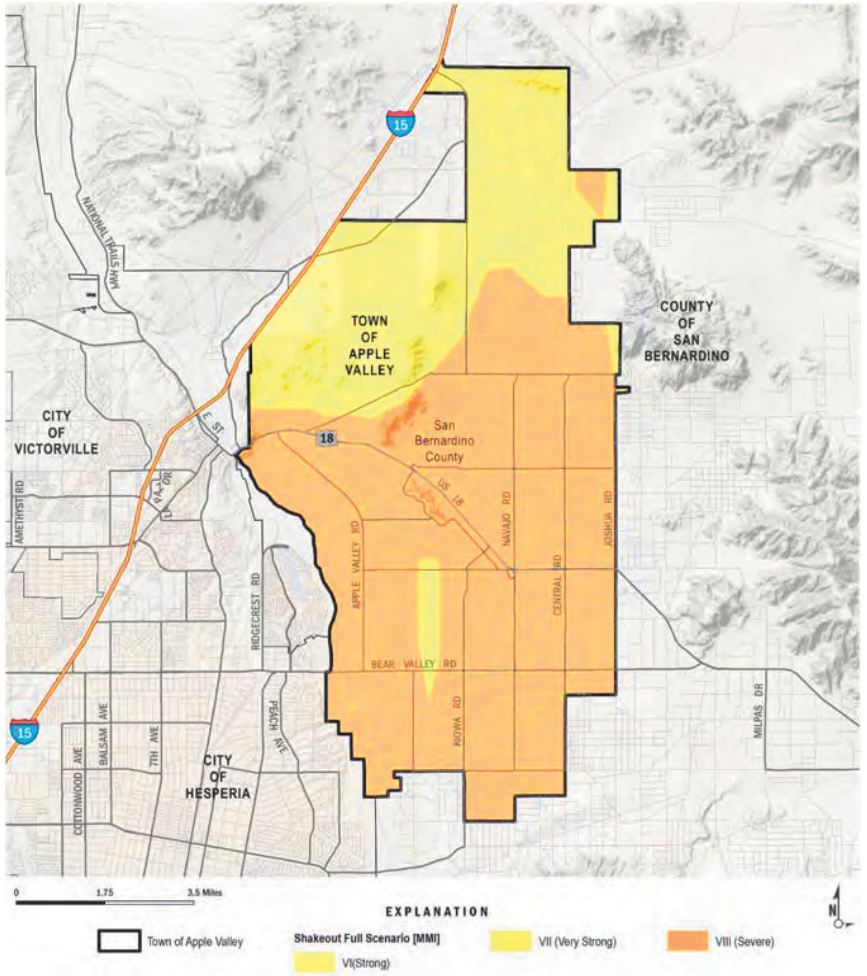


Figure 4-6: Great Shakeout Scenario MMI Classes

4.6.5 Frequency / Probability of Future Occurrences

While earthquakes occur less frequently than other primary natural hazard events, they have accounted for the greatest combined losses (deaths, injuries, and damage costs) in disasters since 1950 in California and have the greatest catastrophic disaster potential (Cal EMA, 2010).

The USGS estimates that the probability of an earthquake occurring over the next 30 Years in the Southern California with a magnitude of 6.7 or greater is 93 percent. Table 4-8 from the USGS lists Average time between earthquakes in the Southern California region together with the likelihood of having one or more such earthquakes in the next 30 years (starting from 2014). "Readiness" indicates the factor by which likelihoods are currently elevated, or lower, because of the length of time since the most recent large earthquakes. The values from the USGS include aftershocks. It is important to note that actual repeat times will exhibit a high degree of variability, and will almost never exactly equal the average listed in the table.

Table 4-8: Southern California Region Earthquake Probability

Magnitude (greater than or equal to)	Average repeat time (years)	30-year likelihood of one or more events	Readiness
5	.7	100%	1.0
6	2.3	100%	1.0
6.7	12	93%	1.0
7	25	75%	1.1
7.5	87	36%	1.2
8	522	7%	1.3

Source: USGS UCERF3: A New Earthquake Forecast for California's Complex Fault System FS 2015-3309

Uniform California Earthquake Forecasts (UCERF) estimated the likelihood that California will experience a magnitude 8 or larger earthquake in the next 30 years has increased from about 4.7% in 2007 (UCERF2[1]) to about 7.0% for the thirty-year duration starting in 2014 (UCERF3[2]). Several of the major Southern California faults have a high probability of experiencing a Magnitude 6.7 or greater earthquake within the next 30 years (Figure 4-7); 59% probability of a M6.7 or greater on the Southern San Andreas Fault, 31% probability on the San Jacinto Fault, and 11% probability on the Elsinore Fault. These probabilities were determined by the USGS and CGS in a 2008 study (2007 Working Group on California

[1] USERF2 = 2008 California Earthquake Probabilities. In April 2008, scientists and engineers released a new earthquake forecast for the State of California called the UCERF. Compiled by USGS, Southern California Earthquake Center (SCEC), and the California Geological Survey (CGS), with support from the California Earthquake Authority, it updates the earthquake forecast made for the greater San Francisco Bay Area by the 2002 Working Group for California Earthquake Probabilities.

[2] UCERF3 = 2014 California Earthquake Probabilities. UCERF3 is the first type of model, representing the latest earthquake-rupture forecast for California. It was developed and reviewed by dozens of leading scientific experts from the fields of seismology, geology, geodesy, paleoseismology, earthquake physics, and earthquake engineering. As such, it represents the best available science with respect to authoritative estimates of the magnitude, location, and likelihood of potentially damaging earthquakes throughout the state (further background on these models, especially with respect to ingredients, can be found in U.S. Geological Survey Fact Sheet 2008–3027, http://pubs.usgs.gov/fs/2008/3027/)

Earthquake Probabilities, 2008, The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2): U.S. Geological Survey Open-File Report 2007-1437 and California Geological Survey Special Report 203 [http://pubs.usgs.gov/of/2007/1437/]).

Figure 4-7 shows the locations of major faults in California, including the four (4) major faults in Southern California in relation to San Bernardino County region. These faults are the Southern San Andreas, the San Jacinto, the Elsinore, and the Garlock Faults. There are also many smaller faults within San Bernardino County capable of producing significant earthquakes. However, these four faults are considered by the United States Geological Survey (USGS) and the California Geological Survey (CGS) to be the most dangerous in the County. (California Geological Survey Special Publication 42, Interim Revision 2007, "Fault-Rupture Hazard Zones in California" - Alquist-Priolo Earthquake Fault Zoning Act).

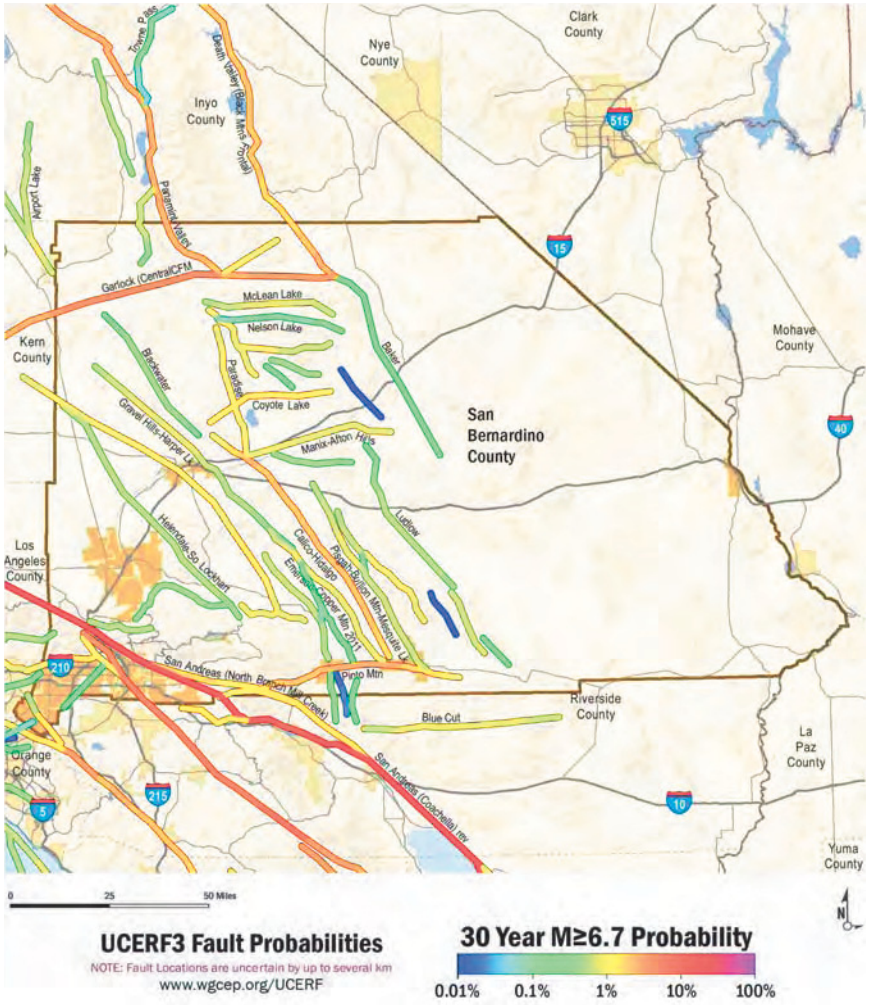


Figure 4-7: UCERF 3 Fault Probabilities

4.7 Climate Change



Climate change refers to any distinct change in measures of climate lasting for a long period of time, more specifically major changes in temperature, rainfall, snow, or wind patterns. Climate change may be limited to a specific region, or may occur across the whole Earth. Climate change may result from:

- Natural factors (e.g., changes in the Sun's energy or slow changes in the Earth's orbit around the Sun);
- Natural processes within the climate system (e.g., changes in ocean circulation);
- Human activities that change the atmosphere's make-up (e.g., burning fossil fuels) and the land surface (e.g., cutting down forests, planting trees, building developments in cities and suburbs, etc.).

The effects of climate change are varied: warmer and more varied weather patterns, melting ice caps, and poor air quality, for example. As a result, climate change impacts a number of natural hazards.

The 2013 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing.

4.7.1 Regulatory Environment

4.7.1.1 The Sustainable Communities and Climate Protection Act of 2008

The Sustainable Communities and Climate Protection Act of 2008 (Sustainable Communities Act, SB 375, Chapter 728, Statutes of 2008) looks to reduce GHG emissions through coordinated transportation and land use planning with the goal of more sustainable communities. Regional targets are established for GHG emissions reductions from passenger vehicle use by the sustainable communities strategy (SCS) established by each metropolitan planning organization (MPO). The SCS is an integral part of the regional transportation plan (RTP) and contains land use, housing, and transportation strategies to meet GHG reductions targets. In San Bernardino County, the South Coast Air Quality Management District facilitates compliance with the federal Clean Air Act and implements the state's air quality program.

The Office of Planning and Research's General Plan Guidelines and SB 375 builds upon Assembly Bill 162 (flood protection) and Senate Bill 1241 (fire protection) and supports Safeguarding California implementation.

SB 375 also supports Assembly Bill 2140 which requires that a City/County General Plan contains a safety element in addition to a Hazard Mitigation Plan. AB 2140 also requires a vulnerability assessment, adaptation goals, policies and objectives, and a set of feasible implementation measures.

4.7.1.2 Town of Apple Valley Climate Action Plan (CAP)

This Climate Action Plan includes general information about greenhouse gases and climate change, assumptions and data used to determine the 2005 inventory and baseline, the 2020 forecast under business as usual conditions, and the proposed reduction measures that will enable the Town to achieve the targeted reduction level, thereby doing its part to limit greenhouse gas emissions statewide that contribute to climate change.

To review the full text document, please click on the following link:

http://www.applevalley.org/services/planning-division/climate-action-plan

4.7.1.3 California Adaptation Planning Guide (APG)

The State of California has been taking action to address climate change for over 20 years, focusing on both greenhouse gas emissions reduction and adaptation. The California Adaptation Planning Guide (APG) continues the state's effort by providing guidance and support for communities addressing the unavoidable consequences of climate change.

Based upon specific factors, 11 Climate impact regions were identified. Some of the regions were based on specific factors particularly relevant to the region. As illustrated in Figure 4-8 San Bernardino County is located in the Desert Region.

4.7.1.4 Apple Valley Choice Energy

Apple Valley is addressing issues relating to Climate Change through the implementation of Apple Valley Choice Energy (AVCE). This program, started April of 2017, allows residents within Apple Valley to receive energy with a higher "renewable" content than what is currently provided by the franchised utility (SCE). The minimum renewable energy content for AVCE customers is 35%. In addition, the program provides an alternate selection of 50% renewable energy content for those who choose to "opt-up" to that plan. AVCE's minimum 35% renewable energy content already exceeds the California state mandate of 33% renewable energy content that will be required in the year 2020.

The renewable energy content is derived from solar, wind, hydro and geothermal sources primarily within California. Apple Valley Choice Energy plans to offer customers of AVCE a 100% renewable energy option in future years that will further reduce the overall impacts of Greenhouse Gases affecting Climate Change as a result of burning fossil fuels.

In addition to supplying renewable energy, AVCE actively promotes Net Energy Metering (NEM) for customers with rooftop solar by offering a premium by-back rate that is nearly double the rate that they would receive from SCE. AVCE will also offer future incentives to Town residents and businesses for improvements that contribute to energy efficiency as well as develop programs to encourage implementation of energy conservation measures. The Town also participates in the High Desert Regional Partnership with the other cities in the High Desert to promote energy efficiency on a regional basis.



Figure 4-8: Climate Impact Regions

The Desert is a heavily urbanized inland region (4.3+ million people) made up of sprawling suburban development in the west near the South Coast region and vast stretches of open, largely federally owned desert land to the east. Prominent cities within the desert portion include Palm Springs (44,500+) and El Centro (42,500+). The region's character is defined largely by the San Gabriel Mountains, San Gorgonio Mountains, San Jacinto Mountains, and smaller inland mountains reaching through the desert to the Colorado River, which borders the region on the east. Communities in the Desert region should consider evaluating the following climate change impacts:

- Reduced water supply
- Increased temperature
- Reduced precipitation
- Diminished snowpack
- Wildfire risk
- Public health and social vulnerability
- Stress on special-status species

4.7.2 Past Occurrences

Climate change has never been directly responsible for any declared disasters. Past flooding, wildfire, levee failure, and drought disasters may have been exacerbated by climate change, but it is impossible to make direct connections to individual disasters. In addition, unlike earthquake and floods that occur over a finite time period, climate change is an on-going hazard, the effects of which some are already experiencing. Other effects may not be seriously experienced for decades, or may be avoided altogether by mitigation actions taken today.

According to the California State Hazard Mitigation Plan (SHMP), the worst single heat wave event in California occurred in Southern California in 1955, when an eight-day heat wave resulted in 946 deaths. The July 2006 heat wave in California caused approximately 140 people deaths over a 13-day period.

4.7.3 Location/Geographic Extent

The effects of climate change are not limited by geographical borders. San Bernardino County, the State of California, the United States, and the rest of the world are all at risk to climate change. As such, the entire County is at risk to the effects of climate change.

Figure 4-9 and Figure 4-10 provide Cal Adapt[3] modeled decadal July high temperature averages for 2010 and 2090. These figures provide current decade-long July temperature averages and possible annual high heating trends for the remaining portion of the century. The data presented in the figures represent a "projection" of potential future climate scenarios, they are not predictions. These figures illustrate how the climate may change based on a variety of different potential social and economic factors. The visualizations are comprised of average values from Coupled Climate model 2.1 (GFDL), Community Climate System Model Version 3 (CCSM3), Coupled Global Climate Model Version 3 (CNRM) and Parallel Climate Model 1 (PCM1).

During the next few decades, scenarios project average temperature to rise between 1° and 2.3°F; however, the projected temperature increases begin to diverge at mid-century so that, by the end of the century, the temperature increases projected in the higher emissions scenario (A2) are approximately twice as high as those projected in the lower emissions scenario (B1). Customizable maps can be viewed at http://cal-adapt.org/temperature/decadal/

[3] Cal-Adapt has been funded to provide access to data and information that has been produced by the State's scientific and research community. The data available in this site offer a view of how climate change might affect California at the local level.

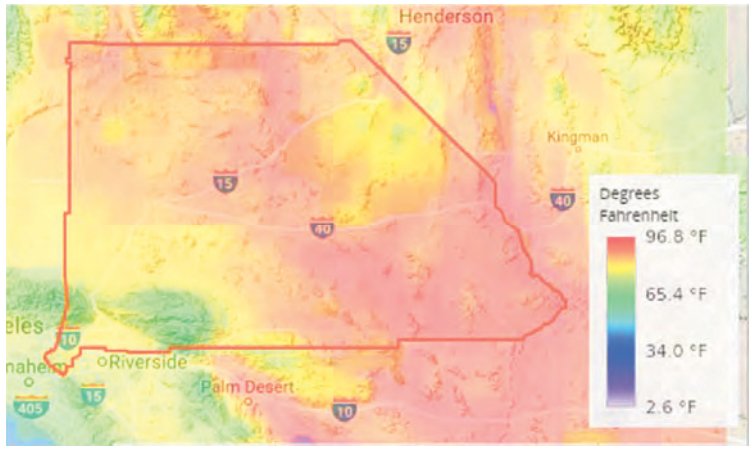


Figure 4-9: Climate Impact Regions: July Decadal Average High Temperature Map; 2010

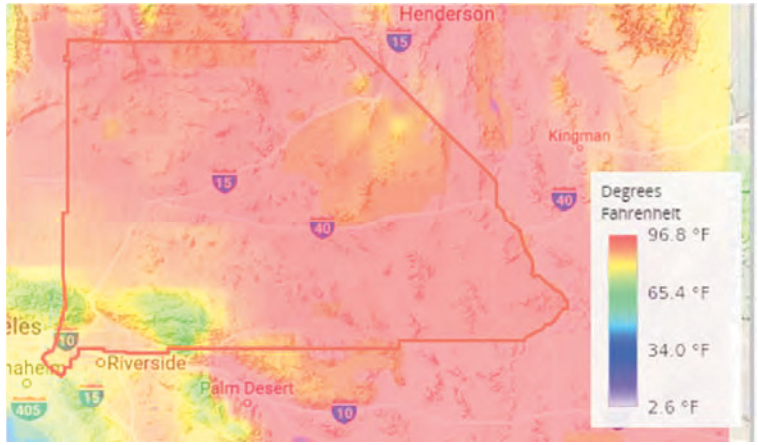


Figure 4-10: Climate Impact Regions: July Decadal Average High Temperature Map; 2090

4.7.4 Magnitude/Severity

The California Adaptation Planning Guide has calculated projections for changes in temperature, precipitation, heat waves, snowpack and wildfire risk in the desert area, as shown in Table 4-9. Hotter, drier conditions are expected to exist in the desert area, increasing the risk for other natural hazards.

Table 4-9: Summary of Cal-Adapt Climate Projections for the Desert Region

Effect	Ranges
Temperature Change, 1990-2100	January increase in average temperatures: 2°F to 4°F by 2050 and 5°F to 8°F by 2100 July increase in average temperatures: 3°F to 5°F by 2050 and 6°F to 9°F by 2100 (Modeled high temperatures; high carbon emissions scenario)
Precipitation	Generally, annual rainfall will decrease in the most populous areas. Wetter areas like the western part of Riverside and southwestern San Bernardino counties will experience a 2 to 4 inch decline by 2050 and 3.5 to 6 inch decline by the end of the century. Big Bear is expected to lose around 8 inches per year by 2090. Southern Imperial County will have a small decline of about 0.5 inches. The eastern, desert portion of the region will see little to no change in annual rainfall. (CCSM3 climate model; high carbon emissions scenario)
Heat Wave	Heat waves are defined by five consecutive days over temperatures in the 100s over most of the region. Three to five more heat waves will be experienced by 2050, increasing to 12 to 16 in the western parts of the region to more than 18 to 20 in the eastern parts of the region.
Snowpack	March snowpack in the Big Bear area will diminish from the 2.5- inch level of 2010 to 1.4 inches in 2030 and almost zero by 2090. (CCSM3 climate model; high emissions scenario)
Wildfire Risk	Most areas are projected to have the same or slightly increased likelihood of wildfire risk. The major exceptions are the Mecca San Gorgonio and San Jacinto Mountains, where wildfire will be 1.5 and 2.0 times more likely. (GFDL model, high carbon emissions scenario)

Source: Public Interest Energy Research, 2011. Cal-Adapt. Retrieved from http://cal-adapt.org]

The California Climate Adaptation Strategy (CAS), citing a California Energy Commission study, states that "over the past 15 years, heat waves have claimed more lives in California than all other declared disaster events combined." This study shows that California is getting warmer, leading to an increased frequency, magnitude, and duration of heat waves. These factors may lead to increased mortality from excessive heat, as shown in Figure 4-11.

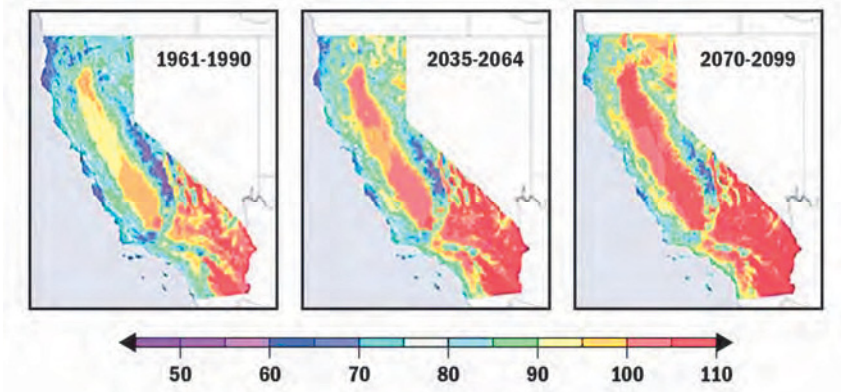


Figure 4-11: California Historical and Projected Temperature Increases - 1961 to 2099

Source: Dan Cayan; California Climate Adaptation Strategy

4.7.5 Frequency/Probability of Future Occurrences

Climate change is one of the few natural hazards where the probability of occurrence is influenced by human action. In addition, unlike earthquake and floods that occur over a finite time period, climate change is an on-going hazard.

The 2009 Climate Adaptation Strategy (CAS) delineated how climate change may impact and exacerbate natural hazards in the future, including wildfires, extreme heat, floods, drought, and levee failure:

- Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in San Bernardino County and the rest of California, which are likely to increase the risk of mortality and morbidity due to heat-related illness and exacerbation of existing chronic health conditions. Those most at risk and vulnerable to climate-related illness are the elderly, individuals with chronic conditions such as heart and lung disease, diabetes, and mental illnesses, infants, the socially or economically disadvantaged, and those who work outdoors.
- The Desert region relies on water from the Colorado River and the State Water Project. Both of these sources begin with mountain snowpack. Climate change will result in drastically reduced supply from these sources. Declining snowpack in the San Gabriel Mountains, San Gorgonio Mountains, and San Jacinto Mountains will lead to permanently diminished local water supply.
- Higher temperatures will melt the snowpack earlier and drive the snowline higher, resulting in less snowpack to supply water to California users.
- Droughts are likely to become more frequent and persistent in the 21st century.

- Intense rainfall events, periodically ones with larger than historical runoff, will continue to affect California with more frequent and/or more extensive flooding.
- Storms and snowmelt may coincide and produce higher winter runoff. Together, these changes will increase the probability of dam and levee failures in the San Bernardino County Flood Control District.
- Warmer weather, reduced snowpack, and earlier snowmelt can be expected to increase wildfire risk through fuel hazards and ignition risks. These changes can also increase plant moisture stress and insect populations, both of which affect forest health and reduce forest resilience to wildfires. An increase in wildfire intensity and extent will increase public safety risks, property damage, fire suppression and emergency response costs to government, watershed and water quality impacts, vegetation conversions and habitat fragmentation.

4.8 Vulnerability Assessment

The hazard exposure analysis has been developed with best available data and follows methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses. There are other intangible losses that could result from a natural hazard event, such as losses of historic or cultural integrity or damage to the environment that are difficult to quantify. Other costs, including response and recovery costs, are often unrecoverable and are not addressed in this document.

4.8.1 Methodology

A vulnerability assessment was conducted for each of the identified priority hazards. Geospatial data is essential in determining population and assets exposed to particular hazards. Geospatial analysis can be conducted if a natural hazard has a particular spatial footprint that can be overlaid against the locations of people and assets. In the Town of Apple Valley, wildfire, flood, and earthquakes have known geographic extents and corresponding spatial information about each hazard.

Several sources of data are necessary to conduct a vulnerability analysis. Figure 4-12 provides an exhibit of the data inputs and outputs used to create the vulnerability analysis results presented in this section. U.S. Census data is the primary source in determining natural hazard exposure to residents. Census data has been used to determine the population at risk, which is generally referred to as population exposure. Population exposure is provided for wildfire, flooding, and earthquakes as potential hazards later in this section.

Together with the U.S. Census data, asset data was used to provide a snapshot of how Town assets are affected by natural hazards. For purposes of this vulnerability analysis, asset data includes parcels and critical infrastructure within the Town of Apple Valley boundaries. Critical infrastructure is described as assets that are essential for people and a community to function. Critical infrastructure includes such as utilities, Apple Valley owned facilities, bridges, schools, and other community facilities that provide essential services to residents.

Critical facilities data was developed from a variety of sources including Apple Valley owned and maintained data, state and federal government datasets, and private industry datasets. A critical infrastructure spatial database was developed

to translate critical facilities information into georeferenced[4] points. Critical facility points are intersected with the spatial hazard layers to develop a list of "at risk" critical facilities. The Town of Apple Valley critical facilities that intersect with natural hazards are referred to as facilities with hazard "exposure". Exposure results are presented later in this section.

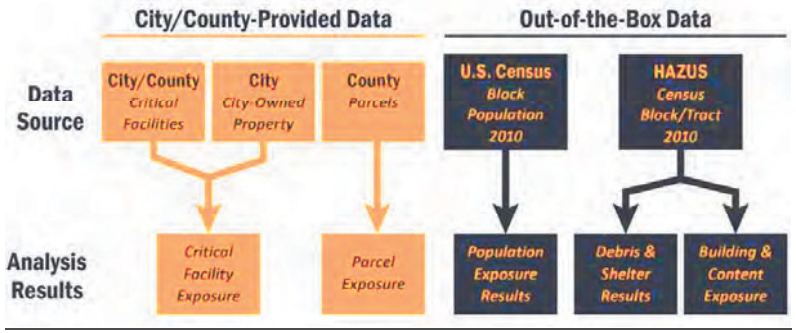


Figure 4-12: Data Source and Methodology

Lastly, FEMA's Hazus 3.2 (Hazus) software was implemented to conduct detailed loss estimation for flood and earthquake. Hazus is a nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. HAZUS uses Geographic Information Systems (GIS) technology to estimate physical, economic, and social impacts of disasters. For purposes of this planning effort, Hazus was used to graphically illustrate the limits of identified high-risk locations due to possible earthquakes and floods.

The vulnerability and potential impacts from priority hazards that do not have specific mapped areas nor the data to support additional vulnerability analyses are discussed in more general terms following the discussion on wildfire, flooding, dam failure and earthquake hazards.

4.8.2 Population and Assets

To describe vulnerability for each hazard, it is important to understand the "total" population and "total" assets at risk. The exposure for each hazard described in this section will refer to the percent of total population or percent of total assets. This provides the possible significance or vulnerability to people and assets for the natural hazard event and the estimated damage and losses expected during a "worst case scenario" event for each hazard. Sections below provide a description of the total population, critical facilities, and parcel exposure inputs.

[4] To georeference something means to define its existence in physical space. That is, establishing its location in terms of map projections or coordinate systems. The term is used both when establishing the relation between raster or vector images and coordinates, and when determining the spatial location of other geographical features.

4.8.2.1 Population

To develop hazard-specific vulnerability assessments, population near natural hazard risks should be determined to understand the total "at risk" population. We can understand how geographically defined hazards may affect the Town of Apple Valley by analyzing the extent of the hazard in relation to the location of population. For purposes of the vulnerability assessment approximately 100% of the Town of Apple Valley's population is exposed to one or more hazards within or near Apple Valley boundaries. Each natural hazard scenario affects the Town of Apple Valley residents differently depending on the location of the hazard and the population density of where the hazard could occur. Vulnerability assessment sections presented later in this section summarize the population exposure for each natural hazard.

4.8.2.2 Vulnerable Populations

The severity of a disaster depends on both the physical nature of the extreme event and the socioeconomic nature of the populations affected by the event. Important socioeconomic factors tend to influence disaster severity. A core concept in a vulnerability analysis is that different people, even within the same region, have a different vulnerability to natural hazards.

4.8.2.2.1 Income and Housing Condition

Income or wealth is one of the most important factors in natural hazard vulnerability. This economic factor affects vulnerability of low income populations in several ways. Lower income populations are less able to afford housing and other infrastructure that can withstand extreme events. Low income populations are less able to purchase resources needed for disaster response and are less likely to have insurance policies that can contribute to recovery efforts. Lower income elderly populations are less likely to have access to medical care due to financial hardship. Because of these and other factors, when disaster strikes, low income residences are far more likely to be injured or left without food and shelter during and after natural disasters.

Figure 4-13 shows the median household income distribution for the Town of Apple Valley in 2012. The "median" is the value that divides the distribution of household income into two equal parts (e.g., the middle). The average median household income in the Town of Apple Valley between 2010 and 2014 was $45,554. In the United States during the same period the median house household income was $50,157. The map in Figure 4-13 shows 2012 household income estimates using Census 2010 geographies.

4.8.2.2.2 Age

Children and the elderly tend to be more vulnerable during an extreme natural disaster. They have less physical strength to survive disasters and are often more susceptible to certain diseases. The elderly often also have declining vision and hearing and often miss reports of upcoming natural hazard events. Children, especially young children, have the inability to provide for themselves. In many cases, both children and the elderly depend on others to care for them during day to day life.

Finally, both children and the elderly have fewer financial resources and are frequently dependent on others for survival. In order for these populations to remain resilient before and after a natural hazard event, it may be necessary to augment city residents with resources provided by the City, State and Federal emergency management agencies and organizations. See Figure 4-14 and Figure 4-15 for location of vulnerable population by age within the Town of Apple Valley.

Town of Apple Valley Local Hazard Mitigation Plan 2017 Update

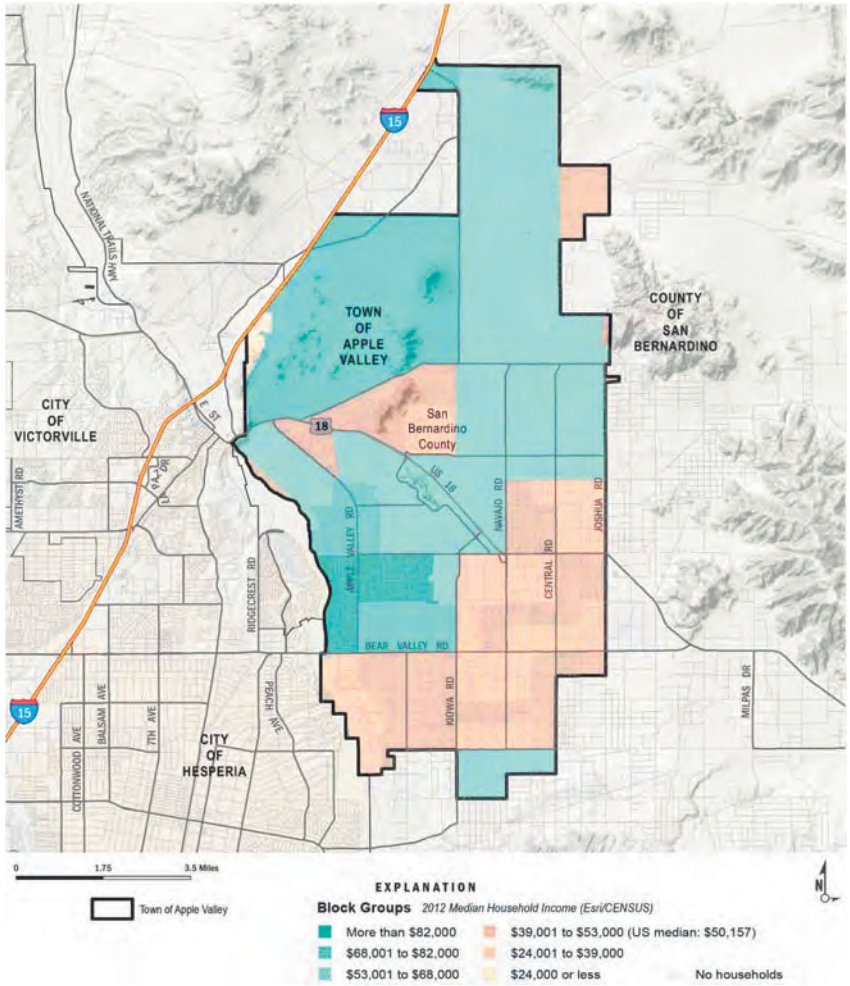


Figure 4-13: Median Household Income Distribution Map

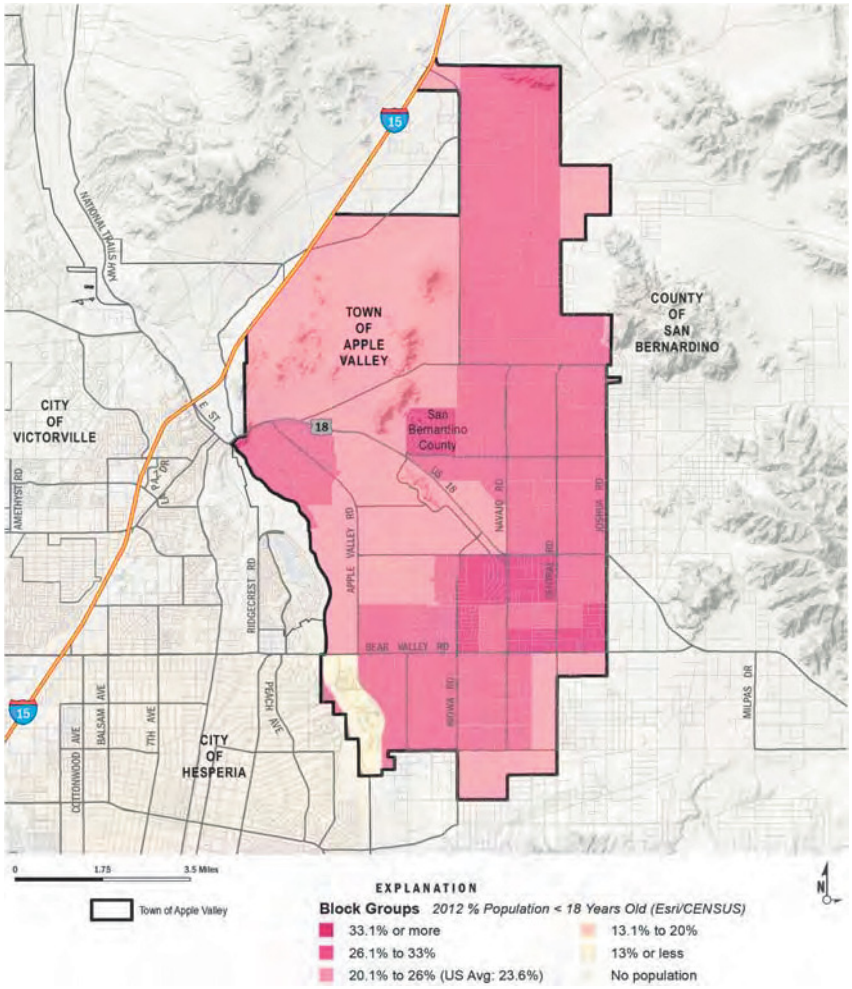


Figure 4-14: Population under 18

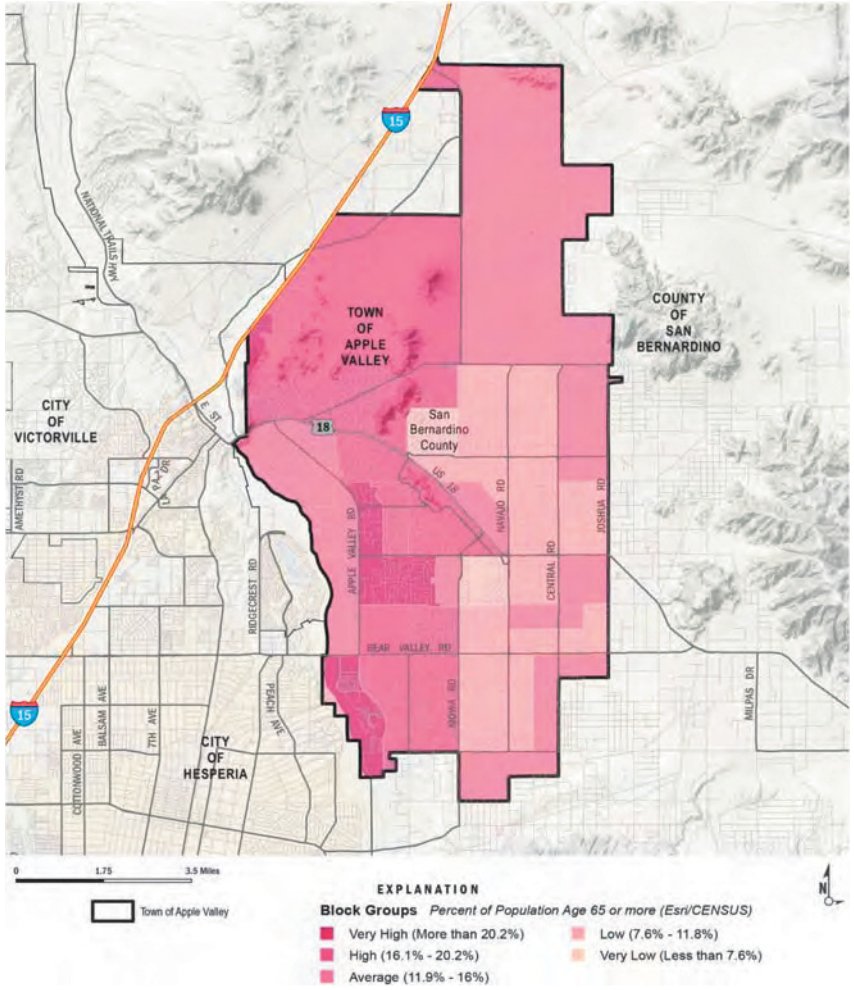


Figure 4-15: Population Over 65

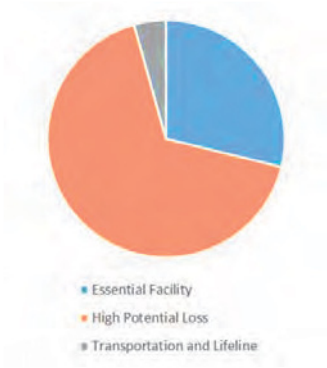
4.8.3 Critical Facilities

Critical facilities are of particular concern when conducting hazard mitigation planning. Critical facilities are defined as essential services, and if damaged, would result in severe consequences to the health, safety, and welfare of the public.

An inventory of critical facilities based on data from the County and other publicly sourced information were used to develop a comprehensive inventory of facility points and lifelines. Critical facility points include fire stations, buildings containing hazardous materials (HAZMAT), schools, transportation, utilities, and government buildings. Lifelines include transportation routes only. A current representation of the critical facilities and lifelines are provided in Table 4-10. Some critical facility information has been omitted from documentation due to national security purposes. The Emergency Preparedness Department manages and maintains a complete list of critical facilities.

Table 4-10: Critical Facility Points

Infrastructure Type	Total Feature Count
Essential Facility	53
EOC	1
Fire Station	6
Government Facility	4
Hospital	1
Police Station	1
School	26
High Potential Loss	137
Hazmat	43
Utility-Communication Facility	8
Utility-Potable Water Facility	2
Utility-Waste Water Facility	8
Vulnerable Pop.-Adult Residential Care	21
Vulnerable Pop.-Child Care	21
Vulnerable Pop.-Foster/Home Care	3
Vulnerable Pop. -Mobile Home Park	12
Vulnerable Pop.-RV Park	2
Vulnerable Population-Senior Care	17
Transportation and Lifeline	4
Highway Bridge	3
Airport Facility	1
Grand Total	**194**



4.8.4 HAZUS- MH Inputs

FEMA's loss estimation software, Hazus 3.2, was used to analyze the Town of Apple Valley's building risk to flood and earthquake hazards. Hazus contains a database of economic, demographic, building stock, transportation facilities, local geology, and other information that can be used for several steps in the risk assessment process. Hazus software operates on structure square footage, structure replacement, and content replacement costs aggregated to the census block and tract levels depending on type of hazard analysis. Figure 4-16 and Figure 4-17 provides value data for building categories at the census block and census tract levels. Census block and census tracts are used to provide input information for the Hazus analysis presented in this report.

The project team used these newly updated DFIRM data into HAZUS to assess potential losses in the mapped 100-year (with and without levee protection) and 500-year flood zones. The Town of Apple Valley's results are provided in Table 4-13.

Note: The Hazus software utilizes different census level information inputs to develop loss estimates depending on the hazard module. The flood module uses census block information while the earthquake module uses census track information. It is important to understand the total values of each as estimated damage to the community is presented on a percent of total value basis.

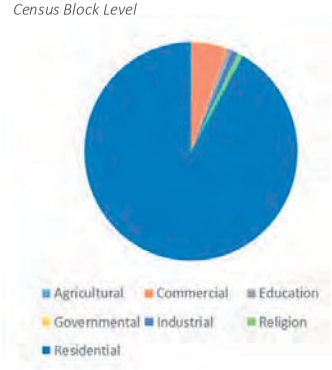
Also building losses are those losses associated with damage to the fixed elements of a structure, such as the foundation, walls, or floors. Content losses are those losses associated with damage to structural elements not permanently fixed within a structure, such as furniture, appliances, and personal possessions.

Table 4-111: Entire Town of Apple Valley Hazus Flood Census Block Input Values

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (%)	Content Replacement Cost ($000)	Content Replacement Cost (%)	Total Value ($000)	Total Value (%)
Agricultural	3,257	50.0%	3,257	50.0%	6,514	0%
Commercial	190,685	48.1%	205,597	51.9%	396,282	7%
Education	30,063	50.0%	30,063	50.0%	60,126	1%
Governmental	1,342	50.0%	1,342	50.0%	2,684	0%
Industrial	38,559	45.6%	45,947	54.4%	84,506	2%
Religion	26,262	50.0%	26,262	50.0%	52,524	1%
Residential	3,313,104	66.7%	1,656,837	33.3%	4,969,941	89%
Total	**$3,603,272**	**65%**	**$1,969,305**	**35%**	**$5,572,577**	

Total Building Input Values by Occupancy

Census Block Level



Total Content Input Values by Occupancy

Census Block Level

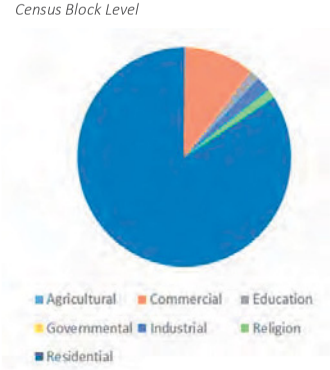


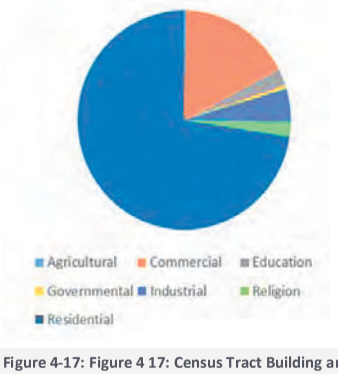
Figure 4-16: Census Block Building and Content Exposure Values-Flood

Table 4-122: Entire Town of Apple Valley Hazus Earthquake Census Tract Input Values

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (%)	Content Replacement Cost ($000)	Content Replacement Cost (%)	Total Value ($000)	Total Value (%)
Agricultural	16,945	50.0%	16,945	50.0%	33,890	0%
Commercial	871,378	48.4%	930,061	51.6%	1,801,439	12%
Education	127,653	46.0%	149,768	54.0%	277,421	2%
Governmental	18,719	46.0%	21,941	54.0%	40,660	0%
Industrial	206,910	43.3%	271,175	56.7%	478,085	3%
Religion	116,478	50.0%	116,478	50.0%	232,956	2%
Residential	7,977,134	66.7%	3,989,622	33.3%	11,966,756	81%
Total	**$9,335,217**	**63%**	**$5,495,990**	**37%**	**$14,831,207**	

Total Building Input Values by Occupancy

Census Tract Level



Total Content Input Values by Occupancy

Census Tract Level

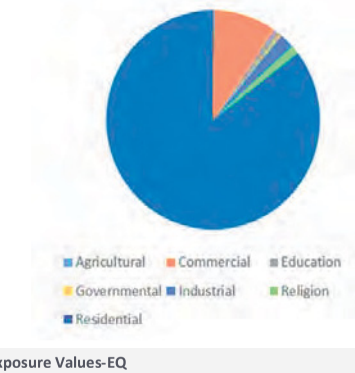


Figure 4-17: Figure 4 17: Census Tract Building and Content Exposure Values-EQ

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4.9 Vulnerability Assessment-Flooding



Flooding has shown to be a natural hazard with concerns in the Town of Apple Valley as described in the flood hazard profile. Historically, San Bernardino County has been subject to flooding during periods of heavy rainfall, falling primarily between the months of October through April, which causes streams and drainage canals to become overwhelmed and overflow their banks and/or inundate storm drainage systems. Occasionally, overbank flows in the Town of Apple Valley have resulted in flooding of residential properties, road blockages, and traffic disruptions. In urbanizing areas, the increase in paved areas associated with new development decrease the amount of open land available to absorb rainfall and runoff, thus increasing the volume of water that must be carried away by waterways.

4.9.1 Population living with Flood Risk

Of greatest concern in the event of a flood is the potential for loss of life. Using 2012 population data aggregated by census blocks, an estimate was made of the population exposed to the 100- and 500-year floodplain. To account for census blocks that were partially within the floodplain, a weighted average was employed to calculate the proportion of the population within the floodplain. The results of the population overlay are shown in Figure 4-18. More than 1400 residents live near or within the 100-year floodplain and approximately 1500 residents live within the 500-year floodplain.

Population Exposure

Population Count within Unincorporated San Bernardino County by Flood Hazard Zone

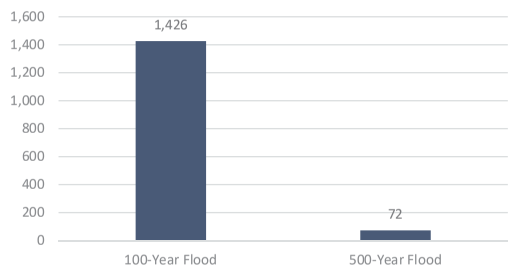


Figure 4-18: Population Exposed to NFIP Flood Zones

4.9.2 Residential Parcel Value with Flood Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels within the FEMA NFIP flood zones. In some cases, a parcel will be within multiple flood zones. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the floodplain layer to determine the flood risk for each structure. The flood zone in which the centroid was located was assigned to the entire parcel. This methodology assumed that every parcel with a square footage value greater than zero was developed in some way. Only improved parcels greater than $20,000 were analyzed. Table 4-13 shows the count of at-risk parcels and their improvement and land exposure values.

Table 4-133: Parcels Exposed to NFIP Flood Zones

Flood Hazard Zone	Improved Parcel Count	Improvement Value Exposure ($000)	Land Value Exposure ($000)	Total Exposure ($000)
100-Year Flood	323	$55,890	$14,092	$69,982
500-Year Flood	22	$5,356	$1,537	$6,892
500-Year, Protected by Levee	-	-	-	-
Grand Total	**345**	**$61,246**	**$15,629**	**$76,875**

Notes:
1-The table above does not display loss estimation results; the table exhibits total value at risk based upon the hazard overlay and San Bernardino County Assessor data.
2- Parcel information is for all county parcels with greater than $20,000 in assessed parcel improvement value only. The San Bernardino County Assessor's roles only provide spatial information on assessed improvement and land values.

While there are several limitations to this methodology, it does allow for potential loss estimation. It should be noted that the analysis may include structures in the floodplain that are elevated at or above the level of the base flood elevation, which will likely decrease potential flood damage to these structures. Also, it is important to remember that the County Assessor's values are well below actual market values; thus, the actual value of assets at risk may be significantly higher than those included herein.

4.9.3 Critical Facilities Exposure

Critical facilities data were overlain with flood hazard data to determine the type and number of facilities within the 100- and 500-year floodplain. Flooding poses numerous risks to critical facilities and infrastructure:

- Roads or railroads that are blocked or damaged can prevent access throughout the area and can isolate residents and emergency service providers needing to reach vulnerable populations or to make repairs.
- Bridges washed out or blocked by floods or debris from floods also can cause isolation.
- Creek or river floodwaters can back up drainage systems causing localized flooding.
- Floodwaters can get into drinking water supplies causing contamination.
- Sewer systems can be backed up causing waste to spill into homes, neighborhoods, rivers, and streams.
- Underground utilities can also be damaged.

Table 4-14 and Table 4-15 provides an inventory of critical facilities in the floodplain for Apple Valley and provides the locations of lifelines relative to the floodplain in the areas of the Apple Valley. With a total of nine essential facilities, high potential losses, and transportation and lifeline structures located in either the 100- or 500-year flood zone, the impact to the community could be devastating if these critical facilities were damaged or destroyed during a flood event.

Table 4-144: Critical Facility Exposed to NFIP Flood Zones

Infrastructure Type	100 Year Flood Zone	500 Year Flood Zone	500 Year Flood Zone, Protected by Levee	Total Feature Count
Essential Facility	1	0	0	1
EOC	0	0	0	0
Fire Station	1	0	0	1
Government Facility	0	0	0	0
Hospital	0	0	0	0
Police Station	0	0	0	0
School	0	0	0	0
High Potential Loss	6	0	0	6
Dam	0	0	0	0
Economic Element-Major Employer	0	0	0	0
Hazmat	3	0	0	3
Historic/Cultural Resource-Historic	0	0	0	0
Utility-Communication Facility	0	0	0	0
Utility-Electric Power Facility	0	0	0	0
Utility-Natural Gas Facility	0	0	0	0
Utility-Potable Water Facility	0	0	0	0
Utility-Waste Water Facility	3	0	0	3
Vulnerable Population-Adult Residential Care	0	0	0	0
Vulnerable Population-Child Care	0	0	0	0
Vulnerable Population-Flood Zone	0	0	0	0
Vulnerable Population-Foster/Home Care	0	0	0	0
Vulnerable Population-Mobile Home Park	0	0	0	0
Vulnerable Population-RV Park	0	0	0	0
Vulnerable Population-Senior Care	0	0	0	0
Transportation and Lifeline	2	0	0	2
Highway/Road Bridge	2	0	0	2
Railway Bridge	0	0	0	0
Bus Facility	0	0	0	0
Rail Facility	0	0	0	0
Airport Facility	0	0	0	0
Grand Total	**9**	**-**	**-**	**9**

Table 4-155: Lifelines Exposure to NFIP Flood Zones

Facility Type	100 Year	500 Year Flood Zone	500 Year Flood Zone, Protected by Levee	Total Mileage
Transportation and Lifeline	22	1	0	23
Railway	0	0	0	0
Roads	22	1	0	23
Interstate Highway	0	0	0	0
State / County Highway	3	0	0	3
Primary Highway	0	0	0	0
Local Road, Major	2	0	0	2
Local Road	14	0	0	14
Other Minor Road	3	0	0	3
Vehicular Trail	0	0	0	0
Cul-de-Sac / Traffic Circle	0	0	0	0
Ramp	0	0	0	0
Service Road	0	0	0	0
Total	**22**	**1**	**0**	**23**

4.9.4 Loss Estimation Results

The Hazus analysis was used to assess the risk from and vulnerability to flooding within the Town Apple Valley. Hazus buildings data is aggregated to the census block level, known as the general building stock (GBS), which has a level of accuracy acceptable for hazard mitigation planning purposes. The following sections describe risk to and vulnerability of the GBS within Apple Valley's mapped regulatory floodplain. The total value of exposed buildings and content within Apple Valley's planning area was generated using Hazus and is previously summarized in Table 4-11

Hazus calculates losses to structures from flooding by considering the depth of flooding and type of structure. Using historical flood insurance claim data, the software estimates the percentage of damage to structures and their contents by applying established depth-damage curves. Damage estimates are then translated to estimated dollar losses. The results are summarized in Figure 4-19 and Figure 4-20.

An estimated $3.9 million of damage could occur in the Town Apple Valley's regulatory floodplain if all flooding sources experienced a 100-year flood event. If all flooding sources experienced a 500-year flood event in Apple Valley there could be an additional $254,000 in damage, for a total of near $4.15 million in lo, Table 4-16.

Table 4-17 & 4-18 show loses for each building type for both the 100-year and 500-year flood event. The Total Town Value shown at the end of each of these tables represents an estimate of the total value of these building types throughout the entire Town of Apple Valley.

While there are several limitations to the FEMA Hazus model, it does allow for potential loss estimation. It should be noted that the analysis may include structures in the floodplain that are elevated at or above the level of the base flood elevation, which will likely mitigate flood damage. Also, it is important to remember that the replacement costs are well below actual market values, thus, the actual value of assets at risk may be significantly higher than those included herein.

Table 4-166: Flood Loss Estimation (Based on Depth) in NFIP Flood Zones

Flood Hazard Zone	Building Loss ($000)	Building Loss (% of Total Value)	Content Loss ($000)	Content Loss (% of Total Value)	Total Estimated Loss ($000)	Total Estimated Loss (% of Total Value)
100-Year	2,039	0.0%	1,874	0.0%	3,914	0.1%
500-Year	138	0.0%	115	0.0%	254	0.0%

*Note: *from section 4.10.3 'Hazus Floods Census Block Input Values' totals*
1- Building Replacement Costs($000) = $3,603,272
2- Content Replacement Cost($000) = $1,969,305
3- Total Value($000) = $5,572,577

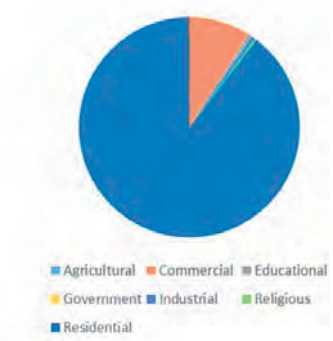
Table 4-177: 100-Year Flood Loss Estimation (Based on Depth) in NFIP Flood Zones by Occupancy Type

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (% of Total Value)	Content Replacement Cost ($000)	Content Replacement Cost (% of Total Value)	Total Estimated Loss ($000)	Total Loss Estimation (% of Total Value)	Total Town Value ($000)
Agricultural	-	0.00%	-	0.00%	-	0.00%	6,514
Commercial	181	0.05%	723	0.18%	904	0.23%	396,282
Educational	14	0.02%	91	0.15%	105	0.17%	60,126
Government	-	0.00%	-	0.00%	-	0.00%	2,684
Industrial	12	0.01%	16	0.02%	28	0.03%	84,506
Religious	5	0.01%	54	0.10%	59	0.11%	52,524
Residential	1,827	0.04%	990	0.02%	2,818	0.06%	4,969,941
Grand Total	**$2,039**	**0.04%**	**$1,874**	**0.03%**	**$3,914**	**0.07%**	**$5,572,577**

*Note: *from section 4.10.3 'Hazus Floods Census Block Input Values' totals*
1- Building Replacement Costs($000) = $3,603,272
2- Content Replacement Cost($000) = $1,969,305
3- Total Value($000) = $5,572,577

100 YR Flood Hazard

Estimated Building Loss by Occupancy Type



100 YR Flood Hazard

Estimated Content Loss by Occupancy Type

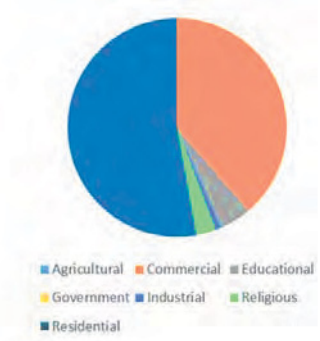


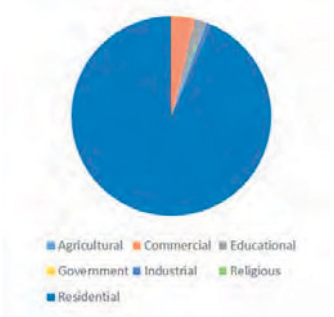
Figure 4-19: Total Building and Content Loss by Occupancy Type

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (% of Total Value)	Content Replacement Cost ($000)	Content Replacement Cost (% of Total Value)	Total Estimated Loss ($000)	Total Loss Estimation (% of Total Value)	Total Town Value ($000)
Agricultural	-	0.00%	-	0.00%	-	0.00%	6,514
Commercial	5	0.00%	17	0.00%	22	0.01%	396,282
Educational	3	0.00%	23	0.04%	27	0.04%	60,126
Government	-	0.00%	-	0.00%	-	0.00%	2,684
Industrial	1	0.00%	1	0.00%	2	0.00%	84,506
Religious	-	0.00%	8	0.02%	8	0.02%	52,524
Residential	129	0.00%	66	0.00%	195	0.00%	4,969,941
Grand Total	**$138**	**0.00%**	**$115**	**0.00%**	**$254**	**0.00%**	**$5,572,577**

*Note: *from section 4.10.3 'Hazus Floods Census Block Input Values' totals*
1- Building Replacement Costs($000) = $3,603,272
2- Content Replacement Cost($000) = $1,969,305
3- Total Value($000) = $5,572,577

500 YR Flood Hazard

Estimated Building Loss by Occupancy Type



500 YR Flood Hazard

Estimated Content Loss by Occupancy Type

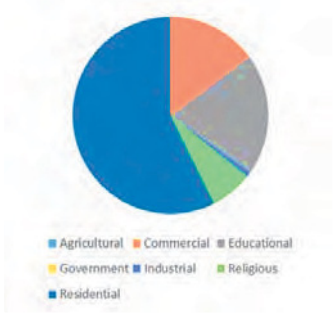
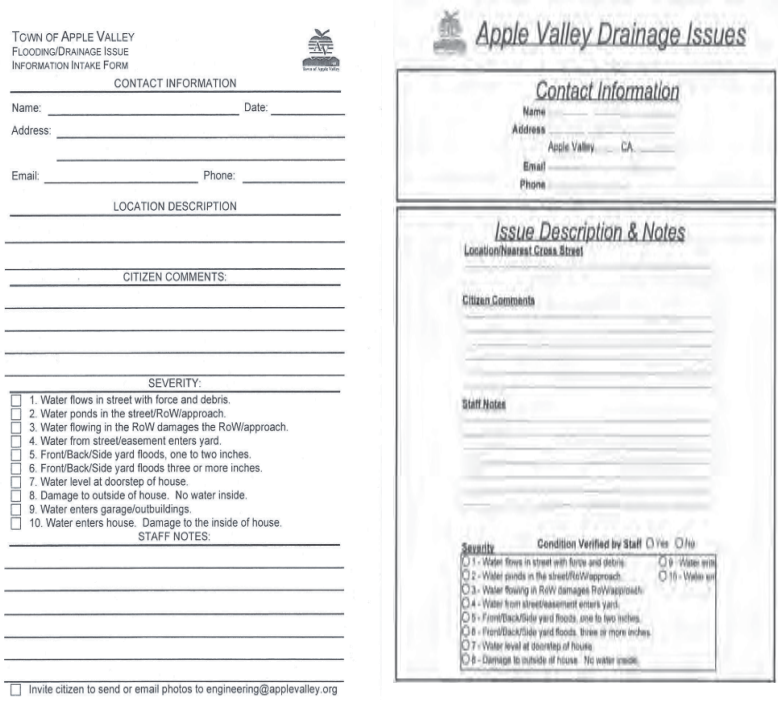


Figure 4-20: Total Building and Content Loss by Occupancy Type

4.9.5 The Local Data Collection

The Town of Apple Valley Engineering Department collects data regarding flooding and drainage issues from the public on a regular basis. Data is collected by the Engineering Department staff and used to identify areas of concerns throughout the Town. Majority of the data is received after heavy rains but data can also be obtained due to broken water mains or private property issues regarding water. Figure 4-20 below is a copy of the two forms that are used to collect data. The first form is used to gather data from the resident and the second form is used by engineering staff to evaluate the reported concern.



TOWN OF APPLE VALLEY
FLOODING/DRAINAGE ISSUE
INFORMATION INTAKE FORM

CONTACT INFORMATION

Name: _____ Date: _____

Address: _____

_____

Email: _____ Phone: _____

LOCATION DESCRIPTION

_____

_____

CITIZEN COMMENTS:

_____

_____

_____

SEVERITY:

- ☐ 1. Water flows in street with force and debris.
- ☐ 2. Water ponds in the street/RoW/approach.
- ☐ 3. Water flowing in the RoW damages the RoW/approach.
- ☐ 4. Water from street/easement enters yard.
- ☐ 5. Front/Back/Side yard floods, one to two inches.
- ☐ 6. Front/Back/Side yard floods three or more inches.
- ☐ 7. Water level at doorstep of house.
- ☐ 8. Damage to outside of house. No water inside.
- ☐ 9. Water enters garage/outbuildings.
- ☐ 10. Water enters house. Damage to the inside of house.

STAFF NOTES:

_____

_____

_____

_____

_____

_____

☐ Invite citizen to send or email photos to engineering@applevalley.org

Apple Valley Drainage Issues

Contact Information

Name
Address
Apple Valley CA
Email
Phone

Issue Description & Notes

Location/Nearest Cross Street

Citizen Comments

Staff Notes

Severity Condition Verified by Staff ○ Yes ○ No

○ 1 - Water flows in street with force and debris.
○ 2 - Water ponds in the street/RoW/approach.
○ 3 - Water flowing in RoW damages RoW/approach.
○ 4 - Water from street/easement enters yard.
○ 5 - Front/Back/Side yard floods, one to two inches.
○ 6 - Front/Back/Side yard floods, three or more inches.
○ 7 - Water level at doorstep of house.
○ 8 - Damage to outside of house. No water inside.
○ 9 - Water ent
○ 10 - Water en

Figure 4-21: Flooding/Drainage Resident Forms

4.10 Vulnerability Assessment-Wildfire



Risk to the Town of Apple Valley from wildfire is of significant concern. High fuel loads in the hills, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. During the May to October fire season the dry vegetation, hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become large and out-of-control.

Potential losses from wildfire include human life, structures and other improvements, natural and cultural resources, quality and quantity of water supplies, cropland, timber, and recreational opportunities. Short and long-term economic losses could also result due to loss of business and other economic drivers associated with the Town of Apple Valley summer season activities. Smoke and air pollution from wildfires can be a severe health hazard. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

Generally, there are three major factors that sustain wildfires and predict a given area's potential vulnerability to burn. These factors are fuel, topography, and weather.

- Fuel – Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and volume. Fuel sources are diverse and include everything from dead tree leaves, twigs, and branches, to dead standing trees, live trees, brush, and cured grasses. Manmade structures are also considered a fuel source, such as homes and other associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Fuel is the only factor that is under human control. Development in the area along the Mojave River currently possess the highest vulnerability to wildfire.
- Topography – An area's terrain and slope affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.
- Weather – Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out fuels that feed wildfires, creating a situation where fuel will ignite more readily and burn more intensely. Thus, during periods of drought the threat of wildfire increases. Wind is the most treacherous weather factor. The greater the wind, the faster a fire can spread and the more intense it can be. Wind shifts, in addition to wind speed, can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. As part of a weather system, lightning also ignites wildfires, often in difficult to reach terrain for firefighters.

Factors contributing to the high, widespread wildfire risk in the Town of Apple Valley include:

- Narrow and often one-lane and/or dead-end roads complicating evacuation and emergency response.
- Nature and frequency of ignitions; and increasing population density leading to more ignitions.
- Slope of the foothills;
- Residential development along the Mojave River

4.10.1 Population at Risk

Wildfire risk is of greatest concern to populations residing in the moderate, high, and very high wildfire hazard zones. According to the LRA Fire Hazard Severity Zone Apple Valley has a moderate risk of wildfire within Town boundaries. Apple Valley census block data was used to estimate populations within the hazard zones. There are a significant number of people living within the WUI described in the wildfire profiles. More than 30,000 residents in the Town limits live within areas considered moderate fire hazard, see Figure 4-21.

Population Exposure

Population Count by Wildfire Hazard Zone



Figure 4-22: Population at risk from Wildfire Hazards

4.10.2 Residential Parcel Value at Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels. In some cases, a parcel will be within multiple fire threat zones. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the fire threat layer to determine the risk for each structure. The fire threat zone in which the centroid was located was assigned to the entire parcel. This methodology assumed that every parcel with a square footage value greater than zero was developed in some way. Only improved parcels were analyzed. Figure 4-19 exhibits portions of the Town of Apple Valley that have significant assets at risk to wildfire in the Moderate fire severity zones.

Table 4-188: Residential Buildings and Content at Risk from Wildfire

Fire Hazard Severity Hazard Zone	Improved Parcel Count	Improvement Value Exposure ($000)	Land Value Exposure ($000)	Total Exposure ($000)
Very High	-	-	-	-
High	-	-	-	-
Moderate	9,664	3,419,489	750,783	4,170,272
Non-Wildland/Non-Urban	39	7,932	1,264	9,196
Urban Unzoned	12,633	3,326,800	1,157,957	4,484,757
Total	**22,336**	**$6,754,220**	**$1,910,004**	**$8,664,225**

Note:
1-The table above does not display loss estimation results; the table exhibits total value at risk based upon the hazard overlay and San Bernardino County Assessor data.
2- Parcel information is for all county parcels with greater than $20,000 in assessed parcel improvement value only. The San Bernardino County Assessor's roles only provide spatial information on assessed improvement and land values

4.10.3 Critical Facilities at Risk

Critical facilities data were overlain with fire hazard severity zone data to determine the type and number of facilities within each risk classification. Lists only included the critical facilities in the High and Very High wildfire hazard zones for Town of Apple Valley. Since Apple Valley only has Medium risk classification within Town boundaries there are no critical facilities at risk.

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4.11 Vulnerability Assessment-Earthquake



Major impacts from earthquakes are primarily the probable number of casualties and damage to infrastructure occurring from ground movement along a particular fault (USGS, 2016). The degree of infrastructure damage depends on the magnitude, focal depth, distance from fault, duration of shaking, type of surface deposits, presence of high groundwater, topography, and the design, type, and quality of infrastructure construction.

To analyze the risk to the Town of Apple Valley residents, the Great Shakeout scenario was chosen modeled by the California Integrated Seismic Network (CISN). The 2008 Great Southern California ShakeOut was based on a potential magnitude 7.8 earthquake on the southern San Andreas Fault— approximately 5,000 times larger than the magnitude 5.4 earthquake that shook southern California on July 29, 2008. Such an earthquake will cause unprecedented damage to Southern California—greatly dwarfing the massive damage that occurred in Northridge's 6.7-magnitude earthquake in 1994. The hazard foot print for this scenario was used to develop exposure results for population, critical facilities, and single family residential parcel values. FEMA Hazus analyses was used to conducted loss estimation for both scenarios and include building and content loss estimation results based on peak ground acceleration, peak ground velocity, and peak spectral acceleration modeled for the 7.8 earthquake on the San Andreas Fault.

Apple Valley follows all existing building codes as required by Section 17992 of the Health and Safety Code of the State of California and Chapter 8 of the Apple Valley Municipal Code.

4.11.1 Population at Risk

According to the 2010 US Census, the population of the Town of Apple Valley is 69,130. Though rural residential construction is not particularly vulnerable to earthquakes, the chosen earthquake scenarios will directly or indirectly expose the entire population of the Town of Apple Valley to ground shaking. Depending on the time of day and exact location of the modeled epicenter, the earthquake scenarios could be experienced differently. Figure 4-23 exhibit the population totals in each modeled earthquake severity zone. Population location is based upon information taken during the 2010 U.S. Census.

Population Exposure

Population Count for Great Shakeout Scenario

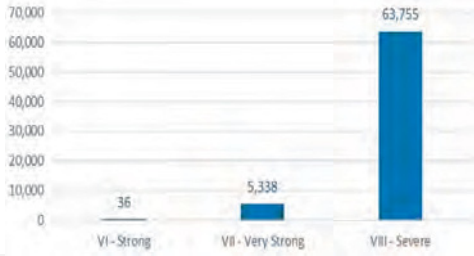


Figure 4-23: Population Exposure to The Great Shakeout EQ Shake Severity Zone

4.11.2 Residential Parcel Value at Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the shake severity zones to determine the at-risk structures. Only improved parcels greater than $20,000 were analyzed. The analysis indicates residential parcels the chosen scenario will experience similar, but different shaking patterns. The type and year of construction will greatly influence damage for structures subject to similar shaking. Table 4-21 shows the count of at-risk structures and their associated improvement and land exposure values.

Table 4-19: Residential Parcel Value Exposure from Southern California Great Shakeout

Shake Severity Zone	Improved Parcel Count	Improvement Value Exposure ($000)	Land Value Exposure ($000)	Total Exposure ($000)
IV - Light	-	-	-	-
V - Moderate	-	-	-	-
VI - Strong	16	4,773	1,289	6,062
VII - Very Strong	1,798	428,924	93,924	522,848
VIII - Severe	20,522	6,320,523	1,814,791	8,135,314
IX - Violent	-	-	-	-
Total	**22,336**	**$6,754,220**	**$1,910,004**	**$8,664,225**

Notes:
1-The table above does not display loss estimation results; the table exhibits total value at risk based upon the hazard overlay and San Bernardino County Assessor data.
2- Parcel information is for all county parcels with greater than $20,000 in assessed parcel improvement value only. The San Bernardino County Assessor's roles only provide spatial information on assessed improvement and land values.

4.11.3 Critical Facilities with Damage Potential

Earthquakes pose numerous risks to critical facilities and infrastructure. Seismic risks, or losses, that are likely to result from exposure to seismic hazards include:

- Casualties (fatalities and injuries).
- Utility outages.
- Economic losses for repair and replacement of critical facilities, roads, buildings, etc.
- Indirect economic losses such as income lost during downtime resulting from damage to private property or public infrastructure.

Roads or railroads that are blocked or damaged can prevent access throughout the area and can isolate residents and emergency service providers needing to reach vulnerable populations or to make repairs.

Linear utilities and transportation routes are vulnerable to rupture and damage during and after a significant earthquake event. The cascading impact of a single failure can have affects across multiple systems and utility sectors. Degrading infrastructure systems and future large earthquakes with epicenters near critical regional infrastructure could result in system outages that last weeks for the most reliable systems, and multiple months for others.

Table 4-22 provides an inventory of critical facility locations (points only) with earthquake exposure to the Great Shakeout Scenario. The building codes have been amended to include provisions for seismic safety at various bench marks years. Depending on "year built", each critical facility presented in the tables may have varying damage potential.

Table 4-190: Critical Facilities with EQ Risk Southern California Great Shakeout

Infrastructure Type	Violent Shake Zone (IX)	Severe Shake Zone (VIII)	Very Strong (VII)	Strong Shake Zone (VI)	Total Feature Count
Essential Facility	-	2	37	-	39
EOC	-	-	1	-	1
Fire Station	-	-	6	-	6
Government Facility	-	1	3	-	4
Hospital	-	-	1	-	1
Police Station	-	-	1	-	1
School	-	1	25	-	26
High Potential Loss	-	8	115	-	123
Dam	-	-	-	-	-
Economic Element-Major Employer	-	-	-	-	-
Hazmat	-	4	39	-	43
Historic/Cultural Resource-Historic	-	-	-	-	-
Utility-Communication Facility	-	-	8	-	8
Utility-Electric Power Facility	-	-	-	-	-
Utility-Natural Gas Facility	-	-	-	-	-
Utility-Potable Water Facility	-	-	2	-	2
Utility-Waste Water Facility	-	-	8	-	8
Vulnerable Population-Adult Residential Care	-	-	21	-	21
Vulnerable Population-Child Care	-	1	20	-	21
Vulnerable Population-Flood Zone	-	-	-	-	-
Vulnerable Population-Foster/Home Care	-	-	3	-	3
Vulnerable Population-Mobile Home Park	-	-	-	-	-
Vulnerable Population-RV Park	-	-	-	-	-
Vulnerable Population-Senior Care	-	3	14	-	17
Transportation and Lifeline		2	2	-	4
Highway Bridge		2	1	-	3
Railway Bridge	-	-	-	-	-
Bus Facility	-	-	-	-	-
Rail Facility	-	-	-	-	-
Airport Facility	-	-	1	-	1
Grand Total	**-**	**12**	**168**	**-**	**180**

4.11.3.1 HazMat Fixed Facilities

Although earthquakes are low probability events, they produce hazardous materials (HazMat) threats at very high levels when they do occur. Depending on the year built and construction of each facility containing HazMat, earthquake initiated hazardous material releases (EIHR) potential will vary. HazMat contained within masonry or concrete structures built before certain benchmark years reflecting code improvements may be of particular vulnerability.

4.11.3.2 Transportation

Earthquake events can significantly impact bridges which often provide the only access to some neighborhoods. Since soft soil regions generally follow floodplain boundaries, bridges that cross water courses are considered vulnerable. Since Town bridges provide access across water courses, they are vulnerable to earthquakes. Key factors in the degree of vulnerability are the bridge's age and type of construction which indicate the standards to which the bridge was built. Special attention will be paid to the multiple bridges that cross interstates. Interstates would serve as major emergency response and evacuation routes.

4.11.3.3 Utilities

Linear utilities and transportation infrastructure would likely suffer considerable damage in the event of an earthquake. Due to the amount of infrastructure and sensitivity of utility data, linear utilities are difficult to analyze without further investigation of individual system components. Table 4-23 provide best available transportation infrastructure data and it should be assumed that these systems are exposed to breakage and failure.

Table 4-201: Lifelines with EQ Risk; Southern California Great Shakeout Scenario

Facility Type	Strong (VI)	Very Strong (VII)	Severe (VIII)	Violent (IX)	Total Mileage
Transportation and Lifeline	11	104	528	0	642
Railway	0	2	3	0	5
Roads	11	101	525	0	637
Interstate Highway	2	2	0	0	4
State / County Highway	0	9	74	0	84
Primary Highway	0	0	0	0	0
Local Road, Major	0	2	54	0	56
Local Road	7	79	377	0	463
Other Minor Road	0	7	18	0	26
Vehicular Trail	1	2	1	0	3
Ramp	0	1	0	0	1
Service Road	0	0	0	0	0
Total	**11**	**104**	**528**	**0**	**642**

4.11.3.4 Loss Estimation Results

The Hazus Level 2 analysis was used to assess the risk from and vulnerability to earthquake shaking within the Town of Apple Valley. Hazus buildings data is aggregated to the census tract level for earthquake models, known as the general building stock (GBS), which has a level of accuracy acceptable for planning purposes. Where possible the GBS was

enhanced using GIS data from the county as described previously. The following sections describe risk to and vulnerability of the GBS within the Town of Apple Valley. Hazus calculates losses to structures from earthquake shaking by considering the amount of ground displacement and type of structure. The software estimates the percentage of damage to structures and their contents by applying established building fragility curves. Damage estimates are then translated to estimated dollar losses.

For each Great Shake Out Scenario ground shaking data (shakemaps) were acquired from CISN and imported into Hazus. The shakemap data consist of peak ground velocity, peak ground acceleration, peak spectral acceleration at 0.3 seconds, and peak spectral acceleration at 1.0 seconds. The earthquake module operates on census tracts that often include population and structures in the incorporated cities and the unincorporated area within a single tract. Due to this fact the results include census tracts that have a substantial portion of land within the incorporated area (loss estimates for some tracts will include structures in incorporated cities).

The results are summarized in Table 4-24 and Figure 4-22 for the Great Shake Out Scenario. It is important to understand that the Hazus earthquake module uses the census tract as its enumeration unit rather than the more detailed census block. The loss estimation values for earthquakes are much higher than those of the flooding and dam failure due to this fact. The portions of incorporated areas included within boundary census tracts elevate the values due to the inclusion of additional GBS. Though the difference between census tracts and census blocks are extremely disparate, the most important summary information is the percent of loss estimation against the total value.

In the Great Shake Out Scenario, residential damage will be the greatest. While there are several limitations to the FEMA Hazus model, it does allow for potential loss estimation. It is important to remember that the replacement costs are well below actual market values, thus, the actual value of assets at risk may be significantly higher than those included herein.

Table 4-212: Estimated Building and Content Loss Great Shake Out Scenario EQ

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (% of Total Value)	Content Replacement Cost ($000)	Content Replacement Cost (% of Total Value)	Total Estimated Loss ($000)	Total Loss Estimation (% of Total Value)	Total Value ($000)
Agricultural	1,071	3.2%	328	1.0%	1,399	4.1%	33,890.00
Commercial	67,058	3.7%	18,665	1.0%	85,724	4.8%	1,801,439.00
Educational	8,089	2.9%	2,725	1.0%	10,814	3.9%	277,421.00
Government	1,532	3.8%	443	1.1%	1,975	4.9%	40,660.00
Industrial	15,727	3.3%	6,510	1.4%	22,238	4.7%	478,085.00
Religious	8,811	3.8%	2,462	1.1%	11,274	4.8%	232,956.00
Residential	244,144	2.0%	58,577	0.5%	302,721	2.5%	11,966,756.00
Grand Total	$346,433	2.3%	$89,711	0.6%	$436,144	2.9%	$14,831,207

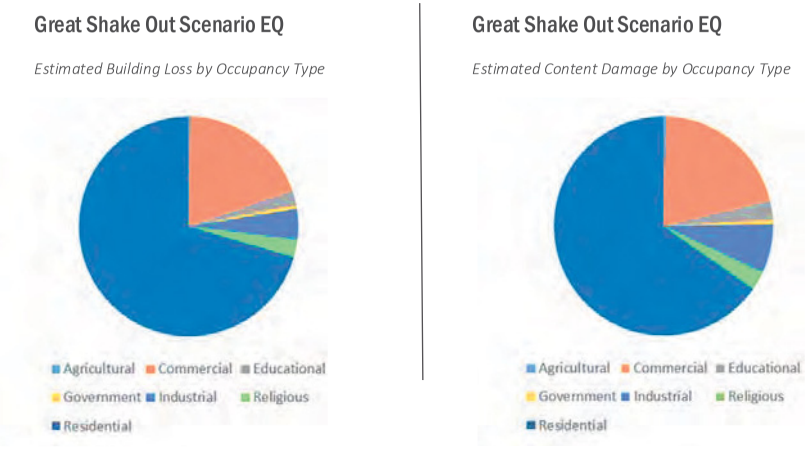


Figure 4-24: Estimated Building and Content by Occupancy Type Shake Out Scenario EQ

4.12 Climate Change

4.12.1 The Impact of Climate Change



Climate change can increase hazards associated with wildfires, rising sea levels, and groundwater supply. Public health can suffer due to greater temperature extremes and more frequent extreme weather events, increases in transmission of infectious disease, and increases in air pollution. Agricultural production can be altered by changes in temperature and rainfall patterns.

Rises in temperature have the potential, for example, to cause a shift in the hydrological cycle. While predicted patterns vary with latitude and global location, roughly 75% of analyzed climate change models agree that within the western United States there will be a 10% to 40% decrease in stream flows by 2050. This may be due to a decrease in precipitation levels, which has been evident in the drought conditions suffered by the southwest in recent years, as well as an increase in evaporation, which is temperature dependent and increases as temperatures climb. It has been predicted that a change in the global average surface temperature of 2°C would be at the low end of the possible range. According to the Institute for the Study of Planet Earth at the University of Arizona, it is estimated that a 2°C increase in temperature corresponds to a 9% to 21% decrease in stream flow on the Colorado River.

The coast of California is likely to see a rise in sea level that could threaten shorelines, cause increased erosion, and loss of life and property. Sea level rise and storm surges could lead to flooding of low-lying property, loss of coastal wetlands, erosion of cliffs and beaches, saltwater contamination of drinking water, and damage to roads, causeways, and bridges.

Between the beginning of the industrialized era and 2005, the atmospheric concentration of CO2 in the atmosphere had increased by 35%, methane by 151%, and nitrous oxide by 18%.

It is estimated that in 2004, total GHG emissions were 20,135 teragrams (Tg) of carbon dioxide equivalents (Tg CO2e), excluding emissions/removals from land use, land use change, and forestry. The U. S. Environmental Protection Agency in 2004 estimated that the U.S. contributed 35% of global GHG emissions, with a total of 7074.4 Tg CO2e, an increase of 15.8% over 1990 emissions.

California is the second largest greenhouse gas contributor in the U.S. and the sixteenth largest in the world. From 1990 to 2003, California's GHG emissions increased 12%. In 2004, California produced 492 Tg CO2e, which is approximately 7% of all U.S. emissions. Transportation is responsible for 41 percent of the state's total GHG emissions; while electricity generation represents 22% of the state's GHG emissions. Conversely, emissions from residential and commercial fuel use in California decreased 9.7% from 1990 to 2004. This decrease may be due to increases in the effectiveness of energy conservation in buildings (Title 24 requirements) and more efficient appliances.

4.12.2 Population at Risk

Vulnerable populations should receive special attention when assessing the community's vulnerability to climate change. For example, care and sheltering during extreme heat conditions must be provided for vulnerable populations such as the elderly. According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. According to the

National Weather Service (NWS), among natural hazards, only the cold of winter—not lightning, hurricanes, tornados, floods, or earthquakes—takes a greater toll. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980, more than 1,250 people died.

4.12.3 Critical Facilities

The Town's Climate Action Plan updated in 2013 addresses concerns that affect the Town in regards to Climate Change. Currently, the focus is on reducing Greenhouse Gas Emissions (GHG) at existing facilities, homes, businesses and institutions. Reducing GHG for new developments in the same categories are discussed in detail as priority measures. This hazard mitigation plan will defer to the CAP for measures and mitigation strategies related to Climate Change in an effort to provide consistent practices. The CAP can be accessed:

http://www.applevalley.org/services/planning-division/climate-action-plan

4.12.3.1 Apple Valley Choice Energy

Apple Valley is addressing issues relating to Climate Change through the implementation of Apple Valley Choice Energy (AVCE). This program, started April of 2017, allows residents within Apple Valley to receive energy with a higher "renewable" content than what is currently provided by the franchised utility (SCE). The minimum renewable energy content for AVCE customers is 35%. In addition, the program provides an alternate selection of 50% renewable energy content for those who choose to "opt-up" to that plan. AVCE's minimum 35% renewable energy content already exceeds the California state mandate of 33% renewable energy content that will be required in the year 2020.

The renewable energy content is derived from solar, wind, hydro and geothermal sources primarily within California. Apple Valley Choice Energy plans to offer customers of AVCE a 100% renewable energy option in future years that will further reduce the overall impacts of Greenhouse Gases affecting Climate Change as a result of burning fossil fuels.

In addition to supplying renewable energy, AVCE actively promotes Net Energy Metering (NEM) for customers with rooftop solar by offering a premium by-back rate that is nearly double the rate that they would receive from SCE. AVCE will also offer future incentives to Town residents and businesses for improvements that contribute to energy efficiency as well as develop programs to encourage implementation of energy conservation measures. The Town also participates in the High Desert Regional Partnership with the other cities in the High Desert to promote energy efficiency on a regional basis.

Section 5. Community Capability Assessment

The Town of Apple Valley strives to protect and maintain the health, safety and welfare of the community on a day-to-day basis, and takes extra measures to reduce the impacts of natural or technological hazards. The Town can use a variety of different tools, assets, and authorities to effectively prepare for, mitigate toward, respond to and recover from emergencies and disasters. These include voluntary and mandatory measures; individual and community efforts; private and public actions; and preventive as well as responsive approaches. Mitigation activities include educating citizens, enforcing building and development codes, constructing capital improvement projects, adopting plans, establishing incentive programs, and improving emergency preparedness and response.

The capabilities available to the Town of Apple Valley fall into the following broad categories: Agencies and People; Existing Plans; Regulations, Codes, Policies, and Ordinances; Mitigation Programs and Fiscal Resources. Identifying and documenting these capabilities provides the basis for developing future mitigation opportunities and how they can be implemented within existing Town programs.

5.1 Active Mitigation Programs

Town of Apple Valley Capability Assessment

- Storm Water Management: Yes
- Zoning Management: Yes
- Subdivision Management: Yes
- Erosion Management: Yes
- Floodplain Management: Yes
- Floodplain Management Plan Published Date: 10/2008
- Floodplain Management Last Delineation Date: 10/2008
- Elevation Certificates Maintained: Yes
- National Flood Insurance Program Community: Yes
- National Flood Insurance Join Date: 03/03/96
- NFIP Number: TAV 060752
- NFIP Rating: None
- NFIP Rating Date: 10/2008
- Land Use Plan: Yes
- Land Use Plan Last Update: 2009
- Community Zoned: Yes
- Zoned Date: 4/27/10
- Established Building Codes: Yes
- Building Codes Last Updated: 09/27/2016
- Type of Building Codes: California Building Code
- Local Electric Utilities: Southern California Edison
- Local Water Utilities:
- Liberty Utilities

- Apple Valley Foothill County Water District
- Rancheritos Mutual Water Company
- Golden State Water Company
- County Service Area 64
- Navajo Mutual Water Company
- Local Sewage Treatment Utilities: Victor Valley Wastewater Reclamation Authority
- Local Natural Gas Utilities: Southwest Gas Corporation
- Local Telephone Utilities: Frontier
- Fire Insurance Rating: Apple Valley Fire Protection District, a self-governing special district, provides fire-related services to the Town of Apple Valley and its sphere of influence. The District's fire insurance rating within Town limits is 4.
- Fire Insurance Rating Date: 06/01/10
- Previous Mitigation Plans: 2011

5.2 Local Planning and Regulatory Capabilities (Supporting Possible Mitigation Activities)

The State of California recommends that the General Plan is updated every 10-20 years; depending mostly on whether or not the plan is meeting the community's needs. The Apple Valley General Plan was last updated and adopted in 2009. The Land Use Element of the General Plan establishes 17 land use designations that apply only to lands within the Town's incorporated boundaries (see Section 1.3, for a listing of the 17 Land Use districts in the Land Use Element). The Land Use Element also describes land use compatibility for the primary three (3) hazards: Geologic; Flood; and, Wildfire.

On an annual basis staff revisits all of these planning and regulatory capabilities to ensure that local hazards and their mitigation strategies are being brought to the discussion table when it is time to update department policy and procedures as well as annual departmental budgets. Funding opportunities through such measures as grants, general funds and taxing authorities are consistently being researched and discussed based on feasibility and accessibility based on current Town staffing and fiscal resources.

In addition to the general plan, the information in Table 5-1 *is used to construct mitigation actions aligned with existing planning and regulatory capabilities of the* Town of Apple Valley. *Planning and regulatory tools typically used by local jurisdictions to implement hazard mitigation activities are building codes, zoning regulations, floodplain management policies, and other County programs or planning documents.*

Table 5-1: Planning and Regulatory Capabilities

Hazard	Plan/Program/ Regulation	Responsible Agency	Comments
Multi-Hazard	California Building Codes	Building & Safety Dept.	California Residential Code California Code of Regulations, Title 24, Part 2.5.
			California Building Code California Code of Regulations, Title 24, Part 2, Volumes 1 and 2.
Multi-Hazard	Municipal Codes	Building & Safety Dept.	Section 17992 of the Health & Safety Code of the State of CA and Chapter 8 of the Apple Valley Municipal Code.
Drought	Urban Water Management Plan (UWMP)	Each water agency is responsible for own plan.	Visit each water agency for plan or visit www.mojavewater.org for their plan.
Drought	Town of Apple Valley Landscape Ordinance	Planning Division	In accordance with Governor Brown's Drought Executive Order, on July 15, 2015 the California Water Commission approved revisions to its MWELO. The Governor's Order mandates that all local agencies have until December 1, 2015 to adopt the Ordinance or adopt their own ordinance which must be at least as effective in conserving water as the State's Ordinance
Drought	2010 California Drought Contingency Plan	California Dept. of Water Resources	Section VI provides an overview of drought preparedness strategies from the California Water Plan Update. Section VII provides a brief description of local, utility, and State agency drought response roles. Situation and assessment reports will be distributed to appropriate agencies and will be posted on the DWR Drought website (www.water.ca.gov/drought).
Flood	Flood Resistant Construction	Building & Safety	Appendix G of the 2013 California Building Codes stipulates existing Flood Resistant Construction standards.
Flood	NFIP Administration	Engineering Dept.	NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in participating communities. As a participating member of the NFIP, the City is dedicated to protecting homes of more than 60 policies currently in force.
Climate Change	Town of Apple Valley Climate Action Plan	Planning	Outline a course of action for the community of Apple Valley to reduce per capita greenhouse gas emissions 15% below business as usual by 2020. In 2020 the Climate Action will be reevaluated and updated based on current population and California emissions standards. This new plan will be included in the HMP updates.

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5.3 Administrative and Technical Mitigation Capabilities

This section contains a summary of administrative and technical capabilities organized by the Town of Apple Valley staff. The department(s) responsible for the capability is also listed. Each department can provide greater detail of the resources available under each capability.

Table 5-2: Administrative and Technical Capabilities

Staff/Personnel Resources	Dept. / Agency	Comments
Planners (with land use / land development knowledge)	Planning Division	
Planners or engineers (with natural and/or human caused hazards knowledge)	Public Works, Local Utilities, Planning, & Engineering Dept.	Fire Prevention can assist as well.
Engineers or professionals trained in building and/or infrastructure construction practices (includes building inspectors)	Engineering, Planning & Public Works Dept.	
Floodplain Management	Engineering Dept.	NFIP is managed by Town Engineer.
Land/Building surveyors	Engineering Dept.	Services are available through contract with CAA.
Personnel skilled in Geographic Information Systems (GIS)	Planning Division	Not a full time position.
Grant writers or fiscal staff to handle large/complex grants	Special Projects Manager & each Dept. manages own smaller grants	Numerous types of federal, state, local, and private grants have been administered for mitigation at the local level in California. .
Construction Equipment	Public Works Dept.	Public Works departments owns and maintains large pieces of equipment available for construction and moving and removal of earthen material.
Emergency Management Personnel	Police Department, Fire Departments and Office of Emergency Preparedness (OEP)	OEP is housed within the Town of Apple Valley and reports directly to the Town Manager.

Staff/Personnel Resources	Dept. / Agency	Comments
Care and Sheltering	Regional Red Cross Personal 17199 Yuma St. Suite #2, Victorville, CA, 92395	Care and sheltering during extreme disaster related events when evacuations orders are mandatory.

5.4 Local Fiscal Capabilities

This section provides a summary of local fiscal capabilities. The department(s) responsible for the revenue raising activity is also listed. The local Fiscal Resources are updated every fiscal year. Each year allocation of funds for hazard mitigation will be adjusted based on the current years' population growth, location, and future hazard risks.

Table 5-3: Local Fiscal Capabilities

Financial Resources	Dept. / Agency	Comments
Permitting Fees	Building & Safety, Engineering, Planning & Finance Dept.	Development fees
General Fund Revenue	Town Council or Finance Dept.	There is no dedicated budget line items for hazard mitigation.
Sewer and Trash Funds	Finance Dept.	
Capital Improvements Program	Engineering Dept.	
State and Federal Community Development Dept. Block Grants (CDBG)	CA Dept. of Housing and Community Development Dept., Dept. of Housing & Urban Dev. (HUD) Town of Apple Valley Housing Division	Programs Include: Community Development Neighborhood Stabilization Program Residential Rehabilitation Program
Home Investments Partnership Program	CA Dept. of Housing and Community Development Dept. of Housing & Urban Dev. (HUD)	Must apply competitively for grant funds.

5.5 Local & San Bernardino County Capabilities

This section contains a summary of Town of Apple Valley and San Bernardino County programs and capabilities organized by hazard type. The example tables below provide details on possible Town and County Capabilities that the Apple Valley community can coordinate with or use as an implementation mechanism for local mitigation activities. While the following programs can be used by the Apple Valley to develop and perform mitigation actions, they are the County of San

Bernardino's programs and the Fire Districts, so the Town is unable to determine how that entity will expand and improve it at this time.

5.5.1 Apple Valley Fire Protection District & County Wildfire Mitigation Programs

Table 5-4: Wildfire Mitigation Programs

Hazard	Program	Responsible Agency	Comments
Wildfire	*Community Based Fuels Reduction program*	*Fire District*	*This program is designed to create community based fuel modification programs across the Town communities. For more information visit www.applevalleyfd.com.*
Wildfire	*Fire Hazard Abatement*	*Fire District*	*Fire Hazard Abatement works to reduce the potential for an individual's property to be the source of fire and structural ignitability. For more information visit www.applevalleyfd.com.*
Wildfire	*Southern California Edison (SCE)*	*Southern California Edison (SCE)*	*SCE removes dead trees near power lines to reduce fire hazards. For more information see County OES website or hazard mitigation plan.*
Wildfire	*Inland Empire Fire Safe Alliance*	*Inland Empire Fire Safe Alliance*	*The Alliance was created to act as a forum for all Fire Safe Councils in San Bernardino County. For more information see County OES website or hazard mitigation plan.*
Wildfire	*Community Wildfire Protection Plans (CWPP)*	*Fire District*	*CWPPs are designed to provide a means for a community to have input into and actively participate in the planning, strategy, goals, and objectives of creating a fire safe community. For more information see County OES website.*
Wildfire	*Organized Group Volunteer Activities*	*Fire District*	*There are several volunteer citizen groups throughout the Town that are capable of providing significant resources that are not provided by traditional governmental agency services. For more information visit ww.readyapplevalley.org.*

5.5.2 County Flood Mitigation Programs

Table 5-5: Count Flood Mitigation Programs

Hazard	Program	Responsible Agency	Comments
Flood	Flood Area Safety Taskforce (FAST)	Flood Control District	The FAST Organization stresses liaison with the communities, provides for community education and information, and places emphases on Community and city partnerships. For more information see County OES website or hazard mitigation plan.
Flood	Alluvial Fan Task Force	Alluvial Fan Task Force	The Task Force reviews the state of knowledge regarding alluvial fan floodplains, determine future research needs, and, if appropriate, develop recommendations relating to alluvial fan floodplain management, with an emphasis on alluvial fan floodplains that are being considered for development. For more information see County OES website or hazard mitigation plan.

5.5.3 Town of Apple Valley & SB County Public Education and Alert Programs

Table 5-6: Public Education and Alert Programs

Hazard	Program	Responsible Agency	Comments
Multi-Hazard	CERT	Town of Apple Valley	The Community Emergency Response Team (CERT) Program educates people about disaster preparedness and trains them in basic response skills. For more information on the CERT program visit www.readyapplevalley.org
Multi-Hazard	California Disaster Corps	SB County Fire District	The Disaster Corps is a first-in-the-nation effort to professionalize, standardize and coordinate highly trained disaster volunteers statewide. This program initiative was built collaboratively in partnership with California Volunteers from the ground up through public-private partnerships and with a wide range of subject matter experts. Visit www.sbcfire.org.
Multi-Hazard	TENS	SB County Fire District	Telephone Emergency Notification Systems (TENS) During an emergency, public safety can be a direct function of the speed and accuracy of the dissemination of information. This is particularly important during emergencies that require evacuations. The program is an automated phone dialing system that calls telephones in specific geographic areas of concern. All areas of San Bernardino County have all been preprogrammed so that during an emergency, the specific target group can be notified as quickly as possible. For more information visit www.sbcfire.org.
Multi-Hazard	ECS	Town of Apple Valley	The Emergency Communications Service (ECS) is a volunteer group providing front-line communications, technical and logistical support to the Apple Valley Fire Protection District and Office of Emergency Preparedness. For more information visit www.readyapplevalley.org.
Multi-Hazard	IPAWS	SB County Fire District	During an emergency, alert and warning officials need to provide the public with life-saving information quickly. The Integrated Public Alert and Warning System (IPAWS) is a modernization and integration of the

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Hazard	Program	Responsible Agency	Comments
			nation's alert and warning infrastructure and will save time when time matters most, protecting life and property. Federal, State, Territorial, Tribal, and local alerting authorities can use IPAWS and integrate local systems that use Common Alerting Protocol (CAP) standards with the IPAWS infrastructure. IPAWS provides public safety officials with an effective way to alert and warn the public about serious emergencies using the Emergency Alert System (EAS), Wireless Emergency Alerts (WEA), the National Oceanic and Atmospheric Administration (NOAA) Weather Radio, and other public alerting systems from a single interface.

5.6 State and Federal Fiscal Resources

To augment local resources, the table in this section provides a list of potential funding programs and resources provided by state and federal agencies and programs which can be used for local hazard mitigation activities. While the following programs can be used by the Town of Apple Valley to develop and perform mitigation actions, they are the State of California/federal programs, so the Town is unable to determine how that entity will expand and improve it at this time.

Table 5-7: Potential Funding Programs/Grants from State & Federal Agencies

Agency / Grant Name	Potential Programs/Grants
California DWR Proposition 50/84: **Integrated Regional Water Management (IRWM) Program.**	***DWR has a number of IRWM grant program funding opportunities. Current IRWM grant programs include planning, implementation, and stormwater flood management.*** http://www.water.ca.gov/irwm/grants/index.cfm Proposition 84, the Safe Drinking Water, Water Quality, and Supply, Flood Control, River and Coastal Protection Bond Act, which provides $1,000,000,000 (P.R.C. §75001-75130) for IRWM Planning and Implementation. CA Dept. of Water Resources' Flood Emergency Response Projects are posted on the webpage at: http://www.water.ca.gov/floodmgmt/hafoo/fob/floodER/
California Housing and Community Development (HCD) Emergency Solutions Grant (ESG) Program	***To fund projects that serve homeless individuals and families with supportive services, emergency shelter/transitional housing, assisting persons at risk of becoming homeless with homelessness prevention assistance, and providing permanent housing to the homeless population. The Homeless Emergency Assistance and Rapid Transition to Housing (HEARTH) Act of 2009 places new emphasis on assisting people to quickly regain stability in permanent housing after experiencing a housing crisis and/or homelessness.*** http://www.hcd.ca.gov/fa/esg/index.html

Agency / Grant Name	Potential Programs/Grants
CalTrans Division of Local Assistance / Safe Routes to School Program	California Dept. of Transportation. Federal funding administered via Caltrans. Local 10% match is the minimum requirement. http://www.dot.ca.gov/hq/LocalPrograms/saferoutes/saferoutes.htm
CA State Office of Historic Preservation (OHP) / Statewide Historic Preservation Plan	Local Government; OHP's Local Government Unit (LGU) offers guidance and assistance to city and county governments to preserve historic properties including damage from natural hazards.
U.S. Dept. of Energy / Energy Efficiency and Conservation Block Grant Program	***Provides funding for weatherization of structures and development of building codes/ordinances to ensure energy efficiency and restoration of older homes.*** http://www1.eere.energy.gov/wip/eecbg.html
Dept. of Homeland Security (DHS) / FEMA Grants	For more information on current grants visit: http://www.fema.gov/grants
Office for Victims of Crime: **Antiterrorism and Emergency Assistance Program (AEAP)**	***The Office for Victims of Crime supports communities responding to terrorist attacks and cases of mass violence. The AEAP Assistance Programs include crisis response, consequence management, criminal justice support, crime victim compensation and training and technical assistance.*** ***More information can be obtained at:*** https://www.ovc.gov/AEAP/
U.S. Department of State Office of Antiterrorism Assistance (ATA): **Antiterrorism Assistance Program**	Antiterrorism Assistance Program The ATA program trains civilian security and law enforcement personnel from friendly governments in police procedures that deal with terrorism. Since its inception in 1983, the program has trained and assisted over 84,000 foreign security and law enforcement officials from 154 countries. Learn more by visiting: http://www.state.gov/m/ds/terrorism/c8583.htm
California Emergency Management Agency (Cal EMA) / Proposition 1B Grants Programs	The Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006, approved by the voters as Proposition 1B at the November 7, 2006 general election, authorizes the issuance of nineteen billion nine hundred twenty-five million dollars ($19,925,000,000) in general obligation bonds for specified purposes, including grants for transit system safety, security, and disaster response projects. http://www.calema.ca.gov/EMS-HS-HazMat/Pages/Emergency-Management-Homeland-Security-and-Hazard-Mitigation-Grant-Programs.aspx
California Proposition 1: **The Water Bond (AB 1471)**	Authorize $7.545 billion in general obligation bonds for state water supply infrastructure projects, such as public water system improvements, surface and groundwater storage, drinking water protection, water recycling and advanced water treatment technology,

Agency / Grant Name	Potential Programs/Grants
	water supply management and conveyance, wastewater treatment, drought relief, emergency water supplies, and ecosystem and watershed protection and restoration. The State Water Resources Control Board (State Water Board) will administer Proposition 1 funds for five programs. The estimated implementation schedule for each is outlined in Five Categories: ▪ Small Community Wastewater ▪ Water Recycling ▪ Drinking Water ▪ Stormwater ▪ Groundwater Sustainability http://www.waterboards.ca.gov/water_issues/programs/grants_loans/proposition1.shtml
Assistance to Firefighters Grant Program (AFG); Fire Prevention and Safety (FP&S)	The primary goal of the FP&S Grants is to enhance the safety of the public and firefighters with respect to fire and fire-related hazards. The Grant Programs Directorate administers the FP&S Grants as part of the AFG Program. FP&S Grants are offered to support projects in two activity areas: 1). Fire Prevention and Safety (FP&S) Activities designed to reach high-risk target groups and mitigate the incidence of death and injuries caused by fire and fire-related hazards. 2). Research and Development (R&D) Activity To learn more about how to prepare to apply for a project under this activity, please see the FP&S Research and Development Grant Application Get Ready Guide. https://www.fema.gov/fire-prevention-safety-grants

5.7 The Budget in Brief

The Town of Apple Valley has a total adopted general fund budget for all funds in the amount of $80.6 million for Fiscal Year 2016-17. Adopted Budget reflects the operating and capital spending plans for the General Fund, Special Revenue Funds, Capital Project Funds, Debt Service and Enterprise Funds.

In comparison to the total adopted FY16-17 budget, on an all funds basis the operating budget comprises 67.48% of the total budget. The following discussion will focus primarily on the operating budget. The adopted operating budget is $54.2 million, an increase of $381,388 or .71% compared to the amended budget in FY 15-16.

5.7.1 Salaries & Benefits

Personnel costs decreased by $120,212 or 1.09% in total. This decrease is mainly due to three long-term employees retiring during the 2015-16 fiscal year. In addition, there is no Cost of Living Allowance (COLA) included in the adopted budget.

5.7.2 Revenues

As a result of the slow but steady rebound in the economy, most revenue sources are projected to increase slightly. The Town has been experiencing slight increases in Sales Tax, Property Tax, and Franchise Taxes and the expectation is that those increases will continue into FY 16-17. A portion of the increased property tax revenues is resulting from an increase in property tax collections due to the elimination of the Redevelopment Agency and subsequent redistribution of previously captured tax increments. In the near term, the local economy is not generally expected to grow at a comparable rate when compared to the economic growth rates realized prior to FY 07-08. However, most economic indicators appear optimistic and most economic projections are generally calling for a long period of sustained 'slow growth'.

5.7.3 Property Tax

Property tax is the single largest source of revenue for the Town. The FY 16-17 estimated revenue from property tax is $9,418,358 or 32.33% of the total General Fund revenues. This amount is $423,200 more than the amended FY 15-16 estimated property tax revenues. This increase of approximately 4.71% in revenue is attributed to the continued slow growth in property values which are anticipated to continue for the foreseeable future. In previous years, the declining market values of property in the Town depressed property tax revenues by as much as 40% in some areas. However, over the last year, property values have begun to rise steadily on a month-over-month basis.

While market values of property in the Town are still at reduced levels when compared to assessed values prior to the beginning of the recession in 2007, a large portion of the property tax base is still assessed at market values less than the maximum taxable value per Proposition 13 limits. These properties may experience Prop. 8 recoveries or increases in assessed values at a rate above 2% up to the Prop. 13 limit over the next year. As such, there is an expectation that the assessed values of those properties will increase at a rate greater than 2% over the next year thereby increasing property tax revenue collections by the Town.

5.7.4 Sales & Use Tax

Sales tax represents the Town's second largest revenue source estimated at $6,015,500 or 20.65% of the total General Fund estimated revenues for FY 16-17. This amount represents an increase of $475,600 compared to the amended revenue estimate for FY 15-16. The majority of the increase is due to the expiration of the sales tax backfill payment ("triple flip") that was received from the State in the form of property taxes (accounted for as Sales Tax In-Lieu). The backfill payment from the State was the result of the "triple flip" that was approved by the voters in November 2004 under Proposition 57 to finance the State's Economic Recovery Bonds. Under this Proposition, the State took one fourth of the local agencies' sales tax and backfilled it with a like amount in property taxes from the Educational Revenue Augmentation Fund (ERAF).

Apple Valley's sales tax base has consistently trended upward over the last several years. This predictability of the sales tax revenue source is due to the diversity of the types of businesses and retailers located within the Town. While the sales tax revenue category had been most directly affected by the recession, sales tax revenues have begun to move upward at a slow gradual pace. Staff is estimating that sales tax revenues will increase (8.19%) when compared to the FY 15-16 revised revenue estimates.

5.7.5 The VLF (Vehicle License Fee)

The VLF swap is the result of the State's action in 2003 to permanently reduce the Vehicle License Fee from 2% to 0.65%. In the past, local government received its full share of the revenues from the 2% rate. When the State reduced the rate,

the State also promised to make local governments whole by backfilling the lost revenue with a like amount in property tax revenues. This backfill payment is linked directly to the growth in property tax revenues. Apple Valley has experienced some revenue losses from the swap as most property values have fallen since the recession began in May, 2007. Although the recession ended in June, 2009, property values in the Town have yet to fully recover to property values existent in 2007.

5.7.6 Franchise Fees

Franchise fees represent the Town's third largest source of revenue. Currently, the Town collects electric franchise fees from Southern California Edison, gas franchise fees from Southwest Gas Company, cable franchise fees from Cable providers and Solid Waste Hauler's franchise fees from the Town's waste hauler. For FY 16-17, estimated revenue from all sources of Franchise Fees is $2,118,500, which represents 7.30% of the total General Fund revenue. The estimated revenue reflects a net increase of $45,500 or 2.19% over the FY 15-16 amended revenue estimate.

5.7.7 Animal Service Contract

Contract payments for animal sheltering services with the County of San Bernardino represent the Town's fourth largest source of revenue. The FY 16-17 revenue estimate from this source is $483,500, which represents 1.66% of the total General Fund revenues. This revenue is a new revenue source to the Town since the County began contracting with the Town for animal sheltering services beginning in January, 2013.

5.7.8 Capital Improvement Program

The Town's Seven-Year Capital Improvement Program (CIP) is listed within the "Capital Improvement Program" section of the adopted budget. This section provides comprehensive, detailed information on each of the capital projects that the Town plans to undertake in the coming fiscal year and beyond. Twenty-four capital improvement projects totaling $10.9 million are adopted for funding in FY 16-17, a decrease of $18.7 million or 63.15% over the adopted CIP in FY 15-16.

5.7.9 Use of Fund Balances

During times of emergency or due to other needs, the Town may utilize its general operating reserve, which is part of the "committed" and "unassigned" portions of General Fund fund balance, if circumstances warrant. The General Fund fund balance should be distinguished from other fund balances. Special Revenue Funds and Capital Projects Funds fund balances are earmarked for specific uses based upon the criteria for which these funds were established. These types of funds may accumulate monies for future appropriations. For example, when the Town is ready and able to embark upon a capital improvement project or special program that meets the specific requirements for the use of the funds, appropriations from fund balances may be used.

5.7.10 Property and Business Improvement District (PBID)

Information on the Apple Valley Village PBID may be found within the "PBID" section of the general budget document. The Town acts as trustee and custodian of PBID funds although the Town does not exercise direct control over PBID activities or expenditures.

Information on all of these programs can be found within the Town's current FY16-17 approved general budget.

Section 6. Mitigation Strategy

6.1 Mitigation Overview

The Town of Apple Valley's mitigation strategy is derived from the in-depth review of the existing vulnerabilities and capabilities outlined in previous sections of this plan, combined with a vision for creating a disaster resistant and sustainable community for the future. This vision is based on informed assumptions, recognizes both mitigation challenges and opportunities, and is demonstrated by the goals and objectives outlined below. The mitigation measures identified under each objective include an implementation plan for each measure. The measures were individually evaluated during discussions of mitigation alternatives and the conclusions used as input when priorities were decided. All priorities are based on consensus of the Planning Team.

Mitigation measures are categorized generally for all hazards and specifically for the four risk hazards facing the Town that were extensively examined in the risk assessment section: climate change, earthquakes, floods, and wildfires.

The intent of the mitigation strategy is to provide the Town of Apple Valley with a guidebook to future hazard mitigation administration. This will help the staff to achieve compatibility with existing planning mechanisms, and ensure that mitigation activities provide specific roles and resources for implementation success.

6.1.1 Mitigation 5 Year Progress Report

The following, Table 6-1, identifies the completed, deleted, or ongoing actions or activities from the previously approved 2011 plan. Due to changes in funding availability and management's change of priorities, some 2011 mitigations actions have been removed from the 2017 mitigation actions. Mitigation efforts are being focused on the community as a whole as opposed to the actions that may only benefit a small percentage of the community.

Table 6-1: Mitigation 5 Year Progress Report

Mitigation Action	Completed	No longer priority	Ongoing	Comments
Develop projects and programs to install automatic gas shut-off valves in residential, commercial, and public buildings		X		No longer an action the Town wants to pursue.
Develop and construct seismic retrofit of critical facilities	X			Adoption of Ord. No. 453 & No. 489
Develop residential and commercial seismic retrofit programs	X			Adoption of Ord. No. 453 & No. 489
Develop earthquake mitigation public outreach education programs			X	
Develop and construct seismic retrofit of city-owned transportation and utilities infrastructure	X			Completion of Yucca Loma Bridge May 2017

Mitigation Action	Completed	No longer priority	Ongoing	Comments
Develop and sponsor projects and programs to brace new or relocated mobile homes to resist earthquakes		X		No longer a priority.
Install detention basin: **Navajo and Ottawa**			X	In process of acquiring property to connect pipe to ret. Basin. **FI Action 1.1**
Install detention basin: **Huasna Road and Chippewa Rd**		X		Vacant property. Will be completed when property developed by landowner.
Install detention basin: Bear Valley and Mohawk Road	X			Installed Dry well – Completed in 2015
Install Dry Well: Quapaw Rd / Eyota Rd	X			Completed in 2011
Install Dry Well: Seneca Rd / Rancherias Road	X			Completed in 2015
Install Dry Well: Pocomoke Rd / Minnetonka Rd	X			Completed in 2011 Minnetonka Rd/Tamiani Rd
Install Dry Well: Algonquin Rd / Lone Eagle Rd		X		No longer priority
Install Dry Well: Mohawk Rd / Laguna Rd.		X		2015 installed dry well on Bear Valley/Mohawk instead
Install Dry Well: Little Beaver / Mesquite Rd		X		No longer priority
Install Dry Well: **Dale Evans/Otoe/Thunderbird/ Rancherias neighborhood area**	X			Completed in 2015 Rancherias Rd & Thunderbird Rd

6.2 Identifying the Problem

As part of the mitigation actions identification process, the HMP Planning Committee identified issues and/or weaknesses as a result of the risk assessment and vulnerability analysis. By combining common issues and weaknesses developed by the Planning Committee, the realm of resources needed for mitigating each can be understood. Community issues and weaknesses are presented by individual hazard in Table 6-2 to Table 6-6.

Table 6-2: All Hazard Problem Statements Table

Problem Description	Problem Type	Action No.
1. Lack of public notification system in the Town	Public Notification	AH 1.1
2. No backup power for EOC	Infrastructure	AH 2.1

Table 6-3: Earthquake Problem Statements Table

Problem Description	Problem Type	Action No.
1. Potential damage to essential facilities and major bridges.	Infrastructure	EQ 1.1, 1.2, 1.3
2. Public awareness and preparedness of earthquake risks at businesses and homes	Public Education and Notification	EQ 2.1
3. Majority of residents live in the severe shaking zone in the Great Shakeout Scenario	Vulnerable Populations	EQ 2.1

Table 6-4: Wildfire Problem Statements Table

Problem Description	Problem Type	Action No.
1. Vegetative fuels in open spaces and backing up to resident's property/homes.	Maintenance Policy	WF 1.1
2. Inadequate water supply for firefighting	Infrastructure	WF 2.1
3. Public education on brush clearance and defensible space.	Public Education and Notification	WF 3.1

Table 6-5: Flood Problem Statements Table

Problem Description	Problem Type	Action No.
1. Drainage issues along major transportation roads throughout Town.	Lifeline/Infrastructure	FL 1.1, 1.2, 1.3
2. Debris/sediment buildup in storm culverts and basins after major storms	Maintenance	FL 2.1

Table 6-6: Climate Change Problem Statements Table

Problem Description	Problem Type	Action No.
1. Greenhouse gas emissions with residential and commercial properties.	Utilities	1.1
2. Greenhouse gas emissions with residential and commercial vehicles	Transportation	1.1

6.3 Mitigation Goals, Objectives, and Projects

The Mitigation Goals included overall goals established by the Town (contained within the Town's General Plan) to guide the establishment and priorities of specific goals, objectives and mitigation measures for each high risk hazard. In reviewing and updating the mitigation goals and actions, it was the Planning Team's consensus that the following goals remain in this HMP update. Our mitigation projects for each hazard are stated within the mitigation actions for each respective hazard. The Town's 2009 General Plan is on file at Town Hall, 14955 Dale Evans Parkway, Apple Valley, CA 92307 and is available for review during normal business hours. The General Plan is also available online at www.applevalley.org.

6.3.1 All Hazard (AH)

Goal: Improve emergency services management capability

Objective 1: Develop warning and evacuation notification system for residents and businesses.

> ***AH Action 1.1:*** Implement a public notification system to increase ability to alert the public to potential emergency situations and hazards.

Objective 2: Identify the need for, and acquire, any special emergency services and equipment to enhance response capabilities for hazards.

> ***AH Action 2.1:*** To ensure continual power supply, purchase and install backup generator at EOC.

6.3.2 Earthquake/Geologic Hazards (EQ)

Goal: The protection and safety of human life, land, and property from the effects of seismic and geotechnical hazards shall be increased. (General Plan, Geotechnical Element)

Earthquake Objective 1: The Town shall coordinate and cooperate with public and quasi-public agencies to ensure that major infrastructure, utility systems and roadways have continued functionality in the event of a major earthquake.

> ***EQ Action 1.1:*** Seismic retrofit of the Bear Valley Bridge over Mojave River.
> ***EQ Action 1.2:*** Seismic analysis of the James Woody Community Center.
> ***EQ Action 1.3:*** Seismic analysis of the Town Hall Development Services Building.
> ***Responsible Agency:*** Planning Division, Public Works Division, Town Engineer, Public and Quasi-Public Utilities.
> ***Schedule:*** Ongoing.

Earthquake Objective 2: The Town shall actively support and participate in local and regional efforts to educate the public on reducing earthquake risks.

> ***EQ Action 2.1:*** Increase number of residents who complete public education programs such as CERT for earthquake risks and response.
> ***Responsible Agency:*** Emergency Preparedness
> ***Schedule:*** Ongoing.

6.3.3 Wildfire (WF)

Goal: Continue to reduce fire hazards in the Town of Apple Valley.

Wildfire Objective 1: Reduce fire risk in open spaces through vegetation management policies.

> ***WF Action 1.1:*** Continue and enhance the hazard abatement program to reduce wildfire hazards.
> ***Responsible Agency:*** Fire District
> ***Schedule:*** ongoing.

Wildfire Objective 2: Improve understanding of locations, potential impacts, and linkage between hazards, vulnerability, and measures needed to protect life and property.

> ***WF Action 2.1:*** Continue to identify areas vulnerable to wildfire due to inadequate water supply for firefighting and implement improvements such as expansion of water supply and storage hydrants.
> ***Responsible Agency:*** Fire District
> ***Schedule:*** ongoing.

Wildfire Objective 3: Increase Public education on brush clearance and defensible space.

> ***WF Action 3.1:*** Continue and enhance community risk reduction programs such as Ready Set Go!, burn permits, and educational programs through the schools.
> ***Responsible Agency:*** Fire District
> ***Schedule:*** ongoing.

6.3.4 Flood (FL)

Goal: Protect lives and property from flooding hazards through a comprehensive system of flood control facilities throughout the Town. (General Plan, Flooding and Hydrology Element)

Flood Objective 1: Upgrade the Town's local and regional drainage system through proactive planning and coordination with other responsible agencies.

> ***FL Action 1.1:*** Drainage system upgrade on Navajo Road near James Woody Community Center.
> ***FL Action 1.2:*** Install drywell Seneca/Cronese Road
> ***FL Action 1.3:*** Install drywell Gayhead/Seminole Road
> ***Responsible Agencies:*** Engineering Division, Public Works Division
> ***Schedule:*** 5-10 years

Flood Objective 2: Assure that adequate access to roadways is maintained during major storm events, and that safe all-weather crossings over drainage facilities and flood control channels are provided where necessary.

FL Action 2.1: Purchase resources such as a skid steer loader and automatic sandbag machine needed to perform routine and annual maintenance for roadways and drainage facilities.
Responsible Agency: Public Works Division, Engineering Division
Schedule: Ongoing

6.3.5 Climate Change (CC)

Goal: Reduce the impacts of climate change on the Town and limit human activities that change the atmosphere's makeup.

Climate Change Objective 1: Meet greenhouse gas (GHG) reduction targets set forth by the Town of Apple Valley's Climate Action Plan (CAP).

CC Action 1.1: Continue implementing measures to reduce GHG and energy usage as identified in the Town of Apple Valley's Climate Action Plan.
Responsible Agency: Planning Division
Schedule: 5-10 years

6.4 Considering Mitigation Alternatives

The HMP Planning Team participated in the development and review of mitigation actions with a wide range of alternatives. To narrow mitigation alternatives for inclusion, FEMA's six broad categories of mitigation alternatives were used. Each FEMA category is described below. The HMP Planning Team developed several mitigation alternatives for implementation under each mitigation category.

Prevention (PRV):

Preventative activities are intended to keep hazard problems from getting worse, and are typically administered through government programs or regulatory actions that influence the way land is developed and buildings are built. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or capital improvements have not been substantial. Examples of preventative activities include:

- Planning and zoning ordinances
- Building codes
- Open space preservation
- Floodplain regulations
- Stormwater management regulations
- Drainage system maintenance
- Capital improvements programming
- Riverine/fault zone setbacks

PRV Alternatives:

Evaluate the City's regulations that manage flood risk and consider additional standards to help prevent flood problems from increasing. These include:

- Changes in zoning ordinance to designate special land uses for flood-prone areas
- Enhanced subdivision regulations
- Enhanced stormwater regulations to reduce stormwater runoff, especially for new development Other additional higher standards in the flood management code

Consider additional policies and regulations to enhance the preservation of open space in flood-prone and wild land fire high risk areas.

Property Protection (PPRO):

Property protection measures involve the modification of existing buildings and structures to help them better withstand the forces of a hazard, or removal of the structures from hazardous locations. Examples include:

- Building elevation
- Critical facilities protection
- Retrofitting (e.g., wind proofing, flood proofing, seismic design techniques, etc.)
- Insurance

PPRO Alternatives:

Establish a program to evaluate RL and flood-prone properties for implementation of property protection measures.

Consider promoting and supporting voluntary property protection measures through several activities, ranging from financial incentives to full funding.

Promote flood insurance for flood-prone properties with a focus on the SFHA and properties with historical flooding areas.

Evaluate publically owned facilities and critical facilities for property protection measures, including flood insurance.

Public Education and Awareness (PE&A):

Public education and awareness activities are used to advise residents, elected officials, business owners, potential property buyers, and visitors about hazards, hazardous areas, and mitigation techniques they can use to protect themselves and their property. Examples of measures to educate and inform the public include:

- Outreach projects including neighborhood and community outreach
- Speaker series / demonstration events
- Hazard mapping
- Real estate disclosures
- Materials library
- School children educational programs
- Hazard expositions

PE&A Alternatives:

Enhance the Town's Public Information Program to include both the public and private sectors. An education and outreach measure to ensure the community understands their role in protecting themselves in a disaster event.

- Safety precautions for all types of hazards, but especially floods, earthquakes, wildfires, and drought
- Knowing where emergency evacuation routes and shelters are located
- Family and emergency preparedness measures
- Mitigation measures for residents at the home

Enhance public outreach program to include all hazards. Appropriate ways to spread information are:

- Websites and social media
- Mailings to residents, in water bill
- Newsletter (Our Town)
- Displays, particularly at special events
- Handouts, flyers and other materials, which can be distributed at special events and at presentations

Natural Resource Protection (NRP):

Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their protective functions. Such areas include floodplains, steep slopes, and open land. Parks, recreation, or conservation agencies and organizations often implement these protective measures. Examples include:

- Floodplain protection
- Watershed management
- Vegetation Management (e.g., fire resistant landscaping, fuel brakes, etc.)
- Erosion and sediment control
- Habitat preservation and restoration

NRP Alternatives:

Enhance public education and outreach efforts to inform the public about our community recycling programs, community clean-up day, and energy saving tips and upgrades.

Inform the public and local businesses how important it is to use drought tolerant landscaping.

Keep promoting water conservation policy's in effect to keep water usage low.

Emergency Services (ES):

Although not typically considered a "mitigation" technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples include:

- Warning Systems
- Construction of evacuation routes
- Sandbag staging for flood protection
- Obtain StormReady certification
- Provide alert and notification to residents through social media for flood risk
- Evacuate and shelter populations displaced due to flooding
- Training

Staff Structural Projects (SP):

Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event through construction. They are usually designed by engineers and managed or maintained by public works staff. Examples include:

- Stormwater diversions / detention / retention infrastructure/drywells
- Utility upgrades
- Seismic Retrofits
- New construction standards

SP Alternatives:

The Town has previously constructed flood control and drainage facilities that move storm and flood waters more efficiently and reduced potential for flooding. The Town should identify and prioritize additional projects in Apple Valley.

The Town should continue to implement regional drainage improvement projects to reduce stormwater runoff and the potential for flooding along local drainages.

6.5 Mitigation Priorities

During the development of the risk assessment for the Town of Apple Valley, the Planning Team proposed and discussed alternative mitigation goals, objectives, and specific mitigation measures that the Town should undertake to reduce the risk from the three high risk hazards facing the Town.

6.5.1 Prioritization Process

Multiple factors were considered to establish the mitigation priorities included in this plan. The Planning Team utilized the 2011 rankings and the last five-year disaster related occurrences to develop the Hazard Summary Worksheet and Risk Factor Final Worksheet identified in Section 4.1 and in Appendix D.1-D.4) to help assess mitigation priorities and determined that the highest priority rankings would be assigned to those mitigation measures that met three primary criteria:

1. Greatest potential for protecting life and property.
2. Greatest potential for maintaining critical City functions and operability following a disaster.
3. Achievability in terms of community support and cost effectiveness.

All rankings were determined by the consensus of the Planning Team. As described in the previous section on hazard and risk assessment, clearly earthquakes have the potential to affect the largest number of people, critical facilities and buildings and to cause the greatest economic losses. This fact, combined with the relatively high probability of an earthquake occurrence in the next several decades, makes increasing disaster resistance and readiness to earthquakes a high priority.

Given the extreme importance of maintaining critical government functions in times of disaster and the large number of the population who depend and rely on government services and infrastructure, those mitigation measures that improve government disaster resistance, readiness, or recovery capacity are generally given higher priority than mitigation of privately owned buildings in which the loss or damage affects relatively few.

Earthquake, flooding, wildfire, and climate change mitigation actions are identified and assigned a priority according to their importance, cost, funding availability, to what degree project planning has been completed and the anticipated time to implement the measures.

The Planning Team discussed alternative mitigation strategies and mitigation measures during workshops, provided their preferences and also suggested additional mitigation measures that the Town should consider. The Planning Team reviewed the list of possible objectives and mitigation measures, made a final selection and then prioritized the individual mitigation measures considered most appropriate for Apple Valley.

6.5.1.1 Public Input for Mitigation Prioritization:

Public input is an essential step in validating the prioritization of mitigation actions. Valuable information was gathered regarding the perception of hazard threats to residents through a community survey. The summary of results can be found in Appendix C.2.

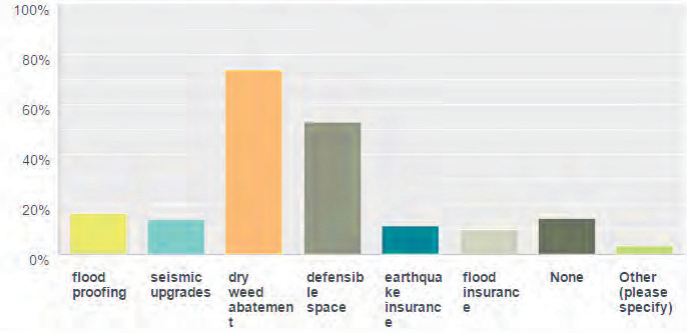
The community survey found that 75.5% of respondents had experienced an earthquake within the past 15 years within the Town of Apple Valley, 46.8% experienced wildfire, and 46.8% had experienced flooding. When asked which hazards

would be very likely to cause damage to buildings or harm residents in the Town, respondents believed drought, wildfire and earthquake were the most likely to cause damage.

As seen in figure 6-1 below the top incentives that would encourage the survey participants to protect their home against natural hazards were insurance premium discounts, property tax breaks or financial assistance programs. This community feedback was taken into consideration when prioritizing mitigation actions.

What mitigation measures or strategies have been completed in the last 5 years to protect your home or business from a natural hazard? Check all that apply

Answered: 123 Skipped: 0



Answer Choices	Responses	
flood proofing	16.26%	20
seismic upgrades	13.82%	17
dry weed abatement	73.98%	91
defensible space	52.85%	65
earthquake insurance	11.38%	14
flood insurance	9.76%	12
None	14.63%	18
Other (please specify) Responses	3.25%	4

Figure 6-1: Example survey question

6.5.2 Cost Benefit:

The action plan was prioritized according to a benefit/cost analysis of the proposed projects and their associated costs (44 CFR, Section 201.6(c)(3)(iii)). The benefits of proposed projects were weighed against estimated costs as part of the project prioritization process. The benefit/cost analysis was not of the detailed variety required by FEMA for project grant eligibility under the Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) grant program.

A less formal approach was used because some projects may not be implemented for up to 10 years, and associated costs and benefits could change dramatically in that time. Therefore, a review of the apparent benefits versus the apparent cost of each project was performed. Parameters were established for assigning subjective ratings (high, medium, and low) to the costs and benefits of these projects and the planning team arrived at such ratings notated in Table 6-7.

Cost ratings were defined as:

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

Benefit ratings were defined as follows:

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

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

6.5.3 Goal, Objective, and Mitigation Action Matrix

Based upon the risk assessment, the City's capabilities and public input, Table 6-7 shows primary objectives and corresponding mitigation actions selected for further implementation and development during the next planning cycle. Table 6-x provides details for each mitigation action with mitigation action descriptions, FEMA mitigation category, responsible party, and timeframe. Implementation Action Plans for each action number highlighted in Table 6-x are shown in further detail in Section 7 (Implementation).

Table 6-7: Goal, Objective, and Mitigation Action Prioritization Matrix

RF Factor	Action No.	Priority Rating	Action Description
EARTHQUAKE			
3.6	EQ 1.1	1	Seismic retrofit of the Bear Valley Bridge over Mojave River.

RF Factor	Action No.	Priority Rating	Action Description
EARTHQUAKE			
3.6	EQ 1.1	3	Seismic analysis of the James Woody Community Center.
3.6	EQ 2.1	2	Seismic analysis of the Town Hall Development Services Building.
3.6	EQ 3.1	4	Increase number of residents who complete public education programs such as CERT for earthquake risks and response.
FIRE			
2.3	WF 1.1	2	Continue and enhance the hazard abatement program to reduce wildfire hazards.
2.3	WF 2.1	1	Continue to identify areas vulnerable to wildfire due to inadequate water supply for firefighting and implement improvements such as expansion of water supply and storage hydrants.
2.3	WF 3.1	3	Continue and enhance community risk reduction programs such as Ready Set Go, burn permits, and educational programs through the schools.
FLOOD			
2.25	FL 1.1	2	Drainage system upgrade on Navajo Road near James Woody Community Center.
2.25	FL 1.2	3	Install drywell Seneca/Cronese Road
2.25	FL 1.3	4	Install drywell Gayhead/Seminole Road
2.25	FL 2.1	1	Purchase resources such as skid steer loader, dump truck and automatic sandbag machine needed to perform routine and annual maintenance for roadways and drainage facilities.
CLIMATE CHANGE			
1.7	CC 1.1	1	Implement measures to reduce GHG and energy usage as identified in the Town's CAP.

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Action No.	Mitigation Action	Description / Background	Mitigation Category	Funding	Cost/ Benefit	Lead Dept.	Timeline
AH 1.1	Implement a public notification system to increase ability to alert the public to potential emergency situations and residents, business owners and visitors.	The Town currently does not have a Town wide notification system for residents, business owners and visitors.	Emergency Services	General Fund Grants	High/High	Emergency Preparedness/PIO	5-10 years
AH 2.1	To ensure continual power supply, purchase and install backup generator at EOC.	The Town would like to move the current location of the EOC to a Town owned facility, however, we do not have a backup generator at any facility.	Public Education & Awareness	General Fund Grants	High/High	Emergency Preparedness & Facilities	3-5 years
EQ 1.1	Seismic retrofit of Bear Valley Bridge over Mojave River.	Town Engineering Department is in the planning stages for seismic retrofit of Bear Valley bridge.	Structural Projects	General Fund Grants	High/High	Engineering	5-10 years
EQ 1.2	Seismic analysis of the James Woody Community Center.	Seismic analysis of the James Woody Community Center would provide information on needed improvements to the building to respond to seismic activity.	Property Protection Alternatives	Grants	High/High	Building & Safety	3-5 years
EQ 1.3	Seismic analysis of the Town Hall Development Services Building.	Seismic analysis of the Town Hall Development Services Building would provide information on needed improvements to the building to respond to seismic activity.	Property Protection Alternatives	Grants	High/High	Building & Safety	3-5 years
EQ 2.1	Increase number of residents who complete public education programs such as CERT for earthquake risks and response.	Apple Valley has one of the most successful CERT programs in the High Desert. To increase public education and preparedness, expansion of CERT and the DSW program is necessary.	Public Education & Awareness	General Fund Grants	Low/High	Emergency Preparedness	On going
WF 1.1	Continue and enhance fire hazard abatement program.	The Fire Hazard/Weed Abatement Program goal is to have combustible vegetation and debris removed to reduce available fuel for fires. Continuation and enhancement of the program is necessary to decrease wildfires throughout Town.	Natural Resource Protection	AVFPD General Fund, Grants	Medium/High	AVFPD	On going
WF 1.2	Continue to identify areas vulnerable to wildfire due to inadequate water supply for firefighting and implement improvements such as expansion of water supply and storage hydrants.	There are some areas of Apple Valley that have sparse development and limited water supply for firefighting capabilities. The Fire District will continue to identify these areas and develop improvements to increase water supply.	Structural Projects	AVFPD General Fund, Grants	Medium/High	AVFPD	On going
WF 2.1	Continue and enhance community risk reduction programs such as Ready Set Go, burn permits, and educational programs through the schools.	The Community Risk Reduction program is dedicated to maintaining a proactive approach to reducing the risk to lives and property within the Apple Valley. The programs aim at preventing an emergency before it happens through education, preparedness, permits, and fire codes.	Public Education & Awareness	AVFPD General Fund, Grants	Medium/High	AVFPD	On going
FL 1.1	Drainage system upgrade on Navajo Road near James Woody Community Center.	During and after a major storm, flooding occurs on Navajo Road near the James Woody Community Center. Town Engineering department has identified the private property adjacent and to the south of the Community Center as a vital acquisition in order to build a basin for flowing water on Navajo Road.	Structural Projects	General Fund Grants	Low/Medium	Engineering	5-10 years
FL 1.2	Install drywell Seneca/Cronese Road	This intersection has been identified by our Engineering Department as an area in need of a drywell to combat flooding after a storm.	Structural Projects	General Fund Grants	Low/Medium	Engineering	3-5 years

Section 7. Plan Maintenance

7.1 Monitoring, Evaluating and Updating the HMP

As a living document it is important that this plan becomes a tool in the Town of Apple Valley's resources to ensure reductions in possible damage from a natural hazard event. This section discusses plan adoption, implementation, monitoring, evaluating, and updating the HMP. Plan implementation and maintenance procedures will ensure that the HMP remains relevant and continues to address the changing environment in the Town of Apple Valley's. This section describes the incorporation of the HMP into existing Apple Valley's planning mechanisms, and how the Apple Valley's staff will continue to engage the public.

7.2 Plan Adoption

To comply with DMA 2000, the Town Council has officially adopted the 2017 Town of Apple Valley HMP. The adoption of the 2017 HMP recognizes Apple Valley's commitment to reducing the impacts of natural hazards within Town limits. A copy of the 2017 HMP adoption resolution is included in the front of the approved HMP document.

7.3 Implementation

Over time, Implementation Strategies will become more detailed and the Town's mitigation planners will work to provide greater detail for priority mitigation actions. In conjunction with the Mitigation Implementation Plan Worksheet and Mitigation Action Reporting Form outlined at the end of Section 7 these will be extremely useful as a plan of record tool for updates. Each implementation strategy worksheet provides individual steps and resources needed to complete each mitigation action. The following provides several options to consider when developing implementation strategies in the future:

- **Use processes that already exist-** initial strategy is to take advantage of tools and procedures identified in the capability assessment in Section 6. By using planning mechanisms already in use and familiar to Town departments and organizations, it will give the planning implementation phase a strong initial boost, especially if a mitigation strategy calls for expanding existing programs, or creating new programs or processes at a later date. Section 6 provides more information on existing planning mechanisms.
- **Updated work plans-** policies, or procedures; hazard mitigation concepts and activities can help integrate the 2017 HMP into daily operations. These changes can include how major development projects and subdivision reviews are addressed in hazard prone areas or ensure that hazard mitigation concerns are considered in the approval of major capital improvement projects.
- **Job descriptions-** working with department or agency heads to revise job descriptions of government staff to include mitigation-related duties could further institutionalize hazard mitigation. This change would not necessarily result in great financial expenditures or programmatic changes.

7.4 Future Participation

The Town of Apple Valley's HMP Planning Committee, established for this update, will become a permanent advisory body to administer and coordinate the implementation and maintenance of the 2017 HMP. The Office of Emergency Preparedness will lead the 2017 HMP plan development and updates and all associated HMP

Action No.	Mitigation Action	Description / Background	Mitigation Category	Funding	Cost/ Benefit	Lead Dept.	Timeline
FL 1.3	Install drywell Gayhead/Seminole Road	This intersection has been identified by our Engineering Department as an area in need of a drywell to combat flooding after a storm.	Structural Projects	General Fund Grants	Low/Medium	Engineering	3-5 years
FL 2.1	Purchase resources such as a skid steer loader and automatic sandbag machine needed to perform routine and annual maintenance for roadways and drainage facilities.	The Town's Public Works department has limited resources to clear drainage facilities and roadways before and after major storms. Purchase of these two resources will aid in increasing staff's efficiency when conducting routine maintenance.	Prevention	General Fund Grants	High/High	Public Works	3-5 years
CC 1.1	Implement measures to reduce GHG and energy usage as identified in the Town's CAP.	The Town of Apple Valley's Climate Action Plan addresses the environmental effects of climate change and GHG reduction for the Town.	Prevention	General Fund Grants	Low/Low	Planning	On Going

maintenance requirements. Other duties include reviewing and promoting mitigation opportunities, informing and soliciting input from the public and developing grant applications for hazard mitigation assistance.

7.5 Schedule

The HMP will be updated every five years, as required by DMA 2000. The formal update process will begin at least one year prior to the expiration of the Town Council adoption date of the HMP notated at the beginning of this plan. However, should a significant disaster occur within Apple Valley, the HMP Planning Committee will reconvene within 30 days of the disaster to review and update the HMP as needed. The Town Council will adopt written updates to the HMP as a DMA 2000 requirement.

7.6 Process

The HMP Planning Committee will coordinate with responsible agencies/departments identified for each mitigation action. These responsible agencies/departments will monitor and evaluate the progress made on the implementation of mitigation actions and report to the HMP Planning Committee on an annual basis. Working with the HMP Planning Committee, these responsible agencies/organizations will be asked to assess the effectiveness of the mitigation actions and modify the mitigation actions as appropriate. A HMP Mitigation Action Progress Report worksheet, provided at the end of this section was developed as part of this HMP to assist mitigation project managers in reporting on the status and assessing the effectiveness of the mitigation actions.

Information culled from the mitigation leads or "champions" will be used to monitor mitigation actions and annual evaluation of the HMP. The following questions will be considered as criteria for evaluating the effectiveness of the HMP:

- Has the nature or magnitude of hazards affecting the Town changed?
- Are there new hazards that have the potential to impact the Town?
- Do the identified goals and actions address current and expected conditions?
- Have mitigation actions been implemented or completed?
- Has the implementation of identified mitigation actions resulted in expected outcomes?
- Are current resources adequate to implement the HMP?
- Should additional local resources be committed to address identified hazards?

An Annual HMP Review Questionnaire worksheet, provided in the Appendix D.7, has been developed as part of this HMP to provide guidance to the HMP Planning Committee on what should be included in the evaluation. Future updates to the HMP will account for any new hazard vulnerabilities, special circumstances, or new information that becomes available. Issues that arise during monitoring and evaluating the HMP, which require changes to the risk assessment, mitigation strategy and other components of the HMP, will be incorporated into the next update of the 2017 HMP in 2022. The questions identified above would remain valid during the preparation of the 2022 update.

7.7 Incorporation into Existing Planning Mechanisms

An important implementation mechanism is to incorporate the recommendation and underlying principles of the HMP into community planning and development such as capital improvement budgeting, building and zoning codes, general plans and regional plans.

The 2017 Hazard Mitigation Plan update process was followed by inclusion of mitigation measures in the Town of Apple Valley's General Plan. The Town of Apple Valley addresses statewide planning goals and legislative requirements through its General Plan, Capital Improvement Projects, Climate Action Plan and City Building and Safety Codes. The Hazard Mitigation Plan will implement a series of recommendations, many of which are closely related to the goals and objectives of existing planning programs just mentioned. The Town of Apple Valley will have the opportunity to implement recommended mitigation action items through existing programs and procedures.

The Hazard Mitigation Plan goals and actions will be incorporated into various general operations of government. For example, much of the information from the Hazard Mitigation Plan will be included in the Town of Apple Valley's Emergency Operations Plan (EOP). As any future Town plans are developed, the Hazard Mitigation Plan will be a great asset in any plan development efforts. As noted earlier, much of the information contained in this Hazard Mitigation Plan is from the Town's General Plan and is already part of the planning process.

7.8 Continued Public Involvement

A critical part of maintaining an effective and relevant Hazards Mitigation Plan is ongoing public review and comment. Consequently, the Town is dedicated to the direct involvement of its citizens in providing feedback and comments on the plan on a continued basis. The public will continue to be apprised of Local Hazard Mitigation Plan actions through the Town's website and through the local media.

The Town of Apple Valley will continue to promote and secure hazard mitigation, preparedness, response, and recovery actions via:

- Regular quarterly meetings of the Apple Valley Disaster Council
- Continued participation in the Operational Area Coordinating Council meeting.
- Regular revision of the Emergency Operations Plan and the Hazard Mitigation Plan as outlined respectively
- Annual drills and training with Emergency Operations Center staff
- Support of the full-time Emergency Preparedness Program
- Promotion at community events whenever possible

All proposed changes to the plan will be subject to citizen review prior to Town Council action. The Town will follow its standard public input process, consistent with the process used in the initial plan development, which is described in Section 3 of this Plan.

7.9 2017 HMP Mitigation Action Implementation Plans

Mitigation Action Implementation Plan	
Action:	
Implementing Agencies	
Lead Agency (ies):	Town of Apple Valley
Roles and Responsibilities:	
Support Agency (ies):	
Roles and Responsibilities:	
Preliminary Identified Tasks:	
1.	
2.	
3.	
Implementation Costs	
Estimated Capital Costs:	
Estimated Maintenance Costs:	
Implementation Resources	
Financial Resources (Funding):	
Technical Assistance Resources:	
Required Equipment, Vehicles, and Supplies	
Office Supplies	
Vehicles	
Implementation Timeframe	
Estimated Mitigation Action Start Date:	
Estimated Mitigation Action Completion Date:	

7.10 Blank Mitigation Action Reporting Forms

Your jurisdictional may wish to use these mitigation actions reporting forms on an annual, semiannual, or quarterly basis.

Progress Report Period:_____ to _____

(date) (date)

Project Title:_____

Project ID#_____

Responsible Agency:_____

Address:_____

Town: _____

Contact Person:_____

Phone#: _____ Email _____

List Supporting Agencies and Contacts:_____

Total Project Cost:_____

Funding Source:_____

Anticipated Cost Overrun/Underrun:_____

Date of Project Approval:_____ Start date of the project:_____

Anticipated completion date: _____

Description of the Project (include a description of each phase, if applicable, and the time frame for completing each phase):_____

Milestones	Completed (✓)	Projected Date of Completion

HMP Goal Addressed: _____

Indicator of Success:_____

Project Status:

□ Project on schedule □ Cost unchanged □ Project completed

□ Cost overrun* □ Project delayed*

*explain_____

Summary of progress on project for this report:

A. What was accomplished during this reporting period?

B. What successes have you encountered, if any?

C. What obstacles, problems, or delays have you encountered, if any?

D. How was each problem resolved?

E. Based on the past experiences (successes and obstacles), what changes, if any, need to be made to ensure completion?

Next Steps: What are the next step(s) to be accomplished over the next reporting period?

Other Comments:

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Section 8. Work Cited

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Appendix A

A.1 Copy of Town Resolution adopting HMP

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Appendix B

B.1 Planning Committee Team

B.2 Planning Committee Invite Letters

B.3 Committee Meeting Documents (PPT's, sign in sheets and agendas)

B.4 Other Meeting Agendas (CERT, Disaster Council, Town Council)

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B.1 Planning Committee Team

Apple Valley HMP Team

Suggested Planning Team Members
Emergency Management
Building Code Enforcement
Fire District
GIS
Parks & Recreation
Planning/Com. Development
PIO
Public Works
Stormwater Management
Transportation

Proposed 2016 HMP Core Planning Team

Title	Person
Emer. Management	Joseph Ramos
Building Official	Patrick Carroll
AVFPD	Sid Hultquist
GIS	Pam Cupp
Parks & Rec	Ralph Wright
Planning/Comm Dev.	Lori Lamson
PIO	Kathie Martin
Public Works	Greg Synder
Engineer	Brad Miller

Key Stakeholders

DSW	Dawn Harrison
City of Hesperia	Rachel Molina
City of Victorville	Dana Welborn
AVUSD	Janet Gould
American Red Cross	Don Gordon
County of SB	Cindy Serrano
SW Gas	Bill Hensley
Edison	Bob Stiens
Liberty Utilities	Kevin Phillips
Nat. Weather Service	Alex Tardy
St. Josephs- St. Mary's	Shannon Welsh
Cal OES	HMP division
FEMA	HMP division

2010

Title	Person
DSW	Shelley Alfieri
Fire Chief	Art Bishop
United Way	Chris Briggs
AV Ranchos Water	Mike Cook
ATM- TOAV	Dennis Cron
CERT Commander	Dawn Harrison
DSW	Pat Hayes
TOAV- Engineer	Brad Miller
PW manager- TOAV	Lance Miller
Risk Manager- AVUSD	David Pinnecker
Building Official- TOAV	Claude Stewart
St. Mary's	Robert Suchomel
ESO- TOAV & AVFPD	Laura Whitehead
P & R Manager	Ralph Wright

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B.2 Planning Committee Invite Letters

Town of Apple Valley
Office of Emergency Preparedness

A Better Way of Life

July 20, 2016

You are invited to make a difference!

Town of Apple Valley is required to maintain a current Local Hazard Mitigation Plan (HMP) approved by CalOES and FEMA that identifies hazards and mitigation potential within the Town of Apple Valley. In addition to preparedness, this plan is necessary to insure that Apple Valley is eligible to receive federal grants and/or aid related to natural disaster. This is a 5-year plan. Apple Valley has begun the process to prepare the 2016 update to the Local Hazard Mitigation Plan (HMP) and we invite you to participate. The HMP will serve as a blueprint for reducing property damage and saving lives from the effects of future natural disasters in Apple Valley.

To guide this process, Apple Valley has established two groups: The Core Planning Committee who will work closely to shape the plan; and the Stakeholder Group to give a broad perspective during plan development. You are receiving this because our ***Town Manager*** has identified you as a key participant at the Core Planning level. We welcome your participation as part of the HMP Core Planning Team to update our natural hazard mitigation documents for Apple Valley.

To provide solidarity in the process, we would like to kick-off the planning efforts with a meeting for team members. The strategy of this meeting is to have members meet, organize and provide input on the hazards, mitigation strategies, and other components of the HMP planning process. Later in the planning process, we will start engaging a larger group of stakeholders, and develop a plan together with the help of a consultant team hired by the County.

The kick-off meeting will be on ***Tuesday, August 2, 2016 at 8:30 a.m.*** at the Town Hall Development Services Building meeting room 1 located at 14975 Dale Evans Parkway.

For more information about the HMP process and history behind the program visit:

www.readyapplevalley.org.

Cal OES Local Hazard Mitigation Planning Program (LHMP):
http://hazardmitigation.calema.ca.gov/plan/local_hazard_mitigation_plan_lhmp

FEMA's Website on Hazard Mitigation Planning Resources:
http://www.fema.gov/hazard-mitigation-planning-resources

FEMA's Guide on Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards:
http://www.fema.gov/library/viewRecord.do?id=6938

FEMA's Guide on Integrating Hazard Mitigation Intro Local Planning: Case Studies and Tools for Community Officials:
http://www.fema.gov/library/viewRecord.do?id=7130

Please advise if you will or will not be able to attend this kick off meeting. If you are unable to attend this meeting, additional information regarding future meetings, draft documents for review, and other project milestones will be provided soon!

If you have any additional questions, please do not hesitate to contact me by phone or email. Thank you for your time and consideration.

Joseph Ramos
Town of Apple Valley
Emergency Services Officer
jramos@applevalley.org
760-240-7000 ext. 7890

Town of Apple Valley

Office of Emergency Preparedness

A Better Way of Life

July 28, 2016

You are invited to make a difference!

Town of Apple Valley has begun the process to prepare the 2016 update to the Hazard Mitigation Plan (HMP) and we invite you to participate. The HMP will serve as a blueprint for reducing property damage and saving lives from the effects of future natural disasters in the Town of Apple Valley. To guide this process, the Town has established two groups: The Planning Committee who will work most closely to shape the plan; and the Stakeholder Group to give a broad perspective during plan development. You are receiving this because you or your agency has been identified as a key participant at the "Stakeholder Group" level. The Town welcomes you (or other interested parties) to assist the HMP Project Management Team to update our natural hazard mitigation documents for the Town of Apple Valley. ***This will involve periodic review of documentation and feedback during certain points of the planning process.***

To provide solidarity in the planning process, we would like to inform you that our project will be starting soon with a kick-off meeting. You are more than welcome to join this meeting but attendance at this meeting is not a requirement to be involved in the entire process. The strategy of this meeting is to have members meet, organize and discuss next steps and other components of the HMP planning process. Later in the planning process, we will start engaging a larger group of stakeholders through various means of engagement. We anticipate the HMP development process to last about 8 to 12 months.

The kick-off meeting will be on ***Tuesday, August 2, 2016 at 8:30 a.m.*** at the Town Hall Development Services Building meeting room 1 located at 14975 Dale Evans Parkway

For more information about the HMP process and history behind the program visit:

www.readyapplevalley.org

Cal OES Local Hazard Mitigation Planning Program (LHMP):
http://hazardmitigation.calema.ca.gov/plan/local_hazard_mitigation_plan_lhmp

FEMA's Website on Hazard Mitigation Planning Resources:
http://www.fema.gov/hazard-mitigation-planning-resources

FEMA's Guide on Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards:
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FEMA's Guide on Integrating Hazard Mitigation Intro Local Planning: Case Studies and Tools for Community Officials:
http://www.fema.gov/library/viewRecord.do?id=7130

Please respond to this e-mail and advise if you will be participating in this process, and who will be assigned to represent your agency. If you are unable to attend this meeting but still wish to participate in the planning process, additional information regarding future meetings, draft documents for review, and other project milestones will be provided through e-mails.

If you have any additional questions, please do not hesitate to contact me by phone or email. Thank you for your time and consideration,

Joseph Ramos
Town of Apple Valley
Emergency Services Officer
jramos@applevalley.org
760-240-7000 ext. 7890

Town of Apple Valley
Office of Emergency Preparedness

A Better Way of Life

Media Alert
July 28, 2016
For immediate release

You are invited to make a difference!

Town of Apple Valley has begun the process to prepare the 2016 update to the Hazard Mitigation Plan (HMP) and we invite you to participate. The HMP will serve as a blueprint for reducing property damage and saving lives from the effects of future natural disasters in the Town of Apple Valley. The Town welcomes you (or other interested parties) to assist the HMP Project Management Team to update our natural hazard mitigation documents for the Town of Apple Valley. This will involve periodic review of documentation and feedback during certain points of the planning process.

To provide solidarity in the planning process, we would like to inform you that our project will be starting soon with a kick-off meeting. You are more than welcome to join this meeting but attendance in this meeting is not a requirement to be involved in the entire process. We anticipate the HMP development process to last about 8 to 12 months.

The kick-off meeting will be on ***Tuesday, August 2, 2016 at 8:30 a.m.*** at the Town Hall Development Services Building meeting room 1 located at 14975 Dale Evans Parkway.

We will have additional discussions of the HMP during all upcoming Disaster Council Meetings and CERT meetings.

For more information about the HMP process and history behind the program visit: www.readyapplevalley.org.

If you have any additional questions, please do not hesitate to contact me by phone or email. Thank you for your time and consideration.

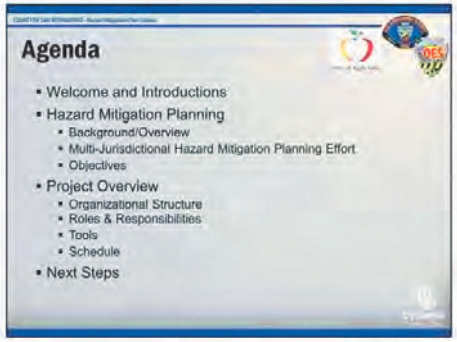
Joseph Ramos
Town of Apple Valley
Emergency Services Officer
jramos@applevalley.org
760-240-7000 ext. 7890

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B.3 Committee Meeting Documents (PPT's, sign in sheets and agendas)

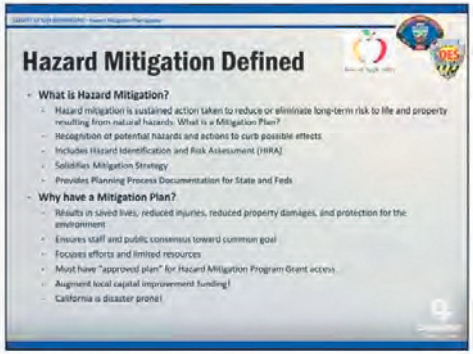
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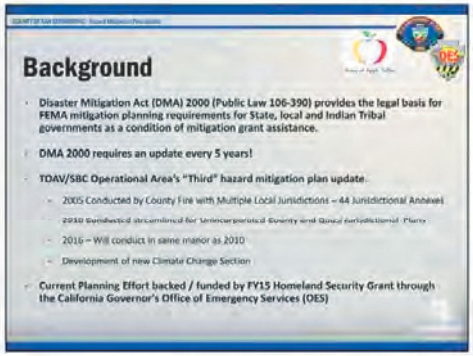




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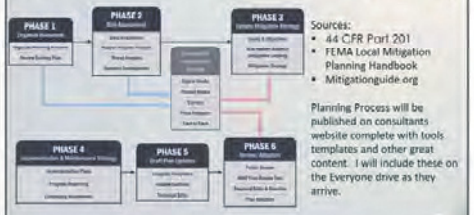




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6/15/2017

6 Phases
Planning Process "Simplified"



Sources:
- 44 CFR Part 201
- FEMA Local Mitigation Planning Handbook
- Mitigationguide.org

Planning Process will be published on consultants website complete with tools templates and other great content. I will include these on the Everyone drive as they arrive.

Beyond Compliance!
Planning Process

- County/ Town/District -specific with detailed implementation guidance
- Competitive edge for Pre-Disaster and Post-Disaster Hazard Mitigation Grant Funding
- Community-driven, transparent, and collaborative planning process that is fully documented
- Legitimacy for County and City Decision Making!
- Integrated with other County / City / District and Regional planning mechanisms
  - E.g. General Plan Safety Element Updates
  - E.g. threat assessments in Emergency Operations Plans
- Public education and awareness
- Communicate risks to your residence

6/15/2017

Primary Objectives

- Setting the expectations and define mitigation planning and actions.
- Mitigate the identified risk.
- This is not a emergency response document!
- Create umbrella planning process with a set prescribed phases and tasks to follow if needed.
- Remain Flexible; implementation will change over time based upon resources, grants and other leveraging.
- Develop something useful!





"Ideal" Schedule

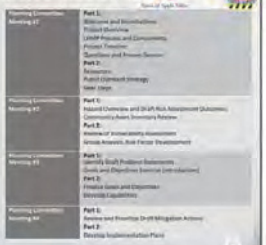


Next Steps (4 Week Window)

- Risk Assessment
  - Review 2011 HMP.
  - Develop building / Parcel inventory
  - Develop Critical Infrastructure Inventory (Linear & Points)
  - Make notes on Hazard mitigation projects completed and in progress (Section 6).
  - Make notes on projects not listed in 2011 plan but have been completed, in progress or planned for the future.

List of Planning Committee Meetings

- 2-3 HRS in Length.
- Facilitated and Structured
- Information from meetings used to curtail and customize plan
- Required component in the update / planning process



QUESTIONS

Joseph Ramos
Emergency Services Officer
760-240-7000 ext. 7890
Dawn Harrison
Emergency Services Assistant
760-240-7000 ext. 7791

Kick Off Meeting Monday August 2, 2016

Planning Committee Dept. / Members	E-Mail	Initial
Town Engineering/building & Safety Department		
Brad Miller	bmiller@applevalley.org	
Patrick Carroll	pcarroll@applevalley.org	
Brett Morgan	bmorgan@applevalley.org	
Town Community Development		
Lori Lamson	llamson@applevalley.org	
Pam Cupp	pcupp@applevalley.org	
Ralph Wright	rwright@applevalley.org	
AV Fire Protection District		
Sid Hultquist	shultquist@applevalleyfd.com	
Rich Unterdorfer	runterdorfer@applevalleyfd.com	
Town Public Works		
Greg Snyder	gsnyder@applevalley.org	
Mike Cody	mcady@applevalley.org	
Town PIO		
Kathy Martin	kmartin@applevalley.org	
Office of Emergency Preparedness		
Joseph Ramos	jramos@applevalley.org	
Dawn Hamlon	dhamlon@applevalley.org	

6/15/2017

2016-17 Hazard Mitigation Plan Update Process

Town of Apple Valley, SBC OES

HMP Meeting

October 18, 2016

Agenda

- Hazard Mitigation Planning
  - Hazard Mitigation Defined
  - Town HMP webpage/survey
  - Schedule
- Project Review
  - Section 1-3
  - Schedule
- Prep for next sections
  - Hazard Prioritization
  - Mitigation Strategies
- Exercise Problem Statements
- Next Step- section 4-5

1

6/15/2017

Hazard Mitigation Defined

- **What is Hazard Mitigation?**
  - Hazard mitigation is sustained action taken to reduce or eliminate long-term risk to life and property resulting from natural hazards. What is a Mitigation Plan?
  - Recognition of potential hazards and actions to curb possible effects
  - Includes Hazard Identification and Risk Assessment (HIRA)
  - Solidifies Mitigation Strategy
  - Provides Planning Process Documentation for State and Feds
- **Why have a Mitigation Plan?**
  - Results in saved lives, reduced injuries, reduced property damages, and protection for the environment
  - Ensures staff and public consensus toward common goal
  - Focuses efforts and limited resources
  - Must have "approved plan" for Hazard Mitigation Program Grant access
  - Augment local capital improvement funding!
  - California is disaster prone!

Background

- **Disaster Mitigation Act (DMA) 2000 (Public Law 106-390) provides the legal basis for FEMA mitigation planning requirements for State, local and Indian Tribal governments as a condition of mitigation grant assistance.**
- **DMA 2000 requires an update every 5 years!**
- **TDAV/SBC Operational Area's "Third" hazard mitigation plan update**
  - 2005 Conducted by County Fire with Multiple Local Jurisdictions – 44 Jurisdictional Annexes
  - 2010 Conducted streamlined for Unincorporated County and Local Jurisdictional Plans
  - 2016 – Will conduct in same manor as 2010
  - Development of new Climate Change Section
- **Current Planning Effort backed / funded by FY15 Homeland Security Grant through the California Governor's Office of Emergency Services (OES)**

2

6/15/2017

"Ideal" Schedule



HMP- Town Web Page

- Strongly recommended by FEMA and Cal OES to create webpage for HMP planning process.
- Essential for involving public in planning process & review period.
- Includes public survey for those who live and work in Apple Valley.
- www.readyapplevalley.org



3

6/15/2017

Section 1
Introduction

- 1.1 Purpose of the Plan- Joseph
- 1.3 Community Profile- Kathie M./PIO
- 1.3.1 Physical Setting- Kathie M./PIO
- 1.3.2 History- Kathie M./PIO
- 1.3.3 Demographics- Kathie M./PIO
- 1.3.4 Existing Land Use- Lori/Planning
- 1.3.5 Development trends- Lori/Planning

Section 2
Plan Adoption

- 2.1 Adoption by local governing body- Joseph
- 2.2 Promulgation Authority- Joseph
- 2.3 Primary Point of Contact- Joseph

6/15/2017

Section 3
Planning Process

- 3.1 Preparing for the Plan- Joseph
- 3.1.1 Planning Team- Dawn
- 3.2 Coordinating w/other jurisdictions, agencies & organizations- Dawn
- 3.3 Public involvement/Outreach- Dawn
- 3.4-3.8 Assess the Hazard, Set Goals, Review & Propose Mitigation Measures, Draft & Adopt Plan- Joseph

Preparing for next sections

- Hazard Prioritization

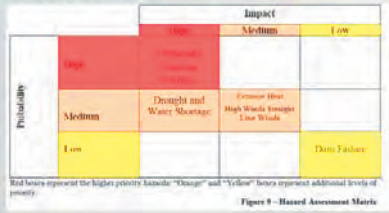


Figure 9 – Hazard Assessment Matrix

6/15/2017

Preparing for next sections

- Mitigation strategies

Action	Lead Agency	Hazard	Funding Source	Timeline	Priority Ranking
Develop projects and programs to install automatic gas shut-off valves in residential, commercial, and public buildings	Apple Valley	Earthquake	PDM HMGP HUD	Long Term	Low
Develop and construct seismic retrofit of critical facilities	Apple Valley	Earthquake	PDM HMGP Diff	Long Term	Low
Develop residential and commercial seismic retrofit programs	Apple Valley	Earthquake	PDM HMGP	Long Term	Low
Develop earthquake mitigation public outreach education programs	Apple Valley	Earthquake	EMPG	Long Term	High
Develop and construct seismic retrofit of city-owned transportation and utilities infrastructure	Apple Valley	Earthquake	PDM HMGP DOT ARRA	Long Term	Low

Preparing for next sections

- Mitigation strategies-Cont.

Develop and sponsor projects and programs to brace new or relocated mobile homes to resist earthquakes	Apple Valley	Earthquake	PDM HMGP	Long Term	Low
Install detention basins Navajo and Ottawa Roads	Apple Valley	Flood	PDM	Long Term	Low
Install detention basins Huasna Road and Chippewa Rd	Apple Valley	Flood	PDM	Long Term	Low
Install detention basins Bear Valley and Mohawk Roads	Apple Valley	Flood	PDM	Long Term	Low
Install Dry Wells Quapaw Rd / Eyota Rd	Apple Valley	Flood	PDM	Long Term	Low
Install Dry Wells Seneca Rd / Rancheria Road	Apple Valley	Flood	PDM	Long Term	Low
Install Dry wells Pocomoke Rd / Minnetonka Rd	Apple Valley	Flood	PDM	Long Term	Low
Install Dry Wells Algonquin Rd / Lone Eagle Rd	Apple Valley	Flood	PDM	Long Term	Low
Install Dry wells	Apple	Flood	PDM	Long	Low

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6/15/2017

Preparing for next sections

- Mitigation strategies-Cont.

Action	Lead Agency	Hazard	Funding Source	Timeline	Priority Ranking
Mohawk Rd / Laguna Rd	Valley			Term	
Install Dry Wells Little Beaver / Mesquite Rd	Apple Valley	Flood	PDM	Long Term	Low
Install Dry wells Dale Evans/Otoe/Thunderbird Rancherias neighborhood area	Apple Valley	Flood	PDM	Long Term	Low

Exercise- Problem Statements

- **Create a problem statement for 4 of the 6 hazards listed as medium/high probability to medium/high impact.**

Explain the specific problem to be solved. For example one hazard our community faces is earthquakes. Suppose that the problem is a number of structures are vulnerable to collapse. Then one specific problem statement may be: *People who are working or using the James Woody Community Center, which is an un-reinforced masonry public building, are at risk of being hurt or killed during an earthquake.*

Other problem statements may address conditions of other public buildings, as well as the need for community education, difficulties anticipated in maintaining emergency communications, or weaknesses in the water system that will be exacerbated should an earthquake occur. Each problem statement should address a unique vulnerability.

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6/15/2017

Exercise- Problem Statements

- **Create a problem statement for 4 of the 6 hazards listed as medium/high probability to medium/high impact.**
- **Examples- Drought**
  - Lack of water supply for fire suppression
- **Earthquake**
  - Damage to roadways and transportation networks
- **Flood**
  - Limited access for fire resources in flood areas
- **High Winds**
  - Power lines down in residential streets
- **High Heat**
  - Power failure due to rolling blackouts
- **Wildfire**
  - Developed property adjacent to wild land interface

Next Steps – Sections 4-5

- **Review Section 4- Risk Assessments/Hazard Identification**
  - I will be seeking out information from some regarding; historical events, critical facility lists
- **Review Section5-Community Capability Assessment**
  - I will be seeking out information from some regarding historical events regarding hazards.
- **Next meeting late November, expect 2-3 hour meeting with food!**

6/15/2017

QUESTIONS

Joseph Ramos
Emergency Services Officer
760-240-7000 ext. 7890
Dawn Harrison
Emergency Services Assistant
760-240-7000 ext. 7791

Meeting: Tuesday October 18, 2016

Planning Committee Dept. / Members	E-Mail	Initial
Town Engineering/Building & Safety Department		
Brad Miller	bmiller@applevalley.org	
Patrick Carroll	pcarroll@applevalley.org	
Brett Morgan	bmorgan@applevalley.org	
Town Community Development		
Lori Lamson	llamson@applevalley.org	
Carol Miller	cmiller@applevalley.org	
Pam Cupp	pcupp@applevalley.org	
Ralph Wright	rwright@applevalley.org	
AV Fire Protection District		
Sid Hultquist	shultquist@applevalleyfd.com	
Rich Unterdorfer	runterdorfer@applevalleyfd.com	
Town Public Works		
Greg Snyder	gsnyder@applevalley.org	
Mike Cady	mcady@applevalley.org	
Town PIO		
Kathy Martin	kmartin@applevalley.org	
Office of Emergency Preparedness		
Joseph Ramos	jramos@applevalley.org	
Dawn Harrison	dharrison@applevalley.org	

6/15/2017

Town of Apple Valley
2016-17
Hazard Mitigation Plan Update Process

HMP Meeting #3
February 21, 2017

Town of Apple Valley Hazard MitigationAgenda:

1. Review- HMP Citizen Survey Results
2. Hazard Summary Worksheet
3. Risk Factor Worksheet
4. Agree on hazards to identify
5. Discuss next steps
6. Next meeting in March- this timeframe work?

1

6/15/2017

Town of Apple Valley
Local Hazard Mitigation Plan Survey

Thursday, February 16, 2017

123

Total Responses

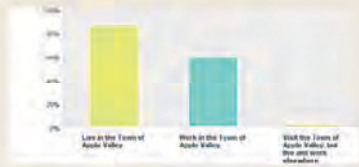
Date Created: Thursday, September 29, 2016

Complete Responses: 123

6/15/2017

Q1: Do you.. (Check all that apply).

Answered: 123 Skipped: 0



Answer Choices	Responses
Live in the Town of Apple Valley	84.55% 104
Work in the Town of Apple Valley	10.57% 13
Visit the Town of Apple Valley, but live and work elsewhere	4.87% 6
Total Respondents: 123	

***Q2: Which of the following types of natural disasters have you or someone in your household experienced in the past 15 years within the Town of Apple Valley? (Check all that apply)

Answered: 123 Skipped: 0



6/15/2017

**Q2: Which of the following types of natural disasters have you or someone in your household experienced in the past 15 years within the Town of Apple Valley? (Check all that apply)

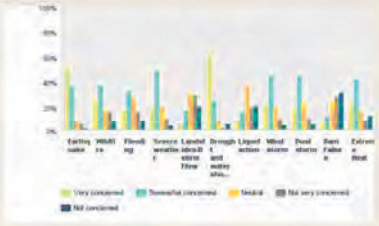
Answered: 123 Skipped: 0

Answer Choices	Responses
[illegible]	12.20%
Wildfire	43.09%
Flooding	33.33%
Severe weather	47.15%
Landslides/ Debris flow	7.32%
Drought/ liquefaction	8.94%
Wind Storm	71.54%
Dust storm	66.67%

Total Respondents: 123

**Q3: How concerned are you about the following natural hazards affecting your home and/or business in Apple Valley? Please check ONE response for each hazard.

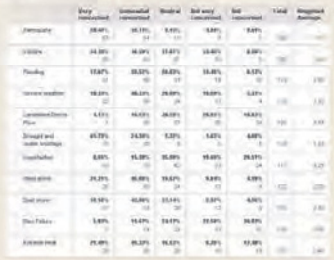
Answered: 123 Skipped: 0



6/15/2017

**Q3: How concerned are you about the following natural hazards affecting your home and/or business in Apple Valley? Please check ONE response for each hazard.

Answered: 123 Skipped: 0



**Q4: Information about the risks from natural hazards is readily available and easy to locate.

Answered: 123 Skipped: 0



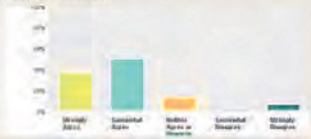
Answer Choices	Responses
Strongly Agree	19.46%
Somewhat Agree	38.21%
Neither Agree or Disagree	15.51%
Somewhat Disagree	12.26%
Strongly Disagree	1.63%
Total	123

Q5: It is my responsibility to educate myself and take actions that will reduce my exposure to the risks from natural hazards.



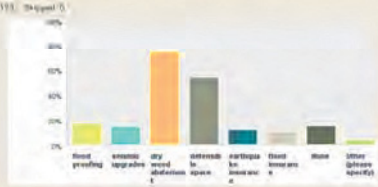
Answer Choices	Responses
Strongly Agree	73.98% 91
Somewhat Agree	22.76% 28
Neither Agree or Disagree	0.81% 1
Somewhat Disagree	1.63% 2
Strongly Disagree	0.81% 1
Total	123

Q6: It is the responsibility of government (local, state and federal) to provide education and programs that promote citizen actions that will reduce exposure to the risks from natural hazards.



Answer Choices	Responses
Strongly Agree	73.98% 91
Somewhat Agree	22.76% 28
Neither Agree or Disagree	0.81% 1
Somewhat Disagree	1.63% 2
Strongly Disagree	0.81% 1
Total	123

Q7: What mitigation measures or strategies have been completed in the last 5 years to protect your home or business from a natural hazard? Check all that apply



Q7: What mitigation measures or strategies have been completed in the last 5 years to protect your home or business from a natural hazard? Check all that apply

Answered: 123 Skipped: 0

Answer Choices	Responses
Flood proofing	18.18% 22
Seismic upgrades	13.22% 16
Dry wood abatement	33.06% 40
Defensible space	32.23% 39
Earthquake insurance	11.57% 14
Flood insurance	9.09% 11
None	14.05% 17
Other (please specify)	3.31% 4
Total Respondents: 121	

6/15/2017

Q8: How much money do you spend annually on mitigation measures to protect your home or business from natural hazards?



Q8: How much money do you spend annually on mitigation measures to protect your home or business from natural hazards?

Answered: 123 Skipped: 0

Answer Choices	Responses	
None	71.54%	88
Less than $250	18.63%	23
$250-$500	7.32%	9
$501-$1000	0.81%	1
More than $1000	1.63%	2
Total		123

6/15/2017

Q9: Which of the following incentives would encourage you to protect your home against natural hazards? (Check all that apply)



Q9: Which of the following incentives would encourage you to protect your home against natural hazards? (Check all that apply)

Answered: 123 Skipped: 0

Answer Choices	Responses	
Insurance premium discount	39.84%	49
Mortgage discount or low interest rate	39.84%	49
Financial assistance for property upgrades or equipment	46.34%	57
Rebate program	47.97%	59
Technical assistance	34.15%	42
Labor assistance	38.21%	47
Grant funding that requires cost share from property owner	25.20%	31
Building permit fee reduction or waiver	34.96%	43
Property tax break or incentive	41.46%	51
Financial assistance for equipment	28.45%	35
Total Respondents: 123		

6/15/2017

Q10: What protection methods do you believe the Town, County, State or Federal agencies should be using in order to reduce damage and disruption from hazard events within the Town of Apple Valley?

Answered: 123 Skipped: 0



Q10: What protection methods do you believe the Town, County, State or Federal agencies should be using in order to reduce damage and disruption from hazard events within the Town of Apple Valley?

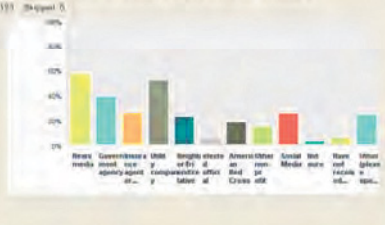
Answered: 123 Skipped: 0

	High Priority	Medium Priority	Low Priority	Total
Retrofit and strengthen essential facilities (such as police, fire, schools and hospitals)	75.40% 89	19.73% 23	4.88% 6	118
Retrofit infrastructure (such as roads, bridges, drainage facilities, water supply, and sewer)	85.37% 105	11.81% 13	8.81% 1	119
Fund projects related to drainage control measures and environmental	29.84% 37	55.29% 68	4.85% 4	123
Strengthen codes and requirements to increase home standards in hazard areas	26.83% 33	43.91% 54	29.27% 36	123
Assist vulnerable property owners with securing funding for mitigation/property protection	32.52% 40	36.59% 45	29.54% 36	123
Increase public information about risks and the exposure to hazards within the Town of Apple Valley	55.28% 68	38.89% 48	13.82% 17	123
Carry out projects to restore the natural environment's capacity to absorb the impacts from natural hazards	91.22% 115	25.71% 41	13.99% 18	126
Acquire emergency generators for essential government facilities and buildings identified as care and shelter	68.18% 74	29.23% 36	16.67% 11	121

6/15/2017

Q11: Thinking back in the last three years, from whom have you received information about how to make members of your household and your home safer from natural disasters? Check all that apply.

Answered: 123 Skipped: 0



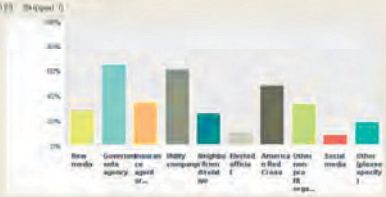
Q11: Thinking back in the last three years, from whom have you received information about how to make members of your household and your home safer from natural disasters? Check all that apply.

Answered: 123 Skipped: 0

Answer Choices	Responses
News media	66.67% 82
Government agency	74.21% 91
Friends/neighbors/coworkers	33.33% 41
Utility company	55.69% 69
Neighborhood Association	25.81% 32
Internet/email	4.87% 6
American Red Cross	13.82% 17
Other non-profit	13.82% 17
Social Media	74.39% 91
Did not receive	2.44% 3
Have not received information	3.25% 4
Other (please specify)	25.58% 33
Total Respondents: 123	

6/15/2017

***Q12: Whom would you most trust to provide you with information about how to make your household and home safer from natural disasters? Choose at least 3 responses.



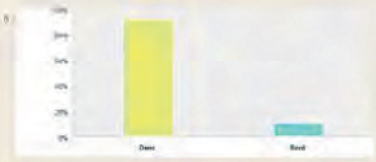
***Q12: Whom would you most trust to provide you with information about how to make your household and home safer from natural disasters? Choose at least 3 responses.

Answered: 123 Skipped: 0

Answer Choices	Responses
Total Respondents: 123	

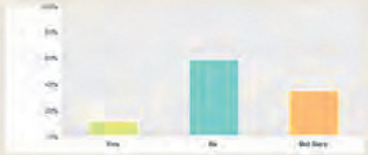
6/15/2017

Q13: Do you rent or own your home or business?



Answer Choices	Responses
Total	123

Q14: Is your home or business in or near a FEMA designated floodplain?



Answer Choices	Responses
Total	123

6/15/2017

Q15: Do you have flood insurance?



Q16: Is your home or business located near an earthquake fault?



6/15/2017

Q17: Do you have earthquake insurance?

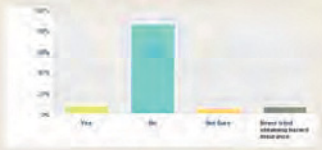


Q18: To the best of your knowledge, does your homeowner's, renter's, or general insurance policy provide coverage for damage from natural hazards?



6/15/2017

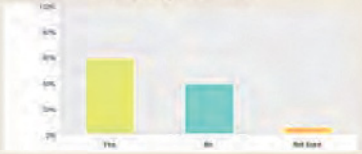
Q19: Have you ever had problems obtaining homeowner's or renter's insurance due to risks from natural hazards?



Answer Choices	Responses
Yes	6.56%
No	84.59%
Not Sure	4.37%
Have tried obtaining but not successful	4.48%
Total	137

*****Q20: When you moved into your home, did you consider the impact a natural hazard event could have on your home?**

Answered: 123 Skipped: 0



Answer Choices	Responses
Yes	57.72%
No	36.71%
Not Sure	5.57%
Total	121

6/15/2017

Q21: Was the presence of a natural hazard risk zone (for example, wild fire area or flood zone) disclosed to you by a real estate agent, seller or landlord before you purchased or moved into your home?



Answer Choices	Responses
Yes	34.55%
No	61.82%
Not Sure	14.55%
Total	121

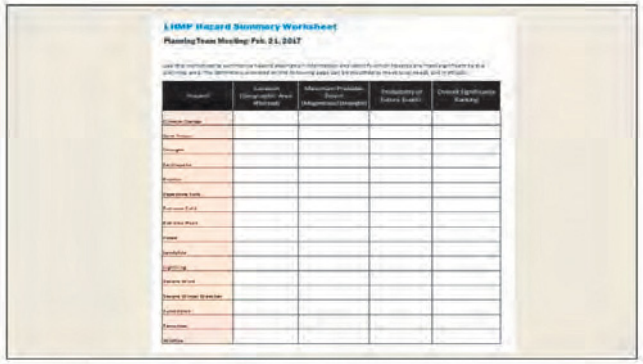
Q22: Would natural hazard real estate disclosures or risk information influence your decision on where to buy or rent a home?

Answered: 123 Skipped: 0



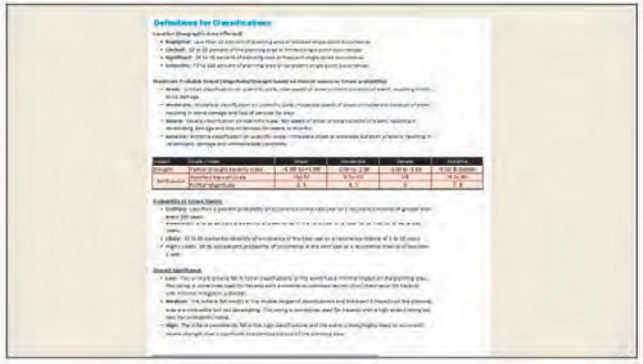
Answer Choices	Responses
Yes	83.19%
No	7.37%
Not Sure	9.94%
Total	121

6/15/2017



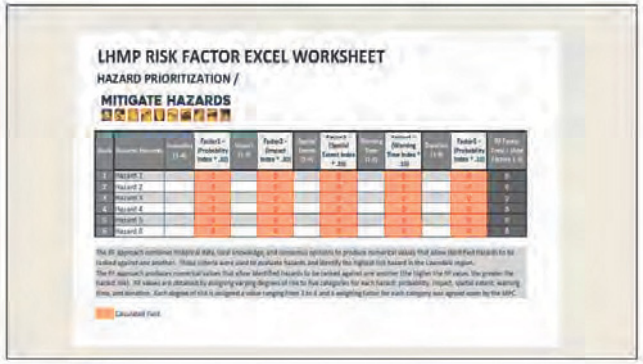
LHMP Hazard Summary Worksheet

Planning Team Meeting: Feb. 21, 2017



Definitions for Classifications

6/15/2017



LHMP RISK FACTOR EXCEL WORKSHEET

HAZARD PRIORITIZATION /

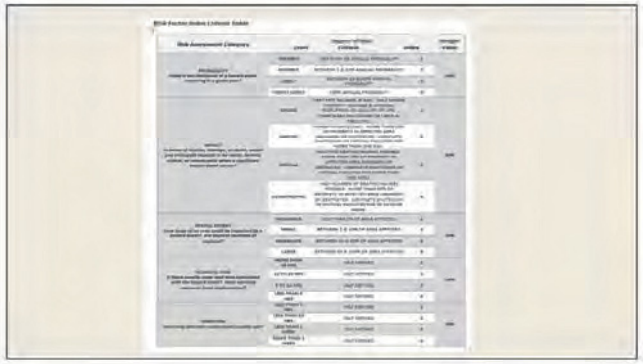
MITIGATE HAZARDS

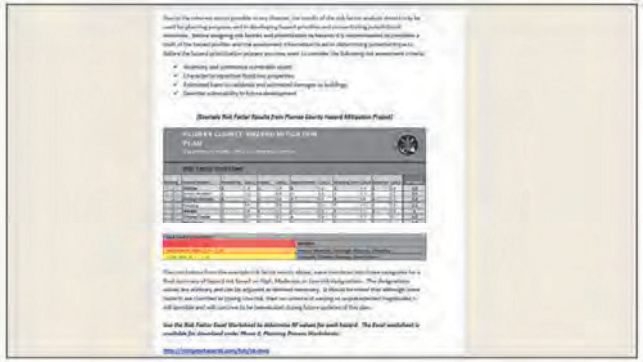


Risk Factor (RF) Approach

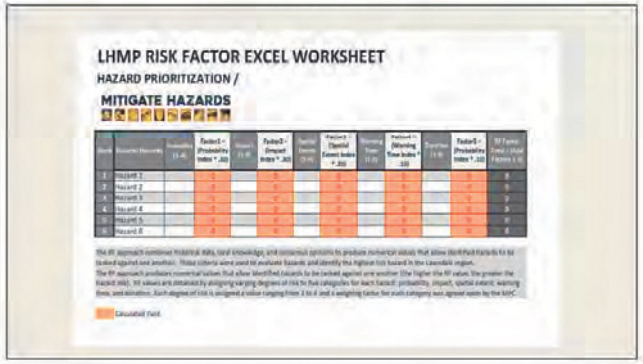
MITIGATE HAZARDS

6/15/2017





6/15/2017



- Discussion on identified hazards
- Due to limited resources will only focus on High Risk Identified Hazards
- Next meeting will discuss vulnerability assessment as it relates to these hazards. Will also begin the discussion on mitigation strategies for the identified hazards

HMP Meeting - Tuesday February21, 2017

Planning Committee Dept. / Members	E-Mail	Initial
Town Engineering/Building & Safety Department		
Brad Miller	bmiller@applevalley.org	
Patrick Carroll	pcarroll@applevalley.org	
Brett Morgan	bmorgan@applevalley.org	
Town Community Development		
Lori Lamson	llamson@applevalley.org	
Pam Cupp	pcupp@applevalley.org	
Ralph Wright	rwright@applevalley.org	
AV Fire Protection District		
Sid Hultquist	shultquist@applevalleyfd.com	SH
Rich Unterdorfer	runterdorfer@applevalleyfd.com	
Town Public Works		
Greg Snyder	gsnyder@applevalley.org	
Mike Cady	mcady@applevalley.org	
Town PIO		
Kathy Martin	kmartin@applevalley.org	
Office of Emergency Preparedness		
Joseph Ramos	jramos@applevalley.org	
Dawn Harrison	dharrison@applevalley.org	
Carol Miller	cmiller@applevalley.org	CM

Planning Committee / Stakeholder Members	Name	E-Mail
County		
Regional Utilities		
Partner Agencies		
City of Hesperia	April Antunia	aantonio@cityofhesperia.us
Cal OES (Hazard Mitigation Pre-Disaster & Flood Mitigation)		

Town of Apple Valley

Town of Apple Valley
HMP Meeting #4

April 28, 2017

Agenda:

1. Review Section 6 Mitigation Goals, Objectives, Actions
2. Review Cost/Benefit
3. Discuss Cost/Benefit for each action
4. Rate each Cost/Benefit for each action
5. Discuss priority for each action
6. Rate priority for each action
7. Discuss crosswalk

HMP Meeting - April 28, 2017

Planning Committee Dept / Members	E-Mail	Initial
Town Engineering/Building & Safety Department		
Brad Miller	bmiller@applevalley.org	
Patrick Carroll	pcarroll@applevalley.org	
Brett Morgan	bmorgan@applevalley.org	
Town Community Development		
Lori Lamson	llamson@applevalley.org	
Carol Miller	cmiller@applevalley.org	
Pam Cupp	pcupp@applevalley.org	
Ralph Wright	rwright@applevalley.org	
AV Fire Protection District		
Sid Hultquist	shultquist@applevalleyfd.com	
Rich Unterdorfer	runterdorfer@applevalleyfd.com	
Town Public Works		
Greg Snyder	gsnyder@applevalley.org	
Mike Cody	mcady@applevalley.org	
Town PIO		
Kathy Martin	kmartin@applevalley.org	
Office of Emergency Preparedness		
Joseph Ramos	jramos@applevalley.org	
Dawn Harrison	dharrison@applevalley.org	

B.4 Other Meeting Agendas (CERT, Disaster Council, Town Council)

CERT MEETING

AGENDA

August 4, 2016

Thursday

6:00-8:00pm

LOCATION:

FIRE STATION 336

19235 Yucca Loma Rd.

Welcome & Announcements

Pledge
Introductions
Guest Speaker

Announcements:
Shirts/Hats –C-ME – Order directly with ID Card – C-ME – 760-241-3577
Names on Vests - $5

Disaster Volunteer Network – Please complete information form
Remind – To receive CERT text messages (Emergencies)
Update from ECS – Mark Yosten
Update from FF Rehab – Kathy Love
Update from Sandbag – Cathy Westmoreland
Hazard Mitigation Plan – What is it?

Station Leaders – Need Leader & Asst. for 335, Asst. for 334, Leader for 336
Please let me know if you are interested or have questions. Thank you.

Useful Links

www.Readyapplevalley.org
www.applevalleyfd.com
www.FEMA.gov
www.ready.gov

Upcoming Event

August 6, 27 and Sept 3 – CERT Class – Help with assisting/refreshments
September 8- 10 - 30 year National CERT Conference, Universal Studios
September 24 – Terrorism Training – Ontario - Eventbrite
September 24 – Command Bus - Reverse Triathlon
October 1 – Annual DSW Drill – VVC Regional Training Facility
October 6 – Meeting/Training – Volunteer Reception Center/Shake Out
Oct 7-8-9 – SAR City – Barstow
October 15 – Health Fair – St 337 – Help needed
October 20 – Great Shake Out – Drill at Town Hall – Sign Up

Today's Training

GET READY FOR ANNUAL DRILL
DO YOU REMEMBER THE BASICS FROM YOUR CERT CLASS?
DAWN HARRISON

CERT MEETING

AGENDA

October 6, 2016

Thursday

6:00-8:00pm

LOCATION:

FIRE STATION 336

19235 Yucca Loma Rd.

Welcome & Announcements

Pledge
Oath/Introductions – New DSW Members

Announcements:
Shirts/Hats –C-ME – Order directly with ID Card – C-ME – 760-241-3577
Names on Vests - $5
Disaster Volunteer Network – Please complete information form
Remind – To receive CERT text messages (Emergencies)
Update from ECS – Mark Yosten
Update from FF Rehab – Kathy Love
Update from Asst. CERT Commanders- Bonnie Ebright/Cathy Westmoreland
Hazard Mitigation Plan – Link for Survey will be shared
Suggestions for 2017 Trainings

Station Leaders – Need Leader & Asst. for 335, Asst. for 334, Leader for 336
Please let me know if you are interested or have questions. Thank you. We would like to give more responsibility & training to station leaders in 2017.

Useful Links

www.Readyapplevalley.org
www.applevalleyfd.com
www.FEMA.gov
www.ready.gov

Upcoming Event (Final 3 of the year)

October 15 – Health Fair – St 337 – Help needed – Sign Up
October 20 – Great Shake Out – Drill at Town Hall – Sign Up
November 3 – Potluck – End of 2016!

Today's Training

BRIEFING – CERT CONFERENCE
BONNIE & KELLY
BRIEFING – TERRORIST SYMPOSIUM
CATHY & KELLY
SHARE YOUR EXPERIENCE WITH THE BLUE CUT FIRE & ANNUAL DRILL
VOLUNTEER RECEPTION CENTER
DAWN HARRISON
JASON NAILON – GUEST SPEAKER – VOLUNTEERS HELPING WITH MEASURE A

CERT MEETING

February 2, 2017

Thursday

6:00-8:00pm

LOCATION:

FIRE STATION 336

19235 Yucca Loma Rd.

AGENDA

Welcome & Announcements

Pledge
Introductions – New DSW Members

Announcements:
- Shirts/Hats –C-ME – Order directly with ID Card – C-ME – 760-241-3577
- Names on Vests - $5
- Remind – To receive CERT text messages (Emergencies)
- Update from ECS – Mark Yosten
- Update from FF Rehab – Kathy Love
- Update from Asst. CERT Commanders- Bonnie Ebright/Cathy Westmoreland
- Hazard Mitigation Plan – Link for Survey will be shared Update
- Red Cross Training – Update – Only if you took the training at the Town Jan. 2017 are you registered with the Red Cross, even if you took the 8 hour training previously!
- Apple Valley CERT Coin – Input needed
- Update on opening of fire stations

Station Leaders – Need Leader & Asst. for 335, Asst. for 334, Leader for 336. Please let me know if you are interested or have questions. Thank you. We would like to give more responsibility & training to station leaders in 2017.

Useful Links

www.Readyapplevalley.org
www.applevalleyfd.com
www.FEMA.gov
www.ready.gov

Upcoming Events

February 4 – Simulation – Help Needed
March 25 – CPR/First Aid – Sign Up
April 6 – Meeting - ICS/Forms Training
April 7-8-9 CERT Train the Trainer - Hesperia
April 15, 22, and 29 – CERT Class
May 6 – Family Safety/Emergency Prep Fair – Town Hall

Today's Training

CUSTOMER SERVICE FOR CERT
CAPT. UNFERDORFER

CERT MEETING

April 6, 2017

Thursday

6:00-8:00pm

LOCATION:

FIRE STATION 336

19235 Yucca Loma Rd.

AGENDA

Welcome & Announcements

Pledge
Oath of Office
Introductions – New DSW Members

Announcements:
- Shirts/Hats –C-ME – Order directly with ID Card – C-ME – 760-241-3577
- Names on Vests - $5
- Remind – To receive CERT text messages (Emergencies)
- Update from ECS – Mark Yosten
- Update from FF Rehab – Kathy Love
- Update from Asst. CERT Commanders- Bonnie Ebright/Cathy Westmoreland
- Hazard Mitigation Plan – Update

Useful Links

www.Readyapplevalley.org
www.applevalleyfd.com
www.FEMA.gov
www.ready.gov

Upcoming Events

April 7-8-9 CERT Train the Trainer – Rancho Cucamonga
April 11 – Disaster Council – 1:30pm – 14975 Dale Evans Pkwy
April 15, 22, and 29 – CERT Class (Help Needed)
May 6 – ECS Meeting
May 6 – Family Preparedness Fair – 10am-1pm Town Hall (Help Needed – Sign Up)
June 1 – Meeting/Training – START Triage/Treatment Review/Games

Today's Training

Fire Season/Grass Fires – Capt. Unferdorfer

ICS SYSTEM
WHO'S IN CHARGE & WHAT DO I DO?
DAWN HARRISON

CERT MEETING

June 1, 2017

Thursday

6:00-8:00pm

LOCATION:

FIRE STATION 336

19235 Yucca Loma Rd.

AGENDA

Welcome & Announcements

Pledge

Introductions – New DSW Members

Announcements:
- Shirts/Hats –C-ME – Order directly with ID Card – C-ME – 760-241-3577
- Names on Vests - $5
- Remind – To receive CERT text messages (Emergencies)

**Thank you to everyone for helping with Family Preparedness Fair!
**Thank you to ECS for participating in Opening of Yucca Loma Bridge!
- Update from ECS – Mark Yosten
- Update from FF Rehab – Kathy Love
- Update from Asst. CERT Commanders- Bonnie Ebright/Cathy Westmoreland
- Hazard Mitigation Plan – Update

Useful Links

****NEW – Twitter Account – Twitter.com/ReadyAV**
www.Readyapplevalley.org
www.applevalleyfd.com
www.FEMA.gov
www.ready.gov

Upcoming Events

August 1 – National Night Out (Super Target, 1700-2000)
May 3 – ECS Meeting
August 3 – Meeting/Training CERT Olympics
Sept 16, 23, 30 – CERT Basic Training

Today's Training – Review

START
Triage/Treatment Review/Games

DAWN HARRISON

TOWN OF APPLE VALLEY
DISASTER COUNCIL
Citizen Corps Council

Tuesday, October 18, 2016 1:30 p.m. **Conference Center, Development Services Building, Apple Valley Town Hall, 14975 Dale Evans Parkway**

AGENDA

1. Call to Order — *Mayor Stanton*
2. Flag Salute
3. Self-Introductions — *Group*
4. Approval of July 12, 2016 minutes — *Mayor Stanton*
5. Approval of CERT/ECS 2017 calendar — *Mayor Stanton*
6. Citizen Corps Activities
   - CERT *(Community Emergency Response Team)* — *CERT : Dawn Harrison*
   - ECS *(Emergency Communications Services)* — *ECS: Rich Unferdorfer*
   - COP's, Neighborhood Watch — *Trish Hill*
7. Update on Emergency Preparedness — *Joseph Ramos*
   - Blue Cut Activation
   - Local Hazard Mitigation Plan
8. **Spotlight Program: Southwest Gas**
   - Gas properties- William Hensley-Intro
9. Roundtable Discussion — *Group*
10. Next Meeting: Tuesday, January 10, 2017, 1:30 p.m. @ Conference Center, Development Services Building, Apple Valley Town Hall, 14975 Dale Evans Parkway
11. Adjournment: _____PM — *Mayor Stanton*

TOWN OF APPLE VALLEY
DISASTER COUNCIL
Citizen Corps Council

Tuesday, January 10, 2017 1:30 p.m. **Conference Center, Development Services Building, Apple Valley Town Hall, 14975 Dale Evans Parkway**

AGENDA

1. Call to Order — *Mayor Nassif*
2. Flag Salute
3. Self-Introductions — *Group*
4. Approval of October 18, 2016 minutes — *Mayor Nassif*
5. Citizen Corps Activities
   - CERT *(Community Emergency Response Team)* — *CERT: Dawn Harrison*
   - ECS *(Emergency Communications Services)* — *ECS: Mark Yosten*
   - COP's, Neighborhood Watch — *Trish Hill*
6. Update on Emergency Preparedness — *Joseph Ramos*
   - Blue Cut Reimbursements
   - Local Hazard Mitigation Plan
7. Update on Measure A — *Chief Hultquist*
8. **Spotlight Program: COAD (Community Organizations Active in Disasters)**
   - Dan Coleman- Co-Chair East End COAD
9. Roundtable Discussion — *Group*
10. Next Meeting: Tuesday, April 11, 2017, 1:30 p.m. @ Conference Center, Development Services Building, Apple Valley Town Hall, 14975 Dale Evans Parkway
11. Adjournment: _____PM — *Mayor Nassif*

TOWN OF APPLE VALLEY
DISASTER COUNCIL
Citizen Corps Council

Tuesday, April 11, 2017 1:30 p.m. **Conference Center, Development Services Building, Apple Valley Town Hall, 14975 Dale Evans Parkway**

AGENDA

1. Call to Order — *Mayor Nassif*
2. Flag Salute
3. Self-Introductions — *Group*
4. Approval of January 10, 2017 minutes — *Mayor Nassif*
5. Citizen Corps Activities
   - CERT *(Community Emergency Response Team)* — *CERT: Dawn Harrison*
   - ECS *(Emergency Communications Services)* — *ECS: Mark Yosten*
   - COP's, Neighborhood Watch — *Trish Hill*
6. Update on Emergency Preparedness — *Joseph Ramos*
   - Local Hazard Mitigation Plan
7. **Spotlight Program: Ounce of Prevention**
   - Dr. Gloria Peak- Director of Community Health Services- St. Mary Medical Center Presentation on Preventative Health Services
8. Roundtable Discussion — *Group*
9. Next Meeting: Tuesday, July 11, 2017, 1:30 p.m. @ Conference Center, Development Services Building, Apple Valley Town Hall, 14975 Dale Evans Parkway
10. Adjournment: _____PM — *Mayor Nassif*

TOWN OF APPLE VALLEY
DISASTER COUNCIL
Citizen Corps Council

Tuesday, July 11, 2017 1:30 p.m. **Conference Center, Development Services Building, Apple Valley Town Hall, 14975 Dale Evans Parkway**

AGENDA

1. Call to Order — *Mayor Nassif*
2. Flag Salute _____
3. Self-Introductions — *Group*
4. Approval of April 11, 2017 minutes — *Mayor Nassif*
5. Citizen Corps Activities
   - CERT *(Community Emergency Response Team)* — *CERT: Dawn Harrison*
   - ECS *(Emergency Communications Services)* — *ECS: Mark Yosten*
   - COP's, Neighborhood Watch — *Trish Hill*
6. Update on Emergency Preparedness — *Joseph Ramos*
   - Hazard Mitigation Plan Update
7. **Spotlight Program: San Bernardino County 211**
   - Cari Thomas- Inland Empire United Way Regional Director
8. Roundtable Discussion — *Group*
9. Next Meeting: Tuesday, October 17, 2017, 1:30 p.m. @ Conference Center, Development Services Building, Apple Valley Town Hall, 14975 Dale Evans Parkway
10. Adjournment: _____PM — *Mayor Nassif*

TOWN OF APPLE VALLEY
TOWN COUNCIL/SUCCESSOR AGENCY

REGULAR MEETING

MINUTES – March 28, 2017

CALL TO ORDER:

Mayor Nassif called to order the regular session of the Apple Valley Town Council and the Successor Agency at 6:30 p.m.

Roll call was taken with the following members present:

Roll Call
Present: Council Members Cusack; Emick; Stanton; Mayor Pro Tem Bishop; Mayor Nassif
Absent: None.

OPENING CEREMONIES

INVOCATION: Pastor Joseph Valery, Victory in Jesus Bible Faith Center

PLEDGE OF ALLEGIANCE: The Pledge of Allegiance was led by Mayor Pro Tem Bishop

PRESENTATIONS: Deputy Derrick Griego, Apple Valley SHOCK Program

PUBLIC COMMENTS

Matthew Fairchild, Apple Valley commented on providing the San Bernardino County Sheriff's Division with all the resources they need to enforce Town speed limits, as well as provide sidewalks for pedestrian safety.

Laloni Flusher, Apple Valley commented on the continued deterioration of east Stoddard Wells Road and the dangerous conditions that exist.

Brad Miller, Town Engineer commented on the location of the section of Stoddard Wells Road east of Dale Evans Parkway is in the unincorporated area of the Town.

Bryen Wright, Apple Valley commented on the Town's Impartial Analysis and that he believes information has been left out of the document.

Patricia Perry, Apple Valley commented that the troubles she has had with her property have gotten better and wanted to thank the Town for their assistance.

COUNCILMEMBER COMMITTEE/COMMISSION PARTICIPATION

Council Member Emick commented on committee meetings and events that he attended.

Council Member Cusack commented on committee meetings and events that he attended.

1A-1

Council Member Stanton commented on committee meetings and events that she attended.

Mayor Pro Tem Bishop commented on committee meetings and events that he attended.

Mayor Nassif commented on committee meetings and events that he attended.

TOWN COUNCIL ANNOUNCEMENTS

Suggested items for future agenda:

Mayor Pro Tem Bishop asked staff to bring back a report on AB 1194 regarding bond issues and property taxes.

Mayor Nassif asked staff to bring back a report to discuss standards that would help elevate the quality of apartments but make them affordable.

Time, Date & Place for Next Town Council Regular or Special Meeting:
A. Regular Meeting – Tuesday, April 11, 2017 – Council Chamber
Regular Session at 6:30 p.m.

TOWN COUNCIL CONSENT AGENDA

Motion by Council Member Emick, seconded by Mayor Pro Tem Bishop, to approve the Consent Calendar items numbered 1-4.

Vote: Motion carried 5-0-0-0
Yes: Council Members Cusack; Emick; Stanton; Mayor Pro Tem Bishop; Mayor Nassif
Absent: None.

1. **Approval of Minutes of the Town Council**
   A. Special Meeting – March 7, 2017
   B. Special Meeting – March 9, 2017
   C. Regular Meeting – March 14, 2017
   Recommendation:
   Approve the subject minutes as part of the consent agenda.

2. **Mojave Riverwalk South – Project No. 2015-08**
   Recommendation:
   That the Town Council:
   1. Accept the work completed as part of the Mojave Riverwalk South Project No. 2015-08, for a total contract cost of $347,868.51.
   2. contractor.

3. **Release of Securities for Tract Map No. 16134**
   Recommendation:
   Find that the construction of various improvements required for Tract 16134 is complete, and approve the fifty-percent (50%) reduction of the performance securities.

4. **Fee Waiver Request for St. Mary's High Desert Fit for Life Challenge 5K/10K Event for the Use of the Civic Center Park/Amphitheater**
   Recommendation:
   For good cause shown and finding a waiver will serve a public purpose, approve the waiver of the Facility Rental Fee of $728.00.

PUBLIC HEARINGS

None.

REPORTS, REQUESTS AND COMMUNICATIONS

None.

TOWN MANAGER'S COMMENTS & LEGISLATIVE UPDATE

Frank Robinson, Town Manager, reported that the State Legislature has come to an agreement about transportation funding and an announcement will be made soon.

Joseph Ramos, Emergency Operations Officer shared information on the Hazard Mitigation Plan and the need for update.

CLOSED SESSION

5. **Closed Session**

Mayor Nassif stated that if needed, Council Member Cusack will be abstaining from one (1) or more of the Closed Session items as it pertains to Liberty Utilities Company due to a potential conflict of interest, as his company does business with the above company.

Mayor Nassif adjourned to Closed Session at 7:23 p.m. to discuss items 5A-5G

A. Conference with Legal Counsel – Anticipated Litigation – Significant exposure to litigation pursuant to Paragraph (2) of subdivision (d) of Section 54956.9: one or more potential cases.

B. Conference with Legal Counsel – Anticipated Litigation – Initiation of litigation pursuant to Paragraph (4) of subdivision (d) of Section 54956.9: one or more potential cases.

C. Conference with Real Property Negotiators – Pursuant to Government Code Section 54956.8. Property: Apple Valley Ranchos Water Company (now Liberty Utilities (Apple Valley Ranchos Water) Corp.); Authority Negotiator: Town Manager; Negotiating Parties: Liberty Utilities Co., Liberty WWH, Inc., Algonquin Power & Utilities Corp., Park Water Company, Western Water Holdings LLC, Tony Penna, General Manager, Apple Valley Ranchos Water Company; Under Negotiation: Price and Terms of Payment.

D. Conference with Legal Counsel – Existing Litigation – Pursuant to Paragraph (1) of subdivision (d) of Government Code Section 54956.9, Case No.: CIVDS1517935 - Apple Valley Ranchos Water Company vs. Town of Apple Valley Et Al.

E. Conference with Legal Counsel – Existing Litigation – Pursuant to Paragraph (1) of subdivision (d) of Government Code Section 54956.9, Case No.: CIVDS1600180 – Town of Apple Valley vs. Apple Valley Ranchos Water Company Et Al.

F. Personnel Matters – Government Code Section 54957/Public Employee Performance Evaluation. Title: Town Manager.

G. Conference with Legal Counsel – Existing Litigation – Pursuant to Paragraph (1) of subdivision (d) of Government Code Section 54956.9, Case No.: CIVDS1601999 – Town of Apple Valley vs. Jess Ranch Development, Et Al.

Upon returning from Closed Session at 8:27p.m., Mayor Nassif stated there was no reportable action taken.

John Brown, Town Attorney requested that a settlement agreement be read into the record, verbatim. The settlement resolved a recent lawsuit against the Town.

Debra Thomas, Deputy Town Clerk read into the record, verbatim, the Settlement Agreement and General Release of Claims in the matter of *Lopez-Burton et al. v. Town of Apple Valley*, Case No. CIVDS1604968.

Discussion ensued describing what this agreement's result ultimately means and described the difference between a Nexus Study and Cost Allocation Study and the ultimate cost to ratepayers.

ADJOURNMENT

Motion by Council Member Emick, seconded by Council Member Cusack, and unanimously carried, to adjourn the meeting of the Apple Valley Town Council at 8:46 p.m.

Scott Nassif, Mayor

Debra Thomas, Deputy Town Clerk

1A-4

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Appendix C

C.1 Survey Media Alert

C.2 Survey Results

C.3 Website/Survey Link

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C.1 Survey Media Alert

Town of Apple Valley
Office of Emergency Preparedness

A Better Way of Life

Media Alert
July 28, 2016
For immediate release

You are invited to make a difference!

Town of Apple Valley has begun the process to prepare the 2016 update to the Hazard Mitigation Plan (HMP) and we invite you to participate. The HMP will serve as a blueprint for reducing property damage and saving lives from the effects of future natural disasters in the Town of Apple Valley. The Town welcomes you (or other interested parties) to assist the HMP Project Management Team to update our natural hazard mitigation documents for the Town of Apple Valley. This will involve periodic review of documentation and feedback during certain points of the planning process.

To provide solidarity in the planning process, we would like to inform you that our project will be starting soon with a kick-off meeting. You are more than welcome to join this meeting but attendance in this meeting is not a requirement to be involved in the entire process. We anticipate the HMP development process to last about 8 to 12 months.

The kick-off meeting will be on ***Tuesday, August 2, 2016 at 8:30 a.m.*** at the Town Hall Development Services Building meeting room 1 located at 14975 Dale Evans Parkway.

We will have additional discussions of the HMP during all upcoming Disaster Council Meetings and CERT meetings.

For more information about the HMP process and history behind the program visit: www.readyapplevalley.org.

If you have any additional questions, please do not hesitate to contact me by phone or email. Thank you for your time and consideration.

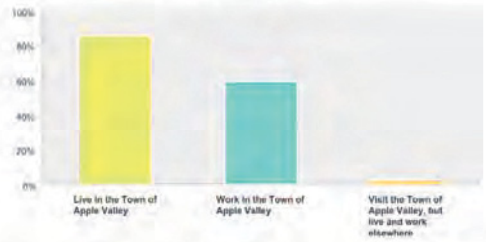
Joseph Ramos
Town of Apple Valley
Emergency Services Officer
jramos@applevalley.org
760-240-7000 ext. 7890

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C.2 Survey Results

Town of Apple Valley Local Hazard Mitigation Plan Survey

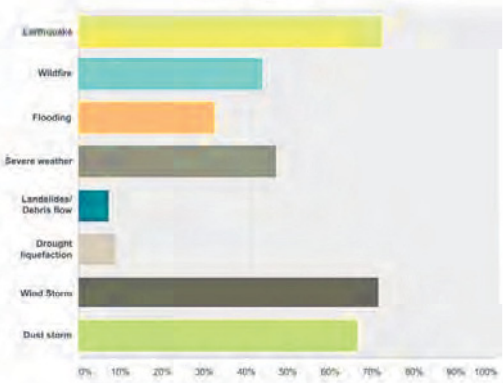
Q1 Do you.. (Check all that apply).



Answer Choices	Responses	
Live in the Town of Apple Valley	84.55%	104
Work in the Town of Apple Valley	58.54%	72
Visit the Town of Apple Valley, but live and work elsewhere	1.63%	2
Total Respondents: 123		

Town of Apple Valley Local Hazard Mitigation Plan Survey

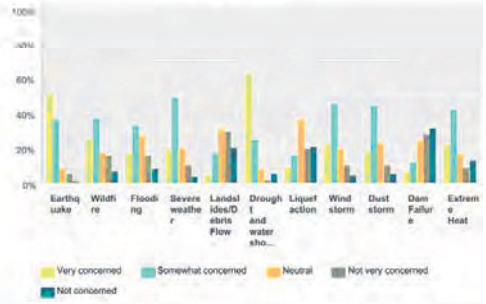
Q2 Which of the following types of natural disasters have you or someone in your household experienced in the past 15 years within the Town of Apple Valley? (Check all that apply)



Answer Choices	Responses	
Earthquake	72.36%	89
Wildfire	43.90%	54
Flooding	32.52%	40
Severe weather	47.15%	58
Landslides/ Debris flow	7.32%	9
Drought liquefaction	8.94%	11
Wind Storm	71.54%	88
Dust storm	66.67%	82
Total Respondents: 123		

Town of Apple Valley Local Hazard Mitigation Plan Survey

Q3 How concerned are you about the following natural hazards affecting your home and/or business in Apple Valley? Please check ONE response for each hazard.



	Very concerned	Somewhat concerned	Neutral	Not very concerned	Not concerned	Total	Weighted Average
Earthquake	50.41% 62	35.77% 44	8.13% 10	4.88% 6	0.81% 1	123	1.70
Wildfire	24.39% 30	36.59% 45	17.07% 21	15.45% 19	6.50% 8	123	2.49
Flooding	17.07% 21	32.52% 40	26.83% 33	15.45% 19	8.13% 10	123	2.65
Severe weather	18.33% 22	46.33% 56	20.00% 24	10.00% 12	3.33% 4	120	2.39
Landslides/Debris Flow	4.13% 5	16.52% 20	30.58% 37	25.93% 30	19.83% 24	121	3.44
Drought and water shortage	61.79% 76	24.39% 30	7.32% 9	1.63% 2	4.88% 6	123	1.63
Liquefaction	9.55% 10	15.36% 18	35.90% 42	19.66% 23	20.51% 24	117	3.28
Wind storm	21.31% 26	45.08% 55	19.67% 24	9.84% 12	4.10% 5	122	2.30
Dust storm	18.18% 22	43.80% 53	23.14% 28	9.92% 12	4.96% 6	121	2.40
Dam Failure	5.83% 7	11.67% 14	24.17% 29	27.50% 33	30.83% 37	120	3.66

Town of Apple Valley Local Hazard Mitigation Plan Survey

Extreme Heat	21.49% 26	41.32% 50	16.53% 20	8.26% 10	12.40% 15	121	2.69

Town of Apple Valley Local Hazard Mitigation Plan Survey

Q4 Information about the risks from natural hazards is readily available and easy to locate.



Answer Choices	Responses	
Strongly Agree	28.46%	35
Somewhat Agree	38.21%	47
Neither Agree or Disagree	19.51%	24
Somewhat Disagree	12.20%	15
Strongly Disagree	1.63%	2
Total		123

Town of Apple Valley Local Hazard Mitigation Plan Survey

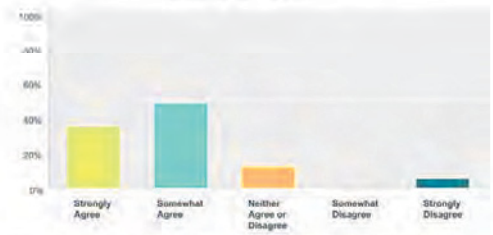
Q5 It is my responsibility to educate myself and take actions that will reduce my exposure to the risks from natural hazards.



Answer Choices	Responses	
Strongly Agree	73.98%	91
Somewhat Agree	22.76%	28
Neither Agree or Disagree	1.63%	2
Somewhat Disagree	1.63%	2
Strongly Disagree	0.00%	0
Total		123

Town of Apple Valley Local Hazard Mitigation Plan Survey

Q6 It is the responsibility of government (local, state and federal) to provide education and programs that promote citizen actions that will reduce exposure to the risks from natural hazards.



Answer Choices	Responses	
Strongly Agree	34.96%	43
Somewhat Agree	47.97%	59
Neither Agree or Disagree	12.20%	15
Somewhat Disagree	0.00%	0
Strongly Disagree	4.88%	6
Total		123

Town of Apple Valley Local Hazard Mitigation Plan Survey

Q7 What mitigation measures or strategies have been completed in the last 5 years to protect your home or business from a natural hazard? Check all that apply



Answer Choices	Responses	
flood proofing	16.26%	20
seismic upgrades	13.82%	17
dry weed abatement	73.98%	91
defensible space	52.85%	65
earthquake insurance	11.38%	14
flood insurance	9.76%	12
None	14.63%	18
Other (please specify)	3.25%	4
Total Respondents: 123		

Town of Apple Valley Local Hazard Mitigation Plan Survey

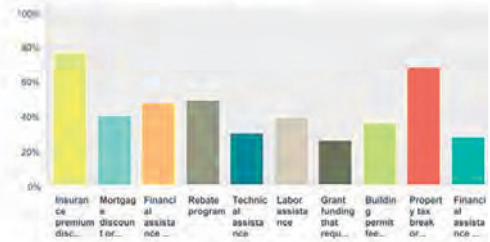
Q8 How much money do you spend annually on mitigation measures to protect your home or business from natural hazards?



Answer Choices	Responses	
None	22.76%	28
Less than $250	45.53%	56
$250-$499	20.33%	25
$500-$1000	9.76%	12
More than $1000	1.63%	2
Total		123

Town of Apple Valley Local Hazard Mitigation Plan Survey

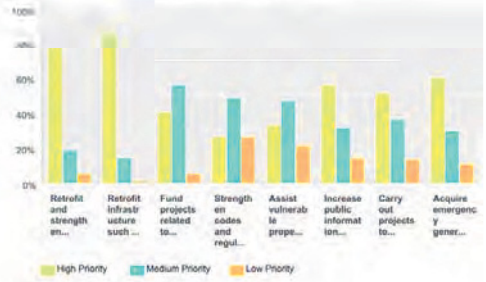
Q9 Which of the following incentives would encourage you to protect your home against natural hazards? (Check all that apply)



Answer Choices	Responses	
Insurance premium discount	75.61%	93
Mortgage discount or low interest loan	39.02%	48
Financial assistance for property upgrades or equipment	48.34%	57
Rebate program	47.97%	59
Technical assistance	29.27%	36
Labor assistance	38.21%	47
Grant funding that requires cost share from property owner	25.20%	31
Building permit fee reduction or waiver	34.96%	43
Property tax break or incentive	67.48%	83
Financial assistance for equipment	26.83%	33
Total Respondents: 123		

Town of Apple Valley Local Hazard Mitigation Plan Survey

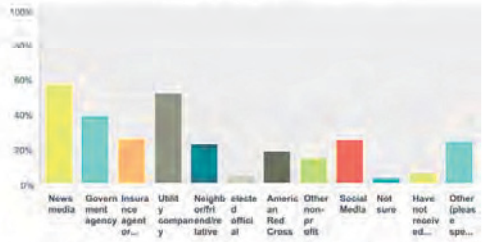
Q10 What protection methods do you believe the Town, County, State or Federal agencies should be using in order to reduce damage and disruption from hazard events within the Town of Apple Valley?



	High Priority	Medium Priority	Low Priority	Total
Retrofit and strengthen essential facilities such as police, fire, schools and hospitals	76.42% 94	18.70% 23	4.88% 6	123
Retrofit infrastructure such as roads, bridges, drainage facilities, water supply, and waster water.	85.37% 105	13.82% 17	0.81% 1	123
Fund projects related to drainage control measures and improvements.	39.84% 49	55.28% 68	4.88% 6	123
Strengthen codes and regulations to include higher standards in hazard areas	26.02% 32	47.97% 59	26.02% 32	123
Assist vulnerable property owners with securing funding for mitigation/property protection.	32.52% 40	46.34% 57	21.14% 26	123
Increase public information about risks and the exposure to hazards within the Town of Apple Valley.	55.28% 68	30.89% 38	13.82% 17	123
Carry out projects to restore the natural environment's capacity to absorb the impacts from natural hazards.	51.22% 63	35.77% 44	13.01% 16	123
Acquire emergency generators for essential government facilities and buildings identified as care and shelter.	60.16% 74	29.27% 36	10.57% 13	123

Town of Apple Valley Local Hazard Mitigation Plan Survey

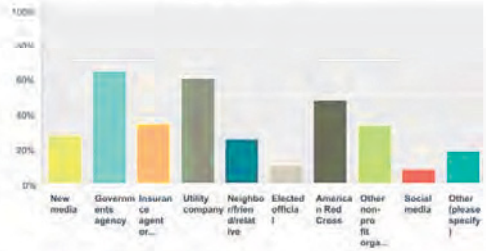
Q11 Thinking back in the last three years, from whom have you received information about how to make members of your household and your home safer from natural disasters? Check all that apply.



Answer Choices	Responses	
News media	56.10%	69
Government agency	38.21%	47
Insurance agent or company	25.20%	31
Utility company	51.22%	63
Neighbor/friend/relative	21.95%	27
elected official	4.07%	5
American Red Cross	17.89%	22
Other non-profit	13.82%	17
Social Media	24.39%	30
Not sure	2.44%	3
Have not received information	5.69%	7
Other (please specify)	23.58%	29
Total Respondents: 123		

Town of Apple Valley Local Hazard Mitigation Plan Survey

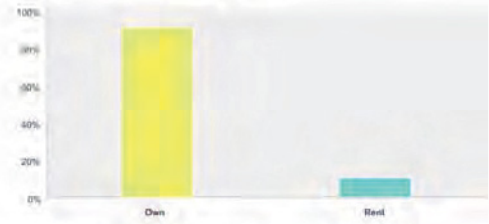
Q12 Whom would you most trust to provide you with information about how to make your household and home safer from natural disasters? Choose at least 3 responses.



Answer Choices	Responses	
New media	26.83%	33
Government agency	63.41%	78
Insurance agent or company	33.33%	41
Utility company	59.35%	73
Neighbor/friend/relative	25.20%	31
Elected official	9.76%	12
American Red Cross	47.15%	58
Other non-profit organization	32.52%	40
Social media	7.32%	9
Other (please specify)	17.89%	22
Total Respondents: 123		

Town of Apple Valley Local Hazard Mitigation Plan Survey

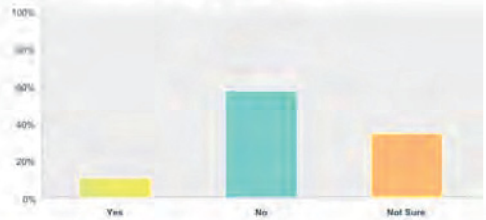
Q13 Do you rent or own your home or business?



Answer Choices	Responses	
Own	90.24%	111
Rent	9.76%	12
Total		123

Town of Apple Valley Local Hazard Mitigation Plan Survey

Q14 Is your home or business in or near a FEMA designated floodplain?



Answer Choices	Responses	
Yes	9.76%	12
No	56.91%	70
Not Sure	33.33%	41
Total		123

Town of Apple Valley Local Hazard Mitigation Plan Survey

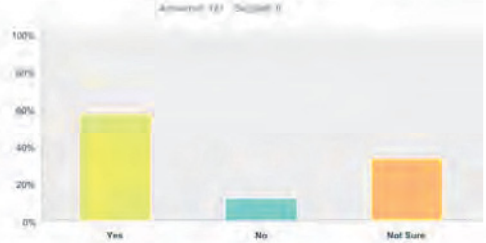
Q15 Do you have flood insurance?



Answer Choices	Responses	
Yes	9.76%	12
No	68.46%	84
Not Sure	9.76%	12
Other (please specify)	0.00%	0
Total		123

Town of Apple Valley Local Hazard Mitigation Plan Survey

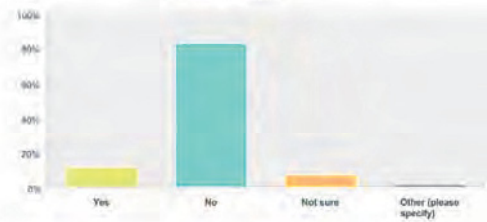
Q16 Is your home or business located near an earthquake fault?



Answer Choices	Responses	
Yes	56.10%	69
No	11.38%	14
Not Sure	32.52%	40
Total		123

Town of Apple Valley Local Hazard Mitigation Plan Survey

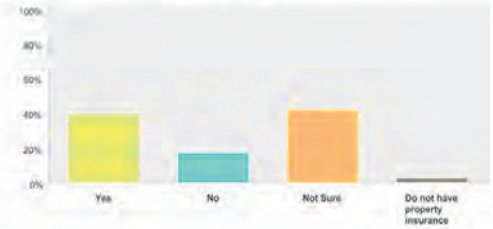
Q17 Do you have earthquake insurance?



Answer Choices	Responses	
Yes	10.57%	13
No	82.11%	101
Not sure	6.50%	8
Other (please specify)	0.81%	1
Total		123

Town of Apple Valley Local Hazard Mitigation Plan Survey

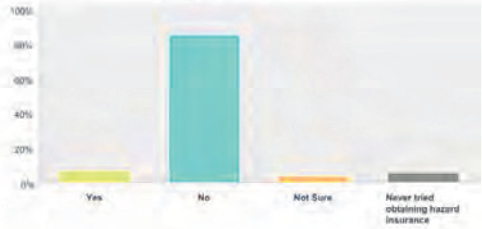
Q18 To the best of your knowledge, does your homeowner's, renter's, or general insurance policy provide coverage for damage from natural hazards?



Answer Choices	Responses	
Yes	39.02%	48
No	17.07%	21
Not Sure	41.46%	51
Do not have property insurance	2.44%	3
Total		123

Town of Apple Valley Local Hazard Mitigation Plan Survey

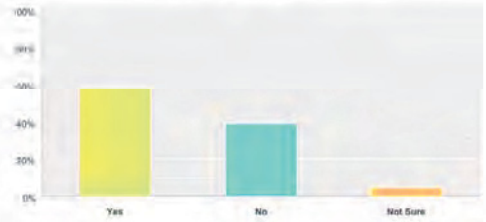
Q19 Have you ever had problems obtaining homeowner's or renter's insurance due to risks from natural hazards?



Answer Choices	Responses	
Yes	6.50%	8
No	84.55%	104
Not Sure	3.25%	4
Never tried obtaining hazard insurance	5.69%	7
Total		123

Town of Apple Valley Local Hazard Mitigation Plan Survey

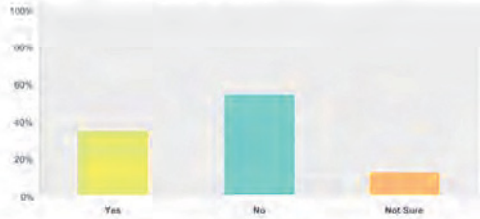
Q20 When you moved into your home, did you consider the impact a natural hazard event could have on your home?



Answer Choices	Responses	
Yes	57.72%	71
No	38.21%	47
Not Sure	4.07%	5
Total		123

Town of Apple Valley Local Hazard Mitigation Plan Survey

Q21 Was the presence of a natural hazard risk zone (for example, wild fire area or flood zone) disclosed to you by a real estate agent, seller or landlord before you purchased or moved into your home?



Answer Choices	Responses	
Yes	34.15%	42
No	53.66%	66
Not Sure	12.20%	15
Total		123

Town of Apple Valley Local Hazard Mitigation Plan Survey

Q22 Would natural hazard real estate disclosures or risk information influence your decision on where to buy or rent a home?



Answer Choices	Responses	
Yes	83.74%	103
No	7.32%	9
Not Sure	8.94%	11
Total		123

Town of Apple Valley Local Hazard Mitigation Plan Survey

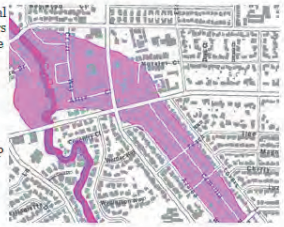
Q23 Thank you again for completing the survey!!!! Please provide any additional comments that you may have regarding hazard mitigation and community protection against natural disasters.

C.3 Website/Survey Link

Apple Valley, CA : Local Hazard Mitigation Plan http://www.applevalley.org/services/emergency-preparedness/hazard-mit...

Local Hazard Mitigation Plan

Welcome to the Town of Apple Valley's Local Hazard Mitigation Plan (HMP) webpage!



This webpage contains information and documents for Apple Valley's Local Hazard Mitigation Plan (HMP). The HMP must be updated every five years to stay current with natural hazard events and maintain eligibility for State and Federal grant funding. This webpage will remain active to document past, current and future hazard mitigation planning efforts for the public and Town officials alike.

Please explore the links on this page to learn more about the HMP.

As always, we are seeking the public's help and input during the local HMP Update process. If you have disaster-related stories and/or photographs that you would like to share, or you have comments or other information pertaining to natural hazard mitigation and the planning process, please send them to:

JRamos@applevalley.org.

Any information or feedback that you can provide is both helpful and appreciated!

Help our community by completing an important survey that will be used for the HMP 2017 update at the link below.

CLICK HERE

Apple Valley Local Hazard Mitigation Plan 2011

United States Geological Survey - Link to the United States Geological Survey's Earthquakes Hazards Program

Federal Emergency Management Agency - Link to FEMA's website dealing with flooding

San Bernardino County Hazard Maps - SBC's Hazard Maps

California My Hazard Maps- CalOES Hazard Maps

Earthquakes in California - Link to a list of major earthquakes throughout California's history.

Chronology of San Bernardino County Proclaimed Disasters - Link to a list of many of the proclaimed disasters that took place in San Bernardino County from 1954 to 2016. Includes earthquakes, floods and fires.

History of San Bernardino County - Link to a County website with major historical milestones of San Bernardino County, from 1853 to 2003.

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Appendix D

D.1 Hazard Summary Worksheet Instructions

D.2 Hazard Summary Worksheet agreed upon by Planning Committee

D.3 Risk Factor Approach Instruction Sheet

D.4 Risk Factor Final Worksheet agreed upon Planning Committee

D.5 Mitigation Action Implementation Plan Form

D.6 Mitigation Action Reporting Form

D.7 Annual HMP Review Questionnaire

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D.1 Hazard Summary Worksheet Instructions

Hazard Summary Worksheet Instructions

Definitions for Classifications

Location (Geographic Area Affected)

- **Negligible:** Less than 10 percent of planning area or isolated single-point occurrences
- **Limited:** 10 to 25 percent of the planning area or limited single-point occurrences
- **Significant:** 25 to 75 percent of planning area or frequent single-point occurrences
- **Extensive:** 75 to 100 percent of planning area or consistent single-point occurrences

Maximum Probable Extent (Magnitude/Strength based on historic events or future probability)

- **Weak:** Limited classification on scientific scale, slow speed of onset or short duration of event, resulting in little to no damage
- **Moderate:** Moderate classification on scientific scale, moderate speed of onset or moderate duration of event, resulting in some damage and loss of services for days
- **Severe:** Severe classification on scientific scale, fast speed of onset or long duration of event, resulting in devastating damage and loss of services for weeks or months
- **Extreme:** Extreme classification on scientific scale, immediate onset or extended duration of event, resulting in catastrophic damage and uninhabitable conditions

Hazard	Scale / Index	Weak	Moderate	Severe	Extreme
Drought	Palmer Drought Severity Index	-1.99 to +1.99	-2.00 to -2.99	-3.00 to -3.99	4.00 & below
Earthquake	Modified Mercalli Scale	I to IV	V to VII	VII	IX to XII
	Richter Magnitude	2, 3	4, 5	6	7, 8

Probability of Future Events

- **Unlikely:** Less than 1 percent probability of occurrence in the next year or a recurrence interval of greater than every 100 years.
- **Occasional:** 1 to 10 percent probability of occurrence in the next year or a recurrence interval of 11 to 100 years.
- **Likely:** 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years
- Highly Likely: 90 to 100 percent probability of occurrence in the next year or a recurrence interval of less than 1 year.

Overall Significance

- **Low:** Two or more criteria fall in lower classifications or the event has a minimal impact on the planning area. This rating is sometimes used for hazards with a minimal or unknown record of occurrences or for hazards with minimal mitigation potential.
- **Medium:** The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating. This rating is sometimes used for hazards with a high extent rating but very low probability rating.
- **High:** The criteria consistently fall in the high classifications and the event is likely/highly likely to occur with severe strength over a significant to extensive portion of the planning area.

3- Cumulative meteorological drought and wet conditions: http://ncdc.noaa.gov/

4 Earthquake intensity and effect on population and structures http://earthquake.usgs.gov/

5 Earthquake magnitude as a logarithmic scale, measured by a seismograph http://earthquake.usgs.gov/

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D.2 Hazard Summary Worksheet agreed upon by Planning Committee

LHMP Hazard Summary Worksheet

Planning Team Meeting- Feb. 21, 2017

Use this worksheet to summarize hazard description information and identify which hazards are most significant to the planning area. The definitions provided on the following page can be modified to meet local needs and methods.

Hazard	Location (Geographic Area Affected)	Maximum Probable Extent (Magnitude/Strength)	Probability of Future Events	Overall Significance Ranking
+ Climate Change	Neg.	W	O	Low
~~Dam Failure~~	L	W	U	Low
Drought	E	M	O	Low
+ Earthquake	E	S	L	High
+ Erosion	N	W	U	Low
~~Expansive Soils~~	N	W	U	Low
~~Extreme Cold~~	N	W	U	Low
+ Extreme Heat	E	M	L	Med
+ Flood	L	M	L	Med
~~Landslide~~	N	W	U	Low
~~Lightning~~	N	W	O	Low
~~Severe Wind~~	E	M	L	Med
~~Severe Winter Weather~~	E	M	L	Med
~~Subsidence~~	N	W	U	Low
~~Terrorism~~	N	W	U	Low
+ Wildfire	L	M-S	L	M-H

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D.3 Risk Factor Approach Instruction Sheet

Risk Factor (RF) Approach

MITIGATE HAZARDS

For use in multi-hazard mitigation planning hazard prioritization exercises.

The RF approach combines historical data, local knowledge, and consensus opinions to produce numerical values that allow identified hazards to be ranked against one another. These criteria were used to evaluate hazards and identify the highest risk hazard in the project region.

The RF approach produces numerical values that allow identified hazards to be ranked against one another (the higher the RF value, the greater the hazard risk). RF values are obtained by assigning varying degrees of risk to five categories for each hazard: *probability, impact, spatial extent, warning time*, and *duration*. Each degree of risk is assigned a value ranging from 1 to 4 and a weighing factor for each category should be agreed upon by the planning committee. Based upon any unique concerns for the planning area, the planning committee may also adjust the RF weighting scheme. To calculate the RF value for a given hazard, the assigned risk value for each category is multiplied by the weighting factor. The sum of all five categories equals the final RF value, as demonstrated in the example equation below:

RF Value = [(Probability x .30) + (Impact x .30) +

(Spatial Extent x .20) + (Warning Time x .10) + (Duration x .10)]

According to the default weighting scheme applied, the highest possible RF value is 4.0.

Please see the Risk Factor Criteria table on the following page for information on the risk factor weighting index and other definitions.

Risk Factor Index Criteria Table

Risk Assessment Category	Level	Degree of Risk Criteria	Index	Weight Value
PROBABILITY What is the likelihood of a hazard event occurring in a given year?	UNLIKELY	LESS THAN 1% ANNUAL PROBABILITY	1	30%
	POSSIBLE	BETWEEN 1 & 10% ANNUAL PROBABILITY	2	
	LIKELY	BETWEEN 10 &100% ANNUAL PROBABILITY	3	
	HIGHLY LIKELY	100% ANNUAL PROBABILTY	4	
IMPACT *In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?*	MINOR	VERY FEW INJURIES, IF ANY. ONLY MINOR PROPERTY DAMAGE & MINIMAL DISRUPTION ON QUALITY OF LIFE. TEMPORARY SHUTDOWN OF CRITICAL FACILITIES.	1	30%
	LIMITED	MINOR INJURIES ONLY. MORE THAN 10% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE DAY.	2	
	CRITICAL	MULTIPLE DEATHS/INJURIES POSSIBLE. MORE THAN 25% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE WEEK.	3	
	CATASTROPHIC	HIGH NUMBER OF DEATHS/INJURIES POSSIBLE. MORE THAN 50% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR 30 DAYS OR MORE.	4	
SPATIAL EXTENT *How large of an area could be impacted by a hazard event? Are impacts localized or regional?*	NEGLIGIBLE	LESS THAN 1% OF AREA AFFECTED	1	20%
	SMALL	BETWEEN 1 & 10% OF AREA AFFECTED	2	
	MODERATE	BETWEEN 10 & 50% OF AREA AFFECTED	3	
	LARGE	BETWEEN 50 & 100% OF AREA AFFECTED	4	
WARNING TIME *Is there usually some lead time associated with the hazard event? Have warning measures been implemented?*	MORE THAN 24 HRS	SELF DEFINED	1	10%
	12 TO 24 HRS	SELF DEFINED	2	
	6 TO 12 HRS	SELF DEFINED	3	
	LESS THAN 6 HRS	SELF DEFINED	4	

DURATION *How long does the hazard event usually last?*	LESS THAN 6 HRS	SELF DEFINED	1	10%
	LESS THAN 24 HRS	SELF DEFINED	2	
	LESS THAN 1 WEEK	SELF DEFINED	3	
	MORE THAN 1 WEEK	SELF DEFINED	4	

Due to the inherent errors possible in any disaster, the results of the risk factor analysis should only be used for planning purposes and in developing hazard priorities and concentrating jurisdictional resources. Before assigning risk factors and prioritization to hazards it is recommended to complete a draft of the hazard profiles and risk assessment information to aid in determining potential impacts. Before the hazard prioritization process you may want to consider the following risk assessment criteria:

- ✓ Inventory and summarize vulnerable assets
- ✓ Characterize repetitive flood loss properties
- ✓ Estimated harm to residents and estimated damages to buildings
- ✓ Describe vulnerability to future development

[Example Risk Factor Results from Plumas County Hazard Mitigation Project]

PLUMAS COUNTY HAZARD MITIGATION PLAN

Department of Health / Office of Emergency Services

Risk Factor Worksheet

Ranking	Natural Hazards	Probability	Calc.1	Impact	Calc.2	Spatial Extent	Calc.3	Warning Time	Calc.4	Duration	Calc.5	RF Factor
1	Wildfire	4	1.2	3	0.9	4	0.8	3	0.3	4	0.4	3.6
2	Severe Weather	4	1.2	2	0.6	4	0.8	1	0.1	2	0.2	2.9
3	Geologic Hazards	4	1.2	2	0.6	1	0.2	4	0.4	2	0.2	2.6
4	Flooding	2	0.6	3	0.9	2	0.4	1	0.1	4	0.4	2.4
5	Drought	2	0.6	1	0.3	3	0.6	1	0.1	4	0.4	2
6	Climate Change	2	0.6	1	0.3	4	0.8	1	0.1	1	0.1	1.9
7	Dam Failure	1	0.3	2	0.6	1	0.2	2	0.2	1	0.1	1.4

Risk Factor Conculsion	
HIGH RISK (3.0 – 4.0)	*Wildfire*
MODERATE RISK (2.0 – 2.9)	*Severe Weather, Geologic Hazards, Flooding*
LOW RISK (0.1 – 1.9)	*Drought, Climate Change, Dam Failure*

The conclusions from the example risk factor results above, were translated into three categories for a final summary of hazard risk based on *High*, *Moderate*, or *Low* risk designations. The designations values are arbitrary and can be adjusted as deemed necessary. It should be noted that although some hazards are classified as posing Low risk, their occurrence of

varying or unprecedented magnitudes is still possible and will continue to be reevaluated during future updates of this plan.

D.4 Risk Factor Final Worksheet agreed upon Planning Committee

LHMP RISK FACTOR EXCEL WORKSHEET

HAZARD PRIORITIZATION /

MITIGATE HAZARDS

Rank	Natural Hazards	Probability (1-4)	Factor1 = (Probability Index * .30)	Impact (1-4)	Factor2 = (Impact Index * .30)	Spatial Extent (1-4)	Factor3 = (Spatial Extent Index * .20)	Warning Time (1-4)	Factor4 = (Warning Time Index * .10)	Duration (1-4)	Factor5 = (Probability Index * .10)	RF Factor Total = (Add Factors 1-5)
1	Climate Change	1	0.3	1	0.3	3	0.6	1	0.1	4	0.4	1.7
2	Earthquake	3	0.9	4	1.2	4	0.8	4	0.4	3	0.3	3.6
3	Erosion	1.5	0.45	1	0.3	1	0.2	3	0.3	1.5	0.15	1.4
4	Extreme Heat	2.5	0.75	1	0.3	2.5	0.5	1	0.1	2.5	0.25	1.9
5	Flooding	2	0.6	2	0.6	2	0.4	4	0.4	2.5	0.25	2.25
6	Wildfire	2	0.6	2	0.6	2	0.4	4	0.4	3	0.3	2.3

The RF approach combines historical data, local knowledge, and consensus opinions to produce numerical values that allow identified hazards to be ranked against one another. These criteria were used to evaluate hazards and identify the highest risk hazard in the Lawndale region.
The RF approach produces numerical values that allow identified hazards to be ranked against one another (the higher the RF value, the greater the hazard risk). RF values are obtained by assigning varying degrees of risk to five categories for each hazard: probability, impact, spatial extent, warning time, and duration. Each degree of risk is assigned a value ranging from 1 to 4 and a weighing factor for each category was agreed upon by the MPC.

Calculated Field

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D.5 Mitigation Action Implementation Plan Form

Mitigation Action Implementation Plan	
Action:	
Implementing Agencies	
Lead Agency (ies):	Town of Apple Valley
Roles and Responsibilities:	
Support Agency (ies):	
Roles and Responsibilities:	
Preliminary Identified Tasks:	
1.	
2.	
3.	
Implementation Costs	
Estimated Capital Costs:	
Estimated Maintenance Costs:	
Implementation Resources	
Financial Resources (Funding):	
Technical Assistance Resources:	
Required Equipment, Vehicles, and Supplies	
Office Supplies	
Vehicles	
Implementation Timeframe	
Estimated Mitigation Action Start Date:	
Estimated Mitigation Action Completion Date:	

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D.6 Mitigation Action Reporting Form

Mitigation Action Reporting Forms

Your jurisdictional may wish to use these mitigation actions reporting forms on an annual, semiannual, or quarterly basis.

Progress Report Period: _____ (date) to _____ (date)

Project Title: _____

Project ID# _____

Responsible Agency: _____

Address: _____

Town: _____

Contact Person: _____

Phone#: _____ Email _____

List Supporting Agencies and Contacts: _____

Total Project Cost: _____

Funding Source: _____

Anticipated Cost Overrun/Underrun: _____

Date of Project Approval: _____ Start date of the project: _____

Anticipated completion date: _____

Description of the Project (include a description of each phase, if applicable, and the time frame for completing each phase): _____

Milestones	Completed (✓)	Projected Date of Completion

HMP Goal Addressed: _____

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D.7 Annual HMP Review Questionnaire

Annual HMP Review Questionnaire

Plan Section	Questions	Yes	No	Comments
Planning Process	Have there been staffing changes that would warrant inviting different members to the planning team?			
	Are there procedures that can be done more efficiently?			
	Are there representatives of essential organizations who have not fully participated in the planning and implementation of actions? If so, can someone else from this organization commit to the team?			
	Has the committee undertaken any public outreach activities regarding the HMP or implementation of mitigation actions?			
	How can public participation be improved?			
Hazard Profiles	Has a natural and/or human caused disaster occurred in this reporting period?			
	Are there natural and/or human caused hazards that have not been addressed in this HMP and should be?			
	Are additional maps/data or new hazards studies available? If so, what have they revealed?			
Vulnerability Analysis	Do any new critical facilities or infrastructure need to be added to the asset lists?			
	How will the vulnerability analysis be affected by additional maps/data or new hazard studies?			
	Have there been changes in development patterns that could influence the effects of hazards or create additional risks?			
	Has the vulnerability analysis changed as a result of the implementation of mitigation actions?			
Mitigation Strategy	Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?			
	Is the goal still applicable?			
	Should new mitigation actions be added to the Mitigation Action Plan?			
	During implementation of the mitigation actions, what has proven effective? What has proven not effective?			
	Do existing mitigation actions listed in the Mitigation Action Plan need to be reprioritized deleted, or revised?			
	Are the mitigation actions listed in the Mitigation Action Plan appropriate for available resources?			
Planning Mechanisms	Has the Mitigation Action plan been incorporated into existing planning mechanisms?			
	Has the Mitigation Action plan incorporated existing plan mechanisms?			

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APPENDIX L

SAN BERNARDINO COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

SAN BERNARDINO COUNTY

MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

FEMA Approved: July 13, 2017

San Bernardino County Unincorporated Area
San Bernardino County Fire Protection District
San Bernardino County Flood Control District
San Bernardino County Special Districts Department



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2017

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RESOLUTION NO. 2017-_____

A RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ADOPTING THE SAN BERNARDINO COUNTY UNINCORPORATED AREA MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN DATED MARCH 2017, AND AUTHORIZING FUTURE NON-SUBSTANTIVE AMENDMENTS TO THE PLAN

On Tuesday, _____, 2017, on motion of Supervisor _____, duly seconded by Supervisor _____ and carried, the following resolution is adopted by the Board of Supervisors of San Bernardino County, State of California.

WHEREAS, the preservation of life and property is an inherent responsibility of local, state and federal government, including the County of San Bernardino, and the San Bernardino County Office of Emergency Services, to prepare a local Multi-Jurisdictional Hazard Mitigation Plan (HMP) for the unincorporated area of San Bernardino County to define hazard mitigation measures to reduce or eliminate loss of life and/or property; and

WHEREAS, this HMP represents a comprehensive description of the County's commitment to reducing, preventing or eliminating potential impacts of disasters caused by natural hazards; and

WHEREAS, the HMP is a Federal requirement under the Disaster Mitigation Act of 2000 for the County to be eligible to apply for federal funds for disaster recovery and mitigation assistance; and

WHEREAS, the HMP established a coordinated effort to support mitigation activities, identifies measures to combat natural hazards within our County; and

WHEREAS, the HMP is an extension of the State of California Multi-Hazard Mitigation Plan, and will be reviewed periodically and revised as necessary to meet changing conditions; and

WHEREAS, the Board of Supervisors agrees to adopt this HMP and urges all officials, employees, public and private organizations, and citizens, individually and collectively, to do their share in furthering the preparation of hazard mitigation within the County of San Bernardino;

NOW, THEREFORE, BE IT RESOLVED THAT:

The Board of Supervisors of the County of San Bernardino, a public entity established under the laws of the State of California, hereby authorizes this HMP to be adopted, that the San Bernardino County Fire Protection District Office of Emergency Services Division Manager is hereby authorized to implement future non-substantive amendments, recommended by the Federal Emergency Management Agency upon their review, to the HMP, that a copy of the Board of Supervisors' approved San Bernardino County Unincorporated Area Hazard Mitigation Plan be forwarded to the Federal Emergency Management Agency and CalOES, that once approved the HMP will be considered to be incorporated into the County's General Plan, and this plan become effective immediately.

PASSED AND ADOPTED by the Board of Supervisors of the County of San Bernardino, State of California, by the following vote:

AYES: SUPERVISORS:

NOES: SUPERVISORS:

ABSENT: SUPERVISORS:

* * * * *

STATE OF CALIFORNIA)
) ss.
COUNTY OF SAN BERNARDINO)

I, **LAURA H. WELCH,** Clerk of the Board of Supervisors of the County of San Bernardino, State of California, hereby certify the foregoing to be a full, true and correct copy of the record of the action taken by the Board of Supervisors, by vote of the members present, as the same appears in the Official Minutes of said Board at its meeting of _____, 2017.

LAURA H. WELCH
Clerk of the Board of Supervisors

By _____
Deputy

RESOLUTION NO. 2017-_____

A RESOLUTION OF THE BOARD OF SUPERVISORS OF THE SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT, STATE OF CALIFORNIA, ADOPTING THE SAN BERNARDINO COUNTY UNINCORPORATED AREA MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN DATED MARCH 2017, AND AUTHORIZING FUTURE NON-SUBSTANTIVE AMENDMENTS TO THE PLAN

On Tuesday, _____, 2017, on motion of Supervisor _____, duly seconded by Supervisor _____ and carried, the following resolution is adopted by the Board of Supervisors of the San Bernardino County Flood Control District, State of California.

WHEREAS, the preservation of life and property is an inherent responsibility of local, state and federal government, including the County of San Bernardino, and the San Bernardino County Office of Emergency Services, to prepare a local Multi-Jurisdictional Hazard Mitigation Plan (HMP) for the unincorporated area of San Bernardino County to define hazard mitigation measures to reduce or eliminate loss of life and/or property; and

WHEREAS, this HMP represents a comprehensive description of the County's commitment to reducing, preventing or eliminating potential impacts of disasters caused by natural hazards; and

WHEREAS, the HMP is a Federal requirement under the Disaster Mitigation Act of 2000 for the County to be eligible to apply for federal funds for disaster recovery and mitigation assistance; and

WHEREAS, the HMP established a coordinated effort to support mitigation activities, identifies measures to combat natural hazards within our County; and

WHEREAS, the HMP is an extension of the State of California Multi-Hazard Mitigation Plan, and will be reviewed periodically and revised as necessary to meet changing conditions; and

WHEREAS, the Board of Supervisors agrees to adopt this HMP and urges all officials, employees, public and private organizations, and citizens, individually and collectively, to do their share in furthering the preparation of hazard mitigation within the County of San Bernardino

NOW, THEREFORE, BE IT RESOLVED THAT:

The Board of Supervisors of the San Bernardino County Flood Control District, a public entity established under the laws of the State of California, hereby authorizes this HMP to be adopted, that the San Bernardino County Fire Protection District Office of Emergency Services Division Manager is hereby authorized to implement future non-substantive amendments, recommended by the Federal Emergency Management Agency upon their review, to the HMP, that a copy of the Board of Supervisors' approved San Bernardino County Unincorporated Area Hazard Mitigation Plan be forwarded to the Federal Emergency Management Agency and the CalOES, that once

approved the HMP will be considered to be incorporated into the County's General Plan, and this plan become effective immediately.

PASSED AND ADOPTED by the Board of Supervisors of the San Bernardino County Flood Control District, State of California, by the following vote:

AYES: SUPERVISORS:

NOES: SUPERVISORS:

ABSENT: SUPERVISORS:

* * * * *

STATE OF CALIFORNIA)
) ss.
COUNTY OF SAN BERNARDINO)

I, **LAURA H. WELCH,** Clerk of the Board of Supervisors of the San Bernardino County Flood Control District, State of California, hereby certify the foregoing to be a full, true and correct copy of the record of the action taken by the Board of Supervisors, by vote of the members present, as the same appears in the Official Minutes of said Board at its meeting of _____, 2017.

LAURA H. WELCH
Clerk

By _____
Deputy

RESOLUTION NO. 2017-

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE SAN BERNARDINO COUNTY FIRE PROTECTION DISTRICT ADOPTING THE SAN BERNARDINO COUNTY UNINCORPORATED AREA MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN DATED MARCH 2017, AND AUTHORIZING FUTURE NON-SUBSTANTIVE AMENDMENTS TO THE PLAN

On Tuesday, , 2017, on motion of Director , duly seconded by Director and carried, the following resolution is adopted by the Board of Directors of San Bernardino County Fire Protection District.

WHEREAS, the preservation of life and property is an inherent responsibility of local, state and federal government, including the County of San Bernardino, and the San Bernardino County Office of Emergency Services, to prepare a local Multi-Jurisdictional Hazard Mitigation Plan (HMP) for the unincorporated area of San Bernardino County to define hazard mitigation measures to reduce or eliminate loss of life and/or property; and

WHEREAS, this HMP represents a comprehensive description of the County's commitment to reducing, preventing or eliminating potential impacts of disasters caused by natural hazards; and

WHEREAS, the HMP is a Federal requirement under the Disaster Mitigation Act of 2000 for the County to be eligible to apply for federal funds for disaster recovery and mitigation assistance; and

WHEREAS, the HMP established a coordinated effort to support mitigation activities, identifies measures to combat natural hazards within our County; and

WHEREAS, the HMP is an extension of the State of California Multi-Hazard Mitigation Plan, and will be reviewed periodically and revised as necessary to meet changing conditions; and

WHEREAS, the Board of Directors agrees to adopt this HMP and urges all officials, employees, public and private organizations, and citizens, individually and collectively, to do their share in furthering the preparation of hazard mitigation within the County of San Bernardino;

NOW, THEREFORE, BE IT RESOLVED THAT:

The Board of Directors of the San Bernardino County Fire Protection District, a public entity established under the laws of the State of California, hereby authorizes this HMP to be adopted, that the San Bernardino County Fire Protection District Office of Emergency Services Division Manager is hereby authorized to implement future non-substantive amendments, recommended by the Federal Emergency Management Agency upon their review, to the HMP, that a copy of the Board of Directors' approved San Bernardino County Unincorporated Area Hazard Mitigation Plan be forwarded to the Federal Emergency Management Agency and CalOES, that once approved

the HMP will be considered to be incorporated into the County's General Plan, and this plan become effective immediately.

PASSED AND ADOPTED by the Board of Directors of the San Bernardino County Fire Protection District by the following vote:

AYES: DIRECTORS:

NOES: DIRECTORS:

ABSENT: DIRECTORS:

* * * * *

STATE OF CALIFORNIA)
) ss.
COUNTY OF SAN BERNARDINO)

I, **LAURA H. WELCH,** Secretary of Board of Directors of the San Bernardino County Fire Protection District, hereby certify the foregoing to be a full, true and correct copy of the record of the action taken by the Board of Directors, by vote of the members present, as the same appears in the Official Minutes of said Board at its meeting of Tuesday, , 2017.

LAURA H. WELCH
Secretary

By _____
Deputy

Section 1. Introduction

The Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) update is a "living document" that should be reviewed, monitored, and updated to reflect changing conditions and new information. As required, the MJHMP must be updated every five (5) years to remain in compliance with regulations and Federal mitigation grant conditions. In that spirit, this MJHMP is an update of the San Bernardino County Unincorporated Area MJHMP approved by FEMA on October 11, 2011. This MJHMP presents updated information regarding hazards being faced by the County, the San Bernardino County Fire Protection District, the San Bernardino County Flood Control District, and those Board-governed Special Districts administered by the San Bernardino County Special Districts Department.

These Board-Governed Special Districts were formed by the Board of Supervisors to provide a specific service for a specific area of San Bernardino County. Additionally, these Special Districts are treated as an all-inclusive County Organization, not as separate or independent entities. Each Special District is governed cooperatively by the San Bernardino County Board of Supervisors acting as the Board of Supervisors for each of the individual districts.

The County of San Bernardino is governed by five (5) Supervisors; one for each supervisorial district who collectively make up the County Board of Supervisors. The Board of Supervisors is responsible for the County department and agencies, including Board Governed Special Districts, providing services to the unincorporated area.

The Board of Supervisors acts as the Board of Directors for the County Fire Protection District, the County Flood Control District, and the Special Districts Department as part of their responsibilities as an elected member of the County of San Bernardino Board of Supervisors.

The San Bernardino County Organizational Chart clearly shows the relationships between these Board-governed Special Districts and other County departments as one of equal relationship Departments/Districts. See Figure 1-1.

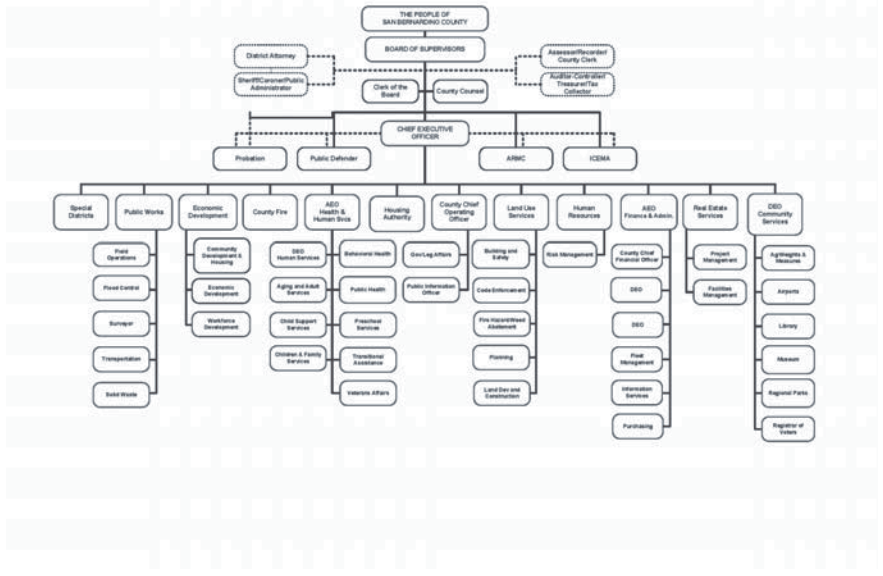


Figure 1-1: Organizational Chart for San Bernardino County

1.1 San Bernardino County Unincorporated Area

The Unincorporated Area of San Bernardino County has a population of 309,759 persons (14.48%) of the entire County Population) and covers 19,233 square miles (95.67% of the entire County land area). There are approximately 61 unincorporated communities within the unincorporated County. San Bernardino County is the largest County in the continental United States. San Bernardino County provides basic services to the residents and citizens of the unincorporated areas. These services include Law Enforcement, Fire Protection, Building and Safety Services, Public Health Services, Library, and Human Services (social services). Five Interstate Highways and four inter-continental railroad lines cross the County, providing vital transportation links from southern California to the remainder of the United States.

1.1.1 San Bernardino County Fire Protection District

San Bernardino County Fire Protection District is a community based all-risk emergency services organization dedicated to the health and well-being of the citizens of San Bernardino County through a balance of regionalized services delivery and accountability to the local community. On July 1, 2008, twenty-seven separate fire districts were merged into one single board governed fire protection district with four regional service zones. The reorganization was not only an administrative advancement but also a significant advancement in operations and delivery of emergency response services.

It has resulted in simplified budgeting and fiscal operations, greater flexibility in the use in the use of department resources and assets and more effective use of day-to-day operations. The reorganization will continue to improve the delivery of fire services and overall operating efficiency.

The San Bernardino County Fire Protection District (County Fire) covers 19,278 square miles, operates 85 fire stations and facilities within 6 Regional Service Zones (Mountain, North Desert, South Desert, High Desert, West Valley and East Valley), and serves 64 unincorporated communities, the City of Grand Terrace, and the Town of Yucca Valley. There are also 6 ambulance enterprise operations that provide service within these Regional Service Zones. In addition, 7 cities are Independent Fire Protection Districts that contract with County Fire: Adelanto, Fontana, Hesperia, Needles, Twentynine Palms, San Bernardino and Victorville. County Fire's executive management is provided by the Fire Chief/County Fire Warden, Deputy Chief, Assistant Chief of Operations as well as Division Managers and Division Chiefs.

County Fire is an all-risk department providing emergency mitigation and management for fire suppression, emergency medical services (paramedic and non-paramedic), ambulance services, HAZMAT response, arson investigation, technical rescue including water borne, flooding and mudslide, winter rescue operations, terrorism and weapons of mass destruction. As part of disaster preparation, response, and mitigation, the department's Office of Emergency Services specifically provides support and assistance to the 24 cities and towns, as well as, all the unincorporated portions of the county. The field functions are supported by a countywide management system that includes organizational business practices, human resources, financial and accounting services, vehicles services and support, and equipment warehousing and distribution. County Fire also provides for the management of community safety services such as: fire prevention, building construction plans and permits, household hazardous waste, Local Oversight Program for hazardous materials, HAZMAT facility inspections, planning and engineering, and public education and outreach.



Figure 1-2: San Bernardino County Fire Protection District

1.1.2 San Bernardino County Flood Control District

1.1.2.1 Description of Major Services

The San Bernardino County Flood Control District (District) was created in 1939 under special state legislation. Since its inception, the District has developed a very extensive system of flood control and water conservation facilities, including dams, conservation basins, debris basins, channels and storm drains. The purpose of these facilities is to intercept and convey flood flows through and away from developed areas of the county, as well as to promote water conservation and improved water quality.

The District covers the entire county, including all of the incorporated cities. The District is divided into six geographic flood zones (in recognition of the different characteristics and flood control needs in various areas).

- Zone 1 encompasses the county's West End, from the Los Angeles and Riverside County lines to West Fontana.
- Zone 2 encompasses the central area of the San Bernardino Valley easterly of Zone 1 to approximately the Santa Ana River and City Creek demarcations.
- Zone 3 covers the east end of San Bernardino valley, east of Zone 2.

- Zone 4 covers the Mojave River valley region, from the San Bernardino Mountains to Silver Lakes.
- Zone 5 primarily includes the San Bernardino Mountains.
- Zone 6 encompasses the remainder of the county not covered by other zones.

The District has also established a countywide administrative zone (Zone 7)

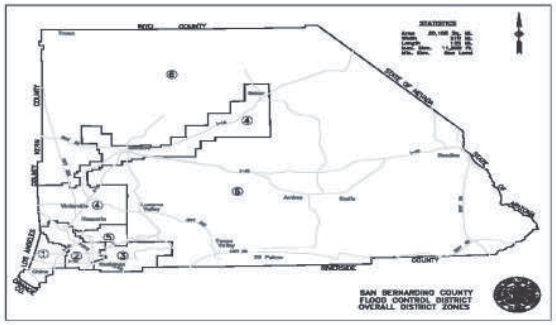


Figure 1-3: Map of San Bernardino County Flood Control District

The District's funding is primarily derived from property taxes, federal and state aid on specific projects, subdivision and permit fees, rents and royalties, and revenue from local water agencies for water spreading services. The District's principal functions are as follows:

- **Flood Protection on Major Streams:** In cooperation with the federal government, the District conducts programs for channel and levee construction, floodwater retention, and debris basin maintenance. Programs or projects are often done in cooperation with the incorporated cities, the U.S. Army Corps of Engineers, and the U.S. Bureau of Reclamation.

- **Water Conservation:** The District operates and maintains water conservation basins and spreading grounds. Water from the local mountains and northern California is spread and percolated into the groundwater basins underlying the county. The District has numerous joint use agreements with water districts allowing use of District facilities for groundwater recharge.

- **Storm Drain Construction:** The District is active in comprehensive storm drain master

planning/construction and cooperates with incorporated cities and other agencies in storm drain projects.

- **Facility Maintenance:** The District has a proactive maintenance program for its facilities. Regular inspections of the storm drains, channels, and basins are made as required by various state and federal agencies.

- **National Pollution Discharge Elimination System (NPDES):** The District is the lead permittee in the San Bernardino valley area-wide NPDES permit with 16 cities as co-permittees. The NPDES program, through the State Water Quality Management Board, regulates storm water quality through very detailed and complex permits, which affect everyone within the Santa Ana River Watershed and is expanding into the high desert area of the Victor Valley under Phase II of the permit.

- **State Water Quality Management Board:** regulates storm water quality through very detailed and complex permits, which affect everyone within the Santa Ana River Watershed and is expanding into the high desert area of the Victor Valley under Phase II of the permit.

- **Flood Operations:** During the flood season, the District maintains telemetry systems for monitoring rainfall and runoff and dispatches storm patrols as dictated by the projected severity of a storm. The District has access to a weather satellite data delivery system to provide state-of-the-art weather information. The system provides advance warning of major storm activity.

- **Flood Area Safety Task Force (FAST):** As a result of the October/November fires of 2003, the FAST organization was created. The District is a key component of this task force, which is meant to respond to the elevated flood risk associated with the aftermath of these devastating fires.

1.1.3 Special Districts Department

The Special Districts Department promotes safe, healthy, enjoyable and dynamic communities by providing essential programs and municipal services that meet the current and future needs of the communities served.

The San Bernardino County Board of Supervisors is the governing body for all Board governed Districts, County Service Areas (CSA), and Improvement Zones. The day-to-day management and administration is done through the Special Districts Department. The County Board of Supervisors and the Special Districts Department depend quite heavily on input from the community. The successful operation of a District, CSA and Improvement Zone is a team effort between County staff and property owners. Where needed, the Board of Supervisors will set up a

property owner Advisory Commission or Municipal Advisory Council (MAC) to work with and make recommendations to the Board and County staff.

The formation process begins with a request from property owners and then involves a feasibility study performed by the Special District Department with the assistance of many other County Departments. The final approval of the District, CSA and Improvement Zone is done by the County Board of Supervisors at a public hearing. Depending on the complexity of the issues, the process can take from three (3) months to one (1) year to complete.

There are various forms of financial mechanisms that can be used to fund services such as fees, special taxes, assessments, etc. Prior to a new funding source being implemented, it must receive approval from either the property owners or the registered voters in the area. It is important to understand that all funding is generated through the Districts, CSAs, and Improvement Zones. No County general funds are used or are available.

Special Districts Department is responsible for operating the Board-governed Special Districts within San Bernardino County. There are 102 special districts managed by the Special Districts Department:

Table 1-1: Special Districts Department District Listing

	District Type	Number
1	Special Revenue Districts	11
2	Enterprise Funds (Airport and Refuse)	3
3	Parks Districts	19
4	Road Districts	41
5	Enterprise Funds (Sewer)	9
6	Street Light Districts	11
7	Enterprise Funds (Water)	8
Total Special Districts		102

- **Special Revenue Districts** were created to provide a service to the property owners within the Special Revenue District.
- **Enterprise Funds Districts** derive their funds through fees collected for delivery of a service or good such as water, sewer, refuse or airport fees from the users within the individual District.
- **Parks Districts** derive their funds through property taxes levied on property owners

within the individual Park District.

- **Road Districts** derive their funds through property taxes levied on property owners within the Road District.
- **Street Light Districts** derive their funds through property taxes levied on property owners within the Street Light District.

The two Special Districts listed below were formed differently than the other special districts listed above managed by the Special Districts Department. These two districts were formed with a Board of Directors. (San Bernardino County Board of Supervisors) and are not independently elected. All governance actions are by the elected members of the Board of Supervisors acting as the Board of Directors for the Recreation and Park District.

Big Bear Valley Recreation and Parks District

Big Bear Valley Recreation and Park District currently maintains 6 developed parks, 2 undeveloped parks, several community buildings including the Big Bear Valley Senior Center, 3 ball fields, and a swim beach. Moonridge Animal Park is administered by the Big Bear Valley Recreation and Park District. The Zoo is open year round for visitors to see alpine species on exhibit. The Zoo receives approximately 99,600 visitors annually.

Bloomington Recreation and Parks District

Bloomington Recreation and Park District maintains two community parks, an equestrian arena, sports fields, and a community center.

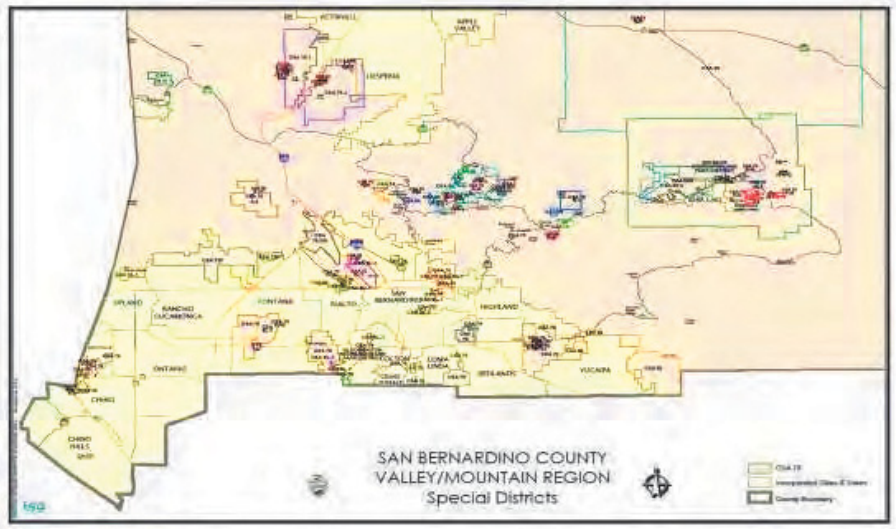


Figure 1-4: Map of Special District Department Districts

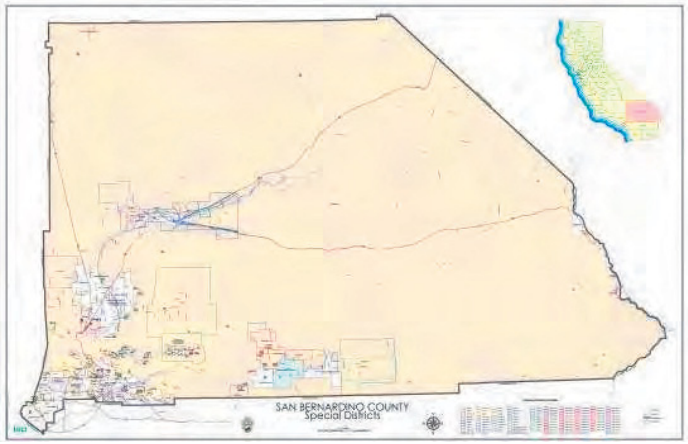


Figure 1-5: Special Districts Valley/Mountain Region

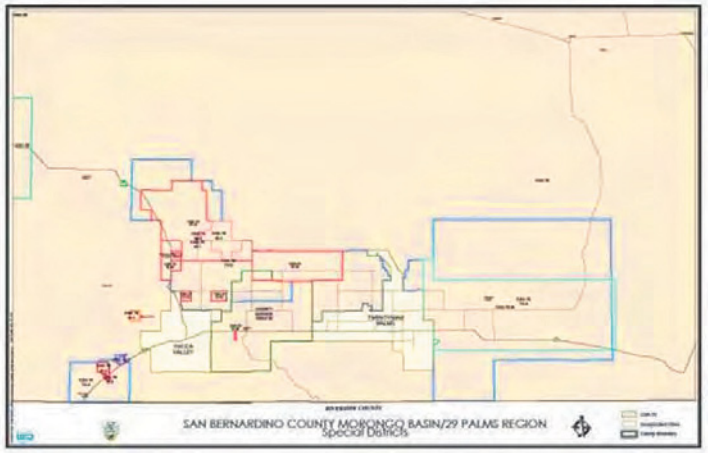


Figure 1-6: Morongo Basin/Twentynine Palms Region



Figure 1-7: Special Districts Victor Valley/Barstow Region

1.2 Purpose of the Plan

The intent of hazard mitigation is to reduce and/or eliminate loss of life and property. Hazard mitigation is defined by FEMA as "any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards." A "hazard" is defined by FEMA as "any event or condition with the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, environmental damage, business interruption, or other loss."

The purpose of the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) is to demonstrate the plan for reducing and/or eliminating risk in the unincorporated area of the County and within areas overseen or managed by the Flood Control District, Fire District and Special Districts Department. The MJHMP process encourages communities within the unincorporated county to develop goals and projects that will reduce risk and build a more disaster resilient community by analyzing potential hazards. By cooperatively and jointly together as a Multi-Jurisdictional Planning team, the partners were able to develop common goals and objectives for mitigation efforts. The individual stakeholders can then take the goals and objectives back to their individual Special Districts for discussion, ranking and project development, and then bring the resulting projects back to the Multi-Jurisdictional Planning Team. The Multi-Jurisdictional Planning Team can then

integrate all projects into the appropriate project listing to be acted upon by the most appropriate managing department or district for the listed projects.

After disasters, repairs and reconstruction are often completed in such a way as to simply restore to pre-disaster conditions. Such efforts expedite a return to normalcy; however, the restoring of things to pre-disaster conditions sometimes result in feeding the disaster cycle; damage, reconstruction, and repeated damage. Mitigation is one of the primary phases of emergency management specifically dedicated to breaking the cycle of damage. Hazard mitigation is distinguished from other disaster management functions by measures that make County development and the natural environment safer and more disaster resilient. Mitigation generally involves alteration of physical environments, significantly reducing risks and vulnerability to hazards by altering the built environment so that life and property losses can be avoided or reduced. Mitigation also makes it easier and less expensive to respond to and recover from disasters.

1.3 Authority

In 2000, FEMA adopted revisions to the Code of Federal Regulations. This revision is known as "Disaster Mitigation Act (DMA)." DMA 2000, Section 322 (a-d) requires that local governments, as a condition of receiving federal disaster mitigation funds, have a Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) that describes the process for assessing hazards, risks and vulnerabilities, identifying and prioritizing mitigation actions, and engaging/soliciting input from the community (public), key stakeholders, and adjacent jurisdictions/agencies.

With an approved (and adopted) MJHMP, the County and participating jurisdictions are eligible for federal disaster mitigation funds/grants (Hazard Mitigation Grant Program, Pre-Disaster Mitigation, and Flood Management Assistance) aimed to reduce and/or eliminate risk.

1.4 What's New

The 2011 San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) contained a detailed description of the planning process, a risk assessment of identified hazards for the San Bernardino County Planning Area and an overall mitigation strategy for reducing the risk and vulnerability from these hazards. Since approval of the plan by FEMA, much progress has been made by San Bernardino County and the participating County Districts on implementation of the mitigation strategy. As part of this 2016 MJHMP Update, a thorough review and update of the 2011 plan was conducted to ensure that this update reflects current community conditions and priorities in order to realign the overall mitigation strategy for the next five-year planning period. This section of the plan includes the following:

- **What's New in the Plan Update** This section provides an overview of the approach to updating the plan and identifies new analyses, data and information included in this Plan Update to reflect current community conditions. This includes a summary of new hazard and risk assessment data as it relates to the San Bernardino Planning Area as well as information on current and future development trends affecting community vulnerability

and related issues. The actual updated data, discussions, and associated analyses are contained in their respected sections within this 2016 MJHMP Update.

- **Summary of Significant Changes to Current Conditions and Hazard Mitigation Program Priorities.** This section provides a summary of significant changes in current conditions, changes in vulnerability, and any resulting modifications to the community's mitigation program priorities.

- **2011 Mitigation Strategy Status and Successes.** This section provides a description of the status of mitigation actions from the 2011 plan and also indicates whether a project is no longer relevant or is recommended for inclusion in the updated 2016 mitigation strategy. This section also highlights key mitigation success stories of the County and participating jurisdictions since the 2011 MJHMP.

This What's New section provides documentation of San Bernardino County Planning Area's progress or changes in their risk and vulnerability to hazards and their overall hazard mitigation program. Completion of this 2016 MJHMP Update further provides documentation of the San Bernardino County community's continued commitment and engagement in the mitigation planning process.

1.4.1 Updates to the Current Plan

This MJHMP update involved a comprehensive review and update of each section of the 2011 plan and includes an assessment of the success of the participating County Districts in evaluating, monitoring and implementing the mitigation strategy outlined in the initial plan. Only the information and data still valid from the 2011 plan was carried forward as applicable into this MJHMP update. In fact, based in part on the issuance of new 2011 and 2013 planning guidance, this 2016 plan has been significantly updated and rewritten.

The San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan (2011) focused on integrating the MJHMP with the County General Plan goals and policies as well as incorporating specific flood mitigation projects that were programmed for completion over the five (5) year period. The Plan did not clearly identify mitigation projects the County would focus on for all priority hazards identified in the plan. However, the County has been very active and engaged in implementing and supporting projects and programs designed to reduce and/or eliminate risk in the County. The list of successful projects in this section represents the activities that the County has undertaken and/or supported to reduce the risks from Wildfire, Earthquake, Flood, Drought, Terrorism, and Climate Change.

1.4.2 New Jurisdictional Annexes

Newly refined and reconfigured Jurisdictional Annexes detail the hazard mitigation planning elements specific to the participating jurisdiction to the San Bernardino County MJHMP Update.

The Annexes are not intended to be a standalone document, but appends to and supplements the information contained in the 2016 base plan document. As such, all sections of the base plan, including the planning process and other procedural requirements apply to and were met by the participating jurisdictions. The newly refined Jurisdictional Annexes provide additional information specific to county participating special district or departments, with a focus on providing additional details on the mitigation strategies for the Fire Protection District, Flood Control District and Special Districts Department. The three annexes provide more detail on mitigation strategies, mitigation projects and existing implementation mechanism for each participating jurisdiction.

The 2011 MJHMP included the Big Bear Valley Recreation and Parks District and Bloomington Recreation and Parks District as standalone jurisdictions. For purposes of this 2016 plan update, Big Bear Valley Recreation and Parks District, and Bloomington Recreation and Parks District hazard mitigation planning efforts are included under the supervision of the Special Districts hazard mitigation planning efforts.

1.4.3 New Risk Assessment

As part of its comprehensive review and update of each section of the plan, San Bernardino County and participating jurisdictions recognized that updated data, if available, would enhance the analysis presented in the risk assessment and utilized in the development of the updated mitigation strategy. Highlights of new data used for this Plan Update is identified below in this Section and is also sourced in context within Chapter 4, Risk Assessment. Specific data used is sourced throughout this plan document. This new data and associated analysis provided valuable input for the development of the mitigation strategy presented in Chapter 5 of this plan. A highlight of new information and analyses contained in this plan update includes the following:

- A new assessment of updated hazards affecting the San Bernardino Planning Area was completed resulting in additional hazards added to planning documents the new hazards include climate change, drought and terrorism.

- The drought hazard was expanded to include water shortage impacts to the County, to better align with the State of California Hazard Mitigation Plan and to reflect the significant issues related to drought conditions resulting from the current and ongoing drought within the County and State of California.

- The climate change hazard was added to include to comply and align with the State of California Hazard Mitigation Plan and to reflect recent SB 379 initiatives. Climate change is affecting and will continue to affect the frequency and severity of natural hazard events, a trend that is of concern across the United States.

- An entire rework of the risk assessment for each identified hazard. This included reworking the hazard profile and adding new hazard event occurrences; redoing the entire vulnerability analysis to add items identified below and updating the vulnerability assessment based on more recent hazard data as well as using the most current parcel and assessor data for the existing built environment.

- An update of the flood hazard analysis to include an updated analysis of the 100-year flood, an analysis of the 500-year flood, including the use the new and updated DFIRMs.
- Utilizing updated critical facility GIS mapping for the Planning Area to provide an updated inventory of critical facilities by jurisdiction (including all municipalities) and a GIS analysis of critical facilities vulnerable to hazards with spatial footprints which include: flood, wildfire, and earthquake.
- An enhanced vulnerability assessment which added a GIS analysis of updated future development areas in the Planning Area and specific to each of the mapped hazards.
- Incorporation and analysis of the new 2010 Census data was utilized for this LHMP update. Census data was used in an intersect analysis to determine how much of the population is exposed to flood, wildfire and earthquake hazards.
- Also, as required by current FEMA planning guidance, an analysis of the County's ongoing and continued compliance with the NFIP is included in the Flood Hazard profile.
- Terrorism is now a reoccurring possibility within the United States, due to the terror attack in San Bernardino County in December of 2015, a hazard profile on this matter has been added to this plan.

1.4.4 Successful Wildfire Mitigation Implementation

1.4.4.1 Fire Safe Councils (FSC) Fuel Reduction Program Success

Fire Safe Councils have received and implemented millions of dollars in grant money for fuels reduction and for public education. Of note recently the Arrowhead Communities FSC developed a grant that did fuels reduction but used the existing staff at the County Tree Removal Program rather than pay additional consultants to do the same work. The benefit of this is that the FSC was able to maximize their expenditure and give the contractor a check upon completion of the project. This way 100% of their grant money went directly to the contractor and none went to administrative overhead.

1.4.4.2 Red Cross Grant Fuel Reduction Success

Although this grant was just recently started, the ARC has successfully removed and reduced fuels on several properties. They have also met with County Roads Sign Division and created the correct number of evacuation directional signs. Fifty signs will be posted in the Moon Ridge area of Big Bear Lake in 2010 and 2011. During an emergency, these directional signs will direct people out of a very confusing network of streets.

1.4.4.3 USFS Grants ARRA and Otherwise and Chipping Program Success

San Bernardino County and its Special Districts were successful in obtaining $3 million in American Recovery and Reinvestment Act funding to support ongoing fuel reduction programs and to create new jobs for the recovering economy. The USFS also funded an additional $13 million to carry on after the NRCS projects were closed out.

Project design, contracting and operations are managed by the County's Public Works Department but the priorities are set by local fire chiefs in monthly MAST Operations Meetings. It is the oldest and most significant program for reducing wildfire threat on a mountain wide basis. Table 1-2 shows current and planned fuels reduction Projects for the San Bernardino County Mountain areas.

Table 1-2: Hazardous Tree Removal Project and Fuel Modification Projects

Project Name	Contract No	Funding	Cost	Project Stage
Mojave view	FM179USFS	USFS	$23,840.00	Complete 2013
Strawberry Lodge	n/a	USFS	n/a	Complete 2013
Harich	n/a	USFS	n/a	Complete 2013
Camp Oaks	n/a	USFS	n/a	Complete 2013
Swinson/Arrowbear	n/a	USFS	n/a	Complete 2013
Osito Rancho/Cedar	n/a	USFS*	n/a	Complete 2013
BBV286SP	n/a	USFS	n/a	Complete 2013
BBV287SP	n/a	USFS	n/a	Complete 2013
BBV280SP	n/a	USFS	n/a	Complete 2013
FF288SP	n/a	USFS	n/a	Complete 2013
LA291SP	n/a	USFS	n/a	Complete 2013
RS292SP	n/a	USFS	n/a	Complete 2013
GVL293SP	n/a	USFS	n/a	Complete 2013
AB294SP	n/a	USFS	n/a	Complete 2013
BBV295SP	n/a	USFS	n/a	Complete 2013
Green Briar	FM100ARRA	ARRA**	$88,000.00	Complete 2013
West Hook Creek	n/a	ARRA	$14,700.00	Complete 2013
Silverwood Lake	n/a	ARRA	$21,000.00	Complete 2013
Weesha	n/a	ARRA	n/a	Complete 2013
Erwin Lake	n/a	ARRA	n/a	Complete 2013
Wrightwood	n/a	ARRA	n/a	Complete 2013
Camp Tahquitz	n/a	ARRA	n/a	Complete 2013

Project Name	Contract No	Funding	Cost	Project Stage
West Cajon	n/a	ARRA	n/a	Complete 2013
LA285SP	n/a	ARRA	n/a	Complete 2013
WW290SP	n/a	ARRA	n/a	Complete 2013
CL289SP	n/a	ARRA	n/a	Complete 2013
Rob Roy	n/a	ARRA	n/a	Complete 2013
Santa's Village	n/a	ARRA	n/a	Complete 2013
Saw Pitt II	n/a	ARRA	n/a	Complete 2013
Oak Hills	n/a	ARRA	n/a	Complete 2013
Fawnskin	n/a	ARRA	n/a	Complete 2013
Heaps Peak	n/a	ARRA	n/a	Complete 2013
Houston	n/a	ARRA	n/a	Complete 2013
Calvary	n/a	ARRA	n/a	Complete 2013
WW298SP	n/a	ARRA	n/a	Complete 2013
LG299SP	n/a	ARRA	n/a	Complete 2013
Project Name	**Contract No**	**Funding**	**Cost**	Complete 2013
Waterman Canyon	n/a	ARRA	n/a	Complete 2013
Willow Creek	FM6501AFSC	ACFSC***	$11,900.00	Complete 2013
LA191EVA	EVA191AFSC	ACFSC	n/a	Complete 2013
NorthBay	FM192AFCS	ACFSC	n/a	Complete 2013
LA215EVA	**n/a**	**ACFSC**	**n/a**	**Complete 2013**

** Funded by United States Forest Service*
*** Funder by American Reinvestment and Recovery Act of 2009*
**** Funded by Arrowhead Communities Fire Safe Council*

1.4.4.4 NRCS Fuel Reduction Project Success

San Bernardino County was the recipient of 72 million dollars that were granted from the National Resource Conservation Service (NRCS) to San Bernardino County Fire Protection District to reduce the amount of fuel and the potential for ignitability. In February of 2010, the grant was successfully closed out one month in advance of the target date. The $72,000,000 provided for almost 1,000 projects substantially reducing heavy fuels on tens of thousands of properties at risk across all mountain communities. Within that grant, $6.7million was provided to the USFS to conduct fuel modifications on Federal land and $7.2 million was provided to Cal Trans to remove fuels along evacuation routes. An additional $2 million was forwarded to San Diego to assist them. The activities funded under this program represent the first of their kind to be accomplished by local/state governments with federal grant funding.

To date the Fuel Management Program has removed over 450,000 trees, improving the overall health of the forested areas in the San Bernardino Mountains and reduced the overall fire threat. On several occasions completed projects have resulted in assisting fire suppression efforts and allowing fire to be contained before it threatens a local community, including Deer Lodge Park in Lake Arrowhead and Nob Hill in Running Springs during the Grass Valley and Slide Fires of 2007.

1.4.5 Flood Hazard Mitigation Success

1.4.5.1 2011 General Plan Amendments

A General Plan Amendment to the Safety Element of the County of San Bernardino 2007 General Plan amended the Flood Plain Overlay District, which became effective on March 11, 2010. The Safety Element includes several layers of hazard overlays that are included in the General Plan mapping system to inform the public of potential hazards to development of property within certain areas of the County and to enable the County to mitigate the risks presented to property owners by these hazards. These overlays include potential flood hazards. Over the past twenty years, certain federal and state agencies have been in the process of digitizing much of this hazard data. The digitization of this data has allowed for greater accuracy as well as more timely updates. In recognition of the new data from various federal and state agencies, the County updated the Flood Hazard Overlay Maps contained within the Safety Element of the General Plan. The Flood Plain Safety Overlay District is amended to incorporate revised FEMA (Federal Emergency Management Agency) Flood Plain data, modifying 47 detail and seven regional General Plan Quad Maps. The FEMA Digital Flood Insurance Rate Map database was adopted in the General Plan Amendment as released by FEMA as it exists as of February 9, 2010 and will updated in the future for the County, by integrating automatic map updates as new data is published by FEMA.

Below is a list of the updated Flood Plain Safety Overlay District Maps effective March 11, 2010.

Map	Quad Name	Map #	Quad Name	Map	Quad Name
DI16B	Baker	FH12B	Telegraph Peak	FH21	Devore
EH07	Hinkley	FH13B	Cajon	FH22	San Bernardino N.
EH14	Wild Crossing	FH14B	Silverwood Lake	FH23	Harrison Mtn.
EH15	Hodge	/FJ B	S Portion of County	FH28	Guasti
EH16	Barstow SE	FH11B	Mt. San Antonio	FH29	Fontana
EH22	Helendale	CK/DK	NE Portion of County	FH30	San Bernardino S.
EH29	Adelanto	EH/FH	SW Portion of County	FH31	Redlands
EH30	Victorville	EI/FI B	S Portion of County	FH32	Yucaipa
EH31	Apple Valley N.	EK/FK B	SW Portion of County	FI09B	Fawnskin
EI01B	Nebo	FH06B	Hesperia	FI10B	Big Bear City
EI02B	Yermo	FH07B	Apple Valley S.	FI17B	Big Bear Lake

Map	Quad Name	Map #	Quad Name	Map	Quad Name
EI03B	Harvard Hill	CH/DH	NW Portion of County	FI18B	Moonridge
EI04B	Manix	CI/DI B	N Portion of County	FH15	Lake Arrowhead
EI09B	Daggett	FH03B	Mescal Creek	FH19	Mt. Baldy
EK03	Needles NW	FH04B	Phelan	FH20	Cucamonga Peak
EK11	Needles SW	FI30B	Joshua Tree S.	FI23B	Sunfair
EK12	Needles	FI32B	Queen Mountain	FI25B	Forest Falls
EK20	**Whale Mountain**	**FI28B**	**Morongo Valley**		

Completed Flood Control Projects with Mitigation Characteristics

Table 1-3: Completed Flood Control Projects

Project Number	Completion Date	Total Cost	Total Funding
F02527	2016	$392,885	$392,885
F00282	2016	$4,100,000	$4,100,000
1-	2010	$7,770,000	$7,700,000
F01761	2016	$4,000,000	$4,000,000
F02234	2016	$1,100,000	$1,100,000
F01767	2014	$3,700,000	$3,700,000
F01389-	2008	$1,300,000	$1,300,000
F01545	2009	$1,500,000	$1,500,000
F01566-	2010	$3,300,000	$3,300,000

1.4.5.2 F02527 29TH Street Basin Levee Certification Restoration Project - Completed

Ensure that the surrounding residential and commercial areas will not be re-mapped as floodplain areas.
Status: Completed
Completion Date: March 2016
Local Priority: High
Total Cost: $392,885
Funding Description: From Flood Control District Budget through Property Tax
Project Selected for: Public safety: history of flood damage at this location
Hazard Mitigated: Potential flooding
Resources to Implement: High

Cost to Implement: High
Time to Implement: High

1.4.5.3 F00282 Alabama at City Creek - Completed

Construct RCB and channel improvements to increase capacity and minimize the possibility of road closures and flood damage.
Status: Completed
Completion Date: January 2016
Local Priority: High
Total Cost: $4.1 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Public safety & convenience
Hazard Mitigated: Flooding, flood damage, road closures and road damage
Resources to Implement: Low
Cost to Implement: High
Time to Implement: Medium

1.4.5.1 F02234 Wilson Creek - Completed

Status: Completed June, 2016
Local Priority: Low
Total Cost: $1.1 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Yucaipa
Project Selected for: public safety and infrastructure protection
Hazard Mitigated: attenuation of high velocities (50 fps); slope protection
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

1.4.5.2 F01767 Lytle Cajon – Completed

Replacement of damaged concrete invert
Status: completed
Completion Date: 2014
Local Priority: High
Total Cost: $3.7million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety and to prevent additional channel damage
Hazard Mitigated: Additional damage to invert and walls; potential flooding and washouts of nearby area
Resources to Implement: Medium
Cost to Implement: High
Time to Implement: High

1.4.5.3 F01761 Kitchen Wash – Completed

To intercept flows upstream of Rimrock Road to capture headwaters and re-route them to the Mojave River
Status: In preliminary design process
Completion Date: Estimated 2017/2018
Local Priority: Low
Total Cost: $4.0 million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: Public safety; protection of commercial center
Hazard Mitigated: local flooding, road damage
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

1.4.5.4 Successful "Finalization" of Drainage Feasibility Study Report

The final Drainage Feasibility Study has been completed to evaluate the continuing landslide hazard within Rimforest and the role of concentrated storm runoff in propagating slope failure. The village of Rimforest has eroding cliff-side property and bluff retreat in the Southern part of the village.

This problem is primarily caused by storm runoff from either rainstorms or snowmelt after winter storms. The runoff flows to the south side of Rimforest and is discharged over the cliff at two principal locations. This study report evaluated a number of options to re-direct the majority of the runoff to other discharge locations for the purpose of reducing and mostly eliminating the cliff-side erosion. Two options presented the study appear to be feasible if new conventional storm drain systems are installed. One of the options is now included as potential future mitigation action presented in Section 6 of this plan.

1.4.6 Geologic Hazard Mitigation Success

1.4.6.1 Successful Geologic Hazard Prevention General Plan Amendments

Twenty two overlay maps were completed as part of the 2007 General Plan Amendment which became effective on March 11th, 2010. For more information on the overlay maps, see Section 6.2.2.3.

1.4.6.2 Amendment to Title 6 County Code to Adopt by Reference the 2010 Editions of the California Building Standards Codes

An amendment to Title 6 of the County of San Bernardino Code to adopt by reference the 2010 Editions of the California Building Standards Codes went before the Board of Supervisors on November 2, 2010 and was continued for a second reading on November 16, 2010 and approved unanimously. The amendment became effective on January 1, 2011.

The County of San Bernardino amendment to Title 6 of the County Code to adopt by reference the 2010 Editions of the California Building Standards Codes repealed the current chapters of Division 3 of Title 6 that reflect the 1994/1995 editions of the California Building Standards Codes and adopt the 2010 editions of these codes by reference.

The California Building Standards Commission approved the California Building Standards Code (Code) for a statewide effective date of January 1, 2011 and requires this Code apply in all parts of the state. This Code consists of the California Building, Residential, Plumbing, Mechanical, Electrical, Energy, Historical Buildings, Existing Building (Unreinforced Masonry) and the Green Building Standards Codes. Since this 2010 Edition was adopted by local ordinance, the prior editions of this code will be repealed and the most recent editions of the codes with applicable amendments requiring express findings and certain appendices necessary for the health and safety of the citizens of this County will be in effect within the unincorporated areas of San Bernardino County. The benefit of adopting this Code is that it provides consistency and clarification for the building community as well as building inspectors and plans examiners. State law (Health & Safety Code 18941.5 and 17958.7) requires the local government make express findings in order to amend building standards and the amendments must be necessary due to local climatic, geological, or topographical conditions.

Those amendments and findings are included in the County's ordinance and were filed with the California Building Standards Commission.

The recommended modifications not requiring express findings are administrative or procedural in nature and concern the local implementation issues that are not covered by building standards.

An example of this type of modification is to the California Residential Code, Section R105.3.1.1 which requires the Board of Appeals to confirm substantial valuations in the flood plain. The traditional purpose of the Board of Appeals has been reserved for a contested decision of the Building Official, and it is felt that it should remain as such.

With respect to grading and excavation regulations found in Appendix J of the 2010 State published code, the 2001 California Building Code dealt with grading with more clarity in regards to what activities require a permit and set forth rules to ensure large grading projects are scrutinized in greater detail than smaller projects by requiring more reporting and inspection of such work. The grading chapter in the 2001 Code has been trusted and in use in its primary form for years. The 2010 Appendix J grading chapter needs substantial amendment and modification to address all grading issues and is not recommended for adoption in its present form. The Board adopted the 2001 Appendix Chapter 33 regulations as part of this proposed ordinance. Relocation permit requirements have been moved to a new section of the Code, and it retains specific standards for relocation procedures in details not found in the 2010 State-published code. Clarification of the types of buildings affected by the new regulations has also been made.

Administrative changes to the 2010 California Existing Building Code (Part 10 of Title 24) were approved to outline the procedures required to set allowable time limits for the retrofit and repair

of unreinforced masonry buildings. Staff is also recommending that authorization be given to the Building and Safety Division of the Land Use Services Department to issue Administrative Citations as an alternative means of enforcement of the County Code provisions.

Express findings are made for changes to the California Plumbing Code, Appendix K regarding the soil conditions that exist in this county. These changes are supported by the Environmental Health Division. These express findings are iterated in the ordinance and will be filed with the Building Standards Commission as required by law in order to become effective.

1.5 Community Profile

1.5.1 Physical Setting

The County is bounded by the states of Arizona and Nevada on the east, Inyo County on the north, Kern and Los Angeles Counties on the west, and Orange and Riverside Counties on the south.

San Bernardino County covers 20,102 square miles and is geographically the largest county in the continental United States. The States of Hawaii, Connecticut, Delaware, and Rhode Island and the District of Columbia could all fit inside the County boundary at the same time. The unincorporated area of San Bernardino County covers approximately 19,848 square miles; this is 98.7% of the entire County.

The remaining 1.3% of acreage (254 square miles) is under the jurisdiction of incorporated cities or towns. Figure 7 displays the unincorporated area and the cities/towns. The cities/towns on the map are concentrated in the south/west portion of the county and are color-coded.

San Bernardino County is characterized by three (3) distinct geographic areas: Valley, Mountains, and Desert: the Valley Region contains the majority of the county's incorporated areas and is the most populous region; the

Mountain Region is primarily comprised of public lands owned and managed by federal and state agencies; and, the Desert Region is the largest region (over 93% of the county's land area) and includes parts of the Mojave Desert.4 Aside from open or undeveloped land, the largest land use in the county is for military purposes.

The mountains stretch across the south end of the county. The mountain elevations range from 2,000 feet along the foothills to the 11,502-foot summit of Mount San Gorgonio, the highest peak in Southern California. Figure 8 displays the terrain/topographic features throughout San Bernardino County.

The San Bernardino Mountains feature four (4) large lakes (Big Bear Lake, Silverwood Lake, Lake Arrowhead, and Lake Gregory), and many smaller lakes. The majority of the lakes are the headwaters of the Santa Ana River and the Mojave River.

The Santa Ana River originates in the San Bernardino Mountains and flows southwest to the ocean. The Santa Ana Watershed includes streams flowing south from the San Gabriel Mountains and streams flowing north and west from the San Jacinto Mountains in Riverside County.

The desert area contains low mountains, valleys, and dry lakebeds. The elevations within the valley range of the County is from about 500 feet on the valley floor to 1,700 feet in Live Oak Canyon, and to about 5,400 feet in the hills in Yucaipa. The desert area is an assemblage of mountain ranges interspersed with long, broad valleys that often contain dry lakes. Many of these mountains rise from 1,000 to 4,000 feet above the valleys. Due to the persistent winds that blow throughout the year, large portions of the desert surface have been modified into a mosaic of pebbles and stones known as desert pavement.

A major physical resource of the desert area is the Mojave River, a critical water source for many of its residents. Among the few rivers that both flow north and do not empty into an ocean, the Mojave River travels north and east away from its watershed in the San Bernardino Mountains. The major part of it is over 100-mile length is marked by a dry riverbed that only on occasion reveals the water within it. Except in exceedingly wet years, the Mojave River ends its flow at Soda Dry Lake near Baker. The Colorado River, at the California and Arizona border, borders the County on the east. Streams in the eastern areas of the County area flow into the Colorado River which eventually ends at the Gulf of California.

The densely urban southern part of the County is at the headwaters of the Santa Ana River with its tributaries crossing the valley floor. With the construction of the Seven Oaks Dam the main river source has been controlled. However, Mill Creek, City Creek, Lytle Creek, and Cajon Creek still have the potential to flood areas of the valley if levees fail. A similar potential occurs with the high desert portion of the County with the Mojave River, which is controlled by the Mojave River Falls Dam that flows north from the San Bernardino Mountains to the city of Barstow. The San Antonio Dam on the southwest side of the county provides more than 100-year flood protection to the west end of the San Bernardino Valley. The Colorado River is on the eastern border of the County. The dams along the river have controlled the flow but bank erosion and damage to roads in the area have been experienced during periods of high water.

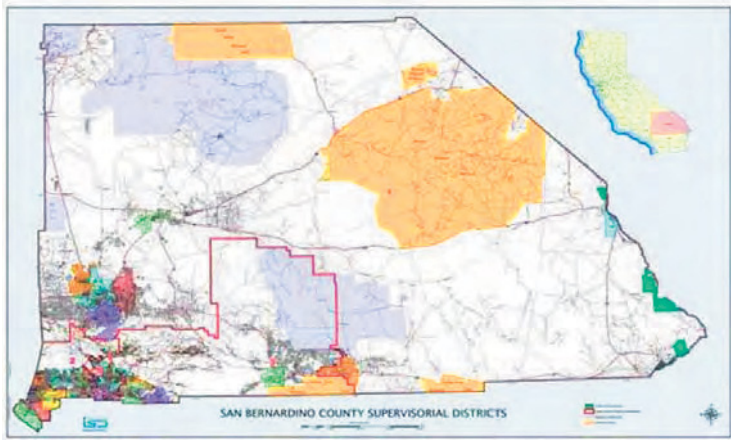


Figure 1-8: Unincorporated and Corporate Areas in San Bernardino County

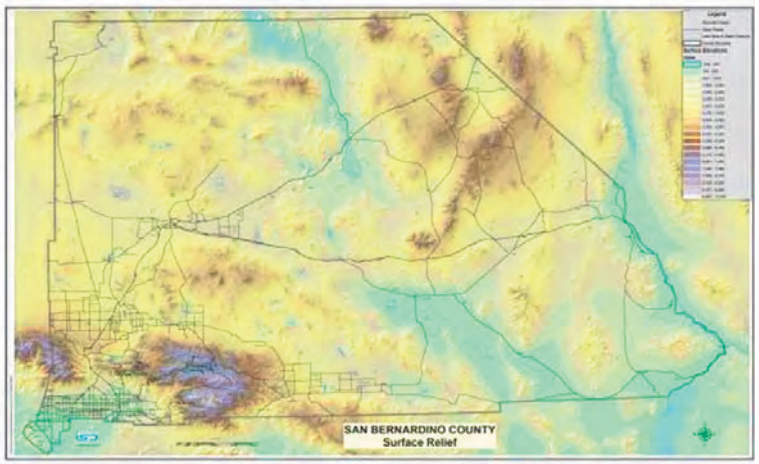


Figure 1-9: Topographic Features in San Bernardino County

1.5.2 History

Paleo-Indian sites dating from c. 10,000 BC show that the San Bernardino County area has been inhabited for at least 12,000 years. Artifacts in the Calico area suggest much earlier human occupation, but this has not been confirmed. In the past three thousand years, various Indian tribes flourished in the area: the Gabrielenos occupied the West Valley; the Serranos lived in the foothills of the San Bernardino Mountains; the Vanyumes lived along the Mojave River; the Mohave lived along the Colorado River; and the Chemehuevi occupied the Mojave Desert.

The first European explorers to enter the area were Pedro Fages, Military Commander of California, in 1772 and Fr. Francisco Garces, a missionary priest, in 1774. On May 20, 1810, Franciscan missionary Francisco Dumatz, of the San Gabriel Mission, led his company into a valley. In observance of the feast day of St. Bernardine of Siena, Dumatz named the valley San Bernardino. This name was later given to the nearby mountain range, and later the city and county.

In 1842 the Lugo family was granted the Rancho San Bernardino, a holding of 37,700 acres encompassing the entire San Bernardino Valley. Captain Jefferson Hunt, of the Mormon Battalion, led a group of settlers into San Bernardino and founded a Mormon Colony. In 1851 the Mormon Colony purchased the Rancho from the Lugo family.

In 1850 California was admitted into the United States. On April 26, 1853, San Bernardino County was created from parts of Los Angeles, San Diego, and Mariposa Counties. In 1854 the City of San Bernardino was incorporated as the county seat.
In 1857, three orange trees were set out on a farm in Old San Bernardino. By 1882 a rail car load of oranges and lemons grown in the East Valley was shipped to Denver, Colorado. As early as the 1840s, vineyards were planted in the Cucamonga area and in the 1870 census; San Bernardino County was credited with producing 48,720 gallons of wine.

In 1860, gold was discovered in Holcomb and Bear Valleys in the San Bernardino Mountains, and placer mining began in Lytle Creek. Silver was being mined at Ivanpah in 1870, and the rich silver mines of the Calico district were developed in the 1880s. Borax was first discovered in 1761 at Searles Dry Lake near Trona, and transported out by twelve-, eighteen- or twenty-mule team wagons.

As a county, San Bernardino has been uniquely endowed with rich mineral deposits. Large deposits of gold have been mined at Stedman and Vanderbilt, with smaller but still important deposits at Alvord, Oro Grande, Old Dad Mountain, Dale and Nantan, Calico, Ivanpah, Waterman and Providence were the largest silver deposits, with lesser, but important deposits in the Mescal Mountains and at the Death Valley Mine. The most important copper mines are the Copper World and the Bagdad Chase (known usually for its gold production).

Except for a brief period after World War I when silver prices were high, low metal prices and inflation put a damper on mining in the 1920s. However, with the Great Depression of the 1930's

and an increase in the price of gold by nearly $15 an ounce, many small operators reactivated old mines. The region around Barstow, Vanderbilt, Stedman, and Dale were the principal centers of mining activity until World War II.

During World War II, iron was extracted from the Vulcan Mine in the Providence Mountains, and the Bagdad Chase Mine remained active. Since the war, there has been sporadic mining of gold, silver, and tungsten in the county. A major new mine opened during the 1950s, the Mountain Pass rare earth mine. Recently, exploration has outlined potential large tonnage molybdenum properties in the New York and Ord Mountains, copper in the Cooper Basin area of the Whipple Mountains and gold in the Clark Mountains.

After World War II, the citrus industry slowly declined. However, dairies relocating out of Los Angeles County settled in the Chino Valley area, creating a robust dairy industry in San Bernardino County.

Elsewhere in the Valley region, suburbs grew as moderate priced housing developments were built. By the late 1980's, the county had grown into bedroom communities and warehousing for southern California.

1.5.3 Climate

The valleys between mountain ranges experience very high temperatures, while the adjacent mountains often experience much cooler temperatures, particularly at their summits. Rainfall and humidity are low. The annual average precipitation for the area is approximately 30 inches. The differences in elevation and topography are in part responsible for variations in temperature and precipitation from the Valley and Desert areas.

Winter temperatures in some areas of the Desert range near zero, the cold often compounded by the wind-chill factor. In the summer, temperatures can reach as high as 134°F in the lower elevations and along the Colorado River area. Temperatures in the San Bernardino valley area range from an average high of 80ºF and an average low of 53ºF. The record high for the area is 117ºF and the record low is 17ºF. The annual average rainfall for the area is 15.6 inches. During the fall and winter months, strong "Santa Ana" winds blow across the area.

The mountains experience a four-season climate. Temperatures in the Mountain area range from an average high of 62ºF and an average low of 36ºF. The record high for the area is 106ºF and the record low is -25ºF. With the possible exception of some of the higher elevations in the mountains, precipitation throughout the Desert area is less than four inches per year, usually of short duration and high intensity. The resulting flash floods rapidly modify the terrain that is exposed to the erosive surface runoff. Unusually heavy or persistent rains often result in the temporary filling of a number of dry lakes until the surface water evaporates or infiltrates the soil. Persistent winds blow throughout the year

1.5.4 Demographics

The total population of San Bernardino County is approximately 2,139,570 people *(State of California, Department of Finance, E-4 Population Estimates for Cities, Counties, and the State, 2011-2016, with 2010 Census Benchmark. Sacramento, California, May 2016)*. Most of the County's population is in the valley areas located in the south west portion of the County. The County's population has grown by 4.13%, 84,835 people, since 2011 (population in 2011 was 2,054,735 people).

The population of the unincorporated area of the County in 2011 was 294,753 people. In 2016, the population is 309,759; an increase of 14,976 persons (or 1.05%) *(State of California, Department of Finance, E-4 Population Estimates for Cities, Counties, and the State, 2011-2016, with 2010 Census Benchmark. Sacramento, California, May 2016)*



Figure 1-10: San Bernardino County Unincorporated Area Population Changes 2011 - 2016

Source: California Department of Finance E-4

Ethnic composition includes Hispanics (48%) who form the largest share of the County's population, followed by Whites (34%). Blacks (9%) and Asians (5%) form a relatively lower share of the total population. It should be noted that the Hispanic population is growing at the fastest rate among all ethnic groups. From 2000 to 2010, the Hispanic population increased by 44%. This trend is consistent with that of the neighboring counties of Riverside and Orange, where the

Latino population grew by 63% and 24%, respectively. During this period, the Asian population grew by 38%, whereas the Black population grew by 15%. The population of Whites declined in

all the six counties in Southern California; San Bernardino County experienced a decline of 7% in its White population. Changes in Ethnicity are from the California Department of Finance, Demographics Unit.

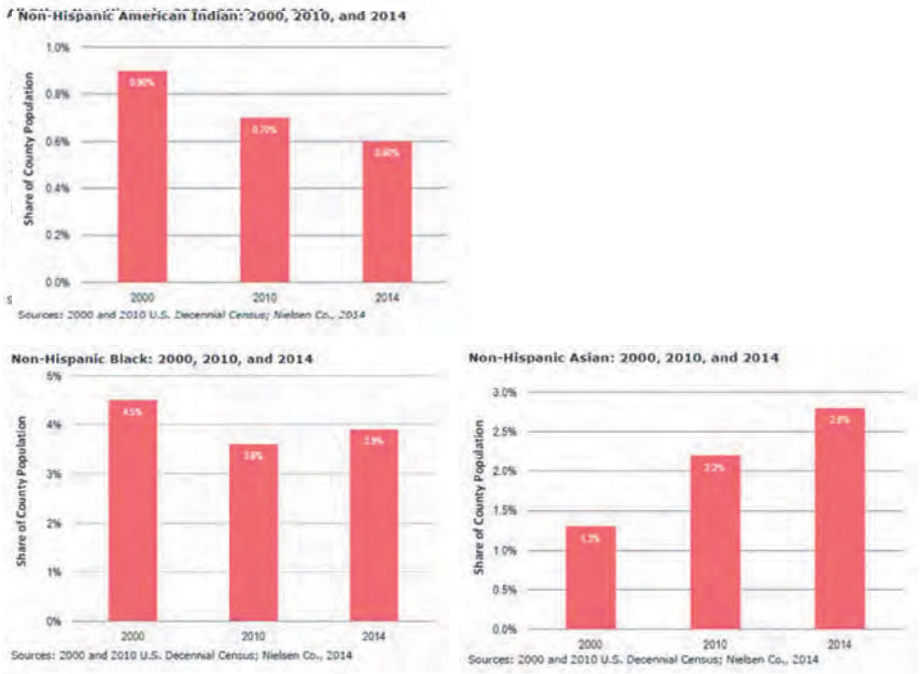


Figure 1-11: San Bernardino County Unincorporated Area 2014 Population by Ethnicity

1.5.5 Existing Land Use

The County has adopted a "one-map approach." The "one-map approach" permits the use of a single map showing both General Plan land use designations and zoning classifications. The one-map approach assures that there will always be land use consistency between the County's General Plan and its Zoning Code.

There are 18 land use zoning districts that apply only to privately owned lands in the County and not to the lands controlled by other jurisdictions. Lands that are controlled by other jurisdictions, including lands controlled by federal and state agencies as well as incorporated cities, are mapped to identify the public agencies that control them. The 18 land use zoning districts are as follows:

- Resource Conservation (RC)
- Agriculture (AG)
- Rural Living (RL),
- Single Residential (RS),
- Multiple Residential (RM),
- Office Commercial (CO),
- Neighborhood Commercial (CN),
- Rural Commercial (CR),
- Highway Commercial (CH),
- General Commercial (CG),
- Service Commercial (CS),
- Community Industrial (IC),
- Regional Industrial (IR),
- Institutional (IN),
- Special Development (SD),
- Floodway (FW),
- Specific Plan (SP), and
- Open Space (OS).

Resource Conservation (RC) comprises the majority (55.98 percent) of the designated land uses in the County. This land use designation covers over 1 million acres, or about 1,500 square miles of land. Most of the land within this designation is publicly owned (federal and state) and includes national parks, military bases, conservation areas, and lands owned by other federal and state agencies. The County has designated approximately 681,500 acres or 1,065 square miles (37.92 percent) for residential uses. Out of this, about 587,535 acres (32.76 percent of total unincorporated area) are designated Rural Living, 67,691 acres are designated Single Residential, while 4,986 acres are designated Multiple Residential.

Commercial land use zoning districts (Office Commercial, Neighborhood Commercial, Rural Commercial, Highway Commercial, General Commercial, and Service Commercial) occupy a total of 12,177 acres or 0.68 percent of the total unincorporated area. Industrial land use zoning districts (including Community Industrial and Regional Industrial) occupy 21,834 acres or 1.21

percent of the total unincorporated area. Other land use designations include Agriculture occupying 41,793 acres (2.32 percent), Institutional occupying 8,567.51 acres (0.48 percent), Floodway occupying 20,281 acres (1.13 percent), and Specific Plan occupying 4,861.37 acres (0.27 percent).

Because of the size of the County, the San Bernardino County General Plan divides the county into 8 quadrants (Figure 1-12). The "one-map approach" allows the quadrant maps to be used for many different planning and development purposes. Figure 1-13 presents the Land Use Zoning for each quadrant. The Land Use Zoning identifies the type of construction and growth that exists or may occurs in area.

County designated Land Use Zoning Districts do not apply to Federal, State, or incorporated owned property.

The County's General Plan can be found at: http://countywideplan.com/home/about/

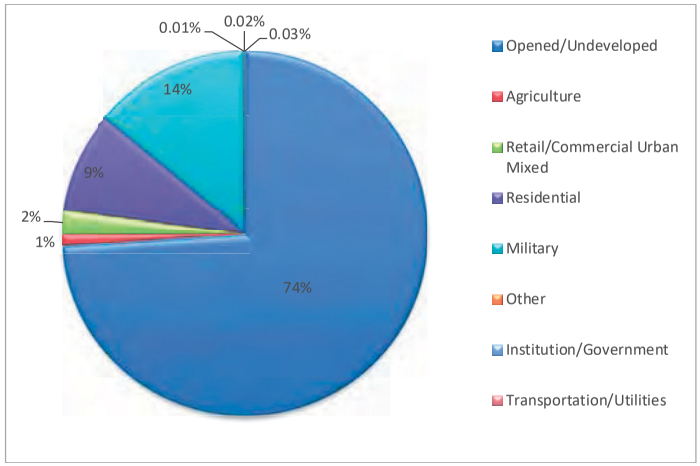


Figure 1-12: San Bernardino County Land Use

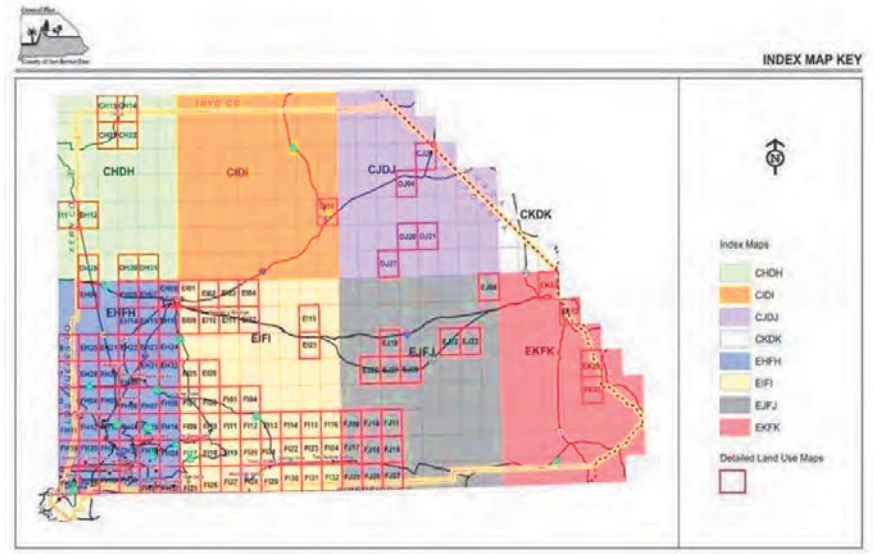


Figure 1-13: San Bernardino County Land Use Map

1.5.6 Development Trends

No major developments occurred in the unincorporated area of the county since the 2010 MJHMP was adopted. The limited development that did occur was scattered throughout the unincorporated area; with no one area being singled out. All development was in accordance with the pre-designated Land Use Zones development zones and complied with all Fire, Flood, and Seismic codes of the County and State at the time of development. This includes commercial, industrial, and residential developments.

The County is optimistic about the potential for future development. The High Desert area of San Bernardino County is one of the best places in the world for solar energy development because of its high altitude, the number of sunny days each year and existing power infrastructure.

- Many large solar energy projects are being proposed in California's desert area on federal Bureau of Land Management (BLM) land. BLM has received right-of-way requests encompassing more than 300,000 acres for the development of approximately 34 large solar thermal power plants totaling approximately 24,000 megawatts. This number of projects has not yet reached the stage of an Application for Certification (AFC) with the California Energy Commission.
- California's electric utility companies are required to use renewable energy to produce 20 percent of their power by 2010 and 33 percent by 2020. A main source of renewable power will be solar energy. Within the County of San Bernardino a Hybrid Power Project has been approved in the Victor Valley area. As of August 2010, three large Solar Projects to be placed in the County are in review by the California Energy Commission.

Once built, these projects will not impact the area to a great extent. Minimal staffing is required to operate these facilities and their very nature places them in remote locations of the County.

Additionally, with the completion of the Alameda Corridor and the emergence of the Ports of Los Angeles and Long Beach as the largest ports in the U.S., shipping trans-Pacific goods from the booming Asian economies, San Bernardino County has evolved as the logistics and distribution hub for the 20 million resident Southern California market and into the rest of the nation. As the international economy recovers amidst tightening land availability for warehousing and transit, San Bernardino County is better positioned than other areas in the region to harness the opportunity to become an even more important logistics hub.

The County has also started development of a bullet train. The bullet train will connect Victorville, CA and Las Vegas NV generally following the I-15 corridor (NOTE: There are discussions of additional bullet trains connecting San Bernardino with Los Angeles and San Diego and San Bernardino County and San Francisco/Sacramento).

While all of these development trends may not be recognized over the next 5 years, all future development that will take place is planned to occur in accordance with the General Plan Land Use Zones and will consider all potential hazards identified within this plan. Additionally, all development will be in compliance with all Fire, Flood, and Seismic codes of the County and State at the time of development.

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Section 2. Plan Adoption

2.1 Adoption by Local Governing Body

The San Bernardino County Board of Supervisors created "districts" to provide a specific service to an area / population of San Bernardino County. These Districts are Board Governed in that the Board of Supervisors has direct control and legislative oversight of the Districts. The Board of Supervisors acts on behalf of each District whenever governance items are necessary. The participating jurisdictions listed in this plan are separate legal entities from the County of San Bernardino. For tax/revenue purposes the Board of Supervisors, acting as the Board of Directors for each participating jurisdiction or "District", will be adopting the Multi-Jurisdictional Hazard Mitigation Plan on behalf of each District. The Districts are not independent from San Bernardino County but are controlled and administered as any other County Department is administered.

This plan represents mitigation efforts for the unincorporated portions of the County and the efforts of three jurisdictions participating in this Multi-Jurisdictional Hazard Mitigation planning effort. The participating jurisdictional special districts include:

San Bernardino County Fire District
San Bernardino County Flood Control District
San Bernardino County Special Districts Department

San Bernardino County Board of Supervisors is responsible for the review, approval, and adoption of the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) update for the unincorporated area of San Bernardino County, the San Bernardino County Fire Protection District, the San Bernardino County Flood Control District, and for the County's Board Governed Special Districts Department. It is also the intent of the San Bernardino County Board of Supervisors to take appropriate actions to incorporate the MJHMP update into the San Bernardino County General Plan.

2.2 Promulgation Authority

The Promulgator Authority for the adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the unincorporated area of San Bernardino County, the San Bernardino County Fire Protection District, the San Bernardino County Flood Control District, and for the County's Board Governed Special Districts Department and incorporation of the MJHMP into the San Bernardino County General Plan is:

- Chairman Robert A. Lovingood First District
- Janice Rutherford Second District Supervisor
- James Ramos Third District Supervisor
- Vice Chairman Curt Hagman Fourth District Supervisor
- Josie Gonzales Fifth District Supervisor

The Point of Contact for information regarding this MJHMP is:

Michael Antonucci, Emergency Services Manager
San Bernardino County Fire
Office of Emergency Services
1743 Miro Way
Rialto, CA 92376
(909) 356-3998

Section 3. Planning Process

3.1 Preparing the Plan

Multi-Jurisdictional Hazard Mitigation Planning is a process State, Tribal, and local governments use to identify risks and vulnerabilities associated with natural disasters, and to develop long-term strategies for protecting people and property from future hazard events.

Planning creates a way to solicit and consider input from diverse interests. Involving stakeholders is essential to building community-wide support for the plan. In addition to emergency managers, the planning process involves other government agencies (e.g., zoning, floodplain management, public works, community, and economic development), businesses, civic groups, environmental groups, and schools.

To assist with the updating of the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP), a Multi-Jurisdictional Planning Team (Planning Team) was established. The Planning Team was the lynchpin for all activities to update the MJHMP. The Planning Team was established to define and identify the strategies, goals, activities, and development of the MJHMP. The Planning Team represents a comprehensive team of subject matter experts from a range of areas that the team felt was affected by the plan or could provide great benefit to the team. Members of the Planning Team were drawn from San Bernardino County Departments, the San Bernardino County Fire Protection District, the San Bernardino County Flood Control District, and the San Bernardino County Special Districts Department.

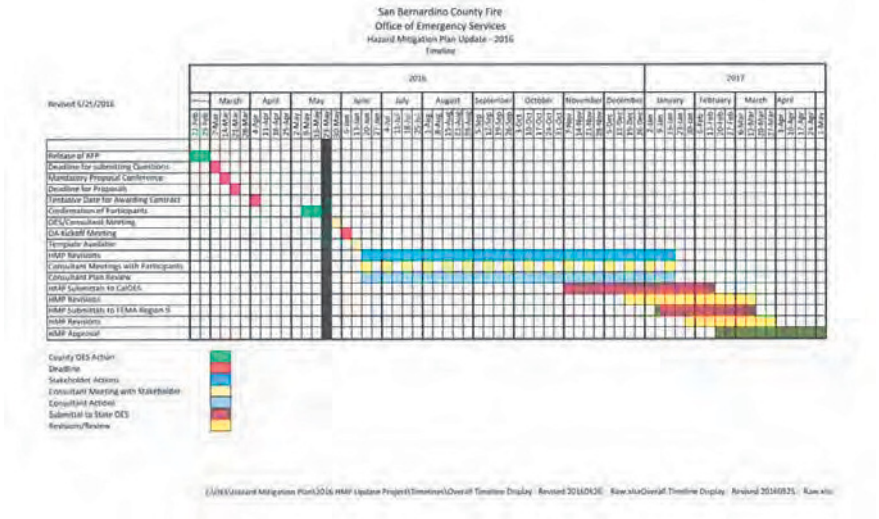
The Multi-Jurisdictional Planning Team members worked together to jointly determine and rank the risks facing the six participating agencies, develop goals and objectives to mitigate the risks, and identify which of the participating jurisdictions would be most appropriate for leading any particular project area identified by the Multi-Jurisdictional Planning Team. The individual Planning Team members then returned to their respective Special Districts where discussions were held, input sought, and potential projects developed and ranked for each of the Planning Team identified risks and projects relevant to the Special District. The Planning Team members then returned to the Multi-Jurisdictional Planning Team and provided the Planning Team with their vetted, prioritized list of potential projects and budgets to include in the Multi-Jurisdictional Hazard Mitigation Plan. These projects and budgets were integrated into the Multi-Jurisdictional Hazard Mitigation Plan. Upon approval, each participating jurisdiction would then be able to apply for grant funding for their prioritized projects without interference from another participating jurisdiction as funding became available.

The Planning Team was led by a representative from the San Bernardino County Fire Protection District-Office of Emergency Service. This representative took on the responsibilities of a Project Manager and facilitated and coordinated activates.

The Project Manager also represented the Unincorporated County at the San Bernardino County Operational Area (OA) Stakeholder meetings. San Bernardino County OES led the effort to coordinate Stakeholder in the Operational Area update their local MJHMP. This effort included: proving technical support, establishing a platform to encourage the exchange of ideas, and help coordination among neighboring stakeholders. The Project Manager was responsible for attending these meetings and incorporating the material into their planning process. One of the resource materials provided through the OA Stakeholder meetings was a suggested Table of Contents (TOC) the purpose of the TOC was to ensure all aspect of the MJHMP requirements were being met and could be found in similar sections in each of the Stakeholders updated MJHMPs.

This sample TOC was reviewed by the Planning Team and incorporated into the unincorporated county's MJHMP update efforts. Using the TOC, the Planning Team decided to conduct a section by section; page by page review of the 2016 MJHMP. To assist with this effort, a proposed project timeline was developed. The proposed Project Timeline illustrates the windows when each section of the 2016 MJHMP will be reviewed and the section revised.

Table 3-1: Proposed Project Timeline



Based on the TOC, the Planning Team divided the update process into seven (7) phases; one for each section of the TOC. This approach allowed for a much focused review of the material and

provided an organized method to introduce new or updated material. The Project Manager led the discussion, solicited comments, took notes, and incorporated results in the MJHMP. Additionally, the Project Manager collected and summarized material provide by Planning Team members. During the Planning Team meetings some members were assigned tasks or action items which were to be completed prior to the next meeting.

Staff assigned to the MJHMP Update reviewed the 2016 MJHMP and provided comments referencing updated information such as current population statistics, new HAZUS-MH MR3 analysis of floods and earthquakes, and provide suggestions for updating the MJHMP. The Planning Team then reviewed the update information and validated/identified Goals, Objectives, and Projects. This step included discussion of how the projects would be prioritized.

3.1.1 Project Prioritization Involved Comprehensive Consideration of Criteria/Factors

While there is not a standard process followed by each of San Bernardino County Departments, and Districts; they all considered social, technological, administrative, political, legal, economic, and environmental factors. The County and each district participated on the Planning Team, and then took the risks, goals, objectives and projects back to their respective jurisdiction for discussion and vetting. After vetting, the individual Planning Team members returned to the Multi-Jurisdictional Planning Team where the individual materials were combined into a single Multi-Jurisdictional Hazard Mitigation Plan. This Multi-Jurisdictional effort resulted in goals, objectives and projects for all participants being listed under the appropriate hazard sections and not by individual participants. This reflects the overall County philosophy of allowing the department/district with the most expertise to suggest and/or manage a project that may affect another participant who does not have expertise in the hazard.

3.1.2 Planning Team

Much of the Planning Team is composed of representatives who were part of the development of the 2010 Unincorporated Area County MJHMP. This provided added value to the team in that they were familiar with the process and provided continuity in the updating of the 2010 MJHMP.

The Planning Team is comprised of representatives from San Bernardino County Departments, the San Bernardino County Fire Protection District, the San Bernardino County Flood Control District, and the San Bernardino County Special Districts Department who specialize in mitigation type activities/planning.

The Planning Team members represented select aspects of the community and were thought of as liaisons to the greater community. Each Planning Team member was responsible for communicating the direction and status of the planning effort to their outside members and in return they are expected to bring to the team outside perspectives. Additionally, the individual Planning Team members acted as liaisons for their respective Special Districts and were responsible for ensuring that the Special Districts provide appropriate input from their respective internal planning processes. Potential projects/budget meetings were held where alternative mitigation actions were discussed and potential mitigation projects were developed and prioritized along with budget development for the individual participating Special Districts and Departments. Additional prioritization after budgets were developed to ensure proper Benefit Cost Analysis (BCA) techniques were applied.

Representation was present on the Multi-Jurisdictional Planning Team from various County Departments and the three participating jurisdictional departments. Planning Team included representatives from all the participating San Bernardino County Special Districts and Departments. See Table 3-2 and Table 3-3.

Table 3-2: Multi-Jurisdictional Planning Team

Multi-Jurisdictional Planning Team Members	Title / Role
Unincorporated County	
Suzanne Peterson	*Countywide Plan Coordinator / Land Use Services / Mitigation Review*
Jerry Blum	*Countywide Plan Coordinator /*
Brent Rolf	*County GIS / Hazus Data Coordinator / Information Services*
Frank Jordan	*Land Use Services / Mitigation Review*
Jim Sowers	*Building and Safety / Risk Assessment Review and Mitigation Action Plan Development*
Patricia Cole	*Economic Development Agency / Implementation and Funding Review*
Carl Alban	*Architecture and Engineering Department*
John Amrhein	*Sherriff's Corner Department Rep. / Mitigation Action Review*
Mazin Kasey	*Public Works Dept. /Transportation Division*
Art Rivera	*Solid Waste Management Division*
Norma Spencer	*Superintendent of Schools*
Fire Protection District	
Michael Antonucci	*OES Director / MJHMP Plan Representative*
Cindy Serrano,	*Project Manager for Planning Process*
Miles Wagner	*Emergency Services Officer, GIS Representative and Stakeholder Coordination.*
David Davis	*Emergency Services Officer / Fire District Representative and Technical Writer*
Mary Barnett	*Technical Writer / Plan Update and Edits*

Multi-Jurisdictional Planning Team Members	Title / Role
Cheryl Nagy	Emergency Services Officer
Carrie Cruz	Emergency Services Officer
Elli Maldonado	Elli Maldonado – Office Assistant
Michael Horton	Michael Horton – Fire Marshal
Flood Control District	
Kevin Blakeslee, Deputy Director – Flood Control	Deputy Director – Flood Control
Kenneth Eke, Chief, Flood Control Planning/ Water Resources Division	Chief, Flood Control Planning/ Water Resources Division
Michael Fam	Flood Control Planning
Mona Sadek	Flood Control Planning
Marjorie Schrage	Flood Control Planning
Special Districts Department	
Jeff Rigney	Special Districts Dept. Director
Steve Samaras	Special Districts Dept. Acting Deputy Director
Erin Opliger	Big Bear Valley Recreation and Parks District Rep.
Erin Opliger	Bloomington Recreation and Parks District Rep.

Table 3-3: Stakeholder List

Stakeholder Members	Name	Title / Role
Municipal Partners		
City of Barstow	Jamie Williams	Fire Chief
City of San Bernardino	Eric Fyvie	Sergeant
City of Chino	Chris Wolff	Administrative Services Manager
City of Chino Hills	Bonnie Michaels	Emergency Services Analyst
City of Colton	Shannon Kendall	Emergency Services Coordinator
City of Fontana	Cheryl Nagy/ Mary	Emergency Services Officer
City of Grand Terrace	Haide Aguirre	Management Analyst
City of Hesperia	Rachel Molina	Public Information Officer
City of Loma Linda	Shannon Kendall	Emergency Services Coordinator
City of Montclair	Angelic Bird	Emergency Services Coordinator
City of Ontario	Raymond Cheung	New Emergency Manager
City of Rancho Cucamonga	Breanna Medina/ Denise School	Emergency Manager
City of Redlands	Fay Glass/ Wanda Viser	Emergency Operations Manager

Stakeholder Members	Name	Title / Role
City of Rialto	Art Podeska	Battalion Chief
City of Upland	Angelic Bird	Emergency Services Coordinator
City of Victorville	Dana Wellborn	Emergency Services Manager
Town of Apple Valley	Joseph Ramos	Emergency Services Officer
Town of Yucca Valley	Jessica Rice	Management Analyst
School District Partners		
Apple Valley Unified School District	Janet Gould	Director, Risk Management
Chino Valley Unified School District	Dr. Grace Park	Assistant Superintendent
San Bernardino County Superintendent of Schools	Norma Spencer	Risk Management Analyst
Snowline Joint Unified School District	Robert Chacon	Director of Risk Management
Special District Partners		
Inland Empire Utilities Agency District Headquarters	Claudia Neighbors/ Tony Arellano	Safety Officer
Newberry Community Services District	Stephen Miller	Fire Chief- Barstow Fire Protection District
Omnitrans	Mark Crosby	Security and Emergency Preparedness Coordinator
Santa Ana Watershed Project Authority	Richard Haller/ Carlos Quintero	Exec. Manager of Engineering and Operations
Water District Partners		
Crestline Village Water District	Larrie Ann Davis	Office Manager
Cucamonga Valley Water District	Rosanna Ammari / Maria Kennedy	Maria Kennedy Consultant Representative
East Valley Water District	Cecilia Contreras / Gary Sturdivan	Administrative Assistant
Monte Vista Water District	Jonathon Dizon	Engineering Technician
San Bernardino Valley Municipal Water District	Dan Borrell/ Brent Adair	Project manager- Construction
Twenty-nine Palms Water District	Gary Sturdivan	Consultant Rep.
Yucaipa Valley Water District	John Hull	Public Works Management
CERT Teams		
Wrightwood		CERT Citizens
Phelan/Pinion Hills		CERT Citizens
Angelus Oaks		CERT Citizens
Big Bear Valley		CERT Citizens
Helendale		CERT Citizens
Lucerne Valley		CERT Citizens
Lytle Creek		CERT Citizens
Mill Creek Canyon		CERT Citizens

Stakeholder Members	Name	Title / Role
Morongo Basin		*CERT Citizens*
Mountain		*CERT Citizens*
Oak Hills		*CERT Citizens*
Rosena Ranch		*CERT Citizens*
San Antonio Heights		*CERT Citizens*
Silver Valley		*CERT Citizens*
Public Representatives		
-	*Destiny Davis*	*Interested Citizen*
-	*John Ferdon*	*Interested Citizen*
Other Partner Agencies		
San Manuel Band of Mission Indians	*Michael Russ*	*Disaster Services Manager*
Arrowhead Regional Medical Center	*Weston Scott Smith*	*Emergency Preparedness*
United States Forest Service	*Marc Stamer*	*San Bernardino National Forest and Angeles National Forest Rep.*
Wrightwood Fire Safe Council	*John Aziz*	*Fire Safe Council*
Rim of the World Mountain Mutual Aid Association	*Aaron Scullin*	*President*

There were a series of meetings held with the Planning Team. Each meeting had a primary focus and provided an opportunity to discuss updates and exchange ideas. Below is a list of the Planning Team meetings:

Table 3-4: Planning Team Meetings

Date	Activity
February 4, 2016	In person meeting to discuss revisions and additions to the Planning Process, Risk Assessment, Community Capability Assessment, Mitigation Strategies, Plan Maintenance, Fiscal Resources, and Public Outreach. Each section was reviewed and discussed by the Team. Additions and corrections will be forwarded to OES for inclusion into the plan.
June 23, 2016	Organizational Meeting for County Unincorporated Area Planning team. Planning Team members were introduced to the project and assigned to review 2016 MJHMP and update risks and mitigation projects as needed.
July 19,2016	Conference Call with participants to discuss revisions and additions to the Planning Process, risk Assessment, Community capability Assessment, Mitigation Strategies, Plan maintenance, fiscal Resources, and Public Outreach. Each section was reviewed and discussed by the Team. Additions and corrections will be forwarded to OES for inclusion into the plan.

August 4, 2010	In person meeting to discuss revisions and additions to the Planning Process, risk Assessment, Community capability Assessment, Mitigation Strategies, Plan maintenance, fiscal Resources, and Public Outreach. Each section was reviewed and discussed by the Team. Additions and corrections will be forwarded to OES for inclusion into the plan
August 30, 2016	In person meeting to discuss revisions and additions to the Planning Process, risk Assessment, Community Capability Assessment, Mitigation Strategies, Plan Maintenance, Fiscal Resources, and Public Outreach. Each section was reviewed and discussed by the Team. Additions and corrections will be forwarded to OES for inclusion in the plan.
September 14, 2016	In Person meeting of the Morongo Basin COAD Community Organizations Active in Disaster. Hazard Mitigations Plan Discussion and outreach for public input on the update of the Hazard Mitigation Plan, and contact information given to the public.
September 20, 2016	In person meeting to discuss changes suggestions with the Fire Safe Council for the following communities: Wrightwood, Phelan, Pinion hills, West Cajon Valley, and Baldy Mesa. The first item on the agenda was the discussion of the LHMP update and explained how to review the current HMP and instructions were given on who and how to contact OES and about 79 persons of the public were present
September 21, 2016	Rim of the World Mountains Mutual Aid Association in Person meeting to discuss Planning Team Goals and Objectives, and any public concerns and contact information was given and it was the first item on the agenda for the meeting. And continuing fire fuel thinning programs (MAST) and Bark Beetle tree removal.
September 24, 2016	In Person meeting of CERT Training on Terrorism, The hazard Mitigation Plan was brought up and discussed and contact information given to the public, a few topics and subjects were brought up.

3.2 Coordination with Other External Jurisdictions, Agencies and Organizations

3.2.1 Internal Coordination

Because of the size and geographical location of Unincorporated County area, there are many jurisdictions, agencies, and organizations that are affected by or have influence on the county and the mitigation planning process. As part of the planning process, the Planning Team, and particularly the Project Manager, took great efforts to engage and include as many members as possible. These members were drawn from San Bernardino County Departments, the San Bernardino County Fire Protection District, the San Bernardino County Flood Control District, and the San Bernardino County Special Districts Department.

One of the first efforts that were made was when the Planning Team was being established. The Planning Team members gave special considerations as to what they thought needed to be in the MJHMP and attempted to identify a person who could representative that area. This consideration went beyond the county departments.

As mentioned above, in addition to being required to participate in the Planning Team meetings, the Planning Team members were also required to liaison with other groups including their own

department/districts planning and project staff and with cooperating agencies to provide updates on the project and to bring to the team the different perspectives and comments. The Planning Team conducted a very extensive outreach effort.

This was done mostly through leveraging of existing meetings and efforts. In this liaison role, the Planning Team members coordinated with CalFire; the United States Forest Service, San Bernardino National Forest and Angeles National Forest; Natural Resource Conservation Service, Special Districts, and the 24 cities and towns within the County. This allowed for the Planning Team to capture a larger perspective; while keeping the Planning Team at a manageable level. The information was then brought back to the Multi-Jurisdictional Planning Team by the individual Planning Team members. At these meeting, potential cooperative projects were discussed, categorized, and prioritized for inclusion in the Multi-Jurisdictional Hazard Mitigation Plan.

As previously mentioned, the Unincorporated County and special districts were also active members of the San Bernardino OA Stakeholder Group meetings. These meetings provided an opportunity to coordinate with all cities/towns and special districts in the county. Through this venue, the Planning Team and the Project Manager reached out to adjacent jurisdictions and associated special districts to ensure that their efforts and findings were not in conflict. Stakeholder Meetings include the primary, alternate, and any consultants for all the participating jurisdictions.

As part of this effort, an OA Stakeholder Web Portal was developed to assist the jurisdictions update their MJHMPs, and encouraged sharing information, resources, and ideas necessary to complete the update process. Meetings, attended by the County Project Manager, were both in person and by conference call; many including a webinar. The Project Manager then brought the materials and discussions held at these meetings back to the Planning Team for review and action wherever applicable to the MJHMP effort. Participating Stakeholders are listed in Annex 5. A list of the OA Stakeholder Meetings is listed below:

- September 21, 2016
  Stakeholders Conference Call/Webinar at OES Headquarters
  1:30 p.m. to 2:30 p.m.

  8 participants in MJHMP Update Project Portal Rollout participated in the Conference Call and Webinar to introduce MJHMP Update Portal. Portal has public and stakeholder sections. During this conference call participants were shown the portal and walked through the log-in process to access the stakeholders' side of the website. Also discussed having weekly and some occasions office calls to update plan progress and needs for information.

- September 28, 2016
  Production team conference call OES Headquarters
  1:30 p.m. to 2:30 p.m.

  This meeting presented the website updates, progress chart and needs from other stakeholder departments to provide data such as proposed, in progress and completed hazard mitigating projects. The MJHMP Resource material was also reviewed. The tentative schedule of Production group meetings was reviewed.

- October 5, 2016
  Production Group Conference Call
  1:30 p.m. to 2:30 a.m.

  Stakeholders discussed MJHMP progress of the MJHMP updates. Revised timelines for updates were presented. New Reference Materials now available on the Web Portal were presented. Questions from the participants were discussed and answered.

- October 12, 2016
  Production team conference call
  OES Headquarters
  1:30 p.m. to 2:30 p.m.

  This meeting presented the website updates, progress chart and needs from other stakeholder departments to provide data such as proposed, in progress and completed hazard mitigating projects. The MJHMP Resource material was also reviewed. The tentative schedule of Production group meetings was reviewed.

- October 19, 2016
  OES Headquarters
  1:30 p.m. to 2:30 p.m.

  This meeting presented the website updates, progress chart and needs from other stakeholder departments to provide data such as proposed, in progress and completed hazard mitigating projects. The MJHMP Resource material was also reviewed. The tentative schedule of Production group meetings was reviewed.

- October 26, CISN
  Project Management Team Meeting
  San Bernardino County Government Center Community Room,
  10:00 a.m. to 12:00 a.m.

  This meeting was with 12 county members and any public to go over changes in the general plan and updates the County Hazard Mitigation plan with current and proposed and approved projects as well as code updates and ordinance changes and draft safety proposals.

- October 26, 2016
  Entire project Teams representatives via in person or video and voice call in
  Video Conference Call
  2 p.m. to 4 p.m.

  All project team stakeholder representatives discussed progress of the MJHMP updates. And timelines were discussed. Questions from the participants were discussed and answered. Also a live meeting in conjunction with Land Use representatives and Fire also consultant staff. 32 in attendance and 108 called in or video linked. Internal and External groups

3.2.2 External Coordination

The unincorporated county also had representation on the OA Working Group team. The Working Group is a small group of OA Stakeholders with experience in developing Multi-Jurisdictional Hazard Mitigation Plans. Members are drawn from the 24 cities/towns, 33 special districts, and the County. The goal of the Working Group is to vet the direction and material being provided to the larger Stakeholder Group such as crosswalk, Web Portal, use of maps, and a method to prioritize and rank the existing and any new hazards. The Working Group also discusses problems and solutions that arise during the MJHMP update process. Meetings were either in person or by conference call.

- June 23, 2016
  Stakeholders Meeting
  San Bernardino Unified School District Community Room, San Bernardino, CA
  2:00 p.m. to 4:00 p.m.

  54 Participants representing 24 cities/towns, 30 special districts, and the unincorporated area of participated. This Stakeholders Meeting introduced the Web Portal and the process to develop a current MJHMP from the 2010 MJHMP. Timelines were presented as well as templates for use in updating the project. Copies of the 2010 MJHMP for the jurisdictions were made available on the Web Portal to use as a starting point in the update process.

- August 30, 2016
  Stakeholders Meeting at OES Headquarters 1:30 p.m. to 2:30 p.m.

  In person meeting to discuss revisions and additions to the Planning Process, risk Assessment, Community capability Assessment, Mitigation Strategies, Plan maintenance, fiscal Resources, and Public Outreach. Each section was reviewed and discussed by the Team. Additions and corrections will be forwarded to OES for inclusion in the plan.

- October 26, 2016
  Entire project Teams representatives via in person, video or voice call in
  Video Conference Call
  2 p.m. to 4 p.m.

  All project team stakeholder representatives discussed progress of the MJHMP updates.
  Timelines were discussed.
  Questions from the participants were discussed and answered. Also a live meeting in conjunction with Land Use representatives and Fire also consultant staff. 32 in attendance and 108 called in or video linked.

3.3 Public Involvement/Outreach

Public involvement was solicited throughout the process. Since the 2016 MJHMP approval, the County and its special districts have taken several steps to educate the public on the hazards facing the county and had several public forums where mitigation projects were discussed and identified. At all events, public opinion and comments are solicited.

The Planning Team also considered the possibility of including public members on the Planning Team. However, because of the vast size of the county and the volume of possibilities, it was determined that having the Planning Team members liaison with the public would better serve and capture the public interest.

During this process, the County and Special Districts also used several platforms to reach out and inform the public of the MJHMP update. Wherever possible, a joint effort was made by the Planning Team members to include discussion for each participating jurisdictions hazards, goals, and objectives. These joint meetings of the Special Districts and County resulted in joint leverage of the planning effort and a resulting joint benefit of goals/objectives, and project development for the MJHMP development. Public Involvement consisted of meetings for County Departments or Special Districts which gave the public the direct opportunity to comment on the County Unincorporated Area MJHMP, meetings of County Department or Special District advisory committees where hazard specific information and possible projects were discussed, updates on the County website, press releases regarding the MJHMP, and public hearing regarding the MJHMP. All participants collectively supported the following public outreach meetings. Below is a summary list of the public outreach:

3.3.1 Public Meetings

- Wrightwood Fire Safe Council
  Wrightwood Museum, Wrightwood, CA
  July 19, 2016
  7:00 p.m. to 9:00 p.m.

17 community members and 7 Wrightwood Fire Safe Council members attended. A demonstration of Thermo-Gel and various application methods was demonstrated by a private vendor.

Reports of activities were given by the Angeles National Forest and the San Bernardino National Forest.
San Bernardino County Fire Protection District Office of Emergency Services presented a PowerPoint presentation on the effort to update the MJHMP for the unincorporated area of the County. A copy of this PowerPoint is in Annex 9 of the MJHMP.

- Rim of the World Mutual Aid Association
  100 W. Meadow Lane, Big Bear City, CA
  August 21, 2016
  6:00 p.m. to 7:30 a.m.

  24 representatives of local agencies, special districts, utilities, and the public in the Big Bear Valley attended the meeting. The City of Big Bear Lake and the Big Bear City CSD reported on the status of their MJHMP Update efforts. Both are proceeding with the goal of submitting the plan following the Group 1 timelines. Both agencies made presentations to their residents explaining the MJHMP Update Process, public involvement, and timelines.

  San Bernardino County Fire Protection District Office of Emergency Services presented a PowerPoint presentation on the effort to update the MJHMP for the unincorporated area of the County.

- Morongo Basin COAD Community Organizations Active in Disasters
  September 14, 2016
  10:00 a.m. to 12:00 p.m.

  This was a public meeting to discuss volunteers in disasters and the Local Hazard Mitigation Plan and the future of volunteer organizations in active disasters in the areas of Morongo and the entire county of San Bernardino County.

- Wrightwood Fire Safe Council
  Wrightwood Elementary School, Wrightwood, Ca
  September 20, 2016

  Community meeting of the fire safe council for the communities of Wrightwood, Pinion Hills, Phelan, West Cajon Valley, Baldy mesa the meeting covered topics of Emergency Alert System and notifications, repopulation and evacuation pans as well as the Local Hazard Mitigation Plan Update

- Rim of the World Mountain Mutual Aid Association
  September 21, 2016

  Rim of the World Mountains Mutual Aid Association in Person meeting to discuss Planning Team Goals and Objectives, and any public concerns and contact information was given and it was the first item on the agenda for the meeting; continuing on with fire fuel thinning programs (MAST) and Bark Beetle tree removal.

- CERT Terrorism Meeting/Training
  Victoria Gardens Community Center Rancho Cucamonga, CA
  September 24, 2016
  8:00 a.m. to 4:00 p.m.

  This was a CERT Symposium on Terrorism that covered the December 2nd Terror Attack and mass shooting incidents and how to react. An Active Shooter Awareness Course and discussion on the Local Hazard Mitigation Plan Update and Counter Terrorism Awareness courses were all presented to 100 CERT Members and public attendees.

3.3.2 Ready SB County Preparedness App Message/Web Postings

An App message was sent out to alert the public about the hazard mitigation process. The message was sent to over 15,000 people via the SB County Preparedness Mobile App and it is attached to the San Bernardino County Fire Website https://sbcfire.org as referenced in Annex 6. Ready SB County Preparedness Mobile App can be used on either an Android or iPhone. This app provides multiple resources for our residents that will assist them in preparing for a disaster and enhancing the recovery process. Protect yourself and your loved ones before, during and after a disaster.

In addition to hazard mitigation plan updates the public can get the Latest News from SBCounty.gov, CalTrans, National Weather Service, and San Bernardino County Fire Office of Emergency Services. This app provides the public with emergency supply kit lists, grocery lists and checklists tailored to an individual. The public can access and update preparedness plans as needed. Learn all you need to plan for and respond to natural disasters, terrorism and pandemic flu in San Bernardino County.

3.3.3 CERT Teams

The Press Release and Executive Summary were forwarded to the CERT Team leaders for those CERT Teams located in the unincorporated County area. The Team Leaders forwarded the MJHMP Press Release and Executive summary to their team members with the request for comments on the MJHMP. The fourteen (14) CERT Teams within the unincorporated County include:

Angelus Oaks CERT	Big Bear Valley CERT	Helendale CERT
Lucerne Valley CERT	Lytle Creek CERT	Mill Creek Canyon CERT
Morongo Basin CERT	Mountain CERT	Oak Hills CERT
Phelan/Pinon Hills CERT	Rosena Beach CERT	San Antonio Heights CERT
Silver Valley CERT	Wrightwood CERT	

3.3.4 Public Hearing Process (to be completed upon FEMA Approval)

Once FEMA "approval pending adoption" notification is received, the Board of Supervisors reviewed, approved, and adopted the Unincorporated Area Multi-Jurisdictional Hazard Mitigation Plan for the County and its Special Districts at the Public Hearing meeting **(date to be determined)**. The Board of Supervisors issued a Letter of Promulgation and Resolution denoting approval of the Multi-Jurisdictional Hazard Mitigation Plan for the County and its special Districts.

Prior to the Public Adoption Hearing Date (date to be determined), the Plan will be posted on the San Bernardino County website as part of the Agenda for the meeting. The Agenda with all attachments is posted the Wednesday prior to the hearing date as a public review requirement. Members of the public were invited to review and make comments at the meeting on (date to be determined). The Multi-Jurisdictional Hazard Mitigation Plan for the County and its Special Districts was on the Board of Supervisors agenda for review and adoption at their regularly scheduled meeting on (date to be determined).Residents of the County were requested to make comments or request information on the Multi-Jurisdictional Hazard Mitigation Plan during the regularly scheduled meeting. After the public had an opportunity to review and comment on the Plan the Board of Supervisors took action on the Board Agenda items.

3.4 Planning Process

As discussed, the planning process followed FEMA How to guides which includes; organizing resources, conducting the risk assessment, developing a capabilities assessment, developing a mitigation strategy and providing implementation measures for continued mitigation success, The Risk Assessment process includes four (4) basic step; 1) hazard identification and screening; 2) hazard profiling; 3) hazard exposure; and, 4) hazard vulnerability. The Project Manager, working with the Planning Team, facilitated discussions around these steps.
The first step in this process was to identify all natural hazards present in the community. The Planning Team started with the 2010 MJHMP and augmented as necessary. This augmentation

considered both adding and removing of hazards to develop a list of potential natural hazards in the community. The Planning Team utilized several sources to ensure they were considering all potential hazards. Material reviewed included the following: 2010 San Bernardino County Operational Area MJHMP, State of California MJHMP, FEMA "How-to Guides," and several surround community MJHMPs. After the list of potential hazards in the community is generated, the hazards were screened. For a full listing of documents see Section 5.1.1

3.4.1 Hazard Screening

The intent of screening hazards is to help prioritize which hazard creates the greatest concern in the community. In 2010, the MJHMP process used Critical Priority Risk Index (CPRI) software to evaluate hazards. In 2016 an alternative approach was implemented. The Planning Team agreed to utilize a non-numerical ranking system for the MJHMP update process. This process consists of generating a qualitative ranking (High, Medium, or Low) rating for: 1) probability; and, 2) impact from each hazard. To further assist with the process, the following definition of "High", "Medium", and "Low" probability and impacts are being provided (NOTE: these definitions we utilized in the 2010 MJHMP process):

Probability
High-Highly Likely/Likely
Medium-Possible
Low-Unlikely
Impact
High-Catastrophic/Critical
Medium-Limited
Low-Negligible

The hazards were then placed into a matrix with the appropriate/corresponding box/cell. The table below is an example of how the process will capture the results.

		Impact		
		High	Medium	Low
Probability	High			
	Medium			
	Low			

After all hazards had been analyzed, the Planning Team then determined which Probability and Impact category (i.e., High Impact; High Probability, Medium Impact) the community will focus on over the next five (5) years. An example of how the hazards may be prioritized is below (Red equaling high priority):

		Impact		
		High	Medium	Low
Probability	High			
	Medium			
	Low			

After identifying the "higher" priority hazards in the community, each of the "high" priority hazards were profiled. The hazard profiling include the incorporation of all new information, material, and reports to better help the Planning Team and the community understand the hazard.

Additionally, for each of the profiled hazards, the Planning Team then analyzed the community's exposure to each hazard (inventory of assets) and the potential impact under scenario events. The Planning Team used HAZUS and hazards intersect analyses recently completed within San Bernardino County to produce this information. See Section 4 for more information.

3.4.2 Set Goals

Goal setting was approached by the Planning Team as a two layered process. The first layer involved the stakeholders acting together as the Planning Team. The second layer involved the individual Special Districts working internally to coordinate those goals identified by the Planning Team with the goals identified internally by the Special Districts. The Planning Team validated and identified new Goals and Objectives for the MJHMP update in 2016. The Planning Team reviewed the hazard exposure and scenario impacts developed during the Risk Assessment portion of the process. With a firm understanding of the risk the community is potentially facing, the Planning Team then re-evaluated the 2010 Multi-Jurisdictional Hazard Mitigation Plan Goals and Objectives; assessed their status and effectiveness in meeting the 2010 Mitigation Measures and identified new Goals and Objectives.

As part of this process, the Planning Team also reviewed the County's General Plan, the State of California MJHMP, Floodplain Management Plans, Task Force After Action, and/or documents, and adjacent local jurisdiction MJHMPs to ensure the Goals and Objectives were comprehensive and compatible with those outlined in this plan.

3.4.3 Review and Propose Mitigation Measures

After the Goals and Objectives were established, the Planning Team then turned to identifying projects under each Goal and Objective that could be implemented to help reduce and/or eliminate the impacts from the priority hazards. As part of this process, the Planning Team reviewed the projects in the 2010 MJHMP to determine which are completed, which are ongoing, and which were deferred. For projects that were not completed the Planning Team validated whether or not the project was necessary.

With a firm understanding of past accomplishments and a good understanding of the potential exposure and scenario impacts from the Risk Assessment section, the Planning Team then started to identify projects that will help reduce and/or eliminate the risk for the high priority hazards. Again, a two-layer approach was used. The Planning Team as a whole identified common projects. These common projects were then coordinated internally by the Special Districts and the County to develop a common list of projects. After a list of all possible projects has been identified, the Planning Team then went through the process of prioritizing the projects.

To assist with this effort the Planning Team adopted the STAPLEE methodology. STAPLEE stands for:

- Social - The public must support the overall implementation strategy and specific mitigation actions. Therefore, the projects will have to be evaluated in terms of community acceptance.
- Technology - It is important to determine if the proposed action is technically feasible, will help to reduce losses in the long term, and has minimal secondary impacts. Determine whether the alternative action is a whole or partial solution, or not a solution at all.
- Administrative - Under this part of the evaluation criteria, examine the anticipated staffing, funding, and maintenance requirements for the mitigation action to determine if the jurisdiction/special district has the personnel and administrative capabilities necessary to implement the action or whether outside help will be needed
- Political - Understanding how your current community and State political leadership feel's about issues related to the environment, economic development, safety, and emergency management. This will provide valuable insight into the level of political support you may have for the mitigation activities and programs. Proposed mitigation objectives sometimes fail because of a lack of political acceptability.
- Legal - Without the appropriate legal authority, the action cannot lawfully be undertaken. When considering this criterion, determine whether your jurisdiction has the legal authority at the State, or local level to implement the action, or whether the jurisdiction must pass new laws or regulations. Each level of government operates under a specific source of delegated authority. As a general rule, most local governments operate under enabling legislation that gives them the power to engage in different activities. Identify the unit of government undertaking the mitigation action, and include an analysis of the interrelationships between local, regional, State, and Federal governments. Legal authority is likely to have a significant role later in the process when your State, or community will

have to determine how mitigation activities can best be carried out, and to what extent mitigation policies and programs can be enforced.

- Economic - Every local government experiences budget constraints at one time or another. Cost effective mitigation actions that can be funded in current or upcoming budget cycles are much more likely to be implemented than mitigation actions requiring general obligation bonds or other instruments that would incur long-term debt to a community. Local communities with tight budgets or budget shortfalls may be more willing to undertake a mitigation initiative if it can be funded, at least in part, by outside sources. "Big ticket" mitigation actions, such as large-scale acquisitions and relocation, are often considered for implementation in a post-disaster scenario when additional Federal and State funding for mitigation is available.
- Environmental - Impact on the environment is an important consideration because of public desire for sustainable and environmentally healthy communities and the many statutory considerations, such as NEPA, to keep in mind when using Federal funds. The Planning Team needed to evaluate whether, when implementing mitigation actions, there would be negative consequences to environmental assets such as threatened and endangered species, wetlands, and other protected natural resources.

In addition to the STAPLEE methodology, the Planning Team incorporated other criteria/factor questions into the process to help engage and solicit input from members. Examples of these criteria/factor questions are:

- Does the Action:
  - Solve the problem?
  - Address Vulnerability Assessment?
  - Reduce the exposure or vulnerability to the highest priority hazard?
  - Address multiple hazards?
  - Address more than one (1) Goal/Objective?
  - Benefits equal or exceed costs?

- Can the Action:
  - Be implemented with existing funds?
  - Be implemented by existing state or federal grant programs?
  - Be completed within the 5-year life cycle of the LMJHMP?
  - Be implemented with currently available technologies?

- Will the Action:
  - Be accepted by the community?
  - Be supported by community leaders?
  - Adversely impact segments of the population or neighborhoods?
  - Require a change in local ordinances or zoning laws?
  - Result in legal action such as a lawsuit?
  - Positively or negatively impact the environment?
  - Comply with all local, state, and federal environmental laws and regulations?

- Is there:
  - Sufficient staffing to undertake the project?
  - Existing authority to undertake the project?

After going through the above mentioned process for each project, the Planning Team identified higher priority projects.

3.4.4 Draft the Multi-Jurisdictional Hazard Mitigation Plan

The Multi-Jurisdictional Hazard Mitigation Plan Update was drafted by the Project Manager, based on input and comments provided by the Planning Team. As indicated previously, the Planning Team used the 2010 MJHMP as a starting point but revised it to reflect updated information). The 2016 MJHMP format and is similar to the 2010 plan with slight heading changes and differences in content. In addition to the heading changes and improved risk assessment information, the Planning Team also uses the FEMA Guidance and materials provided by the consultant hired to coordinate the Operational Area MJHMP and Stakeholder groups. This material aided in the Planning Team's understanding of the level of detail and type of information that is excepting in each section.

This process started with the Special Districts and County providing information to the Planning Team through their liaison on the planning team. After the Planning Team ranked and prioritized the materials, the liaisons returned to their respective Special Districts to vet the Planning Team's work. The Planning Team then worked together with the vetted materials to produce the draft MJHMP. As mentioned earlier, each section was reviewed and updated as necessary. While some Planning Team members are responsible for the updating select sections, all members are responsible for reviewing and commenting on the entire MJHMP. The Planning Team Project Manager was responsible for version control and distribution of the final MJHMP for review.

Once the MJHMP update was drafted, the Planning Team provided opportunities for the public to review and comment on the plan. After the public comment period was closed, the Planning Team finalized the plan and forwarded to Cal EMA and FEMA for approval.

3.4.5 Adopt the Plan

The San Bernardino County Board of Supervisors created each of the Special Districts to provide a specific service to a particular area/population of San Bernardino County. These Special Districts are Board Governed in that the Board of Supervisors has direct control and legislative oversight of the Special Districts. The Board of Supervisors takes action on behalf of each Special District whenever governance items are necessary. As the Five special districts are separate legal entities from the County of San Bernardino for tax/revenue purposes the Board of supervisors, acting as the Board of Directors for each Special District, will be adopting the Multi-

Jurisdictional Hazard Mitigation Plan on behalf of each Special District. The Special Districts are not independent from San Bernardino County but are controlled and administered as any other County Department is administered. In order to comply with legal requirement for each of the five Special Districts, separate resolutions are required. Copies of these resolutions are attached at the front of this MJHMP.

San Bernardino County Board of Supervisors is responsible for the review, approval, and adoption of the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) update for the unincorporated area of San Bernardino County, the San Bernardino County Fire Protection District, the San Bernardino County Flood Control District, the Big Bear Valley Recreation and Park District, Bloomington Recreation and Park District and for the County's board governed Special Districts Department. It is also the intent of the San Bernardino County Board of Supervisors to take appropriate actions to incorporate the MJHMP update into the San Bernardino County General Plan.

After Cal EMA and FEMA have approved the HMP update, it will be adopted by the San Bernardino County Board of Supervisors. Currently, the adoption process is scheduled for **(date to be determined)**. The item will be part of the consent calendar subject to a public hearing if necessary. The HMP will be listed on the agenda with the plan being made available electronically to the general public for at least three (3) business days prior to the Board of Supervisor's meeting date. Any member of the public can make comments on the Plan during the meeting prior to any action by the Board of Supervisors.

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Section 4. Risk Assessment

The goal of mitigation is to reduce and/or eliminate the future impacts of a hazard including property damage, disruption to local and regional economies, and the amount of public and private funds spent to assist with recovery. However, mitigation should be based on an assessment of the risk.

This Risk Assessment Section evaluates the potential loss from a hazard event by assessing the vulnerability of buildings, infrastructure, and people. It identifies the characteristics and potential consequences of hazards, how much of the unincorporated areas of the County could be affected by a hazard, and the impact on unincorporated County area assets. The Risk Assessment approach consists of three (3) components:

- ***Hazard Identification*** – *Identification and screening of hazards (Section 4.1)*
- ***Hazard Profiles*** – *Review of historic occurrences and assessment of the potential for future events (Section 4.2)*
- ***Vulnerability Assessment*** – *Determination of potential losses or impacts to buildings, infrastructure and population (Section 4.3)*

4.1 Hazard Identification

4.1.1 Hazard Screening Criteria

Per FEMA Guidance, the first step in developing the Risk Assessment is identifying the hazards. The County's HMP Planning Team reviewed a number of previously prepared hazard mitigation plans and other relevant documents to determine the universe of natural hazards that have the potential to affect the County and the nearby region. Table 4-1 provides a crosswalk of hazards identified in the 2010 San Bernardino County Multijurisdictional Hazard Mitigation Plan Update, the County of San Bernardino 2007 General Plan Safety Element, Single Jurisdictional Plans and the 2013 CA State Hazard Mitigation Plan. Seventeen different hazards were identified based on a thorough document review. The crosswalk was used to develop a preliminary hazards list providing a framework for County HMP Planning Team members to evaluate which hazards were truly relevant to the County and which ones are not. For example, volcanic activity was considered to be of little relevance to the County, while earthquake, flooding, and wildfire were indicated in almost all hazard documentation.

Table 4-1: Document Review Crosswalk

Hazards	2010 San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan	County of San Bernardino 2007 General Plan Safety Element	Single Jurisdictional Plans	2013 CA State Hazard Mitigation Plan
Climate Change				■
Dam Inundation			■	■
Drought			■	■
Earthquake/ Geologic Hazards	■	■	■	■
Extreme Heat				■
Extreme Cold				■
Flood	■	■	■	■
Hazardous Waste		■	■	■
High Winds/ Straight Line Winds		■	■	
Hail				
Infestation				
Lightning				
Terrorism			■	■
Tornado				
Volcanic Activity		■		■
Wildfire	■	■	■	■
Winter Storm (Heavy Snowfall)				■

In addition to a document review, previous hazard occurrences were used to identify hazards for this hazard mitigation plan. Previous hazard occurrences provide a historical view of hazards that have affected the County in the past, and thus provide a window into the potential hazards that can affect the County in the future. Information about federal and state disaster declarations in San Bernardino County (declarations are declared by County) was compiled from FEMA and Cal EMA's databases, as shown in Table 4-2. Though not a complete snapshot of hazard incidences in the County (since not all hazard events are federally or state declared), Table 4-2 provided the County HMP Planning Team with solidified accounts of the types and extent of disasters that have affected the County dating back to 1965 when flooding affected entire regions of San Bernardino County. As indicated in Table 4-2 large regional incidents have affected San Bernardino County, including the California Wildfires of 1999. Most recently, disasters for terrorist attacks (2015), flood (2011) and severe storms (2010) were declared in San Bernardino County. The disaster declarations in Table 4-2 provide a baseline for consideration in the hazard prioritization process.

Table 4-2: Federal, State and County Declared Disasters

Disaster Number	Declaration Date	Disaster Type	Incident Type	Title
Federal Declarations				
Major Disaster Declarations				
1952	1/26/2011	DR	Flood	Severe Winter Storms, Flooding, and Debris and Mud Flows
1884	3/8/2010	DR	Severe Storm(s)	Severe Winter Storms, Flooding, and Debris and Mud Flows
1731	10/24/2007	DR	Fire	Wildfires, Flooding, Mud Flows, and Debris Flows
1689	3/13/2007	DR	Freezing	Severe Freeze
1585	4/14/2005	DR	Severe Storm(s)	Severe Storms, Flooding, Landslides, and Mud and Debris Flows
1577	2/4/2005	DR	Severe Storm(s)	Severe Storms, Flooding, Debris Flows, and Mudslides
1498	10/27/2003	DR	Fire	Wildfires, Flooding, Mudflow and Debris Flow Directly Related T
1203	2/9/1998	DR	Severe Storm(s)	Severe Winter Storms and Flooding
1046	3/12/1995	DR	Severe Storm(s)	Severe Winter Storms, Flooding Landslides, Mud Flow
1044	1/10/1995	DR	Severe Storm(s)	Severe Winter Storms, Flooding, Landslides, Mud Flows
1005	10/28/1993	DR	Fire	Fires, Mud/Landslides, Flooding, Soil Erosion
979	2/3/1993	DR	Flood	Severe Winter Storm, Mud & Land Slides, & Flooding
947	7/2/1992	DR	Earthquake	Earthquake & Aftershocks
935	2/25/1992	DR	Flood	Rain/Snow/Wind Storms, Flooding, Mudslides
894	2/11/1991	DR	Freezing	Severe Freeze
872	6/30/1990	DR	Fire	Fires
690	9/22/1983	DR	Flood	Flash Flooding
687	7/1/1983	DR	Flood	Flooding
677	2/9/1983	DR	Coastal Storm	Coastal Storms, Floods, Slides & Tornadoes
635	11/27/1980	DR	Fire	Brush & Timber Fires
615	2/21/1980	DR	Flood	Severe Storms, Mudslides & Flooding
547	2/15/1978	DR	Flood	Coastal Storms, Mudslides & Flooding
521	9/21/1976	DR	Flood	Flooding, Tropical Storm Kathleen
295	9/29/1970	DR	Fire	Forest & Brush Fires
253	1/26/1969	DR	Flood	Severe Storms & Flooding
223	1/2/1967	DR	Flood	Severe Storms & Flooding
211	12/7/1965	DR	Flood	Heavy Rains & Flooding
Fire Management Assistance Declarations				
2955	9/2/2011	FM	Fire	Hill Fire
2841	10/4/2009	FM	Fire	Sheep Fire
2836	9/1/2009	FM	Fire	Pendleton Fire
2833	8/31/2009	FM	Fire	Oak Glen Fire
2792	11/15/2008	FM	Fire	Freeway Fire Complex
3279	10/23/2007	EM	Fire	Wildfires
2738	10/22/2007	FM	Fire	Grass Valley Fire
2728	9/15/2007	FM	Fire	Butler 2 Fire
2653	7/12/2006	FM	Fire	Sawtooth Fire Complex

Disaster Number	Declaration Date	Disaster Type	Incident Type	Title
3248	9/13/2005	EM	Hurricane	Hurricane Katrina Evacuation
2503	10/25/2003	FM	Fire	Old Fire
2501	10/23/2003	FM	Fire	Ca-Grand Prix Fire-10-23-2003
2497	9/6/2003	FM	Fire	Ca-Bridge Fire-09-05-2003
2491	8/19/2003	FM	Fire	Ca-Locust Wildfire-08-19-2003
Emergency Declarations				
3140	9/1/1999	EM	Fire	Ca-Wildfires-08/25/1999
CALOES Emergency and Disaster Proclamations/ Executive Orders				
Other Disasters				
2464	9/24/2002	FS	Fire	Williams Fire
2433	6/27/2002	FS	Fire	Louisiana Fire
2425	6/17/2002	FS	Fire	Blue Cut Fire
###	12/18/2015	EM	Terrorist Attack	Mass Shooting
State Declarations				
145	2/14/1963		Severe Storms	California Severe Storms, Heavy Rains, & Flooding
47	12/22/1955		Flood	California Flood
15	2/5/1954		Flood	California Flood & Erosion
County Declarations				
	3/13/1990		Earthquake	Upland Earthquake
	10/31/1988		Fire	Texas Fire (Watershed Damage)
	9/3/1987		Fire	Wildland Fires
	7/13/1984		Weather	Unstable Weather Conditions (City of Big Bear Lake, CSD, Co. Flood Control, Victor Valley Waste Water Authority, Juniper Riviera County Water District)
	9/29/1979		Gasoline Shortage	Gasoline Shortage Emergency
	6/28/1979		Water Shortage	Water Shortage (Lake Gregory)
	7/22/1960		Fire	Major and Widespread Fires

4.1.2 Hazard Prioritization

The Planning Team determined that the County and its Special Districts should focus over the next five (5) years on hazards that fell within the HIGH and MEDIUM "Probability" and "Impact" categories. While all the hazards present a potential problem in the County, the Planning Team felt that if they were able to reduce or eliminate the risk from these hazards, it would provide a greater service to the people within the jurisdiction. Table 4-3 illustrates how the final prioritization of the hazard; the "Green" colored box represents the highest priority hazards; and the "White" colored boxes represent lower (second and third tier) priority hazards.

		Impact		
		High	Medium	Low
Probability	High	Wildfire Flood Earthquake/ Geologic Hazards	Drought	
	Medium	Terrorism	Climate Change (Extreme Heat and other)	Hail Infestation
	Low		Dam Inundation	Tornado High Winds Winter Storm Lightning Extreme Cold

Table 4-3: Prioritized Hazard Assessment Matrix

4.2 Hazard Profiles

Although the County faces the risk of experiencing many natural and manmade hazards, this section profiles only the County's highest priority natural hazards the unincorporated County areas and Special District areas are expected to experience; earthquake, wildfire, flood, drought, terrorism and climate change. The priority hazards are based on the Calculated Priority Risk Index (CPRI) explained in Section 4.1.2.

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4.3 Earthquake Geologic Hazards



An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped the earth as the huge plates that form the earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free, causing the ground to shake. Most earthquakes occur at the boundaries where the plates meet; however, some earthquakes occur in the middle of plates.

Ground shaking from earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge, destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill and other unstable soil, and trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake. When an earthquake occurs in a populated area, it may cause deaths and injuries and extensive property damage. Earthquakes can strike suddenly, without warning. Earthquakes can occur at any time of the year and at any time of the day or night. On a yearly basis, 70 to 75 damaging earthquakes occur throughout the world.

4.3.1 Regulatory Environment

The Alquist-Priolo Earthquake Fault Zoning (AP) Act was passed into law following the destructive February 9, 1971 San Fernando earthquake. The AP Act provides a mechanism for reducing losses from surface fault rupture on a statewide basis. The intent of the AP Act is to ensure public safety by prohibiting the siting of most structures for human occupancy across traces of active faults that constitute a potential hazard to structures from surface faulting or fault creep.

The 2013 California Building Standards Code (also known as Title 24) became effective for the County on January 1st, 2014. Title 24 includes CBC Section 3417: Earthquake Evaluation and Design for Retrofit of Existing Buildings which can be viewed at http://www.bsc.ca.gov/codes.aspx

Changes or additions to the seismic provisions come from many different sources, including new research results and documentation of performance in past earthquakes. A primary resource is the National Earthquake Hazard Reduction Program (NEHRP) Recommended Seismic Provisions for New Buildings and Other Structures (FEMA P-750: http://www.fema.gov/media-library/assets/documents/18152). FEMA's companion document Earthquake Resistant Design

Concepts (FEMA P-749: http://www.fema.gov/media-library/assets/documents/21866) provides a nontechnical background explanation.

4.3.2 Past Occurrences

Table 4-4 shows earthquakes greater than Magnitude 4.0 that have been felt within the San Bernardino County area in the last five years.

Table 4-4: Earthquakes: 2010-2015 San Bernardino County

Date	Name
9/14/2011	Calimesa 4.1
1/15/2014	Fontana 4.4
7/5/2014	Running Springs 4.6
3/29/2014	Brea 5.1
7/25/2015	Fontana 4.2
9/16/15	Big Bear Lake 4.0
12/30/2015	Muscoy 4.4
1/6/2016	Banning 4.4

There are hundreds more small (M<4.0) earthquakes that have occurred within San Bernardino County during this same time frame. Those with a magnitude of below 4.0 are not listed.

4.3.3 Location/Geographic Extent

Figure 4-1 shows the locations of major faults in California, including the four (4) major faults in Southern California in relation to San Bernardino County. These faults are the Southern San Andreas, the San Jacinto, the Elsinore, and the Garlock Faults. There are also many smaller faults within San Bernardino County capable of producing significant earthquakes. However, these four faults are considered by the United States Geological Survey (USGS) and the California Geological Survey (CGS) to be the most dangerous in the County. (California Geological Survey Special Publication 42, Interim Revision 2007, "Fault-Rupture Hazard Zones in California" - Alquist-Priolo Earthquake Fault Zoning Act). Other geologic hazards include liquefaction and landslides. Both occur during and after earthquakes.

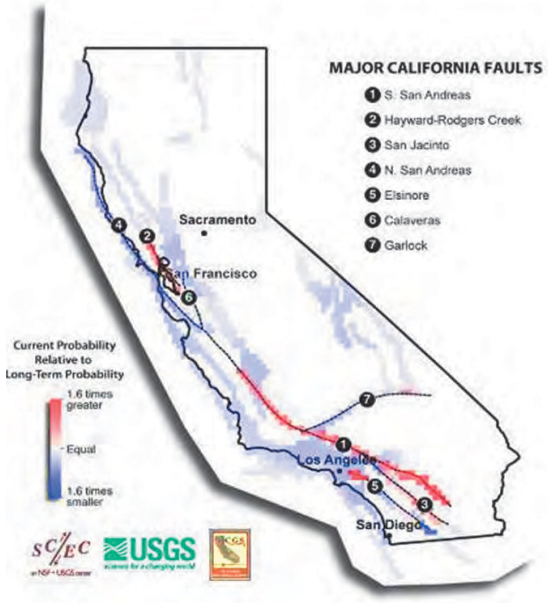


Figure 4-1: Major California Faults

Liquefaction of the ground occurs when the groundwater table is high and soil conditions are favorable. Liquefaction Susceptibility Zones as mapped by the USGS for the 2008 ShakeOut Scenario1 shows areas of the County susceptible to liquefaction during an earthquake. See Figure 4-2

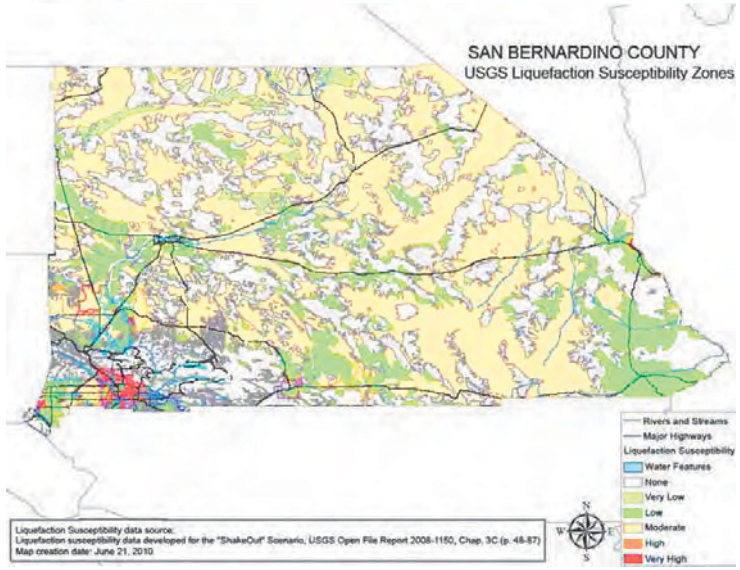


Figure 4-2: USGS Liquefaction Susceptibility Zone

4.3.4 Magnitude/Severity

The MMI Scale measures earthquake intensity as shown in Table 4-5. The MMI Scale has 12 intensity levels. Each level is defined by a group of observable earthquake effects, such as ground shaking and/or damage to infrastructure. Levels I through VI describe what people see and feel during a small to moderate earthquake. Levels VII through XII describe damage to infrastructure during a moderate to catastrophic earthquake.

See Section 4.3.5 to see how magnitude and severity are linked to the probability of earthquake occurrences.

Table 4-5: MMI Scale

Earthquake Magnitude and Intensity		
Magnitude (M_w)	**Intensity (Modified Mercalli Scale)**	**Description**
1.0 – 3.0	I	I. Not felt except by very few people under especially favorable conditions.
3.0 – 3.9	II – III	II. Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
		III. Felt quite noticeably indoors. Many do not recognize it as an earthquake. Standing motorcars may rock slightly.
4.0 – 4.9	IV – V	IV. Felt by many who are indoors; felt by a few outdoors. At night, some awakened. Dishes, windows and doors rattle.
		V. Felt by nearly everyone; many awakened. Some dishes and windows broken; some cracked plaster; unstable objects overturned.
5.0 – 5.9	VI – VII	VI. Felt by everyone; many frightened and run outdoors. Some heavy furniture moved; some fallen plaster or damaged chimneys.
		VII. Most people alarmed and run outside. Damage negligible in well-constructed buildings; considerable damage in poorly constructed buildings.
6.0 – 6.9	VII – IX	VIII. Damage slight in special designed structures; considerable in ordinary buildings; great in poorly built structures. Heavy furniture overturned. Chimneys, monuments, etc. may topple.
		IX. Damage considerable in specially designed structures. Buildings shift from foundations and collapse. Ground cracked. Underground pipes broken.
7.0 and Higher	VIII and Higher	X. Some well-built wooden structures destroyed. Most masonry structures destroyed. Ground badly cracked. Landslides on steep slopes.
		XI. Few, if any, masonry structures remain standing. Railroad rails bent; bridges destroyed. Broad fissure in ground.
		XII. Virtually total destruction. Waves seen on ground. Objects thrown into the air.

4.3.5 Frequency and Probability of Occurrence

Several of the major Southern California faults have a high probability of experiencing a Magnitude 6.7 or greater earthquake within the next 30 years (Figure 4-2); 59% probability of a M6.7 or greater on the Southern San Andreas Fault, 31% probability on the San Jacinto Fault, and 11% probability on the Elsinore Fault. These probabilities were determined by the USGS and CGS in a 2008 study (2007 Working Group on California Earthquake Probabilities, 2008, The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2): U.S. Geological Survey Open-File Report 2007-1437 and California Geological Survey Special Report 203 http://pubs.usgs.gov/of/2007/1437/).

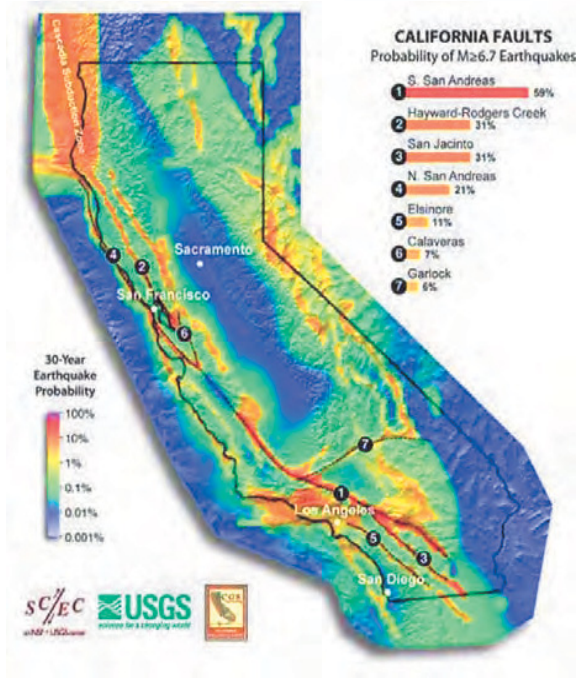


Figure 4-3: California Faults Probability of ≥ M 6.7 Earthquake

As shown in Figure 4-3 the probability of an earthquake with a Magnitude 6.7 or greater occurring somewhere in Southern California within the next 30 years is estimated to be 97% (2007 Working Group on California Earthquake Probabilities, 2008). As can be seen in the table, earthquake probabilities in Southern California are higher than those for Northern California.

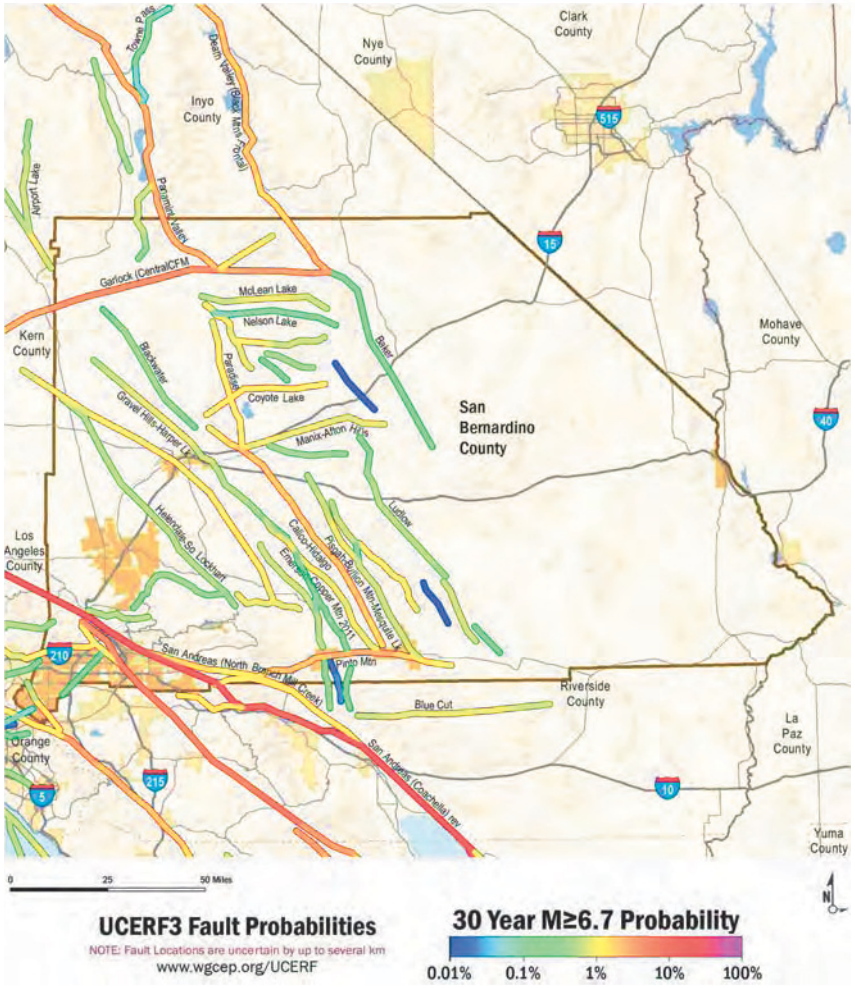


Figure 4-4: California Area Earthquake Probabilities by Magnitude

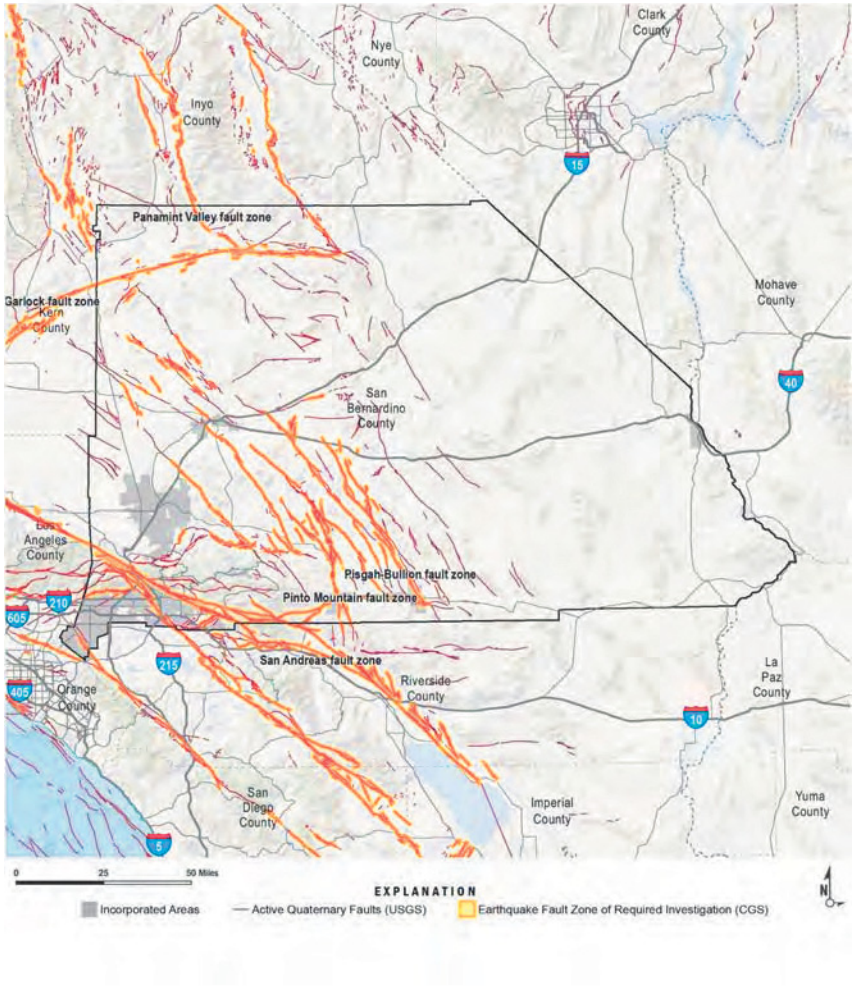


Figure 4-5: Earthquake Fault Zone

4.4 Wildfire



Wildfires present a significant potential for disaster in the County, a region of relatively high temperatures, low humidity, and low precipitation during the summer. This long summer season is followed by a fall season that is famous for high velocity, very dry winds that come out of the desert. The Santa Ana winds very consistently arrive from the middle of October to the end of November. In and of themselves, these weather patterns would be of little significance without the un-naturally dense forest and the dense undergrowth that has been allowed to grow unabated for the last several decades. Compounding the vegetative growth that has occurred is the unchecked development of substantial housing and businesses in mountain communities. This urbanized growth has required parallel growth and sophistication in the fire service that responds to wildfires in the wild land urban interface. With immediate responses to initial fire starts, the vast majority of fires are successfully extinguished in short order. In doing so, this eliminates nature's way of thinning the forest through smaller fires.

Another factor that is a potential for disaster is the number of dead trees in the mountain region. Due to the over densification of the forest combined with drought conditions during the past ten years, trees in the local mountains have become weakened, creating a perfect environment for Bark Beetles to proliferate from 2003 to 2008. Combine these severe burning conditions with people or lightning and the stage is set for the occurrence of large, destructive wildfires. In addition, the forested areas of the County are not only the most popular, with the most visitors in the Nation, but are also the most populated in residences and businesses in the Nation as well. The final element in this catastrophe waiting to happen is that because of the steep mountain terrain, there are only five routes in and out for almost 60,000 residents. On a holiday weekend though, this population can dramatically increase by 50,000 to 100,000 people as weekend vacationers.

4.4.1 Regulatory Environment

4.4.1.1 State

Wildfire State Responsibility Area (SRA) Fire Safe Regulations outline basic wildland fire protection standards for local jurisdictions. SRA Fire Safe Regulations (if policed) can decrease the risk of wildfire events in the wildland interface. SRA Fire Safe Regulations do not supersede local regulations, which equal or exceed minimum state regulations. The State statute for wildfire protection is Public Resources Code, Section 4290. Requirements in the code include information on the following (CA Fire Alliance):

- Road Standards for Fire Equipment Access
- Standards for Signs Identifying Streets, Roads and Buildings
- Minimum Private Water Supply Reserves for Emergency Fire Use
- Fuel Breaks and Greenbelts

4.4.1.2 Local

4.4.1.2.1 Fire Hazard Abatement Program

In an effort to reduce the threat of wild fires, the San Bernardino County Fire Hazard Abatement (FHA) Program enforces the fire hazard requirements outlined in San Bernardino County Code Section 23.0301–23.0319. The primary function of the Fire Hazard Abatement Program is to reduce the risk of fires within communities by pro-actively establishing defensible space and reduction/removal of flammable materials on properties.

The Fire Hazard Abatement Program conducts surveys to identify fire hazards throughout the year. Fire hazards are identified and notices to abate the hazard(s) are mailed to property owners. Property owners are given 30 days to abate the violations. Failure to abate may result in citations, penalties, and/or fees for abatement by the County. The Fire Hazard Abatement Program responds to complaints year round in the unincorporated areas and contracting Cities and Fire Districts.

4.4.2 Past Occurrences

Wildfire locations from 1900 – 2016 are shown in Figure 4-6. In the past five years (since the 2010 MJHMP was approved) there have been 13 significant wildland fires within San Bernardino County. These fires are listed in Table 4-7, and several of the more damaging fires are discussed below.

Table 4-6: Wildfire Occurrences 2010-2016

Number	Date	Name	Acres
1.	9/5/2011	Hill Fire	1,158
2.	11/5/2012	Devore Fire	335
3.	6/28/2013	Mill Fire	534
4.	8/8/2013	Sharp Fire	243
5.	9/24/2013	Sierra Fire	200
6.	4/30/2014	Etiwanda Fire	2,143
7.	5/13/2014	Rancho Incident	1,548
8.	3/31/2015	River Bottom Fire	185
9.	6/17/2015	Lake Fire	31,359
10.	7/17/2015	North Fire/ Pines Fire	4,250
11.	8/23/2015	Summit Fire	555
12.	8/7/2016	Pilot Fire	8,110
13.	8/16/2016	Blue Cut Fire	36,274
			86,894

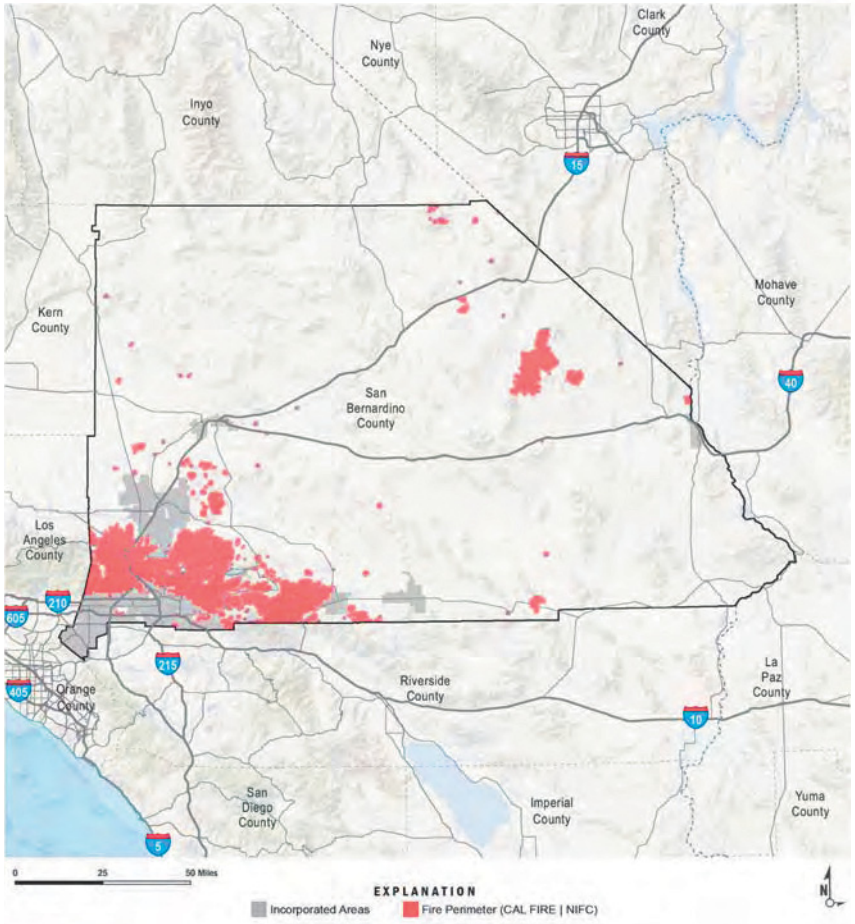


Figure 4-6: Wildfire History 1900 – 2016 (CalFire and USFS Data 2010)

The 2016 Blue Cut Fire was a reminder that wildfires are a significant threat to lives and property in the unincorporated San Bernardino County area. The Blue Cut Fire burned 36,274 acres, destroying an estimated 105 single family residences and 216 outbuildings. In addition, 3 single family residences and 5 other structures were damaged.

In 2015 The Lake Fire burned 31,359 acres and was the cause of 6 minor firefighter injuries and 1 residence and 3 outbuildings were destroyed.

North Fire/Pines Fire in 2015 burned a total of 4,250 acres, destroying 7 homes, 16 outbuildings and 44 vehicles in the community of Baldy Mesa. No injuries were reported.

The Blue Cut Fire, Lake Fire, and North Fire/ Pines Fire all occurred in the County's mapped Very High Fire Severity Zone. Mitigation efforts have reduced but not eliminated the threat from wildfire. The strong fall winds that are capable of creating firestorms cannot be controlled. Drought cannot be controlled. Fuels reduction programs reduce the potential spread of fire, upgraded Building Codes make structures more fire resistant, and public education prepares residents for wildfires. However, the threat of wildfire remains. The continuing goal is to reduce the threat from wildfire wherever possible.

4.4.3 Location/Geographic Extent

Using information from the California Department of Forestry (CAL FIRE) Figure 4-8, illustrates the areas at risk to a wildfire event. The areas with the highest risk of wildfire are the in the southwestern portions of County in the mountainous region.

Figure 4-7 illustrates vegetation mortality due to bark beetle infestation, drought, and other factors in San Bernardino County. These conditions create extreme fire hazards.

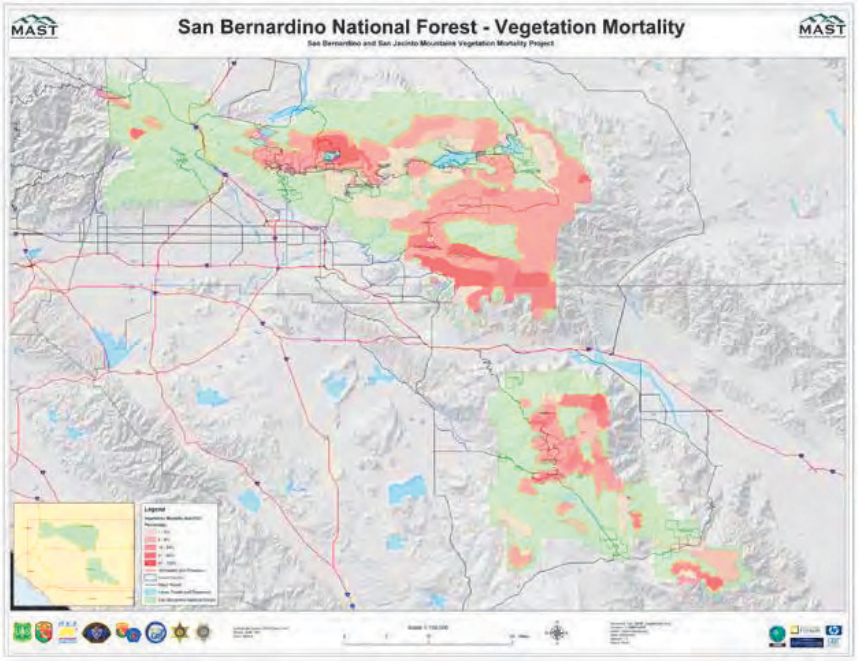


Figure 4-7: San Bernardino National Forest – Vegetation Mortality

4.4.4 Magnitude/Severity

Fire Severity Zones are used in determining additional protective measures required when building new structures or remodeling older structures within the particular zone. Additional measures must be taken on the property around a structure in the higher ranked fire Severity Zones.

CAL FIRE adopted Fire Hazard Severity Zone maps for LRA in June 2008. The Fire Severity Zones for County identifies areas of Very High, High, and Moderate fire hazard severity throughout the County and are mapped in Figure 4-8.

Fire Severity Zones are used in determining additional protective measures required when building new structures or remodeling older structures within the particular zone. Additional measures must be taken on the property around a structure in the higher ranked fire Severity Zones.

Fire hazard mapping is a way to measure the physical fire behavior to predict the damage a fire is likely to cause. Fire hazard measurement includes vegetative fuels, probability of speed at which a wildfire moves the amount of heat the fire produces, and most importantly, the burning fire brands that the fire sends ahead of the flaming front.

The model used to develop the information in accounts for topography, especially the steepness of the slopes (fires burn faster as they burn up-slope.). Weather (temperature, humidity, and wind) also has a significant influence on fire behavior. The areas depicted as moderate and high in are of particular concern and potential fire risk in these are constantly increasing as human development, and the wildland urban interface areas expand.

4.4.5 Frequency/Probability of Future Occurrences

In San Bernardino County, wildfire season commences in the summer when temperatures are high, humidity is low, and conditions remain dry. The season continues into the fall, when the County experiences high velocity, very dry winds coming out of the desert. A statewide drought beginning in 2011 has caused the state to be the driest it's been since record keeping began back in 1895 (California 2016). This has caused extremely dry conditions in unincorporated areas of the County creating plentiful fuel sources for wildfires.

USGS LANDFIRE (Landscape Fire and Resource Management Planning Tools), is a shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior, providing landscape scale geo-spatial products to support cross-boundary planning, management, and operations. Historical fire regimes, intervals, and vegetation conditions are mapped using the Vegetation Dynamics Development Tool (VDDT). This USGS data supports fire and landscape management planning goals in the National Cohesive Wildland Fire Management Strategy, the Federal Wildland Fire Management Policy, and the Healthy Forests Restoration Act.

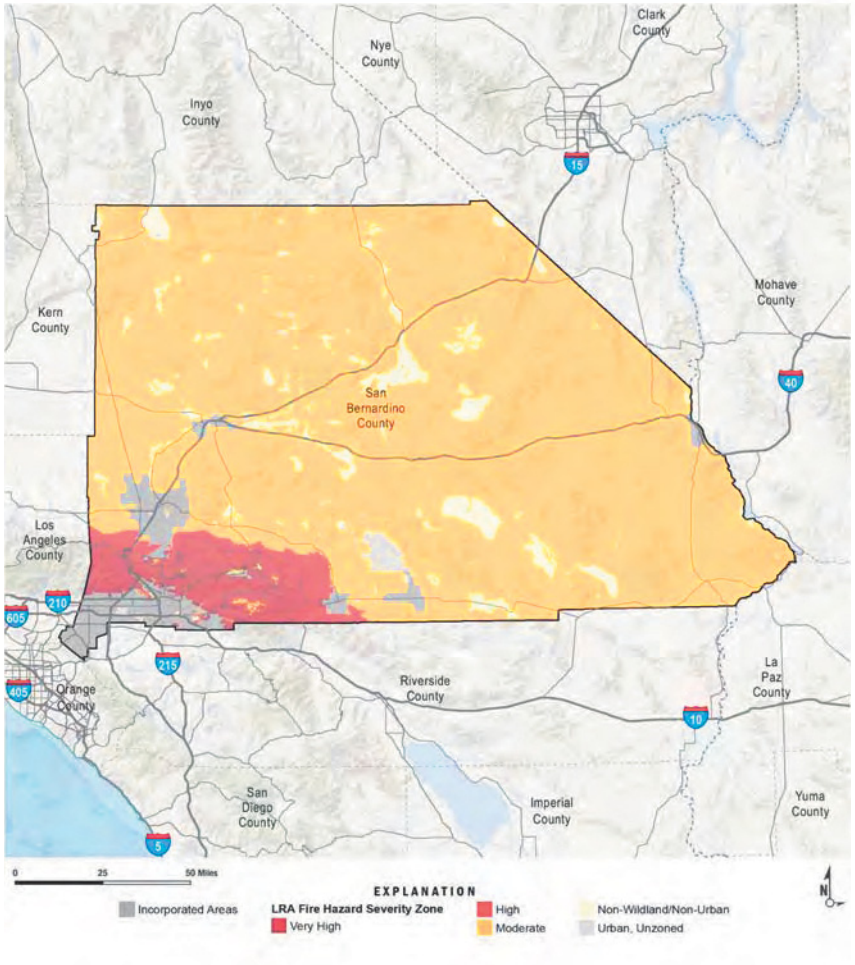


Figure 4-8: Fire Hazard Severity Zone

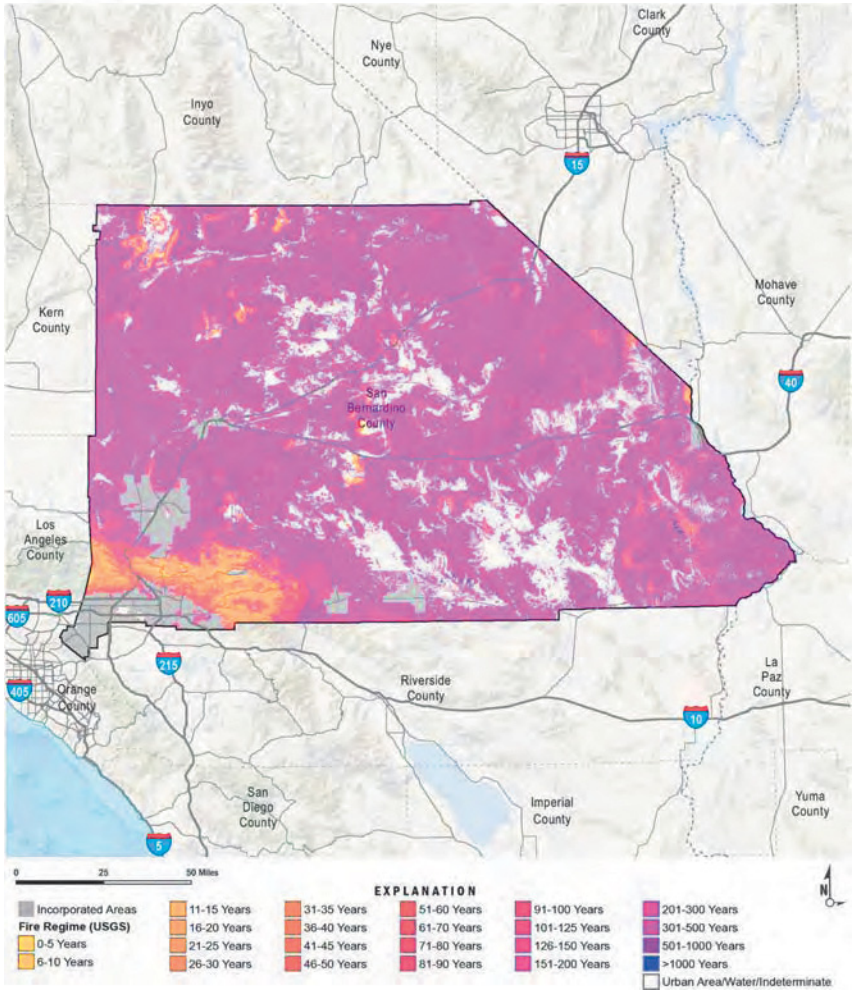


Figure 4-9: USGS Mean Fire Return Interval Map

As part of the USGS Landfire data sets, the Mean Fire Return Interval (MFRI) layer quantifies the average period between fires under the presumed historical fire regime. MFRI is intended to describe one component of historical fire regime characteristics in the context of the broader historical time period represented by the LANDFIRE Biophysical Settings (BPS) layer and BPS Model documentation.

MFRI is derived from the vegetation and disturbance dynamics model VDDT (Vegetation Dynamics Development Tool) (LF_1.0.0 CONUS only used the vegetation and disturbance dynamics model LANDSUM). This layer is created by linking the BpS Group attribute in the BpS layer with the Refresh Model Tracker (RMT) data and assigning the MFRI attribute. This geospatial product should display a reasonable approximation of MFRI, as documented in the RMT. See Figure 4-9 for predicted fire return interval for the jurisdictional area.

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4.5 Flood



Floods are the second most common and widespread of all natural disasters faced by the County and its Special Districts. Most communities in the United States have experienced some kind of flooding during or after spring rains, heavy thunderstorms, winter snow thaws, or summer thunderstorms.

A flood, as defined by the National Flood Insurance Program is: "A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties (at least one of which is the policyholder's property) from:

- Overflow of inland or tidal waters, or
- Unusual and rapid accumulation or runoff of surface waters from any source, or
- Mudflow, or
- Collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels."

Floods can be slow or fast rising but generally develop over a period of hours or days. Mitigation includes any activities that prevent an emergency, reduce the chance of an emergency happening, or lessen the damaging effects of unavoidable emergencies. Investing in mitigation measures now, such as: engaging in floodplain management activities, constructing barriers such as levees, and purchasing flood insurance will help reduce the amount of structural damage to structures and financial loss from building and crop damage should a flood or flash flood occur.

The standard for flooding is the 1% annual chance flood, commonly called the 100-year flood, the benchmark used by the Federal Emergency Management Agency (FEMA) to establish a standard of flood control in communities throughout the country. The 1% annual chance flood is also referred to as the base flood.

The 1% annual chance flood is the flood that has a 1% chance of being equaled or exceeded in any given year and it could occur more than once in a relatively short period of time. By comparison, the 10% flood (10-year flood) means that there is a 10% chance for a flood of its size to occur in any given year.

4.5.1 Regulatory Environmental

4.5.1.1 County of San Bernardino 2007 Development Code and Zoning Ordinances

One of the purposes of this Development Code is to create a comprehensive and stable pattern of land uses upon which to plan drainage/flood control and other public facilities and utilities. The follow chapters of the development code address floodways, flood control and development near such:

Chapter 82.14 Flood Plain Safety (FP) Overlay
Chapter 85.07 Flood Hazard Development Review
Chapter 86.04 Flood Plain Management Administrator

The County has also adopted Zoning Ordinances that are not part of the County Code but are part of the General Plan. These ordinances regulate land use; map the official land use and hazard overlay districts to include safety hazard and environmental protection areas.

4.5.1.2 National Flood Insurance Program

The National Flood Insurance Program (NFIP) makes federally backed flood insurance available to homeowners, renters, and business owners in participating communities. As a participating member of the NFIP, San Bernardino County is dedicated to protecting homes with more than 1,000 policies currently in force. Like most communities participating in NFIP, FEMA has prepared a detailed Flood Insurance Study (FIS) for areas of San Bernardino County. The study presents water surface elevations for floods of various magnitudes, including the 1-percent annual chance of flood (the 100-year flood) and the 0.2-percent annual chance of flood (the 500-year flood). Base flood elevations and the boundaries of the 100 and 500 year floodplains are shown on the Flood Insurance Rate Maps (FIRM). More information on location and geographic extent of the FIRMs are provided in this section.
The County of San Bernardino entered the regular phase of the NFIP on September 09, 1978; in 2016 the County Floodplain Administrator is Marlene Mioyshi. As a participant in the NFIP, San Bernardino County is dedicated to regulating development in the FEMA regulated floodplain areas in accordance with NFIP criteria. Before a permit to build in a floodplain area is issued, San Bernardino County ensures that two basic criteria are met:

- All new buildings and developments undergoing substantial improvements must, at a minimum, be elevated to protect against damage by the 100-year flood.
- New floodplain developments must not aggravate existing flood problems or increase damage to other properties.

Structures permitted or built in the County/City before the NFIP regulatory requirements were incorporated into the San Bernardino County ordinances (before the effective date of the San Bernardino County FIRM) are called "pre-FIRM" structures. For the San Bernardino County, pre-FIRM structures are those permitted or built before September 09, 1978

Extensive FEMA NFIP databases are used to track claims for every participating community including San Bernardino County. NFIP insurance data provided by FEMA indicates that as of September 02, 2016, there were 1,772 policies in San Bernardino County, resulting in $403,874,500 of insurance in force; this amounts to $1,758,534 in total premiums. Of the 1,772 policies, only 1,070 are for structures located within the 1% annual chance flood zones, while the remaining 701 policies are for structures located outside of the FEMA identified floodplain.

Based on this analysis of insurance coverage, San Bernardino County has significant assets at risk to the 100-year flood. Of the 3,426 improved parcels within the 100-year floodplain, only 1,070 of those parcels maintain flood insurance[1]. That means approximately 2,356 improved parcels are without flood insurance in high risk areas according to FEMA. This condition could exist for a number of different reasons. Ground floor elevations are one foot above the 100-year floodplain and home owners and business that wish not to purchase floodplain insurance (non-federally backed loans, home with no mortgage, homes that are "grandfathered" into the NFIP). The 2,356 uninsured structures located in mapped floodplain areas are especially vulnerable.

Currently, San Bernardino County contains 12 Repetitive Loss (RL) properties under their jurisdictional umbrella. The total dollar amount of claims paid to date by the NFIP is $2,606,098. San Bernardino County also contains zero (0) Severe Repetitive Loss (SRL) structure.

Most of the RL properties that have experienced flooding are in the High Desert and Mountain areas of San Bernardino County are due to debris flow in localized areas. Every loss claim is seasonal in nature as all loss claims have been in December, January or February. Some mitigation on these properties has been conducted and San Bernardino County is currently tracking mitigation actions through standardized forms as required by FEMA.

NOTE: A property does not have to be currently carrying a flood insurance policy to be considered a RL or SRL property. Often homes in communities are not carrying flood insurance but are still on the community's repetitive loss list. The "repetitive loss" designation follows a property from owner to owner; from insurance policy to no insurance policy, and even after the property has been mitigated. Having an insurance policy and making claims that fall into the repetitive loss criteria will put a property on the RL list. Even after the policy on a property has lapsed or been terminated, the property will remain on San Bernardino County RL list.

NOTE: The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of certain types of data to the public. Flood insurance policy and claims data are included in the list of restricted information. FEMA can only release such data to state and local governments, and only if the data are used for floodplain management, mitigation, or research purposes. Therefore, this plan does not identify the repetitive loss properties or include claims data for any individual property.
For more information on California Regulation and the NFIP, please see California's Department of Water Resources Quick Guide here: http://www.water.ca.gov/floodmgmt/lrafmo/fmb/docs/CAQG-screen.pdf

4.5.2 Past Occurrences

Severe weather events leading to flooding are listed in Table 4-7; several major events are discussed below.

[1] An improved property owner may not carry flood insurance for a number of reasons; not everyone is required to carry flood insurance. Structures carrying federally-backed mortgages that are in a SFHA are required to carry flood insurance in the County of San Bernardino. Owners who have completed the terms of the mortgage or who purchased their property outright may not choose to carry flood insurance and instead bear the costs of recovery on their own.

Table 4-7: Severe Weather Events 2010-Present

Date	Type
1/18/2010	January 2010 Winter Storms
12/17/2010	Highland Flooding Incident
8/25/2013	Flooding- Remnants of Tropical Storm Ivo
11/21/2013	Winter Storms
2/28/2014	Winter Storm
8/3/2014	Thunderstorms, heavy rain, flash flooding, mudslides
7/6/2015	Flash flooding resulting from Lake Fire
7/30/2015	Severe Thunderstorms
1/6/2016	Strong rain, flooding and mudslides
8/22/16	Flash flooding from storm system

4.5.3 Location/Geographic Extent

Table 4-8 shows the number of acres and square miles that lie in flood hazard areas within the County. Figure 4-10 provides flood hazard data for San Bernardino County as mapped in FEMA's National Flood Hazard Layer for California (April, 2010). Mapped areas include areas subject to inundation by the 1% Annual Chance Flood (also referred to as the 100-year flood), and areas subject to inundation in the 0.2% Annual Chance Flood (500-year flood).

Table 4-8: San Bernardino County Flood Hazard Area

Flood Hazard Type	Sum of Acres	Sum of Square Miles
100-Year Flood	65,209	101.89
100-Year, Floodway	13,968	21.83
500-Year Flood	13,838	21.62
500-Year, Protected by Levee	4,336	7
Total	**97,351**	**152.11**

Table 4-9 shows a land use compatibility chart for 100 year flood plains.

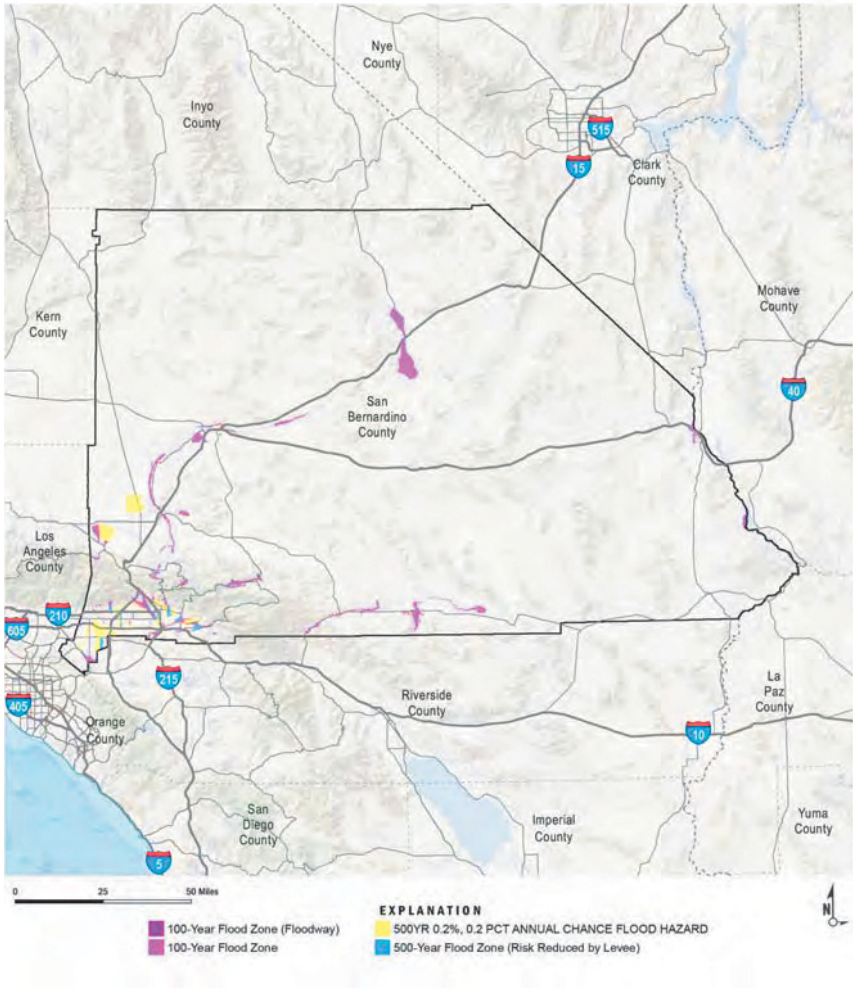


Figure 4-10: Flood Hazard Severity Zone Map

Table 4-9: Land Use Compatibility Chart for 100 Year Flood Plains (General Plan Table S-1)

Land Uses	Compatibility in 100-Year Floodplains
Critical Nuclear related systems; explosives or hazardous materials/ manufacturing, handling or storage; hospitals and other emergency medical facilities.	Restricted
Essential Police, fire and communications systems; Emergency Operations Centers (EOC's); electric power inter-tie systems; power plants; utility substations; sewage treatment plants; water-works; local gas and electric distribution lines; aqueducts; major pipelines; major highways, bridges and tunnels; ambulance services; public assembly sites with 300 or more capacity; schools.	Restricted
High Occupancy Multi-family residential of 20 or more units; major commercial including large shopping centers; office buildings; large hotels; health care clinics and convalescent homes; heavy industry; gas stations.	Generally Incompatible
Normal-Low Risk Single-family and two-family residential; multi-family of less than 20 units; small scale commercial; small hotels, motels; light industry; warehousing.	Generally Incompatible

Restricted unless alternative sites are not available or feasible and it is demonstrated that, although mitigation may be difficult, hazards will be adequately mitigated. Generally Incompatible Restricted unless site investigation demonstrates that site is suitable or that hazards will be adequately mitigated.

4.5.4 Magnitude/Severity

4.5.4.1 Flash Flooding

Flash flooding tends to occur in the summer and early fall because of the monsoon rains and is typified by increased humidity and high summer temperatures.

The desert area contains many mountain ranges that are steep and experience summer thunder storms causing flash floods in many dry washes on the desert floor. The water collects in dry lake beds throughout the desert area.

Environmental permit processing has delayed or prohibited work in the washes to provide flow lines to many bridges on county highways. Many highways do not have bridges but convey water across the road with dip crossings. Flash flooding cause's road and bridge wash outs and erosion of earthen channels and basins when they occur near these facilities.

Cities and towns often experience street closures for several days due to sediment transport and road damage. Because of the sheet flow character of the desert, many private properties experience erosion and sediment deposits. The urban valley also can experience flash flooding in its narrow canyons and within the many unimproved creeks and interim channels feeding the Santa Ana River. The valley floor in many areas is very flat so even minor rain events can produce flooding of roads and private property. In coordination with local jurisdictions, the County of San Bernardino Flood Control District has prepared Master Drainage plans for many cities and towns to provide a plan for reducing flooding due to minor storms. Maps can be found on the County's Department of Public Works website here: http://cms.sbcounty.gov/dpw/FloodControl/Planning/MPD.aspx

However, local resources are not sufficient to cover the cost of the construction of the drainage systems. The densely populated (75% of the county population) urban valley region contains the headwaters of the Santa Ana River. The San Gabriel and San Bernardino Mountains border the North side of the valley are steep reaching 5,000 feet with alluvial fans which are developed and densely populated.

4.5.5 Frequency/Probability of Future Occurrences

The Flood Insurance Rate Map (FIRM) not only identifies the flood hazard zones for insurance and floodplain management purposes, but also provides a statement of probability of future occurrence.

A 500-year flood has a 0.2-percent chance of occurring in any given year; a 100-year flood has a 1-percent chance, a 50-year flood has a 2-percent chance, and a 10-year flood has a 10-percent chance of occurrence. Although the recurrence interval represents the long-term average period between floods of specific magnitude, significant floods could occur at shorter intervals or even within the same year. The FIRM maps typically identify components of the 500-year and 100-year floodplains

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4.6 Drought



Drought is a normal, recurrent feature of climate. It occurs almost everywhere, although its features vary from region to region. Drought severity depends on numerous factors, including duration, intensity, and geographic extent, as well as regional water supply demands by humans and vegetation. The severity of drought can be aggravated by other climatic factors, such as prolonged high winds and low relative humidity.

Drought originates from a deficiency of precipitation over an extended period, usually one or more seasons. Drought can result in a water shortage for some activity, group, or environmental sector. Drought is a complex natural hazard, which is reflected in the following four definitions commonly used to describe it:

- Agricultural – drought is defined principally in terms of naturally occurring soil moisture deficiencies relative to water demands of plant life, usually arid crops.
- Hydrological – drought is related to the effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
- Meteorological – drought is defined solely on the degree of dryness, expressed as a departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
- Socioeconomic – drought associates the supply and demand of economic goods or services with elements of meteorological, hydrologic, and agricultural drought. Socioeconomic drought occurs when the demand for water exceeds the supply as a result of weather-related supply shortfall. It may also be called a water management drought.

Although climate is a primary contributor to hydrological drought, other factors such as changes in land use (e.g., deforestation), land degradation, and the construction of dams all affect the hydrological characteristics of the basin. Since regions are interconnected by hydrologic systems, the impact of meteorological drought may extend well beyond the borders of the precipitation-deficient area. Similarly, changes in land use upstream may alter hydrologic characteristics such as infiltration and runoff rates, resulting in more variable streamflow and a higher incidence of hydrologic drought downstream. Land use change is one of the ways human actions alter the frequency of water shortage even when no change in the frequency of meteorological drought has been observed.

4.6.1 Regulatory Environment

The County and participating jurisdictions have a number of regulatory requirements and documents to address planning for drought in the County. This includes Watershed Water Quality Management Plans (WQMP) for San Bernardino County and the Mojave and Santa Ana Watersheds. On June 21st, 2013, the Executive Officer approved the revised Technical Guidance Document for Water Quality Management Plan (TGD-WQMP).

The 1972 Federal Water Pollution Control Act, also known as the Clean Water Act (CWA) provides the basis for the protection of all inland surface waters, estuaries, and coastal waters. California's Porter-Cologne Water Quality Control Act of 1970 established the Regional Water Quality Control Board as the agency responsible for implementing the CWA and Porter-Cologne requirements in the Santa Ana Watershed.

In 2006, California State lawmakers adopted AB 1881. This provided guidelines and timelines for the revision of the State's Model Water Efficient Landscape Ordinance (MWELO) and mandated that every city, county or other agency within the State adopt MWELO or be in compliance with it through their own ordinance by January 2010. On January 1, 2010 the San Bernardino County Water Efficient Landscape Ordinance was implemented. It can be obtained on the county website.

4.6.1.1 Watershed Water Quality Management Plan

San Bernardino County's WQMP draft was written in 2013 and final approval was given on June 21, 2013.

4.6.1.2 Technical Guidance Document for Water Quality Management Plan (TGD-WQMP)

Approved on June 21, 2013, this document provides direction to project proponents on the regulatory requirements applicable to a private or public development activity, including public works transportation projects, from project conception to completion.

4.6.2 Past Occurrences

- The 2013 California State MHMP states that from 1950 to 2012, there has been eight-drought State Emergency Proclamations in California. Specifically for San Bernardino County, there have been six drought events since 1896. Previous occurrences of drought are described as follows:

- **1975 to 1977:** California experienced the two driest years (1976 and 1977) in the State's history in 1976 and 1977. The drought was declared an Emergency (FEMA-EM-3023) on January 20, 1977. Total crop damages statewide totaled $2.67 billion dollars for both years ($888.5 million in 1976 and $1.8 billion in 1977).

- **2006 to 2009:** A California State-declared three-year drought of below-average rainfall, low snowmelt runoff, and the largest court-ordered water restricting in state's history. The dry conditions damaged crops, deteriorated water quality, and caused extreme wildfire danger. Approximately $300 million in agricultural revenue loss, and a potential $3 billion in economic losses over time.

- **2012 to 2016:** San Bernardino County first declared a local drought emergency in 2014. As of May 23rd, 2016, San Bernardino County and the City of Rancho Cucamonga had both submitted local Emergency Proclamations. This ongoing drought is the most severe drought in over 100 years. In order to abide by the State Water Resources Control Board's mandatory water reductions, the San Bernardino Municipal Water Department Board of Water Commissioners authorized implementation of Stage IIA of the department's Water Supply Contingency Plan on June 1, 2015. The State Water Board will adjust emergency water conservation regulations through the end of January 2017, in recognition of the differing water supply conditions across the state, and develop proposed emergency water restrictions for 2017 if the drought persists.

Additional information about previous occurrences of droughts in California (in general) can be obtained from the California DWR.

4.6.3 Location/Geographic Extent

Drought can affect the County, region, and the State of California as a whole. The County's primary source of water is imported by the San Bernardino Valley Municipal Water District (http://www.sbvmwd.com/about-us/what-we-do) through participation in the State Water Project (SWP). It is received at the Devil Canyon Power Plant Afterbay. This supply is supplemented by groundwater basins in the County. Drought has no defined geographical boundaries and cannot be depicted in map form. As such, the entire County is subject to drought.

4.6.4 Magnitude/Severity

The magnitude of drought is usually measured in time and the severity of the hydrologic deficit. There are several resources available to evaluate drought status and estimate future expected conditions. The National Integrated Drought Information System (NIDIS) Act of 2006 (Public Law 109-430) prescribes an interagency approach for drought monitoring, forecasting, and early warning. The NIDIS maintains the U.S. Drought Portal (www.drought.gov) which is a web-based

access point to several drought related resources. Resources include the U.S. Drought Monitor (USDM) and the U.S. Seasonal Drought Outlook (USSDO).

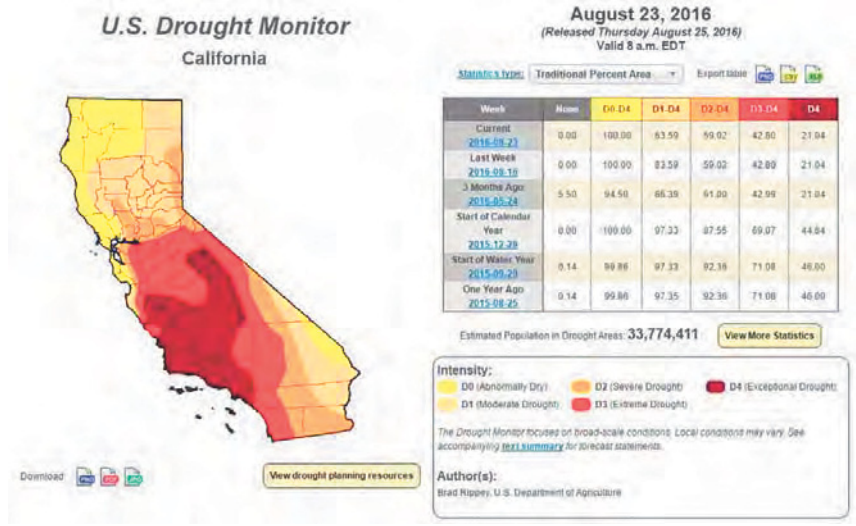


Figure 4-11: US Drought Monitor Map for the State of California on August 23, 2016

The USDM provides a summary of drought conditions across the United States and Puerto Rico and is developed and maintained by the National Drought Mitigation Center (www.drought.unl.edu). USDM includes the U.S. Drought Monitor Map. This map is updated weekly by combining a variety of drought database and indicators, and local expert input into a single composite drought indicator. The map denotes four levels of drought intensity (ranging from D1 - D4) and one level of "abnormal dryness" (D0). In addition, the map depicts areas experiencing agricultural (A) or hydrological (H) drought impacts. These impact indicators help communicate whether short or long-term precipitation deficits are occurring. An example Drought Monitor Map for the State of California for August 23, 2016 is illustrated in Figure 4-11.

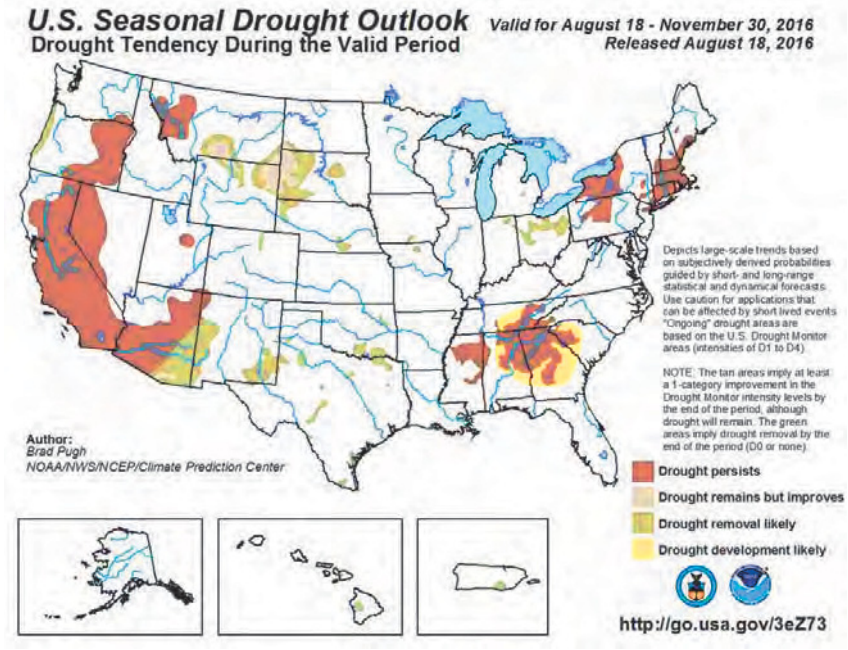


Figure 4-12: USSDO Drought Tendency Map (Valid August 18-November 30, 2016

For western States with mountainous terrain and complex regional microclimates, it is also useful to supplement the PDSI values with other indices such as Surface Water Supply Index and Standardized Precipitation Index (SPI). The Surface Water Supply Index takes snowpack and other unique conditions into account. The National Drought Mitigation Center (NDMC) uses the SPI to identify emerging drought months sooner than the PDSI. It is computed on various time scales to monitor moisture supply conditions. The SPI is the number of standard deviations that precipitation value would deviate from the long-term mean. As shown in Figure 4-13 the 72-month SPI through the end of August 2016 for San Bernardino County is low.

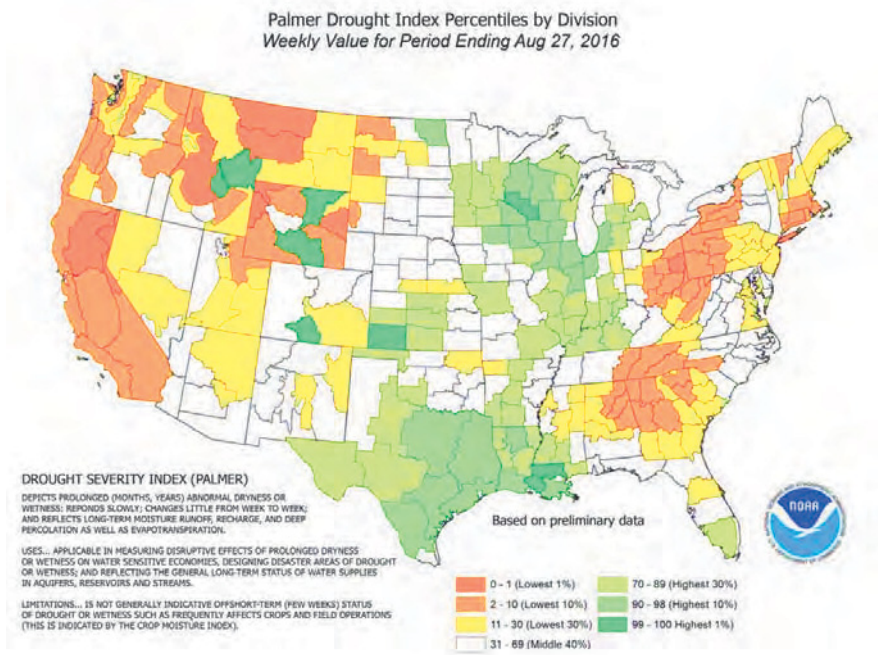


Figure 4-13: Month SPI through the end of August 2016 for San Bernardino County

A number of indices measure how much precipitation for a given period has deviated from historically established norms. The primary indicator for the USDM and USSDO for the western United States is the Palmer Drought Severity Index (PDSI). The PDSI is widely used by the USDA to determine when to grant emergency drought assistance to affected areas. PDSI is a commonly used index that measures the severity of drought for agriculture and water resource management. It is calculated from observed temperature and precipitation values and estimates soil moisture. However, the PDSI is not considered consistent enough to characterize the risk of drought on a nationwide basis (FEMA, 1997) and is not well suited to the dry, mountainous areas in the western U.S.

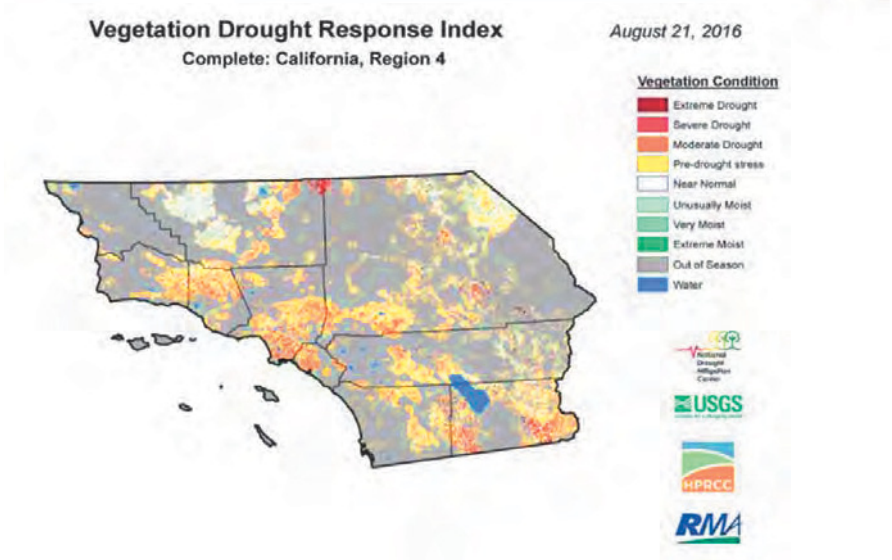


Figure 4-14: Vegetation Drought Response Index – California Region 4 for August 21, 2016

The Vegetation Drought Response Index, or VegDRI, is a bi-weekly depiction of vegetation stress across the contiguous United States. VegDRI is a fine resolution (1-km^2) index based on remote sensing data, and incorporates climate and biophysical data to determine the cause of vegetation stress. Development of the VegDRI map and associated products is a joint effort by the National Drought Mitigation Center (NDMC), the U.S. Geological Survey's (USGS) National Center for Earth Resources Observation and Science (EROS), and the High Plains Regional Climate Center (HPRCC). Figure 4-14 illustrates the VegDRI results for Southern California for August 21, 2016.

4.6.5 Frequency/Probability of Future Occurrences

Currently there is no data on the probability of drought that would be comparable to the USGS effort on earthquakes in the region, or how 100-year flood maps are created.

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4.7 Terrorism



This section was added due to the December 2, 2015 terror attack in San Bernardino County. There is no single, universally accepted definition of terrorism; however, FEMA defines "terrorism" as intentional, criminal, malicious acts. FEMA document 386-7 refers to terrorism specifically as the use of Weapons of Mass Destruction (WMD), including biological, chemical, nuclear, and radiological weapons; arson, incendiary, explosive, and armed attacks; industrial sabotage and intentional hazardous materials releases; and "cyberterrorism."

FEMA developed the Integrated Emergency Management System (IEMS) using an all-hazards approach. While the IEMS was established as an "all-hazard" approach, responding to the threat of terrorism (referred to as counterterrorism) came to be viewed as the responsibility of law enforcement, defense, and intelligence agencies. Furthermore, defensive efforts to protect people and facilities from terrorism (referred to as antiterrorism) were generally limited to the government sector, the military, and some industrial interests.

While the term "mitigation" refers generally to activities that reduce loss of life and property by eliminating or reducing the effects of disasters, in the terrorism context it is often interpreted to include a wide variety of preparedness and response actions. For the purposes of this document, the traditional meaning will be assumed; that mitigation refers to specific actions that can be taken to reduce loss of life and property from manmade hazards by "modifying the built environment" or antiterrorism to reduce the risk and potential consequences of these hazards.

4.7.1 Antiterrorism Regulatory Environment

Adopted on February 9, 2012 and updated on October 1, 2013, United Facilities Criteria (UFC) 4-010-01 defines the United States Department of Defense's (DoD) minimum antiterrorism standards for both new and existing buildings. The document applies to DoD buildings, National Guard buildings, visitor centers and museums, visitor control facilities and expeditionary structures. Historic preservation compliance for implementation of anti-terrorism standards, philosophy, design strategies and assumptions are all taken into account. Site planning, structural design, architectural design, and electrical and mechanical design are discussed in detail in Appendix B.
https://www.fema.gov/news-release/2004/01/13/dhs-announces-new-building-science-guidelines-enhance-terrorism-resistance

4.7.2 Counterterrorism Regulatory Environment

After the 12/2/15 mass shooting, two full time positions with a regional FBI-led terrorist task force (FBI's Joint Terrorism Task Force) were created. These task force officers have the clearance to conduct terrorism investigations in the County. The Task Force includes partners from Homeland Security Investigations (HSI), the San Bernardino Police Department, the San Bernardino County Sheriff's Department, the Riverside County Sheriff's Department, the Ontario Police Department, the Riverside Police Department, the Corona Police Department and the Chino Police Department. For more information regarding the positions, contact the San Bernardino Police Department at (909) 384-5742. Read more here: http://www.pe.com/articles/task-789539-force-san.html

The State of California Department of Justice's Anti-terrorism program works with federal, state and local law enforcement agencies to detect, investigate, prosecute, dismantle, prevent and respond to domestic and international terrorist activities. Read more here: https://oag.ca.gov/bi/atp

The State of California Bureau of Security and Investigative Services' Power to Arrest Course includes a Weapons of Mass Destruction (WMD) & Terrorism Awareness section. Read More Here: http://www.bsis.ca.gov/about_us/laws/bsis_regulations.pdf

4.7.3 Past Occurrences

There have been two terrorist attacks recorded in San Bernardino County. Table 4-10 describes both attacks.
Source: https://www.start.umd.edu/gtd/search/Results.aspx?search=san+bernardino&sa.x=0&sa.y=0&sa=Search

Table 4-10: Terrorist Attacks in San Bernardino County

Date	Perpetrator Group	Fatalities	Injured	Target Type
3/16/1970	White Extremists	0	1	Government (General)
12/2/2015	Unaffiliated Individuals	16	17	Government (General)

The state of California has experienced 574 terrorist attacks from 1970-2011 (Integrated United States Security Database (IUSSD): Data on the Terrorist Attacks in the United States Homeland, 1970-2011 2012). Figure 4-17 shows the types of terrorist attacks in the state of California from 1970 to the present.

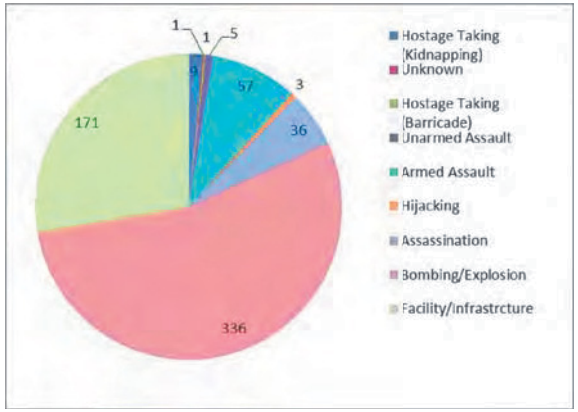
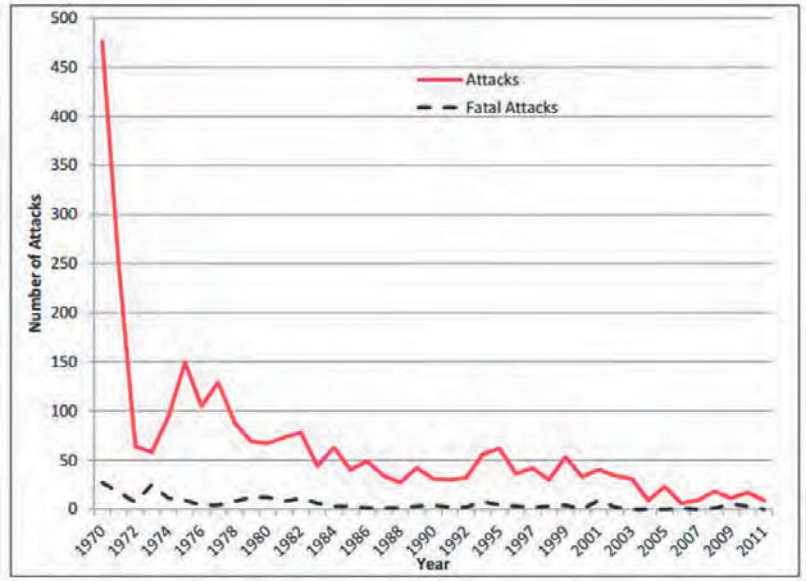


Figure 4-15: Types of Terrorist Attacks in California from 1970-Present

As seen in Figure 4-15 since 1970, the number of terrorist attacks in the United States has steadily decreased. According to http://www.heritage.org most terrorist attacks on America happen outside our nation's borders. The number of international terrorist attacks against the United States from 1970-2011 is shown in Figure 4-16 and Figure 4-17.



Note: There were 2,608 total attacks and 226 fatal attacks between 1970 and 2011.

Figure 4-16: Total and Fatal Terrorist Attacks in the United States by Year

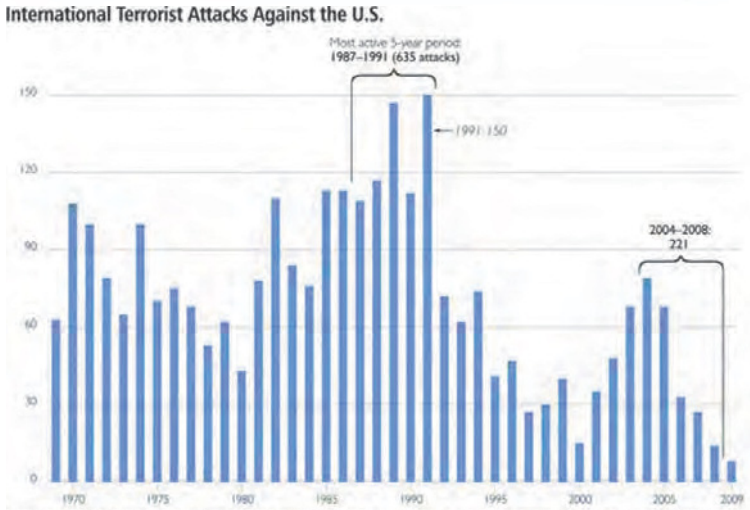


Figure 4-17: International Terrorist Attacks Against the United States

4.7.4 Location/Geographic Extent

Unlike natural hazards, which often follow patterns and can be forecasted, manmade hazards such as acts of terrorism are much more unpredictable. Terrorists have the ability to choose targets and tactics and can often adjust conditions to achieve their objective. Terrorist attacks are often in a more specific location rather than a widespread, more predictable area such as a flood plain. As demonstrated in the 12/2/15 mass shooting, "homegrown terrorists" (self-radicalizing and pulls off their attacks without any help or communication with people in other countries) are even harder to detect and predict.

Translating most manmade hazard profiles into meaningful geospatial information is difficult at best. Instead, the planning team will use an asset-specific approach, identifying potentially at-risk critical facilities and systems in the community. Once a comprehensive list of assets has been developed, it will be prioritized so that the community's efforts can be directed to protect the most

important assets first. Then, beginning with the highest priority assets, the vulnerabilities of each facility or system to each type of hazard will be assessed (FEMA 2003).

4.7.5 Magnitude/Severity

As previously discussed, predicting terrorist attacks cannot be done with the same level of accuracy as predicting a natural hazard and its potential impacts on the community. However, we can learn from past terrorist incidents. Table 4-11 profiles 10 different types of terrorist attacks and technological hazards.

Table 4-11: Event Profiles for Terrorism and Technological Hazards

Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
Conventional Bomb/ Improvised Explosive Device	Detonation of explosive device on or near target; delivery via person, vehicle, or projectile.	Instantaneous; additional "secondary devices" may be used, lengthening the time duration of the hazard until the attack site is determined to be clear	Extent of damage is determined by type and quantity of explosive. Effects generally static other than cascading consequences, incremental structural failure, etc.	Overpressure at a given standoff is inversely proportional to the cube of the distance from the blast; thus, each additional increment of standoff provides progressively more protection. Terrain, forestation, structures, etc. can provide shielding by absorbing and/or deflecting energy and debris. Exacerbating conditions include ease of access to target; lack of barriers/shielding; poor construction; and ease of concealment of device
Chemical Agent *	Liquid/aerosol contaminants can be dispersed using sprayers or other aerosol generators; liquids vaporizing from puddles/ containers; or munitions.	Chemical agents may pose viable threats for hours to weeks depending on the agent and the conditions in which it exists.	Contamination can be carried out of the initial target area by persons, vehicles, water and wind. Chemicals may be corrosive or otherwise damaging over time if not remediated.	Air temperature can affect evaporation of aerosols. Ground temperature affects evaporation of liquids. Humidity can enlarge aerosol particles, reducing inhalation hazard. Precipitation can dilute and disperse agents but

Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
				can spread contamination. Wind can disperse vapors but also cause target area to be dynamic. The micro-meteorological effects of buildings and terrain can alter travel and duration of agents. Shielding in the form of sheltering in place can protect people and property from harmful effects.
Arson/ Incendiary Attack	Initiation of fire or explosion on or near target via direct contact or remotely via projectile.	Generally minutes to hours.	Extent of damage is determined by type and quantity of device/ accelerant and materials present at or near target. Effects generally static other than cascading consequences, incremental structural failure, etc.	Mitigation factors include built-in fire detection and protection systems and fire-resistive construction techniques. Inadequate security can allow easy access to target, easy concealment of an incendiary device and undetected initiation of a fire. Non-compliance with fire and building codes as well as failure to maintain existing fire protection systems can substantially increase the effectiveness of a fire weapon.
Armed Attack	Tactical assault or sniping from remote location.	Generally minutes to days.	Varies based upon the perpetrators' intent and capabilities	Inadequate security can allow easy access to target, easy concealment of weapons and undetected initiation of an attack.
Biological Agent *	Liquid or solid contaminants can be dispersed using sprayers/aerosol generators or by point or line	Biological agents may pose viable threats for hours to years depending on the agent and the	Depending on the agent used and the effectiveness with which it is deployed, contamination can	Altitude of release above ground can affect dispersion; sunlight is destructive to many bacteria and viruses; light to

Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
	sources such as munitions, covert deposits and moving sprayers.	conditions in which it exists	be spread via wind and water. Infection can be spread via human or animal vectors.	moderate wind will disperse agents but higher winds can break up aerosol clouds; the micro-meteorological effects of building and terrain can influence aerosolization and travel of agents.
Cyberterrorism	Electronic attack using one computer system against another.	Minutes to days	Generally no direct effects on built environment.	Inadequate security can facilitate access to critical computer systems, allowing them to be used to conduct attacks.
Agriterrorism	Direct, generally covert contamination of food supplies or introduction of pests and/or disease agents to crops and livestock.	Days to months	Varies by type of incident. Food contamination events may be limited to discrete distribution sites, whereas pests and diseases may spread widely. Generally no effects on built environment.	Inadequate security can facilitate adulteration of food and introduction of pests and disease agents to crops and livestock.
Radiological Agent **	Radioactive contaminants can be dispersed using sprayers/aerosol generators, or by point or line sources such as munitions, covert deposits and moving sprayers.	Contaminants may remain hazardous for seconds to years depending on material used.	Initial effects will be localized to site of attack; depending on meteorological conditions, subsequent behavior of radioactive contaminants may be dynamic.	Duration of exposure, distance from source of radiation, and the amount of shielding between source and target determine exposure to radiation.
Nuclear Bomb **	Detonation of nuclear device underground, at the surface, in the air or at high altitude.	Light/heat flash and blast/shock wave last for seconds; nuclear radiation and fallout hazards can persist for years. Electromagnetic pulse from a high altitude detonation lasts for seconds and affects only	Initial light, heat and blast effects of a subsurface, ground or air burst are static and are determined by the device's characteristics and employment; fallout of radioactive contaminants may	Harmful effects of radiation can be reduced by minimizing the time of exposure. Light, heat and blast energy decrease logarithmically as a function of distance from seat of blast. Terrain, forestation, structures, etc. can provide shielding by

Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
		unprotected electronic systems.	be dynamic, depending on meteorological conditions.	absorbing and/or deflecting radiation and radioactive contaminants.
Hazardous Material Release (fixed facility or transportation)	Solid, liquid and/or gaseous contaminants may be released from fixed or mobile containers.	Hours to days	Chemicals may be corrosive or otherwise damaging over time. Explosion and/or fire may be subsequent. Contamination may be carried out of the incident area by persons, vehicles, water and wind.	As with chemical weapons, weather conditions will directly affect how the hazard develops. The micro-meteorological effects of building and terrain can alter travel and duration of agents. Shielding in the form of sheltering in place can protect people and property from harmful effects. Non-compliance with fire and building codes as well as failure to maintain existing fire protection and containment features can substantially increase the damage from a hazardous materials release.

* Source: Jane's Chem-Bio Handbook
** Source: FEMA, Radiological Emergency Management Independent Study Course

4.7.6 Frequency/Probability of Future Occurrences

We can usually forecast the type, frequency and location of a natural hazard thanks to the laws of physics and nature. However, when dealing with manmade hazards such as terrorism, we are often dealing with functions of the human mind-malevolence, incompetence, carelessness and other behaviors. These actions cannot be predicted with any accuracy; therefore, there is the potential for an act of terrorism to occur anywhere, at any time.

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4.8 Climate Change



Climate change refers to any distinct change in measures of climate lasting for a long period of time, more specifically major changes in temperature, rainfall, snow, or wind patterns. Climate change may be limited to a specific region, or may occur across the whole Earth. Climate change may result from:

- Natural factors (e.g., changes in the Sun's energy or slow changes in the Earth's orbit around the Sun);
- Natural processes within the climate system (e.g., changes in ocean circulation); and
- Human activities that change the atmosphere's make-up (e.g., burning fossil fuels) and the land surface (e.g., cutting down forests, planting trees, building developments in cities and suburbs, etc.).

The effects of climate change are varied: warmer and more varied weather patterns, melting ice caps, and poor air quality, for example. As a result, climate change impacts a number of natural hazards.

The 2013 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing.

4.8.1 Regulatory Environment

California's response to climate change is directed by Legislation and Regulations and by other Mandates such as executive orders.

4.8.1.1 The Sustainable Communities and Climate Protection Act of 2008

The Sustainable Communities and Climate Protection Act of 2008 (Sustainable Communities Act, SB 375, Chapter 728, Statutes of 2008) looks to reduce GHG emissions through coordinated transportation and land use planning with the goal of more sustainable communities. Regional targets are established for GHG emissions reductions from passenger vehicle use by the sustainable communities strategy (SCS) established by each metropolitan planning organization (MPO). The SCS is an integral part of the regional transportation plan (RTP) and contains land use, housing, and transportation strategies to meet GHG reductions targets. In San Bernardino County, the South Coast Air Quality Management District facilitates compliance with the federal Clean Air Act and implements the state's air quality program.

The Office of Planning and Research's General Plan Guidelines and SB 375 builds upon Assembly Bill 162 (flood protection) and Senate Bill 1241 (fire protection) and supports Safeguarding California implementation.

SB 375 also supports Assembly Bill 2140 which requires that a City/County General Plan contains a safety element in addition to a Hazard Mitigation Plan. AB 2140 also requires a vulnerability assessment, adaptation goals, policies and objectives, and a set of feasible implementation measures.

4.8.1.2 California Adaptation Planning Guide (APG)

The State of California has been taking action to address climate change for over 20 years, focusing on both greenhouse gas emissions reduction and adaptation. The California Adaptation Planning Guide (APG) continues the state's effort by providing guidance and support for communities addressing the unavoidable consequences of climate change.

Based on upon specific factors, 11 Climate impact regions were identified. Some of the regions were based on specific factors particularly relevant to the region. As illustrated in Figure 4-18 San Bernardino County is located in the Desert Region.

The Desert is a heavily urbanized inland region (4.3+ million people) made up of sprawling suburban development in the west near the South Coast region and vast stretches of open, largely federally owned desert land to the east. Prominent cities within the desert portion include Palm Springs (44,500+) and El Centro (42,500+). The region's character is defined largely by the San Gabriel Mountains, San Gorgonio Mountains, San Jacinto Mountains, and smaller inland mountains reaching through the desert to the Colorado River, which borders the region on the east. Communities in the Desert region should consider evaluating the following climate change impacts:

- Reduced water supply
- Increased temperature
- Reduced precipitation
- Diminished snowpack
- Wildfire risk
- Public health and social vulnerability
- Stress on special-status species

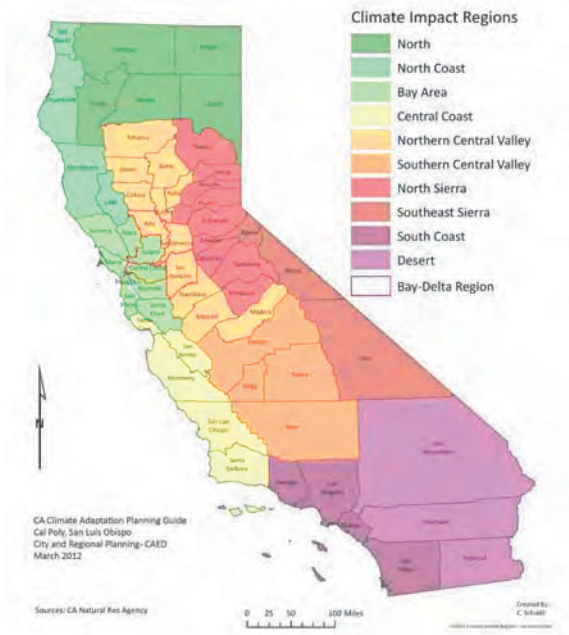


Figure 4-18: Climate Impact Regions

4.8.2 Past Occurrences

Climate change has never been directly responsible for any declared disasters. Past flooding, wildfire, levee failure, and drought disasters may have been exacerbated by climate change, but it is impossible to make direct connections to individual disasters. In addition, unlike earthquake and floods that occur over a finite time period, climate change is an on-going hazard the effects of which some are already experiencing. Other effects may not be seriously experienced for decades, or may be avoided altogether by mitigation actions taken today.

4.8.3 Location/Geographic Extent

The effects of climate change are not limited by geographical borders. San Bernardino County, the State of California, the United States, and the rest of the world are all at risk to climate change. As such, the entire County is at risk to the effects of climate change.

Figure 4-19 and Figure 4-20 provide Cal Adapt[2] modeled decadal July high temperature averages for 2010 and 2090. These figures provide current decade-long July temperature averages and possible annual high heating trends for the remaining portion of the century. The data presented in the figures represent a "projection" of potential future climate scenarios, they are not predictions. These figures illustrate how the climate may change based on a variety of different potential social and economic factors. The visualizations are comprised of average values from Coupled Climate model 2.1 (GFDL), Community Climate System Model Version 3 (CCSM3), Coupled Global Climate Model Version 3 (CNRM) and Parallel Climate Model 1 (PCM1). During the next few decades, scenarios project average temperature to rise between 1° and 2.3°F; however, the projected temperature increases begin to diverge at mid-century so that, by the end of the century, the temperature increases projected in the higher emissions scenario (A2) are approximately twice as high as those projected in the lower emissions scenario (B1). Customizable maps can be viewed at http://cal-adapt.org/temperature/decadal/

[2] Cal-Adapt has been funded to provide access to data and information that has been produced by the State's scientific and research community. The data available in this site offer a view of how climate change might affect California at the local level.

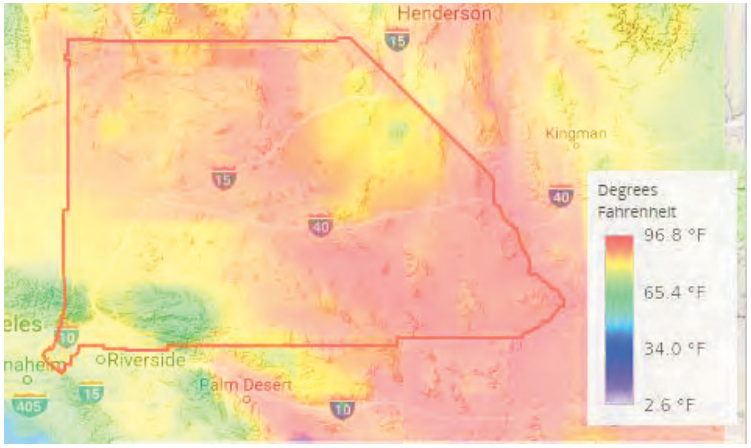


Figure 4-19: July Decadal Average High Temperature Map; 2010

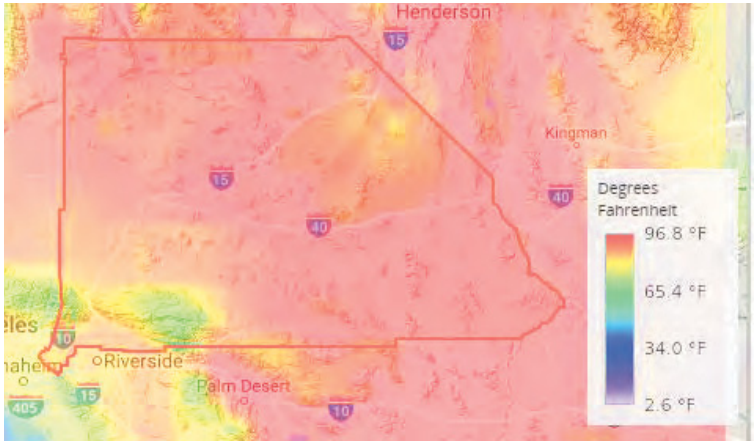


Figure 4-20: July Decadal Average High Temperature Map; 2090

4.8.4 Magnitude/Severity

The California Climate Adaptation Strategy (CAS), citing a California Energy Commission study, states that "over the past 15 years, heat waves have claimed more lives in California than all other declared disaster events combined." This study shows that California is getting warmer, leading to an increased frequency, magnitude, and duration of heat waves. These factors may lead to increased mortality from excessive heat, as shown in Figure 4-21: California Historical and Projected Temperature Increases 1961 to 2099

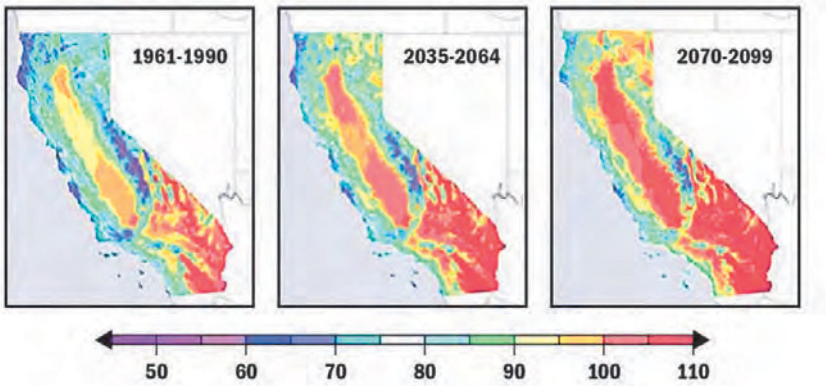


Figure 4-21: California Historical and Projected Temperature increases 1961-2099

Source: Dan Cayan; California Climate Adaptation Strategy

4.8.5 Frequency/Probability of Future Occurrences

According to the ABAG 2010 Local Hazard Mitigation Plan (LHMP), climate change is one of the few natural hazards where the probability of occurrence is influenced by human action. In addition, unlike earthquake and floods that occur over a finite time period, climate change is an on-going hazard.

The 2009 Climate Adaptation Strategy (CAS) delineated how climate change may impact and exacerbate natural hazards in the future, including wildfires, extreme heat, floods, drought, and levee failure:

Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in San Bernardino County and the rest of California, which

are likely to increase the risk of mortality and morbidity due to heat-related illness and exacerbation of existing chronic health conditions. Those most at risk and vulnerable to climate-related illness are the elderly, individuals with chronic conditions such as heart and lung disease, diabetes, and mental illnesses, infants, the socially or economically disadvantaged, and those who work outdoors.

- Higher temperatures will melt the Sierra snowpack earlier and drive the snowline higher, resulting in less snowpack to supply water to California users.
- Droughts are likely to become more frequent and persistent in the 21st century.
- Intense rainfall events, periodically ones with larger than historical runoff, will continue to affect California with more frequent and/or more extensive flooding.
- Storms and snowmelt may coincide and produce higher winter runoff from the landward side, while accelerating sea-level rise will produce higher storm surges during coastal storms. Together, these changes will increase the probability of levee and dam failures in the Sacramento-San Joaquin Delta.
- Warmer weather, reduced snowpack, and earlier snowmelt can be expected to increase wildfire through fuel hazards and ignition risks. These changes can also increase plant moisture stress and insect populations, both of which affect forest health and reduce forest resilience to wildfires. An increase in wildfire intensity and extent will increase public safety risks, property damage, fire suppression and emergency response costs to government, watershed and water quality impacts, vegetation conversions and habitat fragmentation.

4.8.6 El Niño Effect

El Niño is defined as an abnormal weather pattern that is caused by the warming of the Pacific Ocean near the equator, off the coast of South America. This occurs when the normal trade winds weaken (or even reverse), which lets the warm water that is usually found in the western Pacific flow instead towards the east. This warm water displaces the cooler water that is normally found near the surface of the eastern Pacific, setting off atmospheric changes that affect weather patterns in many parts of the world.

As a result of the predicted El Niño in 2015 the following meetings were held during the months of January – December 2015:

El Niño Awareness Program

- **January - December 2015**

- **October 28, 2015** (Two meetings) two separate meetings one with the Public with 200 High Desert residents attending, the other meeting was at the same location of the Victor Ville City Council Chambers of 80 operators
- **November 9, 2015** South Desert Meeting at the Town of Yucca Valley Community Center, with 50 Operators and 235 general public ,residents
- **November 12, 2015** 2:30pm-4:30pm Valley Cooperators Meeting, City of Rancho Cucamonga, Victoria Gardens, 90 Operators and 2nd Meeting at the same location held at 530pm-730pm meeting with 205 public and residents
- **November 16, 2015** Public Meeting at Upland city Hal l for San Antonio heights, Mt. Baldy and local residents 110 Public and Residents in attendance .
- **November 23, 2015** Wrightwood Community Center, 80 Operators and 330 Public and Residents
- **November 24, 2015** City of Yucaipa 40 operators at Yucaipa City Hall
- **December, 2015** 5000 English pamphlets and 5000 Spanish pamphlets distributed Winter Weather Workshop meetings (discuss long term weather models and predictions as far as estimated rain fall anticipated. and Extreme Heat Program meetings (stakeholder and Red Cross and SCE and other responders/operators meetings on anticipated overly hot days and local assistance plans. program in place by OES.

4.8.7 Extreme Weather

The Extreme Weather – Excessive Heat Standard Operating Guidelines (SOG) were developed in response to the potential for Excessive Heat and heat related Power Outage events in San Bernardino County. The following objectives and activities have been established to prevent the harmful effects of excessive heat on at-risk populations and the potential for life-threatening repercussions of power outages during excessive heat events.

The Extreme Weather – Excessive Heat SOG describe the County operations during heat related emergencies and provide guidance for local jurisdictions in their preparation for heat emergencies and other related activities.

The information included in this document is “situation” and/or “incident” driven and subject to revision by the Extreme Weather Committee as conditions warrant. Notifications are information dependent and modification of the activities in these guidelines may be required in response to changing conditions, situations and/or inaccurate weather predictions.
The Extreme Weather – Excessive Heat Standard Operating Guidelines (SOG) were developed through the collaborative efforts of the “Extreme Weather Committee”. The committee consists of

representatives from key County Departments and private sector partners who have a shared interest, responsibility and/or expertise in the County's preparation for an Excessive Heat event. It is designed to protect all of the County's population especially the most vulnerable populations.

For the last ten years the annual Winter Weather Workshop and Meeting brings together San Bernardino County Fire Office of Emergency Services with The San Bernardino County Special Districts key stakeholders and first responders as well as weather experts. The annual meeting is an accumulation of meetings with NOAA and other Meteorological experts on the possible winter weather outlook and forecast including possible precipitation levels and wide ranging forecasts.

The meeting includes discussions on possible plans of actions and response to flooding emergencies and or snow or white out events and the other possibility of continuing long duration droughts.

4.9 Other Hazards

As mentioned earlier, lower priority hazards are addressed at a lesser level of detail due to their relatively fewer impacts, as identified in the preceding hazard assessment section. The lower priority hazards for the unincorporated area are:

- Severe Thunderstorm
- Infestation
- Drought
- High Winds/Straight Line Winds
- Lightning
- Extreme Heat
- Hail
- Tornado

Although not part of the MJHMP, the remaining hazards are a part of the San Bernardino County 2007 General Plan and are addressed in the County Building Codes and Ordinance.

The information in this section provides an explicit representation of what a community stands to lose in a disaster. This is useful for county officials and other decision makers who will need to balance the costs of mitigation against the potential harm to citizens and damage to property. It provides comparable measurements of community natural hazard exposure and assists in determining which hazards and/or what parts of San Bernardino County to focus on making resilient to disaster first. Based upon possible assets at risk, hazard mitigation resources can be directed where need be, in-part, by a vulnerability assessment and information found in hazard profiles presented in Section 4.8.

4.10 Vulnerability Assessment

The information in this section provides an explicit representation of what a community stands to lose in a disaster. This is useful for county officials and other decision makers who will need to balance the costs of mitigation against the potential harm to citizens and damage to property. It provides comparable measurements of community natural hazard exposure[3] and assists in determining which hazards and/or what parts of San Bernardino County to focus on making resilient to disaster first. Based upon possible assets at risk, hazard mitigation resources can be directed where need be, in-part, by a vulnerability assessment and information found in hazard profiles presented in Section 4.2.

The vulnerability assessment is developed by providing the hazard mitigation analysts with quantitative and qualitative information for each hazard identified by the HMP Planning Team Through an exposure analysis, quantitative data is developed for each hazard. An exposure analysis provides quantities of people and assets at risk to particular hazards. Qualitative data has been developed and presented in this section for hazards without measurable data. Qualitative data provides information beyond quantities of people and assets at risk, but rather a description of how the hazard could affect a region like San Bernardino County.

Note: The hazard exposure analysis has been developed with best available data and follows methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses.

Note: There are other intangible losses that could result from a natural hazard event, such as losses of historic or cultural integrity or damage to the environment that are difficult to quantify. Other costs, including response and recovery costs, are often unrecoverable and are not addressed in this document.

4.10.1 Methodology

A vulnerability assessment was conducted for each of the identified priority hazards. Geospatial data is essential in determining population and assets exposed to particular hazards. Geospatial analysis can be conducted if a natural hazard has a particular spatial footprint that can be overlaid against the locations of people and assets. In San Bernardino County, wildfire, flood, earthquake, and landslides have known geographic extents and corresponding spatial information about each hazard.

Several sources of data are necessary to conduct a vulnerability analysis. Figure 4-22provides an exhibit of the data inputs and outputs used to create the vulnerability analysis results presented in this section. U.S. Census data is the primary source in determining natural hazard exposure to residents. Census data has been used to determine the population at risk, which is generally referred to as population exposure. Population exposure is provided for wildfire, flooding, earthquakes and landslides as potential hazards later in this section.

[3] Elements at risk; Risk inventory; Exposure encompasses all elements, processes, and subjects that might be affected by a hazardous event. Consequently, exposure is the presence of social, economic, environmental or cultural assets in areas that may be impacted by a hazard.

Together with the U.S. Census data, asset data was used to provide a snapshot of how City assets are affected by natural hazards. For purposes of this vulnerability analysis, asset data includes parcels and critical infrastructure within the San Bernardino County boundaries. Critical infrastructure is described as assets that are essential for people and a community to function. Critical infrastructure includes such as utilities, San Bernardino County owned facilities, bridges, schools, and other community facilities that provide essential services to residents.

Critical facilities data was developed from a variety of sources including San Bernardino County owned and maintained data, state and federal government datasets, and private industry datasets. A critical infrastructure spatial database was developed to translate critical facilities information into georeferenced[4] points. Critical facility points are intersected with the spatial hazard layers to develop a list of "at risk" critical facilities. The San Bernardino County critical facilities that intersect with natural hazards are referred to as facilities with hazard "exposure". Exposure results are presented later in this section.

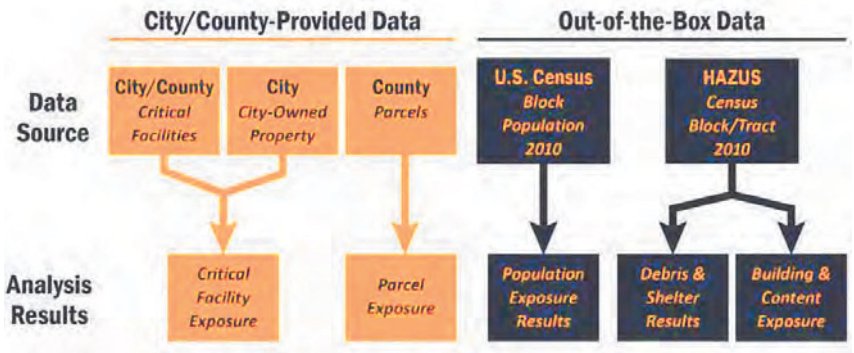


Figure 4-22: Data Source and Methodology

Lastly, FEMA's Hazus-MH MR5 (Hazus) software was implemented to conduct detailed loss estimation for flood and earthquake. Hazus is a nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. HAZUS uses Geographic Information Systems (GIS) technology to estimate physical, economic, and social impacts of disasters. For purposes of this planning effort, Hazus was used to graphically illustrate the limits of identified high-risk locations due to possible earthquakes and floods.

[4] To georeference something means to define its existence in physical space. That is, establishing its location in terms of map projections or coordinate systems. The term is used both when establishing the relation between raster or vector images and coordinates, and when determining the spatial location of other geographical features.

The vulnerability and potential impacts from priority hazards that do not have specific mapped areas nor the data to support additional vulnerability analyses are discussed in more general terms in alphabetical order following the discussion on wildfire, flooding and earthquake hazards.

4.10.2 Hazus MH Inputs

FEMA's loss estimation software, Hazus MH, was used to analyze the San Bernardino County building risk to flood and earthquake hazards. Hazus contains a database of economic, demographic, building stock, transportation facilities, local geology, and other information that can be used for several steps in the risk assessment process. Hazus software operates on structure square footage, structure replacement, and content replacement costs aggregated to the census block and tract levels depending on type of hazard analysis. The following table provides value data for building categories at the census block and census tract levels. Census block and census tracts are used to provide input information for the Hazus analysis presented in this report.

The project team used the San Bernardino County Essential Facilities Risk Assessment (SBEFRA) project and incorporated the newly updated DFIRM data into HAZUS to assess potential losses in the mapped 100-year (with and without levee protection) and 500-year flood zones.

Note: The Hazus software utilizes different census level information inputs to develop loss estimates depending on the hazard module. The flood module uses census block information while the earthquake module uses census track information. It is important to understand the total values of each as estimated damage to the community is presented on a percent of total value basis.

Table 4-12: Hazus Flood Census Block Input Values

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (%)	Content Replacement Cost ($000)	Content Replacement Cost (%)	Total Value ($000)	Total Value (%)
Agricultural	$ 70,841	0.3%	$ 70,841	0.3%	$ 141,682	1%
Commercial	$ 1,208,163	4.4%	$ 1,231,690	4.5%	$ 2,439,853	9%
Education	$ 120,017	0.4%	$ 127,161	0.5%	$ 247,178	1%
Governmental	$ 34,216	0.1%	$ 43,192	0.2%	$ 77,408	0%
Industrial	$ 452,710	1.6%	$ 610,063	2.2%	$ 1,062,773	4%
Religion	$ 176,012	0.6%	$ 176,012	0.6%	$ 352,024	1%
Residential	$ 15,483,634	56.2%	$ 7,744,650	28.1%	$ 23,228,284	84%
Total	**$ 17,545,593**	**64%**	**$ 10,003,609**	**36%**	**$ 27,549,202**	**100 %**

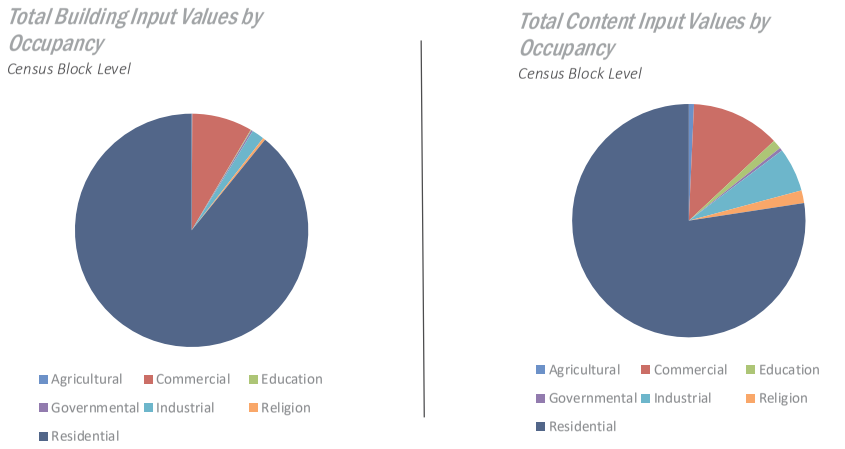


Figure 4-23: Census Block Building and Content Exposure Values

Table 4-13: Hazus Earthquake Census Tract Input Values

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (%)	Content Replacement Cost ($000)	Content Replacement Cost (%)	Total Value ($000)	Total Value (%)
Agricultural	$ 264,949	50.0%	$ 264,949	50.0%	$ 529,898	1%
Commercial	$ 11,056,871	48.5%	$ 11,756,479	51.5%	$ 22,813,350	9%
Education	$ 819,946	48.4%	$ 874,703	51.6%	$ 1,694,649	1%
Governmental	$ 265,933	45.6%	$ 316,930	54.4%	$ 582,863	0%
Industrial	$ 3,733,265	41.4%	$ 5,276,431	58.6%	$ 9,009,696	4%
Religion	$ 958,122	50.0%	$ 958,122	50.0%	$ 1,916,244	1%
Residential	$ 84,302,884	66.7%	$ 42,159,954	33.3%	$ 126,462,838	84%
Total	**$ 101,401,970**	**62%**	**$ 61,607,568**	**38%**	**$ 163,009,538**	**100 %**

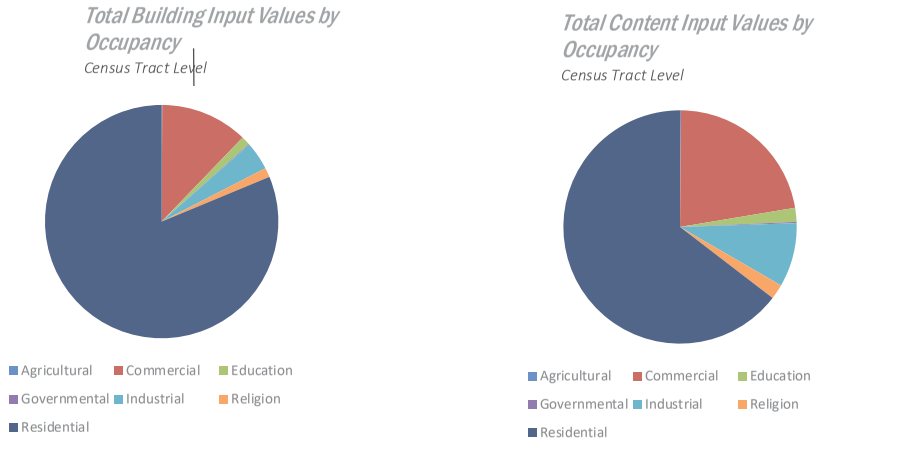


Figure 4-24: Census Tract Building and Content Exposure Values

4.11 Population and Assets

To describe vulnerability for each hazard, it is important to understand the "total" population and "total" assets at risk. The exposure for each hazard described in this section will refer to the percent of total population or percent of total assets. This provides the possible significance or vulnerability to people and assets for the natural hazard event and the estimated damage and losses expected during a "worst case scenario" event for each hazard. Sections below provide a description of the total population, critical facilities, and parcel exposure inputs.

Table 4-12 and Table 4-13 provide an estimate of the number and size of buildings in the County's unincorporated areas and its Special Districts, as well as the replacement value of the buildings and their contents. The table provides information by occupancy class (e.g., residential, commercial, etc.), as well as by construction type (e.g., concrete, wood frame, etc.).

4.11.1 Population

To develop hazard-specific vulnerability assessments, population near natural hazard risks should be determined to understand the total "at risk" population. We can understand how geographically defined hazards may affect San Bernardino County by analyzing the extent of the hazard in relation to the location of population. For purposes of the vulnerability assessment approximately 292,152 (100 %) of the San Bernardino County's population is exposed to one or more hazards within or near the County of San Bernardino boundaries. Each natural hazard scenario affects the San Bernardino County residents differently depending on the location of the hazard and the population density of where the hazard could occur. Vulnerability assessment sections presented later in this section summarize the population exposure for each natural hazard.

4.11.1.1 Vulnerable Populations

The severity of a disaster depends on both the physical nature of the extreme event and the socioeconomic nature of the populations affected by the event. Important socioeconomic factors tend to influence disaster severity. A core concept in a vulnerability analysis is that different people, even within the same region, have a different vulnerability to natural hazards.

4.11.1.2 Income and Housing Condition

Income or wealth is one of the most important factors in natural hazard vulnerability. This economic factor affects vulnerability of low income populations in several ways. Lower income populations are less able to afford housing and other infrastructure that can withstand extreme events. Low income populations are less able to purchase resources needed for disaster response and are less likely to have insurance policies that can contribute to recovery efforts. Lower income elderly populations are less likely to have access to medical care due to financial hardship. Because of these and other factors, when disaster strikes, low income residences are far more likely to be injured or left without food and shelter during and after natural disasters.

Figure 4-25 shows the median household income distribution for the County of San Bernardino in 2012. The "median" is the value that divides the distribution of household income into two equal parts (e.g., the middle). The average median household income in the County of San Bernardino between 2010 and 2014 was $54,100, in the United States during the same period the median house household income was $51,759.

4.11.1.3 Age

Children and the elderly tend to be more vulnerable during an extreme natural disaster. They have less physical strength to survive disasters and are often more susceptible to certain diseases. The elderly often also have declining vision and hearing and often miss reports of upcoming natural hazard events. Children, especially young children, have the inability to provide for themselves. In many cases, both children and the elderly depend on others to care for them during day to day life.

Finally, both children and the elderly have fewer financial resources and are frequently dependent on others for survival. In order for these populations to remain resilient before and after a natural hazard event, it may be necessary to augment city residents with resources provided by the City, state and federal emergency management agencies and organizations. See Figure 4-26 and Figure 4-27 for location of vulnerable population by age within the County of San Bernardino.

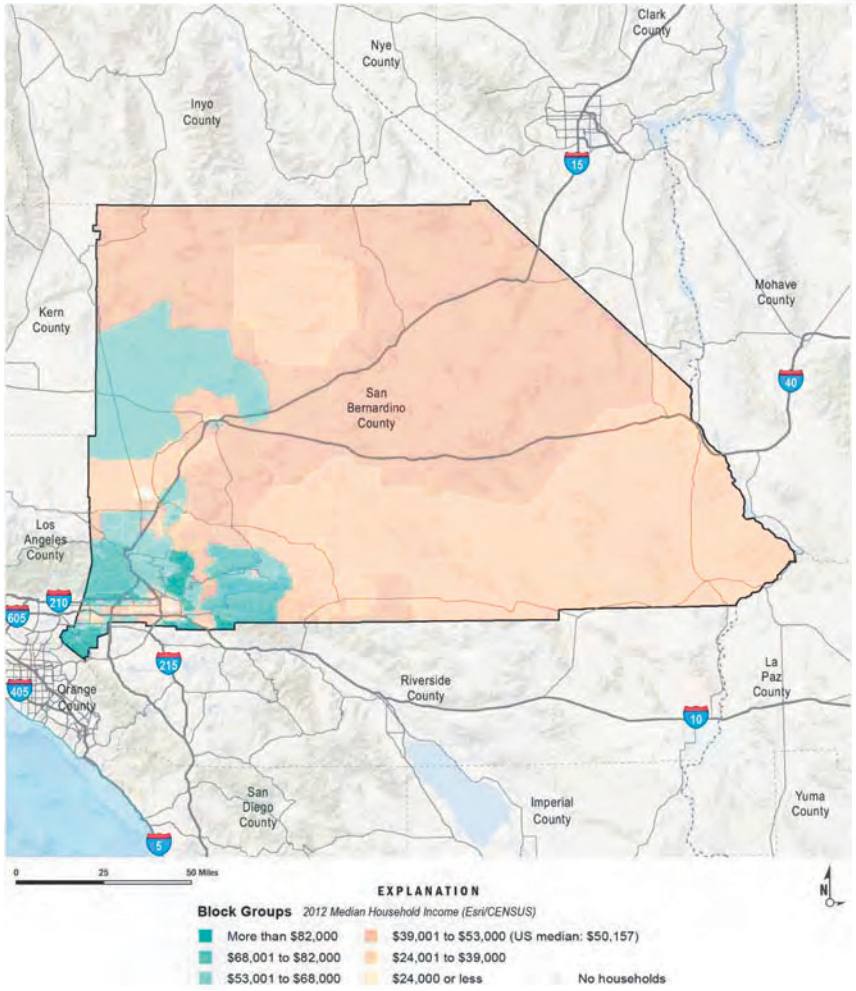


Figure 4-25: Median Household Income Distribution Maps

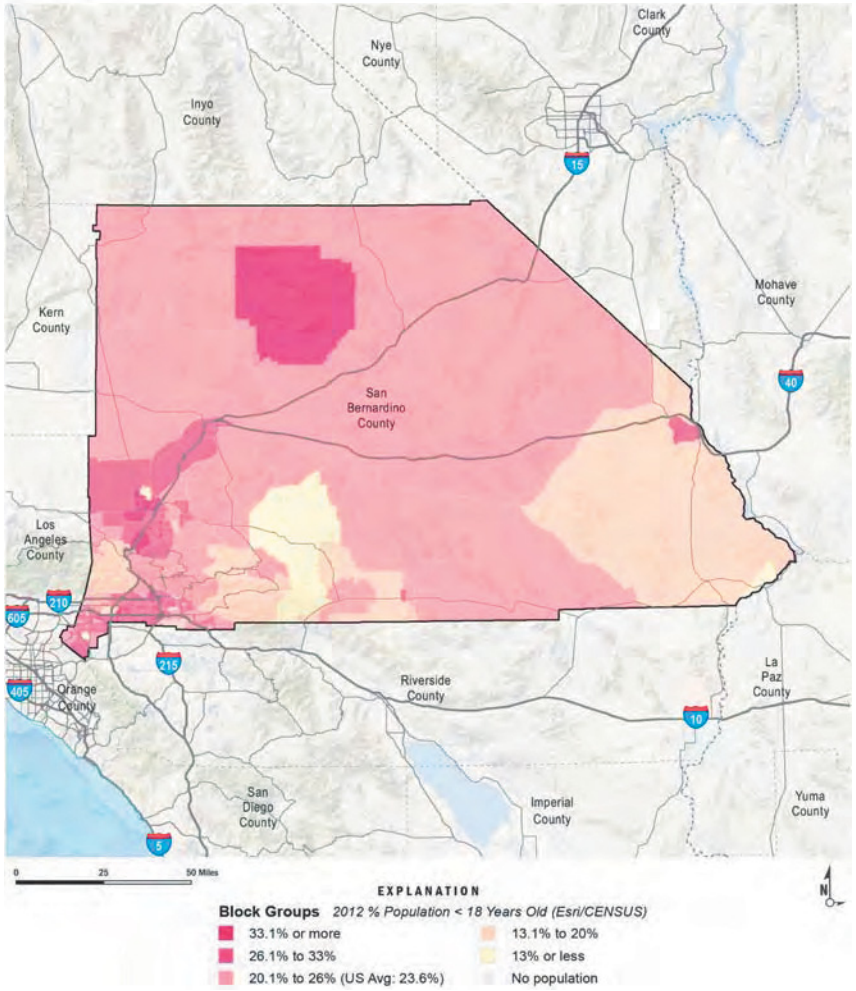


Figure 4-26: Population Under Age 18

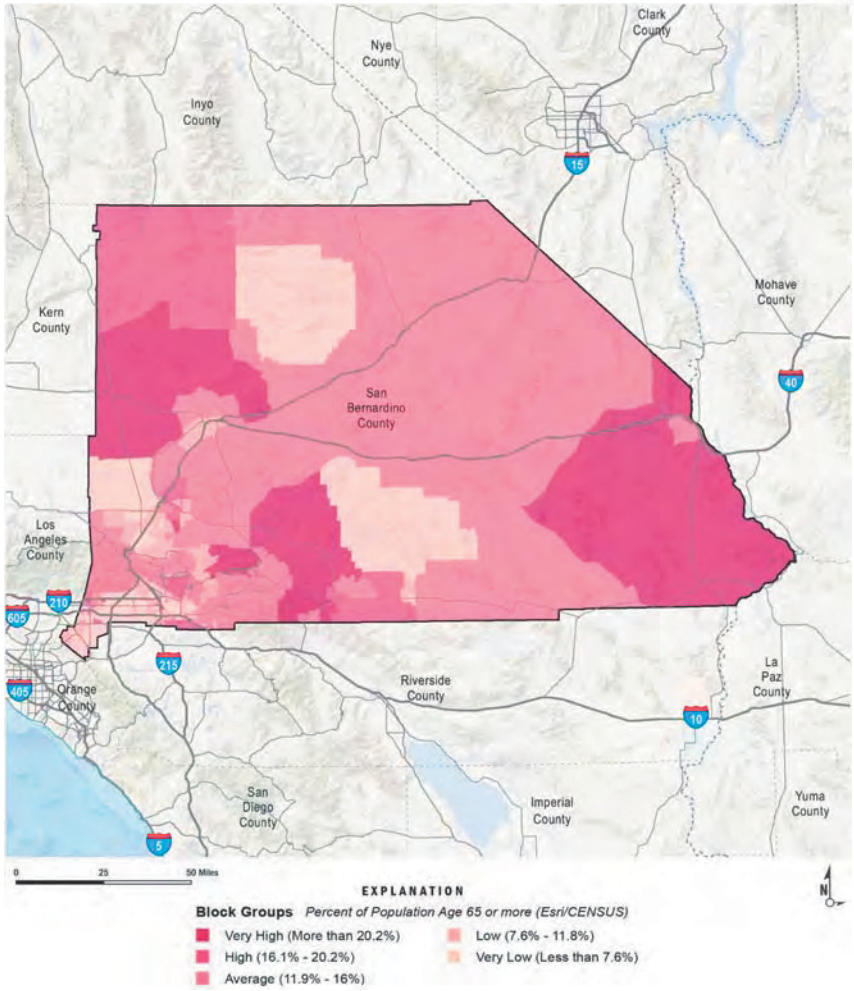


Figure 4-27: Population Over Age 65

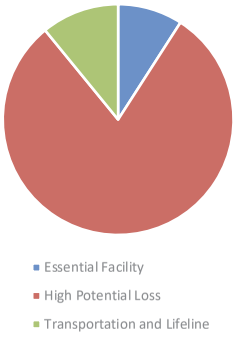
4.11.1.4 Critical Facility List

As stated in the San Bernardino County Emergency Operations Plan (EOP), the San Bernardino County Sheriff's Department (Sheriff) is the lead County agency in identifying critical infrastructure in the County and its Special Districts. A Sheriff's Department Working Group was established to identify Critical Facilities throughout San Bernardino County. Due to Homeland Security and issues related to terrorism, this list is not included in the MJHMP, but is available through the Sheriff's Department.

The Sheriff's Department maintains a Critical Infrastructure Database listing the site name, location, critical level, threat level, site type, and contact information. This database was created for the 2010 MJHMP and has been updated regularly by the Intelligence Division. The Sheriff's Intelligence Division has created Emergency Response Folders (Folders) on each of the locations. The Folders contain site-specific information needed by emergency personnel to respond to any type of emergency. The Folders contain floor plans, photographs, entry/exit points, utility locations, ingress and egress locations, known hazardous materials on site, and emergency contact information for the responsible persons of the site. The Sheriff's Department maintains control and transport of this information to an Incident Command Post/Department Operations Center/Emergency Operations Center when needed.

Table 4-14: Critical Facility Points

Infrastructure Type	Feature Count
Essential Facility	**268**
EOC	2
Fire Station	99
Hospital	9
Police Station	28
School	130
High Potential Loss	**1,155**
Child Care Center	91
Child Residential Care - 24 hour	2
Foster Family Agency	2
Adult Residential Care	52
Home Care Organization	2
Elder Residential Care	35
Communication Facility	40
Dam	24
Waste Water Facility	2



Infrastructure Type	Feature Count
HAZMAT	51
EPA FRS Facility	731
FCC ASR	107
Electric Power Facility	6
Natural Gas Facility	7
Potable Water Facility	3
Transportation and Lifeline	**636**
Airport	34
Runway	36
Bus Facility	2
Highway Bridge	553
Railway Bridge	11
Grand Total	**2,059**

Table 4-15: Linear Utilities

Infrastructure Type	Total Linear Mileage
Transportation and Lifeline	**16,992**
Railway	**719**
Roads	**16,273**
Interstate Highway	587
State / County Highway	1,259
Primary Highway	308
Local Road, Major	2,928
Local Road	6,530
Other Minor Road	4,031
Vehicular Trail	543
Cul-de-Sac / Traffic Circle	11
Ramp	68
Service Road	8
Grand Total	**16,992**

4.11.1.5 Utility Agencies

The utilities and transportation infrastructure is another significant concern for the County and its Special Districts. Various laws, ordinances, regulations, standards, and guidelines have been established to ensure proper and thorough mitigation measures to decrease the effects of hazards.

The following are two of the major utility agencies:

Southern California Edison (SCE) has undertaken an all-hazards approach to planning for an emergency event. SCE has developed an Emergency Response and Recovery Plan to provide a safe and reliable electric service. SCE also has a long-standing relationship with the County and is an active member of several local, state, and federal organizations. According to SCE they have acted to mitigate the impacts of hazards on their electrical system.

Southwest Gas Corporation (SWG) has also coordinated with the County, maintains a natural gas high-pressure system within the County, and consists of approximately 100 miles of underground pipelines. The system also includes some above ground facilities. The total replacement cost for the entire system is approximately $40,000,000. Southwest Gas conducts annual training for the first responders within their service territories to teach the proper methods of responding to and working with natural gas leaks. Staff from SWG serves on local emergency management committees within their service territory.

4.12 Hazard Specific Vulnerabilities

This section summarizes the possible impacts and quantifies, where data permits, the County's vulnerability to each of the priority hazards identified in the hazard profiles earlier in this section.

An estimate of the vulnerability of the County to each identified hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, geographic extent, and damage and casualty potential. It is categorized into the following classifications:

Low: Minimal potential impact the occurrence and potential cost of damage to life and property is minimal.

Medium: Moderate potential impact this ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.

High: Widespread potential impact this ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.

Extremely High: Very widespread with catastrophic impact.

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of buildings subject to the identified hazard can be inventoried and their values tabulated. Other information can be collected in regard to the hazard area, such as the location of critical community facilities, historic structures, and valued natural resources. Together, this information conveys the vulnerability of that area to a hazard.

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4.13 Earthquake

Major Impacts from earthquakes are primarily the probable number of casualties and damage to infrastructure occurring from ground movement along a particular fault (USGS, 2016). The degree of infrastructure damage depends on the magnitude, focal depth, distance from fault, duration of shaking, type of surface deposits, presence of high groundwater, topography, and the design, type, and quality of infrastructure construction.

To analyze the risk to San Bernardino County residents, the Great Shakeout scenario was chosen modeled by the California Integrated Seismic Network (CISN). The 2016 Great Southern California ShakeOut was based on a potential magnitude 7.8 Earthquake on the southern San Andreas Fault approximately 5,000 times larger than the magnitude 5.4 earthquake that shook southern California on July 29, 2008. Such an earthquake will cause unprecedented damage to Southern California greatly dwarfing the massive damage that occurred in Northridge's 6.7-magnitude earthquake in 1994. The hazard foot print for this scenario was used to develop exposure results for population, critical facilities, and single family residential parcel values. FEMA Hazus analyses was used to conducted loss estimation for both scenarios and include building and content loss estimation results based on peak ground acceleration, peak ground velocity, and peak spectral acceleration modeled for the 7.8 earthquake on the San Andreas Fault.

4.13.1 Population at Risk

According to the 2010 US Census, the population of jurisdiction is 297,425. Though rural residential construction is not particularly vulnerable to earthquakes, the chosen earthquake scenarios will directly or indirectly expose the entire population of San Bernardino County to ground shaking. Depending on the time of day (the population differs based on employment opportunities) and exact location of the modeled epicenter, the earthquake scenarios could be experienced differently. Figure 4-28 exhibit the population totals in each modeled earthquake severity zone. Population location is based upon information taken during the 2010 U.S. Census.

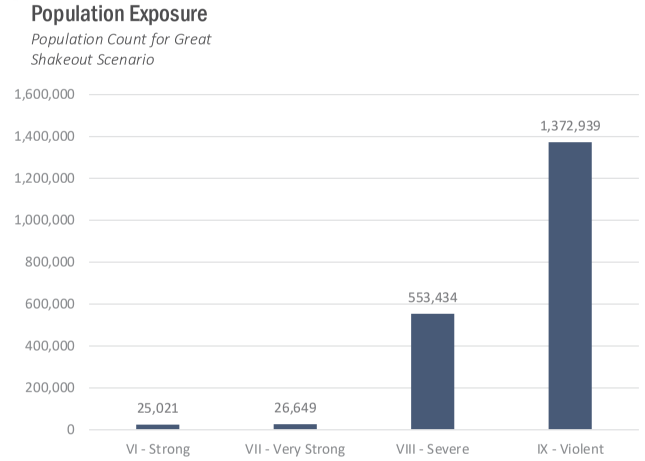


Figure 4-28: Population Exposure to the Great Shakeout EQ Shake Severity Zone

4.13.2 Improved Parcel Value at Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels. GIS was used to create centroids, or points, to represent the center of each parcel polygon this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the shake severity zones to determine the at-risk structures. Only improved parcels greater than $20,000 were analyzed. The analysis indicates residential parcels the chosen scenario will experience similar, but different shaking patterns. The type and year of construction will greatly influence damage for structures subject to similar shaking. Table 4-16 shows the count of at-risk structures and their associated improvement and land exposure values.

Table 4-16: Improved Parcel Value Exposure from Southern California Great ShakeOut

Shake Severity Zone	Improved Parcel Count	Improvement Value Exposure ($000)	Land Value Exposure ($000)	Total Exposure ($000)
IV - Light	1,099	$ 181,952	$ 64,548	$ 246,499
V - Moderate	4,382	$ 485,082	$ 215,875	$ 700,956

Shake Severity Zone	Improved Parcel Count	Improvement Value Exposure ($000)	Land Value Exposure ($000)	Total Exposure ($000)
VI - Strong	1,340	$ 142,763	$ 63,941	$ 206,704
VII - Very Strong	7,669	$ 824,794	$ 206,725	$ 1,031,519
VIII - Severe	46,889	$ 8,741,904	$ 3,039,484	$ 11,781,388
IX - Violent	46,974	$ 9,068,446	$ 3,591,379	$ 12,659,825
Grand Total	**108,353**	**$ 19,444,940**	**$ 7,181,951**	**$ 26,626,891**

4.13.3 Critical Facilities with Damage Potential

Earthquakes pose numerous risks to critical facilities and infrastructure. Seismic risks, or losses, that are likely to result from exposure to seismic hazards include:

- Casualties (fatalities and injuries).
- Utility outages.
- Economic losses for repair and replacement of critical facilities, roads, buildings, etc.
- Indirect economic losses such as income lost during downtime resulting from damage to private property or public infrastructure.

Roads or railroads that are blocked or damaged can prevent access throughout the area and can isolate residents and emergency service providers needing to reach vulnerable populations or to make repairs.

Linear utilities and transportation routes are vulnerable to rupture and damage during and after a significant earthquake event. The cascading impact of a single failure can have affects across multiple systems and utility sectors. Degrading infrastructure systems and future large earthquakes with epicenters near critical regional infrastructure could result in system outages that last weeks for the most reliable systems, and multiple months for others.
Table 4-17provides an inventory of critical facility locations (points only) with earthquake exposure to the Great Shakeout Scenario. The building codes have been amended to include provisions for seismic safety at various bench marks years. Depending on “year built”, each critical facility presented in the tables may have varying damage potential.

Table 4-17: Critical Facilities with Earthquake Risk Southern California Great ShakeOut

Infrastructure Type	Violent Shake Zone (IX)	Severe Shake Zone (VIII)	Very Strong (VII)	Strong Shake Zone (VI)	Feature Count
Essential Facility	3	12	80	122	217
EOC	-	-	2	-	2
Fire Station	3	7	31	34	75
Hospital	-	-	9	-	9
Police Station	-	-	3	24	27
School	-	5	35	64	104

Infrastructure Type	Violent Shake Zone (IX)	Severe Shake Zone (VIII)	Very Strong (VII)	Strong Shake Zone (VI)	Feature Count
High Potential Loss	31	56	213	484	784
Child Care Center	1	3	25	56	85
Child Residential Care – 24 hour	-	-	-	2	2
Foster Family Agency	-	-	-	2	2
Adult Residential Care	2	5	10	34	51
Home Care Organization	-	-	1	1	2
Elder Residential Care	-	1	9	25	35
Communication Facility	1	9	9	8	27
Dam	1	-	11	4	16
Electric Power Facility	1	-	-	-	1
Natural Gas Facility	2	-	-	-	2
Waste Water Facility	-	2	-	-	2
HAZMAT	-	-	6	16	22
EPA FRS Facility	21	27	115	307	470
FCC ASR	2	9	27	29	67
Transportation and Lifeline	16	20	41	131	208
Airport	5	5	8	-	18
Runway	5	6	7	1	19
Bus Facility	-	-	1	-	1
Highway Bridge	6	8	24	124	162
Railway Bridge	-	1	1	6	8
Grand Total	**50**	**88**	**334**	**737**	**1,209**

HazMat Fixed Facilities

Although earthquakes are low probability events, they produce hazardous materials (HazMat) threats at very high levels when they do occur. Depending on the year built and construction of each facility containing HazMat, earthquake initiated hazardous material releases (EIHR) potential will vary. HazMat contained within masonry or concrete structures built before certain benchmark years reflecting code improvements may be of particular vulnerability.

Transportation

Earthquake events can significantly impact bridges which often provide the only access to some neighborhoods. Since soft soil regions generally follow floodplain boundaries, bridges that cross water courses are considered vulnerable. Since most of the San Bernardino County bridges provide access across water courses, most are at least somewhat vulnerable to earthquakes. Key factors in the degree of vulnerability are the bridge’s age and type of construction which indicate the standards to which the bridge was built. Special attention will be paid to the multiple bridges that cross interstates. Interstates would serve as major emergency response and evacuation routes.

Utilities

Linear utilities and transportation infrastructure would likely suffer considerable damage in the event of an earthquake. Due to the amount of infrastructure and sensitivity of utility data, linear utilities are difficult to analyze without further investigation of individual system components. Table 4-18 provides the best available linear data and it should be assumed that these systems are exposed to breakage and failure.

Table 4-18: Lifeline with Earthquake Risk Southern California Great ShakeOut

Facility Type	Strong	Very Strong	Severe	Violent	Total Mileage
Transportation and Lifeline	1,324	1,951	2,796	2,624	8,697
Railway	47	22	22	99	191
Roads	1,277	1,929	2,774	2,525	8,506
Interstate Highway	22	7	-	48	77
State / County Highway	57	90	263	233	644
Primary Highway	34	15	19	27	95
Local Road, Major	102	207	625	792	1,726
Local Road	540	1,153	1,728	1,128	4,550
Other Minor Road	494	423	109	96	1,122
Vehicular Trail	25	32	26	178	261
Cul-de-Sac / Traffic Circle	-	1	2	2	5
Ramp	2	1	2	20	25
Service Road	-	-	-	1	1
Grand Total	**1,324**	**1,951**	**2,796**	**2,624**	**8,695**

4.13.4 Loss Estimation Results

The Hazus Level 2 analysis was used to assess the risk from and vulnerability to earthquake shaking within San Bernardino County. Hazus buildings data is aggregated to the census tract level for earthquake models, known as the general building stock (GBS), which has a level of accuracy acceptable for planning purposes. Where possible the GBS was enhanced using GIS data from the county as described previously. The following sections describe risk to and vulnerability of the GBS within the San Bernardino County Hazus calculates losses to structures from earthquake shaking by considering the amount of ground displacement and type of structure. The software estimates the percentage of damage to structures and their contents by applying established building fragility curves. Damage estimates are then translated to estimated dollar losses.

For each Great ShakeOut Scenario ground shaking data (shakemaps) were acquired from CISN and imported into Hazus. The shakemap data consist of peak ground velocity, peak

ground acceleration, peak spectral acceleration at 0.3 seconds, and peak spectral acceleration at 1.0 seconds. The earthquake module operates on census tracts that often include population and structures in the incorporated cities and the unincorporated area within a single tract. Due to this fact the results include census tracts that have a substantial portion of land within the incorporated area (loss estimates for some tracts will include structures in incorporated cities).

The results are summarized in Table 4-17 for the Great ShakeOut Scenario. It is important to understand that the Hazus earthquake module uses the census tract as its enumeration unit rather than the more detailed census block. The loss estimation values for earthquakes are much higher than those of the flooding and dam failure due to this fact. The portions of incorporated areas included within boundary census tracts elevate the values due to the inclusion of additional GBS. Though the difference between census tracts and census blocks are extremely disparate, the most important summary information is the percent of loss estimation against the total value.

Residential building and content loss estimation from the Great ShakeOut Scenario is *$9.3* billion dollars and 57 percent of the total value of the residential buildings. In Great ShakeOut Scenario, residential damage will be the greatest. While there are several limitations to the FEMA Hazus model, it does allow for potential loss estimation. It is important to remember that the replacement costs are well below actual market values, thus, the actual value of assets at risk may be significantly higher than those included herein.

Table 4-19: Estimated Building and Content Loss Great ShakeOut Scenario Earthquake

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (% of Total Value)	Content Replacement Cost ($000)	Content Replacement Cost (% of Total Value)	Total Estimated Loss ($000)	Total Loss Estimation (% of Total Value)
Agricultural	$ 51,431	9.7%	$ 17,215.68	3.2%	$ 68,646.80	13.0%
Commercial	$ 3,286,331	14.4%	$ 1,110,422.84	4.9%	$ 4,396,754.29	19.3%
Educational	$ 175,987	10.4%	$ 56,822.89	3.4%	$ 232,810.20	13.7%
Government	$ 53,348	9.2%	$ 20,298.84	3.5	$ 73,647.28	12.6%
Industrial	$ 1,179,339	13.1%	$ 590,913.81	6.6%	$ 1,770,253.41	19.6%
Religious	$ 243,891	12.7%	$ 80,862.72	4.2%	$ 324,754.33	16.9%
Residential	$ 7,841,645	6.2%	$ 1,525,181.65	1.2%	$ 9,366,826.84	7.4%
Grand Total	**$ 12,831,972**	**7.9%**	**$ 3,401,718.42**	**2.1%**	**$ 16,233,693.14**	**10.0%**

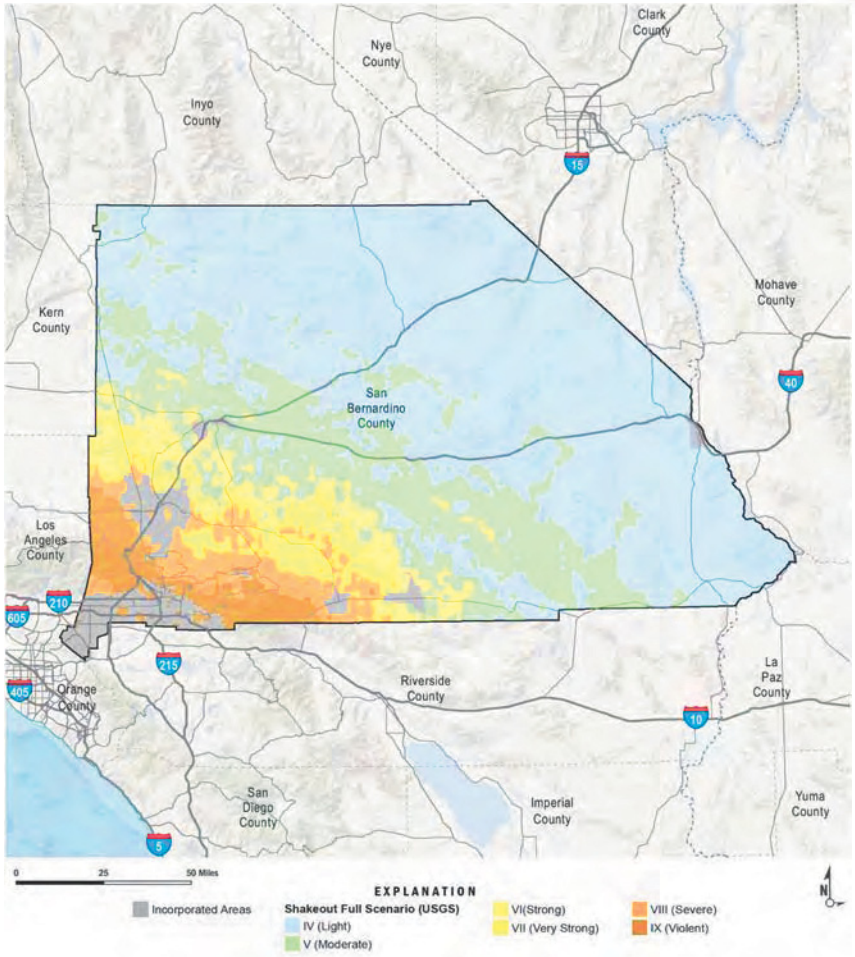


Figure 4-29: Great Shakeout Scenario MMI Classes

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4.14 Wildfire



Risk to the County of San Bernardino from wildfire is of significant concern. High fuel loads in the hills, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. During the May to October fire season the dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become large and out-of-control.

Potential losses from wildfire include human life, structures and other improvements, natural and cultural resources, quality and quantity of water supplies, cropland, timber, and recreational opportunities. Short and long-term economic losses could also result due to loss of business and other economic drivers associated with San Bernardino County summer season activities. Smoke and air pollution from wildfires can be a severe health hazard. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

Generally, there are three major factors that sustain wildfires and predict a given area's potential vulnerability to burn. These factors are fuel, topography, and weather.

- Fuel – Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and volume. Fuel sources are diverse and include everything from dead tree leaves, twigs, and branches, to dead standing trees, live trees, brush, and cured grasses. Manmade structures are also considered a fuel source, such as homes and other associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Fuel is the only factor that is under human control. Development in the mountain region currently possesses the highest vulnerability to wildfire.

- The residents of this region are also considered to be the most vulnerable due to their age and income levels. This area is comprised of lower income (that is, lower than the US median income) homes as well as a higher than average amount of residents under age 18 and an average amount of residents 65 or older.
- Topography – An area's terrain and slope affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.

- Weather – Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out fuels that feed wildfires, creating a situation where fuel will ignite more readily and burn more intensely. Thus, during periods of drought the threat of wildfire increases. Wind is the most treacherous weather factor. The greater the wind, the faster a fire can spread and the more intense it can be. Wind shifts, in addition to wind speed, can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. As part of a weather system, lightning also ignites wildfires, often in difficult to reach terrain for firefighters.

Factors contributing to the high, widespread wildfire risk in San Bernardino County include:

- Narrow and often one-lane and/or dead-end roads complicating evacuation and emergency response.
- Nature and frequency of ignitions; and increasing population density leading to more ignitions.
- Slope of the foothills;
- Residential development along the foothills;

4.14.1 Population at Risk

Wildfire risk is of greatest concern to populations residing in the moderate, high, and very high wildfire hazard zones. The San Bernardino County census block data was used to estimate populations within the hazard zones. There are a significant number of people living within the WUI described in the wildfire profiles. More than 34,000 residents in the unincorporated county live within areas considered very high fire hazard and more than 63,000 residents live within a very high hazard

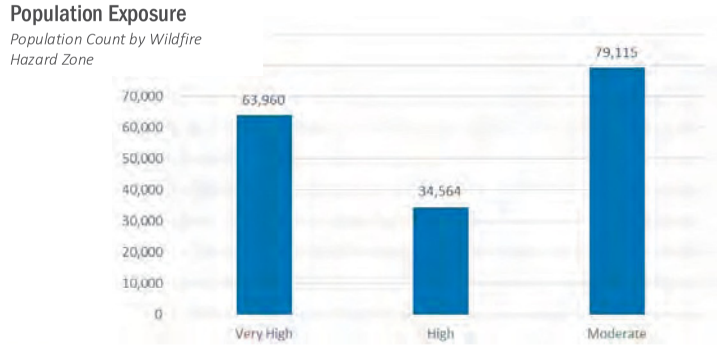


Figure 4-30: Population at Risk from Wildfire Hazards

4.14.2 Improved Parcel Value at Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels. In some cases, a parcel will be within in multiple fire threat zones. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the fire threat layer to determine the risk for each structure. The fire threat zone in which the centroid was located was assigned to the entire parcel. This methodology assumed that every parcel with a square footage value greater than zero was developed in some way. Only improved parcels were analyzed. Table 4-20 exhibits portions of San Bernardino County that have significant assets at risk to wildfire in the Moderate, High and Very High fire severity zones.

Table 4-20: Residential Buildings and Content at Risk from Wildfire

Fire Hazard Severity Hazard Zone	Improved Parcel Count	Improvement Value Exposure ($000)	Land Value Exposure ($000)	Total Exposure ($000)
Very High	43,794	$ 8,602,590	$ 3,075,148	$ 11,677,739
High	11,512	$ 1,822,731	$ 551,160	$ 2,373,892
Moderate	25,477	$ 3,221,982	$ 950,044	$ 4,172,026
Non-Wildland/Non-Urban	621	$ 573,866	$ 294,283	$ 868,148
Urban Un-zoned	26,974	$ 5,223,286	$ 2,310,932	$ 7,534,219
Grand Total	**108,378**	**$ 19,444,456**	**$ 7,181,567**	**$ 26,626,023**

Note:
1-The table above does not display loss estimation results; the table exhibits total value at risk based upon the hazard overlay and San Bernardino County Assessor data.
2- Parcel information is for all county parcels with greater than $20,000 in assessed parcel improvement value only. The San Bernardino County Assessor's roles only provide spatial information on assessed improvement and land values.

4.14.3 Critical Facilities at Risk

Critical facilities data were overlain with fire hazard severity zone data to determine the type and number of facilities within each risk classification. Tables 4-21 and 4-22 list the critical facilities in the High and Very High wildfire hazard zones for San Bernardino County.

Table 4-21: Critical Facilities at Risk from Wildfire

Infrastructure Type	High	Very High	Feature Count
Essential Facility	11	105	116
EOC	2	0	2
Fire Station	4	45	49
Hospital	0	5	5
Police Station	0	24	24
School	5	31	36
High Potential Loss	72	177	249
Child Care Center	3	29	32
Child Residential Care - 24 hour	1	0	1
Foster Family Agency	0	0	0
Adult Residential Care	11	4	15
Home Care Organization	0	0	0
Elder Residential Care	8	5	13
Communication Facility	2	13	15
Dam	0	14	14
Electric Power Facility	0	0	0
Natural Gas Facility	0	0	0
Potable Water Facility	0	0	0
Waste Water Facility	0	0	0
HAZMAT	0	2	2
EPA FRS Facility	37	83	120
FCC ASR	10	27	37
Transportation and Lifeline	10	103	113
Airport	1	0	1
Runway	1	0	1
Bus Facility	1	0	1
Highway Bridge	7	101	108
Railway Bridge	0	2	2
Grand Total	**93**	**385**	**478**

Table 4-22: Lifelines with Wildfire Risk

Facility Type	High	Very High	Total Mileage
Transportation and Lifeline	819	1,906	2,725
Railway	19	47	66
Roads	800	1,859	2,659
Interstate Highway	4	37	41
State / County Highway	33	226	259
Primary Highway	17	13	30
Local Road, Major	311	521	832
Local Road	389	806	1,195
Other Minor Road	34	56	91
Vehicular Trail	10	184	195
Cul-de-Sac / Traffic Circle	1	2	3
Ramp	2	12	13
Service Road	0	1	1
Grand Total	**819**	**1,906**	**2,725**

4.14.4 Loss Estimation Results

Wildland fire cost impacts of damage done to land and structures and also to critical infrastructure

It is impossible to estimate the possible cost in dollars to replace and pay for actual firefighting as the damage costs that incur from wildland fires varies so greatly. One of the varied costs is the replacement and repair of structures and remediate of the damaged properties. Then the rebuilding costs and replacing of the structures with laws requiring new buildings to meet new criteria as a result of state laws that may require more stringent building and construction practices far greater than the original building of the said structure. Also the estimate of damages to critical infrastructures such as power lines and delivery systems as it is difficult the collateral loses to businesses and individuals losing power for and unknown time. Also damages to railroads and bridges also to road way, freeways as it is impossible to gauge the actual lose amounts from commerce being impeded.

Many of the County's landfills, transfer stations, and closed disposal sites are situated in areas subject to wildfires. In 2003, the Old Fire burned through three separate sites and caused major damage at the Heaps Peak Transfer Station when the fire burned through the office building and Transfer Station site.

None of this takes into account the costs of labor and retardants, vehicle damages and fuel and wear and tear as well as equipment expended and used and or damaged. Along with replace any safety gear or injuries to any persons working to mitigate the wildland fire

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4.15 Flooding



The County has experienced severe and widespread flooding throughout its history. Several major drainage basins have the potential to subject residents and structures to a high risk of flooding. In addition, the cumulative increase in impervious surfaces has increased problems related to surface run- off. While complete avoidance or protection through control facilities is not practical, considerable improvement can be made through structural and non-structural methods.

The County currently utilizes land use zoning districts to prohibit habitable structures in floodways as defined by the federal requirements necessary to participate in the National Flood Insurance Program. The consistent adoption of overlays is needed to require special review, conditions, and the prohibition of some uses in floodplain areas (areas subject to 100-year floods), including dry lakes. In addition, there are land use policies and development standards that can be implemented, including reduction of impervious surfaces; increase of percolation, infiltration, and recharge; and the control of urban run-off. There is a need for the County to identify all areas of flood and drainage hazards, especially in the Desert Region where mapping is sparse, as well as areas with a heavy concentration of debris or the potential for dam inundation. Flood hazards are more comprehensively discussed in the Safety Background Report.

The vulnerable areas are addressed in the County's General Plan. See Sections 5 and 6 for additional information. San Bernardino County has seven (7) properties listed in the Repetitive Loss and Severe Repetitive Loss properties. All of the properties are single-family residences. The properties are located in:

- Barstow – 2 properties (1999 and 2005)
- Crestline (1980 and 1982)
- Forest Falls (1995 and 1999)
- Lake Arrowhead (1998 and 2005)
- Lytle Creek (1998 and 2005)
- Sugarloaf (1993 and 1995)

These properties were damaged during unusual storms and/or immediately after a wildfire in the area and are isolated properties in widely scattered areas of the County. The properties were not damaged during the 2009 or 2010 winter storm events. Property addresses are not listed to comply with privacy laws.

The areas are now covered by the County General Plan and County Ordinance. These are in compliance with the National Flood Insurance Program.

4.15.1 Population at Risk

Of greatest concern in the event of a flood is the potential for loss of life. Using 2012 population data aggregated by census blocks, an estimate was made of the population exposed to the 100 and 500-year floodplain. To account for census blocks that were partially within the floodplain, a weighted average was employed to calculate the proportion of the population within the floodplain. The results of the population overlay are shown in Figure 4-31. More than 9,500 residents live near or within the 100-year floodplain and approximately 13,346 county residents live within the 500-year floodplain. Approximately 18,816 county residents live within areas protected by levees.

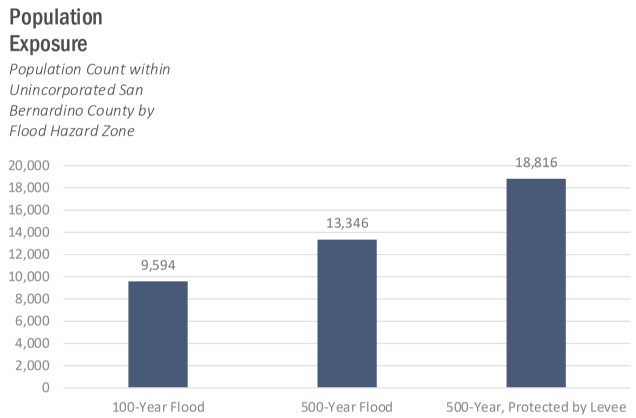


Figure 4-31: Population Exposed to NFIP Flood Zones

4.15.2 Residential Parcel Value with Flood Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels within the FEMA NFIP flood zones. In some cases, a parcel will be within in multiple flood zones. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the floodplain layer to determine the flood risk for each structure. The flood zone in which the centroid was located was assigned to the entire parcel. This methodology assumed that every parcel with a square footage value greater than zero was developed in some way. Only improved parcels greater than $20,000 were analyzed.

Table 4-23 shows the count of at-risk parcels and their improvement and land exposure values.

Table 4-23: Parcels Exposed to NFIP Flood Zones

Flood Hazard Zone	Improved Parcel Count	Improvement Value Exposure ($000)	Land Value Exposure ($000)	Total Exposure ($000)
100-Year Flood	3,426	$ 518,483	$ 368,058	$ 886,541
500-Year Flood	3,397	$ 833,287	$ 338,728	$ 1,172,014
500-Year, Protected by Levee	4,608	$ 1,327,942	$ 527,317	$ 1,855,259
Grand Total	11,431	$ 2,679,711	$ 1,234,103	$ 3,913,814

While there are several limitations to this methodology, it does allow for potential loss estimation. It should be noted that the analysis may include structures in the floodplain that are elevated at or above the level of the base flood elevation, which will most likely decrease potential flood damage to these structures. Also, it is important to remember that the County Assessor's values are well below actual market values; thus, the actual value of assets at risk may be significantly higher than those included herein.

4.15.3 Critical Facilities Exposure

Critical facilities data were overlain with flood hazard data to determine the type and number of facilities within the 100- and 500-year floodplain. Flooding poses numerous risks to critical facilities and infrastructure:

- Roads or railroads that are blocked or damaged can prevent access throughout the area and can isolate residents and emergency service providers needing to reach vulnerable populations or to make repairs.
- Bridges washed out or blocked by floods or debris from floods also can cause isolation.
- Creek or river floodwaters can back up drainage systems causing localized flooding.
- Floodwaters can get into drinking water supplies causing contamination.
- Sewer systems can be backed up causing waste to spill into homes, neighborhoods, rivers, and streams.
- Underground utilities can also be damaged.

Tables 4-24 and 4-25 provide an inventory of critical facilities in the floodplain for San Bernardino County and it provides the location of lifelines relative to the floodplain in the areas of the San Bernardino County. With a total of 810 essential facilities, high potential losses, and transportation and lifeline structures located in either the 100 or 500-year flood zone, the impact to the community could be devastating if these critical facilities were damaged or destroyed during a flood event.

Table 4-24: Critical Facility Exposed to NFIP Flood Zones

Infrastructure Type	100 Year Flood Zone	500 Year Flood Zone	500 Year Flood Zone, Protected by Levee	Feature Count
Essential Facility	21	114	5	140
EOC	0	1	0	1
Fire Station	4	27	2	33
Hospital	0	4	0	4
Police Station	2	23	0	25
School	15	59	3	77
High Potential Loss	52	458	52	562
Child Care Center	13	57	3	73
Child Residential Care - 24 hour	0	2	0	2
Foster Family Agency	0	2	0	2
Adult Residential Care	0	37	3	40
Home Care Organization	0	2	0	2
Elder Residential Care	0	24	8	32
Communication Facility	0	7	0	7
Dam	2	3	0	5
Waste Water Facility	1	0	0	1
HAZMAT	0	16	1	17
EPA FRS Facility	33	286	35	354
FCC ASR	3	22	2	27
Transportation and Lifeline	26	77	5	108
Airport	2	5	0	7
Runway	2	5	0	7
Bus Facility	1	1	0	2
Highway Bridge	20	65	5	90
Railway Bridge	1	1	0	2
Grand Total	**99**	**649**	**62**	**810**

Table 4-25: Lifelines Exposure to NFIP Flood Zones

Facility Type	100 Year	500 Year Flood Zone	500 Year Flood Zone, Protected by Levee	Total Mileage
Transportation and Lifeline	204	1,952	69	2,225
Railway	9	44	6	59
Roads	195	1,908	63	2,166
Interstate Highway	1	34	1	36
State / County Highway	20	189	9	218
Primary Highway	7	20	-	28

Facility Type	100 Year	500 Year Flood Zone	500 Year Flood Zone, Protected by Levee	Total Mileage
Local Road, Major	32	377	38	447
Local Road	115	1,168	13	1,295
Other Minor Road	18	86	2	107
Vehicular Trail	2	15	-	17
Cul-de-Sac / Traffic Circle	0	1	-	1
Ramp	0	18	0	19
Grand Total	**204**	**1,952**	**69**	**2,225**

4.15.4 Loss Estimation Results

The Hazus analysis was used to assess the risk from and vulnerability to flooding within San Bernardino County. Hazus buildings data is aggregated to the census block level, known as the general building stock (GBS), which has a level of accuracy acceptable for hazard mitigation planning purposes. The following sections describe risk to and vulnerability of the GBS within the San Bernardino County mapped regulatory floodplain. The total value of exposed buildings and content within the San Bernardino planning area was generated using Hazus and is previously summarized.

Hazus calculates losses to structures from flooding by considering the depth of flooding and type of structure. Using historical flood insurance claim data, the software estimates the percentage of damage to structures and their contents by applying established depth-damage curves. Damage estimates are then translated to estimated dollar losses. The results are summarized in Tables 4-26 and 4-27 and Figure 4-32. While there are several limitations to the FEMA Hazus model, it does allow for potential loss estimation. It should be noted that the analysis may include structures in the floodplain that are elevated at or above the level of the base flood elevation, which will likely mitigate flood damage. Also, it is important to remember that the replacement costs are well below actual market values, thus, the actual value of assets at risk may be significantly higher than those included herein.

Table 4-26: Flood Loss Estimation (Based on Depth) in NFIP Flood Zones

Flood Hazard Zone	Building Loss ($000)	Building Loss (% of Total Value)	Content Loss ($000)	Content Loss (% of Total Value)	Total Estimated Loss ($000)	Total Estimated (% of Total Value)
100-Year	$ 34,749.00	0.1%	$ 24,858.00	0.1%	$ 59,849.00	0.2%
500-Year	$ 218,454.00	0.8%	$ 173,304.00	0.6%	$ 396,336.00	1.4%

Table 4-27: 100 Year Flood Los Estimation (Based on Depth) in NFIP Flood Zones by Occupancy Type

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (% of Total Value)	Content Replacement Cost ($000)	Content Replacement Cost (% of Total Value)	Total Estimated Loss ($000)	Total Loss Estimation (% of Total Value)
Agriculture	$ 147.00	0.10%	$ 246.00	0.17%	$ 427.00	0.30%
Commercial	$ 1,874.00	0.08%	$ 4,458.00	0.18%	$ 6,463.00	0.26%
Education	$ 46.00	0.02%	$ 271.00	0.11%	$ 319.00	0.13%
Government	$ 56.00	0.07%	$ 304.00	0.39%	$ 370.00	0.48%
Industrial	$ 201.00	0.02%	$ 389.00	0.04%	$ 624.00	0.06%
Religious/Non-Profit	$ 326.00	0.09%	$ 1,946.00	0.55%	$ 2,279.00	0.65%
Residential	$ 32,099.00	0.14%	$ 17,244.00	0.07%	$ 49,367.00	0.21%
Grand Total	**$ 34,749**	**0.13%**	**$ 24,858**	**0.09%**	**$ 59,849**	**0.22%**

100 YR Flood Hazard

Estimated Content Loss by Occupancy Type

100 YR Flood Hazard

Estimated Building Loss by Occupancy Type

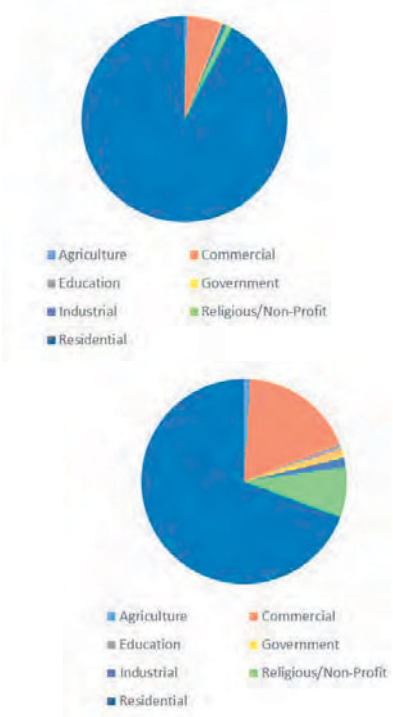


Figure 4-32: Total Building and Content Loss by Occupancy Type for 100 Year Flood

Table 4-28: 500 Year Flood Loss Estimation (Based on Depth) In NFIP Flood Zones by Occupancy Type

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (% of Total Value)	Content Replacement Cost ($000)	Content Replacement Cost (% of Total Value)	Total Estimated Loss ($000)	Total Loss Estimation (% of Total Value)
Agriculture	$ 674.00	0.48%	$ 981.00	0.69%	$ 1,781.00	1.26%
Commercial	$ 10,080.00	0.41%	$ 27,640.00	1.13%	$ 39,179.00	1.61%
Education	$ 720.00	0.29%	$ 3,563.00	1.44%	$ 4,355.00	1.76%
Government	$ -	0.00%	$ 2.00	0.00%	$ 9.00	0.01%
Industrial	$ 6,036.00	0.57%	$ 13,975.00	1.31%	$ 22,438.00	2.11%
Religious/Non-Profit	$ 1,210.00	0.34%	$ 6,070.00	1.72%	$ 7,332.00	2.08%
Residential	$ 199,734.00	0.86%	$ 121,073.00	0.52%	$321,242.00	1.38%
Grand Total	**$ 218,454**	**0.79%**	**$ 173,304**	**0.63%**	**$ 396,336**	**1.44%**

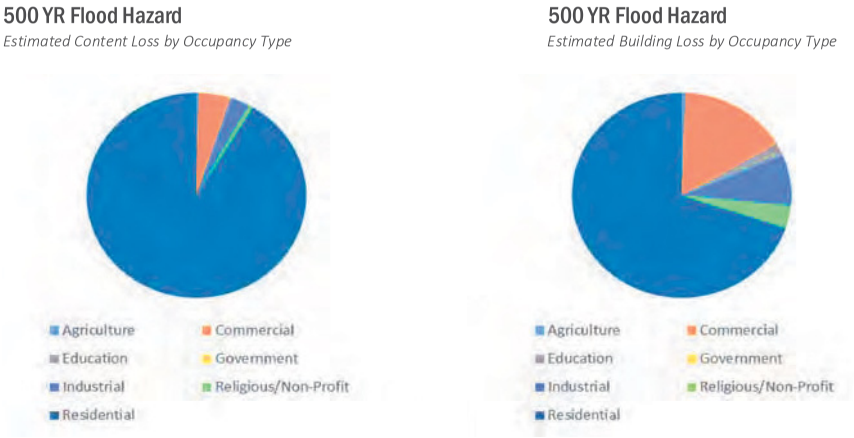
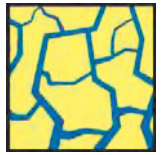


Figure 4-33: Total Building and Content Loss by Occupancy Type for 500 Year Flood

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4.16 Drought



Drought should not be viewed as merely a physical phenomenon or natural event. Its impacts on society result from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demand people place on water supply.

Due to the lack of defined geographical boundaries, the vulnerability assessment for drought differs from other natural hazards. The impacts of drought can be categorized as economic, environmental, or social. Many economic impacts occur in agriculture and related sectors, including forestry and fisheries, because of the reliance of these sectors on surface and subsurface water supplies. In addition to obvious losses in yields in crop and livestock production, drought is associated with increases in insect infestations, plant disease, and wind erosion. Droughts also bring increased problems with insects and diseases to forests and reduce growth. The incidence of forest and range fires increases substantially during extended droughts, which in turn places human and wildlife populations, buildings, infrastructure and critical facilities, at higher levels of risk.

Income loss is another indicator used in assessing the impacts of drought because so many sectors are affected. Reduced income for farmers has a ripple effect. Retailers and others who provide goods and services to farmers face reduced business. This leads to unemployment, increased credit risk for financial institutions, capital shortfalls and loss of tax revenue for local, state and federal government. Less discretionary income affects the recreation and tourism industries. Prices for food, energy and other products increase as supplies are reduced. In some cases, local shortages of certain goods result in the need to import these goods from outside the stricken region.

4.16.1 Loss Estimation Results

No standardized methodology exists for estimating losses due to drought. Drought does not generally have a direct impact on critical and non-critical facilities and building stock. Instead, drought vulnerability is primarily measured by its potential impact to sectors of the County's economy and natural resources. In San Bernardino County some of the potential impacts to the economy include the following:

- Reduced agricultural and livestock production;
- Loss of timber from increased wildfires;
- Decreased municipal and industrial water supply;
- Loss of recreation/tourism; and
- Decreased wildlife and wildlife habitat.

4.16.2 Statewide Mandatory Water Reductions

Recognizing persistent, yet less severe, drought conditions throughout California, on May 18, 2016 the State Water Resources Control Board adopted an emergency water conservation

regulation requiring locally developed conservation standards based upon each water supplier's specific circumstances. It replaces the prior percentage reduction-based water conservation standard. In San Bernardino County, each water wholesaler (Mojave Water Agency) was required to calculate the supply of water for the next three years, considering drought conditions persist. Each water supply retailer subsequently self-certified the expected demand on water resources, determining whether or not there is sufficient supply to meet demand. Our Department certified that there is sufficient water supply to meet the demand over the next three years; however due to ongoing drought conditions in the region, water conservation efforts should continue. The County has developed a watering schedule, watering hour restrictions and additional end user watering restrictions which can be viewed here: http://www.specialdistricts.org/index.aspx?page=548

4.17 Terrorism



Translating most manmade hazard profiles into meaningful geospatial information is difficult at best. Instead, the planning team will use an asset-specific approach. Population, facilities, systems and assets will be prioritized and assessed in this vulnerability assessment.

Special consideration should be given to areas with high density and those containing vulnerable populations (young, old, and those whose primary language is not English).

Facilities at high risk may include gathering places, critical facilities/ transportation and lifelines and utilities.

4.17.1 Population at Risk

Since terrorism can happen anytime, anywhere, 100% of the population is vulnerable to terrorism. In particular, people with access and functional needs, the elderly and the very young are especially vulnerable because they often rely heavily on others in their daily lives. Persons with English as a second language are also vulnerable as they may not receive warnings or notifications related to an incident in their primary language.

4.17.2 Critical Facilities Exposure

Critical facilities may include essential facilities (such as hospitals, police and fire stations, evacuation centers, etc.), transportation systems, lifeline utility systems, high potential loss facilities (such as nuclear power plants, dams and military installations, etc.), and hazardous material facilities.

Gathering facilities should also receive special attention. Places of mass gathering not only present terrorists with potential opportunities for mass casualties, symbolism and high impact media coverage, they pose a broad range of security challenges for their owners and operators. The National Counter Terrorism Committee has noted that places of mass gathering have been specifically identified by religious and political extremists as attractive targets.

Places of mass gathering incorporate a diverse range of facilities including, but not limited to, sporting venues, shopping and business precincts, tourism/entertainment venues/attractions, hotels and convention centers, major events and public transport hubs. This also includes significant one off events.

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4.18 Climate Change



The vulnerability assessment for climate change is different from other natural hazards discussed in this HMP due to the lack of defined geographical boundaries. This section provides a summary of San Bernardino County's vulnerability to climate change.

The most serious threats to the public health of Californians will stem primarily from the higher frequency of extreme conditions, principally more frequent, more intense, and longer heat waves. A heat wave is defined as 5 or more consecutive extreme heat days. An increase in heat waves may increase the risk of directly related conditions such as heat stroke and dehydration.

In the desert areas of the County, the Extreme Heat Day Threshold temperatures are around 110°F and in the mountainous regions it is in the mid 80's. According to the Cal-Adapt Extreme Heat Tool, the number of extreme heat days (a day in April through October where the maximum temperature (Tmax) exceeds the 98th historical percentile of maximum temperatures based on daily temperature data between 1961 and 1990) will continue to increase rapidly from the present day to 2090.

Projections by Scripps Institution of Oceanography show little change in total annual precipitation in San Bernardino County. However, even modest changes would have a significant impact because California ecosystems are conditioned to historical precipitation levels and water resources are nearly fully utilized. The Mediterranean seasonal precipitation pattern is expected to continue, with most precipitation falling during winter from North Pacific storms. In the mountainous areas of the County, it is projected that the decadal average of snowpack will continue to decrease until 2090. As shown in Figure 4-34 the sharpest decreases in snowpack are projected to begin around 2030. The area projected to be burnt by wildfire toward the end of the century will not increase substantially in the County. The most change will be experienced in the mountainous regions.

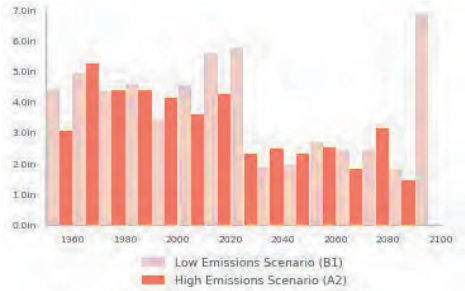


Figure 4-34: Decadal Snowpack Averages 1960-2090

Source: cal-adapt.org/snowpack/decadal

4.18.1 Population at Risk

Vulnerable populations should receive special attention when assessing the community's vulnerability to climate change. For example, care and sheltering during extreme heat conditions must be provided for vulnerable populations such as the elderly. Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. According to the National Weather Service (NWS), among natural hazards, only the cold of winter—not lightning, hurricanes, tornados, floods, or earthquakes—takes a greater toll. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980, more than 1,250 people died.

Section 5. Community Capability Assessment

5.1 Existing Plans, Policies and Programs

San Bernardino County is encouraging all departments, special districts, and agencies to share reports and common information. This sharing and exchanging of ideas has led to more coordinated efforts and better planning. The driving document in the County of San Bernardino is the County's General Plan. The County General Plan provides the foundation on which all development and future programs are built upon.

5.1.1 San Bernardino County General Plan

The State of California recommends that the General Plan is updated every 10-20 years; depending mostly on whether or not the plan is meeting the community's needs. The San Bernardino County General Plan was last updated and adopted in 2007. There are seven (7) mandatory elements in a General Plan:

- Circulation Element,
- Conservation Element,
- Housing Element,
- Land Use Element,
- Noise Element,
- Open Space Element, and
- Safety Element.

However, there are several optional elements. The County of San Bernardino General Plan includes an optional element, the Economic Development Element.

The Land Use Element of the General Plan establishes 18 land use zoning districts that apply only to lands governed by the County; not for lands controlled by other jurisdictions or lands controlled by federal and state government (see Section 1.3.5, page 8 for a listing of the 18 Land Use districts in the Land Use Element). The Land Use Element also describes land use compatibility for the primary three (3) hazards: Geologic; Flood; and, Wildfire. Because of these commonalities between the General Plan and the MJHMP, the county Board of Supervisors has adopted the MJHMP as part of the County's General Plan.

5.1.2 Regulations, Code, Policies and Ordinances

The following titles of the San Bernardino County Code include regulations and ordinances on the following issues and topics related to hazard mitigation:

Table 5-1: County Development Code Hazard Crosswalk

Hazard	Plan/Program/ Regulation	Description
Multi-Hazard	**Title 2**	Emergency Services Uniform Fire Code and related miscellaneous fire regulations Police Regulations and Public Protection
Multi-Hazard	**Title 3**	Emergency Medical Services Domestic Water Sources and Systems Hazardous Materials and Toxics Control Waste Management
Multi-Hazard	**Title 6**	California Building Code California Electrical Code California Plumbing Code California Mechanical Code
Multi-Hazard	**Title 7**	Airport Rules and Regulations
Multi-Hazard	**Title 8**	Development Code includes regulations relative to Land Use, Development Standards, Safety Standards, and Environmental Protection.
Multi-Hazard	**Zoning Ordinances**	The County has also adopted Zoning Ordinances that are not part of the County Code but are part of the General Plan. These ordinances regulate land use; map the official land use and hazard overlay districts to include safety hazard and environmental protection areas.

5.1.3 Local Programs for Mitigation Implementation

The information in Table 5-2 is used to construct mitigation actions aligned with existing planning and regulatory capabilities of the County. Planning and regulatory tools typically used by local jurisdictions to implement hazard mitigation activities are building codes, zoning regulations, floodplain management policies, and other County programs or planning documents.

Table 5-2: Planning and Regulatory Mitigation Capabilities Summary

Hazard	Plan/Program/ Regulation	Responsible Agency	Comments
Multi-Hazard	Mountain Mutual Aid	Fire District	Mountain Mutual Aid is an operational group of emergency responders. It is comprised of all of the agencies and volunteer relief groups that would be and have been involved in any and all disasters on the mountain. It is of note to that their main and most frequent call to service is in response to a wildfire. They meet monthly and maintain themselves in a constant state of readiness.
Wildfire	Forest Care	Cal Fire	Forest Care is a program dedicated to creating a healthier forest. This program provides foresters to assess individual properties for thinning the vegetation and then provides 75% of the funding to do so. Funding originates at the Federal level but is passed through Cal Fire and it employs Cal Fire Foresters as well as staff from the National Forest Association

5.1.3.1 Public Education and Alert Programs

Table 5-3: Public Education and Alert Programs

Hazard	Program	Responsible Agency	Comments
Multi-Hazard	MAST	Multiple	Mountain Area Safety Taskforce (MAST) has a substantial public education component. All agencies participate with the goal to have no one on the mountain uneducated about creating a thinner forest which is a more fire safe forest. For more information on MAST, see Annex A Section A.6 Fire Protection District Mitigation Project .
Multi-Hazard	CERT	Fire District	The Community Emergency Response Team (CERT) Program educates people about disaster preparedness and trains them in basic response

Hazard	Program	Responsible Agency	Comments
			skills. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
Multi-Hazard	Listos	Fire District	Listos, which means "ready" in Spanish, is a twelve-hour disaster preparedness course created specifically for the Spanish-speaking community and is delivered entirely in Spanish. The program is intended to be adaptable, flexible and culturally relevant. This means participants are encouraged to involve the entire family and accommodations are made for young children. San Bernardino County Fire, Office of Emergency Services currently partners with the Cities of Fontana and Rialto to bring Listos to their communities
Multi-Hazard	California Disaster Corps	Fire District	The Disaster Corps is a first-in-the-nation effort to professionalize, standardize and coordinate highly trained disaster volunteers statewide. This program initiative was built collaboratively in partnership with California Volunteers from the ground up through public-private partnerships and with a wide range of subject matter experts. See Annex A Section A.6 Fire Protection District Mitigation Project .
Multi-Hazard	TENS	Fire District	Telephone Emergency Notification Systems (TENS) During an emergency, public safety can be a direct function of the speed and accuracy of the dissemination of information. This is particularly important during emergencies that require evacuations. To that end the Board of Supervisors dedicated General Fund money in 2003 to the implementation of an automated phone dialing system that calls telephones in specific geographic areas of concern. All areas of San Bernardino County have all been preprogrammed so that during an emergency, the specific target group can be notified as quickly as possible.

Hazard	Program	Responsible Agency	Comments
Multi-Hazard	ECS	Fire District	The Emergency Communications Service (ECS) is a volunteer group providing front-line communications, technical and logistical support to the San Bernardino County Fire Department and Office of Emergency Services. Their primary mission is to support County Fire, County Government and other local agencies in time of disaster. In addition, ECS has provided telecommunications and event support to other County departments including Public Health, Behavioral Health, Public Works, Pre-School Services, Sheriff's Search and Rescue and other County Departments.
Multi-Hazard	AM Radio	Fire District	Community Based AM Radio Transmitters The Fire Safe Councils discovered the existence of very inexpensive but very effective community based AM radio transmitters. The transmitters are very effective for providing information and updates to a community that is either preparing for a community emergency or just had one. As a delivery modality they are extremely reliable because in most all emergencies the AM radio in your car is likely to be operational particularly when the electricity is out in your house.
Multi-Hazard	IPAWS	Fire District	During an emergency, alert and warning officials need to provide the public with life-saving information quickly. The Integrated Public Alert and Warning System (IPAWS) is a modernization and integration of the nation's alert and warning infrastructure and will save time when time matters most, protecting life and property. Federal, State, Territorial, Tribal, and local alerting authorities can use IPAWS and integrate local systems that use Common Alerting Protocol (CAP) standards with the IPAWS infrastructure. IPAWS provides public safety officials with an effective way to alert and warn the public about serious emergencies using the Emergency Alert System (EAS), Wireless Emergency Alerts (WEA), the

Hazard	Program	Responsible Agency	Comments
			National Oceanic and Atmospheric Administration (NOAA) Weather Radio, and other public alerting systems from a single interface.

5.1.3.2 Wildfire Mitigation Programs

San Bernardino County has one of the most comprehensive set of programs to mitigate the potential for catastrophic wildfires in the Nation. There is no other jurisdiction that has the comprehensive, multi-agency cooperation and coordination as is found in San Bernardino County. See Annex A Section A.6 Fire Protection District Mitigation Project to see how the Fire Protection District will implement the following programs:

Table 5-4: Wildfire Mitigation Programs

Hazard	Program	Responsible Agency	Comments
Wildfire	MAST	Multiple	The mission of the MAST is to facilitate a coordinated effort by cities, county, state, federal, and non-profit agencies to provide for protection from wildfire. For more information on MAST, see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	Community Based Fuels Reduction program	Fire District	This program is designed to create community based fuel modification programs across the mountain communities. For more information see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	Cal Fire	Cal Fire	Cal Fire provides programs to increase fire safety in high fire hazard severity zones. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	County Fire Hazard Abatement	Fire District	Fire Hazard Abatement works to reduce the potential for an individual's property to be the source of fire and structural ignitability. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .

Hazard	Program	Responsible Agency	Comments
Wildfire	Contractor Certification	City of Big Bear Lake Fire Department	This program trains and certifies landscape contractors to provide a qualified workforce to conduct fuels reduction activities on individual properties. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	Southern California Edison (SCE)	Southern California Edison (SCE)	SCE removes dead trees near power lines to reduce fire hazards. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	Wood Shake Roof Replacement	County	This code requires that all Wood Shake Roofs in the Fire Safety Overlay, as defined in the Development Code, ongoing effort.
Wildfire	Inland Empire Fire Safe Alliance	Inland Empire Fire Safe Alliance	The Alliance was created to act as a forum for all Fire Safe Councils in San Bernardino County. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	Community Wildfire Protection Plans (CWPP)	Fire District	CWPPs are designed to provide a means for a community to have input into and actively participate in the planning, strategy, goals, and objectives of creating a fire safe community. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	Organized Group Volunteer Activities	Fire District	There are several volunteer citizen groups throughout the County that are capable of providing significant resources that are not provided by traditional governmental agency services. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .

5.1.3.3 Earthquake/Geologic Mitigation Programs

San Bernardino County's seismic mitigation programs focus on two areas that have historically resulted in the greatest amount of damage and life loss from major earthquakes in California.

5.1.3.3.1 Bridge Retrofit Program

Caltrans inspects County and City bridges yearly every 2 years for structural sufficiency (which applies to earthquake) and functional obsolescence (which applies to floods). Caltrans provides reports that include recommended repairs or replacement. The County and Cities make the repairs and/or apply for bridge replacement funds thru the Federal Highway Bridge Program (HBR). Currently the County has 5 funded HBR replacements due to structural deficiencies:

- Dola Ditch, (out for bid to construct)
- Lanzit Ditch, (out for bid to construct)
- Garnett at Mill Creek (under construction)
- Yermo Rd at Manix Wash.(waiting for SCAG approval for additional funds to move forward with the Design & Environmental)
- Baker Blvd west of SR127. (waiting for HBP fund for Design & Environmental)
- National Trails Hwy at Kalmia Bridge (waiting for HBP funds)
- National Trails HWY @ Adena Ditch (Received HBP funds for design phase)
- Bridge Management (consultant on board that has prioritized all timber bridges on National Trails Highway and DPW is submitting groups of bridges for funding over a ten year period)

The design and environmental work has been started for Rock Springs Road (functionally obsolete bridge) using DPW funds, waiting for HBP funds for R/W phase.

The County has completed the construction of the Alabama Street at Plunge Creek bridge replacement using Federal Emergency Relief funds.

5.1.3.3.2 Unreinforced Masonry Building Program

In the 1990's, the County of San Bernardino compiled a master list of suspected Unreinforced Masonry Buildings within the unincorporated areas. Since that time, several sites have been incorporated and therefore, are now removed from County jurisdiction. In addition, several appear to have been demolished or retrofitted since the 1990's. The Land Use Services Department's Building and Safety Division is currently in the process of re-evaluating the URM list. Re-evaluation will include a field visit to each site photographing structures and verifying the occurrence of unreinforced masonry. This process is scheduled to be completed by the end of the 2010.The program would be an inspection program and maintenance and inspections as warranted.

There are no large publically utilized URM structures currently on the list. These types of structures are typically restricted to the incorporated areas of the County. There are only twenty-two (22) structures remaining on the list.

5.1.3.3.3 Geologic Hazard Mapping

The Seismic Hazards Mapping Act (Public Resources Code, Chapter 7.8 Section 2690-2699.6) directs the Department of Conservation, California Geological Survey (CGS) to identify and map areas prone to liquefaction, earthquake-induced landslides and amplified ground shaking. Although the San Bernardino area has a full spectrum of geologic hazards, CGS does not have adequate funding to complete the hazard mapping within the County.

5.1.3.4 Flood Mitigation Programs

The flood mitigation projects are programs that were established by San Bernardino County Flood Control District to protect life and property. These projects are typically designed to convey 1% annual chance or greater storm flows in order to mitigate danger to life and property, and critical infrastructure consisting of existing, new and future structures. Also, these projects include revisions to local land use and building codes where analysis or experience shows the need for code revisions or amendments to meet previously unidentified circumstances.

Hazard	Program	Responsible Agency	Comments
Flood	Flood Area Safety Taskforce(FAST)	Flood Control District	The FAST Organization stresses liaison with the communities, provides for community education and information, and places emphases on Community and city partnerships. For more information on FAST, see Annex B Section B.6 Flood Project Prioritization and Implementation.
Flood	Alluvial Fan Task Force	Alluvial Fan Task Force	The Task Force reviews the state of knowledge regarding alluvial fan floodplains, determine future research needs, and, if appropriate, develop recommendations relating to alluvial fan floodplain management, with an emphasis on alluvial fan floodplains that are being considered for development. For more information, see Annex B Section B.6 Flood Project Prioritization and Implementation.
Flood	StormReady	Flood Control District	San Bernardino County is a StormReady County. For more information, see Annex B Section B.6 Flood Project Prioritization and Implementation.

5.1.3.5 Climate Change Programs

5.1.3.5.1 Extreme Heat, Extreme Cold Programs

This document is a contingency plan supporting the San Bernardino County Emergency Operations Plan (EOP).

Excessive Cold events are commonplace in San Bernardino County and most often warrant monitoring activities only. These Standard Operating Guidelines provide GUIDANCE based on the most likely scenario, and can be expanded to meet the parameters of a "disaster" scenario if necessary.

The Extreme Weather – Excessive Cold Standard Operating Guidelines (SOG) were developed in response to the potential for Excessive Cold and cold related Power Outage events in San Bernardino County. The following objectives and activities are to prevent the harmful effects of excessive cold on at-risk populations and the potential for life-threatening repercussions of power outages during excessive cold events.

The information included in this plan is "situation" and/or "incident" driven and subject to revision by the Extreme Weather Committee as conditions warrant. Notifications are information dependent and modification of the activities in these guidelines may be required in response to changing conditions, situations and/or inaccurate weather predictions

5.1.3.5.2 San Bernardino County Fire Office of Emergency Services Heat Plan

This document is a contingency plan supporting the San Bernardino County Emergency Operations Plan (EOP). The Extreme Weather – Excessive Heat Standard Operating Guidelines (SOG) were developed in response to the potential for Excessive Heat and heat related Power Outage events in San Bernardino County. The following objectives and activities have been established to prevent the harmful effects of excessive heat on at-risk populations and the potential for life-threatening repercussions of power outages during excessive heat events. The Extreme Weather – Excessive Heat SOG describe the County operations during heat related emergencies and provide guidance for local jurisdictions in their preparation for heat emergencies and other related activities. The information included in this plan is "situation" and/or "incident" driven and subject to revision by the Extreme Weather Committee as conditions warrant. Notifications are information dependent and modification of the activities in these guidelines may be required in response to changing conditions, situations and/or inaccurate weather predictions.

5.2 Fiscal Resources

The 2016-17 recommended budgets of $5.4 Billion are balanced and consistent with policy and direction received from the Board of Supervisors. The 2016-17 Recommended Budgets address the following key issues:

- Ongoing funding for neglected raises for County employees
- Ongoing funding for maintenance of County roads
- Continues investment in facilities, infrastructure and operating systems.
- Ongoing funding of mental health and medical services for County residents.
- Maintains fiscal responsibility through contributions to the reserves of $62.8 million.

The budget represents the County General Fund and County restricted general funds .It also presents capitol project funds, special revenue funds, enterprise funds, internal service funds and permanent funds for all entities in the 2016-17 Recommended Budget including the County Board Governed County Service Areas, San Bernardino County Fire Protection District, San Bernardino County Flood Control District. Other agencies presented in the budget include County Industrial Development Authority, Inland Counties Emergency Medical Agency and the recently added Housing Authority of the County of San Bernardino. The total requirements for these funds in the 2016-17 are $5.4 billion, which includes amounts budgeted as contingencies or contributions to reserves. Excluding these amounts, total projected expenditures for the 2016-17 are $5.3 billion. The General fund Requirements total $2.9 billion and are funded by countywide discretionary revenues (primary property taxes), departmental revenues and other funding sources of the General Fund, of this $2.9 billion, only $558.3 million is truly discretionary.

5.2.1 The Budget in Brief

This budget book collectively presents the general fund, special revenue funds, capital project funds, internal service funds, and enterprise funds for the county and its Special Districts. The total spending authority for these funds in 2016– 2017 is $5.4 billion. The general fund spending authority totals $5.3 billion and is funded by countywide discretionary, and the beginning fund balance of the General Fund. Of this $2.9 billion, only $558.5 million is truly discretionary.

Table 5-5: Spending Authority for San Bernardino County

	Spending Authority (in Millions)		
	2015-16	2016–2017	Change
General Fund	$ 2,984.3	$ 2,911.1	$ (73.2)
Restricted Funds	49.3	49.7	(.4)
Capital Project Funds	1169.	911.3	(258.4)
Special Revenue Funds	257.6	298.4	40.7
Enterprise Funds	984.9	1001.	16.5
Internal Service Funds	1.6	0.0	(1.6)
	$ 5,692.0	**$ 5,420.0**	**272.0**

There is a $73.2 million net decrease in General Fund requirements due to a $106.1 million reduction in contributions to General Fund reserves, as the Board of Supervisors approved an increase to multiple County General Fund operational groups' requirements are increasing by $32.9 million. There are Law and Justice ($12.5 million). The Human Services Operational Group is anticipating increased State and Federal funding that will support Department of Behavioral Health services, including inpatient hospitalization, indigent hospital care, general mental health services, and services for children, youth, and families .The County is also continuing to allocate additional resources to meet the growing need for augmented health and mental health correctional services associated with Public Safety Realignment.

The net reduction of $258.4 Million is Special Revenue Funds is associated with the County's shift in 2015-16 from budgeting contingencies to instead placing unallocated resources in reserves. This technical change resulted in a large one-time contribution to reserves in 2015-16 that is not required in 2016-17. This reduction in contributions to reserves totaling $289.6 million is offset by increased operational costs of $31.2 million. This is due to increases within the Department of Behavioral Health's Mental Health Services Act (MHSA) budget unit and the County Fire Protection budget is increasing as a result of the pending annexation of fire prevention and suppression services from the City of San Bernardino (429.6 million) and Twentynine Palms ($1.7 million).

The $40.7 million increase in Capital Project Funds is primarily due to the planned construction of two Department of Behavioral funded Crisis Stabilization Centers and four Crisis Residential Treatment Centers totaling $36.5 million. This will enable Community Crisis Response Team (CCRT) clinics throughout the County to be expanded to provide 24 hour services and to respond to request by law enforcement for support during the night hours.

Enterprise Funds requirements are increasing a net $16.5 million. Notably, the Housing Authority of the County of San Bernardino has been added to the budget book and is contributing to the overall increase in Enterprise Fund requirements, including additional assumed payments for Housing Assistance and increased Capital Expenditures.

Table 5-6: 2015-2017 Staffing Budget

	Budgeted Staffing		
	2015–2016	2016–2017	Change
General Fund	14,332	14,425	93
Other Funds	6,375	6,508	133
Special Districts and Other Agencies	1402	15601	159
Total:	**22,109**	**36,534**	**385**

5.2.2 Budget Highlights (2016 – 2017)

Create and Maintain and Grow Jobs and Economic Value in the County

- The Real Estate Services Department of Project Management Division (formerly Architecture and Engineering) Capital improvement budget includes 355 active projects with total requirements of $295.2 million, including $128.2 million in new projects funded with $57.7 million of Discretionary General Funding includes an ongoing base budget of $12.0 million for maintenance and non-major Capital Improvement Plan (CIP) projects ,and $45.7 million for construction and major CIP projects .These major projects include $26.4 million for the 800 Megahertz Upgrade Project ,$12.2 million for various Sheriff's facility improvements ,$8.0 million for the County Buildings Acquisition and Retrofit Project including the upgrade of the County Government Center parking lots and grounds ,and $7.6 million for a variety of other projects.

Improve County Government Operations

- Enterprise Financial Management System: Implementation of the new system began in May 2016 with the first phase (out of two phases) continuing into 2016-17 at an estimated cost of $7.1 million. The total cost for the financial system is estimated to be $25.0 million and will streamline business processes and provide better management information.

- Public Health will continue its efforts to achieve and maintain National Accreditation, through the Public Health Accreditation Board (PHAB). Accreditation ensures the Department's continued focus on quality and performance improvement, transparency and accountability to all stakeholders, and the capacity to deliver core Public Health functions. The department will be submitting the required application to PHAB in December 2016.

- The County Library continues its plans to enhance service by replacing outdated computer hardware and software. Funding has been included in the Library's material's budget, which adds high demand items to the collection, including an expanded digital book collection.
- Land Use Services, in conjunction with Public Works, Information Services, and other County departments, continues to upgrade to a new enterprise permit solution, Accela. The new system will include a shared database, precise digital maps, and satellite images of land data that are linked to the County's GIS database. It will also provide field staff remote real-time access to the database. This solution will streamline the permitting process, offering the public access to a web portal to manage and monitor applications and permits online.

Operate in a Fiscally-Responsible and Business-like Manner

- The County Museum's budget of $3.8 million demonstrates the County's commitment to support the Museum through a time of transition. The budget includes $1.1 million in one-time Discretionary General Funding which includes bridge funds to support current operations and funding for activities related to re-accreditation. The County Museum continues to implement the consultant study recommendations as approved by the Board of Supervisors, to address organizational and financial challenges.

- The Transitional Assistance Department is in the second of a four year reduction to the State's CalFresh Match Waiver pursuant to the phase-out agreement adopted in the prior year State budget. This wavier allowed the County to draw additional Federal and half of the State funding without increasing the County's Maintenance of Effort. The budget includes the use of $2.5 million of the original $5.0 million general fund reserve that the Board approved in 2014-15 for this phase-out period.

Ensure Development of a Well-Planned, Balanced, and Sustainable County

- The County continues work on a complete overhaul of the County's General Plan, referred to as the Countywide Plan. This Countywide Plan will be a comprehensive web-based system to document land use planning and organizational governance policies. It will be comprised of three basic components: The Policy Plan (a comprehensive general plan); the County Business Plan (a system that will define and guide how the County government operates and manages itself); and the Regional Issues Forum (a web-based resource center containing information regarding shared Countywide issues). Additionally, the County is updating and expanding the community plans. When completed, there will be 27 web-based community plans involving 49 communities.

- A team of County departments will continue to monitor the drought and develop ways to reduce water usage at County facilities to show good stewardship of this valuable resource. The Special Districts Department, in collaboration with other County

departments, will continue to implement water conservation programs/strategies at various County Service Areas and Districts throughout the County.

- The Registrar of Voters budget fluctuates based on the 4-year election cycle, with the Presidential Election being the largest and most costly of the major elections. The Department is transitioning from a one minor and two major election cycles in 2015-16 to a one minor and one major election cycle for 2016-17. The budget includes provisions for the following: November 8, 2016 Presidential General Election (major); December 6, 2016 San Bernardino County Employees' Retirement Association Election (minor); and three anticipated, but unscheduled special elections (minor). The minor elections are 100% reimbursable; however, the November Presidential General Election is only 30% reimbursable and thus requires one-time Discretionary General Funding (Net County Cost) of $3.7 million for the year.

- The Public Works – Transportation budget includes over $35.0 million in major infrastructure projects, funded in part with Discretionary General Funding. Budgeted activities include design, right of way and/or construction for major projects including:
  - Bridge replacements on: Glen Helen Parkway, Baker Boulevard, Garnet Street, Rock Springs Road, Dola Ditch Bridge, Lanzit Ditch Bridge, Yermo Road and Arrowbear Drive;
  - New bridge on Shadow Mountain Road;
  - Widening of Slover Avenue in the Bloomington Area;
  - Installation of raised pavement markers on National Trails Highway in the Amboy area;
  - Reconstruction of Institution Road to improve access to the Sheriff facility in San Bernardino;
  - National Trails Highway Bridges: Bridge management plan for the repair, rehabilitation or replacement of 127 bridges on National Trails Highway and starting the design phase for replacement of 10 bridges:
  - Rehabilitation and re-profiling at various locations on Needles Highway in the Needles area;
  - Improvements to alleviate congestion and improve circulation of the interchange on Interstate 10 at Cedar Avenue

- The Public Works – Transportation budget includes $31.5 million worth of pavement improvement projects, funded in part with ongoing Discretionary General Funding, to preserve the County's roadways by investing enough to keep the system from deteriorating further.

- The Public Works – Solid Waste Management Division plans to complete $8.9 million of capital improvement projects, which includes the following:
  - $2.0 million for resurfacing the entrance and haul roads at the San Timoteo Landfill;
  - $957,000 for construction of Groundwater Treatment Systems at the closed Lenwood-Hinkley Landfill and Yucaipa Disposal Site;

- $1.5 million for the East Slope Stabilization and Mitigation project at the closed Heaps Peak Disposal Site;
- $1.5 million for construction of Landfill Gas Extraction Systems at the Barstow and Big Bear Landfills which includes $300,000 to bring electrical power to the Barstow Landfill

- The Public Works – Flood Control District (District) budget includes $37.6 million in capital improvement projects. The District anticipates completion of the following projects: Cactus Basin # 3, Wilson Creek Channel, Santa Ana River Flood Wall Repair, and the waterline relocations for Bandicoot Basin and Amethyst Basin. The District also plans to start construction on the following projects: Levee Certification Restoration for Patton Basin, Mojave River Levee, and Sand Creek/Warm Creek Confluence.

- Land Use Services Planning budget includes $150,000 of Discretionary General Funding for the preparation of a Morongo Basin Cultural Plan.

- The Special Districts department's budget includes $45.3 million capital improvement projects including the design and construction of the Big Bear Alpine Zoo relocation, rehabilitation of the Lake Gregory Dam, and construction of Snow Drop Road. Water and sanitation infrastructure projects of $19.2 million include pipeline replacements; water system improvements, and design and construction of a pipeline, a 75,000-gallon water reservoir, and a pump station in CSA 70 W-4 – Pioneertown.

- Community Development & Housing is constructing Phase 2 of the Bloomington Community and Neighborhood Revitalization. A total of 190 multi-generational affordable housing units include 120 family units and 70 senior units and the Bloomington Branch Library. The Bloomington Branch Library and the first phase of housing are completed. The second phase is currently under construction and will be completed by spring 2017.

Provide for the Safety, Health and Social Service Needs of County Residents

- The County is expanding efforts to provide homeless support to County residents through the flowing allocations included in the 2016-17 budget:
  - The Department of Behavioral Health is investing $4.0 million by providing basic needs, case management, outreach services, and additional built and supportive housing opportunities.
  - The Sheriff/Coroner/Public Administrator is continuing to fund the HOPE Program (Homeless Outreach Proactive Enforcement) Team ($620,000), which provides services to the homeless population by connecting them to the appropriate agencies for much needed services that help in the transition from homelessness.
  - The Probation Department has included $3.2 million towards transitional housing for adult offenders requiring Probation Department supervision.

- The Department of Behavioral Health is expanding Mental Health Treatment Services, notable in the following areas:
  - $1.0 million towards staffing Community Crisis Response Team clinics, which will now provide 24 hour services to departmental consumers and respond to requests by law enforcement for support during night hours. The department has also allocated $36.5 million towards the construction of new CCRT clinics throughout the County to expand these services.
  - $8.5 million for the Mental Health Act (MHSA) Comprehensive Children and Family Support Services program to support expanded mental health services for children.
  - $4.3 million for the MHSA Regional Adult Full Service Partnership (FSP) program support expanded mental health services to adults.
  - $1.0 million for the MHSA Forensic Integrated Mental Health Partnership program to expand services to develop peer support and mentoring strategies for individuals who have been released early from County jail or State prison.

- The Sheriff/Coroner/Public Administrator budget included $1.1 million of existing departmental resources for a program authorized by the Board as a pilot on December 15, 2015 (Item No. 72) related to the delivery of law enforcement services to unincorporated areas of the West End including the North Rancho/Etiwanda Preserve and the Mission Corridor, respectively. The program was successful and is now being incorporated as an ongoing service beginning in 2016-17 ,

- The Sheriff/Coroner/Public Administrator budget includes $9.0 million of one-time Discretionary General Funding (Net County Cost) to replace 2 aging and obsolete patrol helicopters: including equipment, travel and training for pilots and mechanics, installation of equipment, and delivery charges. The helicopter replacements will provide newer more reliable aircraft.
- The Public Defender Proposition 47 program will use media resources to reach all potential citizens who have convictions eligible for reclassification to further enhance their ability to rehabilitate within the community.

- County Fire is assuming fire, rescue, Emergency Medical Services (EMS), and prevention responsibilities within the Cities of San Bernardino ($29.6 million) and Twentynine Palms ($1.7 million) as a result of the pending annexations. This continued expansion of a regional approach will provide a more effective and efficient delivery of fire services for County residents.

- Land Use Services Code Enforcement is continuing to pilot various strategic initiatives to address issues with short-term rentals, particularly in the mountain areas. For 2016-17, a pilot program for a short-term rental hotline will be established where the public can report illegal or disruptive activities at short-term rental properties.

- The Information Services Department Telecommunication Services division is in the process of upgrading the County's Regional Public Safety Radio System (800 Mhz Upgrade Project). The project is currently on schedule, with an estimated completion date of 2020-21. The estimated cost of the project is $158.2 million primarily funded with Discretionary General Funding.

- The Department of Aging and Adult Services (DAAS) budget of $8.3 million will supplement programs such as the Elderly Nutrition, Supportive Services, Medicare Improvements for Patients and Providers Act, and Family Caregiver.

- The Arrowhead Regional Medical Center (ARMC) budget includes the addition of 14 positions to strengthen the Sterile Processing division to meet operational needs and ensure compliance with regulatory standards.

- The Department of Children and Family Services is implementing an After Hours Response Center (ARC) in June 2016 to provide optimal customer services to our community partners, children and families. The Center will enhance the departments critical after hour function of responding to child abuse, neglect and exploitation referrals called into the Child and Adult Abuse Hotline (CAAHL).

Pursue County Goals and Objectives by Working with Other Agencies

- ARMC is participating in California's 1115 waiver Renewal (Medi-Cal 2020), working alongside the California Association of Public Hospitals, the State of California, The Centers for Medicare & Medicaid Services, and multiple County departments focusing on improved patient outcomes, efficiencies and access in patient care integrated care models and procuring maximum reimbursement for performance of prescriptive clinical measures. The budget includes $52.5 million in revenues related to the Medicaid Waiver programs.

Focus on Recovery and Resiliency Following the December 2, 2015 Terrorist Attack (SB Strong)

- The County Administrative Office has commenced a countywide effort to document the impact and ongoing response to the December 2, 2015 terrorist attack while pursuing multiple sources of potential cost-reimbursement and to create a historic and best-practices document.

- The County has allocated approximately $10.2 million in funds towards improving security at County facilities. This includes $8.2 million in immediate improvements to facilities, such as expanded security guard services, upgraded security camera and key card access installations, and $2.0 million to conduct a security assessment of all County facilities.

Challenges in Fiscal Year 2016-17 and Beyond

Although the balancing of future costs with projected revenue has improved compared to prior County five year forecasts, broad economic challenges remain. The current economic expansion will be 7 years at the end of June 2016, which is the fourth longest in the history of the United States and cannot be assumed to last indefinitely. In addition, the fiscal uncertainly inherent in the State budget process continues to present a major challenge to the County's fiscal planning efforts.

Economic Challenges

The County's Five Year Financial Forecast covers July 2016 through June 2021 and includes moderate growth of major revenue streams throughout the period. Not included in the forecast are the impacts of a potential recession or the unknown economic impacts of the coming statewide $15 minimum wage.

By the end of the third year of the County's forecast the current economic expansion would match the longest expansion in history. Although the weakness of the current recovery and quantitative easing may have pushed off the next recession temporarily, it would be without precedent for the economy to expand throughout the County's entire five year forecast. In response to these unknown variables, the County has taken the approach of budgeting revenue growth in a conservative fashion over the entire five year forecast rather than assuming greater potential revenue increase in the immediate future with reductions in the later part of the forecast.

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Section 6. Mitigation Strategy

6.1 Mitigation Goals and Objectives

Goals and objectives discussed in this section help describe what actions should occur, using increasingly narrow descriptors. Long-term goals are developed which can be accomplished by objectives. To achieve the stated objectives "mitigation actions" provide specific measurable descriptors on how to accomplish the objective. The goals, objectives, and actions form the basis for the development of a Mitigation Action Strategy and specific mitigation projects to be considered for implementation.

The process consists of 1) setting goals and objectives, 2) considering mitigation alternatives, 3) identifying strategies or "actions", and 4) developing a prioritized action plan resulting in a mitigation strategy.

The following section provides an overview of the Mitigation Goals and Objectives for profiled hazards, Wildfire, Earthquake, Flood, Drought, Terrorism, and Climate Change for the County Unincorporated Area and the County's Special Districts. These goals were compiled from various sources including the County of San Bernardino 2007 General Plan. (See Section 3.5 for a detailed description of the process used by the County Planning Team)

6.1.1 All Hazard (AH)

AH GOAL: Increase readiness for all hazards in the unincorporated areas of San Bernardino County.

OBJECTIVE 1: Construct All-Hazard Response Facilities: Construct facilities to increase operational readiness to reduce impacts of natural hazards.

> **AH Action 1.1: Construct Valley Dispatch and Operations Center.** Construct facility and ensure cohesive working and response to any scale emergency and operations in a secure complex
>
> **AH Action 1.2: Construct Shelter Operations Compound (SHOC).** This shelter concept provides a new one-stop shelter concept. The SHOC combines a shelter, a Local Assistance Center (LAC) and a Non-LAC Unit in one easy location.

OBJECTIVE 2: Special District Funding: Continue Special Districts Projects relating to all hazards.

AH Action 2.1: Continue funding and support for Special Districts Projects relating to water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big

Bear Valley Recreation Park District and Bloomington Recreation and Park District for all hazards.

AH Action 2.2: Install Generators at Critical Facilities Retrofit existing buildings and facilities with connectors/ ATS for emergency generators and/or install permanent emergency generators at critical facilities, including wells and booster station locations.

AH Action 2.3: Water Systems Repair Plan Develop a plan for speeding the repair of and functional restoration of water and wastewater systems through stockpiling of shoring materials, temporary pumps, surface pipelines, portable hydrants, and other supplies.

AH Action 2.4: Smart Water Meters and SCADA Utilization of SCADA and Smart Water Meters to get real time data on problems with the system and reduce drive time emissions as a result of traditional meter reading.

AH Action 2.5: Provide Employees with Emergency Supplies Provide emergency supplies of food, water, and portable generators for employees at office and field locations.

AH Action 2.6: Annual Tower and Guide Wire Inspections Conduct annual tower and guide wire inspections to mitigate storm/wind/earthquake hazards from knocking out communications.

AH Action 2.7: **Maintain Tower Lighting** Maintain lights on all tower locations.

AH Action 2.8: Designate Emergency Operations Sites Conduct an inventory or list of County Park Facilities and Community Centers to establish a list of pre-designated emergency operations or disaster relief sites. Not all Community Centers are an appropriate size to accommodate large numbers of evacuees and may only serve as command and control centers or distribution centers.

AH Action 2.9: Establish Power Sources for Emergency Operations Sites Establish small solar energy fields or other forms of renewable power at County Community Centers to
facilitate stand-alone emergency operations for the community.

AH Action 2.10: Connect Water Systems to Generators Connect water systems to generators to ensure delivery even in disaster situations.

AH Action 2.11: Establish a Centralized Communications Network Establish a centralized communications network to monitor channel output for TV Districts and provide emergency information by way of character generator tied to channel transmissions.

AH Action 2.12: Incorporate as appropriate requirements from the State of California's most recent land use regulations regarding the hazard mitigation planning process (Government Code 65302 and 8685.9).

6.1.2 Wildfire (WF)

WF GOAL: Continue to reduce fire hazards in the unincorporated areas of San Bernardino County.

WILDFIRE OBJECTIVE 1: **Mountain Area Safety Taskforce.** Continue the cooperation and coordination of Fire Hazard Mitigation efforts with all stakeholders in the mountain areas of San Bernardino County through participation in MAST.

WF Action 1.1: Continue Mountain Area Safety Taskforce (MAST) funding to support mitigation activity.

WILDFIRE OBJECTIVE 2: Support Mountain Mutual Aid Objectives. Continue development of and continue the mission of mutual aid between the first responders in the County mountain areas through County Mitigation Planning.

WF Action 2.1: Update Mountain Mutual Aid Mapbook to document.

WF Action 2.2: Update Community Structure Protection Plans as necessary.

WILDFIRE OBJECTIVE 3: Community Based Fuels Reduction Program. Continue the community based Fuels Reduction Program through community based programs, both volunteer and government funded.

WF Action 3.1: Implement identified community based fuels reduction projects.

WF Action 3.2: Develop fuels reduction "maintenance program" by obtaining participation from citizens and/or homeowners associations.

WF Action 3.3: Vegetation Removal Clear vegetation from Road District facilities/yards.

WILDFIRE OBJECTIVE 4: Forest Care. Continue providing assistance to homeowners by expanding services to all communities in the Mountain areas of the County.

WF Action 4.1: Increase homeowner assistance services to mountain residents for fuel reduction.

WF Action 4.2: Continue working with Southern California Edison to remove dead trees near power lines.

WILDFIRE OBJECTIVE 5: County Fire Hazard Abatement. Overcome funding shortfalls while improving service delivery.

WF Action 5.1: Inspect every residence in the mountain communities within the next two years to enforce the new Fire Hazard Abatement code that addresses green fuels.

WF Action 5.2: Continue to collaborate with Forest Care, Red, Cross and Cal Fire to overcome increased costs of enforcement.

WILDFIRE OBJECTIVE 6: Decrease Wildfire Hazards at Private Property through the Fire Hazard Abatement Programs

WF Action 6.1: Train and Certify landscape contractors to comply with the new Fire Hazard Abatement Code.

WF Action 6.2: Continue wildfire mitigation efforts under the Wood Shake Roof Replacement Program.

WF Action 6.3: Protect Property in Wilderness Areas Rockscape or pave property grounds which have structures located in wilderness and or areas prone to wildfires. Double the width of external fire breaks.

WILDFIRE OBJECTIVE 7: Support Mitigation Strategies in Community Wildfire Protection Plans. Continue to improve CWPP's in cooperation with Cal Fire, the IEFSA and individual Fire Safe Councils.

WF Action 7.1: Modify independent and unique CWPPs into a more common framework making them similar but leaving room to provide specific hazard characteristics and mitigation actions for each community.

WILDFIRE OBJECTIVE 8: Improve Emergency Access. Improve and maintain emergency access for wildfire protection.

WF Action 8.1: Construct Arrowbear Drive Realignment and Widening

WF Action 8.2: Construct Cedar Glen Fire Access Road

WF Action 8.3: Structural Fire Breaks Widening Double the width of external fire breaks on grounds which have structures located in wilderness and or areas prone to wildfires.

WILDFIRE OBJECTIVE 9: Special District Funding: Continue Special Districts Projects relating to wildfire.

WF Action 9.1: Continue funding and support for Special Districts Projects relating to wildfire in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District.

WF Action 9.2: Emergency Water Supplies Purchase emergency water supply or water purification devices to ensure uninterrupted supply of water to emergency response personal. (completed with continuous fresh of supplies and rotation)

6.1.3 Earthquake/Geologic Hazards (EQ)

GOAL: Minimize exposure to structural and contents damage from geologic and seismic conditions. (Complements General Plan, Section VIII, Safety Element (Goal S 7)

EARTHQUAKE OBJECTIVE 1: Educate the public on reducing earthquake risk.

EQ Action 1.1: Improve public education programs and practices to residents for earthquake risk.

EARTHQUAKE OBJECTIVE 2: Protect occupants and structures in proposed developments from high levels of risk caused by rupture of the ground surface during an earthquake (Complements General Plan, Section VIII Safety Element Policy S 7.4).

EQ Action 2.1: Evaluate single family homes for Earthquake hazard when conducting permit applications and plan reviews.

EQ Action 2.2: Seismic Strapping for existing water tanks and future construction.

EQ Action 2.3: Employee Emergency Sheltering Develop a plan for short-term and intermediate-term sheltering of employees.

EARTHQUAKE OBJECTIVE 3: Continue geologic hazard mapping projects to minimize and prevent damage caused by earthquakes and other geologic hazards.

EQ Action 3.1: Identify liquefaction hazard areas outside the currently designated Geologic Hazard Overlay Districts.

EARTHQUAKE OBJECTIVE 4: Protect life and property from risks resulting from gravity-derived and/or earthquake-triggered landslides, expansive soils and/or other poor soil conditions. (Complements General Plan, Section VIII, Safety Element Policy § 7.6)

EQ Action 4.1: Require development on hillsides to minimizes the extent of topographic alteration and erosion, to maintain slope stability, and to reduce the potential for offsite sediment transport (Complements General Plan, Section VIII, Safety Element Policy § 6.1).

EQ Action 4.2: Generator Installation Install generators at all road facilities. This will allow uninterrupted communications and provide power to refuel critical emergency response equipment.

EARTHQUAKE OBJECTIVE 5: Reduce runoff over the cliffs in the Rimforest neighborhood. (Complements Rimforest Drainage Feasibility Study)

EQ Action 5.1: Divert runoff to Little Bear Creek.

EARTHQUAKE OBJECTIVE 6: Special District Funding: Continue Special Districts Projects relating to earthquake hazards.

EQ Action 6.1: Continue funding and support for Special Districts Projects relating to earthquake hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District.

6.1.4 Flood (FL)

GOAL: Provide adequate flood protection to minimize hazards and structural damage. (General Plan, Safety Element, Goal S 5)

FLOOD OBJECTIVE 1: National Flood Insurance Program. Participate in the National Flood Insurance Program (NFIP), which provides flood insurance within designated floodplains. (General Plan, Safety Element, Policy S 5)

FL Action 1.1: Update NFIP data and maps with newly identified flood hazard areas in the County, as new information becomes available.

FLOOD OBJECTIVE 2: Alluvial Task Force. Review and analyze the findings and recommendations from the recently released Alluvial Fan Task Force reports, as funding permits.

FL Action 2.1: Determine whether or not additional amendments to development standards or policies are merited, based on the completed analysis.

FLOOD OBJECTIVE 3: Flood Hazard Reduction. Reduce flood hazards through development standards and policies stated in the County of San Bernardino General Plan and County of San Bernardino 2010 Development Code.

FL Action 3.1: Amend the Flood Plain Safety Overlay District through automatic map updates as new data is released and published by FEMA.

FL Action 3.2: Review development plans to ensure compliance with ordinances.

FL Action 3.3: Inspect construction to ensure compliance with approved development plans.

FL Action 3.4: Soil Stabilization on Roadways and Along Roadway Shoulders Soil stabilization on roadway shoulders and dirt roads. This will prevent erosion caused by flood conditions.

FL Action 3.5: Encasing Pipelines Encase water pipelines with specific sized rock, gravel, and road base in natural waterways to prevent continual washout or exposure during heavy storm events/floods.

FLOOD OBJECTIVE 4: Future Flood Mitigation Projects. Improve existing facilities and construct new facilities to mitigate flooding with the County.

FL Action 4.1: In each flood control zone, construct facilities identified in those zones by the Flood Control Advisory Committee. See Flood Control District Annex for a listing of projects.

FLOOD OBJECTIVE 5: Special District Funding: Continue Special Districts Projects relating to flood hazards.

FL Action 6.1: Continue funding and support for Special Districts Projects relating to flood hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District.

FL Action 6.2: On Call Contractors Employ on call contractors to assist in emergency situations.

6.1.5 Drought (DR)

GOAL: Minimize the effects of drought on the County in all aspects including economically and socially.

DROUGHT OBJECTIVE 1: Educate the public on water conservation methods.

DR Action 1.1: Create a public awareness campaign advising citizens, business owners and farmers on water conservation.

DR Action 1.2: Provide incentives for farmers to grow crops that are less water intensive.

DR Action 1.3: Continue to coordinate with the San Bernardino Valley Water Conservation District to provide Qualified Water Efficient Landscaper (QWEL) training.

DR Action 1.4: Continue to enforce the watering schedule and watering restrictions throughout the County.

DROUGHT OBJECTIVE 2: Protect the quality of the County's watersheds.

DR Action 2.1: Approve the County's Watershed Water Quality Management Plan written in 2013.

DROUGHT OBJECTIVE 3: Special District Funding: Continue Special Districts Projects relating to drought hazards.

DR Action 3.1: Continue funding and support for Special Districts Projects relating to drought hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District.

6.1.6 Anti-Terrorism (AT)

GOAL: Use antiterrorism strategies to discourage terrorism and protect the people, infrastructure and assets in San Bernardino County from the effects of terrorism.

ANTI-TERRORISM OBJECTIVE 1: Use anti-terrorism design strategies to discourage / prevent acts of terrorism.

AT Action 1.1: Identify and prioritize mitigation activities (anti-terrorism force protection) at critical facilities and gathering places that are vulnerable to terrorist attacks.

ANTI-TERRORISM OBJECTIVE 2: Special District Funding: Continue Special Districts Projects relating to terrorism hazards.

AT Action 2.1: Continue funding and support for Special Districts Projects relating to terrorism hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District.

6.1.7 Climate Change (CC)

GOAL: Reduce the impacts of climate change on the County and limit human activities that change the atmosphere's makeup.

CLIMATE CHANGE OBJECTIVE 1: Meet greenhouse gas (GHG) reductions targets set forth by the Clean Air Act.

CC Action 1.1: Continue working with the South Coast Air Quality Management District and the Mojave Desert AQMD to meet GHG reductions targets.

CC Action 1.2: Continue implementing the energy conservation and efficiency measures identified in the County of San Bernardino Greenhouse Gas Emissions Reduction Plan. (San Bernardino County Renewable Energy and conservation Element)

CLIMATE CHANGE OBJECTIVE 2: Educate the public on the effects of climate change and reducing our impact.

CC Action 2.1: Encourage carpooling and the use of public/ alternative transportation methods.

CC Action 2.2: Optimize energy efficiency in the built environment and promote the local economic benefits of energy efficiency retrofits. (San Bernardino County Renewable Energy and conservation Element)

CC Action 2.3: Encourage residents and businesses to conserve energy. (San Bernardino County Renewable Energy and conservation Element)

CLIMATE CHANGE OBJECTIVE 3: Special District Funding: Continue Special Districts Projects relating to climate change hazards.

CC Action 3.1: Continue funding and support for Special Districts Projects relating to climate change hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District.

6.2 Mitigation Strategy

To narrow mitigation alternatives for inclusion, FEMA's six broad categories of mitigation alternatives were used. Each FEMA category is listed below. The HMP Planning Committee developed several mitigation alternatives for implementation under each mitigation category.

- Prevention (PRV)

- Property Protection (PPRO)
- Public Education and Awareness (PE&A)
- Natural Resource Protection (NRP)
- Emergency Services (ES)
- Structural Projects (SP)

Table 6-1 summarizes the mitigation alternatives for categories of projects addressing the hazards in the San Bernardino County Unincorporated Area Multi-Jurisdictional Hazard Mitigation Plan. The Table includes implementation strategies for the wildfire, earthquake/geologic hazards, flood, drought, climate change and terrorism.

Table 6-1: Mitigation Alternative Summary

Action	Lead Agency	Hazard	Funding Source
Prevention (PRV): **Preventative activities are intended to keep hazard problems from getting worse, and are typically administered through government programs or regulatory actions that influence the way land is developed and buildings are built. This includes the development of additional code requirements to further reduce or eliminate damages from the identified hazards.**	County Land Use Services	All Hazards	General Fund
Natural Resource Protection (NRP): **To locate and protect natural and cultural resources at risk from the identified hazards.**	Fire Protection District / Flood Control District	Wildfire and Flood	General Fund, Grants
Property Protection (PPRO): **Property protection measures involve the modification of existing buildings and structures to help them better withstand the forces of a hazard, or removal of the structures from hazardous locations.**	Fire Protection District.	Wildfire	General Fund, Grants
Public Education and Awareness (PE&A): **To continue and develop new public education programs targeting the top identified hazards.**	Fire Protection District.	All Hazards	General Fund, Grants

Action	Lead Agency	Hazard	Funding Source
Emergency Services (ES): **Although not typically considered a "mitigation" technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples include:**	Fire Protections District	All Hazards	General Fund, Special District Funds, Grants
Structure Protection (SP) – Flooding **To continue to identify, fund, and build projects that reduce or eliminate flood hazards in the County.**	Flood Control District	Flooding Hazards	General Fund, Special District Funds, Grants
Structure Protection (SP)– Geological Hazards **To identify unknown hazards and develop additional new and retrofit requirements or programs to reduce or eliminate damage from geological hazards.**	Land Use Services	Geological Hazards	General Fund Grants
Structure Protection (SP) – Wildfire **To further protect structures at risk from wildfire through education, building, and enforcement codes and actions.**	Fire Protections District	Wildfire	General Fund, Special District Funds, Grants

6.2.1 Mitigation Action Plan

This section serves to identify *on-going* actions and projects in the County Unincorporated Area. With the results of the hazard risk assessment finalized, mitigation goal established, and capabilities assessed, the County and participating districts then set out to identify new mitigation actions that would reduce the outlined in the vulnerability assessment.

Not all identified mitigation actions are implementable in the 5-year plan cycle, due to technical feasibility, political acceptance, lack of funding, or other constraints. Once the mitigation actions for each participating jurisdiction were identified, they were evaluated and prioritized (by providing a time frame) to identify the most suitable mitigation actions for each participating jurisdiction to implement.

Cost effectiveness of each measure was a primary consideration when developing mitigation actions. Because mitigation is an investment to reduce future damages, it is important to select measures for which the reduced damages over the life of the measure are likely to be greater than the project cost. For structural projects, the level of cost effectiveness is primarily based on the likelihood of damages occurring in the future, the severity of the damages when they occur, and the level of effectiveness of the selected measure. While detailed analysis was not conducted during the mitigation action development process, these factors were of primary concern when selecting measures. For measures that do not result in a quantifiable reduction of damages, such as public education and outreach, the relationship of the probable future benefits and the cost of each measure was considered when developing the mitigation actions.

Based upon the participating jurisdiction capabilities, Table 6-2 shows primary actions selected for further implementation and development during the next planning cycle. Table 6-2 provides details for each mitigation action with mitigation action descriptions, FEMA mitigation category, responsible party, and timeframe.

Important to Note: See Jurisdictional Annexes for more information on implementation mechanisms and mitigation projects for each participating jurisdiction. If a participating jurisdiction is identified as a primary lead for implementation, the mitigation actions are also contained the corresponding jurisdictional annex.

Table 6-2: Mitigation Action Descriptions

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
ALL Hazard	**AH Action 1.1:** Valley Dispatch and Operations Center.	Update and maintain the operations of the facility and ensure cohesive working and response to any scale emergency and operations in a secure complex	ES	Budgetary Items from County and Federal Grant Funding EMPG, HMPG, UASI.	Fire Protection District.	1-3 Years	See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project .
ALL Hazard	**AH Action 1.2:** Maintain Shelter Operations Compound (SHOC). This shelter concept provides a new one-stop shelter concept. The SHOC combines a shelter, a Local Assistance Center (LAC) and a Non-LAC Unit in one easy location.	After the 2003 Wildland Fires, the County and American Red Cross recognized the need to provide services beyond basic care and short-term sheltering, especially during large fires, floods, and earthquakes The Mass Care & Shelter Plan and Concept of Operations, outlines the framework of a new one-stop shelter concept. Shelter Operations Compound (SHOC). It combines a shelter, a Local Assistance Center (LAC) and a Non-LAC Unit in one easy location. Residents can access public information and referral services through the LAC, and then take a short walk to the Non-LAC Unit for communication, postal services, and other private organizations/business at little to no cost. The completion of the Plan in 2012 will help to sync local resources, encourage local self-sufficiency, foster partnership between public and private agencies, and serve as a reference document for the region. By June 2017, the program will have 32 trailers/caches equipped with mass care and shelter supplies, strategically placed throughout the County and ready for rapid deployment. It is expected to serve over 12,000 residents. In addition to enhancing the comfort levels of shelter residents, the program will produce standardized documents and protocols for procuring and maintaining Mass Care and Shelter trailers/caches. These plans and programs will help the County prepare for and mitigate damages from hazards. This is an update and expansion of the plan and done without more grant funds.	ES	To increase Mass Care and Shelter capability of the county, grants from 2008-2009 Homeland Security Grant Program (HSGP) and 2009 Riverside Regional Urban Area Security Initiative (UASI) funded the Mass Care and Shelter Trailer/Cache Program.	Fire Protection District/	1-5 Years	See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project .
All-Hazard	**AH Action 2.1:** Continue funding and support for Special Districts Projects relating to all hazards.	Continue funding and support for Special Districts Projects relating to water systems. sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District for all hazards. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	
All-Hazard	**AH Action 2.2:** Install Generators at Critical Facilities	Retrofit existing buildings and facilities with connectors/ ATS for emergency generators and/or install permanent emergency generators at critical facilities, including wells and booster station locations.	ES, SP	TBD	Water Systems	TBD	Critical sites are already set up for connection or has a permanently installed generator

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
All-Hazard	**AH Action 2.3:** Water Systems Repair Plan	Develop a plan for speeding the repair of and functional restoration of water and wastewater systems through stockpiling of shoring materials, temporary pumps, surface pipelines, portable hydrants, and other supplies.	PRV	SDD WAS	Water Systems	TBD	We have a warehouse and inventory. Add'l inventory would need to be purchased from local wholesaler
All-Hazard	**AH Action 2.4:** Smart Water Meters and SCADA	Utilization of SCADA and Smart Water Meters to get real time data on problems with the system and reduce drive time emissions as a result of traditional meter reading.	PRV	Individual CSAs	Water Systems	Ongoing	Both SCADA and Smart Meters have been installed and continue to be installed
All-Hazard	**AH Action 2.5:** Provide Employees with Emergency Supplies	Provide emergency supplies of food, water, and portable generators for employees at office and field locations.	ES	SDD/WAS	Water Systems	Ongoing	WAS has a stock of emergency food supplies, water, and generators.
All-Hazard	**AH Action 2.6:** Annual Tower and Guide Wire Inspections	Conduct annual tower and guide wire inspections to mitigate storm/wind/earthquake hazards from knocking out communications.	PRV	TBD	TV Districts	7/1/2016-7/1/2017	All Districts
All-Hazard	**AH Action 2.7**: Maintain Tower Lighting	Maintain lights on all tower locations.	SP	TBD	TV Districts	June-17	
All-Hazard	**AH Action 2.8:** Designate Emergency Operations Sites	Conduct an inventory or list of County Park Facilities and Community Centers to establish a list of pre-designated emergency operations or disaster relief sites. Not all Community Centers are an appropriate size to accommodate large numbers of evacuees and may only serve as command and control centers or distribution centers.	PRV	TBD	Park Districts	April-17	All Districts
All-Hazard	**AH Action 2.9:** Establish Power Sources for Emergency Operations Sites	Establish small solar energy fields or other forms of renewable power at County Community Centers to facilitate stand-alone emergency operations for the community.	PRV, SP	TBD	Park Districts	12/1/2016-7/1/2018	Lucerne Valley Joshua Tree
All-Hazard	**AH Action 2.10:** Connect Water Systems to Generators	Connect water systems to generators to ensure delivery even in disaster situations.	PRV, SP	TBD	Park Districts	TBD	
All-Hazard	**AH Action 2.11:** Establish a Centralized Communications Network	Establish a centralized communications network to monitor channel output for TV Districts and provide emergency information by way of character generator tied to channel transmissions.	PRV	TBD	TV Districts	7/1/2017-12/1/2017	All districts
All-Hazard	**AH Action 2.12** Incorporate as appropriate requirements from the State of California's	Government Code 65302.6 requires the following elements to be included in the hazard mitigation plan: (1) An initial earthquake performance evaluation of public facilities that provide essential services, shelter, and critical governmental functions.	PRV, NRP	TBD	Primary: Land Use Services	1-3 years	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
	most recent land use regulations regarding the hazard mitigation planning process (Government Code 65302 and 8685.9).	(2) An inventory of private facilities that are potentially hazardous, including, but not limited to, multiunit, soft story, concrete tilt-up, and concrete frame buildings. (3) A plan to reduce the potential risk from private and governmental facilities in the event of a disaster. Government Code 8685.9 requires that the state share shall not exceed 75 percent of total state eligible costs unless the local agency is located within a city, county, or city and county that has adopted a local hazard mitigation plan as part of the safety element of its general plan. In that situation, the Legislature may provide for a state share of local costs that exceeds 75 percent of total state eligible costs.			Secondary: Fire Protection District/		
All-Hazard	**AH Action 3.1:** Continue funding and support for Special Districts Projects relating to all hazards.	Continue funding and support for Special Districts Projects relating to water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District for all hazards. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	On-Going	
Wildfire	**WF Action 1.1** Continue Mountain Area Safety Taskforce (MAST) funding to support mitigation activity.	MAST was formed to mitigate the region wide risk of a catastrophic wildfire due to dead and dying trees in the mountain communities. The mission of the MAST is to facilitate a coordinated effort by cities, county, state, federal, and non-profit agencies to provide for the protection of property owners, residents, and property subject to the risk of catastrophic wildfire that could occur in San Bernardino County with an initial emphasis on the threat resulting from the Old and Grand Prix fires in 2003. MAST priorities are to continue reducing fire hazards through fuel reduction programs and hazard abatement though enforcement of county ordinances. The Mountain Area Safety Taskforce (MAST) Operations Section meets monthly. MAST Operations Section determines project priorities based on the benefit cost analysis of the projects and the effect of the project on the overall goals of the MAST organization. Goals can change as detailed Benefit Cost Analysis is conducted and CEQA/NEPA reviews are completed.	NRP, PPRO	Seeking additional funding through HMPG.	San Bernardino County Fire Protection District	On-Going	See Implementation plan on more information on MAST. See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project .
Wildfire	**WF Action 2.1:** Update Mountain Mutual Aid Map Book to document updated information contained in 2016 HMP.	The Map Book portion of the Community Safety and Structure Protection Plan provides not only a street network of the area but more importantly it provides the locations of strategic and critical resources for fire fighters. These include but are not limited to safe zones, open areas, locations for refuge. They also identify areas within communities that have narrow and steep winding streets and or with limited ingress and egress. The document is handed out to all responding strike teams from out of the area and has proved invaluable in directing and coordinating an effective firefighting response and reduces the potential for life loss and property damage.	ES	Seeking additional funding through HMPG.	San Bernardino County Fire Protection District	On-Going	See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project .

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Wildfire	**WF Action 2.2** Update Community Structure Protection Plans as necessary.	This is an on-going action (from the 2011 MJHMP) with the goal to continue development of and continue the mission of mutual aid between first responders in the County mountain areas.	PPRO		Fire Protection District	On-Going	
Wildfire	**WF Action 3.1:** Implement identified community based fuels reduction projects.	The Fuels Reduction Program is designed to create community based fuel modification programs across the mountain communities. These projects are selected specifically to reduce the potential for catastrophic wildfires and the damage that they can do to the communities. Project design, contracting, and operations are managed by the County's Public Works Department with priorities set by local fire chiefs in monthly MAST Operations Meetings. This program is the oldest and most significant for reducing wildfire threat on a mountain wide basis.	PPRO	Current Funding: Seeking additional funding through HMPG.	Primary: San Bernardino Public Works Department Secondary: County Fire Protection District	On-Going	
Wildfire	**WF Action 3.2:** Develop fuels reduction "maintenance program" by obtaining participation from citizens and/or homeowners associations.	To survive a wildfire, property owners need to manage the land surrounding their homes and communities effectively. Removing fuels in the wildland fuel reduction zone beyond the defensible space can reduce the speed and intensity of an oncoming wildfire. But if these areas aren't regularly **maintained**, they lose their effectiveness. Plants grow back, and flammable vegetation needs to be routinely removed and disposed of properly. This guide provides tips on how to create and maintain defensible space and wildland fuels treatments around your property.	PPRO, PE&A	Seeking additional funding through HMPG	Primary: Public Works Secondary: Fire Protection District	On-Going	
Wildfire	**WF Action 4.1** Increase homeowner assistance services to mountain residents for fuel reduction.	This is an ongoing wildfire mitigation action (from the 2011 MJHMP) for the group Forest Care to achieve the goal of providing assistance to homeowners by expanding services to all communities in the Mountain areas of the County. Forest Care is a program dedicated to creating a healthier forest. This program provides foresters to assess individual properties for thinning the vegetation and then provides 75% of the funding to do so.	PPRO, PE&A	Seeking additional funding through HMPG	San Bernardino County Fire Protection District	On-Going	
Wildfire	**WF Action 4.2** Continue working with Southern California Edison (SCE) to remove dead trees near power lines.	A significant number of fires across the State are caused by trees falling into power lines. When the forests in the mountain communities became infested with bark beetles the pine tree die off was unprecedented. Thousands of these dead trees were standing precariously close to power lines. Early in the Bark Beetle Emergency in 2004, Southern California Edison swiftly initiated a program to remove all trees that were dead, dying, and/or diseased that had the potential to fall into any SCE power lines.	PRV, PPRO	As of July of 2010 Southern California Edison (SCE) has spent $179,758,978 to remove dead dying and diseased trees.	San Bernardino County Fire Protection District	On-Going	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
		The role of Southern California Edison was critical to the success of MAST both operationally and financially. Edison still removes the most difficult trees, the most costly trees; and the ones that are most likely to be the source of ignition for a wild land fire. They are also removing the trees that are immediately threatening homes. They have removed 118,305 trees since the inception of the program in 2004. They also provided reimbursements to people that removed their own trees.					
Wildfire	**WF Action 5.1:** Inspect every residence in the mountain communities throughout the year to enforce the Fire Hazard Abatement code that addresses green fuels.	The Fire Hazard Abatement Program conducts surveys to identify fire hazards throughout the year. Fire hazards are identified and notices to abate the hazard(s) are mailed to property owners. Property owners are given 30 days to abate the violations. Failure to abate may result in citations, penalties, and/or fees for abatement by the County. The Fire Hazard Abatement Program responds to complaints year round in the unincorporated areas and contracting Cities and Fire Districts. The Division completes more than 430,000 inspections, issues more than 45,000 Notices to Abate Fire Hazards, issues over 4,000 citations for non-compliance, and abates the fire hazards on more than 2,000 parcels annually. Within the last 5 years, the Fire Hazard Abatement Division has received even more financial resources that enable them to abate all properties declared a fire hazard.	PRV, PPRO, PE&A	Seeking additional funding through HMPG	Primary: Land Use Services Secondary: Fire Protection District	On-Going	For more information on Contractor Certification, see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	**WF Action 5.2:** Continue to collaborate with Forest Care, Red, Cross and Cal Fire to overcome increased costs of enforcement.	This is an on-going action from the 2011 MJHMP with the goal of overcoming funding shortfalls for the County Fire Hazard Abatement Program.	PRV		San Bernardino County Fire Protection District	On-Going	
Wildfire	**WF Action 6.1** Train and Certify landscape contractors to comply with the Fire Hazard Abatement Code.	The City of Big Bear Lake created a program to train and certify landscape contractors to provide a qualified workforce to conduct fuels reduction activities on individual properties. The contractors are trained to comply with the new Fire Hazard Abatement Code that exists both in the City of Big Bear and the County unincorporated area. The City of Big Bear Lake Fire Department conducts the classes for landscapers and handy persons. This provides an incentive for the contractors and provides a level of certification that the homeowner can rely on when they are deciding to hire a landscape contractor to conduct fuels abatement around their home.	PRV, PPRO	Seeking additional funding through HMPG	San Bernardino County Fire Protection District	On-Going	On-Going

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Wildfire	**WF Action 6.2:** Continue wildfire mitigation efforts under the Wood Shake Roof Replacement Program.	The County successfully passed an ordinance that requires the replacement of wood shake roofs by 2014. MAST has successfully mapped all of the wood shake roofs in the fire safety overlay and has created a strategy as to which roofs will be selected to participate in the FEMA funded project. This is an on-going project in cooperation with Big Bear Lake Fire Protection District in order to provide more funding for wood shake roof replacements by property owners.	PRV, PPRO, SP		Primary: MAST Secondary: San Bernardino County Fire Protection District	On-Going	
Wildfire	**WF Action 6.3:** Protect Property in Wilderness Areas	Rockscape or pave property grounds which have structures located in wilderness and or areas prone to wildfires. Double the width of external fire breaks.	PPRO, PRV, SP	TBD	Sewer Systems	January-17	All sewer pump stations have paving
Wildfire	**WF Action 7.1:** Modify independent and unique CWPPs into a more common framework making them similar but leaving room to provide specific hazard characteristics and mitigation actions for each community.	Community Wildfire Protection Plans are designed to provide a means for a community, usually through the Fire Safe Council, to have input into and actively participate in the planning, strategy, goals, and objectives of creating a fire safe community.	PRV	Seeking additional funding through HMPG	San Bernardino County Fire Protection District	On-Going	On-Going For more information on CWPP see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	**WF Action 8.1:** Construct Arrowbear Drive Realignment and Widening.	The Arrowbear community off State Highway 18 has limited access to State Highway 138. The existing bridge/spillway and road needs to be realigned and widened to facilitate access by emergency personnel during wildfires and flooding. Mitigation strategy for this is to remove and replace existing bridge/spillway, realign and widen the road.	SP	Seeking grant funding Total Cost: $3,000,000 Approx.	Primary: Public Works Secondary: San Bernardino County Fire Protection District	1-3 Years	
Wildfire	**WF Action 8.2:** Construct Cedar Glen Fire Access Road.	Lack of paved roads inhibits traffic circulation and the ability to enter and exit the area without backtracking during wildfire emergencies. Strategy is to Construct road and drainage improvements to Little Bear Creek Road and Elder Drive.	SP	Seeking grant funding **Total Cost:** $2,500,000	Public Works	1-3 Years	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Wildfire	**WF Action 8.3:** Structural Fire Breaks Widening	Double the width of external fire breaks on grounds which have structures located in wilderness and or areas prone to wildfires.	SP, PRV	Individual CSAs	Water Systems	7/1/2017-7/19/2019	
Wildfire	**WF Action 9.1:** Continue funding and support for Special Districts Projects relating to wildfire.	Continue funding and support for Special Districts Projects relating to wildfire in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	On-Going	
Wildfire	**WF Action 9.2:** Emergency Water Supplies	Purchase emergency water supply or water purification devices to ensure uninterrupted supply of water to emergency response personal.(completed with continuous fresh of supplies and rotation)	ES	TBD	Roads	TBD	
Earthquake	**EQ Action 1.1:** Improve public education programs and practices to residents for earthquake risk.	Public education and outreach programs are an efficient and cost-effective way to promote meaningful changes within a community. A Program for Public Information (PPI) for earthquake awareness and mitigation could significantly reduce injury and property damage to earthquake. Use a suite of partnerships, activities, and products to educate the public about earthquake science and motivating homeowners to become prepared for earthquakes.	PE&A		Human Resources	5-10 Years	
Earthquake	**EQ Action 2.1:** Evaluate single family homes for Earthquake hazard when conducting permit applications and plan reviews.	82.15.040 Development Standards states that a structure used for human occupancy shall be located 50 feet or farther from any active earthquake fault traces. Lesser setbacks may be applicable in certain situations as determined by an appropriate geologic investigation and approved by the County Geologist or other engineering geologist designated by the Building Official. Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code Section 2621 et seq.) requires the delineation of potential damage areas along known active faults throughout California. It requires local governments to withhold approval of construction permits in those zones until geologic investigation has determined that the site is not threatened by surface displacement from future faulting.	PRV		Land Use Services	TBD	On-Going
Earthquake	**EQ Action 2.2:** Seismic Strapping	Seismic strapping for existing water tanks and future construction.	SP, PRV	CSA 64	Water Systems	7/17/2017-7/1/2019	Ongoing currently
Earthquake	**EQ Action 2.3:** Employee Emergency Sheltering	Develop a plan for short-term and intermediate-term sheltering of employees.	PRV	WAS	Sewer Systems	7/17/2017-7/19/2019	To purchase cots, small portable generators, tents, etc.

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Earthquake	**EQ Action 3.1:** Identify liquefaction hazard areas outside the currently designated Geologic Hazard Overlay Districts.	Supported by General Plan mechanism (General Plan, Section VIII, Safety Element Policy § 7.5; California Building Code §1803.5.11); Seismically- induced lateral spreading, and/or seismically-induced lateral flow, can cause devastating structural damage and a high potential for saturation exists when the groundwater level is within the upper 50 feet of alluvial material.	PRV		Land Use Services	5-10 Years	
Earthquake	**EQ Action 4.1**: Require development on hillsides to minimizes the extent of topographic alteration and erosion, to maintain slope stability, and to reduce the potential for offsite sediment transport (Complements General Plan, Section VIII, Safety Element Policy § 6.1).	This mitigation action is especially important in the San Bernardino and San Gabriel Mountains which have high slope failure / erosion potential. Typical slope mitigation techniques that are used include: Drainage Improvements - Since water is the biggest culprit in failing slopes, drainage improvements should be the first priority. Some drainage improvements may include: ▪ Collect or divert surface water from the problem slope. This may include catch basins, swales, or sealing tension cracks to prevent infiltration. ▪ Collect and remove subsurface water. This may include drains constructed within the subsurface to remove excess seepage, or lower ground water. Some earthwork mitigation techniques are as follows: ▪ Remove the upper soils of the slope to create a flatter slope. ▪ Buttress the slope toe by filling with rock, gravel, or soil. ▪ Benching the slope if each bench is on competent subgrade. ▪ Structural Improvements - Structural improvements include: ▪ Friction Piles ▪ Retaining walls ▪ Geo Grid ▪ Sheet Piles ▪ Rock Bolts ▪ Vegetative Cover Complements General Plan, Section VIII, Safety Element Policy § 7.6 Complements General Plan, Section VIII, Safety Element Policy § 6.1)	PRV	N/A	Land Use Services	On-Going	Provide enhanced information during the development review process to address slope failure concerns.
Earthquake	**EQ Action 4.2:** Generator Installation	Install generators at all road facilities. This will allow uninterrupted communications and provide power to refuel critical emergency response equipment.	SP, PPRO	TBD	Roads	TBD	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Earthquake	**EQ Action 5.1:** Divert runoff to Little Bear Creek.	To reduce the runoff over the cliff(s) in the Rimforest neighborhood, the runoff must be diverted to another path. This will be accomplished over three phases: • Phase 1: Reduce Runoff Tributary Area by 64%- 50.35 AC • Phase 2: Reduce Runoff Tributary Area by 30%- 23.79 AC • Phase 3: Reduce Runoff Tributary Area by 5%- 3.99 AC	SP, NRP, PRV		Primary: Public Works Secondary: Flood Control District		
Earthquake	**EQ Action 6.1:** Continue funding and support for Special Districts Projects relating to earthquake hazards.	Continue funding and support for Special Districts Projects relating to earthquake hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	On-Going	
Flood	**FL Action 1.1:** Update NFIP data and maps with newly identified flood hazard areas in the County, as new information becomes available.	As required by the State of California, National Flood Insurance Program (NFIP) maps published by FEMA must be included in the HMP or General Plan Safety Element. Keeping this information current is an important mitigation action.	PRV, PPRO		San Bernardino County Flood Control District	On-Going	
Flood	**FL Action 2.1:** Determine whether or not additional amendments to development standards or policies are merited, based on the Alluvial Fan Task Force Recommendation.	This is an on-going mitigation action from the 2011 MJHMP.	PRV		Primary: San Bernardino County Flood Control District Secondary: Land Use Services	On-Going	
Flood	**FL Action 3.1:** Amend the Flood Plain Safety Overlay District through automatic map updates as new data is released and published by FEMA.	Current San Bernardino County Hazard Maps can be found at: http://cms.sbcounty.gov/lus/Planning/ZoningOverlayMaps/HazardMaps.aspx.	PRV, NRP		Primary: San Bernardino County Flood Control District Secondary: Land Use Services	On-Going	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Flood	**FL Action 3.2:** Review development plans to ensure compliance with ordinances.	This is an on-going mitigation action from the 2011 MJHMP in order to reduce the flood hazards through development standards and policies stated in the General Plan and San Bernardino 2077 Development Code.	PRV		Primary: Land Use Services Secondary: San Bernardino County Flood Control District	On-Going	
Flood	**FL Action 3.3:** Inspect construction to ensure compliance with approved development plans.	This is an on-going mitigation action from the 2011 MJHMP in order to reduce the flood hazards through development standards and policies stated in the General Plan and San Bernardino 2077 Development Code.	PRV, PPRO, SP		Primary: Public Works Secondary: Flood Control District	On-Going	
Flood	**FL Action 3.4:** Soil Stabilization on Roadways and Along Roadway Shoulders	Soil stabilization on roadway shoulders and dirt roads. This will prevent erosion caused by flood conditions.	SP, PRV	TBD	Roads	TBD	
Flood	**FL Action 3.5:** Encasing Pipelines	Encase water pipelines with specific sized rock, gravel, and road base in natural waterways to prevent continual washout or exposure during heavy storm events/floods.	SP, PRV	CSA 70 J	Water Systems	7/17/2017-7/1/2027	
Flood	**FL Action 4.1:** In each flood control zone, construct facilities identified in those zones by the Flood Control Advisory Committee. See Flood Control District Annex for a listing of projects.	This is an ongoing mitigation action from the 2011 MJHMP to achieve the goal of improving existing facilities and construct new facilities to mitigate flooding within the County.	SP		Primary: Public Works Secondary: San Bernardino County Flood Control District	On-Going	
Flood	**FL Action 6.1:** Continue funding and support for Special Districts Projects relating to flood hazards.	Continue funding and support for Special Districts Projects relating to flood hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	On-Going	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Flood	**FL Action 6.2:** On Call Contractors	Employ on call contractors to assist in emergency situations.	PRV, ES	TBD	Roads	TBD	
Drought	**DR Action 1.1:** Create a public awareness campaign advising citizens, business owners and farmers on water conservation.	Public education and outreach programs are an efficient and cost-effective way to promote meaningful changes within a community. A program to raise awareness on the importance of water conservation could significantly reduce the amount of water used by the public.	PE&A, NRP		Human Resources	TBD	
Drought	**DR Action 1.2:** Provide incentives for farmers to grow crops that are less water intensive.	Farmers use 80% of the State's water. By offering incentives to produce less water intensive foods (such as beets, carrots and potatoes) as opposed to more water intensive foods such as almonds, beef and pork) would make a substantial difference in water consumption.	NRP, PRV,		DAO Community Services?	On-Going	
Drought	**DR Action 1.3:** Continue to coordinate with the San Bernardino Valley Water Conservation District to provide Qualified Water Efficient Landscaper (QWEL) training.	The Qualified Water Efficient Landscaper training presents an affordable proactive local approach to reducing landscape water demand. QWEL provides graduates with knowledge in water efficient and sustainable landscape practices including water management and preservation of other valuable resources.	PE&A		Economic Development Agency?	On-Going	
Drought	**DR Action 1.2:** Approve the County's Watershed Water Quality Management Plan.	The County's Watershed Water Quality Management Plan written in 2013.	PRV, NRP			On-Going	
Drought	**DR Action 1.4:** Continue to enforce the watering schedule and watering restrictions throughout the County.	In response to the State Water Resources Control Board's 2016 emergency water conservation regulation, the County enforces a watering schedule for residential and commercial addresses.	PRV, NRP		Land Use Services	On-Going	
Drought	**DR Action 3.1:** Continue funding and support for Special Districts Projects relating to drought hazards.	Continue funding and support for Special Districts Projects relating to drought hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7	VARIES	VARIES	VARIES	On-Going	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Anti-Terrorism	**AT Action 1.1:** Identify and prioritize mitigation activities (anti-terrorism force protection) at critical facilities and gathering places that are vulnerable to terrorist attacks.	Critical facilities may include essential facilities (such as hospitals, police and fire stations, evacuation centers, etc.), transportation systems, lifeline utility systems, high potential loss facilities (such as nuclear power plants, dams and military installations, etc.), and hazardous material facilities. Gathering facilities should also receive special attention. Places of mass gathering not only present terrorists with potential opportunities for mass casualties, symbolism and high impact media coverage, they pose a broad range of security challenges for their owners and operators.	PRV, PPRO		Land Use Services	On-Going	
Anti-Terrorism	**AT Action 2.1:** Continue funding and support for Special Districts Projects relating to terrorism hazards.	Continue funding and support for Special Districts Projects relating to terrorism hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	On-Going	
Climate Change	**CC Action 1.1:** Continue working with the South Coast Air Quality Management District to meet GHG reductions targets.	The San Bernardino County General Plan Amendment and Greenhouse Gas Reduction Plan addresses the environmental effects specific to the proposed General Plan Amendment, Greenhouse Gas Reduction Plan, and associated Development Code Amendment and can be found here: http://www.sbcounty.gov/Uploads/lus/Countywide/GreenhouseGas/Full-Vol-1.pdf	PRV, NRP		Land Use Services	On-Going	
Climate Change	**CC Action 1.2:** Continue implementing the energy conservation and efficiency measures identified in the County of San Bernardino Greenhouse Gas Emissions Reduction Plan.	According to the San Bernardino County Renewable Energy and conservation Element, San Bernardino County's commercial, institutional and residential communities will continue to grow in the foreseeable future. Access to dependable and affordable energy sources is critical to maintaining and enhancing the quality of life enjoyed by San Bernardino residents and businesses. As energy needs grow, so do the needs to develop new energy sources.	PRV, NRP		Land Use Services	On-Going	
Climate Change	**CC Action 2.1:** Encourage carpooling and the use of public/ alternative transportation methods.	Reduction Measure R2T1 of the County of San Bernardino Greenhouse Gas Emissions Reduction Plan establishes an Employment Based Trip and VMT Reduction Policy. Some features include a compressed work week, car/vanpools, employee bicycle/pedestrian programs, and shuttle/ transit programs.	PE&A, PRV, NRP		Human Resources	On-Going	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Climate Change	**CC Action 2.2:** Optimize energy efficiency in the built environment and promote the local economic benefits of energy efficiency retrofits. (San Bernardino County Renewable Energy and Conservation Element)	This is an on-going mitigation policy from the San Bernardino County Renewable Energy and Conservation Element.	SP, PE&A, PRV		Public Works	On-Going	
Climate Change	**CC Action 2.3:** Encourage residents and businesses to conserve energy. (San Bernardino County Renewable Energy and conservation Element)	This is an on-going mitigation policy from the San Bernardino County Renewable Energy and Conservation Element.	PE&A, NRP, PRV		Human Resources	On-Going	
Climate Change	**CC Action 3.1:** Continue funding and support for Special Districts Projects relating to climate change hazards.	Continue funding and support for Special Districts Projects relating to climate change hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	On-Going	

Section 7. Plan Maintenance

7.1 Monitoring Evaluating and Updating the HMP

The San Bernardino County Fire Protection District Office of Emergency Services (OES) is the custodian of the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). In the 2010 MJHMP, County of San Bernardino indicated that the MJHMP would be reviewed annually. Although no formal meetings were held, OES reviewed the plan annually and collected new hazard mitigation information and mitigation efforts throughout the county. Additionally, OES referenced/reviewed the MJHMP before submitting grant applications to ensure the project was captured in the plan when applying for all grants to assist their mitigation efforts.

There are three (3) main components to the MJHMP: hazards, projects, and stakeholder involvement (public, as well as, county staff). The County and its Special Districts have focused on these components and over the last 5 years have made steady improvements in all areas. The County and its Special Districts participated and facilitated several meetings and established several tasks forces to help advance the understanding of hazards in the community. This information was shared with other county personnel and the general public. OES believes that this sharing of information leads to a more informed community, thus a more robust MJHMP.

Departments and Special Districts with projects track the status of the projects through the entire life cycle from concept to completion. Projects in progress are tracked to ensure all milestones are met and payments are made in a timely manner. Each year proposed projects are reviewed during budget development every spring and selected projects are submitted for funding to the appropriate funding source. These funding sources include but are not limited to grant funding, General Fund funding, and Special District funding.

Because the MJHMP is a living document that reflects ongoing hazard mitigation activities, the process of monitoring, evaluating, and updating will be critical to the effectiveness of hazard mitigation within the County Unincorporated Area. The County and its Special Districts will hold internal planning meetings to discuss current projects and evaluate newly proposed projects resulting from internal staff meetings and input from the public. The results of these Departmental/Special District meetings will be presented to the Multi-Jurisdictional Planning Team meetings at their annual meetings. To facilitate the Multi-Jurisdictional Hazard Mitigation Planning process, OES is proposing to conduct these annual meeting with the Multi-Jurisdictional County Planning Team where the Team Members will discuss the projects, priorities, and goals in the current plan and from individual Special District meetings and suggest any necessary changes. Results of the annual meeting will be retained and compiled for the 2016 update. The County Planning Team will continue to support focused outreach for county Departments and Districts as well as support Countywide activities.

7.1.1 Plan Adoption

To comply with DMA 2000, the San Bernardino County Board of Supervisors has officially adopted the 2016 San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan. The adoption of the 2016 MJHMP recognizes the County's commitment to reducing the impacts of natural hazards within the County limits. A copy of the 2016 MJHMP adoption resolution is included after the table of contents in this document.

7.1.2 Implementation

The knowledge gained from the MJHMP has helped the county enhance other planning efforts. One of the biggest results from the 2010 MJHMP efforts was the incorporation of the MJHMP into the 2007 General Plan's Safety Element. This merging of plans has help ensure development decisions are considering the most recent hazard information. It is the County's intent to incorporate by reference the updated MJHMP into the County General Plan upon approval from FEMA.

The MJHMP has also led to the strengthening and improvement of several County Ordinances, which are designed to ensure proper fuels reduction was completed in the Severe Fire Hazard Zones. Two new ordinances were passed requiring replacement of wood shake roofs in the Severe Fire Hazard Severity Zones by 2014 and the reduction of live fuel loads around structures in the Very High Fire Hazard zone.

The MJHMP goals and actions will be incorporated into various general operations of government. For example, much of the information from the MJHMP will be included in the County Operational Area Emergency Operation Plan (EOP). As any future County plans are developed, the Multi-Jurisdictional Hazard Mitigation Plan will be a great asset in any plan development efforts. As noted earlier, much of the information contained in this MJHMP is from the County General Plan and is already part of the planning process.

Additional benefit is gained from the County and its Special Districts reviewing existing mitigation projects and development of additional mitigation projects at their internal annual Planning Team meetings. This input includes comments and suggestions from the public as well as from the internal planning process of each County department and District.

7.1.2.1 Implementation through Existing County Mechanisms

7.1.2.1.1 All Hazards

7.1.2.1.2 Amendment to Title 6 County Code

An amendment to Title 6 of the County of San Bernardino Code to adopt by reference the 2010 Editions of the California Building Standards Codes went before the Board of Supervisors on

November 2, 2010 and was continued for a second reading on November 16, 2010 and approved unanimously. The amendment became effective on January 1, 2011.

The County of San Bernardino amendment to Title 6 of the County Code to adopt by reference the 2010 Editions of the California Building Standards Codes repealed the current chapters of Division 3 of Title 6 that reflect the 1994/1995 editions of the California Building Standards Codes and adopt the 2010 editions of these codes by reference.

The California Building Standards Commission approved the California Building Standards Code (Code) for a statewide effective date of January 1, 2011 and requires this Code apply in all parts of the state. This Code consists of the California Building, Residential, Plumbing, Mechanical, Electrical, Energy, Historical Buildings, Existing Building (Unreinforced Masonry) and the Green Building Standards Codes. Since this 2010 Edition was adopted by local ordinance, the prior editions of this code will be repealed and the most recent editions of the codes with applicable amendments requiring express findings and certain appendices necessary for the health and safety of the citizens of this County will be in effect within the unincorporated areas of San Bernardino County. The benefit of adopting this Code is that it provides consistency and clarification for the building community as well as building inspectors and plans examiners. State law (Health & Safety Code 18941.5 and 17958.7) requires the local government make express findings in order to amend building standards and the amendments must be necessary due to local climatic, geological, or topographical conditions.

Those amendments and findings are included in the County's ordinance and were filed with the California Building Standards Commission.

The recommended modifications not requiring express findings are administrative or procedural in nature and concern the local implementation issues that are not covered by building standards.

An example of this type of modification is to the California Residential Code, Section R105.3.1.1 which requires the Board of Appeals to confirm substantial valuations in the flood plain. The traditional purpose of the Board of Appeals has been reserved for a contested decision of the Building Official, and it is felt that it should remain as such.

With respect to grading and excavation regulations found in Appendix J of the 2010 State published code, the 2001 California Building Code dealt with grading with more clarity in regards to what activities require a permit and set forth rules to ensure large grading projects are scrutinized in greater detail than smaller projects by requiring more reporting and inspection of such work. The grading chapter in the 2001 Code has been trusted and in use in its primary form for years. The 2010 Appendix J grading chapter needs substantial amendment and modification to address all grading issues and is not recommended for adoption in its present form. The Board adopted the 2001 Appendix Chapter 33 regulations as part of this proposed ordinance. Relocation permit requirements have been moved to a new section of the Code, and it retains specific standards for relocation procedures in details not found in the 2010 State-published code. Clarification of the types of buildings affected by the new regulations has also been made.

Administrative changes to the 2010 California Existing Building Code (Part 10 of Title 24) were approved to outline the procedures required to set allowable time limits for the retrofit and repair of unreinforced masonry buildings. Staff is also recommending that authorization be given to the Building and Safety Division of the Land Use Services Department to issue Administrative Citations as an alternative means of enforcement of the County Code provisions.

Express findings are made for changes to the California Plumbing Code, Appendix K regarding the soil conditions that exist in this county. These changes are supported by the Environmental Health Division. These express findings are iterated in the ordinance and will be filed with the Building Standards Commission as required by law in order to become effective.

7.1.2.2 Wildfire

7.1.2.2.1 Inland Empire Fire Safe Alliance (IEFSA)

The Inland Empire Fire Safe Alliance (IEFSA) was created to act as a forum for all Fire Safe Councils in San Bernardino County. Some of the benefits are developing a consistent and comprehensive message to citizens about fire safety; coordinating efforts for grant administration, writing, and reporting; a one-stop shop for information, resources and research; and a centralized source for sharing of updates from cooperating governmental agencies. There are approximately 20 Fire Safe Councils active in San Bernardino County.

IEFSA has held bimonthly meetings for over 5 years and have been the focal point for all regional Fire Safe Councils including some from Riverside County. They have also held numerous workshops and seminars regarding fire resistive construction, and materials, BAER reports, CWPPs and grant writing. The IEFSA was the focal point for Fire Safe Councils (FSCs) that were working on completing their CWPPs and created a focus group and a steering committee to accomplish these critical plans. To support public education and involvement,

IEFSA created the web site www.fireinformation.com as well as participated in countless safety fairs and fire wise awareness activities. They also conducted a Public Education Media Exchange where all FSC and Agencies got together to share educational modalities and create common thought and educational threads. They have reached out to thousands of mountain residents in preparing them for wildfires.

7.1.2.2.2 Mountain Area Safety Taskforce (MAST)

MAST was formed to mitigate the region wide risk of a catastrophic wildfire due to dead and dying trees in the mountain communities. The mission of the MAST is to facilitate a coordinated effort by cities, county, state, federal, and non-profit agencies to provide for the protection of property owners, residents, and property subject to the risk of catastrophic wildfire that could occur in San Bernardino County with an initial emphasis on the threat resulting from the Old and Grand Prix fires in 2003. MAST priorities are to continue reducing fire hazards through fuel reduction programs and hazard abatement though enforcement of county ordinances.

The Mountain Area Safety Taskforce (MAST) Operations Section meets monthly. MAST Operations Section determines project priorities based on the benefit cost analysis of the projects and the effect of the project on the overall goals of the MAST organization.

The MAST Unified Command identified the following objectives as their focus and direction:

- Provide for Community Safety.
- Develop Coordinated Public Information Dissemination Between Cities, County, Special Districts, State, Federal, and Non-Profit Agencies.
- Develop Immediate, Mid-range and Long-range Coordinated Agency Plans.
- Identify and Secure Potential Funding Resources to Provide Protective Measures.
- Document Task Force Activities Including Mission, Goals and Objectives, Policies, Procedures, and Outcomes. Prior to any type of flood threat, the following precautionary measures may be taken by MAST members to reduce the impact of impending fires:
- Review mutual aid agreements
- Define evacuation areas and trigger points
- Review the use of alert and warning systems
- Provide information to the public of fire prone areas and protective measures in progress or planned for those areas
- Educate public on emergency self-help and preparedness
- Develop and maintain emergency notification procedures and checklists

MAST is the central point of coordination for all projects related to the reduction of the potential for catastrophic wildfires. There are numerous participants and all levels of government. MAST partners collaborate to provide multi-agency technical support to ensure project success. Economic impacts are considered and the result has been significant increase in economic activity through thoughtful application of grant funding. MAST has been so successful in the environmental management of projects that all of the local environmental groups including national affiliates are now supporters of MAST fuels projects.

The MAST group includes:

- San Bernardino County Board of Supervisors
- County Administrative Office
- County Public Works-Flood Control/Transportation/Solid Waste

- County Fire Protection District
- County Fire Protection District/Office of Emergency Services (OES)
- County Sheriff's Department
- Southern California Edison
- Bear Valley Electric
- Arrowbear Lake Fire Department
- Big Bear City Fire Protection District
- City of Big Bear Lake Fire Department
- Crest Forest Fire Protection District
- Running Springs Fire Department
- USFS
- San Bernardino National Forest Association
- Forest Care
- Cal Fire
- Caltrans
- California Highway Patrol
- Inland Empire Fire Safe Alliance
- Angelus Oaks Fire Safe Council
- Arrowhead Communities Fire Safe Council
- Bear Valley Fire Safe Council
- Lytle Creek Fire Safe Council
- Mill Creek Fire Safe Council
- Mountain Rim Fire Safe Council
- Wrightwood Fire Safe Council

Since its beginnings, MAST has been the Unified Command that has successfully implemented and completed numerous programs leading to safer communities, a more educated public and an improved environment.

MAST provides an extensive Fuels Reduction Program. The Fuels Reduction Program began with removal of dead hazardous trees from areas threatening electrical transmission lines, evacuation routes, and structures within the San Bernardino Mountains. Dead and dying trees pose an extreme fire danger, and MAST members began removing these trees under state and federal grants, including a $70 million grant from the USDA Natural Resources Conservation Service. At the height of the program, Southern California Edison contractors were taking out 650 trees a day. As the program developed, additional hazards were identified, such as green fuel load density and wood shake roofs on structures within the San Bernardino Mountains

The MAST mission has expanded to include reducing green fuel by thinning live trees in densely wooded areas. Property owners also are being urged to thin the live trees and vegetation on their property to gain an upper hand on the bark beetle infestation and reduce the risk of catastrophic wildfires like the Grand Prix and Old fires in 2003.

Other MAST Achievements include:

- Increasing awareness of the drought-related bark beetle emergency and the threat of catastrophic wildfires
- Distributing fire safety and prevention information to the public
- Developing evacuation plans and distributing emergency planning information to the public
- Developing commercial use or disposal options for waste wood products.

The Mountain Area Safety Taskforce (MAST) Operations Section meets monthly. MAST Operations Section determines project priorities based on the benefit cost analysis of the projects and the effect of the project on the overall goals of the MAST organization.

Goals can change as detailed Benefit Cost Analysis is conducted and CEQA/NEPA reviews are completed.

7.1.2.2.3 Fire Safety Overlay District Mitigation

A General Plan Amendment to the Safety Element of the County of San Bernardino 2007 General Plan updated the Fire Safety Overlay District effective March 11, 2010. The Safety Element includes several hazard overlays that are included in the General Plan mapping system to inform the public of potential hazards to development of property within certain areas of the County and to enable the County to mitigate the risks presented to property owners by these hazards, by requiring fire resistant building construction methods. The overlays include potential fire hazards within the mountain regions as well as the valley and desert "interface". Over the past twenty years, certain federal and state agencies have been in the process of digitizing much of this hazard data. The digitization of this data has allowed for greater accuracy as well as more timely updates. In recognition of the new data from various federal and state agencies, the County updated the Fire Safety Overlay District contained within the Safety Element of the General Plan. The Fire Safety Overlay District is amended by modifying four General Plan Quad Maps to incorporate updated fire safety mapping published by Cal Fire for the Valley area.

As new information is received, the overlay maps are updated to reflect changes. These updates are made by the Land Use Services Department in collaboration with County Fire Protection District. More areas have been added through annexation and contract for services and so there has been large growth and the overlay will be updated. The future 2018 CountyWide Plan will replace the General Plan, and will contain more update maps and regulations that will allow development to occur but ensure safety and sustainability within the Fire Safety Overlay District.

7.1.2.2.4 Public Education Programs

The County through MAST conducted a comprehensive mountain-wide multi-modality Public Outreach Program from 2006 to 2008. It can be found at www.CalMAST.org. The program in both English and Spanish created and presented multiple public educational meetings, newsletters,

brochures, calendars, and posters. Because of the large number of visitors to the forest, MAST also created Emergency Information Visitors brochure and glove box sized Emergency Response Evacuation maps for the mountain communities. The program won national awards for advertising and public relations. Other jurisdictions initiated their own public education activities but brought them back through MAST so that the entire group could receive the benefit. The City of Big Bear Lake Fire Department was the most prolific in developing innovative and creative educational programs. They developed the Thin-Is-In website at (www.thinisin.org) that is an excellent site for citizens and agencies as well. Since the Big Bear Valley is served by an excellent radio station KBHR (k-bear) they have posted numerous public safety messages. Also during the Butler, Butler II and Slide Fires, KBHR provided constant updates to the community regarding the fire.

7.1.2.2.5 County Fire Hazard Abatement

Land Use Services Department, Environmental Health Division is responsible for Fire Hazard Abatement (FHA). Fire Hazard Abatement works to reduce the potential for an individual's property to be the source of fire and structural ignitability. Failing to maintain private property in a fire safe condition is seen as a fire threat and is considered a threat to neighbor's property rights. To obtain compliance, FHA issues notices of violation to properties that have dry vegetation and flammable green vegetation. If the property owner doesn't comply with the notice, FHA then obtains a warrant to go onto the property and abate the fire hazard.

The Fire Hazard Abatement portion of the County Code was completely rewritten and redesigned around real flammable fuels. The most significant change was to include certain types of green fuels as flammable vegetation.

Following in the City of Big Bear Lake's path, the County adopted the new code in the fall of 2008. In January of 2010 the County amended the Hazard Overlay maps.

The Fire Hazard Abatement Division of the Land Use Services Department conducts annual inspections of all parcels of land in mountain regions for the purpose of identifying exterior fire hazards. Biannual inspections are completed in valley and desert serviced areas. The targeted hazards include high energy release shrubs, dead and hazardous trees, flammable vegetation, weeds, grasses and combustible rubbish. The Division completes more than 430,000 inspections, issues more than 45,000 Notices to Abate Fire Hazards, issues over 4,000 citations for non-compliance, and abates the fire hazards on more than 2,000 parcels annually. Within the last 5 years, the Fire Hazard Abatement Division has received even more financial resources that enable them to abate all properties declared a fire hazard.

7.1.2.2.6 Countywide Fuels Management Program

In May of 2005 the San Bernardino County Fire Protection District and the San Bernardino County Flood Control District formed a partnership to implement the Hazardous Tree Removal Program, later the Fuels Management Program. In this endeavor the Flood Control District

formed the Hazardous Tree Removal Operations Division which was tasked with developing, bidding and administering Tree Removal and Fuel Reduction Contracts funded by various grants. Contracts originally focused on removing dead, dying, and diseased trees caused by the drought conditions and the bark beetle infestation. The program has evolved to include fuel modification projects which remove hazardous vegetative fuels through the thinning of live vegetation. In addition the location of the fuel reduction projects are moving beyond the limits of the San Bernardino Mountains and into the interface between the Mountain foothills and the high desert.

The following are the types of programs/projects included in the Fuels Management Program:

- Emergency Tree Removal Projects consist of the removal of a tree (or trees) that poses an immediate threat to safety, a structure, or the public right-of-way.
- Block Projects are dead dying diseased tree removal projects on multiple parcels which are located in close proximity to one another.
- Large Urban Parcel Projects are dead dying diseased tree removal projects on a single or multiple large parcels.
- Fuel Modification Projects focus on the removal of hazardous fire fuels in the wildland/urban interface. The fuels removed in these projects are both live and dead vegetation. The goal of these projects is to reduce a future forest fire's intensity as well as the removal of ladder fuels which carry the fire from the forest floor to the forest canopy and result in a crownfire.

In addition to the Hazardous Tree Removal Operations Division, the San Bernardino County Fire Fuels Management Crews are also funded by the same grant sources. The primary focus of the crews is to create and maintain fuel modification projects in the vicinity of communities at risk and construct fuel breaks. In addition the crews assist the public with curb side chipping programs throughout local partner jurisdictions.

7.1.2.2.7 Fireworks Interdiction

The unlawful transport of dangerous fireworks continues to be enforced by several local and state fire and law enforcement agencies, The program continues ensures that thousands of pounds of fireworks per year are seized and properly disposed of, preventing fires, fire injuries and fire deaths.

7.1.2.2.8 Programs Listed in Fire District Annex

Table 7-1: Wildfire Mitigation Implementation Methods

Mitigation type	Description
PPRO	SCE removes dead trees near power lines to reduce fire hazards. For more information, see Annex A Section A.6 Mitigation Project Prioritization and Implementation.
ES	Mountain Mutual Aid is an operational group of emergency responders.
PRV	The Alliance was created to act as a forum for all Fire Safe Councils in San Bernardino County. For more information, see Annex A Section A.6 Mitigation Project Prioritization and Implementation.
PRV	Fire Hazard Abatement works to reduce the potential for an individual's property to be the source of fire and structural ignitability. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
PE&A	Cal Fire provides programs to increase fire safety in high fire hazard severity zones. For more information, see Annex A Section A.6 Mitigation Project Prioritization and Implementation.
PRV, PPRO	The Contractor Certification program trains and certifies landscape contractors to provide a qualified workforce to conduct fuels reduction activities on individual properties. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
PRV, PPRO	CWPPs are designed to provide a means for a community to have input into and actively participate in the planning, strategy, goals, and objectives of creating a fire safe community. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .

7.1.2.3 Earthquake / Geologic

A General Plan Amendment to the Safety Element of the County of San Bernardino 2007 General Plan updated the Geologic Hazard Overlay Maps which became effective on March 11, 2010. The Safety Element includes several layers of hazard overlays that are included in the General Plan mapping system to inform the public of potential hazards to development of property within certain areas of the County and to enable the County to mitigate the risks presented to property owners by these hazards. These overlays include potential geologic hazards. Over the past twenty years, certain federal and state agencies have been in the process of digitizing much of this hazard data. The digitization of this data has allowed for greater accuracy as well as more timely updates. In recognition of the new data from various federal and state agencies, the County updated the geologic hazard overlay maps, specifically the Generalized Liquefaction

Susceptibility layer and the Generalized Landslide Susceptibility layer, contained within the Safety Element of the General Plan.

The Generalized Liquefaction Susceptibility layer was amended to modify four General Plan Quad Maps to incorporate new liquefaction data in the Big Bear Lake area designated by the County Geologist for the Big Bear Lake Valley. This information was then incorporated into the County-designated Geologic Hazard Overlay District.

The Generalized Landslide Susceptibility layer was amended by modifying 17 General Plan Quad Maps and one regional Quad Map, to incorporate updated existing landslide data published by the U. S. Geological Survey for the Mountain area. The County Geologist updated the landslide inventory within the Geologic Hazard Overlay District by incorporating new geologic mapping by the U.S. Geological Survey.

The following is a list of the updated General Plan Geologic Hazard Overlay Maps effective on March 11, 2010:

Table 7-2: General Plan Geologic Hazard Overlay Maps

Map #	Quad Name
FH08C	Fifteen Mile Valley
FH11C	Mt. San Antonio
FH12C	Telegraph Peak
FH13C	Cajon
FH14C	Silverwood Lake
FH15C	Lake Arrowhead
FH16C	Butler Peak
FH19C	Mt. Baldy
FH20C	Cucamonga Peak
FH21C	Devore
FH22C	San Bernardino North.
FH24C	Keller Peak
FH27C	Ontario
FH30C	San Bernardino South
FH31C	Redlands
FH32C	Yucaipa
FI09C	Fawnskin
FI10C	Big Bear City

Map #	Quad Name
FI17C	Big Bear Lake
FI18C	Moonridge
EH/FH C	SW Portion of County
FH23C	**Harrison Mtn.**

7.1.2.4 Flood

7.1.2.4.1 Existing Drainage Studies

Drainage studies including review of upstream properties, site drainage area, potential upstream development, and site-specific development will help to mitigate damage from future storm events. San Bernardino County owns landfill sites, transfer stations and closed disposal sites where combined site property totals several hundred acres. Landfills and disposal site properties include acreage that has been constructed to design grades and may include improved drainage systems. Also, within most landfill and disposal site properties there are many acres of property that remain in its natural state including native vegetation and natural grades. During severe weather events, both engineered areas and undisturbed areas are subject to erosion from storm run-off. The erosion can range from minor to severe depending on the storm event and amount of precipitation. Most sites where engineered drainage systems are in place hold up well experiencing only minor erosion and debris flow. However, during major storm events, runoff from native and unimproved areas carrying solids and debris flow may compromise downstream drainage systems and overwhelm system facilities. Much of the damage to landfill and disposal sites during the December 2010 Winter Storm event was caused by erosion with sediment carried from undeveloped/undisturbed areas or where no improved drainage system is in place.

Other events that may cause damage to property and structures include earthquakes, wildfires, high winds, extreme freezes, and lightning storms.

- Earthquakes have the potential of causing damage to site roadways, structures, and systems including concrete drainage systems, Landfill Gas systems (LFG) and Leachate Collection Recovery Systems (LCRS). With earthquakes, there is always the potential of slope failure and slides on the landfill surface. Damage to any of these facilities has the potential to result in an inability to temporarily service the community.
- High Winds can cause damage to temporary drainage structures, fencing, and metal structures. During past high wind events, Transfer Stations have experienced roof panels being torn from the beams. Landfill sites with exposed geo-synthetic liners may experience damage if the winds lift and tear the liners.
- In January 2007, the County experienced a loss of over $21,000 in damage when water pipes at three separate Transfer Stations froze, then burst, causing damage to offices and electrical equipment.

- Lightning storms have the potential to damage electrical components in scale houses, in-ground scales, LFG, and LCRS.

7.1.2.4.2 NFIP Program and County General Plan Policies

Because the County has entered into an agreement to participate in the National Flood Insurance Program (NFIP) which provides flood insurance within designated floodplains, the following goals, policies and programs shall apply:

As stated in the San Bernardino County General Plan Safety Element:

GOAL S 5
The County will provide adequate flood protection to minimize hazards and structural damage.

Policy S 5.1: Participate in the National Flood Insurance Program (NFIP), which provides flood insurance within designated floodplains.

Programs

1) Designate Floodway and Floodplain areas, as identified by the Federal Emergency Management Agency (FEMA) on flood insurance rate maps and flood boundary maps, as Floodway (FW) on the Land Use Maps and Floodplain Overlays on the Hazards Overlay Maps.

2) Designated floodway areas will be preserved for non-structural uses through restrictions of the FW Land Use Zoning District

3) All new development, including filling, grading, and construction, proposed within designated floodplains, will require submission of a written assessment prepared by a qualified hydrologist or engineer, in accordance with the latest "San Bernardino County Hydrology Manual" and the various detention basin policies (see Existing Policy FL-11), to determine whether the development will significantly increase flood hazard and to show that all new structures will be adequately protected. Development will be conditioned on receiving approval of this assessment by the San Bernardino County Surveyor Division of the Public Works Department. All new construction in a Floodplain Overlay area will be required to be flood-proofed, located, and designed to allow unrestricted flow of floodwaters.

4) The Land Use Compatibility Chart for 100-Year Flood Plains Table 5-1 will apply to County reviews of all discretionary and ministerial actions in County designated floodplains.

5) Lands within floodplain areas may be developed with non-critical and non-essential uses if mitigation measures are incorporated to ensure that the proposed development will not be hazardous, increase flood depths or velocities downstream, or degrade water quality, especially uses such as parks, trails, and open space.

6) Provide known flood hazard information with every discretionary or ministerial application.

7) When no mapped data exist, existing topographical, watershed, and drainage course data will be evaluated for a determination of potential flood hazard for every discretionary and ministerial action.

Policy S 5.2: Update data and maps with newly identified flood hazard areas in the County, as new information becomes available.

Programs

1) As new overflow studies and mapping are completed and approved by either the County's Land Development Engineer or the San Bernardino County Flood Control District, they will supplement the FEMA mapping and will be incorporated into Flood Hazard Overlay mapping.

2) Initiate and finance programs for the continuous evaluation and designation of floodway, floodplain, and drainage areas.

3) Timely application for FEMA mapping changes will be initiated to reflect any additions to or alterations in identified Floodways or Floodplains by the County Floodplain Management Administrator.

7.1.2.5 Drought

7.1.2.5.1 Water Efficient Landscape Ordinance

Over the years, the State of California has been promoting water conservation for all new development within the State. In a drought-prone California, where approximately 60 percent of all residential water is used in landscape applications, California lawmakers have adopted such legislation as Assembly Bill (AB) 325 (1990), AB 2717 (2004), and AB 1881 (2006) that outline, and in some instances mandate, the practice of water conservation in landscape applications. As part of AB 325, the Department of Water Resources (DWR) was charged to assemble a task force of stakeholders representing the landscape, water, and building industries as well as cities, counties, and other agencies that would help DWR prepare and promote the State's first Model Water Efficient Landscape Ordinance (MWELO).

While AB 325 did not require cities, counties, and other agencies within the State to comply with the first adopted MWELO, it did encourage local agencies to implement water conservation techniques into their local ordinances and codes. The County adopted Administrative Guidelines

that were amended several times and ultimately given the status of "regulation" when they were incorporated into the Development Code (Chapter 83.10) during the 2007 General Plan Update process.

In 2006, State lawmakers adopted AB 1881, which gave guidelines and timelines for revision of the State's MWELO and mandated that every city, county, or other agency within the State of California adopt the State's revised MWELO, or be in compliance with it through their own ordinance, by January 2010. Local agencies are required to report their final action, along with findings of ordinance effectiveness, to DWR by January 2011. While this process was underway, Senate Bill X7-7 was enacted (2009). This bill requires the State of California to achieve a 20 percent reduction in urban per capita water use by December 31, 2020; additionally, it requires the State to make incremental progress towards this goal by reducing per capita water use by at least 10 percent by December 31, 2015. These requirements were incorporated into the MWELO and, in February 2008, DWR made a draft of the State's revised MWELO available to all cities, counties, and other agencies within the State. The final version of the revised MWELO was released in September 2009.

Upon review of the final version of the State's MWELO and the provisions of AB 1881, staff determined the County would need to revise Development Code Chapter 83.10 which sets forth landscaping and irrigation standards within the unincorporated areas of the County. This would in part, become a mitigation measure to assist with any drought hazard the County may encounter. In the meanwhile, the County began enforcing the State's revised MWELO in January 2010, as required by law.
Once the proposed changes to the Development Code have been adopted by the Board of Supervisors, staff will notify and forward all required information regarding the adoption and effectiveness of the County's Water Efficient Landscaping Ordinance to the State DWR as required by January 2011.

The proposed Development Code Amendment will revise the landscaping standards to reflect the changes governed by and to be as effective as, the State of California's revised Model Water Efficient Landscape Ordinance, while continuing to recognize the unique character of the regions that make up the County of San Bernardino.
The ***proposed revisions*** will require the applicant/developer to:

- Design and install systems that meet more effective and efficient water conservation standards in all landscaped areas on a project site, including residential;
- Comply with the revised standards for all new and rehabilitated landscape areas regardless of square footage for projects that are not homeowner installed and for all new and rehabilitated landscape areas, that are homeowner installed, that are 5,000 square feet or greater. This includes the following:
    - Submit a comprehensive Landscape Documentation Package, which has been prepared by a landscape architect licensed to work in the State of California or other licensed professional authorized to design and prepare Landscape Plans within the State of California;

    - Submit estimated annual water budget calculations for compliance with water conservation practices and the efficient use of water for each new or rehabilitated landscape. Calculations for the annual water budget for a project/site specific landscape shall use the formulas for the Maximum Applied Water Allowance (MAWA) and the Estimated Annual Water Use (EAWU) outlined in the ordinance;
    - Submit a Landscape Certificate of Compliance prepared by the landscape professional who prepared the Landscape Documentation Package conveying the project's compliance with the requirements of Development Code prior to final inspection;
    - Planting material within landscaped areas shall be chosen based on the information found in the Water Use Classification of Landscape Species, third edition (WUCOLS III) and the climate zone for the region based on information found in Sunset Western Garden Book;
    - Irrigation systems shall be equipped with a "smart" irrigation controller, which automatically adjusts the frequency and/or duration of irrigation events in response to changing environmental conditions.
    - Submit a rough and/or precise grading plan on all projects proposing more than 50 cubic yards of grading;
    - Submit a soil management report, that includes recommendations for soil modification and/or amendment;
    - Submit a project-specific regular maintenance schedule and two project-specific irrigation schedules for those projects subject to the ordinance.

Other provisions of the new regulations include standards for non-potable/recycled water use where it is available and new enforcement standards for compliance with water conservation practices.

Since the State law became effective on January 1, 2010, the Landscape Plan Review Fee was adjusted (Ordinance #4412, June 22, 2010) to reflect the increase in staff time necessary to meet these additional requirements.

The Planning Commission considered this ordinance on October 21, 2010. There was no one at the hearing who wished to address the Commission on this issue. The Commission recommended that the Board adopt the ordinance as presented on a vote of four commissioners in favor and one absent.

The proposed amendment is exempt from the California Environmental Quality Act (CEQA) in accordance with Section 15061(b) (3) of the CEQA Guidelines as the proposed change does not have the potential to cause a significant effect on the environment.

The proposed Ordinance is to be presented to the County of San Bernardino Board of Supervisors for adoption in the first quarter of 2011. Utilizing either the State Water Efficient Landscape Ordinance, which is in effect currently, or the County's specific Water Efficient Landscape Ordinance; the drought mitigation for this hazard is positive.

7.1.2.5.2 San Bernardino County Desert Area Groundwater Inventory and Atlas

As of January 2011, the California Department of Water Resources anticipates releasing the Final Local Groundwater Assistance (LGA) Guidelines later this calendar year. In December 2009, the draft LGA Guidelines and Proposal Solicitation Package (PSP) was available for public comment. The comment period ended on January 12, 2010.

Local public agencies with authority to manage groundwater resources are encouraged to apply Examples of projects that may be considered are: Groundwater data collection, modeling, monitoring and management studies; monitoring programs and installation of equipment; basin management; development of information systems; and other groundwater related work.

The County of San Bernardino Board of Supervisors may consider an action directing staff to apply for the grant when it becomes available for a Desert Area Groundwater Inventory (DGI) and Atlas. The DGI falls within the scope of the Local Groundwater Assistance (LGA) Program, which is funded with Prop 84 IRWM funds anticipated to be available for fiscal year 2010-2011. Grants are limited to $250,000 per recipient, and total funding is $4.7 million.

California Department of Water Resources will give priority to local agencies with adopted groundwater management plans (SB1938 compliant), and which demonstrate collaboration with other local agencies in managing groundwater basins. County's groundwater management ordinance satisfies this requirement.

By having a Desert Area Groundwater Inventory and Atlas, this would enable the County to have a database providing locational and water depth information for specific regions of the County that currently do not have a groundwater inventory. This Inventory and Atlas would provide information applicable for flood mitigation or ground water availability for usage during severe drought. The location and water depth in the inventory are important for an earthquake hazard analysis, if liquefaction potential exists.

Since there is not a Desert Area Groundwater Inventory currently, and if liquefaction is a concern in a specific region of the County, then the water depth data would estimate the vertical distance from the land surface to the top of the groundwater aquifer (i.e., the groundwater-saturated layer.)

Table 7-3: Tentative Schedule for the LGA Grant

Date	Event	
TBD	Release Final LGA Guidelines and PSP	Dependent upon Grant approval
TBD	Proposal Applications Due	Dependent upon Grant approval
TBD	Public Release of Draft Award Recommendations	Dependent upon Grant approval

Fund Source: Proposition 84

7.1.3 Continued Public Involvement

As indicated earlier, the County will continue to engage the general public and seek input on the mitigation and preparedness planning process. In addition to the San Bernardino County Board of Supervisor meetings, the actions include:

- Municipal Advisory Communities throughout the unincorporated County area,
- Flood Zone Advisor Committees,
- Special District Advisory Committees,
- Public hearings for County General Plan updates held four times a year,
- MAST and FAST meetings,
- Fire Safe Council meetings,
- Community Emergency Response Team meetings, and
- Public events where educational efforts are undertaken in the unincorporated areas.

Additionally, the public is kept involved through annual programs such as the Great Shakeout held annually in October, SKY Warn events sponsored by the National Weather Service, and other monthly safety programs. The County will continue to use several different methods to reach out to the public: mailers, cable TV, website, social networks, e-mail, posting in public libraries, and fairs.

Section 8. Works Cited

USGS. (2009).

USGS. (2016, April 7). *USGS Earthquake Hazards Program*. Retrieved from https://earthquake.usgs.gov/learn/glossary/?term=earthquake

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Appendix A. Outreach Documentation

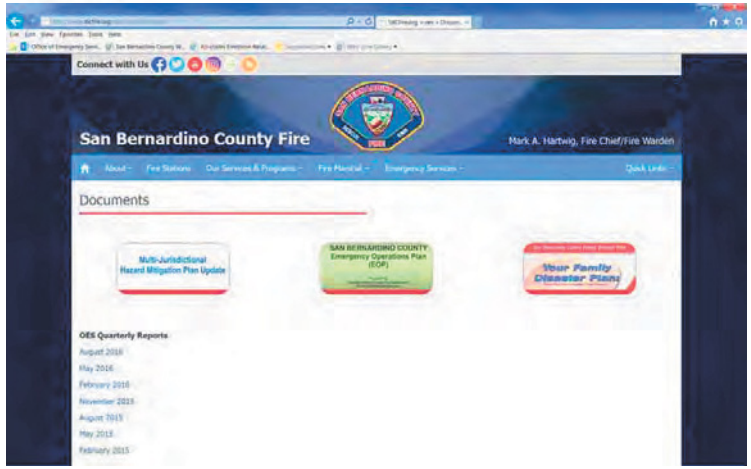
A.1 Ready SB County Preparedness App Message

An App message was sent out to over 15,000 persons with the App and it is attached to the San Bernardino County Fire Website. .Ready SB County Preparedness Mobile App can be used on either an Android or iPhone. This app provides multiple resources for our residents that will assist them in preparing for a disaster and enhancing the recovery process. Protect yourself and your loved ones before, during and after a disaster.

Get the Latest News from SBCounty.gov, CalTrans, National Weather Service, and San Bernardino County Fire Office of Emergency Services. This app will provide you with an emergency supply kit list, grocery list and checklists tailored to your needs. You can access and update your plan as needed. Learn all you need to plan for and respond to natural disasters, terrorism and pandemic flu in San Bernardino County

A.2. San Bernardino County Fire Public Input Requested

San Bernardino County Fire Department/Office of Emergency Services (OES) is coordinating the update of the San Bernardino County Unincorporated Area Multi Hazard Mitigation Plan. Hazard Mitigation Plans are updated every five years and must be approved by Cal OES and FEMA. The purpose of the public input and comment is to show progress being made and elimination of hazards since the last plan. Your input is appreciated by reviewing and commenting on the current plan (link below) by calling OES at 909-356-3998 – ask for David Davis. Comment period **closed at 5:00 p.m., Wednesday, November 3, 2016.**
http://www.sbcfire.org/oes/Documents.aspx



A.3. MJHMP PowerPoint Presentation









Annex A. Fire Protection District

A.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Fire Protection District, a previously participating jurisdiction to the 2011 San Bernardino County Hazard Mitigation Plan Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the base plan document. As such, all sections of the base plan, including the planning process and other procedural requirements apply to and were met by the Fire Protection District. This Annex provides additional information specific to the Fire Protection District, with a focus on providing additional details on mitigation actions and projects.

The Board of Supervisors acts as the Board of Directors for the County Flood Control District, and as part of their responsibilities as an elected member of the County of San Bernardino Board of Supervisors.

A.2 Fire District Profile

The San Bernardino County Fire Department is an all-risk/full-service fire department committed to providing the highest level of service in the most efficient and cost effective manner to the citizens and communities that we serve. At 20,160 square miles, San Bernardino County is the largest county in the continental United States. Our jurisdiction encompasses 19,278 square miles of extremely diverse environments that stretch from the Los Angeles County line on the west, to the Colorado River on the east, to the Nevada State line and Kern and Inyo counties on the north. We provide services to more than 60 communities/cities and all unincorporated areas of the county.

Mission Statement
Community-based all-risk emergency services organization dedicated to the health and well-being of the citizens of San Bernardino County through a balance of regionalized services delivery and accountability to the local community supported by centralized management and services.

Service Motto
Duty, Honor, Community.

Standard of Commitment
"Where Courage, Integrity, and Service Meet."

Vision Statement
Committed to Providing Premier Fire Services.

Hazard Mitigation Planning Group:
Michael Antonucci – Emergency Services Manager

A.3 Planning Process

As described above, the County Fire District followed the planning process detailed in Section 3 of the base plan. In addition to providing representation on the San Bernardino County Hazard Mitigation Planning Committee (HMPC), the District formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table A-1. Additional details on plan participation and District representatives are included in Appendix A.

Table A-1: Fire District Planning Team

Name	Title / Role
Michael Antonucci	Emergency Services Manager
Cindy Serrano	Assistant Emergency Services Manager
David Davis	Emergency Services Officer
Miles Wagner	Emergency Services Officer
Cheryl Nagy	Emergency Services Officer
Carrie Cruz	Emergency Services Officer
Elli Maldonado	Office Assistant
Mary Barnett	Technical Writer / Plan Update and Edits
Michael Horton	Fire Marshal

Weekly meetings held every Tuesday since July 2016 with conference calls to the consultant group and other stakeholders plus all meetings listed in this document.

A.4 Hazard Identification and Prioritization

The County Fire Protection District Planning Team participated in the County hazard identification and prioritization process described in the base plan. The Fire District Planning Team assisted to summarize the extent, probability of future occurrences, potential magnitude/severity, and significance specific to the Fire District in the base plan.

The Planning Team (all participating jurisdictions) determined that the County and its Special Districts should focus over the next five (5) years on hazards that fell within the HIGH and MEDIUM “Probability” and “Impact” categories. While all the hazards present a potential problem in the County, the Planning Team felt that if they were able to reduce or eliminate the risk from “fire related” hazards, it would provide a greater service to the people within the jurisdiction. Table 4-3 illustrates how the final prioritization of the hazard; the “Green” colored box represents the highest priority hazards; and the “White” colored boxes represent lower (second and third tier) priority hazards.

Table A-2: Fire District Hazard Priority Matrix

Probability	Impact: High	Impact: Medium	Impact: Low
High	**Wildfire** Flood Earthquake/ Geologic Hazards	Drought	
Medium	Terrorism	Climate Change (Extreme Heat and other)	Hail Infestation
Low		Dam Inundation	Tornado High Winds Winter Storm Lightning Extreme Cold

A.5 Coordination with existing Fire District Mechanisms

Coordination with other District planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the Fire Protection District integrated the previously-approved 2011 Plan into existing planning mechanisms and programs.

While not designed or proposed specifically as mitigation projects, the County Fire Protection District undertakes many activities that incorporate mitigation elements and integrate risk reduction as an additional benefit. The following describes a number of these projects which exemplify how the County integrates hazard mitigation into county-wide programs.

A.5.1 Critical Route Planning Committee

San Bernardino County Fire Protection District Office of Emergency Services has a “Critical Route Planning Committee” that is developing countywide routes and alternate routes for use in evacuating residents from a disaster area while simultaneously allowing first responders’ access into a disaster area without congestion and gridlock. The Committee members are from County departments, City and Town representatives, and key state and federal agencies. The Critical Route Planning effort is being coordinated with surrounding counties to prevent congestion and gridlock at the County boundaries.

A.5.2 Public Alert and Education Programs

A.5.2.1 Wireless Emergency Alerts (WEA)

During threatening emergencies in your area, authorized government agencies can send Wireless emergency Alerts to your mobile device. Messages regarding extreme weather, life threatening emergencies, AMBER alerts, and Presidential Alerts during a national emergency are all sent through the WEA system

A.5.2.2 Emergency Alert System (EAS)

The Emergency Alert Systems: national public warning system that requires TV and radio broadcasters, cable television systems, wireless cable systems, satellite digital audio radio service providers, direct broadcast satellite service providers and wireline video service providers to offer to the President the communications capability to address the American public during a national emergency. The FCC works with the Federal Emergency Management Agency and the National Oceanic and Atmospheric
Administration's National Weather Service to implement the EAS at the national level. Only the President determines when the EAS will be activated at the national level, and has delegated the administration of this function to FEMA.
Accordingly, FEMA activates the national EAS, and directs national EAS tests and exercises. The NWS uses the EAS on a local and statewide basis to provide the public with alerts and warnings regarding dangerous weather and other emergency conditions.

The EAS allows participating providers to send and receive emergency information quickly and automatically, even if their facilities are unattended. If one link in the system for spreading emergency alert information is broken, members of the public have multiple alternate sources of warning. EAS equipment also provides a method for automatic interruption of regular programming, and in certain instances is able to relay emergency messages in languages other than English.

A.5.2.3 Integrated Public Alert & Warning System (IPAWS)

During an emergency, alert and warning officials need to provide the public with lite-saving Information quickly. The Integrated Public Alert and Warning System (IPAWS) is a modernization and integration of the nation's alert and warning infrastructure and will save time when time matters most, protecting life and property. Federal, State, territorial, tribal and local alerting authorities can use IPAWS and integrate local systems that use Common Alerting Protocol (CAP) standards with the IPAWS infrastructure. IPAWS provides public safety officials with an effective way to alert and warn the public about serious emergencies using the Emergency Alert System {EAS}, Wireless Emergency Alerts (WEA), the National Oceanic and Atmospheric Administration (NOAA) Weather Radio and other public alerting systems from a single interface.

A.5.2.4 Telephone Emergency Notification System (TENS) Implementation

Emergency service agencies like the Sheriff's Office have implemented TENS on numerous occasions to notify residents in specified areas to evacuate. Most recently it was used to evacuate hundreds of homes in the eastern portion of Yucaipa during the Pendleton Fire and in Wrightwood during the Sheep Fire when the entire community was ordered evacuated.

A.5.2.5 Emergency Communications Services (ECS)

In the last 10 year the ECS program has continually provided support to all major and minor incidents. The more recent events were the Pilot Fire and the Blue Cut Fire in 2016. ECS provides communications and logistical support to public safety and disaster preparedness events. They have also set up a training program for other County Departments that are not typical emergency responders but provided support in an emergency. ECS delivered and set up amateur radio equipment for Department of Public Works, Department of Public Health, Preschool Services Department, and Department of Behavioral Health and provided training for the employees.

A.5.2.6 Fire Safe Council/CERT Community Based AM Radio Transmitters

The Wrightwood Fire Safe Council and the Big Bear City CSD set up and operates a local AM radio transmitter. It has been brought into use during local incidents including a power outage where it is very useful. In power outages, the AM radio in a person's car still works. It was also used to provide preparatory information to the citizens of Wrightwood as the Station Fire was approaching the community from the west. It is also used extensively during the Wrightwood Fire Wise Awareness Days to keep citizens apprised of community events.

A.5.3 OES Volunteer Programs

The San Bernardino County Fire, Office of Emergency Services (County OES) is proud to provide residents of San Bernardino County with meaningful disaster-related volunteer opportunities. Recognizing that during disasters and other emergencies professional responders may be overwhelmed or need assistance County OES trains residents to integrate with and support professional responders during incidents. County OES currently does these through three volunteer programs; the Community Emergency Response Team (CERT), Emergency Communications Service (ECS) and California Disaster Corps programs. Please visit the links below to learn about the programs offered.

A.5.3.1 Community Emergency Response Team (CERT)

The Community Emergency Response Team (CERT) Program educates people about disaster preparedness and trains them in basic response skills. Following a catastrophic event CERT

Members can assist themselves, their families, and others in their neighborhood or workplace until professional responders arrive. Fourteen (14) CERT programs are in the communities of:

- Angelus Oaks
- Big Bear Valley
- Helendale
- Lucerne Valley
- Lytle Creek
- Mill Creek Canyon
- Morongo Basin
- Mountain
- Oak Hills
- Phelan/Pinon Hills
- Rosena Ranch
- San Antonio Heights
- Silver Valley
- Wrightwood CERT

San Bernardino County Fire Protection District Office of Emergency Services has sworn in over 1000 CERT participants as California Disaster Service Workers. These participants have gone on to receive a Sheriff's Department background check to become members of their community's CERT.

The program receives guidance and resources from Department of Homeland Security, FEMA, Citizen Corps, and California Volunteers. The program is administered locally by the San Bernardino County Fire Protection District Office of Emergency Services.

A.5.3.2 LISTOS

Listos, which means "ready" in Spanish, is a twelve-hour disaster preparedness course created specifically for the Spanish-speaking community and is delivered entirely in Spanish. The program is intended to be adaptable, flexible and culturally relevant. This means participants are encouraged to involve the entire family and accommodations are made for young children. San Bernardino County Fire, Office of Emergency Services currently partners with the Cities of Fontana and Rialto to bring Listos to their communities

A.5.3.3 California Disaster Corps

The Disaster Corps is a first-in-the-nation effort to professionalize, standardize and coordinate highly trained disaster volunteers statewide. This program initiative was built collaboratively in partnership with California Volunteers from the ground up through public-private partnerships and with a wide range of subject matter experts including representatives from all levels of government, local emergency managers, state agency volunteer coordinators, and leaders in non-governmental volunteer programs.

Disaster Corps programs reside only in San Bernardino, San Francisco and Riverside Counties. San Bernardino County Disaster Corps volunteers are those volunteers participating in the volunteer programs residing within the unincorporated communities of San Bernardino County and have demonstrated commitment to their volunteer program and strive to continue developing their skills and training to better support their program and their community.

Within San Bernardino County Disaster Corps volunteers are set aside from regular CERT (Community Emergency Response Team) and ECS (Emergency Communication Services) volunteers by having the ability to be deployed throughout other areas of San Bernardino County and the state. They have received specialized training in SEMS and NIMS, plus have completed many other ICS courses and First Aid and CPR training. In addition there are additional training opportunities not offered to the regular CERT and ECS volunteers.

A.5.3.4 ECS Emergency Communications Service

The Emergency Communications Service (ECS) is a volunteer group providing front-line communications, technical and logistical support to the San Bernardino County Fire Department and Office of Emergency Services. Their primary mission is to support County Fire, County Government and other local agencies in time of disaster. In addition, ECS has provided telecommunications and event support to other County departments including Public Health, Behavioral Health, Public Works, Pre-School Services, Sheriff's Search and Rescue and other County Departments.

ECS coordinates disaster communications between city and county agencies, provides a communication link to Cal OES and ensures backup communication channels are kept open in times of a major disaster.

In an average calendar year, ECS supports approximately two-dozen events and incidents throughout the County. These events range from parades and community events, to major public safety incidents including fires and floods. The 200 ECS volunteers donate an average of 9,100 hours per year to the County of San Bernardino.

ECS currently provides multiple HAM licensing classes to County Departments and the residents of San Bernardino County each year.

A.5.4 ROPE Plan (Responders Organized For Pass Emergencies)

ROPE Field Operations Guide (FOG) and Standard Operating Guide (SOG) for use by participating Federal, State, County, and Municipal agencies and industries for day-to-day incidents in the Cajon Pass, as well as for larger regional incidents requiring coordinated and unified multi agency response. The ROPE FOG contains; communications information, emergency contact information, critical infrastructure mapping and ICS planning tools.

A.5.5 Great ShakeOut County Drill in all Disciplines (held annually)

The San Bernardino County Operational Area will be participating in the annual The Great ShakeOut drill which will focus on the Southern California Regional Catastrophic Plan (SCRCP). This plan is based on a large scale magnitude earthquake scenario along the southern section of the San Andres Fault. The purpose for participation in the Great ShakeOut Exercise is to address the County's potential to respond to a catastrophic earthquake event based on the plan, and to better prepare for such an occurrence. The goal of the exercise will be to conduct an effective multiagency/multi-jurisdictional evaluation of the Regional Catastrophic Plan with our Operational Area response partners.

A.5.6 "Ready SB" Smart Phone App for Disaster Preparedness Program

The new mobile app, Ready SB, provides residents with multiple resources that will assist them in preparing for a disaster. Ready SB is now available as a free download from the Apple App Store and the Google Play Store it can immediately help residents prepare themselves for emergencies.

Ready SB features include: "My Plan", an individual emergency plan and/or a family or group plan. The person that downloads the application will receive county wide alerts and notifications of emergency situations in that person's area. There is a feature called "Share My Status" it is a place to update your status via text or email.

The app also includes information about areas that need to be evacuated, where to go, what routes are open and also what resources are available during that emergency.
The app features include: Evacuation Routes and Shelters, Need to Know, and has a Resources List.

A.5.7 Cal Fire

Cal Fire provides programs to increase fire safety in high fire hazard severity zones. It funds and staffs programs from public education activities to performing fuel modifications with inmate crews. One example is the active Re-Leaf program where mountain residents are educated about drought tolerant and fire resistive landscaping that is available and sustainable. Cal Fire is also the lead agency on reforestation after a wildfire to ensure the stability of the environment. Cal Fire Foresters are active participants in the MAST process helping educate citizens and leading forestry activities on private lands within the USFS boundary.

Numerous fuels projects have been completed by State inmate crews that do significant hand work in dense fuels adjacent to communities. Cal Fire has also led the way in countless re-forestation projects that ensure that new stands of the same trees will repopulate an area and that the original forest won't be overtaken by a different type of replacement forest.

A.5.8 Organized Group Volunteer Activities

Mountain communities are populated by several volunteer citizen groups that are capable of providing significant resources that are not provided by traditional governmental agency services.

Volunteer groups particularly “Mountain Hearts and Lives” (MHL) responded to numerous emergencies particularly of note the Grass Valley and Slide Fires. These groups have also spent significant time working to prepare citizens for disasters. MHL has coordinated CERT training as well as HAM radio operator training. Other activities can be found at www.heartsandlives.org. Other partners that assist in coordinated endeavors for disaster preparedness and disaster relief are Rim Family Services and the Rim Resource Community Network. Members of these and other groups work very closely with MAST, Mountain Mutual Aid and the American Red Cross.

A.6 Fire Protection District Mitigation Project Prioritizing

Cost effectiveness of each measure was a primary consideration when developing mitigation actions. Because mitigation is an investment to reduce future damages, it is important to select measures for which the reduced damages over the life of the measure are likely to be greater than the project cost. For structural projects, the level of cost effectiveness is primarily based on the likelihood of damages occurring in the future, the severity of the damages when they occur, and the level of effectiveness of the selected measure. While detailed analysis was not conducted during the mitigation action development process, these factors were of primary concern when selecting measures. For measures that do not result in a quantifiable reduction of damages, such as public education and outreach, the relationship of the probable future benefits and the cost of each measure was considered when developing the mitigation actions.

Based upon the Fire Districts capabilities, Table A-3: Mitigation Project Prioritization and Implementation shows primary actions selected for further implementation and development during the next planning cycle. Table A-3 provides details for each mitigation action with mitigation action descriptions, FEMA mitigation category, responsible party, and timeframe.

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A.7 Fire Protection District Mitigation Project Actions

Table A-3: Mitigation Project Prioritization and Implementation

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
ALL Hazard	**AH Action 1.1:** Valley Dispatch and Operations Center.	Update and maintain the operations of the facility and ensure cohesive working and response to any scale emergency and operations in a secure complex	ES	General Fund and HMP Grant	Fire Protection District/	1-3 Years	See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project .
ALL Hazard	**AH Action 1.2:** Maintain Shelter Operations Compound (SHOC). This shelter concept provides a new one-stop shelter concept. The SHOC combines a shelter, a Local Assistance Center (LAC) and a Non-LAC Unit in one easy location.	After the 2003 Wildland Fires, the County and American Red Cross recognized the need to provide services beyond basic care and short-term sheltering, especially during large fires, floods, and earthquakes The Mass Care & Shelter Plan and Concept of Operations, outlines the framework of a new one-stop shelter concept, Shelter Operations Compound (SHOC). It combines a shelter, a Local Assistance Center (LAC) and a Non-LAC Unit in one easy location. Residents can access public information and referral services through the LAC, and then take a short walk to the Non-LAC Unit for communication, postal services, and other private organizations/business at little to no cost. The completion of the Plan in 2012 will help to sync local resources, encourage local self-sufficiency, foster partnership between public and private agencies, and serve as a reference document for the region. By June 2017, the program will have 32 trailers/caches equipped with mass care and shelter supplies, strategically placed throughout the County and ready for rapid deployment. It is expected to serve over 12,000 residents. In addition to enhancing the comfort levels of shelter residents, the program will produce standardized documents and protocols for procuring and maintaining Mass Care and Shelter trailers/caches. These plans and programs will help the County prepare for and mitigate damages from hazards. This is an update and expansion of the plan and done without more grant funds.	ES	To increase Mass Care and Shelter capability of the county, grants from 2008-2009 Homeland Security Grant Program (HSGP) and 2009 Riverside Regional Urban Area Security Initiative (UASI) funded the Mass Care and Shelter Trailer/Cache Program.	Fire Protection District/	1-5 Year	See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project .
All-Hazard	**AH Action 2.1** Incorporate as appropriate requirements from the State of California's most recent land use regulations regarding the hazard mitigation planning process (Government Code 65302 and 8685.9).	Government Code 65302.6 requires the following elements to be included in the hazard mitigation plan: (1) An initial earthquake performance evaluation of public facilities that provide essential services, shelter, and critical governmental functions.	PRV, NRP	General Fund	Primary: Land Use Services Secondary: Fire Protection District/	1-3 years	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
		(2) An inventory of private facilities that are potentially hazardous, including, but not limited to, multiunit, soft story, concrete tilt-up, and concrete frame buildings. (3) A plan to reduce the potential risk from private and governmental facilities in the event of a disaster. Government Code 8685.9 requires that the state share shall not exceed 75 percent of total state eligible costs unless the local agency is located within a city, county, or city and county that has adopted a local hazard mitigation plan as part of the safety element of its general plan. In that situation, the Legislature may provide for a state share of local costs that exceeds 75 percent of total state eligible costs.					
Wildfire	**WF Action 1.1** Continue Mountain Area Safety Taskforce (MAST) funding to support mitigation activity.	MAST was formed to mitigate the region wide risk of a catastrophic wildfire due to dead and dying trees in the mountain communities. The mission of the MAST is to facilitate a coordinated effort by cities, county, state, federal, and non-profit agencies to provide for the protection of property owners, residents, and property subject to the risk of catastrophic wildfire that could occur in San Bernardino County with an initial emphasis on the threat resulting from the Old and Grand Prix fires in 2003. MAST priorities are to continue reducing fire hazards through fuel reduction programs and hazard abatement though enforcement of county ordinances. The Mountain Area Safety Taskforce (MAST) Operations Section meets monthly. MAST Operations Section determines project priorities based on the benefit cost analysis of the projects and the effect of the project on the overall goals of the MAST organization. Goals can change as detailed Benefit Cost Analysis is conducted and CEQA/NEPA reviews are completed.	NRP, PPRO	Seeking additional funding through HMPG.	San Bernardino County Fire Protection District	On-Going	See Implementation plan on more information on MAST. See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project .
Wildfire	**WF Action 2.1:** Update Mountain Mutual Aid Map Book to document updated information contained in 2016 HMP.	The Map Book portion of the Community Safety and Structure Protection Plan provides not only a street network of the area but more importantly it provides the locations of strategic and critical resources for fire fighters. These include but are not limited to safe zones, open areas, locations for refuge. They also identify areas within communities that have narrow and steep winding streets and or with limited ingress and egress. The document is handed out to all responding strike teams from out of the	ES	Seeking additional funding through HMPG.	San Bernardino County Fire Protection District	On-Going	See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project .

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
		area and has proved invaluable in directing and coordinating an effective fire-fighting response and reduces the potential for life loss and property damage.					
Wildfire	**WF Action 2.2** Update Community Structure Protection Plans as necessary.	This is an on-going action (from the 2011 MJHMP) with the goal to continue development of and continue the mission of mutual aid between first responders in the County mountain areas.	PPRO	HMP Grant Funding	Primary: San Bernardino County Fire Protection District Secondary: Land Use Services	On-Going	
Wildfire	**WF Action 3.1:** Implement identified community based fuels reduction projects.	The Fuels Reduction Program is designed to create community based fuel modification programs across the mountain communities. These projects are selected specifically to reduce the potential for catastrophic wildfires and the damage that they can do to the communities. Project design, contracting, and operations are managed by the County's Public Works Department with priorities set by local fire chiefs in monthly MAST Operations Meetings. This program is the oldest and most significant for reducing wildfire threat on a mountain wide basis.	PPRO	Current Funding: Seeking additional funding through HMPG.	Primary: San Bernardino Public Works Department Secondary: County Fire Protection District	On-Going	
Wildfire	**WF Action 3.2:** Develop fuels reduction "maintenance program" by obtaining participation from citizens and/or homeowners associations.	To survive a wildfire, property owners need to manage the land surrounding their homes and communities effectively. Removing fuels in the wildland fuel reduction zone beyond the defensible space can reduce the speed and intensity of an oncoming wildfire. But if these areas aren't regularly **maintained**, they lose their effectiveness. Plants grow back, and flammable vegetation needs to be routinely removed and disposed of properly. This guide provides tips on how to create and maintain defensible space and wildland fuels treatments around your property.	PPRO, PE&A	Seeking additional funding through HMPG	Primary: Public Works Secondary: Fire Protection District	On-Going	
Wildfire	**WF Action 4.1** Increase homeowner assistance services to mountain residents for fuel reduction.	This is an ongoing wildfire mitigation action (from the 2011 MJHMP) for the group Forest Care to achieve the goal of providing assistance to homeowners by expanding services to all communities in the Mountain areas of the County. Forest Care is a program dedicated to creating a healthier forest. This program provides foresters to assess individual properties for thinning the vegetation and then provides 75% of the funding to do so.	PPRO, PE&A	Seeking additional funding through HMPG	San Bernardino County Fire Protection District	On-Going	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Wildfire	**WF Action 4.2** Continue working with Southern California Edison (SCE) to remove dead trees near power lines.	A significant number of fires across the State are caused by trees falling into power lines. When the forests in the mountain communities became infested with bark beetles the pine tree die off was unprecedented. Thousands of these dead trees were standing precariously close to power lines. Early in the Bark Beetle Emergency in 2004, Southern California Edison swiftly initiated a program to remove all trees that were dead, dying, and/or diseased that had the potential to fall into any SCE power lines. The role of Southern California Edison was critical to the success of MAST both operationally and financially. Edison still removes the most difficult trees, the most costly trees; and the ones that are most likely to be the source of ignition for a wild land fire. They are also removing the trees that are immediately threatening homes. They have removed 118,305 trees since the inception of the program in 2004. They also provided reimbursements to people that removed their own trees.	PRV, PPRO	As of July of 2010 Southern California Edison (SCE) has spent $179,758,978 to remove dead dying and diseased trees.	San Bernardino County Fire Protection District	On-Going	
Wildfire	**WF Action 5.1:** Inspect every residence in the mountain communities throughout the year to enforce the Fire Hazard Abatement code that addresses green fuels.	The Fire Hazard Abatement Program conducts surveys to identify fire hazards throughout the year. Fire hazards are identified and notices to abate the hazard(s) are mailed to property owners. Property owners are given 30 days to abate the violations. Failure to abate may result in citations, penalties, and/or fees for abatement by the County. The Fire Hazard Abatement Program responds to complaints year round in the unincorporated areas and contracting Cities and Fire Districts. The Division completes more than 430,000 inspections, issues more than 45,000 Notices to Abate Fire Hazards, issues over 4,000 citations for non-compliance, and abates the fire hazards on more than 2,000 parcels annually. Within the last 5 years, the Fire Hazard Abatement Division has received even more financial	PRV, PPRO, PE&A	Seeking additional funding through HMPG	Primary: Land Use Services Secondary: San Bernardino County Fire Protection District	On-Going	For more information on Contractor Certification, see Annex A Section A.6 Fire Protection District Mitigation Project .

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
		resources that enable them to abate all properties declared a fire hazard.					
Wildfire	**WF Action 5.2:** Continue to collaborate with Forest Care, Red, Cross and Cal Fire to overcome increased costs of enforcement.	This is an on-going action from the 2011 MJHMP with the goal of overcoming funding shortfalls for the County Fire Hazard Abatement Program.	PRV	HMP Grant Funding	San Bernardino County Fire Protection District	On-Going	
Wildfire	**WF Action 6.1** Train and Certify landscape contractors to comply with the Fire Hazard Abatement Code.	The City of Big Bear Lake created a program to train and certify landscape contractors to provide a qualified workforce to conduct fuels reduction activities on individual properties. The contractors are trained to comply with the new Fire Hazard Abatement Code that exists both in the City of Big Bear and the County unincorporated area. The City of Big Bear Lake Fire Department conducts the classes for landscapers and handy persons. This provides an incentive for the contractors and provides a level of certification that the homeowner can rely on when they are deciding to hire a landscape contractor to conduct fuels abatement around their home.	PRV, PPRO	Seeking additional funding through HMPG	San Bernardino County Fire Protection District	On-Going	On-Going
Wildfire	**WF Action 6.2:** Continue wildfire mitigation efforts under the Wood Shake Roof Replacement Program.	The County successfully passed an ordinance that requires the replacement of wood shake roofs by 2014. MAST has successfully mapped all of the wood shake roofs in the fire safety overlay and has created a strategy as to which roofs will be selected to participate in the FEMA funded project. This is an on-going project in cooperation with Big Bear Lake Fire Protection District in order to provide more funding for wood shake roof replacements by property owners.	PRV, PPRO, SP	Various Grant Funding from Edison, FEMA, Cal Fire	Primary: MAST Secondary: San Bernardino County fire Protection District	On-Going	
Wildfire	**WF Action 7.1:** Modify independent and unique CWPPs into a more common framework making them similar but leaving room to provide specific hazard characteristics and mitigation actions for each community.	Community Wildfire Protection Plans are designed to provide a means for a community, usually through the Fire Safe Council, to have input into and actively participate in the planning, strategy, goals, and objectives of creating a fire safe community.	PRV	Seeking additional funding through HMPG	San Bernardino County Fire Protection District	On-Going	On-Going For more information on CWPP see Annex A Section A.6 Fire Protection District Mitigation Project .

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Wildfire	**WF Action 8.1:** Construct Arrowbear Drive Realignment and Widening.	The Arrowbear community off State Highway 18 has limited access to State Highway 138. The existing bridge/spillway and road needs to be realigned and widened to facilitate access by emergency personnel during wildfires and flooding. Mitigation strategy for this is to remove and replace existing bridge/spillway, realign and widen the road.	SP	Seeking grant funding Total Cost: $2,000,000	Primary: Public Works Secondary: San Bernardino County Fire Protection District	1-3 Years	
Wildfire	**WF Action 8.2:** Construct Cedar Glen Fire Access Road.	Lack of paved roads inhibits traffic circulation and the ability to enter and exit the area without backtracking during wildfire emergencies. Strategy is to Construct road and drainage improvements to Little Bear Creek Road and Elder Drive.	SP	Seeking grant funding **Total Cost:** $2,500,000	Primary: Public Works Secondary: San Bernardino County Fire Protection District	1-3 Years	
Wildfire	**WF Action 9.1:** Continue funding and support for Special Districts Projects relating to wildfire.	Continue funding and support for Special Districts Projects relating to wildfire in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	On-Going	
Wildfire	**WF Action 9.2:** Emergency Water Supplies	Purchase emergency water supply or water purification devices to ensure uninterrupted supply of water to emergency response personal.(completed with continuous fresh of supplies and rotation)	ES	TBD	Roads	TBD	

Annex B. Flood Control District

B.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Flood Control District, a previously participating jurisdiction to the 2010 San Bernardino County Hazard Mitigation Plan Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the base plan document. As such, all sections of the base plan, including the planning process and other procedural requirements apply to and were met by the Flood Control District. This Annex provides additional information specific to the Flood Control District, with a focus on providing additional details on mitigation actions and projects.

The Board of Supervisors acts as the Board of Directors for the County Flood Control District, and as part of their responsibilities as an elected member of the County of San Bernardino Board of Supervisors.

B.2 Flood District Profile

Flood Control District Functions:
The Flood Control functions are handled through the San Bernardino County Flood Control District under State legislation enacted in 1939. The District has developed a very extensive system of facilities, including dams, conservation basins, channels, and storm drains. The purpose of these facilities is to intercept and convey flood flows through and away from the major developed areas of the County. The principle functions are:

- Flood protection on major streams.
- Water conservation.
- Storm Drain construction.

Mission:
To enhance the quality of life for our communities by developing and maintaining public infrastructure, and providing a variety of municipal services that complements our natural resources and environment.

Vision:
Lead the way to a thriving community through innovation in public works, fiscal responsibility, and environmental stewardship.

B.3 Planning Process

As described above, the County Flood Control District followed the planning process detailed in Section 3 of the base plan. In addition to providing representation on the San Bernardino County Hazard Mitigation Planning Committee (HMPC), the District formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table B-4. Additional details on plan participation and District representatives are included in Appendix A.

Table B-4: Flood Control District Hazard Mitigation Planning Team

Name	Title	Role
Kevin Blakeslee	Deputy Director – Flood Control	Public Works Deputy Director
Kenneth Eke	Chief Flood Control Planning/ Water Resources Division	Public Works Engineer
Michael Fam	Flood Control Planning	Public Works Engineer
Mona Sadek	Flood Control Planning	Flood Control Planner
Marjorie Schrage	Flood Control Planning	Public Works Engineer Technician

B.4 Hazard Identification and Prioritization

The Flood Control District Planning Team participated in the County hazard identification and prioritization process described in the base plan. The Flood Control District Planning Team assisted to summarize the extent, probability of future occurrences, potential magnitude/severity, and significance specific to the Flood Control District (See Section 4).

The Planning Team determined that the County and its Special Districts should focus over the next five (5) years on hazards that fell within the HIGH and MEDIUM "Probability" and "Impact" categories. While all the hazards present a potential problem in the County, the Planning Team felt that if they were able to reduce or eliminate the risk from "food and drought related" hazards, it would provide a greater service to the people within the jurisdiction. Table 4-3 illustrates how the final prioritization of the hazard; the "Green" colored box represents the highest priority hazards; and the "White" colored boxes represent lower (second and third tier) priority hazards.

Table B-5: Prioritized Hazard Assessment Matrix

		Impact		
		High	Medium	Low
Probability	High	Wildfire **Flood[x]** Earthquake/ Geologic Hazards	Drought	
	Medium	Terrorism	Climate Change (Extreme Heat and other)	Hail Infestation
	Low		Dam Inundation	Tornado High Winds Winter Storm Lightning Extreme Cold

[x] = Flood District Area of Concentration

B.5 Coordination with Existing Flood District Mechanisms

Coordination with other County planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the Flood Control District integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Specifically, the District incorporated into or implemented the 2011 MJHMP through other plans and programs shown below.

B.5.1 Flood Area Safety Taskforce (FAST)

During the devastating fires in the fall of 2003, there was great concern of what the ramifications might be for flooding in the burned areas, as well as in the valleys. In response to these concerns, an organization was established that mirrored the Mountain Area Safety Taskforce (MAST), mentioned above, which played a key role in minimizing damage.

While the fires were ravishing the countryside, representatives from multiple agencies met often to address potential issues associated with flood, mud and debris flows develop a strategy and to protect communities from flooding incidents. These agencies united together to become the Flood Area Safety Taskforce (FAST). FAST is structured as an ICS/SEMS Organization for managing incident activities both readiness and response. The FAST Organization stresses liaison with the communities, provides for community education and information, and places emphases on Community and city partnerships.

The FAST group includes:

- Elected State officials
- Representatives from all five (5) County Supervisorial Districts
- State Office of Emergency Services
- County Administrative Office
- County Public Works-Flood Control/ Transportation/Solid Waste
- County Fire Protection District
- County Fire Protection District/Office of Emergency Services (OES)
- County Sheriff's Department
- Representatives from the cities of Fontana, Highland Rancho Cucamonga, Rialto, and San Bernardino.
- USFS
- Caltrans
- CHP

The mission of the FAST is to facilitate a coordinated effort by cities, county, state, federal, and non-profit agencies to provide for the protection of property owners, residents, and property subject to the risk of erosion, mudflows, and flooding that could occur in San Bernardino County with an initial emphasis on the threat resulting from the Old and Grand Prix fires in 2003.

The FAST Unified Command identified the following objectives as the focus and direction of the FAST:

- Provide for Community Safety.
- Develop Coordinated Public Information Dissemination between Cities, County, State, Federal and Non-Profit Agencies.
- Develop Immediate, Mid-range and Long-range Coordinated Agency Plans.
- Identify and Secure Potential Funding Resources to Provide Document Task Force Activities Including Mission, Goals and Objectives, Policies, Procedures, and Outcomes.

Prior to any type of flood threat, the following precautionary measures may be taken by FAST members to reduce the impact of impending flooding:

- Review mutual aid agreements
- Define evacuation areas and trigger points
- Review the use of alert and warning systems
- Provide information to the public of potentially susceptible flooding areas and protective measures in progress or planned for those areas
- Educate public on emergency self-help and preparedness
- Develop and maintain emergency notification procedures and checklists.

A FAST Concept of Operations (CONOPS) was developed to provide activity guidelines for pre-flood activities related to National Weather Service (NWS) watches and warnings. Due to the unstable condition of the burned areas, activities and coordination needed to be established and implemented between departments.

The CONOPS is "situation" and "incident" driven and subject to revision by the Unified Command which includes County Flood Control District & Co Roads, County Fire Protection District, United States Forest Service (USFS), California Department of Transportation (Caltrans), California Highway Patrol (CHP), County Sheriff, City of Fontana, City of Highland, City of Rancho Cucamonga, City of Rialto, and City of San Bernardino. The Unified Command has the ability to modify activities in these guidelines in response to current situations and predicted changes. Currently, the CONOPS includes both summer and Winter Storm Event Readiness.

In addition, the CONOPS includes the San Bernardino County Flood Area Safety Taskforce Paging Network and a draft of the Alert Communication Matrix by Rain Amount/NWS Warning.

Over the past 10 years, the County has used the FAST CONOPS many times, greatly enhancing the County's ability to respond to flash flood in the desert and foothill areas. The CONOPS activity coordination between the agencies has been very successful. Because of the great success of the CONOPS, State Emergency Management Agency (Cal EMA) is using the CONOPS as a model for other agencies throughout the State.

In addition, San Bernardino County the CONOPS and FAST Plan is updated every two years and has done so since been put in to action the latest update being May of 2015.

B.5.2 Alluvial Fan Task Force

In December of 2002, the California Floodplain Management Task Force Report recommended that "The State should convene a task force specifically for alluvial fans, with stakeholder participation, to review the state of knowledge regarding alluvial fan floodplains, determine future research needs, and, if appropriate, develop recommendations relating to alluvial fan floodplain management, with an emphasis on alluvial fan floodplains that are being considered for development."

In September of 2004, Governor Arnold Schwarzenegger signed Assembly Bill 2141, which recommended the creation of the Alluvial Fan Task Force (Task Force). The Director of the Department of Water Resources (DWR) convened the Task Force in December of 2007 after funding to support Task Force activities was secured from a Pre-Disaster Mitigation Planning Grant from the Federal Emergency Management Agency (FEMA) and a state match was authorized by Assembly Bill 466. Funding supported the tasks charged to the Task Force including:

- Review the state of knowledge regarding alluvial fan floodplains;
- Determine future research needs;
- Develop a voluntary locally-adopted model ordinance for communities subject to alluvial fan flooding that supports land use decisions on alluvial fans;
- Develop local planning tools to assist local communities evaluate development on alluvial fans;
- Prepare recommendations relating to alluvial fan floodplain management.

Appointments to the Task Force by DWR Director Lester Snow represented a broad range of interests. Members included elected officials, represented by five Supervisors from Kern, Los Angeles, Riverside, San Diego and San Bernardino County where future alluvial fan development is projected. Appointments also included representatives of the development and environmental community, local floodplain managers and associated state and federal agencies, including the Federal Emergency Management Agency (FEMA), plus at-large members representing other issues related to future development on alluvial fans. The entire process was coordinated by the Water Resources Institute at California State University San Bernardino.

Primarily, the purpose of the Alluvial Fan Taskforce *Findings and Recommendations Report* (July 2010) and *The Integrated Approach for Sustainable Development on Alluvial Fans* (July 2010) documents are to provide a non-prescriptive and flexible model that local governments can use at their own discretion adapting to local conditions and needs that supports wise future land use decisions associated with development on alluvial fans.

As one of the ten Southern California counties studied by the Task Force, the County may review the development of the suite of local planning tools for pre-project screening for future development proposals on alluvial fans. If funding allows for the review, these planning tools may be useful as an optional database reference for project management. Additionally, the flood management tools designed to analyze alluvial fan flood hazards and formulate flood hazard protection, which were developed to be consistent with FEMA guidelines, may provide an optional data source for project development. Long term funding for updating and maintaining the pre-project screening tools database is a concern regarding the reliability for current data.

If funding exists, for the implementation of the *Integrated Approach for Sustainable Development on Alluvial Fans*, the methods contained therein may be used as some of the approaches for planning and evaluating the suitability of development on alluvial fans. During the analysis and review, if budgets allow, the long term ecological and financial sustainability issues would also be evaluated.

Based on the Findings from the Alluvial Fan Task Force process, recommendations were made for specific future actions that the State and other public agencies should consider regarding alluvial fans. The San Bernardino County Departments of Land Use, Special Districts and the Flood Control District are all coordinating on the below recommendations:

Recommendation 1: *on-going*

In February 2010, a General Plan Amendment (GPA) to the Safety Element of the 2007 General Plan was adopted to amend the Flood Plain Safety Overlay District to incorporate revised FEMA (Federal Emergency Management Agency) Flood Plain data, modifying 47 detail and seven regional General Plan Quad Maps. The GPA also adopted the FEMA Digital Flood Insurance Rate Map database as released by FEMA as it currently exists and as updated in the future for the County allowing for automatic map updates as new data are published by FEMA. This action by the County of San Bernardino Board of Supervisors implements the portion of the first recommendation from the Alluvial Fan Task Force by working with FEMA to continue updating flood insurance rate maps.

In addition, the GPA for the Safety Element in 2010 (a) amended the Generalized Landslide Susceptibility layer, modifying 17 General Plan Quad Maps and one regional Quad Map, to incorporate updated existing landslide data published by the U. S. Geological Survey for the Mountain area; (b) amended the Fire Safety Overlay District, modifying four General Plan Quad Maps to incorporate updated fire safety mapping published by Cal Fire for the Valley area; and (c) amended the Generalized Liquefaction Susceptibility layer, modifying four General Plan Quad Maps to incorporate new liquefaction data in the Big Bear Lake area designated by the County Geologist for the Big Bear Lake area.

Recommendation 2: *on-going*

The County will coordinate with the California Geological Survey (CGS) and the United States Geological Survey (USGS) to review any newly developed Quaternary geologic maps in alluvial fan areas in order to identify potential hazards in areas projected for future development.

Recommendation 4: *on-going*

Historical, documentation of flooding occurrences are preserved by the County's Flood Control District that would review the recommendation to identify flooding events that were associated with alluvial fans.

Recommendation 6: *on-going*

The increased severity and intensity of wildfires in Southern California increase flood risk because the same structures subject to fire risk are also prone to post-fire debris flows. Many of the debris basins that were constructed some time ago did not anticipate the increased severity and intensity of wildfires or the additional developments that would follow. The CalOES projects that climate change will further increase the severity of storms, wildland fires, flooding, mudslides and landslides in areas of Southern California where existing debris basins are located.

All of San Bernardino County Flood Control District's Debris Basins in the valley area; from the Los Angeles County Line to Yucaipa, were analyzed after the Grand Prix and Old Fires. Flood Control District Safety Assessment Teams utilized the Corps of Engineers' Los Angeles District methodology to determine debris production, the same methodology the Corps uses when designing debris basins. In many cases basins were physically expanded and additional measures such as K-rails and debris racks were installed. The understanding of post-fire debris flows continues to evolve; we work closely with the USGS as they develop Post Wildfire Debris Flow Hazard Assessments. The rainfall "Trigger Points" in our FAST CONOPS is a result of the USGS assessments. All Flood Control Basins are also studied on an annual basis to determine existing capacity.

Any additional funding to support our efforts will meet the intent of recommendation #6 which states that the State and local agencies should conduct assessments of the adequacy of strategically located debris basins under a range of scenarios in urbanized areas in light of increased fire and post-fire debris-flow events.

Recommendation 8: *on-going*

When funding sources become available for the maintenance and further development of the database for the web-based portal; which would be utilized as a pre-project screening and flood management tool for special alluvial fan areas, the County may evaluate the benefits of its use in the planning process.

Recommendation 9: future proposal

As financial resources are allocated, the County will consider the analysis of the Integrated Approach tools to be studied for use in land use planning for development on alluvial fans.

Recommendation 10: *future proposal*

If funding is provided, the County will review and propose for adoption a model ordinance tailored for the specific needs of the County.

Recommendation 12: *future proposal*

The County's Office of Legislative Affairs, after consulting with the appropriate departments and staff, may explore supporting the economic strategies recommended in the Integrated Approach regarding future maintenance of flood management infrastructure.

B.5.3 StormReady

On July 29, 2009, the National Weather Service recognized San Bernardino County as a "StormReady County". This recognition is valid until July 29, 2012 and has been renewed in use (2016) when the National Weather Service will review the County's weather related planning and notification procedures prior to renewing the "StormReady County" status.

San Bernardino County is the only StormReady jurisdiction in the United States covered by three Weather Forecast Offices. The NWS Offices are:

- San Diego, CA;
- Las Vegas, NV; and
- Phoenix, AZ.

This NWS Recognition may provide the County residents with a discount on their Flood Insurance premiums.

B.6 Mitigation Project Prioritization and Implementation

Flood Project Prioritization and Implementation

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Earthquake	**EQ Action 5.1:** Divert runoff to Little Bear Creek.	To reduce the runoff over the cliff(s) in the Rimforest neighborhood, the runoff must be diverted to another path. This will be accomplished over three phases: • Phase 1: Reduce Runoff Tributary Area by 64%- 50.35 AC • Phase 2: Reduce Runoff Tributary Area by 30%- 23.79 AC • Phase 3: Reduce Runoff Tributary Area by 5%- 3.99 AC	SP, NRP, PRV	TBD	Primary: Public Works Secondary: San Bernardino County Flood Control District		
Flood	**FL Action 1.1:** Update NFIP data and maps with newly identified flood hazard areas in the County, as new information becomes available.	As required by the State of California, National Flood Insurance Program (NFIP) maps published by FEMA must be included in the HMP or General Plan Safety Element. Keeping this information current is an important mitigation action.	PRV, PPRO	TBD	San Bernardino County Flood Control District	On-Going	
Flood	**FL Action 2.1:** Determine whether or not additional amendments to development standards or policies are merited, based on the Alluvial Fan Task Force Recommendations.	This is an on-going mitigation action from the 2011 MJHMP.	PRV	TBD	Primary: San Bernardino County Flood Control District Secondary: Land Use Services	On-Going	
Flood	**FL Action 3.1:** Amend the Flood Plain Safety Overlay District through automatic map updates as new data is released and published by FEMA.	Current San Bernardino County Hazard Maps can be found at: http://cms.sbcounty.gov/lus/Planning/ZoningOverlayMaps/HazardMaps.aspx.	PRV, NRP	TBD	Primary: San Bernardino County Flood Control District Secondary: Land Use Services	On-Going	
Flood	**FL Action 3.2:** Review development plans to ensure compliance with ordinances.	This is an on-going mitigation action from the 2011 MJHMP in order to reduce the flood hazards through development standards and policies stated in the General Plan and San Bernardino 2077 Development Code.	PRV	TBD	Primary: Land Use Services Secondary: San Bernardino	On-Going	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
					County Flood Control District		
Flood	**FL Action 3.3:** Inspect construction to ensure compliance with approved development plans.	This is an on-going mitigation action from the 2011 MJHMP in order to reduce the flood hazards through development standards and policies stated in the General Plan and San Bernardino 2077 Development Code.	PRV, PPRO, SP	TBD	Primary: Public Works Secondary: San Bernardino County Flood Control District	On-Going	
Flood	**FL Action 4.1:** In each flood control zone, construct facilities identified in those zones by the Flood Control Advisory Committee. See the following pages for a listing of projects.	This is an ongoing mitigation action from the 2011 MJHMP to achieve the goal of improving existing facilities and construct new facilities to mitigate flooding within the County.	SP	TBD	Primary: Public Works Secondary: San Bernardino County Flood Control District	On-Going	

B.7 Flood Project Prioritization and Implementation

The Flood District project rankings utilize the same format as the 2011 Multi-Jurisdictional Hazard Mitigation Plan, and rankings are based on the current project funding status as shown on the County Flood Control District's 10 year Plan. A 'High' Local Priority, or (3), indicates that project funding is expected to be complete within about the next three years, depending on the Flood Zone and its' available revenue. A 'Medium' Local Priority (2) indicates that project funding is expected to be complete within about four to seven years. A 'Low' Local Priority (1) indicates that the project is on the 10-Year Plan but complete funding is likely eight to ten years or more in the future.

The task of determining local project priority is the responsibility of the County Flood Control District's staff and City Engineers. Each of the six zones of the District is represented by a Citizens Advisory Committee, composed of eleven members and serving by appointment of the Board of Supervisors without compensation. Each committee is formed of spirited citizens and public officials with unselfish and devoted interests, organized to meet annually or on call to afford recommendations to the Board of Supervisors on matters of tax levies, budgets, work programs, priority of projects, ventures and other counsel. The Mayor of each incorporated city in the District is a committee member with full standing for the appropriate zone.

County Flood Control District staff and the City Engineers for each zone meet twice per year to discuss future project needs and current project status. Projects are proposed based on the public safety needs within the particular zone. In addition to public safety, other issues are considered in the prioritization process such as grant funding, environmental reviews and approvals, and other impediments that may cause construction of the project to be delayed. (See Annex 1 for examples of how these prioritization factors are applied to proposed projects.)

Almost without reservation, the recommendations of these organized committees have been accepted by the Board of Supervisors in its administration of County Flood Control District functions.

Each flood control zone constructs facilities identified in those zones by the Flood Control Advisory Committee. The City Engineers for each zone along with the Flood Control District I Advisory Committee establishes Project Priorities based on Benefit Cost Analysis, Community input, and fiscal resources available for the project in addition to any other noted factors. The following three tables illustrate priority rankings based on three key factors: Total Cost, Hazard Assessment, and Potential Fatalities.

Table B-6: Priority Flood Control Projects

Project No	Completion Date	Total Cost	Total Funding	Status
1-112	5 Year Plan	$10,000,000	$10,000,000	Priority
1-114	10 Year Plan	$15,000,000	$1,000,000	Priority

Project No	Completion Date	Total Cost	Total Funding	Status
1-701	5 Year Plan	$1,100,000	$1,100,000	Priority
1-806	10 Year Plan	$5,000,000	$1,000,000	Priority
1-809	5 Year Plan	$8,500,000	$1,000,000	Priority
1-910	10 Year Plan	$10,000,000	$2,000,000	Priority
2-113	10 Year Plan	$3,100,000	$500,000	Priority
2-308	10 Year Plan	$27,000,000	$500,000	Priority
F01272	10 Year Plan	$31,600,000	$600,000	Priority
F01336	2017-2018	$12,800,000	$13,740,000	Priority
F01389-2	10 Year Plan	$2,700,000	$1,430,000	Priority
F01417	10 Year Plan	$39,500,000	$21,150,000	Priority
F01452-2	2017-2018	$38,400,000	$1,170,000	Priority
F01473	10 Year Plan	$8,100,000	$5,001,000	Priority
F01650	2017-2018	$5,200,000	$3,440,000	Priority
F01667	10 Year Plan	$26,900,000	$16,000,000	Priority
F01911	2018-2019	$8,700,000	$3,140,000	Priority
F02129	10 Year Plan	$16,700,000	$1,024,000	Priority
F02228	10 Year Plan	$8,700,000	$7,600,000	Priority
F02243	10 Year Plan	$2,400,000	$400,000	Priority
Totals:		$281,400,000	$91,795,000	

B.7.1 Priority Project Descriptions

B.7.1.1 1-112 West State Storm Drain – Priority

Channel Invert Repair
Status: Proposed
Completion Date: 5-year plan
Total Cost: 11.4 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Public Safety; protection of local and downstream infrastructure
Hazard Mitigated: Downstream flooding

B.7.1.2 1-114 Carbon Canyon Channel – Priority

Channel improvement
Status: Proposed
Completion Date: 10-year plan
Total Cost: 15 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Public Safety; protection of local and downstream infrastructure
Hazard Mitigated: Downstream flooding

B.7.1.3 1-701 Etiwanda Channel Invert Repair – Priority

Channel Invert Repair
Status: Proposed
Completion Date: 5-year plan
Total Cost: 1.1 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Public Safety; protection of local and downstream infrastructure
Hazard Mitigated: Downstream flooding

B.7.1.4 1-806 Hawker Crawford Channel and Rich Basin – Priority

Channel / Basin improvement
Status: Proposed
Completion Date: 10-year plan
Total Cost: 5 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Public Safety; protection of local and downstream infrastructure by reducing peak Q
Hazard Mitigated: Downstream flooding

B.7.1.5 1-809 West Fontana Channel (From Banana Basin to Hickory Basin) – Priority

Channel Repair
Status: Proposed
Completion Date: 5-year plan
Total Cost: 8.5 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Public Safety; protection of local and downstream infrastructure
Hazard Mitigated: Downstream flooding

B.7.1.6 1-910 Grove Basin-Priority

Basin out improvement
Status: Proposed
Completion Date: 10-year plan
Total Cost: 10 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Public Safety; protection of local and downstream infrastructure by reducing peak Q
Hazard Mitigated: Downstream flooding

B.7.1.7 2-113 Randal Basin outlet improvement – Priority

Outlet improvements D/S of the Basin
Status: Proposed
Completion Date: On 10-year plan

Local Priority: Medium
Total Cost: $3.1 million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: Public Safety
Hazard Mitigated: Potential failure & flooding downstream
Resources to Implement: Medium
Cost to Implement: High
Time to Implement: High

B.7.1.8 2-308 Cable Creek Channel – Priority

Channel improvements
Status: Proposed
Completion Date: On 10-year plan
Local Priority: Low
Total Cost: $27 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Compliance with FEMA Levee Certification program
Hazard Mitigated: Reduction of floodplain; reduction of potential for major flooding
Resources to Implement: High
Cost to Implement: High
Time to Implement: High

B.7.1.9 F01272 Rialto Channel, Etiwanda Avenue to Willow Avenue – Priority

Construct Rialto channel to ultimate condition
Status: Proposed
Completion Date: On 10-year plan
Local Priority: Low
Total Cost: $31.6 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Rialto
Project Selected for: Public Safety & convenience Hazard Mitigated: Residential area flooding and road closures due to wash-outs
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.1.10 F01336 Amethyst Detention Basin – Priority

Construct a detention basin at Amethyst and Sycamore
Status: Design completed, Permits In process
Completion Date: Estimated 2017/2018
Local Priority: High
Total Cost: $12.8 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Victorville
Project Selected for: Public Safety; protection of local and downstream infrastructure by reducing peak Q
Hazard Mitigated: downstream flooding

Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.1.11 F01389-2 Mojave River Phase II – Priority

Construct earthen levee lined with 1/2 ton rock slope protection between Oro Grande Wash and Mojave River Phase I
Status: Proposed
Completion Date: On 10-year plan
Local Priority: Low
Total Cost: $2.7million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: To finalize levee improvement construction; protection of Amtrak station
Hazard Mitigated: Local flooding, railroad flooding
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.1.12 F01417 Bandicoot Detention Basin (Phase I&II) – Priority

Construction of detention basin, inlet/outlet facilities, fencing to attenuate 10-year storm flows adjacent to California Aqueduct and downstream residential and commercial properties developments.
Status: Proposed
Completion Date: On 10-year plan
Local Priority: Low
Total Cost: $39.5 million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: To protect the State water aqueduct
Hazard Mitigated: Flood damage to aqueduct & local area
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.1.13 F01452-2 West Fontana Channel, Phase I – Priority

Construction of concrete channel from Juniper to Banana Basin
Status: In process
Completion Date: Estimated 2017/2018
Local Priority: Medium
Total Cost: $38.4 million
Funding Description: San Bernardino County Flood Control Taxes, City of Fontana
Project Selected for: Public safety & convenience
Hazard Mitigated: Flooding of railroad & Metrolink tracks; road damage & closure
Resources to Implement: Medium
Cost to Implement: High

Time to Implement: High

B.7.1.14 F01473 Rialto Channel – Priority

Construct channel improvements south of Interstate 10
Status: Proposed
Completion Date: On 10-year plan
Local Priority: Medium
Total Cost: $8.1 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Rialto
Project Selected for: Public Safety
Hazard Mitigated: Existing channel is interim and undersized
Resources to Implement: Medium
Cost to Implement: High
Time to Implement: High

B.7.1.15 F01650 Sand Creek/ Warm Creek Channels – Priority

Improve existing confluence of Sand Creek and Warm Creek Channels
Status: In process
Completion Date: Estimated 2017/2018
Local Priority: Medium
Total Cost: $5.2 million
Funding Description: San Bernardino County Flood Control
Project Selected for: channel improvements to interim storm drain system
Hazard Mitigated: Potential damage to infrastructure
Resources to Implement: High
Cost to Implement: High
Time to Implement: High

B.7.1.16 F01667 Cactus Basins #4 & 5 – Priority

Construction of detention basins to mitigate downstream flooding of Rialto Channel Work includes inlet/outlet structures
Status: Proposed
Completion Date: 10-year plan
Local Priority: Low
Total Cost: $26.9 million
Funding Description: San Bernardino County Flood Control, City of Rialto
Project Selected for: Ability to reduce downstream peak Q
Hazard Mitigated: flooding of nearby area

B.7.1.17 F01911 Elder Gulch – Priority

Construct trapezoidal rock-lined channel
Status: Proposed
Completion Date: Estimated FY 18/19
Local Priority: High

Total Cost: $8.7 million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: Public safety
Hazard Mitigated: Flooding of local area
Resources to Implement: Low
Cost to Implement: High
Time to Implement: Medium

B.7.1.18 F02129 Wildwood Channel – Priority

Channel improvement
Status: In preliminary design process
Completion Date: On 10-year plan
Local Priority: High
Total Cost: $16.7 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Yucaipa
Project Selected for: History of flooding due to high debris flows
Hazard Mitigated: reduction in size of floodplain; minimized flooding
Resources to Implement: Low
Cost to Implement: High
Time to Implement: Low

B.7.1.19 F02228 Plunge Creek Spillway – Priority

Repair of severe damage caused by storms in 2005
Status: Proposed
Completion Date: On 10-year plan
Local Priority: High
Total Cost: $3 million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: Necessary repairs due to previous flood damage
Hazard Mitigated: Potential failure & flooding downstream
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.1.20 F02243 Rialto Channel Priority Crossings – Priority

Status: In preliminary design process
Completion Date: On 10-year plan
Local Priority: Low
Total Cost: $2.4 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Rialto

Project Selected for: Public Safety & convenience
Hazard Mitigated: Elimination of flooding at intersections
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.2 Projects with Mitigation Benefits

Table B-7 is a list of the proposed projects to mitigate the Flood hazard within the County Unincorporated Area.

Table B-7: In Progress Flood Control Mitigation Projects

Project No	Completion Date	Total Cost	Total Funding	Status
F01312	2017/2018	4,400,000	2,200,000	Under Construction
F01666	2017/2018	17,800,000	17,800,000	Under Construction
F02094	2017	4,000,000	4,000,000	Under Construction
F02126	2017/2018	8,300,000	6,180,000	Under Construction
	Totals:	34,500,000	30,180,000	

B.7.2.1 F01312 English Channel/ Peyton Drive (Under Construction)

Construct triple RCB and channel upstream and downstream of Peyton Drive.
Status: In preliminary design process
Completion Date: Estimated 2017/2018
Local Priority: High
Total Cost: $4.4 million
Funding Description: San Bernardino County Flood Control Property Taxes, 50% and City of Chino Hills 50%
Project Selected for: Public safety & convenience
Hazard Mitigated: Flooding of roads in residential area
Resources to Implement: High
Cost to Implement: High
Time to Implement: Medium

B.7.2.2 F01666 Cactus Basin #3/ Expansion of Basin #3 – (Under Construction)

Status: In process
Completion Date: Estimated 2017/2018
Local Priority: High
Total Cost: $17.8 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Rialto

Project Selected for: Public safety & improved future development; protection of water filtration plant across the street; reduction of peak Q downstream.
Hazard Mitigated: Flooding of immediate area and downstream along Rialto Channel
Resources to Implement: Low
Cost to Implement: High
Time to Implement: Medium

B.7.2.3 F02094 Cucamonga Basin #6, Phase II – (Under Construction)

Landscaping improvements
Status: Partial Completed
Completion Date: Mid-2011 – (Landscaping Phase Completion date end of 2017)
Local Priority: High
Total Cost: $4.0 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Environmental compliance & aesthetics
Hazard Mitigated:
Resources to Implement: Low
Cost to Implement: High
Time to Implement: Low

B.7.2.4 F02126 Francis Street Storm Drain (Under Construction)

Construct ultimate storm drain improvements from Sultana Avenue east to beyond Grove Avenue
Status: In preliminary design process
Completion Date: Estimated 2017/2018
Local Priority: Low
Total Cost: $8.3 million
Funding Description: San Bernardino County Flood Control Property Taxes 75% and City of Ontario 25%
Project Selected for: Public safety & convenience
Hazard Mitigated: Existing storm drain is undersized/interim; local flooding
Resources to Implement: Medium

B.7.3 Future Year Projects

Table B-8: Future Year Projects

Project Number/Name	Completion Date	Total Cost	Status
2-509 Little Sand Creek	10 Year Plan	$10,500,000	Future
3-501 Mission Channel	10 Year Plan	$28,800,000	Future
3-601 Wilson Creek (10th St-I-10)	10 Year Plan	$38,800,000	Future
CSDP Drain Project	10 Year Plan	$18,500,000	Future
Extension of VV Line E-01	10 Year Plan	$2,000,000	Future
F01284	10 Year Plan	$7,200,000	Future
F01582	10 Year Plan	$19,000,000	Future
F01584	2018/2019	$11,700,000	Future
F01609	10 Year Plan	$32,500,000	Future

Project Number/Name	Completion Date	Total Cost	Status
F02225	10 Year Plan	$33,100,000	Future
F02475	10 Year Plan	$9,000,000	Future
F02476	10 Year Plan	$32,300,000	Future
H1458	2021	$3,000,000	Future
Institution Road	2021	$30,000,000	Future
Line C-01 Hesperia	10 Year Plan	$5,300,000	Future
Line D-01 Hesperia	10 Year Plan	$32,500,000	Future
Line E-01 Apple Valley	10 Year Plan	$36,300,000	Future
Lone Pine Canyon Road Culvert	TBD	$25,000,000	Future
National Trails Hwy Bridge	TBD	$40,000,000	Future
Old Waterman Canyon Rd Culvert	TBD	$2,500,000	Future
Pine View Dr. Storm Drain	TBD	$6,000,000	Future
Piute Wash	2021	$34,500,000	Future
Rimforest Drainage Project	10 Year Plan	$6,900,000	Future
Rock Springs Rd Bridge Replacement	TBD	$32,876,000	Future
Tussing Ranch-Juniper Basin	10 Year Plan	$6,500,000	Future
Yermo Rd/National Trails Hwy Bridge	TBD	$40,000,000	Future
	Totals:	$544,776,000	

B.7.3.1 2-509 Little Sand Creek

Creek improvements between Date Street and Del Lemon basin
Status: Proposed
Completion Date: 10-year plan
Local Priority: Medium
Total Cost: $10.5 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety; residential area with school nearby
Hazard Mitigated: Flooding and pedestrian hazards
Resources to Implement: Medium
Cost to Implement: High
Time to Implement: High

B.7.3.2 3-501 Mission Channel

Channel Repair, Construct concrete channel improvements
Status: Proposed
Completion Date: 10-year plan
Local Priority: Medium
Total Cost: $28.8 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety; residential area with school nearby
Hazard Mitigated: Flooding and pedestrian hazards
Resources to Implement: Medium

Cost to Implement: High
Time to Implement: High

B.7.3.3 3-601 Wilson Creek (from 10st Street to I-10)

Channel Repair, between 10st Street to I-10
Status: Proposed
Completion Date: 10-year plan
Local Priority: Medium
Total Cost: $38.8 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety; residential area with school nearby
Hazard Mitigated: Flooding and pedestrian hazards
Resources to Implement: Medium
Cost to Implement: High
Time to Implement: High

B.7.3.4 CSDP -- Storm Drain Project – Colton

Construction of storm drains from Randall Basin to the Santa Ana River according to Comprehensive Storm Drain Plan (CSDP) 3-5 and 3-8
Status: Proposed
Completion Date: On 10-year plan
Local Priority: Medium
Total Cost: $18.5 million
Funding Description: San Bernardino County Flood Control Property Taxes
Hazard Mitigated: Existing channel is interim and undersized
Resources to Implement: Medium
Cost to Implement: High
Time to Implement: High

B.7.3.5 Extension of Victorville Line E-01

Construct Storm Drain line E-01
Status: In preliminary design process
Completion Date: On 10-year plan
Local Priority: High
Total Cost: $2.0 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Victorville
Project Selected for: Public safety of commercial area
Hazard Mitigated: local flooding; road closure/road damage (State Hwy)
Resources to Implement: High
Cost to Implement: High
Time to Implement: Low

B.7.3.6 FO1284 Donnell Basin (Phase I&II)

Construct detention basin.
Status: Proposed
Completion Date: 10-year plan
Local Priority: Medium
Total Cost: $7.2 million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: Public Safety; roadway protection; Safe Routes to School Program (SR2S)
Hazard Mitigated: Flood protection for homes, infrastructure, and pedestrians
Resources to Implement: Low

B.7.3.7 FO1582 Desert Knolls II

Construct flood control channel from Apple Valley Road to Tuscola Road
Status: Proposed
Completion Date: On 10-year plan
Local Priority: High
Total Cost: $19 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety/future development
Hazard Mitigated: Potential localized flooding due to increased development
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.3.8 FO1584 Desert Knolls

Construct channel improvements from the Mojave River to Phase I
Strategy: Construct concrete lined channel to provide for 100 year storm flows and debris flows.
Status: Proposed
Completion Date: Estimated FY 18/19
Local Priority: High
Total Cost: $11.7 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Environmental requirements
Hazard Mitigated: This project is the mitigation aspect of Phase II
Resources to Implement: Low
Cost to Implement: High
Time to Implement: Medium

B.7.3.9 FO1609 Ranchero Basin

Construct detention basin
Status: Proposed

Completion Date: 10-year plan
Local Priority: High
Total Cost: $32.5 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety and reduction of peak Q
Hazard Mitigated: Potential damage to bridges and roads downstream due to high flows
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.3.10 F02225 Del Rosa

Channel Repair, Construct concrete channel improvements between Pacific Street and Del Rosa Avenue
Status: Proposed
Completion Date: 10-year plan
Local Priority: Medium
Total Cost: $33.1 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety; residential area with school nearby
Hazard Mitigated: Flooding and pedestrian hazards
Resources to Implement: Medium
Cost to Implement: High
Time to Implement: High

B.7.3.11 F02475 Seneca Basin

Construct detention basin
Status: Proposed
Completion Date: 10-year plan
Local Priority: High
Total Cost: $9 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety and reduction of peak Q
Hazard Mitigated: Potential damage to bridges and roads downstream due to high flows
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.3.12 F02476 Oak Hills Basin

Construct detention basin
Status: Proposed
Completion Date: 10-year plan
Local Priority: High
Total Cost: $32.3 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety and reduction of peak Q
Hazard Mitigated: Potential damage to bridges and roads downstream due to high flows
Resources to Implement: Low

Cost to Implement: High
Time to Implement: High

B.7.3.13 H1458 Arrowbear Dr. Bridge Replacement

Replacement of bridge crossing on Arrowbear Drive and increase spillway flow capacity to prevent flooding
Status: Proposed
Completion Date: 2021
Total Cost: $3,000,000.00
Funding Description: Major Local Highway Project Funds
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.14 Institution Road

Construction of bridge crossing along Institution Road on Cajon Wash
Status: Proposed
Completion Date: 2021
Total Cost: $30,000,000.00
Funding Description: seeking grant funding
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.15 Line C-01 Hesperia

Construction of concrete trapezoidal channel improvements, short reach of levee along the channel, 96 inch RCP and reconstruction of the existing deficient reach as a concrete trapezoidal channel with a portion of riprap channel
Status: Proposed
Completion Date: 10-year plan
Total Cost: $5.3 million
Funding Description: San Bernardino County flood Control
Project selected for: Public safety and roadway protection
Hazard Mitigated: Flooded roads and residential area
Resources to implement: High
Cost to implement: High
Time to implement: High

B.7.3.16 Line D-01 Hesperia

Improve the storm drain facility.
Status: Proposed
Completion Date: 10-year plan
Total Cost: $32.5 million
Funding Description: San Bernardino County flood Control
Project selected for: Public safety and roadway protection
Hazard Mitigated: Flooded roads and residential area
Resources to implement: High
Cost to implement: High

Time to implement: High

B.7.3.17 Line E-01 Apple Valley

Improve the storm drain facility.
Status: Proposed
Completion Date: 10-year plan
Total Cost: $36.3 million
Funding Description: San Bernardino County flood Control
Project selected for: Public safety and roadway protection
Hazard Mitigated: Flooded roads and residential area
Resources to implement: High
Cost to implement: High
Time to implement: High

B.7.3.18 Lone Pine Canyon Road Culvert

Construction of Culvert on Long Pine Canyon Road
Status: Proposed
Completion Date: No date until funding is available
Total Cost: $2,500,000.00
Funding Description: TBD
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.19 National Trails Highway Bridge Replacement

Removal of approximately 31 old timber bridges and construction of replacement bridges spanning Under 20' on National Trails Highway
Status: Preliminary engineering and environmental study only
Completion Date: No date until funding is available
Total Cost: $40,000,000.00
Funding Description: TBD
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.20 Old Waterman Canyon Road Culvert

Removal of approximately 31 old timber bridges and construction of replacement bridges spanning less than 20' on National Trails Highway
Status: Preliminary engineering and environmental study only
Completion Date: No date until funding is available
Total Cost: $2,500,000.00
Funding Description:
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.21 Pine View Dr. Storm Drain

Construction of storm drain on Pine View Drive
Status: Proposed
Completion Date: Shelf ready but no date until funding is available
Total Cost: $6,000,000.00
Funding Description: TBD
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.22 Piute Wash

Construction of bridge crossing along Needles highway road on Piute washes to prevent flooding and washing the road out.
Status: Proposed
Completion Date: 2021
Total Cost: $34,500,000
Funding Description: seeking grant funding
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.23 Rimforest Drainage Project – Rimforest Area

Capture the surface water within Rimforest and convey it to Little Bear Creek, away from the escarpment.
Status: In preliminary design process
Completion Date: On 10-year plan
Local Priority: High
Total Cost: $6.9 million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: Public safety of commercial area
Hazard Mitigated: Public safety and reduction of peak Q
Resources to Implement: High
Cost to Implement: High
Time to Implement: Low

B.7.3.24 Rock Springs Road Bridge Replacement

Construct Replacement Bridge on Glen Helen Parkway over Cajon Wash It will increase flow capacity with a longer span and reduce flooding of the roadway.
Status: Proposed
Completion Date: No date until full funding is available
Total Cost: $32,876,000
Funding Description: Partially funded with General Fund Money
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.25 Tussing Ranch – Juniper Basin

Construct detention basin
Status: Proposed
Completion Date: 10-year plan
Local Priority: High
Total Cost: $6.5 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety and reduction of peak Q
Hazard Mitigated: Potential damage to bridges and roads downstream due to high flows
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.3.26 Yermo Road and National Trails Highway Bridge Replacement

Removal of approximately 11 old timber bridges and construction of replacement bridges spanning under 20' on National Trails Highway and Yermo Road. The military is using high load tractors and trailers warranting the need to increase the load capacity of the bridges.
Status: Preliminary engineering and environmental study only
Completion Date: No date until funding is available
Total Cost: $40,000,000.00
Funding Description: TBD
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

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Annex C. Special Districts Department

C.1 Introduction

Special Districts Department, under the direction of the San Bernardino County Board of Supervisors, provides administrative oversight and manages the operation of over 100 special districts throughout San Bernardino County. Through the formation of County Service Areas (CSAs) and Improvement Zones, these special districts provide a variety of municipal-type services to unincorporated areas of the county.

C.2 Special Districts Profile

Special District Functions:
The County Service Areas (CSAs) and Improvement Zones can provide one or all of the following services to meet the individual needs of communities, neighborhoods and new developments depending on needs and financial feasibility:

- Cemetery
- Dam Operation
- Detention Basin
- Engineering and Construction
- Landscaping
- Open Spaces
- Park and Recreation
- Public Financing
- Refuse
- Roads
- Streetlights
- Television Translator
- Water and Sanitation

Mission:
The Special Districts Department works to ensure safe, healthy, and enjoyable communities by providing customizable programs and municipal services for those who work, play and stay in San Bernardino County.

Vision:
To be recognized as the preeminent provider of customized municipal services focusing on improved quality of life for the residents and visitors of San Bernardino County.

C.3 Planning Process

As described above, the County Flood Control District followed the planning process detailed in Section 3 of the base plan. In addition to providing representation on the San Bernardino County Hazard Mitigation Planning Committee (HMPC), the District formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table C-9. Additional details on plan participation and District representatives are included in Appendix A.

Table C-9: Special District Hazard Mitigation Planning Team

Name	Title
Jeffrey Rigney	Director of Special Districts
Steve Samaras	Water and Sanitation Division Manager
Tim Millington	Engineering Division Manager,
Reese Troublefield	Operations Division Manager
Erin Opliger	Districts Services Coordinator

The Special Districts Department has attending the following planning meetings:

Meeting Date	Meeting Type	Attendees	Additional Details
6/23/16	LHMP Update - Kickoff Meeting	Steve Samaras, Erin Opliger	
8/30/16	LHMP Group Meeting	Erin Opliger	
10/26/16	LHMP Blue Jeans Meeting	Erin Opliger	

The County of San Bernardino Special Districts Department (Department) has historically identified goals, objectives, and projects to mitigate the negative effects of hazards. The Department continues to work with various Advisory Commissions and the public to identify and mitigate the impacts of hazards to the various services that the Department provides, including: cemetery operations, dam operations, detention basin operations, landscaping services, open space, parks and recreation, refuse services, roads, streetlights, television translator, water distribution and treatment system operations, sewer collection system operations, and wastewater treatment plant operations.

The Department diligently identifies the hazards that each service district or County Service Area (CSA) and its zones face, and has assessed the vulnerability according to the potential event. Hazards, whether they are technological or natural, affect CSAs with varying frequency and can cause injury, impose monetary losses, and the disruption of services, affecting the Department's mission as a public agency service provider. Losses can be substantially reduced or eliminated through comprehensive pre- disaster planning and mitigation actions.

Many groups and individuals have contributed to the Department's planning for Disasters and the necessary hazard mitigation efforts. Advisory Committees, located in the Department's various CSAs, provide on-going input and support for the various aspects of hazard mitigation, including identifying persistent hazards that develop after storm events and options for mitigation.

Department staff participates in the hazard mitigation process by completing semi-annual audits of various CSAs, recommending temporary fixes and/or permanent solutions. CSA customers and the public have also participated in hazard mitigation planning by approaching staff in the field, contacting the office, and/or attending public meetings to identify temporary and ongoing hazards that need to be addressed. These resources have proved valuable to the Department in identifying and mitigating potential hazards. The Department also uses the following process to prepare hazard mitigation plans:

- Identify and prioritize disaster events that are most probable and destructive;
- Identify critical facilities;
- Identify areas within communities that are most vulnerable;
- Develop goals and objectives for reducing the effects of a disaster event;
- Develop specific projects to be implemented for each goal;
- Identify funding sources;
- Develop procedures for monitoring progress;
- Mitigate identified potential hazards.

The Department has identified areas for mitigation projects within the Special Districts of San Bernardino County as a result of their internal planning processes. These projects, shown below, are organized by type of special district these proposed projects are in the conceptual stage and detailed planning will be done in the future as funding becomes available. Prioritization of projects will be done in the planning stages, based on the risk prioritizations developed for the current Multi-Jurisdictional Hazard Mitigation Plan.

C.4 Hazard Identification and Prioritization

The Special Districts Planning Team participated in the County hazard identification and prioritization process described in the base plan. The Special Districts Planning Team assisted to summarize the extent, probability of future occurrences, potential magnitude/severity, and significance specific to the Special Districts (See Section 4).

C.5 Coordination with County Planning Efforts

Coordination with other County planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the Special Districts integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Specifically, the District incorporated into or implemented the 2011 MJHMP through other plans and programs shown below.

C.5.1 3.2 Water Systems (Distribution Systems):

Fire:

- Rockscape or paved property grounds which have structures located in wilderness and or areas prone to wildfires. Double the width of external fire breaks.
- Re-roof buildings and structures with tile, metal or fire resistant material.

Flood:

- Add drainage, elevate facilities and adjust sloping for facilities in low-lying areas and in natural waterways or floodplains. (Recent Completion)
- Conduct hydrologic and hydraulic studies for all facilities located near flood plains/natural waterways.
- Encase water pipelines with specific sized rock, gravel, and road base in natural waterways to prevent continual washout or exposure during heavy storm events/floods.

Earthquake:

- Retrofit structures to higher seismic standards.
- Purchase portable containers (Conex containers) to stage emergency supplies and equipment for the first responders (i.e. water, food, small off road vehicles, fuel, cots, toiletries, communication devices, blankets, wet weather gear, etc.) at strategic water system locations throughout County of San Bernardino. Conex containers can be relocated if necessary to assist field staff during a disaster to maintain the operations of water systems. (Recent Completion and in implementation phase)

General Hazard (Fire/Flood/Earthquake):

- Retrofit existing buildings and facilities with connectors/ATS for emergency generators and/or install permanent emergency generators at critical facilities, including wells and booster station locations.
- Develop a plan for speeding the repair of and functional restoration of water and wastewater systems through stockpiling of shoring materials, temporary pumps, surface pipelines, portable hydrants, and other supplies.
- Develop a plan for areas subject to high ground shaking, earthquake-induced ground failure, and surface fault rupture to determine a replacement schedule for pipelines (along with importance, age, type of construction material, size, condition, and maintenance or repair history).(Project now in effect)
- Develop a plan for short-term and intermediate-term sheltering of employees.
- Develop a plan to work with local agencies that handle hazardous materials to coordinate mitigation efforts for the possible release of these materials due to a natural disaster such as an earthquake, flood, fire, or landslide.

- Utilization of SCADA and Smart Water Meters to get real time data on problems with the system and reduce drive time emissions as a result of traditional meter reading.
- Provide emergency supplies of food, water, and portable generators for employees at office and field locations.
- Install emergency generators at district facilities

C.5.2 3.3 Sewer Systems (Collection Systems):

Fire:

- Rockscape or pave property grounds which have structures located in wilderness and or areas prone to wildfires. Double the width of external fire breaks.(Completion and program implementation by January 2017 estimated)
- Re-roof buildings and structures with tile or fire resistant material.

Flood:

- Add drainage, elevate facilities and adjust sloping for facilities in low-lying areas and in natural waterways or floodplains.
- Encase sewer pipelines with specific sized rock, gravel, and road base in natural waterways to prevent continual washout or exposure during heavy storm events/floods.

Earthquake:

- Develop a plan for short-term and intermediate-term sheltering of employees.
- Retrofit structures to higher seismic standards.

General Hazard (Fire/Flood/Earthquake):

- Retrofit existing buildings and facilities with connectors/ATS for emergency generators and/or install permanent emergency generators.

- Develop a plan for speeding the repair and functional restoration of water and wastewater systems through stockpiling of shoring materials, temporary pumps, surface pipelines, portable hydrants, and other supplies.
- Develop a plan for areas subject to high ground shaking, earthquake-induced ground failure, and surface fault rupture to determine a replacement schedule for pipelines (along with importance, age, type of construction material, size, condition, and maintenance or repair history).
- Install emergency power generators at district facilities.

C.5.3 3.4 Wastewater Treatment Plant

Fire:

- Rockscape or pave property grounds which have structures located in wilderness and or areas prone to wildfires. Double the width of external fire breaks.
- Purchase and store water pumps capable of suppressing fire.

Flood

- Add drainage, elevate facilities and adjust sloping for facilities in low-lying areas and in natural waterways or floodplains.

Earthquake:

- Develop a plan for short-term and intermediate-term sheltering of employees.

C.5.4 3.5 Roads

Fire:

- Install generators at all road facilities. This will allow uninterrupted communications and provide power to refuel critical emergency response equipment.
- Purchase emergency water supply or water purification devices to ensure uninterrupted supply of water to emergency response personal.(completed with continuous fresh of supplies and rotation)
- Clear vegetation from Road District facilities/yards

Flood:

- Upgrade culverts in all flood prone areas. Most existing culvert sizes were never designed for high water volume. Upgrading will prevent roadway washouts caused by water bypassing existing culverts.(Complete and continuous maintenance)
- Upgrade culvert sizes in Main Channels and replace old culverts in Main Channels as required.(complete and continuous maintenance)
- Slope stabilization at water crossing areas along roadways. This will prevent the loss of the roadways at these areas by preventing undermining by the water.
- Install generators at all road facilities. This will allow uninterrupted communications and provide power to refuel critical emergency response equipment.
- Purchase emergency water supply or water purification devices to ensure uninterrupted supply of water to emergency response personal.
- Soil stabilization on roadway shoulders. This will prevent erosion caused by flood conditions.

- Soil stabilization of dirt roadways. This will help mitigate the loss of material from the roadway during flooding conditions.
- Employ on call contractors to assist in emergency situations.

Earthquake:
Install generators at all road facilities. This will allow uninterrupted communications and provide power to refuel critical emergency response equipment.
Purchase emergency water supply or water purification devices to ensure uninterrupted supply of water to emergency response personal. (Completed and refresh of supplies as needed)

C.5.5 3.6 Television Translator Districts

General Hazard (Fire, Flooding, Earthquake):

- Install and maintain emergency generators at all TV Translator sites. Newberry Springs, Lucerne Valley, and Morongo Valley TV Transmitter sites are in need emergency generators. Pinto and Elephant Mountain sites have existing generators. Installing emergency generators at these sites will enable emergency information to be disseminated to the residents living in these remote locations.(Complete and maintenance of upgrades)
- Establish a centralized communications network to monitor channel output for TV Districts and provide emergency information by way of character generator tied to channel transmissions.
- Conduct annual tower and guide wire inspections to mitigate storm/wind/earthquake hazards from knocking out communications.
- Install poly insulators on power poles with high voltage power lines for Pinto Mountain. Establish an open purchase order for a High Voltage Electrician to provide annual inspections of power poles and service lines.(Completed and continuous maintenance)
- Maintain roadways on mountaintops and within washes leading to remote tower sites. Earthquakes and flash floods can block roadways, making them impassable to restore emergency communications.
- Maintain lights on all tower locations.

C.5.6 3.7 Parks Districts

- Trim large trees in parks to avert limb breakage and toppling during storm events.
- Establish emergency centers to ration drinking water at various County Park Community Centers.
- Establish community garden plots in designated County Park areas as an ongoing and emergency food source, including planting fruit bearing trees.
- Conduct an inventory or list of County Park Facilities and Community Centers to establish a list of pre-designated emergency operations or disaster relief sites. Not all Community

Centers are an appropriate size to accommodate large numbers of evacuees and may only serve as command and control centers or distribution centers.

- Establish small solar energy fields or other forms of renewable power at County Community Centers to facilitate stand-alone emergency operations for the community.
- Conduct repair and replacement of old roofs, and clearing of gutters and roof drains to minimize potential damage from major storm events.(Completed and continuous maintenance)
- Conduct an evaluation or study of County Park and Community Center facilities to install curbs, retaining walls, and drains to carry or divert water away from buildings.
- Connect water systems to generators to ensure delivery even in disaster situations.
- Provide emergency supply of food and water for employees in disaster situations.

C.6 Special Districts Mitigation Project Prioritizing

Cost effectiveness of each measure was a primary consideration when developing mitigation actions. Because mitigation is an investment to reduce future damages, it is important to select measures for which the reduced damages over the life of the measure are likely to be greater than the project cost. For structural projects, the level of cost effectiveness is primarily based on the likelihood of damages occurring in the future, the severity of the damages when they occur, and the level of effectiveness of the selected measure. While detailed analysis was not conducted during the mitigation action development process, these factors were of primary concern when selecting measures. For measures that do not result in a quantifiable reduction of damages, such as public education and outreach, the relationship of the probable future benefits and the cost of each measure was considered when developing the mitigation actions.

Based upon the Special Districts capabilities, Table C-10 shows primary actions selected for further implementation and development during the next planning cycle. Table C-10 provides details for each mitigation action with mitigation action descriptions, FEMA mitigation category, responsible party, and timeframe.

C.7 Special Districts Mitigation Actions

Table C-10: Mitigation Project Prioritization and Implementation

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
All-Hazard	**AH Action 2.1:** Continue funding and support for Special Districts Projects relating to all hazards.	Continue funding and support for Special Districts Projects relating to water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District for all hazards. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	
All-Hazard	**AH Action 2.2:** Install Generators at Critical Facilities	Retrofit existing buildings and facilities with connectors/ ATS for emergency generators and/or install permanent emergency generators at critical facilities, including wells and booster station locations.	ES, SP	TBD	Water Systems	TBD	Critical sites are already set up for connection or has a permanently installed generator
All-Hazard	**AH Action 2.3:** Water Systems Repair Plan	Develop a plan for speeding the repair of and functional restoration of water and wastewater systems through stockpiling of shoring materials, temporary pumps, surface pipelines, portable hydrants, and other supplies.	PRV	SDD WAS	Water Systems	TBD	We have a warehouse and inventory. Add'l inventory would need to be purchased from local wholesaler
All-Hazard	**AH Action 2.4:** Smart Water Meters and SCADA	Utilization of SCADA and Smart Water Meters to get real time data on problems with the system and reduce drive time emissions as a result of traditional meter reading.	PRV	Individual CSAs	Water Systems	Ongoing	Both SCADA and Smart Meters have been installed and continue to be installed
All-Hazard	**AH Action 2.5:** Provide Employees with Emergency Supplies	Provide emergency supplies of food, water, and portable generators for employees at office and field locations.	ES	SDD/WAS	Water Systems	Ongoing	WAS has a stock of emergency food supplies, water, and generators.
All-Hazard	**AH Action 2.6:** Annual Tower and Guide Wire Inspections	Conduct annual tower and guide wire inspections to mitigate storm/wind/earthquake hazards from knocking out communications.	PRV	TBD	TV Districts	7/1/2016-7/1/2017	All Districts
All-Hazard	**AH Action 2.7**: Maintain Tower Lighting	Maintain lights on all tower locations.	SP	TBD	TV Districts	June-17	
All-Hazard	**AH Action 2.8:** Designate Emergency Operations Sites	Conduct an inventory or list of County Park Facilities and Community Centers to establish a list of pre-designated emergency operations or disaster relief sites. Not all Community Centers are an appropriate size to accommodate large numbers of evacuees and may only serve as command and control centers or distribution centers.	PRV	TBD	Park Districts	April-17	All Districts
All-Hazard	**AH Action 2.9:** Establish Power Sources for Emergency Operations Sites	Establish small solar energy fields or other forms of renewable power at County Community Centers to facilitate stand-alone emergency operations for the community.	PRV, SP	TBD	Park Districts	12/1/2016-7/1/2018	Lucerne Valley Joshua Tree
All-Hazard	**AH Action 2.10:** Connect Water Systems to Generators	Connect water systems to generators to ensure delivery even in disaster situations.	PRV, SP	TBD	Park Districts	TBD	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
All-Hazard	**AH Action 2.11:** Establish a Centralized Communications Network	Establish a centralized communications network to monitor channel output for TV Districts and provide emergency information by way of character generator tied to channel transmissions.	PRV	TBD	TV Districts	7/1/2017-12/1/2017	All districts
Wildfire	**WF Action 3.3:** Vegetation Removal	Clear vegetation from Road District facilities/yards	PRV	TBD	Roads	TBD	
Wildfire	**WF Action 6.3:** Protect Property in Wilderness Areas	Rockscape or pave property grounds which have structures located in wilderness and or areas prone to wildfires. Double the width of external fire breaks.	PPRO, PRV, SP	TBD	Sewer Systems	January-17	All sewer pump stations have paving
Wildfire	**WF Action 8.3:** Structural Fire Breaks Widening	Double the width of external fire breaks on grounds which have structures located in wilderness and or areas prone to wildfires.	SP, PRV	Individual CSAs	Water Systems	7/1/2017-7/19/2019	
Wildfire	**WF Action 9.1:** Continue funding and support for Special Districts Projects relating to wildfire.	Continue funding and support for Special Districts Projects relating to wildfire in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	
Wildfire	**WF Action 9.2:** Emergency Water Supplies	Purchase emergency water supply or water purification devices to ensure uninterrupted supply of water to emergency response personal.(completed with continuous fresh of supplies and rotation)	ES	TBD	Roads	TBD	
Earthquake	**EQ Action 2.2:** Seismic Strapping	Seismic strapping for existing water tanks and future construction.	SP, PRV	CSA 64	Water Systems	7/17/2017- 7/1/2019	Ongoing currently
Earthquake	**EQ Action 2.3:** Employee Emergency Sheltering	Develop a plan for short-term and intermediate-term sheltering of employees.	PRV	WAS	Sewer Systems	7/17/2017-7/19/2019	To purchase cots, small portable generators, tents, etc.
Earthquake	**EQ Action 4.2:** Generator Installation	Install generators at all road facilities. This will allow uninterrupted communications and provide power to refuel critical emergency response equipment.	SP, PPRO	TBD	Roads	TBD	
Earthquake	**EQ Action 6.1:** Continue funding and support for Special Districts Projects relating to earthquake hazards.	Continue funding and support for Special Districts Projects relating to earthquake hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	
Flood	**FL Action 3.4:** Soil Stabilization on Roadways and Along Roadway Shoulders	Soil stabilization on roadway shoulders and dirt roads. This will prevent erosion caused by flood conditions.	SP, PRV	TBD	Roads	TBD	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Flood	**FL Action 3.5:** Encasing Pipelines	Encase water pipelines with specific sized rock, gravel, and road base in natural waterways to prevent continual washout or exposure during heavy storm events/floods.	SP, PRV	CSA 70 J	Water Systems	7/17/2017-7/1/2027	
Flood	**FL Action 6.1:** Continue funding and support for Special Districts Projects relating to flood hazards.	Continue funding and support for Special Districts Projects relating to flood hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	
Flood	**FL Action 6.2:** On Call Contractors	Employ on call contractors to assist in emergency situations.	PRV, ES	TBD	Roads	TBD	
Drought	**DR Action 3.1:** Continue funding and support for Special Districts Projects relating to drought hazards.	Continue funding and support for Special Districts Projects relating to drought hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	
Anti-Terrorism	**AT Action 2.1:** Continue funding and support for Special Districts Projects relating to terrorism hazards.	Continue funding and support for Special Districts Projects relating to terrorism hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	
Climate Change	**CC Action 3.1:** Continue funding and support for Special Districts Projects relating to climate change hazards.	Continue funding and support for Special Districts Projects relating to climate change hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	

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APPENDIX M

WATER RATES STRUCTURE

SCHEDULE NO. 1

RESIDENTIAL GENERAL METERED SERVICE

APPLICABILITY

Applicable to residential metered water service.

TERRITORY

Town of Apple Valley and vicinity, San Bernardino County.

RATES

Quantity Rates:

Tier 1 First 11 100 cu. ft	$ 3.914	(I)
Tier 2 Over 11 through 22 100 cu. ft.	$ 4.532	|
Tier 3 All over 22 100 cu ft.	$ 5.150	(I)

Service Charge:	Per Meter Per Month	
For 5/8 x ¾-inch meter	$ 22.50	(I)
For ¾-inch meter	33.75	|
For 1-inch meter	56.25	|
For 1 ½-inch meter	112.50	|
For 2-inch meter	180.00	|
For 3-inch meter	337.50	|
For 4-inch meter	562.50	|
For 6-inch meter	1,125.00	|
For 8-inch meter	1,800.00	|
For 10-inch meter	3,262.50	(I)

This Service Charge is a readiness-to-serve charge which is applicable to all metered services and to which is to be added the monthly charge computed at the Quantity Rates.

SPECIAL CONDITIONS

1. A late charge will be imposed per Schedule No. LC.
2. In accordance with Section 2714 of the Public Utilities Code, if a tenant in a rental unit leaves owing the Company, service to subsequent tenants in that unit will, at the Company's option, be furnished on the account of the landlord or property owner.
3. All bills are subject to the reimbursement fee set forth on Schedule No. UF.

(Continued)

SCHEDULE NO. 1

RESIDENTIAL GENERAL METERED SERVICE

(Continued)

(D)

14. As authorized by the California Public Utilities Commission, an amount of $0.156 per Ccf is to be added to the quantity rate for a period of 17 months, beginning on the effective date of Advice Letter 228-W. This surcharge will recover the under-collection in the WRAM and MCBA as of December 31, 2017.

15. As authorized by the California Public Utilities Commission, a one-time surcredit is to be added to the Customer's bill beginning on the effective date of Advice Letter 234-W-A. This surcredit is to refund the over collection in the WRAM and MCBA as of December 31, 2018. **(N)**

The table below shows the surcredits for each meter size.

Meter Size	One-Time Surcredit
5/8"	$ 21.76
¾"	$ 32.64
1"	$ 54.40
1 ½"	$ 108.80
2"	$ 174.08
3"	$ 326.40
4"	$ 544.00
6"	$1,088.00
8"	$1,740.80
10"	$3,155.20

(N)

SCHEDULE NO. 2

GRAVITY IRRIGATION SERVICE

APPLICABILITY

Applicable to all water service from the Company's gravity irrigation system.

TERRITORY

Within the entire service areas of the Company.

RATES

Quantity Rates:

All water delivered per 100 cu. ft. ……..$ 0.323

Service Charge:

	Per Meter Per Month	
For 5/8 x ¾-inch meter……	$ 22.50	(I)
For ¾-inch meter……..	33.75	
For 1-inch meter…….....	56.25	
For 1 ½-inch meter…….	112.50	
For 2-inch meter…….	180.00	
For 3-inch meter…….	337.50	
For 4-inch meter…….	562.50	
For 6-inch meter……..….	1,125.00	
For 8-inch meter……..	1,800.00	
For 10-inch meter……	3,262.50	(I)

SPECIAL CONDITIONS

1. Service under this schedule is limited to lands not developed for residential use.
2. All outlets for this water shall be protected by signs stating: NON-POTABLE WATER-NOT FOR HUMAN CONSUMPTION.
3. A late charge will be imposed per Schedule LC.
4. All bills are subject to the Public Utilities Commission Reimbursement Fee set forth on Schedule No. UF.

(Continued)

SCHEDULE NO. 2

GRAVITY IRRIGATION SERVICE
(Continued)

D

8. As authorized by the California Public Utilities Commission, an amount of $0.009 per Ccf is to be added to the quantity rate for a period of 21.5 months, beginning on the effective date of Advice Letter 216-W-A. This surcharge will recover the under collection in the Interim Rates Memorandum Account as of November 23, 2015. (D)

D

SCHEDULE NO. 3

NON-RESIDENTIAL GENERAL METERED SERVICE

APPLICABILITY

Applicable to all non-residential metered water service.

TERRITORY

Town of Apple Valley and vicinity, San Bernardino County.

RATES

Quantity Rates:

All water delivered per 100 cu. ft. .....$ 4.208 **(I)**

Service Charge:

	Per Meter Per Month	
For 5/8 x ¾-inch meter	$ 22.50	**(I)**
For ¾-inch meter	33.75	
For 1-inch meter	56.25	
For 1 ½-inch meter	112.50	
For 2-inch meter	180.00	
For 3-inch meter	337.50	
For 4-inch meter	562.50	
For 6-inch meter	1,125.00	
For 8-inch meter	1,800.00	
For 10-inch meter	3,262.50	**(I)**

SPECIAL CONDITIONS

1. A late charge will be imposed per Schedule No. LC.
2. In accordance with Section 2714 of the Public Utilities Code, if a tenant in a rental unit leaves owing the Company, service to subsequent tenants in that unit will, at the Company's option, be furnished on the account of the landlord or property owner.
3. All bills are subject to the reimbursement fee set forth on Schedule No. UF.

(Continued)

SCHEDULE NO. 3

NON-RESIDENTIAL GENERAL METERED SERVICE
(continued)

(D)

14. As authorized by the California Public Utilities Commission, an amount of $0.156 per CcF is to be added to the quantity rate for a period of 17 months, beginning on the effective date of Advice Letter 228-W. This surcharge will recover the under-collection in the WRAM and MCBA as of December 31, 2017.

15. As authorized by the California Public Utilities Commission, a one-time surcredit is to be added to the Customer's bill beginning on the effective date of Advice Letter 234-W-A. This surcredit is to refund the over collection in the WRAM and MCBA as of December 31, 2018. **(N)**

The table below shows the surcredits for each meter size.

Meter Size	One-Time Surcredit
5/8"	$ 21.76
¾"	$ 32.64
1"	$ 54.40
1 ½"	$ 108.80
2"	$ 174.08
3"	$ 326.40
4"	$ 544.00
6"	$1,088.00
8"	$1,740.80
10"	$3,155.20

(N)

SCHEDULE NO. 4

NON-METERED FIRE SERVICE

APPLICABILITY

Applicable only for water service to privately-owned fire-hydrant and fire-sprinkler systems where water is to be used only for the purpose of fire suppression or for periodic system testing.

TERRITORY

Town of Apple Valley and vicinity, and Town of Yermo and vicinity, San Bernardino County, California.

RATES

Size of Service:

	Per Service Per Month	
2-inch	$ 46.91	(I)
3-inch	70.40	
4-inch	93.73	
6-inch	140.34	
8-inch	187.25	
10-inch	226.03	
12-inch	263.95	(I)

SPECIAL CONDITIONS

1. The fire protection service connection shall be installed by the utility with the cost paid by the applicant. Such payment shall not be subject to refund.
2. The minimum diameter for fire protection service shall be two (2) inches, and the maximum diameter shall be not more than the diameter of the main to which the service is connected.
3. If a distribution main of adequate size to serve a private fire protection system in addition to all other normal service does not exist in the street or alley adjacent to the premises to be served, then a service main from the nearest main of adequate capacity shall be installed by the utility and the cost paid by the applicant. Such payment shall not be subject to refund.
4. Service hereunder is for private fire systems which are regularly inspected by the local fire protection agency having jurisdiction and to which no connection for other than fire suppression purposes shall be made. Service shall be installed according to specifications of the utility and shall be maintained to the satisfaction of the utility. The utility will install the detector meter listed by the Underwriters Laboratories, Inc. or other device to indicate unauthorized use, leakage, or waste of water. The cost of such installation and the cost of the meter or other device shall be paid by the applicant.
5. The utility undertakes to supply only such water at such pressure as may be available at any time through the normal operation of its system.

(Continued)

SCHEDULE NO. 4

NON-METERED FIRE SERVICE
(Continued)

6. Any unauthorized use of water, other than for fire extinguishing purposes shall be charged for at the regular established rate as set forth under Schedule No. 3, Non-Residential General Metered Service, and/or may be the grounds for the immediate disconnection of the service without liability to the Company.

7. A late charge will be imposed per Schedule No. LC.

8. All bills subject to the reimbursement fee set forth on Schedule No. UF.

D

12. As authorized by the California Public Utilities Commission, an amount of $9.16 per month Is to be added to the service charge for a period of 21.5 months, beginning on the effective Date of Advice Letter 216-W-A. This surcharge will recover the under-collection in the Interim Rates Memorandum Account as of November 23,2015. (D)

D

APPENDIX N

RESOLUTION ADOPTING 2020 UWMP AND WSCP

UNANIMOUS WRITTEN CONSENT OF THE BOARD OF DIRECTORS OF LIBERTY UTILITIES (APPLE VALLEY RANCHOS WATER) CORP.

June 24, 2021

2020 URBAN WATER MANAGEMENT PLAN AND WATER SHORTAGE CONTINGENCY PLAN

The undersigned members of the Board of Directors ("Board") of Liberty Utilities (Apple Valley Ranchos Water) Corp. (the "Corporation"), a corporation existing under the laws of the state of California, acting pursuant to the California Corporations Code, hereby waives any and all formalities of notice, time, date, place and purpose of meeting and consents to and adopts the following resolutions and declares them to be in full force and effect as if they were adopted at a meeting duly held on the date first written above:

WHEREAS, the California Urban Water Management Planning Act, Water Code sections 10610 through 10650 (the "Act"), mandates that each urban water supplier that provides water for municipal purposes to more than 3,000 customers or delivers more than 3,000 acre feet of water annually must prepare and adopt an updated Urban Water Management Plan ("UWMP") at least once every five years;

WHEREAS, pursuant to Water Code Section 10632.3, Liberty Utilities (Apple Valley Ranchos Water) Corp. is required to develop a Water Shortage Contingency Plan ("WSCP") which addresses water supply disruptions and/or water shortage conditions, and describes how the Corporation intends to manage and mitigate a water shortage;

WHEREAS, the Act specifies the requirements and procedures for adopting such UWMPs and WSCPs;

WHEREAS, Liberty Utilities (Apple Valley Ranchos Water) Corp. is an "urban retail water supplier" under the Act that provides potable municipal water to more than 3,000 end users;

WHEREAS, in accordance with applicable laws, including the requirements of the Act, the Corporation has prepared its 2020 UWMP and WSCP and has undertaken certain agency coordination, public notice, public involvement and outreach, public comment, and other procedures relating to the 2020 UWMP and WSCP;

WHEREAS, a public hearing was held on June 24, 2021 at 10:00 am via WEBEX, to, among other things, provide members of the public and other interested entities with the opportunity to be heard in connection with the proposed 2020 UWMP and WSCP; and

WHEREAS, it is desirable and in the best interest of the Corporation to adopt the 2020 UWMP and WSCP for submittal to the state of California as a true and accurate representation of the Corporation's water resources plan in accordance with the requirements of the Act.

NOW, THEREFORE, BE IT RESOLVED that the Corporation is hereby authorized to adopt and submit the 2020 UWMP and WSCP in the form attached hereto as Exhibit A, and the adoption and delivery of the 2020 UWMP and WSCP to the state of California on behalf of the Corporation by any two officers of the Corporation is hereby approved and authorized in all respects, such delivery to be conclusive evidence of such approval and authorization of the 2020 UWMP and WSCP.

FURTHER RESOLVED, that any two officers of the Corporation be, and each of them hereby is, authorized, empowered and directed, in the name and on behalf of the Corporation, to take or cause to be taken any and all actions necessary or appropriate to effectuate the foregoing resolutions and to otherwise carry out the purposes and intent of the foregoing resolutions, including, but not limited to, adoption and submittal of the 2020 UWMP and WSCP in the form substantially the same as attached hereto.

IN WITNESS WHEREOF, the undersigned, being all of the Directors of the Corporation, have executed this Statement of Unanimous Written Consent as of the date first written above.

LIBERTY UTILITIES (APPLE VALLEY RANCHOS WATER) CORP.

By: _____
Name: Arun Banskota
Title: Director

By: _____
Name: Brian Brady
Title: Director

By: _____
Name: Virginia Grebbien
Title: Director

By: _____
Name: Johnny Johnston
Title: Director

By: _____
Name: Brian Thomas
Title: Director

NOW, THEREFORE, BE IT RESOLVED that the Corporation is hereby authorized to adopt and submit the 2020 UWMP and WSCP in the form attached hereto as Exhibit A, and the adoption and delivery of the 2020 UWMP and WSCP to the state of California on behalf of the Corporation by any two officers of the Corporation is hereby approved and authorized in all respects, such delivery to be conclusive evidence of such approval and authorization of the 2020 UWMP and WSCP.

FURTHER RESOLVED, that any two officers of the Corporation be, and each of them hereby is, authorized, empowered and directed, in the name and on behalf of the Corporation, to take or cause to be taken any and all actions necessary or appropriate to effectuate the foregoing resolutions and to otherwise carry out the purposes and intent of the foregoing resolutions, including, but not limited to, adoption and submittal of the 2020 UWMP and WSCP in the form substantially the same as attached hereto.

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By: _____
Name: Brian Thomas
Title: Director